MARION COUNTY BOARD OF COMMISSIONERS

Board Session Agenda Review Form

Meeting date:	August 23, 2017				
Department:	Business Services	Agenda Planning Date:	8/17/2017	Time required:	15
☐ Audio/Visual aids	N/A				
Contact:	Colleen Coons-Chaffins	Phone:	(503) 373-4426		

Department Head Signature: Kelly D. Ilsford, Acting In Capacity.

TITLE	Marion County GMP Amendment to Contract for CM/GC contract with Emerick Construction for the Sheriff's Office Public Safety Building
Issue, Description & Background	In August 2016 the Marion County Business Services Department issued a request for proposals (RFP) for Construction Manager/General Contractor (CM/GC) services to support construction of a new Public Safety Building for the Marion County Sheriff's Office. The RFP resulted in a CM/GC contract being awarded to Emerick Construction Company on March 1, 2017. This Guaranteed Maximum Price (GMP) Amendment will establish the costs for construction for the project.
Financial Impacts:	This amendment will result in a contract value of $9,251,817 funded through CIP #16-073.
Impacts to Department & External Agencies	There is no forecasted impact to County departments outside of Business Services and the Sheriff's Office.
Options for Consideration:	Approve GMP Amendment Deny approval GMP Amendment Take no action at this time
Recommendation:	Business Services Staff recommends approval of the GMP Amendment
List of attachments:	GMP Amendment to the CM/GC Contract with Emerick Construction Company
Presenter:	Colleen Coons-Chaffin

Copies of completed paperwork sent to the following: (Include names and e-mail addresses.)

Copies to:	Jacob Clotfelter jclotfelter@co.marion.or.us

Marion County
OREGON
FINANCE DEPARTMENT

Contract Review Sheet

Contract #: BS-1112-17

Person Sending: **Tina Toney** Department: **Business Services**

Contact Phone #: **x4388** Date Sent: **Friday, August 11, 2017**

☑ Contract ☑ Amendment # **1** ☐ Lease ☐ IGA ☐ MOU ☐ Grant (attach approved grant award transmittal form)

Title: **Marion County GMP Amendment to Contract**

Contractor's Name: **Emerick Construction Company**

Term - Date From: **Aug 23, 2017** Expires: **Jul 28, 2017**

Contract Total: **$56,200.00** Amendment Amount: **$9,195,617.00** New Contract Total: **$9,251,817.00**

Source Selection Method: RFP (attach transmittal) # **C25102 CMGCSO-16**

Additional Considerations (check all that apply)

☐ Board Order# _____
☐ Incoming Funds
☐ Independent Contractor (LECS) approval date: _____
☐ Insurance Waiver (attach)
☑ CIP# **16-073** (required for all goods /software greater than $5,000)
☐ Feasibility Determination (attach approved form)
☐ Federal Funds (attach sub-recipient / contractor analysis)
☐ Reinstatement (attach written justification)
☐ Retroactive (attach written justification)

Description of Services or Grant Award:

Consideration for approval of the Guaranteed Maximum Price to construct the new Public Safety Building. A Construction Management General Contractor (CM/GC) contract was signed on March 1, 2017 which authorized the construction management portion of the contract. This amends the contract to add the construction cost of the building and locking in a fixed cost.

FOR FINANCE USE

Date Finance Received: BOC Planning Date: Date Legal Received:

Comments:

REQUIRED APPROVALS:

Finance - Contracts Date

Risk Manager Date

Legal Counsel Date

Chief Administrative Officer Date

Date _____ ☐ To be filed ☐ Added to master list

☐ Returned to _____ Department for _____ signatures

Marion County
OREGON
Board of Commissioners

(503) 588-5212
(503) 588-5237 - FAX

November 1, 2016

BOARD OF COMMISSIONERS
Samuel Brentano
Kevin Cameron
Janet Carlson

CHIEF ADMINISTRATIVE OFFICER
John Lattimer

RE: Request for Proposal # C25102-CMGCSO-16
CM/GC Services for Sheriff's Office P&P and CDO Buildings
Notice of Intent to Award

Dear Proposers:

Marion County is pleased to announce a Notice of Intent to Award for the above-referenced project to Emerick Construction Company.

If you wish to protest the County's Intent to Award, you must do so by 4:00 PM (Pacific Time) on Tuesday, November 8th, 2016. Late protests will not be considered.

The protest must comply with the terms of Marion County's Public Contracting Rules, Section 40-0450. Any protest not in compliance will not be considered by the County.

Protests must be directed by mail or courier to Marion County, Attn: Justin Ford, 555 Court St. NE, Ste. 4247, Salem, OR 97301.

Questions relating to the procurement process must be directed to Justin Ford, Marion County Contracts Compliance Analyst at 503-589-3280 or via email: jwford@co.marion.or.us

Thank you to all who submitted proposals.

11/1/16

Justin Ford
Marion County Finance Department

MARION COUNTY
GMP AMENDMENT TO CONTRACT

THIS AMENDMENT IS BETWEEN:

OWNER: **Marion County,**
a political subdivision of the State of Oregon

And

CONSTRUCTION MANAGER/
GENERAL CONTRACTOR ("the CM/GC"): **Emerick Construction Company**

The Project is: Sheriff's Office – Central District Office and Parole & Probation Building

Date of Original CM/GC Contract: March 1, 2017

Date of this Amendment: August 11 **, 2017**

Owner and the CM/GC hereby amend the Contract as set forth below. Capitalized terms used but not defined herein shall have the meanings given in the Contract Documents. Except as amended hereby, the Contract remains in full force and effect.

1. **GMP.** The parties agree that the GMP for the Project is $9,251,817.00, consisting of the Preconstruction Fee, the Estimated Cost of the Work and the CM/GC Fee (stated as a fixed dollar lump sum amount), as follows:

Preconstruction Fee:	$ **56,200.00**
Estimated Cost of Work ("ECOW):	$ **8,382,593.00**
CM/GC Fee (2.95% of ECOW):	**$ 233,362.00**
Construction Contingency (5% of ECOW)	**$ 437,887.00**
Bonds, Insurance (CCIP), Builder's Risk	**$ 141,775.00**
GMP (Total of above categories):	$ **9,251,817.00**

For purposes of determining the GMP, the ECOW includes the CM/GC's Contingency, the Fixed Cost for GC Work, and the costs of all components and systems required for a complete, fully functional facility.

2. **Basis of GMP.** The GMP is based on the GMP Supporting Documents attached as Attachments A-C (773 pages) including the Allowances, assumptions, exclusions, unit prices, and alternates designated therein.

3. **Plans and Specifications.** The Plans and Specifications for the Project are as listed in the GMP Supporting Documents. The CM/GC shall perform Construction Phase Services in accordance with the Plans and Specifications and the other Contract Documents.

4. **Substantial Completion Date.** Notwithstanding any provision in the GMP Supporting Documents to the contrary, the required date for Substantial Completion is: August 6, 2018

5. **Tax Compliance Certification.** The individual signing on behalf of the CM/GC hereby certifies and swears under penalty of perjury that s/he is authorized to act on behalf of the CM/GC, s/he has authority and knowledge regarding the CM/GC's payment of taxes, and to the best of her/his knowledge, the CM/GC is not in violation of any Oregon tax laws. For purposes of this certification, "Oregon tax laws" means a state tax imposed by ORS 401.792 to 401.816, ORS 320.005 to 320.150 and 403.200 to 403.250, and ORS chapters 118, 314, 316, 317, 318, 320, 321 and 323; the elderly rental assistance program under ORS 310.630 to 310.706, and local taxes administered by the Department of Revenue under ORS 305.620.

THIS AMENDMENT is executed in three original copies, of which one is to be delivered to the CM/GC and the remainder to Owner.

CM/GC:

Name of Firm: Emerick Construction Company

Address: 7855 SW Mohawk St.
Tualatin, OR 97062

CM/GC's Federal Tax I.D. #: 93-0451960

Construction Contractor's Board Registration No.: 10723

Larry Sitz
Signature of Authorized Representative of CM/GC
Title CEO
Date 08/11/2017

OWNER:

Marion County, a political subdivision of the State of Oregon

BOARD OF COMMISSIONERS

Chair Date

Commissioner Date

Commissioner Date

Authorized Signature: _____ 8/11/17
Department Director or designee Date

Reviewed by Signature: _____
Marion County Legal Counsel Date

Reviewed by Signature: _____
Marion County Contracts & Procurement Date

Attachment A Plans, Specifications, Supplementary Conditions of the Contract, on which the Guaranteed Maximum Price is based, Drawing pages G-000 through E6.01 dated 6/12/2017 and Specification pages 1-665 dated 6/12/2017.

Attachment B Completion schedule, pages 1 through 6.

Attachment C Alternate prices, pages 1 through 5

EMERICK
CONSTRUCTION CO

August 11, 2017

Eric Eckfield
Marion County
555 Court Street NE
Salem, OR 97301

Subject: Marion County Sheriff's Office

Dear Eric,

Emerick Construction is pleased to present you with the following proposal for the Marion County Sheriff's Office Public Safety Building for the base bid amount of Nine million, Two Hundred and Ten Thousand, Four Hundred and Seventy Seven Dollars ($9,195,617).

The price is based on the: Plans and specifications dated 6/12/2017, and Addendum 1 dated 7/14/2017 from Carlson Veit Architects PC..

Alternate Pricing as follows:

1 – Add canopy system at patio area	Add $ 88,460
2 – Add paving in East parking lot	Add $ 53,863
3 – Add canopy system at East parking lot	Add $ 174,433
4 – Add Temp roof system	Add $ 28,355

The project pricing is based on the attached 11 ½ month schedule.

We look forward to working with you on a mutually successful project. Please contact me if you should have any questions.

Sincerely,
Emerick Construction, Inc.

Matt Winkler
Project Manager

MARION COUNTY SHERIFF'S OFFICE - PSB
GMP Headsheet
Bid Date/Time: JULY 25TH @ 2:00 P.M.

ECCO Bid # 168

Section	Description	Sub Name	Labor HR	Labor $$$	Material $$$	Sub $$$	Total $$$
DIV 1	**GENERAL REQUIREMENTS**						
007200	General Conditions	ECCO				$ 430,000	$ 430,000
007200	General Requirements	ECCO				$ 329,603	$ 329,603
DIV 2	**SITE CONSTRUCTION**						
022113.15	Survey	Lazer Site Survey					$ 19,000
DIV 3	**CONCRETE**						
032000	Concrete Reinforcing - FOB	PRECISION REBAR				$ 14,465	$ 14,465
032001	Concrete Reinforcing - Install	SI CONTRACTING				$ 12,699	$ 12,699
033000	Cast-in-Place Concrete	ECCO SELF PERFORM				$ 392,000	$ 392,000
DIV 4	**MASONRY**						
042000	Unit Masonry	DAVIDSONS				$ 157,977	$ 157,977
DIV 5	**METALS**						
055000	Metal Fabrications	ATC		IN R CARP		$ 20,617	$ 20,617
055133	Metal Ladders	Okeeffe Ladders		$ 600	$ 3,165		$ 3,765
DIV 6	**WOOD & PLASTICS**						
061000	Rough Carpentry	DSL				$ 877,260	$ 877,260
062000	Finish Carpentry	LJ PEARSON				$ 10,160	$ 10,160
062000	Siding	DSL				$ 272,300	$ 272,300
064116	Plastic-Laminate-Clad Architectural Cabinets	OCE/ECCO INSTALL PLUG		$ 80,000			$ 80,000
066100	Solid Surface Fabrications	NATURAL STONE				$ 10,990	$ 10,990
DIV 7	**THERMAL & MOISTURE PROTECTION**						
071100	Dampproofing	NORTHWEST MASONRY				$ 35,420	$ 35,420
071900	Water Repellents	NORTHWEST MASONRY				$ 10,728	$ 10,728
075300	Elastomeric Membrane Roofing	COBRA				$ 386,773	$ 386,773
076000	Flashing and Sheet Metal	PORTLAND SHEET METAL				$ 92,950	$ 92,950
077200	Roof Accessories	SIMONIS		$ 800		$ 2,960	$ 3,760
079200	Joint Sealants	NORTHWEST MASONRY/ECCO PLUG				$ 2,214	$ 2,214
DIV 8	**DOORS & WINDOWS**						
081113	Hollow Metal Doors and Frames - SUPPLY	BELL HARDWARE				$ 202,080	$ 202,080
081113	INSTALL DOORS AND HARDWARE	GIBSON				$ 28,955	$ 28,955
083113	Access Doors and Frames	BY TRADES		$ 2,000			$ 2,000
088000	Glazing	SOUTHTOWN				$ 261,150	$ 261,150
DIV 9	**FINISHES**						
092900	Gypsum Board	HARVER				$ 663,175	$ 663,175
093013	Ceramic Tiling	PARAGON				$ 36,481	$ 36,481
096800	Carpeting	RUBENSTEINS				$ 109,301	$ 109,301
099000	Painting and Coating	BOLES				$ 79,046	$ 79,046
DIV 10	**SPECIALTIES**						
101116	Markerboards	OFCI		$ 1,200			$ 1,200
101400	Signage	ICON				$ 9,135	$ 9,135
102113	Toilet Compartments	BMS				$ 14,342	$ 14,342
102226	Operable Partitions	INTERIOR TECH				$ 32,060	$ 32,060
102813	Toilet Accessories	WH CRESS		$ 4,600		$ 2,552	$ 7,152
105113	Metal Lockers	OCE/SPACE SAVER				$ 17,904	$ 17,904
108000	Other Specialties	HUNTER/WH CRESS/FLTER/CONSTRUCTI		$ 4,800		$ 6,185	$ 10,985
DIV 12	**FURNISHINGS**						
122000	Window Treatments	CONTRACT DÉCOR				$ 5,800	$ 5,800
DIV 21	**FIRE SUPPRESSION**						
210000	Fire Suppression	HARVEY & PRICE				$ 148,287	$ 148,287
DIV 22 / 23	**MECHANICAL - Plumbing & HVAC**						
230000	HVAC / Plumbing	HYDROTEMP				$ 1,374,300	$ 1,374,300
DIV 26 / 27 / 28	**ELECTRICAL - Elect., Comm., Safety & Security**						
260000	ELECTRICAL - Elect., Comm., Safety & Security	NORTHSIDE ELECTRIC				$ 998,250	$ 998,250
DIV 31	**EARTHWORK**						
312000	Earth Moving	K&E				$ 772,926	$ 772,926
DIV 32	**EXTERIOR IMPROVEMENTS**						

MARION COUNTY SHERIFF'S OFFICE - PSB
GMP Headsheet
Bid Date/Time: JULY 25TH @ 2:00 P.M.

ECCO Bid # 168

Section	Description	Sub Name	Labor HR	Labor $$$	Material $$$	Sub $$$	Total $$$
321216	Asphalt Paving	KNIFE RIVER				$ 35,017	$ 35,017
321613	Concrete Curbs & Sidewalks	LARUSSO				$ 142,542	$ 142,542
321723	Pavement Markings	B&T STRIPING				$ 3,600	$ 3,600
323113	Chain Link Fences and Gates	WILLAMETTE				$ 46,920	$ 46,920
328000	Irrigation	EARTHTECH				$ 211,928	$ 211,928
	Unspecified Items - COLD FLUID APPLIED WATERPROOFING	NORTHWEST				$ 5,376	$ 5,376
		Totals	**0**	**$ 94,000**	**$ 3,165**	**$ 8,266,428**	**$ 8,382,593**

		Contractor's Fee	2.95%	$ 233,362
			SUB TOTAL	$8,615,955
Self performed work		**Liability Insurance**	0.65%	$ 56,004
Concrete	$ 392,000		**SUB TOTAL**	**$ 8,671,959**
Install casework	$ 80,000	**Builders Risk**	0.30%	$ 26,016
Total self perfromed work	$ 472,000		**SUB TOTAL**	**$ 8,697,975**
		P&P Bond	0.687%	$ 59,755
			TOTAL	**$ 8,757,730**
		Construction Contingency	5.000%	$ 437,887
			TOTAL	**$ 9,195,617**

MARION COUNTY

SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY - SALEM, OREGON 97317



REGISTERED ARCHITECT
MICHAEL VEIT LANGE
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:

kmd
ARCHITECTS+PLANNERS PC
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com

SÄZÄN GROUP
CONSULTING STRUCTURAL ENGINEERS
MSC
ENGINEERS PDX, INC.
3431 SW SHERMAN PLACE, NE SUITE 120
HILLSBORO, OREGON 97124
PHONE: 503.726.7299
WEBSITE: www.msceng.com

Westech Engineering, Inc
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/2017
project: 05416
drawn by: MV
checked by: Checker

copyright © 2017
Carlson Veit Architects P.C.

COVER SHEET

sheet:
G-000

ABBREVIATIONS

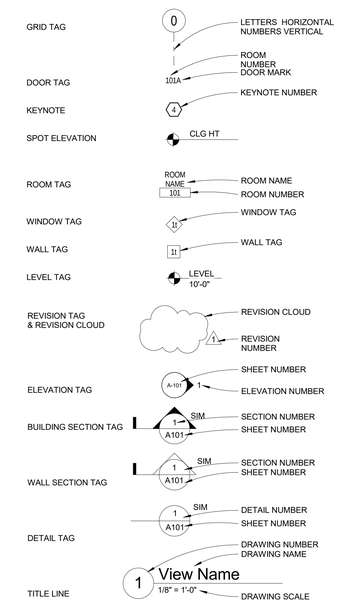
(REFER TO CONSUTANT DRAWINGS FOR ADDITIONAL ABBREVIATIONS)

AB	ANCHOR BOLT
AC	ACOUSTIC
ADJ	ADJUSTABLE, ADJUST
AFF	ABOVE FINISHED FLOOR
ALUM	ALUMINUM
ANOD	ANODIZED
APPROX	APPROXIMATELY
ASPH	ASPHALT
BD	BOARD
BLDG	BUILDING
BLKG	BLOCKING
BM	BENCH MARK, BEAM
BOT	BOTTOM
BUR	BUILT-UP ROOFING
CAB	CABINET
CB	CATCH BASIN, CORNER BEAD
CG	CORNER GUARD
CHBD	CHALKBOARD
CI	CAST IRON
CJ	CONTROL JOINT
CLG	CEILING
CLR	CLEAR, CLEARANCE
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONSTR	CONSTRUCTION
CONT	CONTINUOUS, CONTINUE
CONTR	CONTRACTOR
CNTR	COUNTER
CRS	COURSE, COURSES
CSK	COUNTERSINK, COUNTERSUNK
CW	COLD WATER
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DIM	DIMENSION
DIV	DIVIDE, DIVIDED, DIVISION
DR	DOOR
DS	DOWNSPOUT
DTL	DETAIL
DWG	DRAWING
E	EAST
EA	EACH
EF	EXHAUST FAN
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRIC, ELECTRICAL
ELEV	ELEVATOR
ENCL	ENCLOSURE
EQ	EQUAL
EQUIP	EQUIPMENT
EW	EACH WAY
EXIST	EXISTING
EXP B	EXPANSION BOLT
EXT	EXTERIOR
FD	FLOOR DRAIN
FDTN	FOUNDATION
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FH	FIRE HYDRANT
FHWS	FLATHEAD WOOD SCREW
FIN	FINISH, FINISHED
FIN FLR	FINISHED FLOOR
FL	FLOOR
FLASH	FLASHING
FTG	FOOTING
FOS	FACE OF STUD
GA	GAGE
GALV	GALVANIZED
GB	GRAB BAR
GL	GLASS
GLB	GLU-LAM BEAM
GYP BD	GYPSUM BOARD
HB	HOSE BIBB
HCP	HANDICAP, HOLLOW CORE
HDR	HEADER
HDW	HARDWARE
HC	HOLLOW CORE
HORIZ	HORIZONTAL
HS	HOLLOW STEEL, HIGH STRENGTH
HT	HEIGHT
HVAC	HEATING VENTILATING AIR CONDITIONING
HW	HOT WATER
INSUL	INSULATE, INSULATED, INSULATION
INT	INTERIOR
INV	INVERT
JAN	JANITOR
J-BOX	JUNCTION BOX
JST	JOIST
JT	JOINT
KD	KNOCKED DOWN
LAM	LAMINATE
LAV	LAVATORY
LS	LANDSCAPING
LT	LIGHT
MATL	MATERIAL
MAX	MAXIMUM
MB	MACHINE BOLT
MECH	MECHANICAL
MFR	MANUFACTURER
MH	MANHOLE
MI	MIRROR
MIN	MINIMUM
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MT	MOUNT
MTL	METAL
N	NORTH
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NUMBER
NTS	NOT TO SCALE
OA	OVERALL OUTSIDE AIR
OBS	OBSCURE
OC	ON CENTER
OCEW	ON CENTER EACH WAY
OD	OUTSIDE DIAMETER
OFCI	OWNER FURNISHED-CONTRACTOR INSTALLED
OH	OVERHEAD
OPG	OPENING
OFOI	OWNER FURNISHED-OWNER INSTALLED
OPP	OPPOSITE
PAF	POWDER ACUATED FASTNER
PBD	PARTICLE BOARD
PL	PROPERTY LINE, PLATE
PLAM	PLASTIC LAMINATE
PLBG	PLUMBING
PLYWD	PLYWOOD
PNL	PANEL
PR	PAIR
PRKG	PARKING
PTD	PAPER TOWEL DISPENSER
PTN	PARTITION
PT	POINT
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
QUAL	QUALITY
R	RADIUS, RISER
RC	RESILIENT CHANNEL
RD	ROOF DRAIN
RECEP	RECEPTACLE
REF	REFERENCE, REFRIGERATOR
REINF	REINFORCE, REINFORCEMENT
REQD	REQUIRED
REV	REVISION, REVISED
RHWS	ROUND HEAD WOOD SCREW
RM	ROOM
RO	ROUGH OPENING
ROW	RIGHT OF WAY
S	SOUTH
SC	SOLID CORE
SCR	SCREW
SD	SOAP DISPENSER, SMOKE DETECTOR, STORM DRAIN
SF	SQUARE FOOT
SHTHG	SHEATHING
SHT	SHEET
SIM	SIMILAR
SPEC	SPECIFICATION, SPECIFIED
SPKR	SPEAKER
SQ	SQUARE
SSK	SERVICE SINK
SST	STAINLESS STEEL
STD	STANDARD
STL	STEEL
STOR	STORAGE
STRUC	STRUCTURE, STRUCTURAL
SUSP	SUSPENDED
T	TEMPERED, TREAD
TEL	TELEPHONE
T&G	TONGUE & GROOVE
THK	THICK, THICKNESS, THICKENED
TOC	TOP OF CURB
TPD	TOILET PAPER DISPENSER
TYP	TYPICAL
ULMT	UNDERLAYMENT
UON	UNLESS OTHERWISE NOTED
UR	URINAL
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VNR	VENEER
VTR	VENT THROUGH ROOF
WAINS	WAINSCOT
W	WEST, WIDE, WIDTH
WC	WATER CLOSET
WD	WOOD
WDW	WINDOW
WH	WATER HEATER
W/O	WITHOUT
WP	WATERPROOFING
WT	WEIGHT
WWF	WELDED WIRE

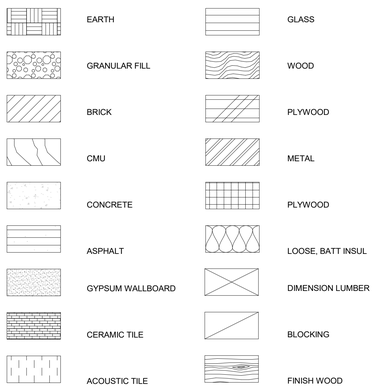
SYMBOLS USED AS ABBREVIATIONS

@	AT
℄	CENTERLINE
°	DEGREE
±	PLUS/MINUS

SYMBOL LEGEND



MATERIAL REFERENCE



INDEX OF DRAWINGS

01- GENERAL		A-501	SITE DETAILS
G-000	COVER SHEET	A-502	EXTERIOR DETAILS
G-001	INDEX	A-503	DOOR & WINDOW DETAILS
G-002	FIRE, LIFE, & SAFETY	A-504	INTERIOR DETAILS
		A-505	INTERIOR DETAILS
CIVIL		A-701	FINISH PLAN
C1.0	TOPOGRAPHIC SURVEY	A-702	FINISH SCHEDULE
C1.1	DEMOLITION & PREDEVELOPED EROSION CONTROL PLAN	A-703	FURNITURE PLAN
C1.2	POST DEVELOPED EROSION CONTROL PLAN		
C1.3	EROSION CONTROL NOTES	PLUMBING	
C1.4	EROSION CONTROL DETAILS	P0.01	PLUMBING LEGENDS, NOTES & ABBREVIATIONS
C2.0	GRADING & DRAINAGE PLAN	P0.02	PLUMBING SCHEDULES
C3.0	UTILITY PLAN	P2.01A	PARTIAL FLOOR PLAN - AREA A - PLUMBING
C4.0	SURFACING PLAN	P2.01B	PARTIAL FLOOR PLAN - AREA B - PLUMBING
C5.0	CONSTRUCTION NOTES	P2.01C	PARTIAL FLOOR PLAN - AREA C - PLUMBING
C6.0	CIVIL DETAILS	P2.01D	PARTIAL FLOOR PLAN - AREA D - PLUMBING
C6.1	CIVIL DETAILS	P4.01	PLUMBING DETAILS
C6.2	CIVIL DETAILS		
		MECHANICAL	
LANDSCAPE		M0.01	MECHANICAL LEGENDS, NOTES & ABBREVIATIONS
L1.0	LANDSCAPE PLAN	M0.02	MECHANICAL SCHEDULES
L2.1	IRRIGATION PLAN	M2.01A	PARTIAL FLOOR PLAN - AREA A - HVAC
		M2.01B	PARTIAL FLOOR PLAN - AREA B - HVAC
STRUCTURAL		M2.01C	PARTIAL FLOOR PLAN - AREA C - HVAC
S-001	GENERAL NOTES	M2.01D	PARTIAL FLOOR PLAN - AREA D - HVAC
S-101	OVERALL FOUNDATION PLAN	M2.02	MECHANICAL ROOF PLAN
S-102	ENLARGED FOUNDATION PLAN - WEST	M4.01	MECHANICAL DIAGRAMS
S-103	ENLARGED FOUNDATION PLAN - EAST	M4.02	MECHANICAL P&ID
S-201	OVERALL LOWER ROOF PLAN	M5.01	MECHANICAL DETAILS
S-202	LOWER ROOF FRAMING PLAN - WEST	M5.02	MECHANICAL DETAILS
S-203	LOWER ROOF FRAMING PLAN - EAST	MP2.01A	PARTIAL FLOOR PLAN - AREA A - MECHANICAL
S-204	UPPPER ROOF FRAMING PLAN - WEST	MP2.01B	PARTIAL FLOOR PLAN - AREA B - MECHANICAL
S-205	UPPER ROOF FRAMING PLAN - EAST	MP2.01C	PARTIAL FLOOR PLAN - AREA C - MECHANICAL
S-501	FOUNDATION DETAILS	MP2.01D	PARTIAL FLOOR PLAN - AREA D - MECHANICAL
S-502	FOUNDATION DETAILS	MP2.02	MECHANICAL ROOF PLAN
S-601	MASONRY DETAILS		
S-801	ROOF FRAMING DETAILS	ELECTRICAL	
S-802	ROOF FRAMING DETAILS	E0.01	ELECTRICAL NOTES, LEGENDS & ABBREVIATIONS
S-803	ROOF FRAMING DETAILS	E0.02	LUMINAIRE SCHEDULE
S-804	ROOF FRAMING DETAILS	E0.03	ELECTRICAL EQUIPMENT SCHEDULE
		E1.01	ELECTRICAL SITE PLAN
ARCHITECTURAL		E2.01A	PARTIAL FLOOR PLAN - AREA A - LIGHTING
A-100	OVERALL SITE PLAN	E2.01B	PARTIAL FLOOR PLAN - AREA B - LIGHTING
A-101	SITE PLAN	E2.01C	PARTIAL FLOOR PLAN - AREA C - LIGHTING
A-102	WEST FLOOR PLAN	E2.01D	PARTIAL FLOOR PLAN - AREA D - LIGHTING
A-103	EAST FLOOR PLAN	E3.01A	PARTIAL FLOOR PLAN - AREA A - POWER & SIGNAL
A-104	REFLECTED CEILING PLAN	E3.01B	PARTIAL FLOOR PLAN - AREA B - POWER & SIGNAL
A-105	ROOF PLAN - LOWER	E3.01C	PARTIAL FLOOR PLAN - AREA C - POWER & SIGNAL
A-106	ROOF PLAN - UPPER	E3.01D	PARTIAL FLOOR PLAN - AREA D - POWER & SIGNAL
A-201	EXTERIOR ELEVATIONS	E3.02	ELECTRICAL ROOF PLAN
A-202	EXTERIOR ELEVATIONS	E4.01	ONE-LINE DIAGRAM
A-203	INTERIOR ELEVATIONS	E5.01	PANEL SCHEDULES
A-301	BUILDING SECTIONS	E5.02	PANEL SCHEDULES
A-302	WALL SECTIONS	E6.01	ELECTICAL DETAILS
A-401	LARGE SCALE FLOOR PLANS & ELEVATIONS		

CONSULTANTS

OWNER:
MARION COUNTY
555 COURT STREET NE
SALEM, OREGON 97301
PHONE: (503) 588-5212

ARCHITECT:
CARLSON VEIT ARCHITECTS
3095 RIVER ROAD NORTH
SALEM, OREGON 97303
PHONE: (503) 390-0281

KMD ARCHITECTS
222 VALLEJO ST.
SAN FRANSISCO, CALIFORNIA
PHONE: (415) 398-5191

CONSTRUCTION MANAGEMENT:
DAY CPM
12745 SW BEAVERDAM ROAD, SUITE 120
BEAVERTON, OREGON 97005
PHONE: (503) 729-4545

MECHANICAL/PLUMBING ENGINEER:
SAZAN GROUP
111 SW FIFTH AVENUE, SUITE 2120
PORTLAND, OREGON 97204
PHONE: (503) 416-2400

GENERAL CONTRACTOR:
EMERICK CONSTRUCTION COMPANY
7855 SW MOHAWK STREET
TUALATIN, OREGON 97317
PHONE: (503) 799-8895

ELECTRICAL ENGINEER:
SAZAN GROUP
111 SW FIFTH AVENUE, SUITE 2120
PORTLAND, OREGON 97204
PHONE: (503) 416-2400

CIVIL ENGINEER:
WESTECH ENGINEERING, INC.
3841 FAIRVIEW INDUSTRIAL DRIVE SE
SALEM, OREGON 97302
PHONE: (503) 585-2474

LANDSCAPE ARCHITECT:
CHARLES MANGUM LANDSCAPE ARCHITECT
5114 36TH AVENUE SE
SALEM, OREGON 97317
PHONE: (503) 364-1240

STRUCTURAL ENGINEER:
MSC ENGINEERS, INC.
3470 PIPEBEND PLACE, SUITE 120
SALEM, OREGON 97301
PHONE: (503) 399-1399

GEO-TECHNICAL ENGINEER:
REDMOND GECTECHNICAL SERVICES, LLC
PO BOX 20547
PORTLAND, OREGON 97294
PHONE: (503) 285-0598

GENERAL NOTES

ARCHITECTURAL ELEVATIONS ARE BASED ON MAIN FLOOR LEVEL 0'-0" = CIVIL FINISH FLOOR ELEVATION. SEE CIVIL FOR F.F.E.

WHERE ENLARGED PLANS ARE PROVIDED, DETAILED DIMENSIONS AND OTHER INFORMATION WILL BE FOUND ON THE ENLARGED PLAN UNLESS OTHERWISE INDICATED.

DIMENSIONS ARE TO FACE OF STUD OR TO GRIDLINES OR TO REFERENCE DIMESION POINT (DIMPT). REFER TO DETAILS.

CONTRACTOR TO COORDINATE AND VERIFY THAT THE TRANSITION OF MATERIALS PROVIDES FOR CONTINUOUS WEATHER TIGHT ENVELOPE WHERE DIFFERENT TRADES ARE RESPONSIBLE FOR WEATHER TIGHT CONSTRUCTION OF THE EXTERIOR ENVELOPE.

ALL EXTERIOR WALLS TO HAVE THERMAL INSULATION. PROVIDE CONTINUOUS THERMAL AND VAPOR RETARDER AT WALLS AND CEILING PENETRATIONS. FIRESTOPPING TO COMPLY WITH U.L DESIGNS.

CONTRACTOR TO VERIFY CONTINUITY OF MOVEMENT OR DEFLECTION JOINTS THROUGHOUT THE BUILDING.

ALL ELEMENTS LOCATED ON CURTAINWALL OR STOREFRONT MULLIONS, INCLUDING BUT NOT LIMITED TO: FIRE ALARM PULL STATIONS, AND EXIT SIGNAGE TO HAVE CONNECTION AND POWER ELEMENTS ROUTED IN A CONCEALED SPACE WITHIN THE CURTAINWALL OR STOREFRONT SYSTEM AND INCLUDED FINISHED BACKPLATES.
CONTRACTOR TO COORDINATE WITH VARIOUS TRADES. ALL SUCH ELEMENTS TO BE INDICATED AND LOCATED IN SUBMITTAL PACKAGES FOR VERIFICATION OF EXACT LOCATION WITH ARCHITECT PRIOR TO INSTALLATION.

MAXIMUM ALLOWABLE DEFLECTION OF ALL METAL FRAMING MEMBERS ABOVE WINDOWS AND OTHER OPENINGS SHALL BE 3/8".

REGISTERED ARCHITECT
MARK VEIT OREGON
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd ARCHITECTS • planners pc
220 nw eighth avenue
portland, oregon
97209
1.503.221.1474
kmdarch@kmdpc.com
SÄZAN GROUP
CONSULTING MECHANICAL ELECTRICAL ENGINEERS
MSC ENGINEERS, INC.
3470 PIPEBEND PLACE, NE SUITE 120
SALEM, OREGON 97301
(503) 399-1399
mscengineers@msceng.com
Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/2017
project: 05416
drawn by: MV
checked by: Checker

copyright © 2017
Carlson Veit Architects P.C.

INDEX

sheet:
G-001

CODE SUMMARY

GOVERNING BUILDING CODE: OSSC 2014 (IBC 2012)

THIS PROJECT COMPRISES A NEW 30,980 SF BUILDING FOR MARION COUNTY SHERIFF OFFICE.

ZONING CODE

PLANNING ZONE	PH- PUBLIC HEALTH
USE: PUBLIC SAFETY (EMERGENCY SERVICES)	

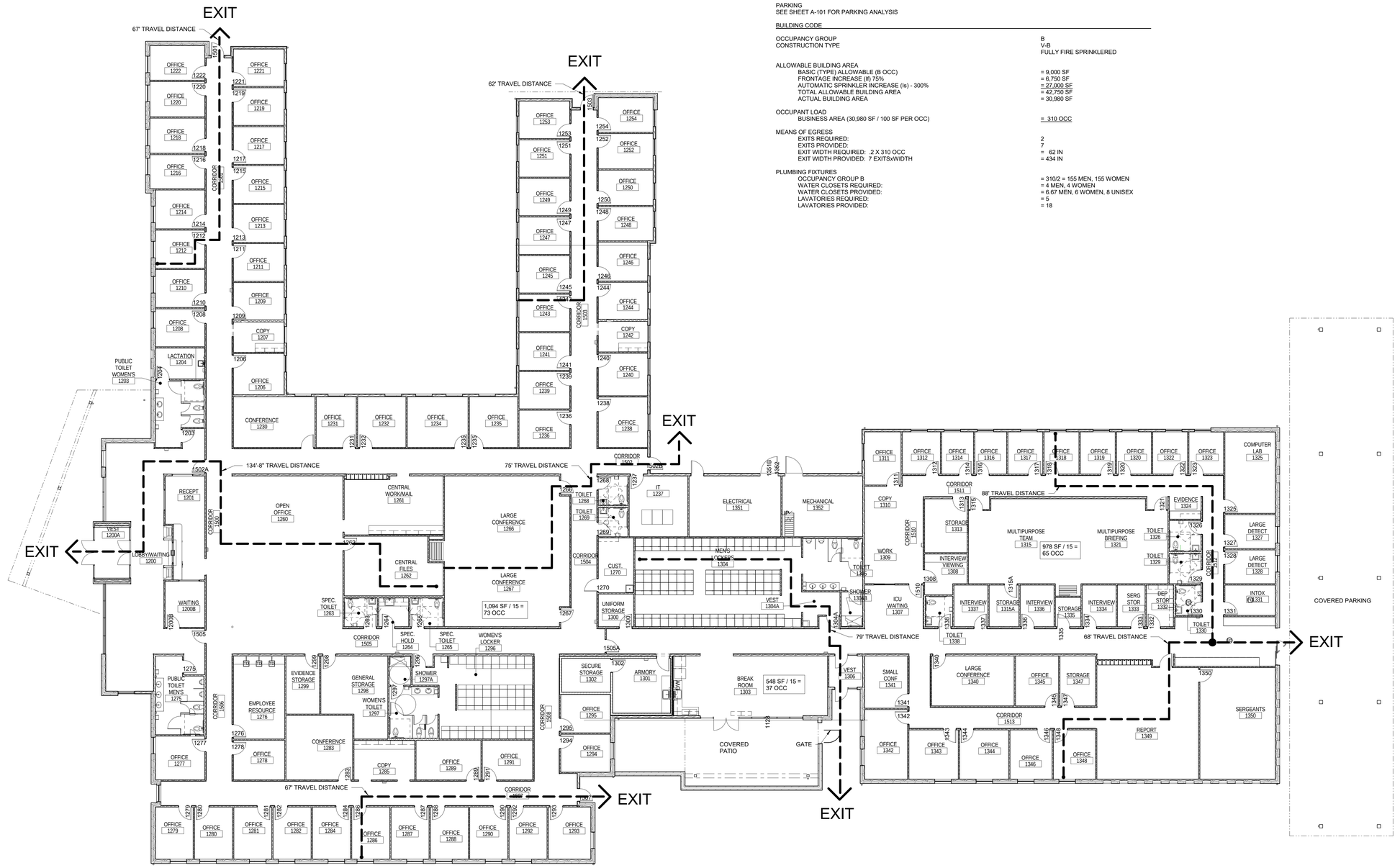
PARKING
SEE SHEET A-101 FOR PARKING ANALYSIS

BUILDING CODE

OCCUPANCY GROUP	B
CONSTRUCTION TYPE	V-B
	FULLY FIRE SPRINKLERED
ALLOWABLE BUILDING AREA	
BASIC (TYPE) ALLOWABLE (B OCC)	= 9,000 SF
FRONTAGE INCREASE (If) 75%	= 6,750 SF
AUTOMATIC SPRINKLER INCREASE (Is) - 300%	= 27,000 SF
TOTAL ALLOWABLE BUILDING AREA	= 42,750 SF
ACTUAL BUILDING AREA	= 30,980 SF
OCCUPANT LOAD	
BUSINESS AREA (30,980 SF / 100 SF PER OCC)	= 310 OCC
MEANS OF EGRESS	
EXITS REQUIRED:	2
EXITS PROVIDED:	7
EXIT WIDTH REQUIRED: .2 X 310 OCC	= 62 IN
EXIT WIDTH PROVIDED: 7 EXITSxWIDTH	= 434 IN
PLUMBING FIXTURES	
OCCUPANCY GROUP B	= 310/2 = 155 MEN, 155 WOMEN
WATER CLOSETS REQUIRED:	= 4 MEN, 4 WOMEN
WATER CLOSETS PROVIDED:	= 6.67 MEN, 6 WOMEN, 8 UNISEX
LAVATORIES REQUIRED:	= 5
LAVATORIES PROVIDED:	= 18

LEGEND

MAX EXIT TRAVEL DISTANCE



FIRE LIFE SAFETY PLAN - LEVEL 1
3/32" = 1'-0"

REGISTERED ARCHITECT — MARK VEIT — RENEWAL 12/31/2017 — SALEM, OREGON — STATE OF OREGON

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc — 220 nw eighth avenue, portland, oregon 97209, 1.503.221.1474, kmdarchitects.com
SÄZÄN GROUP — MSC CONSULTING STRUCTURAL ENGINEERS — 3431 TIPSOO TRACE NE SUITE 120, SALEM, OR 97305, 503.399.1799, WEBSITE: www.sazangroupmsc.com
Westech Engineering, Inc. — CONSULTING ENGINEERS & PLANNERS — CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

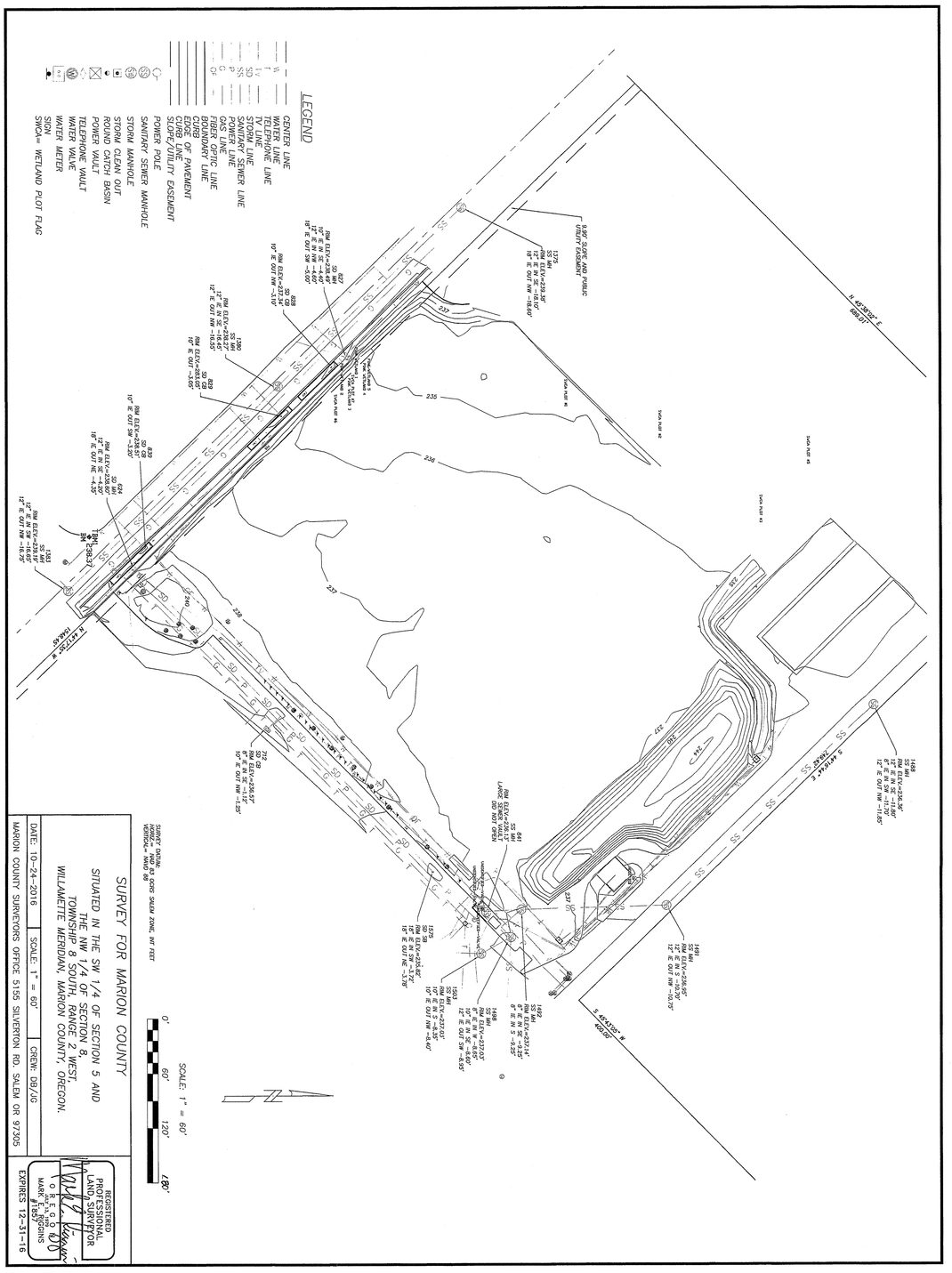
project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/2017
project: 05416
drawn by: NB
checked by: Checker
copyright © 2017 Carlson Veit Architects P.C.

FIRE, LIFE, & SAFETY

sheet: G-002



revisions:

date: 6-5-17
project: A-SP-05416
dwg file: 05416
drawn by: TN
checked by:
copyright© 2016 Carlson Veit Architects P.C.

TOPOGRAPHIC SURVEY

sheet: C1.0
of:

project:
MARION COUNTY SHERIFF
CENTRAL DISTRICT/PAROLE & PROBATION OFFICES

Marion County OREGON

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com

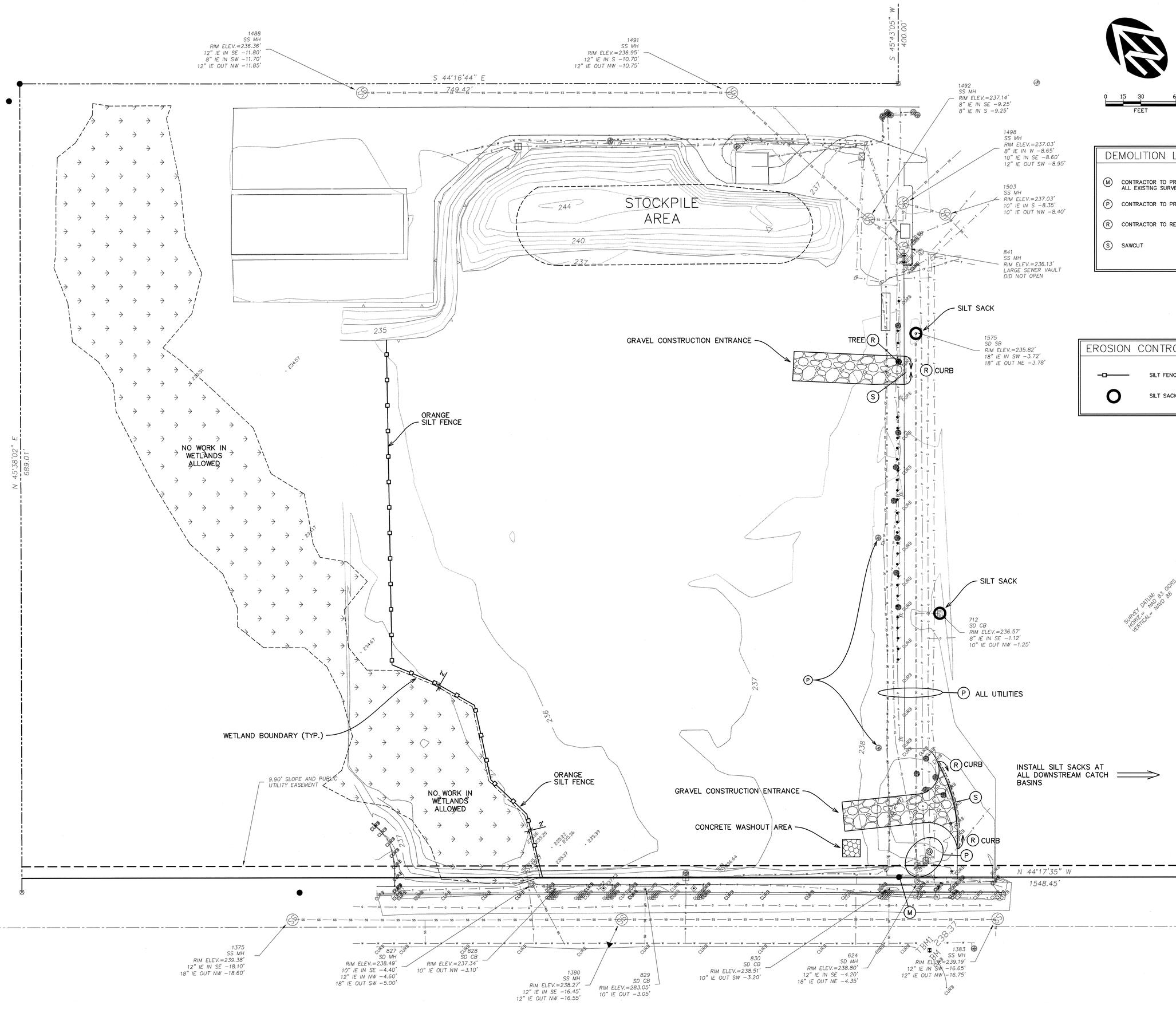
WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: westech@westech-eng.com

SAZAN GROUP

MSC ENGINEERS INC.

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

REGISTERED PROFESSIONAL ENGINEER
OREGON JULY 13, 2004
WILLIAM J. STEIN
RENEWS: 6/30/2018



5/31/2017 2:22:30 PM
R:\Dwg\CARL_V\Marion County Sheriffs-2942.00000.0\Civil\Plots\C1.0-1.4 EROSION CONTROL.dwg, (C1.1 tab)

REGISTERED PROFESSIONAL ENGINEER
79418PE
OREGON
NOV. 12, 2008
WILLIAM J. WELLS
RENEWS: 6/30/2018

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SAZAN GROUP
MSC ENGINEERS INC.

consultants:
kmd architects planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com

WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: westech@westech-eng.com

project:
MARION COUNTY SHERIFF
CENTRAL DISTRICT/PAROLE & PROBATION OFFICES

Marion County OREGON

revisions:

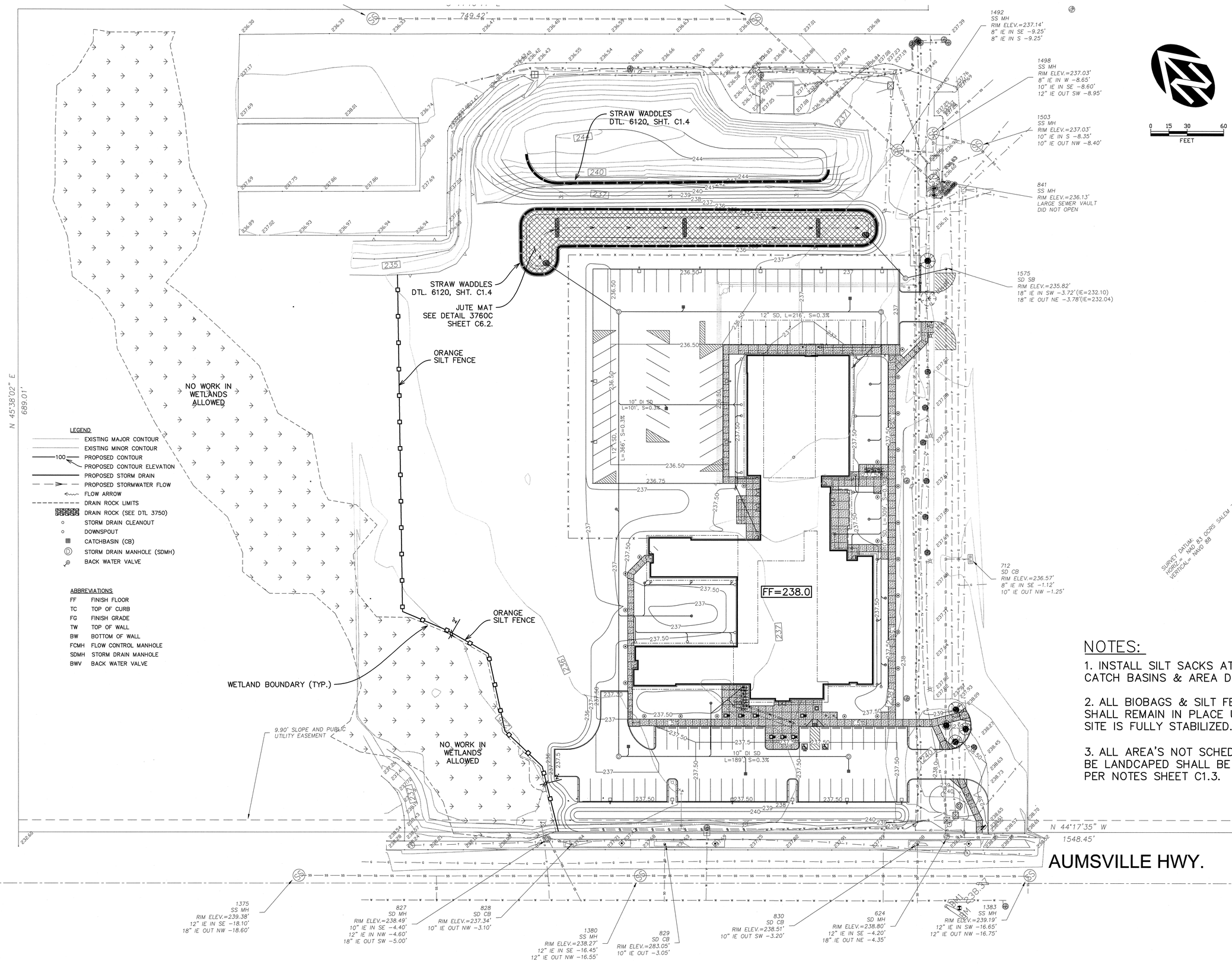
date: 6-5-17
project: A-SP-05416
dwg file: 05416
drawn by: RGS/TN
checked by: WJW

copyright © 2016
Carlson Veit Architects P.C.

DEMOLITION & PREDEVELOPED EROS. CNTRL PLAN

sheet:
C1.1

of:



NOTES:

1. INSTALL SILT SACKS AT ALL CATCH BASINS & AREA DRAINS.
2. ALL BIOBAGS & SILT FENCE SHALL REMAIN IN PLACE UNTIL SITE IS FULLY STABILIZED.
3. ALL AREA'S NOT SCHEDULED TO BE LANDCAPED SHALL BE COVERED PER NOTES SHEET C1.3.

REGISTERED PROFESSIONAL ENGINEER
78419PE
OREGON
DEC. 12, 2006
WILLIAM J. WELLS
RENEWS: 6/30/2018

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2469 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SAZAN GROUP
MSC ENGINEERS INC.

consultants:
kmd architecture + planning pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com

WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr., S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: westech@westech-eng.com

project:
MARION COUNTY SHERIFF
CENTRAL DISTRICT/PAROLE & PROBATION OFFICES

Marion County OREGON

revisions:

date: 6-5-17
project: A-SP-05416
dwg file: 05416
drawn by: RGS/TN
checked by: WJW

copyright © 2016
Carlson Veit Architects P.C.

POST DEVELOPED EROSION CONTROL PLAN

sheet: C1.2
of:

5/31/2017 2:23:38 PM
R:\Dwg\CARL-V\Marion County Sheriffs-2942.0000.00\Civil\Plots\C1.2 Post Eros Plan.dwg, (C1.2 tab)

CITY OF SALEM PUBLIC WORKS DESIGN STANDARDS:

Division 007 Appendix A–EPSC Plan Standard Notes

(a) PRE–CONSTRUCTION

(1). Prior to any land disturbing activities, the boundaries of the clearing and grading limits, vegetated buffers, and any sensitive areas shown on this plan shall be clearly delineated in the field. Unless otherwise approved, no disturbance is permitted beyond the clearing limits. The Contractor must maintain the delineation for the duration of the project. Note: vegetated corridors to be delineated with orange construction fence or approved equal.

(2). BMPs that must be installed prior to land disturbing activities are construction entrance, perimeter sediment control, and inlet protection.

(3). Hold a preconstruction conference to review the EPSCP and with the City's Project Manager and Inspector.

(b) CONSTRUCTION

(1). All sediment is required to stay on site. Sediment amounts greater than 1/2–cubic foot which leave the site must be cleaned up within 24 hours and placed back on the site and stabilized or properly disposed. Vacuuming or dry sweeping must be used to clean up released sediment and it must not be swept or washed into storm sewers, drainage ways, or water bodies. The cause of the sediment release must be found and prevented from causing a recurrence of the discharge within thesame 24 hours. Any in–stream clean up of sediment shall be performed according to the DSL required time frame.

(2). Construction, maintenance, replacement, and upgrading of erosion prevention and sediment control facilities is the sole responsibility of the Contractor until all construction is completed, approved, and permanent erosion control (i.e., vegetation/landscaping) is established on all disturbed areas.

(3). All recommended erosion prevention and sediment control procedures are dependent on construction methods, staging, site conditions, weather, and scheduling. During the construction period, erosion control facilities shall be revised, upgraded, replaced, or added, to comply with SRC and State and Federal regulatory requirements.

(4). The Contractor is solely responsible for protection of all adjacent property and downstream facilities from erosion and siltation during project construction. Any damage resulting from such erosion and siltation shall be corrected at the sole expense of the Contractor.

(5). When saturated soil is present, water–tight trucks must be used to transport saturated soils from the construction site. Soil may be drained on site at a designated location, using appropriate BMPs. Soil must be drained sufficiently to drip less than one gallon per hour prior to leaving the site.

(6). All materials spilled, dropped, or washed into storm drains must be removed immediately, and the Contractor shall provide protection of downstream inlets and catch basins to ensure sediment–laden water does not enter the storm drain system.

(7). All discharge of sediment–laden water must be treated with an appropriate BMP to remove sediment from discharge waters and to comply with SRC and State and Federal Regulatory Permits.

(8). In areas subject to wind erosion, appropriate BMPs must be used which may include the application of fine water spraying, plastic sheeting, mulching, or other approved measures.

(9). The EPSC measures and BMPs shown on this plan are the minimum requirements for anticipated site conditions. During the construction period, these measures shall be upgraded as needed to maintain compliance with all regulations.

(10). The contractor shall provide onsite water or other appropriate BMPs to prevent dust and wind erosion of fine grain soils.

(11). Disturbed areas must be stabilized after 14 days of inactivity, or immediately if rain is forecasted. See Subsection 7A.1(c)–Wet Weather Period.

(12). During the wet weather work period or when rain is forecasted, all active and inactive soil stock piles must be covered with appropriate plastic sheeting. Plastic sheeting must cover the entire stock pile and be sufficiently anchored.

(c) POLLUTANTS, SOLID WASTE AND HAZARDOUS MATERIALS MANAGEMENT

(1). Any use of toxic or other hazardous materials must include proper storage, application, and disposal.

(2). The contractor is solely responsible to properly manage pollutants, hazardous wastes, used oils, contaminated soils, concrete waste, sanitary waste, liquid waste, or other toxic substances discovered or generated during construction to prevent leakage, spills or release of pollutants to the environment and surface waters.

(3). Contractor shall develop a project specific written spill prevention and response procedures that includes employee training on spill prevention and proper disposal procedures; regular maintenance schedule for vehicles andmachinery; and material delivery and storage controls, signage, material use, and use of covered storage areas for waste and supplies. The plan shall comply with SRC and Federal and State requirements, and shall be available on site at all times.

(d) WET WEATHER PERIOD (OCTOBER 15 THROUGH APRIL 30)

(1). Construction activities must avoid or minimize the duration of disturbed areas.

(2). Temporary stabilization of the site including covering of bare soils with approved BMPs, must be installed at the end of the shift before a holiday or weekend, or at the end of each workday if rainfall is forecast in the next 24 hours.

(3). Temporary stabilization or covering of soil stockpiles and protection of stockpiles located away from construction activity must occur at the end of each workday.

(e) MAINTENANCE

(1). Erosion control measures shall be maintained in such a manner as to ensure that erosion is prevented and sediment–laden water does not enter a drainage system, roadway, or violate applicable water quality standards.

(2). Sediment shall not be washed or swept into storm sewers, drainage ways, or water bodies.

(3). Sediment must be removed from behind all sediment control measures when it has reached a height of 1/3 the barrier height, and prior to the control measures removal.

(4). Removal of trapped sediment in a sediment basin or sediment trap or catch basins must occur when the sediment retention capacity has been reduced by 50 percent; is not functioning properly and/or at the completion of project.

(5). Cleaning of all structures, inlet protection BMPs, and sump pumps must be completed regularly and as required to ensure structures and inlets function properly and flow freely.

(6). Construction site exits shall be maintained in a condition that will prevent tracking or flow of mud onto the ROW or approved access point. The entrance may require periodic top dressing as conditions demand, and repair and/or cleanout of any structures used to trap sediment. Wheel washing shall be required to prevent sediment and material tracking on road surfaces if passive BMPs are not effective.

(f) INSPECTION

(1). The EPSCP must be kept onsite at all times. All measures shown on the plan must be installed properly to ensure compliance with SRC and State and Regulatory permits, and that sediment does not enter a surface water system, roadway, or other properties.

(2). Written EPSC inspection logs shall be maintained onsite and available to City inspectors upon request.

(3). All BMPs shall be inspected at least every week. When a rainfall event exceeds 1/2–inch in a 24–hour period, daily inspection of the erosion controls, sediment controls, and discharge outfalls must be conducted and documented. Inspections shall be done by a representative of the permit registrant who is knowledgeable and experienced in the principles, practices, installation, and maintenance of erosion and sediment controls.

(g) INACTIVE CONSTRUCTION PERIODS AND POST–CONSTRUCTION

(1). Should work cease in any area for 14 days, the inactive area must be stabilized with appropriate soil stabilization BMPs. If all construction activity ceases the entire site must be temporarily stabilized using vegetation, heavy mulch layer, temporary seeding, or other method.

(2). All temporary erosion prevention and sediment control facilities shall be removed by the contractor within 30 days after permanent landscaping/vegetation is established and the threat of erosion and sediment transport has been mitigated.

(3). Temporary grass cover measures must be fully established by October 15 or other cover measures (i.e., erosion control blankets with anchors, one–inch of straw mulch, six mil HDPE plastic sheet, etc.) shall be in place over all disturbed soil areas until April 30. To establish an adequate grass stand for controlling erosion by October 15, it is recommended that seeding and mulching occur by September 1.

(4). Permanent erosion control vegetation on all embankments and disturbed areas shall be re–established as soon as construction is completed.

(h) SPECIFICATIONS

(1). Soil preparation. Topsoil should be prepared according to the landscape plans, if available, or recommendations of the grass seed supplier. Slopes shall be texturred before seeding by rack walking (i.e., driving a crawling tractor up and down the slopes to leave a pattern of cleat imprints parallel to slope contours) or other method to provide stable areas for seeds to rest.

(2). Seeding. Erosion control grass seed mix shall be as follows: Dwarf grass mix (low height, low maintenance) consisting of dwarf perennial ryegrass (80 percent by weight), creeping red fescue (20 percent by weight). Application rate shall be 100 pounds per acre minimum.

(3). Grass seed shall be fertilized at a rate of ten pounds per 1,000 square feet with 16–16–16 slow release type fertilizer. Disturbed areas within 50 feet of water bodies and wetlands must use a non–phosphorous fertilizer.

(4). The application rate of fertilizers used to reestablish vegetation shall follow manufacturer's recommendations. Nutrient releases from fertilizers to surface waters shall be minimized. Time release fertilizers shall be used. Care shall be made in the application of fertilizers within any waterway riparian zone to prevent leaching into the waterway.

(5). When used, hydromulch shall be applied with grass seed at a rate of 2,000 pounds per acre between April 30 and June 10, or between September 1 and October 1. On slopes steeper than ten percent, hydroseed and mulch shall be applied with a bonding agent (tackifier). Application rate and methodology shall be in accordance with seed supplier recommendations.

(6). When used in lieu of hydromulch, dry, loose, weed–free straw used as mulch shall be applied at a rate of 4,000 pounds per acre (double the hydromulch application requirement). Anchor straw by working in by hand or with equipment (rollers, cleat trackers, etc.). Mulch shall be spread uniformly immediately following seeding.

(7). When conditions are not favorable to germination and establishment of the grass seed, the Contractor shall irrigate the seeded and mulched areas as required to establish the grass cover.

(8). Sediment fences shall be constructed of continuous filter fabric to avoid use of joints. When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum six–inch overlap, and both ends securely fastened to a post.

(9). The standard strength filter fabric shall be fastened securely to stitched loops installed on the upslope side of the posts, and six inches of the fabric shall be extended into the trench. The fabric shall not extend more than 30 inches above the original ground surface. Filter fabric shall not be stapled to existing trees.

(10). Bio–filter bags shall be clean 100 percent wood product waste. Bags shall be 18–inch x 18–inch x 30–inch, weigh approximately 45 pounds, and be contained in a bag made of 1/2–inch plastic mesh.

(11). Minimum wet weather slope protection. For 3H:1V or steeper slopes use Bon Terra Type C2 or North American Green Type C125 erosion control blankets. Use a minimum of two inches straw mulch or North American Green Type S150 for slopes flatter than 3H:1V and greater than 6H:1V. Slopes flatter than 6H:1V use one inch straw mulch, hydroseed with hydromulch and tackifier. Slope protection shall be placed on all disturbed areas immediately after completion of each section of construction activity, until the erosion control seeding has been established. As an option during temporary or seasonal work stoppages, a six–mil HDPE plastic sheet may be placed on exposed slopes. The plastic sheet shall be provided with an anchor trench at the top and bottom of the slope, and shall be sandbagged on the slopes as required to prevent damage or displacement by wind.

DEQ EROSION CONTROL STANDARD NOTES:

1. Hold a pre–construction meeting of project construction personnel that includes the inspector to discuss erosion and sediment control measures and construction limits. (Schedule A.8.c.i.(3))
2. All inspections must be made in accordance with DEQ 1200–C permit requirements. (Schedule A.12.b and Schedule B.1)
3. Inspection logs must be kept in accordance with DEQ's 1200–C permit requirements. (Schedule B.1.c and B.2)
4. Retain a copy of the ESCP and all revisions on site and make it available on request to DEQ, Agent, or the local municipality. During inactive periods of greater than seven (7) consecutive calendar days, the above records must be retained by the permit registrant but do not need to be at the construction site. (Schedule B.2.c)
5. All permit registrants must implement the ESCP. Failure to implement any of the control measures or practices described in the ESCP is a violation of the permit. (Schedule A 8.a)
6. The ESCP must be accurate and reflect site conditions. (Schedule A.12.c.i)
7. Submission of all ESCP revisions is not required. Submittal of the ESCP revisions is only under specific conditions. Submit all necessary revision to DEQ or Agent within 10 days. (Schedule A.12.c.iv. and v)
8. Phase clearing and grading to the maximum extent practical to prevent exposed inactive areas from becoming a source of erosion. (Schedule A.7.a.iii)
9. Identify, mark, and protect (by construction fencing or other means) critical riparian areas and vegetation including important trees and associated rooting zones, and vegetation areas to be preserved. Identify vegetative buffer zones between the site and sensitive areas (e.g., wetlands), and other areas to be preserved, especially in perimeter areas. (Schedule A.8.c.i.(1) and (2))
10. Preserve existing vegetation when practical and re–vegetate open areas. Re–vegetate open areas when practicable before and after grading or construction. Identify the type of vegetative seed mix used. (Schedule A.7.a.v)
11. Maintain and delineate any existing natural buffer within the 50–feet of waters of the state. (Schedule A.7.b.i.and (2(a)(b))
12. Install perimeter sediment control, including storm drain inlet protection as well as all sediment basins, traps, and barriers prior to land disturbance. (Schedule A.8.c.i.(5))
13. Control both peak flow rates and total stormwater volume, to minimize erosion at outlets and downstream channels and streambanks. (Schedule A.7.c)
14. Control sediment as needed along the site perimeter and at all operational internal storm drain inlets at all times during construction, both internally and at the site boundary. (Schedule A.7.d.i)
15. Establish concrete truck and other concrete equipment washout areas before beginning concrete work. (Schedule A.8.c.i.(6))
16. Apply temporary and/or permanent soil stabilization measures immediately on all disturbed areas as grading progresses. Temporary or permanent stabilizations measures are not required for areas that are intended to be left unvegetated, such as dirt access roads or utility pole pads.(Schedule A.8.c.ii.(3))
17. Establish material and waste storage areas, and other non–stormwater controls. (Schedule A.8.c.i.(7))
18. Prevent tracking of sediment onto public or private roads using BMPs such as: construction entrance, graveled (or paved) exits and parking areas, gravel all unpaved roads located onsite, or use an exit tire wash. These BMPs must be in place prior to land–disturbing activities. (Schedule A 7.d.ii and A.8.c.i(4))
19. When trucking saturated soils from the site, either use water–tight trucks or drain loads on site. (Schedule A.7.d.ii(5))
20. Control prohibited discharges from leaving the construction site, i.e., concrete wash–out, wastewater from cleanout of stucco, paint and curing compounds. (Schedule A.6)
21. Use BMPs to prevent or minimize stormwater exposure to pollutants from spills; vehicle and equipment fueling, maintenance, and storage; other cleaning and maintenance activities; and waste handling activities. These pollutants include fuel, hydraulic fluid, and other oils from vehicles and machinery, as well as debris, fertilizer, pesticides and herbicides, paints, solvents, curing compounds and adhesives from construction operations. (Schedule A.7.e.i.(2))
22. Implement the following BMPs when applicable: written spill prevention and response procedures, employee training on spill prevention and proper disposal procedures, spill kits in all vehicles, regular maintenance schedule for vehicles and machinery, material delivery and storage controls, training and signage, and covered storage areas for waste and supplies. (Schedule A. 7.e.iii.)
23. Use water, soil–binding agent or other dust control technique as needed to avoid wind–blown soil. (Schedule A 7.a.iv)
24. The application rate of fertilizers used to reestablish vegetation must follow manufacturer's recommendations to minimize nutrient releases to surface waters. Exercise caution when using time–release fertilizers within any waterway riparian zone. (Schedule A.9.b.iii)
25. If an active treatment system (for example, electro–coagulation, flocculation, filtration, etc.) for sediment or other pollutant removal is employed, submit an operation and maintenance plan (including system schematic, location of system, location of inlet, location of discharge, discharge dispersion device design, and a sampling plan and frequency) before operating the treatment system. Obtain plan approval before operating the treatment system. Operate and maintain the treatment system according to manufacturer's specifications. (Schedule A.9.d)
26. Temporarily stabilize soils at the end of the shift before holidays and weekends, if needed. The registrant is responsible for ensuring that soils are stable during rain events at all times of the year. (Schedule A 7.b)
27. As needed based on weather conditions, at the end of each workday soil stockpiles must be stabilized or covered, or other BMPs must be implemented to prevent discharges to surface waters or conveyance systems leading to surface waters. (Schedule A 7.e.ii.(2))
28. Construction activities must avoid or minimize excavation and bare ground activities during wet weather. (Schedule A.7.a.i)
29. Sediment fence: remove trapped sediment before it reaches one third of the above ground fence height and before fence removal. (Schedule A.9.c.i)
30. Other sediment barriers (such as biobags): remove sediment before it reaches two inches depth above ground height and before BMP removal. (Schedule A.9.c.i)
31. Catch basins: clean before retention capacity has been reduced by fifty percent. Sediment basins and sediment traps: remove trapped sediments before design capacity has been reduced by fifty percent and at completion of project. (Schedule A.9.c.iiIde iv)
32. Within 24 hours, significant sediment that has left the construction site, must be remediated. Investigate the cause of the sediment release and implement steps to prevent a recurrence of the discharge within the same 24 hours. Any in–stream clean–up of sediment shall be performed according to the Oregon Division of State Lands required timeframe. (Schedule A.9.b.i)
33. The intentional washing of sediment into storm sewers or drainage ways must not occur. Vacuuming or dry sweeping and material pickup must be used to cleanup released sediments. (Schedule A.9.b.ii)
34. The entire site must be temporarily stabilized using vegetation or a heavy mulch layer, temporary seeding, or other method should all construction activities cease for 30 days or more. (Schedule A.7.f.i)
35. Provide temporary stabilization for that portion of the site where construction activities cease for 14 days or more with a covering of blown straw and a tackifier, loose straw, or an adequate covering of compost mulch until work resumes on that portion of the site. (Schedule A.7.f.ii)
36. Do not remove temporary sediment control practices until permanent vegetation or other cover of exposed areas is established. Once construction is complete and the site is stabilized, all temporary erosion controls and retained soils must be removed and disposed of properly, unless doing so conflicts with local requirements. (Schedule A.8.c.iii(1) and D.3.c.ii and iii)

Rev. 12/15/15 By: Krista Ratliff

YEAR: / MONTH:	'17 06	'17 07	'17 08	'17 09	'17 10	'17 11	'17 12	'18 01	'18 02	'18 03	'18 04	'18 05
CLEARING	X	X	X									
EXCAVATION	X	X	X									
GRADING	X	X	X	X	X							
CONSTRUCTION	X	X	X	X	X	X	X	X	X	X	X	X
SEDIMENT CONTROLS:												
Silt Fencing	X	X	X	X	X	X	X	X	X	X	X	X
Sediment Traps	X	X	X	X	X	X	X	X	X	X	X	X
Sediment Basins												
Storm Inlet Protection												
Drainage Swales												
Check Dams					X	X	X	X	X	X	X	X
Contour Furrows												
Terracing												
Pipe Slope Drains												
Rock Outlet Protection					X	X	X	X	X	X	X	X
Gravel Construction Entrance	X	X	X	X	X	X	X	X	X	X	X	X
Grass–lined Channel (Turf Reinforcement Mats)												
Protection of trees with construction fences												
Temporary Seeding and Planting						X	X	X	X	X	X	X
Permanent Seeding and Planting						X	X	X	X	X	X	X
Other:												

CONTROL MEASURE	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5
Silt Fencing	X	X	X		
Construction Entrance	X	X			
Sediment Traps			X		
Storm Inlet Protection			X		
Concrete Washout			X		
Rock Outlet Protection			X	X	X
Permanent Seeding and Planting				X	X

Phase 1: Prior to Ground Disturbance
Phase 2: After Completion of Rough Grading
Phase 3: After Installation of Storm Facilities
Phase 4: After Paving & Construction
Phase 5: After Project Completion and Cleanup

INSPECTION FREQUENCY FOR BMP

Site Condition	Minimum Frequency
1. Active period	Daily when stormwater runoff, including runoff from snowmelt, is occurring. At least once every 14 days, regardless of whether stormwater runoff is occurring.
2. Prior to the site becoming inactive or in anticipation of site inaccessibility.	Once to ensure that erosion and sediment control measures are in working order. Any necessary maintenance and repair must be made prior to leaving the site.
3. Inactive periods greater than seven (14) consecutive calendar days	Once every month.
4. Periods during which the site is inaccessible due to inclement weather	If practical, inspections must occur daily at a relevant and accessible discharge point or downstream location.
5. Periods during which discharge is unlikely due to frozen conditions	Monthly. Resume monitoring immediately upon melt, or when weather conditions make discharge likely.

BMP Rationale

A comprehensive list of available Best Management Practices (BMP) options based on DEQ's 1200–C Permit Application and ESCP Guidance Document has been reviewed to complete this Erosion and Sediment Control Plan. Some of the above listed BMPs were not chosen because they were determined to not effectively manage erosion prevention and sediment control for this project based on specific site conditions, including soil conditions, topographic constraints, accessibility to the site, and other related conditions. As the project progresses and there is a need to revise the ESCP, an Action Plan will be submitted.

SOIL TYPE(S): PER MARION CO. SOIL SURVEY THE SITE SOILS INCLUDE AMITY SILT LOAM, COURTNEY GRAVELLY SILT LOAM, & DAYTON SILT LOAM

EROSION HAZARD: PER MARION CO. SOIL SURVEY EROSION HAZARD RANGES FROM "SLIGHT" TO "MODERATE".

SITE AREA: 11.63 Ac

DISTURBANCE AREA: 5.20 Ac

SUPPLEMENTAL WESTECH NOTES:

1. Erosion control measures shall be maintained in such a manner as to ensure that sediment and sediment–laden water does not enter the drainge system, roadways, or violate applicable water quality standards.
2. The erosion control construction, maintenance, replacement and upgrading of the erosion control facilities is the responsibility of the Contractor until all construction is completed and approved, and permanent erosion control (i.e. vegetation/landscaping) is established on all disturbed areas.
3. All recommended erosion control procedures are dependent on construction methods, staging, site conditions, weather and scheduling. During the construction period, erosion control facilities shall be upgraded as necessary due to unexpected storm events and to ensure that sediment and sediment laden water does not leave the site.
4. The Contractor is responsible for control of sediment transport within project limits. If an installed erosion control system does not adequately contain sediment on site, then the erosion control measures shall be adjusted or supplemented by the Contractor as necessary to ensure that sediment laden water does not leave the site. Additional measures shall be provided as required to ensure that all paved areas are kept clean for the duration of the project. Additional interim measures will include, at a minimum, installation of silt fences in accordance with the details shown on the drawings. These measures shall be installed along all exposed embankments and cut slopes to prevent sediment transport.
5. All existing and newly constructed storm inlets and drains shall be protected until pavement surfaces are completed and/or vegetation is established.
6. Erosion control facilities and sediment fences on active sites shall be inspected by the Contractor at least daily during any period with measurable precipitation. Any required repairs or maintenance shall be completed immediately. The erosion control facilities on inactive sites shall be inspected and maintained by the Contractor a minimum of once a month or within 24 hours following the start of a storm event.
7. All catch basins and conveyance lines shall be cleaned prior to paving. The cleaning operation shall not flush sediment–laden water into the downstream system. The Contractor shall remove all accumulated sediment from all impacted catch basins and storm pipes prior to acceptance by the Owner.
8. The Contractor is solely responsible for protection of all adjacent property and downstream facilities from erosion and siltation during project construction. Any damage resulting from such erosion and siltation shall be corrected at the sole expense of the Contractor.
9. The Contractor shall provide site watering as necessary to prevent wind erosion of fine–grained soils.
10. Unless otherwise indicated on the drawings, all temporary erosion control facilities, including sediment fences, silt sacks, bio–bags, etc. shall be removed by the Contractor within 30 days after permanent landscaping/vegetation is established.
11. Sediment fences shall be constructed of continuous filter fabric to avoid use of joints. When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum 6–inch overlap, and both ends securely fastened to a post.
12. Sediment fence shall be installed per drawing details. Sediment fences shall have adequate support to contain all silt and sediment captured.
13. The standard strength filter fabric shall be fastened securely to stitched loops installed on the upslope side of the posts, and 6 inches of the fabric shall be extended into the trench. The fabric shall not extend more than 30 inches above the original ground surface. Filter fabric shall not be stapled to existing trees.
14. Bio–filter bags shall be clean 100 percent wood product waste. Bags shall be 18–inch x 18–inch x 30–inch, weigh approximately 45 lbs., and be contained in a bag made of 1/2–inch plastic mesh.
15. Sediment barriers shall be maintained until the up–slope area has been permanently stabilized. At no time shall more than 10–inches of sediment be allowed to accumulate behind sediment fences. No more than 2 inches of sediment shall be allowed to accumulate behind bio–filter bags. Sediment shall be removed prior to reaching the above stated depths. New sediment barriers shall be installed uphill as required to control sediment transport.
16. Stabilized construction entrances shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures may be required to ensure that all paved areas are kept clean for the duration of the project.
17. The Contractor shall verify that all trucks are well sealed when transporting saturated soils from the site. Water drippage from trucks transporting saturated soils must be reduced to less than 1 gallon per hour prior to leaving the site.
18. The entrance shall be maintained in a condition that will prevent tracking or flow of mud onto the public right–of–way or approved access point. The entrance may require periodic top dressing as conditions demand, and repair and/or cleanout of any structures used to trap sediment.
19. All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into storm drains must be removed immediately, and the Contractor shall provide protection of downstream inlets and catch basins to ensure sediment laden water does not enter the storm drain system.
20. Temporary grass cover measures must be fully established by October 15th, or other cover measures (ie. erosion control blankets with anchors, 3–inches minimum of straw mulch, 6 mil HDPE plastic sheet, etc.) shall be in place over all disturbed soil areas until April 30th. To estcblish an adequate grass stand for controlling erosion by October 15th, it is recommended that seeding and mulching occur by September 1st. Straw mulch, if used, shall not leave any bare ground visible through the straw.
21. Minimum wet weather slope protection. For slopes steeper than 3H:1V but less than 2H:1V, use Tensar/North American Green Type S150 erosion control blanket. For slopes 2H:1V or steeper, use Tensar/North American Green Type SC150 erosion control blanket. Use a minimum of 2–inches straw mulch or Tensar/North American Green Type S150 for slopes flatter than 3H:1V. Slope protection shall be placed on all disturbed areas immediately after completion of each section of construction activity, until the erosion control seeding has been established. As an option during temporary or seasonal work stoppages, a 6–mil HDPE plastic sheet may be placed on exposed slopes. The plastic sheet shall be provided with an anchor trench at the top and bottom of the slope, and shall be sandbagged on the slopes as required to prevent damage or displacement by wind.
22. Permanent erosion control vegetation on all embankments and disturbed areas shall be re–established as soon as construction is completed.
23. Soil preparation. Topsoil should be prepared according to landscape plans, if available, or recommendations of grass seed supplier. It is recommended that slopes be textured before seeding by rack walking (ie. driving a crawling tractor up and down the slopes to leave a pattern of cleat imprints parallel to slope contours) or other method to provide stable areas for seeds to rest.
24. When used, hydromulch shall be applied with grass seed at a rate of 2000 lbs. per acre between April 30 and June 10, or between September 1 and October 1. On slopes steeper than 10 percent, hydroseed and mulch shall be applied with a bonding agent (tackifier). Application rate and methodology to be in accordance with seed supplier recommendations.
25. When used in lieu of hydromulch, dry, loose, weed free straw used as mulch shall be applied at a rate of 4000 lbs. per acre (double the hydromulch application requirement). Anchor straw by working in by hand or with equipment (rollers, cleat trackers, etc.). Mulch shall be spread uniformly immediately following seeding.
26. When conditions are not favorable to germination and establishment of the grass seed, the Contractor shall irrigate the seeded and mulched areas as required to establish the grass cover.
27. Seeding. Recommended erosion control grass seed mix is as follows. Dwarf grass mix (low height, low maintenance) consisting of dwarf perennial ryegrass (80 % by weight), creeping red fescue (20 % by weight). Application rate shall be 100 lbs. per acre minimum.
28. Grass seed shall be fertilized at a rate of 10 lbs. per 1000 S.F with 16– 16–16 slow release type fertilizer. Development areas within 50 feet of water bodies and wetlands must use a non–phosphorous fertilizer.
29. Prior to starting construction contractor shall acquire the services of a DEQ Certified Erosion and Sediment Control Inspector and shall submit an "Action Plan" to DEQ indentifying their names, contact information, training and experience as required in Schedule A.6.b.i–ii of the 1200–C Permit
30. Contractor shall submit "Notice of Termination" to DEQ to end the 1200–C permit coverage once all soil disturbance activities have been completed and final stabilization of exposed soils has occured.

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

REGISTERED PROFESSIONAL ENGINEER — OREGON — NOV. 12, 2008 — WILLIAM J. WELLS
RENEWS: 6/30/2018

SAZAN GROUP

MSC ENGINEERS INC.

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com

WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: mail@westech-eng.com

project:
MARION COUNTY SHERIFF
CENTRAL DISTRICT/PAROLE & PROBATION OFFICES

Marion County OREGON

revisions:

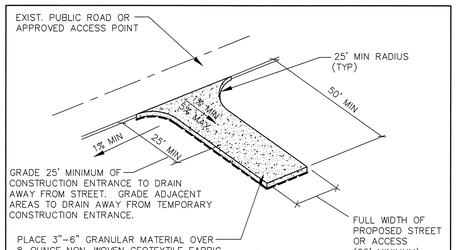
date: 6-5-17
project: A-SP-05416
dwg file: 05416
drawn by: RGS/TN
checked by: WJW

copyright© 2016
Carlson Veit Architects P.C.

EROSION CONTROL NOTES

sheet: C1.3
of:

5/31/2017 2:22:39 PM
R:\Dwg\CARL_V\Marion County Sheriffs–23452.0000.01\Civil\Plots\C1.0–1.4 EROSION CONTROL.dwg, (C1.3 tab)



DRY WEATHER ACCESS
14–INCH MIN. DEPTH OVER COMPACTED SUBGRADE & FABRIC

WET WEATHER ACCESS
24–INCH MIN. DEPTH OVER UNDISTURBED SUBGRADE & FABRIC

CONSTRUCTION NOTES:

1. THE AREA OF THE CONSTRUCTION ENTRANCE SHALL BE STRIPPED OF ALL TOPSOIL, VEGETATION, ROOTS, AND OTHER NON–COMPACTABLE MATERIAL.
2. SUBGRADE SHALL BE COMPACTED AND PROOFROLLED PRIOR TO PLACEMENT OF GRANULAR MATERIAL. FAILURE TO PASS PROOFROLL WILL REQUIRE USE OF WET WEATHER SECTION.
3. FAILURE OR PUMPING OF THE DRY WEATHER SECTION WILL REQUIRE REMOVAL OF THE GRANULAR MATERIAL AND INSTALLATION OF THE WET WEATHER SECTION.

MAINTENANCE NOTES:

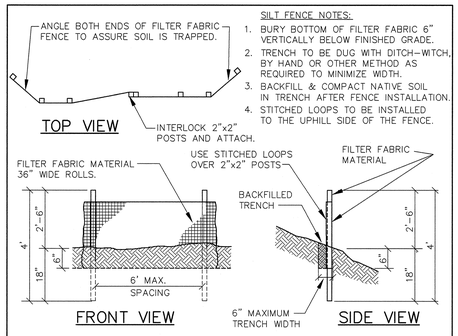
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOW OF SEDIMENT ONTO PUBLIC RIGHT–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH 3"–6" INCH STONE AS CONDITIONS DEMAND, AND REPAIR AND/OR CLEAN–OUT OF STRUCTURES USED TO TRAP SEDIMENT.
2. ALL MATERIALS SPILLED, DROPPED, WASHED OR TRACKED FROM VEHICLES ONTO ROADWAYS OR INTO STORM DRAINS MUST BE REMOVED IMMEDIATELY.
3. ALL TRUCKS TRANSPORTING SATURATED SOILS SHALL BE WELL SEALED. WATER DRIPPAGE FROM TRUCKS MUST BE REDUCED TO 1 GALLON PER HOUR PRIOR TO LEAVING THE SITE.

LAST REVISION DATE:	JO #
MAY 2013	STANDARD

TEMPORARY CONSTRUCTION ENTRANCE

(NTS)

WESTECH ENG.	DETAIL NO. 6100



SILT FENCE NOTES:

1. BURY BOTTOM OF FILTER FABRIC 6" VERTICALLY BELOW FINISHED GRADE.
2. TRENCH TO BE DUG WITH DITCH–WITCH, BY HAND OR OTHER METHOD AS REQUIRED TO MINIMIZE WIDTH.
3. BACKFILL & COMPACT NATIVE SOIL IN TRENCH AFTER FENCE INSTALLATION.
4. STITCHED LOOPS TO BE INSTALLED TO THE UPHILL SIDE OF THE FENCE.

MAINTENANCE NOTES:

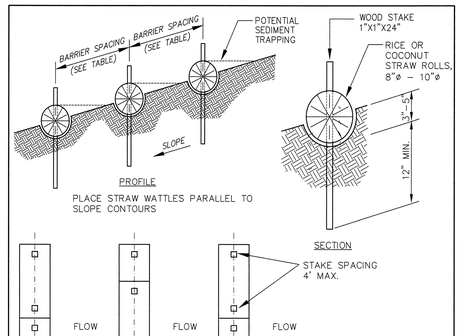
1. SEDIMENT BARRIERS SHALL BE MAINTAINED UNTIL UP–SLOPE AREA IS PERMANENTLY STABILIZED.
2. AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE BEHIND SEDIMENT FENCES OR BIOFILTER BAGS.
3. NEW SEDIMENT BARRIERS SHALL BE INSTALLED UPHILL AS REQUIRED TO CONTROL SEDIMENT TRANSPORT.

LAST REVISION DATE:	JO #
APRIL 2014	STANDARD

SEDIMENT BARRIERS

(NTS)

WESTECH ENG.	DETAIL NO. 6110



BARRIER SPACING FOR GENERAL APPLICATION

INSTALL PARALLEL TO CONTOURS AS FOLLOWS	
SLOPE RATIO	MAXIMUM SPACING ON SLOPE BETWEEN WATTLES
10.0% OR FLATTER	50' O.C.
10.1% TO 20.0%	25' O.C.
20.1% TO 30.0%	10' O.C.
30.1% OR STEEPER	5' O.C.

NOTES:

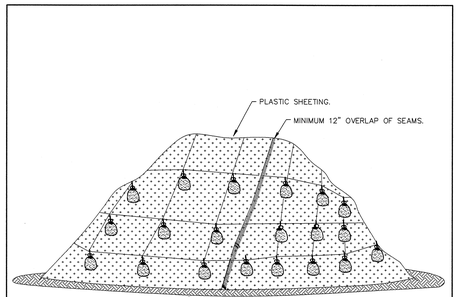
1. ALL MATERIAL SHALL CONFORM TO OSHD STANDARD SPECIFICATIONS, 1996 EDITION.
2. SEDIMENT BARRIERS SHALL BE MAINTAINED UNTIL UP–SLOPE AREA IS PERMANENTLY STABILIZED.
3. AT NO TIME SHALL SEDIMENT BE ALLOWED TO ACCUMULATE ABOVE THE TOP OF THE STRAW WATTLE.
4. NEW SEDIMENT BARRIERS SHALL BE INSTALLED UPHILL AS REQUIRED TO CONTROL SEDIMENT TRANSPORT.

LAST REVISION DATE:	JO #
DEC. 2000	STANDARD

STRAW WATTLE SEDIMENT BARRIER

(NTS)

WESTECH ENG.	DETAIL NO. 6120



STOCKPILE DETAIL

NOTES:

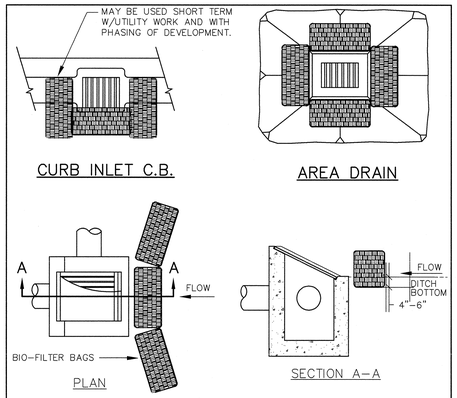
1. MINIMUM 12" OVERLAP OF ALL SEAMS REQUIRED.
2. BARRIER REQUIRED @ TOE OF STOCK PILE.
3. COVERING MAINTAINED TIGHTLY IN PLACE BY USING SANDBAGS OR TIRES ON ROPES WITH A MAXIMUM 10' GRID SPACING IN ALL DIRECTIONS.

LAST REVISION DATE:	JO #
AUG. 2015	STANDARD

STOCKPILE DETAIL

(NTS)

WESTECH ENG.	DETAIL NO. 6170



MAINTENANCE NOTES:

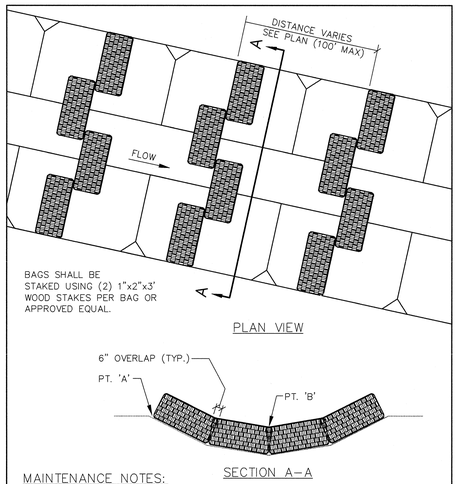
1. SEDIMENT BARRIERS SHALL BE MAINTAINED UNTIL UP–SLOPE AREA IS PERMANENTLY STABILIZED.
2. AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE BEHIND SEDIMENT FENCES OR BIOFILTER BAGS.
3. NEW SEDIMENT BARRIERS SHALL BE INSTALLED UPHILL AS REQUIRED TO CONTROL SEDIMENT TRANSPORT.

LAST REVISION DATE:	JO #
APRIL 2014	STANDARD

INLET SEDIMENT CONTROL

(NTS)

WESTECH ENG.	DETAIL NO. 6130



MAINTENANCE NOTES:

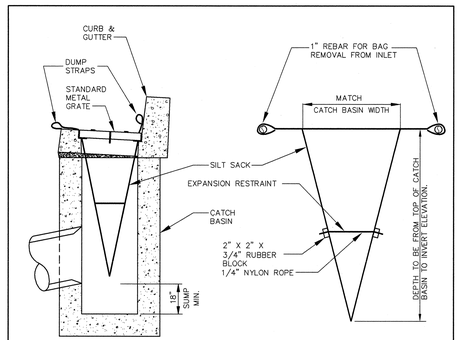
1. SEDIMENT BARRIERS SHALL BE MAINTAINED UNTIL UP–SLOPE AREA IS PERMANENTLY STABILIZED.
2. AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE BEHIND BIOFILTER BAGS.
3. NEW SEDIMENT BARRIERS SHALL BE INSTALLED UPHILL AS REQUIRED TO CONTROL SEDIMENT TRANSPORT.
4. PT. 'A' SHALL BE 6" MIN. HIGHER THAN PT. 'B'.

LAST REVISION DATE:	JO #
APRIL 2014	STANDARD

DITCH AND SWALE EROSION PROTECTION

(NTS)

WESTECH ENG.	DETAIL NO. 6140



NOTES:

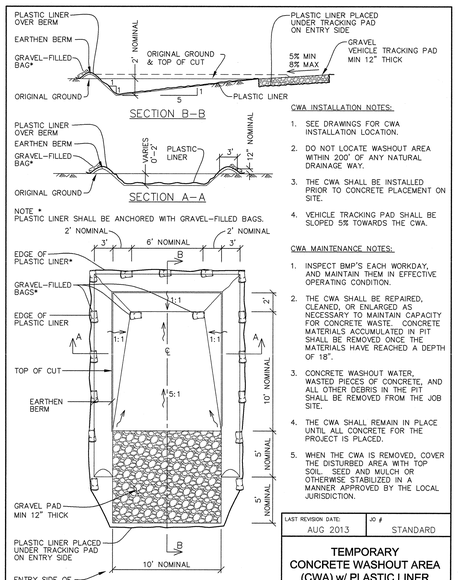
1. EMPTY SILT SACK AS NECESSARY.
2. SILTSACK SEDIMENT CONTROL DEVICE AS MANUFACTURED BY ACF ENVIRONMENTAL AND SUPPLIED BY ACF WEST (503) 771–5115 OR APPROVED EQUAL.

LAST REVISION DATE:	JO #
OCT 2002	STANDARD

SILTSACK INLET DETAIL

(NTS)

WESTECH ENG.	DETAIL NO. 6150



CWA INSTALLATION NOTES:

1. SEE DRAWINGS FOR CWA INSTALLATION LOCATION.
2. DO NOT LOCATE WASHOUT AREA WITHIN 200' OF ANY NATURAL DRAINAGE WAY.
3. THE CWA SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE.
4. VEHICLE TRACKING PAD SHALL BE SLOPED 5% TOWARDS THE CWA.

CWA MAINTENANCE NOTES:

1. INSPECT BMP'S EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION.
2. THE CWA SHALL BE REPAIRED, CLEANED, OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR CONCRETE WASTE. CONCRETE MATERIALS ACCUMULATED IN PIT SHALL BE REMOVED ONCE THE MATERIALS HAVE REACHED A DEPTH OF 18".
3. CONCRETE WASHOUT WATER, WASTED PIECES OF CONCRETE, AND ALL OTHER DEBRIS IN THE PIT SHALL BE REMOVED FROM THE JOB SITE.
4. THE CWA SHALL REMAIN IN PLACE UNTIL ALL CONCRETE FOR THE PROJECT IS PLACED.
5. WHEN THE CWA IS REMOVED, COVER THE DISTURBED AREA WITH TOP SOIL, SEED AND MULCH OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

LAST REVISION DATE:	JO #
AUG 2013	STANDARD

TEMPORARY CONCRETE WASHOUT AREA (CWA) w/ PLASTIC LINER

(NTS)

WESTECH ENG.	DETAIL NO. WE6161

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 12, 2005
WILLIAM J. WELLS
RENEWS: 6/30/2018

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2456 • WWW.CARLSONVEIT.COM
3065 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SAZAN GROUP
MSC ENGINEERS INC.

consultants:
kmd architecture+planning pc
220 nw eighth avenue portland, oregon 97209
t 503.221.1474
kmdarchitects.com

WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585–2474 Fax: (503) 585–3986
E–mail: westech@westech–eng.com

project:
MARION COUNTY SHERIFF
CENTRAL DISTRICT/PAROLE & PROBATION OFFICES

Marion County OREGON

revisions:

date: 6-5-17
project: A-SP-05416
dwg file: 05416
drawn by: RGS/TN
checked by: WJW

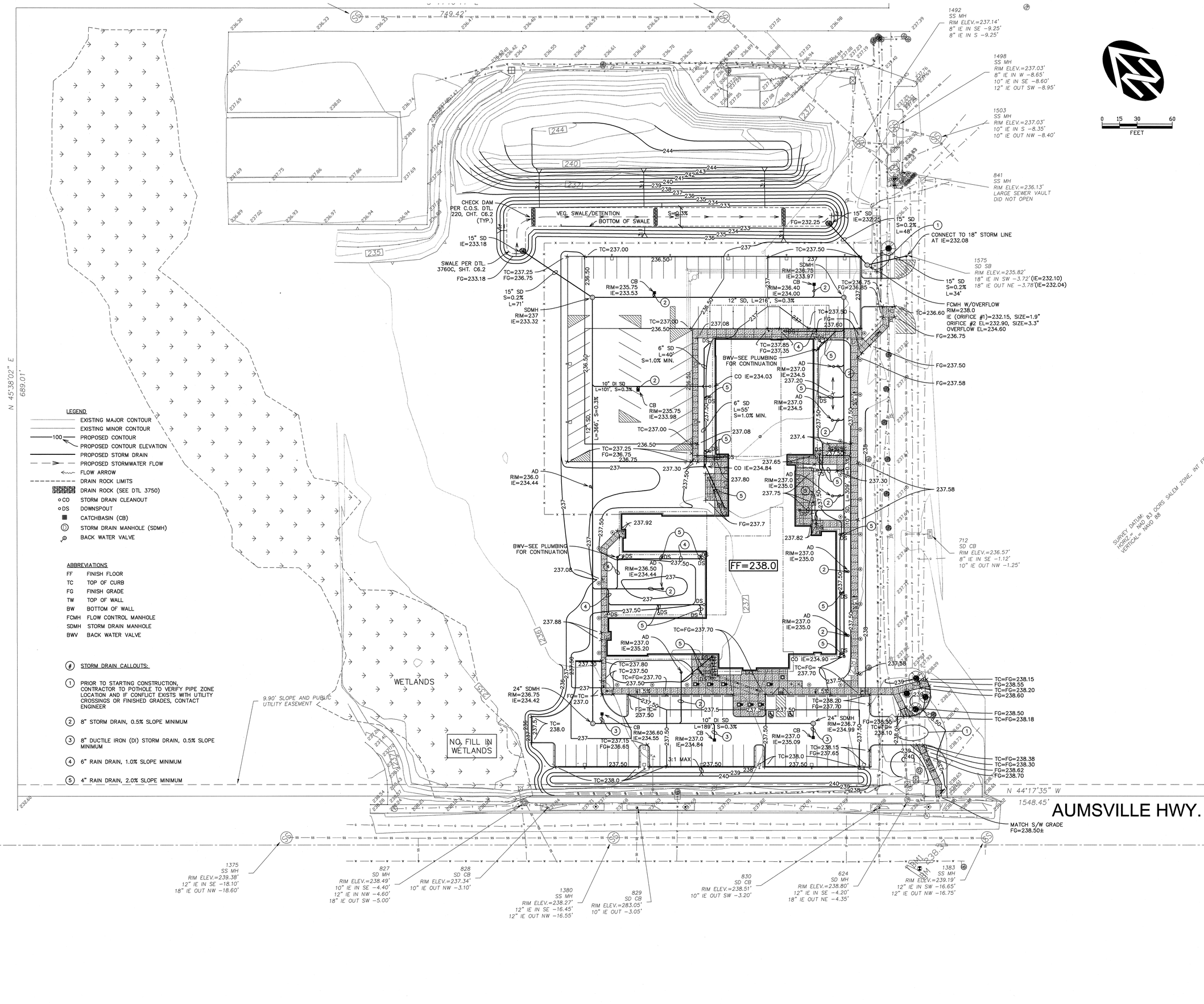
copyright© 2016 Carlson Veit Architects P.C.

EROSION CONTROL DETAILS

sheet:
C1.4

of:

5/31/2017 2:22:48 PM
R:\Dwg\CARL–V\Marion County Sheriffs–2942.00000.0\Civil\Plots\C1.0–1.4 EROSION CONTROL.dwg, (C1.4 tab)



5/31/2017 2:24:16 PM
R:\Dwg\CARL-V\Marion County Sheriffs-2942.0000.01\Civil\Plots\C2.0 GRADING & DRAINAGE.dwg, (Layout1 tab)

REGISTERED PROFESSIONAL ENGINEER OREGON DEC. 12, 2008 WILLIAM J. WELLS
RENEWS: 6/30/2018

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SAZAN GROUP
MSC ENGINEERS INC.

consultants:
kmd architecture planners pc
220 nw eighth avenue portland, oregon 97209
t 503.221.1474
kmdarchitects.com

WESTECH ENGINEERING, INC. CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: westech@westech-eng.com

project:
MARION COUNTY SHERIFF
CENTRAL DISTRICT/PAROLE & PROBATION OFFICES

Marion County OREGON

revisions:

date: 6-5-17
project: A-SP-05416
dwg file: 05416
drawn by: RGS/TN
checked by: WJW

copyright © 2016 Carlson Veit Architects P.C.

GRADING AND DRAINAGE PLAN

sheet:
C2.0
of:

S 44°16'44" E
749.42'

N 45°38'02" E
689.01'

WETLANDS

WETLANDS

9.90' SLOPE AND PUBLIC UTILITY EASEMENT

N 44°17'35" W
1548.45'

AUMSVILLE HWY.

FF=238.0

NEW SSCO

NEW 6" SS LINE
L=125', S=1.0% MIN.

NEW SS LINE
L=74', S=1.0% MIN.

1492
SS MH
RIM ELEV.=237.14'
8" IE IN SE -9.25' (IE=227.89)
8" IE IN S -9.25'

CONTRACTOR TO TAP EXISTING PRIVATE SS MANHOLE @ EL=228.10

1498
SS MH
RIM ELEV.=237.03'
8" IE IN W -8.65'
10" IE IN SE -8.60'
12" IE OUT SW -8.95'

1503
SS MH
RIM ELEV.=237.03'
10" IE IN S -8.35'
10" IE OUT NW -8.40'

841
SS MH
RIM ELEV.=236.13'
LARGE SEWER VAULT
DID NOT OPEN

CONTRACTOR TO TAP EXT'G DOMESTIC WATER LINE

1575
SD SB
RIM ELEV.=235.82'
18" IE IN SW -3.72'
18" IE OUT NE -3.78'

CONTRACTOR TO TAP EXT'G FIRE LINE W 12"x8" TEE & 6" G.V.

712
SD CB
RIM ELEV.=236.57'
8" IE IN SE -1.12'
10" IE OUT NW -1.25'

90° BEND W/ T.B.

8"x6" REDUCER

3" SCH 40 DOMESTIC WATER LINE

8" C900 FIRE SERVICE
6" D.I. FDC LINE

FDC DRAIN MH PER DTL U5610, SHT. C6.2

45° BENDS W/TB & RET. GLANDS

NEW FDC

DOMESTIC, FIRE, & FDC LINES IN COMMON TRENCH

NEW FH ASSEMBLY WITH 8"x6" TEE & 6" G.V.

3" SCH 40 DOMESTIC WATER LINE
3" C900 FIRE SERVICE
6" D.I. FDC LINE

CLEANOUT
IE @ BLDG=230.10
SEE PLUMBING FOR CONTINUATION

90° BEND W/ T.B. (BOTH FIRE & FDC)

SEE FIRE SERVICE DESIGN FOR MAIN LINE & FDC LINE CHECK VALVE

NEW FH ASSEMBLY

6" 45° BEND W/TB & RET. GLANDS

EXT'G 12" FIRE LINE

EXT'G 4" DOMESTIC WAT LINE

CONTRACTOR TO TAP EXT'G 12" PRIVATE FIRE LINE W/12"x6" TEE & 6" G.V. W/TBC

1375
SS MH
RIM ELEV.=239.38'
12" IE IN SE -18.10'
18" IE OUT NW -18.60'

827
SD MH
RIM ELEV.=238.49'
10" IE IN SE -4.40'
12" IE IN NW -4.60'
18" IE OUT SW -5.00'

828
SD CB
RIM ELEV.=237.34'
10" IE OUT NW -3.10'

1380
SS MH
RIM ELEV.=238.27'
12" IE IN SE -16.45'
12" IE OUT NW -16.55'

829
SD CB
RIM ELEV.=283.05'
10" IE OUT -3.05'

830
SD CB
RIM ELEV.=238.51'
10" IE OUT SW -3.20'

624
SD MH
RIM ELEV.=238.80'
12" IE IN SE -4.20'
18" IE OUT NE -4.35'

1383
SS MH
RIM ELEV.=239.19'
12" IE IN SW -16.65'
12" IE OUT NW -16.75'

(#) KEY CALLOUTS:

(1) PRIOR TO STARTING CONSTRUCTION, CONTRACTOR TO POTHOLE UTILITIES. IF CONFLICT EXISTS, CONTACT ENGINEER

NOTES:

1. ALL FIRE LINES & FDC LINES SHALL HAVE RESTRAINED PIPE, FITTINGS, & CONNECTIONS.

0 20 30 60
FEET

SURVEY DATUM:
HORIZ.= NAD 83 OCRS SALEM ZONE, INT FEET
VERTICAL= NAD 88

5/31/2017 2:24:50 PM
R:\Dwg\CAREL-V\Marion County Sheriffs-2942.0000.0\Civil\Plots\C3.0 UTILITY.dwg, (C3.0 tab)

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 12, 2005
WILLIAM J. WELLS
RENEWS: 6/30/2018

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SAZAN GROUP

MSC ENGINEERS INC.

consultants:
kmd architecture planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com

WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E. Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: westech@westech-eng.com

project:
MARION COUNTY SHERIFF
CENTRAL DISTRICT/PAROLE & PROBATION OFFICES

Marion County OREGON

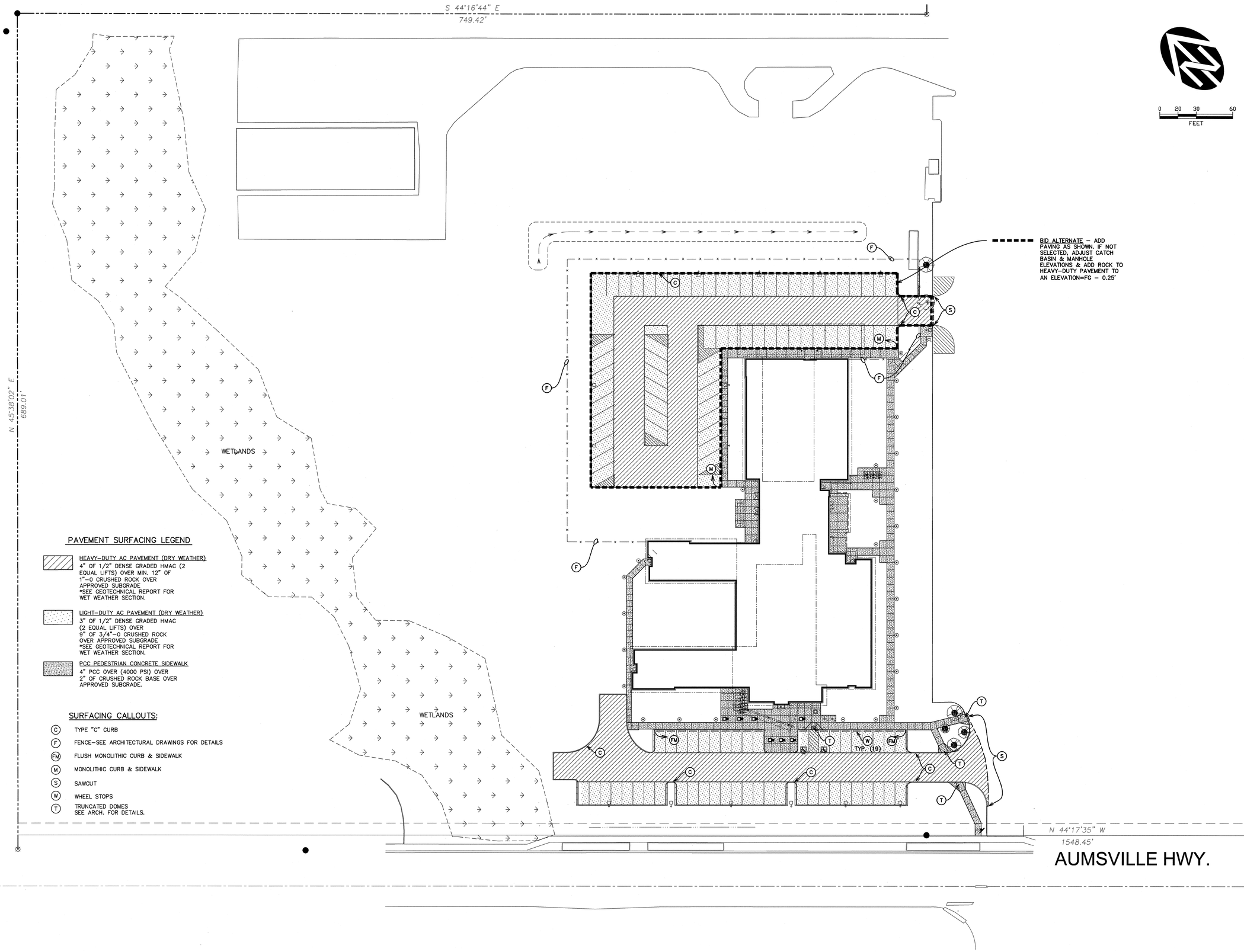
revisions:

date: 6-5-17
project: A-SP-05416
dwg file: 05416
drawn by: RGS/TN
checked by: WJW

copyright © 2016
Carlson Veit Architects P.C.

UTILITY PLAN

sheet:
C3.0
of:



PAVEMENT SURFACING LEGEND

HEAVY-DUTY AC PAVEMENT (DRY WEATHER)
4" OF 1/2" DENSE GRADED HMAC (2 EQUAL LIFTS) OVER MIN. 12" OF 1"-0 CRUSHED ROCK OVER APPROVED SUBGRADE
*SEE GEOTECHNICAL REPORT FOR WET WEATHER SECTION.

LIGHT-DUTY AC PAVEMENT (DRY WEATHER)
3" OF 1/2" DENSE GRADED HMAC (2 EQUAL LIFTS) OVER 9" OF 3/4"-0 CRUSHED ROCK OVER APPROVED SUBGRADE
*SEE GEOTECHNICAL REPORT FOR WET WEATHER SECTION.

PCC PEDESTRIAN CONCRETE SIDEWALK
4" PCC OVER (4000 PSI) OVER 2" OF CRUSHED ROCK BASE OVER APPROVED SUBGRADE.

SURFACING CALLOUTS:

- (C) TYPE "C" CURB
- (F) FENCE–SEE ARCHITECTURAL DRAWINGS FOR DETAILS
- (FM) FLUSH MONOLITHIC CURB & SIDEWALK
- (M) MONOLITHIC CURB & SIDEWALK
- (S) SAWCUT
- (W) WHEEL STOPS
- (T) TRUNCATED DOMES SEE ARCH. FOR DETAILS.

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

REGISTERED PROFESSIONAL ENGINEER
OREGON
NOV. 12, 2008
WILLIAM J. WELLS
RENEWS: 6/30/2018

SAZAN GROUP
MSC ENGINEERS INC.

Consultants:
kmd architecture+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com

WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: westech@westech-eng.com

project:
MARION COUNTY SHERIFF
CENTRAL DISTRICT/PAROLE & PROBATION OFFICES

Marion County OREGON

revisions:

date: 6-5-17
project: A-SP-05416
dwg file: 05416
drawn by: RGS/TN
checked by: WJW

copyright© 2016
Carlson Veit Architects P.C.

SURFACING PLAN

sheet:
C4.0
of:

5/31/2017 2:25:33 PM
R:\Dwg\CARL-V\Marion County Sheriffs-2942.0000.0\Civil\Plots\C4.0 SURFACING.dwg, (Layout1 tab)

General Notes

1. Contractor shall procure, pay all costs for, and conform to all construction permits required by the City of Salem. Contractor shall coordinate and pay all fees and costs associated with connecting to existing water, sanitary sewer and storm sewer facilities, including services and inspections by the Approving Agency. Costs shall include as applicable but not be limited to fees for connection, tapping, inspection, testing, chlorination, water meters, backflow certifications, or other similar or related costs. Owner to pay SDC, and plan review costs.

2. Oregon law requires the Contractor to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. Obtain copies of the rules by calling the center. (Note: the telephone number for the Oregon Utility Notification Center is 503-232-1987).

3. Contractor to notify City, County and all utility companies a minimum of 48 business hours (2 business days) prior to start of construction, and comply with all other notification requirements of the Approving Agency with jurisdiction over the work.

4. Contractor shall provide all bonds and insurance required by public and/or private agencies having jurisdiction. Where required by public and/or private agencies having jurisdiction, the Contractor shall submit a suitable maintenance bond prior to final payment.

5. For City construction permits, contact Salem Public Works Engineering Construction Management at 588-6211. For City building permits, contact Salem Permit Application Center at 588-6256.

6. Contractor to apply and pay for services at the permit application center (PAC office) for work to be done by City forces on public mains.

7. All materials and workmanship for facilities in street right-of-way or easements shall conform to Approving Agencies' construction specifications wherein each has jurisdiction, including but not limited to the City, County, Oregon Health Division (OHD) and the Oregon Department of Environmental Quality (DEQ).

8. Unless otherwise approved by the Public Works Director, construction of all public facilities shall be done between 7:00 a.m. and 6:00 p.m., Monday through Saturday.

9. The Contractor shall perform all work necessary to complete the project in accordance with the approved construction drawings including such incidentals as may be necessary to meet the Approving Agencies' requirements and provide a completed project.

10. Any inspection by the City, County or other Approving Agency shall not, in any way, relieve the Contractor from any obligation to perform the work in strict compliance with the contract documents, applicable codes, and Approving Agency requirements.

11. Contractor shall maintain one complete set of approved drawings on the construction site at all times whereon he will record all approved deviations in construction from the approved drawings, as well as the station locations and depths of all existing utilities encountered. These field record drawings shall be kept up to date at all times and shall be available for inspection by the Approving Agency or Owner's Representative upon request. Failure to conform to this requirement may result in delay in payment and/or final acceptance of the project.

12. Upon completion of construction of all new facilities, Contractor shall submit a clean set of field record drawings containing all as-built information to the Engineer. All information shown on the Contractor's field record drawings shall be subject to verification. If significant errors or deviations are noted, an as-built survey prepared and stamped by a registered professional Land Surveyor shall be completed at the Contractor's expense.

13. Contractor shall conform to DEQ stormwater permit No. 1200C for construction activities where 1 acre or more are disturbed.

14. The contractor shall retain and pay for the services of a registered Civil Engineer and/or Land Surveyor licensed in the State of Oregon to establish construction control and perform initial construction surveys to establish the lines and grades of improvements as indicated on the drawings. Staking for buildings, structures, curbs, gravity drainage pipes/structures and other critical improvements shall be completed using equipment accurate to 0.04 feet horizontally and 0.02 feet vertically, or better. Use of GPS equipment for final construction staking of these critical improvements is prohibited. The registered professional surveyor shall provide the design engineer with copies of all grade sheets for construction staking performed for the project.

15. See architectural drawings for site lighting, site dimensioning, and continuation of all utilities.

TRAFFIC CONTROL

16. Contractor shall erect and maintain barricades, warning signs, traffic cones (and all other traffic control devices required) per City and County requirements in accordance with the current MUTCD (including Oregon amendments). Access to driveways shall be maintained at all times. All traffic control measures shall be approved and in place prior to any construction activity. Prior to any work in the existing public right-of-way, Contractor shall submit final traffic control plan to the Approving Agency for review and issuance of a Lane Closure or Work in Right-of-Way Permit.

17. Prior to any work in the existing right-of-way, Contractor shall submit final traffic control plan to City of Salem for review and issuance of lane closure permit. Contractor to obtain a lane closure permit before construction starts for any work within the existing public right-of-way, including public street improvements or driveway connections to existing streets.

TESTING AND INSPECTION:

18. The Contractor shall be responsible to ensure that all required or necessary inspections are completed by authorized inspectors prior to proceeding with subsequent work which covers or that is dependent on the work to be inspected. Failure to obtain necessary inspection(s) and approval(s) shall result in the Contractor being fully responsible for all problems and/or corrective measures arising from uninspected work.

19. Unless otherwise specified, the attached "Required Testing and Frequency" table outlines the minimum testing schedule for the project. This testing schedule is not complete, and does not relieve the Contractor of the responsibility of obtaining all necessary inspections or observations for all work performed, regardless of who is responsible for payment. Cost for retesting shall be borne by the Contractor.

EXISTING UTILITIES & FACILITIES:

20. The location and descriptions of existing utilities shown on the drawings are compiled from available records and/or field surveys. The Engineer or utility companies do not guarantee the accuracy or the completeness of such records. Contractor shall field verify locations and sizes of all existing utilities prior to construction.

21. Utility locations are based on record information and should be field-verified. Call 1-800-332-2344 or at least 48 hours prior to construction for on-site locating of utilities. Contractor shall also be responsible for all costs associated with marking private onsite utilities prior to starting construction or ordering materials.

22. Prior to starting construction or ordering materials, contractor shall field verify location and depth of all existing utilities where new facilities cross. All utility crossings marked or shown on the drawings shall be potholed using hand tools or other non-invasive methods prior to excavating or boring. Contractor shall be responsible for exposing potential utility conflicts far enough ahead of construction to make necessary grade or alignment modifications without delaying work. If grade or alignment modification is necessary, Contractor shall notify the Design Engineer, and the Design Engineer or the Owner's Representative shall obtain approval from the Approving Agency prior to construction.

23. The Contractor shall be responsible for locating and marking all existing survey monuments of record (including but not limited to property and street monuments) prior to construction. If any survey monuments are removed, disturbed or destroyed during construction of the project, the Contractor shall retain and pay for the services of a Registered Professional Surveyor licensed in the State of Oregon to reference and replace all such monuments prior to final payment. The monuments shall be replaced within a maximum of 90 days, and the County Surveyor shall be notified in writing as required by per ORS 209.150.

24. All facilities shall be maintained in-place by the Contractor unless otherwise shown or directed. Contractor shall take all precautions necessary to support, maintain, or otherwise protect existing utilities and other facilities at all times during construction. Contractor to leave existing facilities in an equal or better-than-original condition and to the satisfaction of the Approving Agency and Owner's Representative.

25. Utilities or interfering portions of utilities that are abandoned in place shall be removed by the Contractor to the extent necessary to accomplish the work. The Contractor shall plug the remaining exposed ends of abandoned utilities after appropriate verification procedures have taken place.

26. Contractor shall remove all existing signs, mailboxes, fences, landscaping, etc., as required to avoid damage during construction and replace them to existing or better condition.

27. Unless otherwise approved by the Approving Agency, all field tiles or drain lines intercepted or exposed during construction shall be connected to new storm lines, unless they are removed completely during construction, or are located and plugged at 50 foot maximum intervals uphill of the location intercepted. Any abandoned drain tiles downstream of the intercepting trenches shall be plugged with grout.

28. The Contractor shall be responsible for managing construction activities to ensure that public streets and right-of-ways are kept clean of mud, dust or debris. Dust abatement shall be maintained by adequate watering of the site by the Contractor.

GRADING, PAVING & DRAINAGE:

29. Contractor to review soils report prepared by Redmond & Associates and conform to all recommendations listed in the report.

30. Unless otherwise noted, all grading, rocking and paving to conform to Oregon Standard Specifications for Construction (OSSC/ODOT/APWA), 2008 edition.

31. Clear and grub within work limits all surface vegetation, trees, stumps, brush, roots, etc. Do not damage or remove trees except as approved by the Owner's Representative or as shown on the drawings. Protect all roots two inches in diameter or larger.

32. Strip work limits, removing all organic matter, which cannot be compacted into a stable mass. All trees, brush, and debris associated with clearing, stripping or grading shall be removed and disposed of off-site.

33. For public and private improvements, except as otherwise allowed by the specifications, drawing details or notes, immediately following stripping and grading operations, compact subgrade to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor). Subgrade must be inspected and approved by the Owner's authorized representative before placing, engineered fills or fine grading for base rock.

34. Engineered fills shall be constructed and compacted in 6" lifts over approved subgrade. All fills shall be engineered and comply with the Oregon Structural Specialty Code, with each lift compacted to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor).

35. For private improvements, Granular baserock shall conform to the requirements of OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve.

36. Compact granular baserock to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor). Written baserock compaction test results from an independent testing laboratory must be received by the Owner's authorized representative before placing AC pavement, and a finished rock grade proof-roll (witnessed by the Owners authorized representative) must be performed.

37. For private improvements, A.C. pavement shall conform to OSSC (ODOT/APWA) 00745 (Hot Mixed Asphalt Concrete Pavement) for standard duty mix. Unless otherwise specified or shown on the drawings, base lifts shall be 3/4" dense graded mix, while wearing courses shall be 1/2" dense graded mix. Unless otherwise specified or shown on the drawings, A.C. pavement for parking lots and streets shall be Level 2 mix (50 blow Marshall) per OSSC (ODOT/APWA) 00744.13. A.C. Pavement shall be compacted to a minimum of 91% of maximum density as determined by the Rice standard. Written A.C. pavement compaction test results from an independent testing laboratory must be received by the Owner's authorized representative before final payment.

38. Pavement surface shall be a smooth, well-sealed, tight mat without depressions or bird baths. Bony or open graded pavement surfaces shall be repaired to the satisfaction of the Owner's authorized representative, prior to final acceptance of the work.

39. For private improvements, HMAC mixtures shall be placed only when the surface is dry and weather conditions are such that proper handling, finishing and compaction can be established. In no case shall bituminous mixtures be placed when the surface temperature is below the minimum established under 2008 OSSC (ODOT/APWA) 00744.40 (AC - Season and Temperature Limitations) or the project specifications, whichever is more stringent.

40. Contractor shall protect new pavement against traffic as required, until it has cooled sufficiently to avoid tracking.

41. For parking lots or private access drives, the final lift of AC pavement shall not be placed until after the building is fully enclosed and weatherproof, unless otherwise approved by the Owner's authorized representative.

42. Unless otherwise shown on the drawings or details, straight grades shall be run between all finish grade elevations and/or finish contour lines shown (exception: where grades shown cross sidewalks, slopes shall be adjusted to ensure that maximum allowable sidewalk cross slopes are not exceeded).

43. Finish pavement grades at transition to existing pavement shall match existing pavement grades or be feathered past joints with existing pavement as required to provide a smooth, free draining surface.

44. All existing or constructed manholes, cleanouts, monument boxes, gas valves, water valves and similar structures shall be adjusted to match finish grade of the pavement, sidewalk, landscaped area or median strip where they lie. Verify that all valve boxes and risers are clean and centered over the operating nut.

45. Unless otherwise shown on the drawings, no cut or fill slopes shall be constructed steeper than 3H:1V.

46. Unless otherwise on the landscape and irrigation plans shall be backfilled with approved topsoil minimum 8" thick. Stripping materials shall not be used for planter backfill.

47. Contractor shall seed and mulch (uniformly by hand or hydroseed) all exposed slopes and disturbed areas which are not scheduled to be landscaped, including trench restoration areas. If the Contractor fails to apply seed and mulch in a timely manner during periods favorable for germination, or if the seeded areas fail to germinate, the Owner or Owner Representative may (at his discretion) require the Contractor to install sod to cover such disturbed areas.

48. Grading shown on the drawings is critical to functioning of stormwater system and shall be strictly followed.

49. Contractor shall coordinate and ensure that stormwater swale and inspected and approved by public agencies having jurisdiction before paving and landscaping.

CURBS & SIDEWALKS:

50. Unless otherwise shown or indicated on the drawings, 6-inches nominal curb exposure used for design of all parking lot and street grades.

51. Where new curbing connects to existing curbing or is installed along existing streets or pavement, the gutter grade shall match the existing street grades so as to allow drainage from the street to the gutter and through any transitions. The Contractor shall notify the Owner's Representative in writing of any grade discrepancies or problems prior to curb placement.

52. Contractor shall construct all handicap access ramps in accordance with current ADA requirements.

53. Sidewalks shall be a minimum of 4-inches thick. Commercial use driveways and alley approaches shall be minimum 8-inches thick. All curbs, sidewalks and driveways shall be constructed using 3300-psi concrete, and shall be cured with Type 1 or Type 1D clear curing compound. All sidewalks shall be ADA compliant.

54. Curb & sidewalk concrete shall be placed only during periods when it will not be damaged by rain (protect unhardened concrete from precipitation). Concrete shall not be placed on frozen baserock. Do not begin concrete placement until temperature in the shade is a minimum of 35°F and rising, and stop placement if air temperature falls below 35°F. Protect concrete from freezing for a minimum of 5 days after placement per OSSC (ODOT/APWA) 0000440.40.d & 00756.40 or the project specifications, whichever is more stringent.

55. Contraction joints shall be installed directly over any pipes that cross under the sidewalk, to control cracking. In general, cracks in new curbs or sidewalks (at locations other than contraction joints) are not acceptable, and cracked panels shall be removed & replaced unless otherwise approved by the Approving Agency and the design engineer.

56. All sidewalks shall be ADA compliant. Direction of sidewalk cross slope shall conform with the slope direction shown on the grading plan. Sidewalk cross slopes shall not exceed 1:67 (1.5%) nor be less than 1%. Longitudinal slope shall not exceed 1:20 (5%).

57. Where trench excavation requires removal of PCC curbs and/or sidewalks, the curbs and/or sidewalks shall be sawcut and removed at a tooled joint unless otherwise authorized in writing by the Approving Agency. The sawcut lines shown on the drawings are schematic and not intended to show the exact alignment of such cuts.

58. Unless otherwise shown on the drawings, areas along curbs and sidewalks shall be backfilled with approved topsoil, as well as being seeded and mulched (or hydroseeded).

PIPED UTILITIES:

59. All tapping of existing private sanitary sewer, storm drain mains, and manholes must be done by Contractor forces.

60. The Contractor shall have appropriate equipment on site to produce a firm, smooth, undisturbed subgrade at the trench bottom, true to grade. The bottom of the trench excavation shall be shall be smooth, free of loose materials or tooth grooves for the entire width of the trench prior to placing the granular bedding material.

61. All pipes shall be bedded with minimum 6-inches of 3/4"-0 crushed rock bedding and backfilled with compacted 3/4"-0 crushed rock in the pipe zone (crushed rock shall extend a minimum of 12-inches over the top of the pipe in all cases). Unless CDF or other backfill is shown or noted on the drawings, crushed rock trench backfill shall be used under all improved areas, including pavement, sidewalks, foundation slabs, buildings, etc.

62. Granular trench bedding and backfill shall conform to the requirements of OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), 3/4"-0. Unless otherwise shown on the drawings, compact granular backfill to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor).

63. Contractor shall arrange to abandon existing sewer and water services not scheduled to remain in service in accordance with approving agency requirements.

64. All piped utilities abandoned in place shall have all openings closed with concrete plugs with a minimum length equal to 2 times the diameter of the abandoned pipe.

65. The end of all utility service lines shall be marked with a 2-x-4 painted white and wired to pipe stub. The pipe depth shall be written on the post in 2" block letters.

66. All non-metallic water, sanitary and storm sewer piping shall have an electronically conductive insulated 12 gauge solid core copper tracer wire the full length of the installed pipe using blue wire for water and green wire for storm and sanitary piping. Tracer wire shall be extended up into all valve boxes, catch basins, manholes and lateral cleanout boxes. Tracer wire penetrations into manholes shall be within 18 inches of the rim elevation and adjacent to manhole steps. The tracer wire shall be tied to the top manhole step or otherwise supported to allow retrieval from the outside of the manhole. All tracer wire splices shall be made with waterproof splices or waterproof/corrosion resistant wire nuts.

67. No trenches in sidewalks, roads, or driveways shall be left in an open condition overnight. All such trenches shall be closed before the end of each workday and normal traffic and pedestrian flows restored.

68. Before mandrel testing, TV inspection or final acceptance of gravity pipelines, all trench compaction shall be completed and all sewers and storm drains flushed & cleaned to remove all mud, debris & foreign material from the pipelines, manholes and/or catch basins.

69. Where future extensions are shown upstream of new manholes (sewer or storm), catch basins, or junction boxes, pipe stubs (with gasketed caps) shall be installed at design grades to a point 2' minimum outside of the structure.

WATER SYSTEM:

70. City forces to operate all valves, including fire hydrants, on existing public mains.

71. All water mains shall be Class 52 ductile iron or C-900 PVC (DR 18). All fittings 4-inches through 24-inches in diameter shall be ductile iron fittings in conformance with AWWA C-153 or AWWA C-110. The minimum working pressure for all MJ cast iron or ductile iron fittings 4-inches through 24-inch in diameter shall be 350 psi for MJ fittings and 250 psi for flanged fittings.

72. All water mains to be installed with a minimum 36 inch cover to finish grade unless otherwise noted or directed. Water service lines shall be installed with a minimum 30-inch cover. Deeper depths may be required as shown on the drawings or to avoid obstructions.

73. Unless otherwise shown or approved by the Engineer, all valves shall be flange connected to adjacent tees or crosses.

74. Thrust restraint shall be provided on all bends, tees and other direction changes per Approving Agency requirements and as specified or shown on the drawings.

75. Unless otherwise noted, water service pipe 3-inch and smaller on the private side of the meter shall be Schedule 40 PVC. Water service pipe 4-inches and larger on the private side of the meter shall be C900, pressure service piping shall be hydrostatically pressure tested to a minimum of 150% of the maximum static pressure at the site. All materials and workmanship for all private water lines, including water lines located within any building envelope, shall be installed in conformance with Uniform Plumbing Code requirements. All water service pipe on the private side of the meter shall be installed by a licensed plumber in accordance with Uniform Plumbing Code requirements.

76. Domestic and fire backflow prevention devices and vaults shall conform to requirements of public and/or private agencies having jurisdiction. The Contractor shall be responsible for having backflow devices tested and certified prior to final acceptance of the work.

77. Contractor shall provide all necessary equipment and materials (including plugs, bloworffs, valves, service taps, etc.) required to flush, test and disinfect waterlines per the Approving Agency requirements.

78. The work shall be performed in a manner designated to maintain water service to buildings supplied from the existing waterlines. In no case shall service to any main line or building be interrupted for more than four (4) hours in any one-day. Contractor shall notify the Approving Agency and all affected residents and businesses a minimum of 24 business hours (1 business day) before any interruption of service.

79. Where new waterlines cross below or within 18-inches vertical separation above a sewer main or sewer service lateral, center one full length of waterline pipe at point of crossing the sewer line or sewer lateral. In addition (unless otherwise approved in writing by the Owner or Approving Agency, existing sewer mains and/or service laterals within this zone shall be replaced with a full length of Class 50 Ductile Iron or C-900 PVC pipe (DR 18) centered at the crossing in accordance with OAR 333-061 and Approving Agency requirements. Connect to existing sewer lines with approved rubber couplings. Example: For an 8-inch waterline with 36-inches cover, 4-inch service lateral inverts within 5.67-feet (68-inches) of finish grade must be DI or C-900 PVC at the crossing.

80. All waterlines, services and appurtenances shall be pressure tested for leakage. All testing shall conform to requirements as outlined in the specifications, Approving Agency standards and/or testing forms. The hydrostatic test shall be performed with all service line corporation stops open and meter stops closed, and with all hydrant line valves open. Prior to the start of each pressure test, the position of all mainline valves, hydrant line valves and service line corporation stops in the test segment shall verified.

81. After the pressure test and prior to disinfecting, the water lines shall be thoroughly flushed through hydrants, blow offs or by other approved means.

82. Disinfection & Bacteriological Testing. All water mains and service lines shall be chlorine disinfected per Approving Agency requirements, AWWA C-651 or OAR 333-061 (25 mg/L minimum chlorine solution, 24 hours contact time), whichever is more stringent. Unless otherwise approved by the Approving Agency, a Representative from the Approving Agency shall witness the application of the chlorine solution and the chlorine testing at the end of the 24 hour contact period. After the 24 hour chlorine contact period, the free chlorine concentration shall be checked, and if it is found to be 10 mg/L or more, the chlorine solution shall be drained (otherwise the line shall be rechlorinated), the waterline flushed with potable water, and a minimum of two consecutive samples taken at least 24 hours apart shall be collected from the waterline for microbiological analysis (ie. one sample immediately after flushing, and another sample 24 hours later). Contractor to pay for laboratory analysis of water samples taken under the supervision of the Approving Agency. If the results of both analyses indicate that the water is free of coliform organisms, the waterline may be placed in service. Should the initial treatment prove ineffective, the chlorination shall be repeated until confirmed tests show acceptable results.

83. Disinfection of Connections. For connections which cannot be disinfected with the waterline mainlines as noted above, all fittings, valves and appurtenances, including tool surfaces which will come in contact with potable water, shall be thoroughly cleaned by washing with potable water and then swabbed or sprayed with a one percent (1%) hypochlorite solution (10,000 mg/L) in accordance with the requirements of AWWA C-651 and OAR 333-061.

SEWER & STORM MANHOLES:

84. All precast manholes shall be provided with integral rubber boots. Where manholes without integral rubber boots are approved by the Owner's Representative and Approving Agency, a pipe joint shall be provided on all mainlines within 1.5 feet of the outside face of the manhole. Where required by Public Works, watertight lockdown lids required on all manholes outside of public right-of-way.

85. Openings for connections to existing manholes shall be made by core-drilling the existing manhole structure, and installing a rubber boot. Connections shall be watertight and shall provide a smooth flow into and through the manhole with no ponding. Small chipping hammers or similar light tools which will not damage or crack the manhole base may be used to shape channels, but may be used to enlarge existing openings only if authorized in writing by the Owner's Representative. Use of pneumatic jackhammers shall be prohibited.

86. Manhole channels depths (sewer & storm) shall be to the heights shown on the drawings, but in no case shall be the channel depth be less than 2/3 of the pipe diameter. Channels, as well as shelves between the channels and the manhole walls, shall be sloped to drain per plan details.

87. Manholes constructed over existing sanitary sewers shall conform to the requirements of OSSC (ODOT/APWA) 490.41, Manholes over Existing Sewers. The existing pipe shall not be broken out until after the completion of the manhole test.

SANITARY SEWER SYSTEM:

88. Unless otherwise specified, sanitary sewer pipe shall be solid wall PVC in conformance with ASTM D3034, SDR 35 (S15") or ATSM F-679, PS 46 (218"). Minimum stiffness shall be 46 psi per ASTM D-2412 and joint type shall be elastomeric gasket conforming to ASTM D-3212. All other appurtenances and installation to conform to the Approving Agency's specifications. All materials and workmanship for all private sanitary sewers, including sewers located within any building envelope, shall be installed in conformance with Uniform Plumbing Code requirements.

89. Unless otherwise specifically noted on the drawings, manufactured fittings (tee or wye per Approving Agency) shall be used for all lateral connections to new sewer mainlines.

90. Contractor shall provide all necessary materials, equipment and facilities to test sanitary sewer pipe and appurtenances for leakage in accordance with the testing schedule herein or the Approving Agency's construction standards, whichever are more stringent. Sanitary sewer pipe and appurtenances shall be tested for leakage. Leakage tests shall include air testing of all sewer mains and laterals and vacuum testing of the manholes. Manhole testing shall be performed after completion of AC pavement and final surface restoration.

91. After manhole channeling and prior to mandrel testing and/or TV inspection, flush and clean all sewers, and remove all foreign material from the mainlines and manholes. Failure to clean all dirt, rock and debris from pipelines prior to TV inspection will result in the need to re-clean and re-TV the sewer lines.

92. Contractor shall conduct deflection test of flexible sanitary sewer pipes by pulling an approved mandrel through the completed pipeline following trench compaction. The diameter of the mandrel shall be 95% of the initial pipe diameter. Test shall be conducted not less than 30 days after trench backfilling and compaction has been completed, unless otherwise approved by the Approving Agency.

93. Upon completion of all sanitary sewer construction, testing and repair, the Contractor shall conduct a color TV acceptance inspection of all mainlines in accordance with OSSC (ODOT/APWA) 445.74 to determine compliance with grade requirements of OSSC (ODOT/APWA) 445.40.b. The TV inspection shall be conducted by an approved technical service which is equipped to make audio-visual recordings of the TV inspections on DVD (VHS video tape acceptable only upon prior written approval by Public Works). Unless otherwise required by the Approving Agency, a standard 1-inch diameter ball shall be suspended in front of the camera during the inspection to determine the depth of any standing water. Sufficient water to reveal low areas or reverse grades shall be discharged into the pipe immediately prior to initiation of the TV inspection. The DVD and written report shall be delivered to the Approving Agency.

STORM DRAIN SYSTEM:

94. Storm sewer pipe materials shall conform to the construction drawings and Approving Agency's requirements. Unless otherwise noted or shown on the drawings, storm sewer pipe materials with watertight joints shall conform to the attached "Storm Pipe Table". Contractor shall use uniform pipe material on each pipe run between structures unless otherwise directed or approved. Jointed HDPE pipe shall not be used for slopes exceeding ten percent (10%). All materials and workmanship for all private storm drains, including storm drains located within any building envelope, shall be installed in conformance with Uniform Plumbing Code requirements.

95. Contractor shall designate the pipe material actually installed on the field record drawings and provide this information for inclusion on the as-built drawings.

96. Catch basins and junction boxes shall be set square with buildings or with the edge of the parking lot or street wherein they lie. Storm drain inlet structures and paving shall be adjusted so water flows into the structure without ponding water.

97. Unless otherwise approved by the Engineer, all storm drain connections shall be by manufactured tees or saddles.

98. Unless otherwise shown on the drawings, all storm pipe inlets & outfalls shall be beveled flush to match the slope wherein they lie.

99. Sweep (deflect) storm sewer pipe into catch basins and manholes as required. Maximum joint deflection shall not exceed 5 degrees or manufacturers recommendations, whichever is less.

100. Unless otherwise shown or directed, install storm sewer pipe in accordance with manufacturer installation guidelines.

101. After manhole channeling and prior to mandrel testing or final acceptance, flush and clean all sewers, and remove all foreign material from the mainlines, manholes and catch basins.

102. Mandrel Testing. Contractor shall conduct deflection test of flexible storm sewer pipes by pulling an approved mandrel through the completed pipeline following trench compaction. The diameter of the mandrel shall be 95% of the initial pipe diameter. Test shall be conducted not more than 30 days after the trench backfilling and compaction has been completed.

103. Prior to acceptance, the Owner's Representative may lamp storm lines upstream & downstream of structures to verify that the pipes are clean and there is no grout or concrete in the mainlines, and that there are no observable bellies in the line. When necessary, sufficient water to reveal low areas shall be discharged into the pipe by the Contractor prior to any such inspection by the Owner's Representative or the Approving Agency.

FRANCHISE & PRIVATE UTILITIES:

104. Unless otherwise shown on the drawings or approved by jurisdiction having authority, all new franchise and private utilities (power, cable TV, telephone, gas, data, communication, control, alarms, etc.) shall be installed underground. Installation of such utilities or associated conduits in a common trench with public water, sanitary sewer, or storm sewer is prohibited.

105. Contractor shall coordinate with gas, power, telephone, and cable TV Company for location of conduits in common trenches, as well as location or relocation of vaults, pedestals, etc. The Contractor shall be responsible for providing franchise utility companies adequate written notice of availability of the open trench (typically 10 days minimum), and reasonable access to the open trench. Unless otherwise approved in writing by the Approving Agency, all above-grade facilities shall be located in PUEs (where PUEs exist or will be granted by the development), and otherwise shall be placed in a location outside the proposed sidewalk location.

106. Unless otherwise approved by the Approving Agency, installation of private utilities (including either franchise utilities or private water, sewer or storm services) in a common trench with or within 3 feet horizontally of and paralleling public water, sanitary sewer or storm drains is prohibited.

107. Power, telephone and TV trenching and conduits shall be installed per utility company requirements with pull wire. Contractor shall verify with utility company for size, location and type of conduit before construction, and shall ensure that trenches are adequately prepared for installation per utility company requirements. All changes in direction of utility conduit runs shall have long radius steel bends.

108. Contractor shall notify and coordinate with franchise utilities for removal or relocation of power poles, vaults, pedestals, manholes, etc. to avoid conflict with Public utility structures, fire hydrants, meters, sewer or storm laterals, etc.

STORM PIPE TABLE	
Cover Depth	6" – 18" Diameter
Less than 2' Cover	Class 50 ductile iron pipe with bell and spigot joints and rubber gasket.
2' to 2–1/2' Cover	Pipe specified for lesser cover depths –or– Class 3, ASTM C–14 non–reinforced concrete pipe with bell and spigot joints & rubber gaskets, ASTM 150 Type II cement. –or– PVC pipe conforming to AWWA C900 DR 18 (6"–12") or AWWA C–905 (14"–18") with bell and spigot joints and rubber gasket
2–1/2' to 15' Cover	Pipe specified for lesser cover depths –or– PVC pipe conforming to ASTM D–3034 PVC SDR 35 (6"–15") or ASTM F–679 PVC solid wall SDR 35 (18") with bell and spigot joints and rubber gasket. –or– HDPE (high density polyethlene) pipe conforming to AASHTO M–252, (8"–10") or AASHTO M–294 (12"–18"). For slopes less than 6% the pipe shall be ADS N–12 IB ST, Hancor Sure–Lok F477, or approved equal. For slopes greater than 6% the pipe shall be ADS N–12 IB ST, Hancor Blue Seal, or approved equal with watertight pressure testable fittings, –except– jointed HDPE (high density polyethylene) pipe referenced above not permitted for depth to invert greater than 12 feet.

REQUIRED TESTING AND FREQUENCY TABLE		Party Responsible for payment		
		Contractor	Others (see note 1)	
Streets, Fire Lanes, Common Driveways, Parking Lots, Pads, Fills, etc.				
Subgrade	1 Test/4000 S.F./Lift (4 min)	✓	See note 2 & note 3	
Engineered Fills	1 Test/4000 S.F./Lift (4 min)	✓	See note 2 & note 5	
Baserock	1 Test/4000 S.F./Lift (4 min)	✓	See note 2 & note 3	
Asphalt	1 Test/6000 S.F./Lift (4 min)	✓	See note 2	
Piped Utilities, All				
Trench Backfill	1 Test/200 Foot Trench/Lift (4 min)	✓	See note 2	
Trench AC Restoration	1 Test/300 Foot Trench (4 min)	✓	See note 2	
Water				
Pressure Test	(to be witnessed by Owner's Representative or approving agency)	✓	See note 4	
Bacterial Water Test	Per Oregon Health Division	✓	See note 2	
Chlorine Residual Test	Per City Requirements	✓		
Sanitary Sewer				
Air Test	Per City or APWA Requirements, whichever is more stringent	✓	See note 4	
Mandrel	95% of actual inside diameter	✓	See note 4	
TV Inspection	All. Lines must be cleaned prior to TV work	✓		
Manhole	(1) Vacuum test per manhole, witnessed by Owner's Representative or approving agency	✓	See note 2	
Storm				
Mandrel	95% of actual inside diameter	✓	See note 4	
Concrete, Block, etc.				
Slump, Air & Cylinders for all structures, curbs, sidewalks & PCC pavements. Unless otherwise specified, one set of cylinders per 100 cubic yards (or portion thereof) of concrete poured per day. Slump & air tests required on same load as cylinders.		✓	See note 2	

Note 1: "Others" refers to Owner's authorized Representative or Approving Agency as applicable. Contractor responsible for scheduling testing. All testing must be completed prior to performing subsequent work.

Note 2: Testing must be performed by an approved independent testing laboratory.

Note 3: In addition to in–place density testing, the subgrade and base rock shall be proof–rolled with a loaded 10 yard dump truck provided by the Contractor. Baserock proofroll shall take place immediately prior to (within 24 hours of) paving, and shall be witnessed by the Owner's authorized Representative or approving agency. Location and pattern of proofroll to be as directed by said Owner's authorized Representative or approving agency.

Note 4: To be witnessed by the Owner's Representative or approving agency. The Contractor shall perform pretests prior to scheduling witnessed waterline or sanitary sewer pressure tests, or pipeline mandrel test.

Note 5: The approved independent laboratory retained by the Contractor shall provide a certification (stamped by an engineer licensed in the State of Oregon) that the subgrade was prepared and all engineered fills were placed in accordance with the provisions of the construction drawings and the contract documents.

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 12, 2005
WILLIAM L. WELLS
RENEWS: 6/30/2018

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2458 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SAZAN GROUP
MSC ENGINEERS INC.

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com

WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
e-mail: mail@westech-eng.com

project:
MARION COUNTY SHERIFF
CENTRAL DISTRICT/PAROLE & PROBATION OFFICES
Marion County OREGON

revisions:

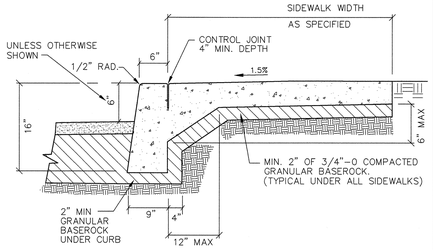
date: 6-5-17
project: A-SP-05416
dwg file: 05416
drawn by: RGS/TN
checked by: WJW

copyright© 2016
Carlson Veit Architects P.C.

CONSTRUCTION NOTES

sheet:
C5.0
of:

5/31/2017 2:25:58 PM
R:\Dwg\CARL_V\Marion County Sheriffs-2942.0000.01\Civil\Plots\C5.0-C6.2 NOTES & DETAILS.dwg, (C5.0 tab)



TYPICAL SECTION

NTS

NOTES:

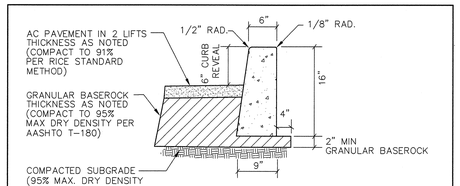
1. CONCRETE DEPTH FOR STANDARD SIDEWALKS SHALL BE 4" MIN.
2. CONCRETE SHALL BE 3300 PSI @ 28 DAYS.
3. INSTALL TOOLED CONTRACTION JOINTS AT 5' INTERVALS. SIDEWALKS 10' & WIDER SHALL HAVE A LONGITUDINAL CONTRACTION JOINT AT 5' ON CENTER.
4. INSTALL MIN. 2 WEEP HOLES ON ALL LOTS. ONE WEEP HOLE TO BE AT LOW POINT OF LOT, 5' FROM P/L. A CONTRACTION JOINT SHALL BE PLACED ALONG AND OVER WEEPHOLE & DRAIN PIPE
5. PUBLIC SIDEWALKS SHALL BE LOCATED ENTIRELY WITHIN RIGHT-OF-WAYS OR SIDEWALK EASEMENTS, INCLUDING SIDEWALKS AT DRIVEWAY APRONS.

LAST REVISION DATE:	JO #
NOV 2013	STANDARD

MONOLITHIC CURB AND SIDEWALK

(NTS)

WESTECH ENG.	DETAIL NO. 2112



PAVEMENT & BASEROCK SECTIONS:

1. LIGHT DUTY PAVEMENT
   SEE SHEET C4.0 PAVEMENT LEGEND
2. HEAVY DUTY PAVEMENT
   SEE SHEET C4.0 PAVEMENT LEGEND

PAVEMENT/TYPE "C" CURB DETAIL

NTS

NOTES:

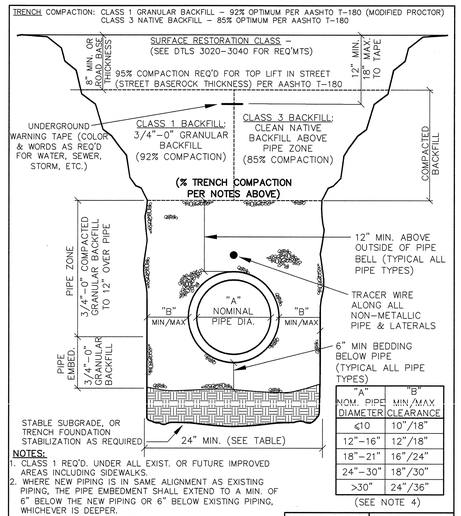
1. SEE GRADING PLAN FOR LOCATION OF LIGHT AND HEAVY DUTY PAVEMENT.
2. DESIGN SUBGRADES SHALL BE COMPACTED AND PROOF-ROLLED PRIOR TO PLACEMENT OF BASEROCK. IF SUBGRADE PASSES PROOF-ROLL BUT FAILS DENSITY TESTING, MIN. 4.5 OZ NON-WOVEN GEOTEXTILE FABRIC SHALL BE PLACED ON SUBGRADE PRIOR TO PLACEMENT OF BASEROCK. FAILURE OF PROOF-ROLL WILL REQUIRE OVEREXCAVATION.
3. IF SUBGRADE FAILS THE PROOF-ROLL, SUBGRADE SHALL BE OVEREXCAVATED TO UNDISTURBED SOIL AND BACKFILLED WITH BASEROCK OVER MIN. 8.0-OZ. NON-WOVEN FABRIC AS REQUIRED TO ALLOW COMPACTION OF UPPER (DESIGN) BASEROCK SECTION AND TO MAINTAIN STRUCTURAL INTEGRITY OF NATIVE SUBGRADE SOILS. TYPICAL MIN. OVEREXCAVATION REQUIRED IS 12-INCHES. NO RUBBER TIRED EQUIPMENT ALLOWED ON SUBGRADE FOLLOWING OVEREXCAVATION.
4. SUBGRADE TO BE PROOFROLLED IMMEDIATELY PRIOR TO PLACING BASEROCK. BASEROCK TO BE PROOFROLLED IMMEDIATELY PRIOR TO PAVING.
5. CONTRACTION JOINTS SHALL BE PLACED AT 15' MIN. INTERVALS AND SHALL EXTEND AT LEAST 50% THROUGH THE CURB SECTION.
6. ALL CONCRETE SHALL BE 3300 PSI @ 28 DAYS.
7. CURBS TO CURE A MINIMUM OF 7 DAYS PRIOR TO PLACING FINAL BASEROCK AND PAVING. USE TYPE 1 OR 1-D CLEAR CURING COMPOUND.

LAST REVISION DATE:	JO #
DEC 1999	X

PAVEMENT AND TYPE 'C' CURB DETAIL

(NTS)

WESTECH ENG.	DETAIL NO. 2390



"A" NOM. PIPE DIAMETER	"B" MIN/MAX CLEARANCE
≤10	10"/18"
12"-16"	12"/18"
18"-21"	16"/24"
24"-30"	18"/30"
>30"	24"/36"

(SEE NOTE 4)

NOTES:

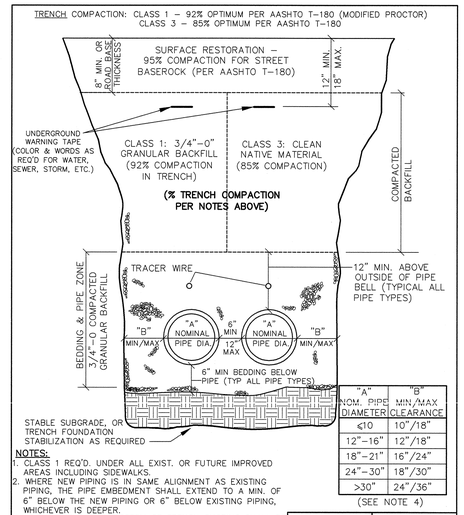
1. CLASS 1 REQ'D. UNDER ALL EXIST. OR FUTURE IMPROVED AREAS INCLUDING SIDEWALKS.
2. WHERE NEW PIPING IS IN SAME ALIGNMENT AS EXISTING PIPING, THE PIPE EMBEDMENT SHALL EXTEND TO A MIN. OF 6" BELOW THE NEW PIPING OR 6" BELOW EXISTING PIPING, WHICHEVER IS DEEPER.
3. FOR FLEXIBLE PIPE, BOTTOM OF TRENCH SHORING SHALL BE ABOVE PIPE SPRINGLINE PRIOR TO COMPACTING BACKFILL BELOW THE PIPE SPRINGLINE AND UNDER THE PIPE HAUNCHES.
4. MINIMUM CLEARANCES SHOWN ("B") ASSUMES STANDARD 6" WALL TRENCH BOXES SET ON TRENCH BOTTOM, AND REPRESENTS WIDTH REQUIRED TO CONSOLIDATE GRANULAR MATERIAL UNDER PIPE HAUNCHES (TO AVOID LOSS OF SIDE SUPPORT WHEN TRENCH BOX IS MOVED OR PULLED FORWARD). TRENCH WIDTH REDUCTION REQUIRES PRIOR APPROVAL BASED ON ACTUAL TRENCH SHORING PROPOSED.

LAST REVISION DATE:	STANDARD
JAN 2016	STANDARD

TRENCH BACKFILL, BEDDING, AND PIPE ZONE

(NTS)

WESTECH ENG.	DETAIL NO. 3010



"A" NOM. PIPE DIAMETER	"B" MIN/MAX CLEARANCE
≤10	10"/18"
12"-16"	12"/18"
18"-21"	16"/24"
24"-30"	18"/30"
>30"	24"/36"

(SEE NOTE 4)

NOTES:

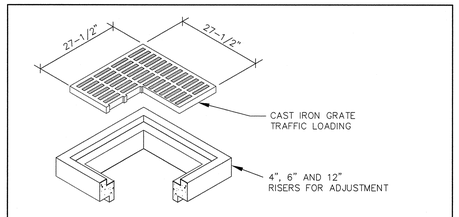
1. CLASS 1 REQ'D. UNDER ALL EXIST. OR FUTURE IMPROVED AREAS INCLUDING SIDEWALKS.
2. WHERE NEW PIPING IS IN SAME ALIGNMENT AS EXISTING PIPING, THE PIPE EMBEDMENT SHALL EXTEND TO A MIN. OF 6" BELOW THE NEW PIPING OR 6" BELOW EXISTING PIPING, WHICHEVER IS DEEPER.
3. FOR FLEXIBLE PIPE, BOTTOM OF TRENCH SHORING SHALL BE ABOVE PIPE SPRINGLINE PRIOR TO COMPACTING BACKFILL BELOW THE PIPE SPRINGLINE AND UNDER THE PIPE HAUNCHES.
4. MINIMUM CLEARANCES SHOWN ("B") ASSUMES STANDARD 6" WALL TRENCH BOXES SET ON TRENCH BOTTOM, AND REPRESENTS WIDTH REQUIRED TO CONSOLIDATE GRANULAR MATERIAL UNDER PIPE HAUNCHES (TO AVOID LOSS OF SIDE SUPPORT WHEN TRENCH BOX IS MOVED OR PULLED FORWARD). TRENCH WIDTH REDUCTION REQUIRES PRIOR APPROVAL BASED ON ACTUAL TRENCH SHORING PROPOSED.

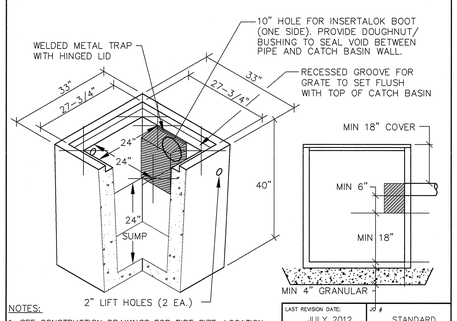
LAST REVISION DATE:	JO #
DEC 2015	STANDARD

MULTIPLE PIPE TRENCH BEDDING, PIPE ZONE & BACKFILL

(NTS)

WESTECH ENG.	DETAIL NO. 3011





NOTES:

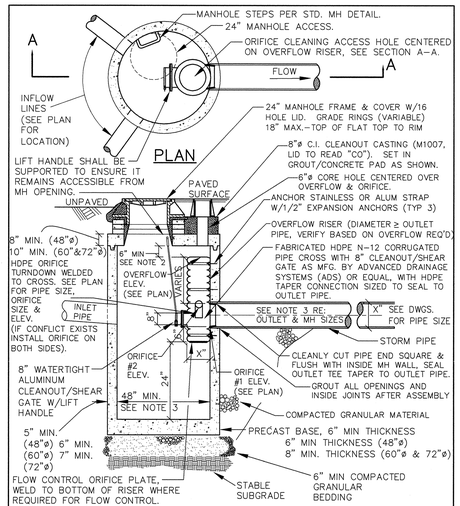
1. SEE CONSTRUCTION DRAWINGS FOR PIPE SIZE, LOCATION AND INVERT ELEVATION.
2. CONCRETE SHALL BE 4000 PSI @ 28 DAYS.
3. REBAR SHALL CONFORM TO ASTM A615 GRADE 60.
4. REBAR SHALL BE MIN. #4 BARS @ 6" C.C.
5. SET CB SQUARE WITH BUILDINGS OR WITH EDGE OF PARKING LOT OR DRIVEWAY WHEREIN IT LIES.
6. ADJUST PAVING SO WATER FLOWS TO CB WITH NO PONDING

LAST REVISION DATE:	JO #
JULY 2012	STANDARD

PARKING LOT CATCH BASIN (PRECAST CONCRETE)

(NTS)

WESTECH ENG.	DETAIL NO. 3150



SECTION A-A

NOTES:

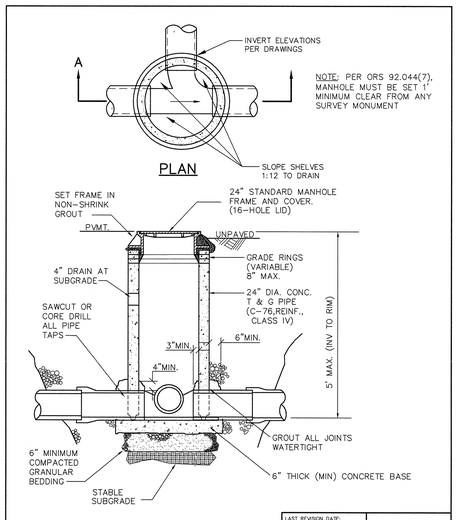
1. PRECAST SECTIONS SHALL CONFORM TO ASTM C-478.
2. DISTANCE FROM TOP OF OVERFLOW TO MH RIM SHALL BE BASED ON OVERFLOW CAPACITY CALC'S BY DESIGN ENGINEER (ASSUME ORIFICE CONTROL).
3. 60" MINIMUM DIA. MANHOLE REQUIRED FOR OUTLET PIPE LARGER THAN 15" OR INLET > 21".
4. ORIFICE CLEANING ACCESS TO BE 6" CORE HOLE THROUGH FLAT-TOP (CENTERED ON OVERFLOW) WITH CI CLEANOUT BOX GROUTED TO SLAB.

LAST REVISION DATE:	STANDARD
AUG 2014	STANDARD

POLLUTION/FLOW CONTROL MANHOLE W/OVERFLOW

(NTS)

WESTECH ENG.	DETAIL NO. 3200



SECTION A-A

NOTE:

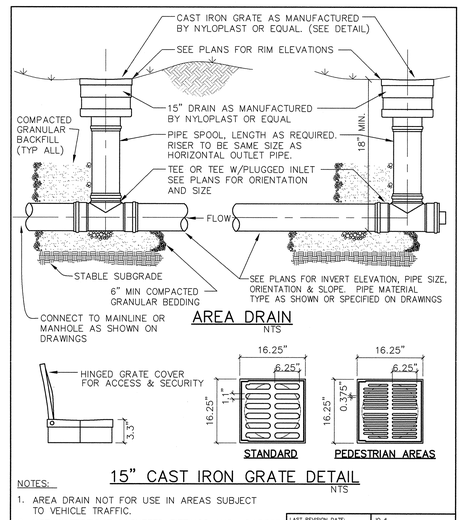
1. MAXIMUM PIPE NUMBER & DIAMETERS AS FOLLOWS:
   12" DIAMETER OR LESS - 4 MAXIMUM.
   15" DIAMETER - 2 MAXIMUM.
   ALL OTHER CONFIGURATIONS REQUIRE STANDARD MANHOLE.

LAST REVISION DATE:	STANDARD
MAR 2008	STANDARD

24" DIA. STORM MANHOLE

(NTS)

WESTECH ENG.	DETAIL NO. 3500



15" CAST IRON GRATE DETAIL

NTS

NOTES:

1. AREA DRAIN NOT FOR USE IN AREAS SUBJECT TO VEHICLE TRAFFIC.
2. USE WATERTIGHT GASKETED FITTINGS AND ADAPTORS FOR ALL PIPE CONNECTIONS.
3. ALL GRATES IN PEDESTRIAN AREAS SHALL CONFORM WITH ADA REQUIREMENTS, INCLUDING GRATE OPENING SIZE.

LAST REVISION DATE:	JO #
SEP 2005	STANDARD

AREA DRAIN, LANDSCAPE AND PEDESTRIAN AREAS (NON-TRAFFIC)

(NTS)

WESTECH ENG.	DETAIL NO. 3550

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 12, 2005
WILLIAM J. WELLS
RENEWS: 6/30/2018

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3065 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SAZAN GROUP

MSC ENGINEERS INC.

consultants:
kmd architects+planners pc
220 nw eighth avenue portland, oregon 97209
t 503.221.1474
kmdarchitects.com

WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: westech@westech-eng.com

project:
MARION COUNTY SHERIFF
CENTRAL DISTRICT/PAROLE & PROBATION OFFICES

Marion County OREGON

revisions:

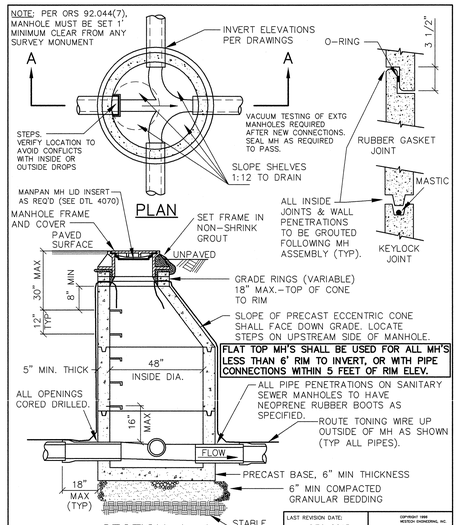
date: 6-5-17
project: A-SP-05416
dwg file: 05416
drawn by: RGS/TN
checked by: WJW

copyright© 2016 Carlson Veit Architects P.C.

CIVIL DETAILS

sheet:
C6.0
of:

5/31/2017 2:26:05 PM
R:\Dwg\CARL-V\Marion County Sheriffs-2942.0000.01\civil\Plots\C5.0-C6.2 NOTES & DETAILS.dwg, (C6.0 tab)



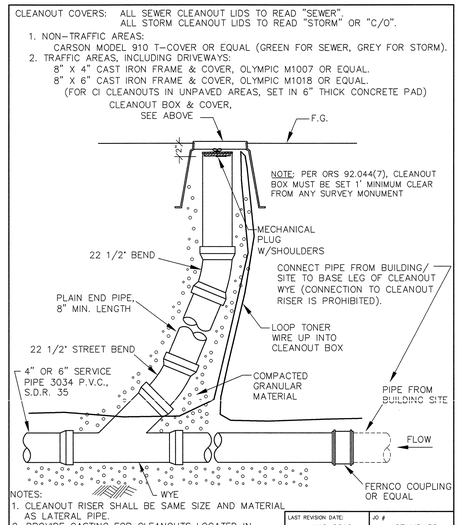
NOTES:
1. PRECAST SECTIONS SHALL MEET OR EXCEED ASTM C-478.
2. WATERTIGHT O-RING OR MASTIC KEYLOCK JOINTS REQUIRED.
3. STEPS TO BE POLYPROPYLENE PLASTIC WITH GRADE 60 REINFORCING ROD. ADD STEPS TO EXTG CONNECTION MH IF EXTG STEPS ARE ABSENT.

LAST REVISION DATE:	COPYRIGHT 1998 WESTECH ENGINEERING, INC.
DEC 2015	

STANDARD MANHOLE FOR 21" PIPE AND SMALLER

(NTS)

WESTECH ENG. | DETAIL NO. 4010



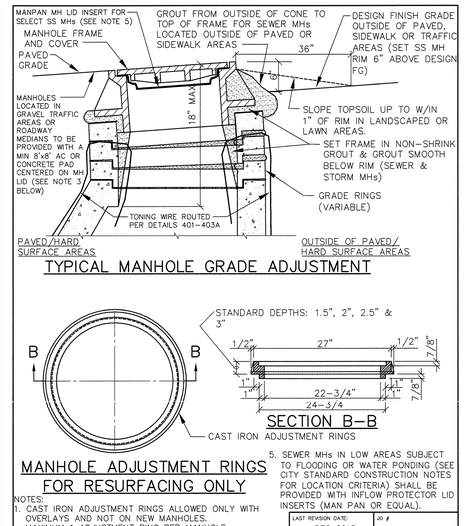
NOTES:
1. CLEANOUT RISER SHALL BE SAME SIZE AND MATERIAL AS LATERAL PIPE.
2. PROVIDE CASTING FOR CLEANOUTS LOCATED IN DRIVEWAYS OR TRAFFIC AREAS (CONCRETE PAD TO BE 6" LARGER THAN TOP OF CLEANOUT BOX).
3. CLEANOUT PIPE SHALL BE LEFT A MINIMUM OF 18" ABOVE EXISTING GRADE UNTIL ALL CURBING IS INSTALLED AND ALL PRIVATE UTILITY TRENCHES ARE BACKFILLED. CLEANOUTS SHALL THEN BE SET NO MORE THAN 6" BELOW FINISH GRADE, AND CLEANOUT BOXES SET FLUSH WITH FINISH GRADE.

LAST REVISION DATE:	JO #
AUG 2016	STANDARD

STANDARD SERVICE LATERAL CLEANOUT

(NTS)

WESTECH ENG. | DETAIL NO. 4161



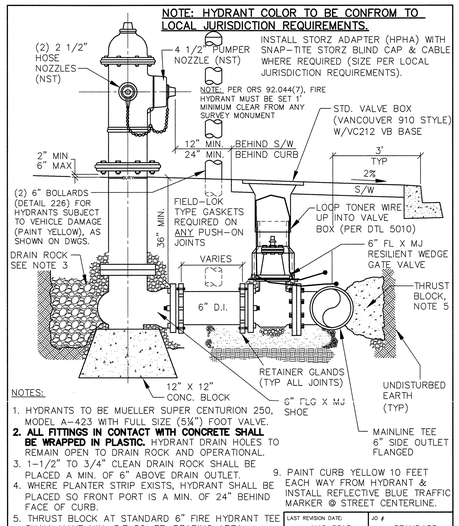
NOTES:
1. CAST IRON ADJUSTMENT RINGS ALLOWED ONLY WITH OVERLAYS AND NOT ON NEW MANHOLES. MAXIMUM 1 ADJUSTMENT RING PER MANHOLE.
2. SANITARY SEWER MHs – 2 HOLE LIDS STORM DRAIN MHs – 16 HOLE LIDS
3. MH PADS IN UNPAVED TRAFFIC AREAS – 8'x8' MIN SIZE OF (A) 3" MIN. AC OVER 10" COMPACTED BASEROCK (OR PUBLIC ROAD STANDARD THICKNESS IF LOCATED IN R.O.W) (B) 8" CONCRETE OVER 2" BACKROCK.
4. MH PADS IN ROAD MEDIAN PLANTER AREAS – 4" CONC (PER DTL 212, 10' MIN SQUARE W/5' SCORING PATTERN).
5. SEWER MHs IN LOW AREAS SUBJECT TO FLOODING OR WATER PONDING (SEE CITY STANDARD CONSTRUCTION NOTES FOR LOCATION CRITERIA) SHALL BE PROVIDED WITH INFLOW PROTECTOR LID INSERTS (MAN PAN OR EQUAL).

LAST REVISION DATE:	JO #
DEC 2015	

MANHOLE RIM ADJUSTMENT DETAILS

(NTS)

WESTECH ENG. | DETAIL NO. 4070



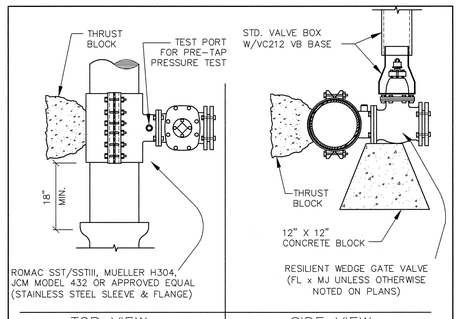
NOTES:
1. HYDRANTS TO BE MUELLER SUPER CENTURION 250, MODEL A-423 WITH FULL SIZE (5¼") FOOT VALVE.
2. **ALL FITTINGS IN CONTACT WITH CONCRETE SHALL BE WRAPPED IN PLASTIC.** HYDRANT DRAIN HOLES TO REMAIN OPEN TO DRAIN ROCK AND OPERATIONAL.
3. 1-1/2" TO 3/4" CLEAN DRAIN ROCK SHALL BE PLACED A MIN. OF 6" ABOVE DRAIN OUTLET.
4. WHERE PLANTER STRIP EXISTS, HYDRANT SHALL BE PLACED SO FRONT PORT IS A MIN. OF 24" BEHIND FACE OF CURB.
5. THRUST BLOCK AT STANDARD 6" FIRE HYDRANT TEE SHALL HAVE MIN. 3.7 SQ. FT. BEARING AREA.
6. ALL HYDRANTS SHALL BE SET PLUMB.
7. FOR HYDRANT LEADS LONGER THAN 30', AN ADDITIONAL GATE VALVE SHALL BE PROVIDED WITHIN 3 FT. OF THE HYDRANT.
8. RESTRAIN ALL JOINTS ON ALL HYDRANT LEADS. RETAINER GLANDS SHALL TO BE USED IN LIEU OF THRUST BLOCK BEHIND HYDRANT.
9. PAINT CURB YELLOW 10 FEET EACH WAY FROM HYDRANT & INSTALL REFLECTIVE BLUE TRAFFIC MARKER @ STREET CENTERLINE.

LAST REVISION DATE:	JO #
AUG 2015	STANDARD

STANDARD FIRE HYDRANT ASSEMBLY

(NTS)

WESTECH ENG. | DETAIL NO. 5030



NOTES:
1. WATER MAIN SHALL BE CLEANED & SPRAYED WITH CHLORINE SOLUTION IN TAP AREA BEFORE ATTACHING SLEEVE.
2. TAPPING SLEEVE SHALL BE ALL STAINLESS STEEL WITH FULL PERIMETER GASKET.
3. TAPPING VALVE SHALL BE EPOXY COATED PER AWWA C-550.
4. PRE-TAP PRESSURE TEST. SLEEVE AND VALVE SHALL BE PRESSURE TESTED BEFORE MAKING TAP. PRESSURE TEST AND TAP SHALL BE MADE IN THE PRESENCE OF AN AUTHORIZED WATER SYSTEM REPRESENTATIVE.
5. APPROVED TAPPING MACHINE SHALL BE USED TO MAKE TAP.
6. 3/4" GRANULAR BACKFILL SHALL BE PLACED AND COMPACTED TO 92% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-180.
7. THRUST BLOCKING PER DETAIL 510.
8. TAP SHALL BE MADE NO CLOSER THAN 18" FROM THE NEAREST JOINT.
9. **SLEEVE AND VALVE SHALL BE WRAPPED WITH 8 MIL PLASTIC PRIOR TO CONCRETE PLACEMENT.**
10. CONCRETE BLOCK(S) SHALL COMPLETELY SUPPORT TAPPING TEE AND VALVE.
11. CONTRACTOR SHALL COORDINATE ALL TAPS WITH CITY AND PERFORM ALL TAPS WITH PUBLIC WORKS STAFF PRESENT.
12. ALL TAPPING EQUIPMENT (AND ANY TOOL COMING IN CONTACT WITH THE PIPE THOUGH THE TAPPING SLEEVE) SHALL BE CHLORINE DISINFECTED WITH A 300 MG/L CHLORINE SOLUTION.

LAST REVISION DATE:	JO #
MAR 2017	STANDARD

TAPPING TEE AND VALVE

(NTS)

WESTECH ENG. | DETAIL NO. 5050

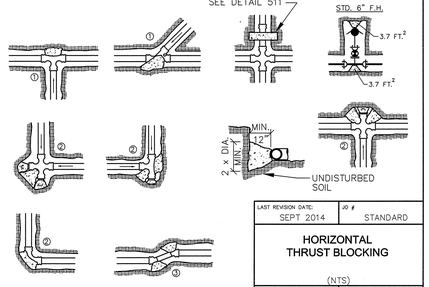
FITTING SIZE (inches)	TEE, WYE, & ① HYDRANTS	90° BEND ② PLUGGED CROSS TEE PLUGGED-RUNS	45° BEND ③	22 1/2° BEND ③	11 1/4° BEND ③
2	*	*	*	*	*
4	1.7	2.4	1.3	*	*
6	3.7	5.3	2.9	1.5	*
8	6.7	9.5	5.1	2.7	1.3
10	10.5	14.8	8	4.1	2
12	15.1	21.3	11.6	5.9	2.9
16	26.8	37.9	20.5	10.4	5.2
18	33.9	47.9	25.9	12.8	6.7
LARGER	* *	* *	* *	* *	* *

BEARING AREA OF THRUST BLOCKS (sq. ft.)

1. ALL VALUES ARE BASED ON THE FOLLOWING ASSUMPTIONS: AVG. PRESSURE = 100 PSI x 2 (safety factor); 1500 PSF SOIL BEARING CAPACITY; NORMAL DISTRIBUTION SYSTEM DESIGN VELOCITY NOT TO EXCEED 5 FPS.
2. **ALL FITTINGS SHALL BE WRAPPED IN PLASTIC PRIOR TO PLACEMENT OF CONCRETE.**
3. BEARING SURFACE OF THRUST BLOCKING SHALL BE AGAINST UNDISTURBED SOIL.
4. TRUCK-MIXED CONCRETE MIX SHALL HAVE A MIN. 28 DAY STRENGTH OF 3300 PSI (5" MAX SLUMP). USE OF HAND-MIXED SACK-CRETE TYPE CONCRETE REQUIRES WRITTEN CITY APPROVAL PRIOR TO USE, AND SHALL BE 4000 PSI MIX, MIXED WITH MIN AMOUNT OF WATER NECESSARY FOR WORKABILITY (5" MAX SLUMP). USE OF DRY SACK-CRETE MIX (BAGS OR LOOSE MIX) IS PROHIBITED FOR PERMANENT THRUST RESTRAINT.
5. ALL PIPE ZONES SHALL BE BACKFILLED WITH GRANULAR BACKFILL AND COMPACTED.
6. THRUST BLOCKS FOR PLUGGED CROSS AND PLUGGED TEE SHALL HAVE #4 REBAR LIFTING LOOPS INSTALLED AS SHOWN.
7. VERTICAL THRUST DETAILS-SEE DWG. 512.
8. STRADDLE BLOCK DETAILS-SEE DWG. 511.

* BLOCK TO UNDISTURBED TRENCH WALLS

* * THRUST BLOCKS FOR PIPES LARGER THAN 18" WILL BE INDIVIDUALLY DESIGNED BY THE ENGINEER.

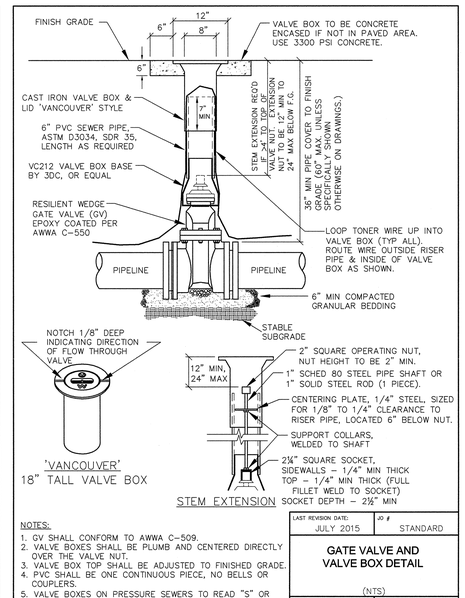


LAST REVISION DATE:	JO #
SEPT 2014	STANDARD

HORIZONTAL THRUST BLOCKING

(NTS)

WESTECH ENG. | DETAIL NO. 5100



NOTES:
1. GV SHALL CONFORM TO AWWA C-509.
2. VALVE BOXES SHALL BE PLUMB AND CENTERED DIRECTLY OVER THE VALVE NUT.
3. VALVE BOX TOP SHALL BE ADJUSTED TO FINISHED GRADE.
4. PVC SHALL BE ONE CONTINUOUS PIECE, NO BELLS OR COUPLERS.
5. VALVE BOXES ON PRESSURE SEWERS TO READ "S" OR "SEWER".

LAST REVISION DATE:	JO #
JULY 2015	STANDARD

GATE VALVE AND VALVE BOX DETAIL

(NTS)

WESTECH ENG. | DETAIL NO. 5010

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 12, 2005
WILLIAM J. WELLS
RENEWS: 6/30/2018

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SAZAN GROUP

MSC ENGINEERS INC.

consultants:
kmd architects+planners pc
220 ne eighth avenue portland, oregon 97209
t 503.221.1474
kmdarchitects.com

WESTECH ENGINEERING, INC. CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, Or. 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: mail@westech-eng.com

project:
MARION COUNTY SHERIFF
CENTRAL DISTRICT/PAROLE & PROBATION OFFICES

Marion County OREGON

revisions:

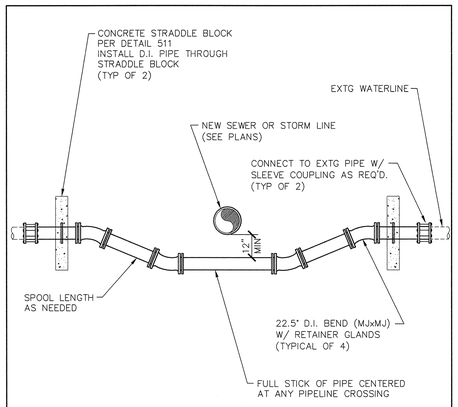
date: 6-5-17
project: A-SP-05416
dwg file: 05416
drawn by: RGS/TN
checked by: WJW

copyright© 2016 Carlson Veit Architects P.C.

CIVIL DETAILS

sheet: C6.1
of:

5/31/2017 2:26:12 PM
R:\Dwg\CARL-V\Marion County Sheriffs-2942.0000.0\Civil\Plots\C5.0-C6.2 NOTES & DETAILS.dwg, (C6.1 tab)



NOTES:

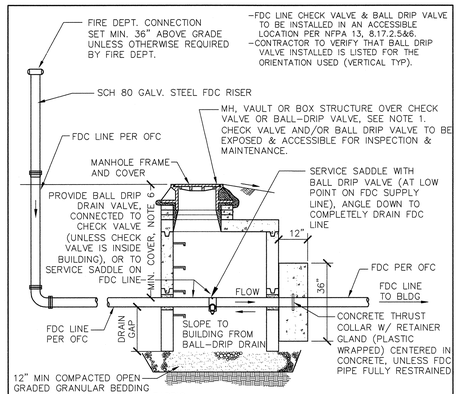
1. ALL PIPE SHOWN WITHIN LIMITS OF DETAIL TO BE CLASS 52 DUCTILE IRON.
2. PROVIDE RETAINER GLANDS ON ALL MECHANICAL JOINTS SHOWN.
3. PROVIDE FIELD-LOCK GASKETS ON ANY PUSH-ON JOINTS.

LAST REVISION DATE:	JO #
NOV 2009	STANDARD

WATERLINE LOWERING DETAIL

(NTS)

WESTECH ENG.	DETAIL NO. 5130



NOTES:

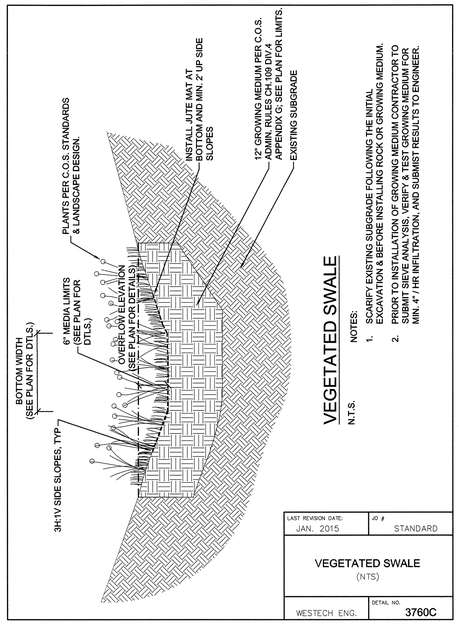
1. INSTALL 48" PRECAST MANHOLE PER DETAIL 402, UNLESS OTHER APPROVED VAULT OR BOX IS SHOWN OR NOTED ON DWGS.
2. ALL PIPE OPENINGS SHALL BE SEALED WITH NON-SHRINK WATERTIGHT GROUT.
3. WHERE REQUIRED, THRUST COLLAR CONCRETE SHALL BE 3300 PSI @ 28 DAYS.
4. IF AN FDC LINE CHECK VALVE IS PROVIDED INSIDE BUILDING, AN EXTERIOR FDC LINE CHECK VALVE IS NOT REQUIRED UNLESS OTHERWISE DIRECTED IN WRITING BY FIRE CODE OFFICIAL. BALL DRIP DRAIN VALVE SHALL BE INSTALLED ON CHECK VALVE OR AT LOW POINT ON FDC LINE (DETAIL 562) TO DRAIN FDC LINE BETWEEN CHECK VALVE & FDC RISER.
5. PER NFPA 13, A10.4.1, 36" MIN COVER REQUIRED FOR "WET" FDC LINES (ANY PORTION OF FDC LINE WHICH REMAINS FILLED WHEN NOT IN USE). COVER MAY BE REDUCED TO 12" MIN ON "DRY" FDC LINE WHICH IS DRAINED COMPLETELY WHEN NOT IN USE.
6. THIS DETAIL DOES NOT SUPERCEDE REQUIREMENTS UNDER THE OREGON FIRE CODE, NFPA STANDARDS OR DIRECTION FROM FIRE CHIEF.

LAST REVISION DATE:	JO #
OCT 2013	STANDARD

BELOW GRADE CHECK VALVE & BALL DRIP VALVE, IN OPEN BOTTOM DRAIN MANHOLE

(NTS)

WESTECH ENG.	DETAIL NO. U5610



VEGETATED SWALE

N.T.S.

NOTES:

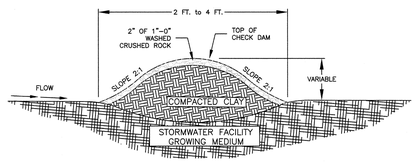
1. SCARIFY EXISTING SUBGRADE FOLLOWING THE INITIAL EXCAVATION & BEFORE INSTALLING ROCK OR GROWING MEDIUM.
2. PRIOR TO INSTALLATION OF GROWING MEDIUM, CONTRACTOR TO SUBMIT SIEVE ANALYSIS, VERIFY & TEST GROWING MEDIUM FOR MIN. 4" / HR INFILTRATION, AND SUBMIT RESULTS TO ENGINEER.

LAST REVISION DATE:	JO #
JAN. 2015	STANDARD

VEGETATED SWALE

(NTS)

WESTECH ENG.	DETAIL NO. 3760C



CHECK DAM

CHECK DAM SPACING			
FACILITY LENGTH (FT)	LONGITUDINAL STREET SLOPE	# OF CHECK DAMS	ADDITIONAL INLETS
30	<=1%	0	NONE
	>=1%	1	NONE
31 - 50	<=1%	1	NONE
	>=1%	2	1
51-70	<=1%	2	1
	>=1%	3	2
71-90	<=1%	3	2
	>=1%	4	3
91 +	<=1%	4	3
	>=1%	5	4

NOTES:

1. CHECK DAMS TO BE EVENLY SPACED BETWEEN INLET AND OUTLET. ADDITIONAL REQUIREMENTS MAY BE NECESSARY ON STEEP SLOPES
2. ADDITIONAL INLETS TO BE PLACED DIRECTLY DOWNSTREAM OF CHECK DAMS
3. TOP OF CHECK DAM TO BE 1" BELOW GUTTER ELEVATION AT INLET (AT CURB LINE) BUT NOT GREATER THAN 2" BELOW TOP OF CURB

CITY OF SALEM
DEPARTMENT OF PUBLIC WORKS

STANDARD PLAN
CHECK DAM DETAILS

APPROVED	CITY ENGINEER	1/01/14	DRAWN BY	KAK	12/2013	NO. 220
		DATE	CHECKED BY	KR	12/2013	

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 12, 2005
WILLIAM J. WELLS
RENEWS: 6/30/2018

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SAZAN GROUP
MSC ENGINEERS INC.

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com

WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: mail@westech-eng.com

project:
MARION COUNTY SHERIFF
CENTRAL DISTRICT/PAROLE & PROBATION OFFICES

Marion County OREGON

revisions:

date: 6-5-17
project: A-SP-05416
dwg file: 05416
drawn by: RGS/TN
checked by: WJW

copyright© 2016
Carlson Veit Architects P.C.

CIVIL DETAILS

sheet: C6.2
of:

5/31/2017 2:26:19 PM
R:\Dwg\Civil_-_V\Marion County Sheriffs-2942.0000.01\Civil\Plots\C5.0-C6.2 NOTES & DETAILS.dwg, (C6.2 tab)

BIO-SWALE PLANT LEGEND

REVISED: 3-24-2016 City of Salem

BOTANICAL NAME	COMMON NAME	SIZE	SPACING
DO NOT PLANT WITHIN 48" OF BIO-SWALE PIPING, BIO-BAGS, RIP RAP OR OTHER PLANT MATERIAL			
ZONE 1: PROFILE 0"-12" WET/ MOIST ZONE			**# needed**
Per City requirement all Zone 1 plants shall be triangular spaced 12" o.c.:			
BSW 1	Agrostis exarata	Spike Bentgrass	1 gal. 12"
BSW 2	Carex obnupta	Slough Sedge	1 gal. 12"
BSW 3	Carex stipata	Sawbeak Sedge	1 gal. 12"
BSW 4	Juncus effusus pacificus	Common Rush	1 gal. 12"
BSW 5	Juncus patens	Spreading Rush	1 gal. 12"
BSW 6	Juncus tenuis	Slender Rush	1 gal. 12"
BSW 7	Scirpus microcarpus	Small F. Bulrush	1 gal. 12"

BOTANICAL NAME	COMMON NAME	SIZE	SPACING
DO NOT PLANT WITHIN 48" OF BIO-SWALE PIPING, BIO-BAGS, RIP RAP OR OTHER PLANT MATERIAL			
ZONE 2: PROFILE 12"-24" MOIST/ DRY ZONE			
City requirement of (6) 1 gallon shrubs/ 100 sq. ft. Repeat groups of 10 of Each plant throughout zone. Prior to planting have layout approved by Owner or Landscape Architect.			
BSW 7	Cornus sericea	Redtwig Dogwood	1 gal.
BSW 8	Deschampsia caespitosa	Tufted Hairgrass	1 gal.
BSW 9	Polystichum munitum	Western Sword Fern	1 gal.
BSW 10	Ribes sanguineum	Red Currant	1 gal.
BSW 11	Mahonia aquifolium	Oregon grape	1 gal.

BIO-SWALE NOTES:

1. BIO-SWALE SHALL REQUIRE 12" DEPTH OF APPROVED STORMWATER QUALITY MIX.
2. REFER TO CIVIL DRAWINGS, WHICH REQUIRES THAT ALL STORMWATER QUALITY SOIL MIX SHALL CONFORM TO CITY OF SALEM OREGON STORMWATER MANAGEMENT STANDARDS.
3. REFER TO CIVIL ENGINEERING DRAWINGS FOR LOCATIONS OF STORMWATER QUALITY SOIL MIX.
4. LANDSCAPE CONTRACTOR TO PROVIDE AND INSTALL ALL APPROVED STORMWATER QUALITY SOIL MIX.
5. LANDSCAPE CONTRACTOR TO COORDINATE WITH CIVIL GRADING PLAN. PROVIDE AND PLACE 2" TOPDRESS DEPTH OF PEA GRAVEL IN THE BOTTOM PROFILE OF THE BIO-SWALES AFTER PLANTING. CARE SHALL BE TAKEN TO NOT DAMAGE THE PLANTS. LANDSCAPE CONTRACTOR TO COORDINATE WITH CIVIL FOR ALL BIO-SWALE AREAS FOR EROSION CONTROL.
6. IRRIGATION SHALL PROVIDE COMPLETE AND EVEN COVERAGE OF ALL BIO-SWALE AND LANDSCAPED AREAS AND BE COMPLETED PRIOR TO ANY PLANTINGS.
7. LANDSCAPE CONTRACTOR TO PROVIDE AND PLANT FROM BIO-SWALE LEGEND.

LANDSCAPE NOTES

1. PLANT QUANTITIES SHOWN ARE FOR CONTRACTORS CONVENIENCE.
2. OTHER TRADES SHALL NOT DUMP ANY: PAINT, CHEMICALS, LIME, CONCRETE, SCRAP BUILDING MATERIALS, OR ANY OTHER TOXIC MATERIALS IN LANDSCAPE BEDS.
3. LANDSCAPE CONTRACTOR SHALL ROTOTILL, FERTILIZE, AND FINISH GRADE ALL LANDSCAPE AREAS.
4. NO SUBSTITUTIONS SHALL BE MADE WITHOUT THE WRITTEN CONSENT OF OWNER OR LANDSCAPE ARCHITECT.
5. VERIFICATION OF UNDERGROUND UTILITIES IS THE RESPONSIBILITY OF THE LANDSCAPE CONTRACTOR. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMMEDIATE REPAIR OF ANY DAMAGE CAUSED BY HIS WORK.
6. THE OWNER OR LANDSCAPE ARCHITECT SHALL HAVE THE RIGHT TO REJECT ANY WORK OR MATERIALS AT ANY STAGE OF THE OPERATION THAT IN HIS OPINION DO NOT MEET THE REQUIREMENTS OF THESE PLANS AND SPECIFICATIONS.
7. ALL PLANT BEDS SHALL BE TOP DRESSED WITH 2" OF BARK MULCH.
8. ALL PLANT MATERIAL SHALL BE CONTAINER GROWN OR BALLED AND BURLAPPED. BARE ROOT STOCK IS NOT ACCEPTABLE.
9. ALL TREES, SHRUBS, AND GROUND COVER SHALL BE GUARANTEED FOR A PERIOD OF 12 MONTHS BEGINNING ON THE DATE OF ACCEPTANCE OF PROJECT. ANY SICK OR DEAD PLANTS SHALL BE REPLACED IMMEDIATELY.
10. ALL GRADES, DIMENSIONS, AND EXISTING CONDITIONS SHALL BE VERIFIED BY THE LANDSCAPE CONTRACTOR BEFORE CONSTRUCTION BEGINS. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT OR OWNER.
11. EVERY POSSIBLE SAFEGUARD SHALL BE TAKEN TO PROTECT BUILDING SURFACES, PAVING, EQUIPMENT, AND FURNISHINGS. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE OR INJURY TO PERSON OR PROPERTY THAT MAY OCCUR AS A RESULT OF HIS NEGLIGENCE IN THE EXECUTION OF HIS WORK.
12. THE LANDSCAPE CONTRACTOR SHALL PROVIDE AND PLACE 3" OF APPROVED COMPOST IN ALL LANDSCAPE BEDS, AND SHALL ROTOTILL THE COMPOST INTO THE TOP 8" CHANGING DIRECTIONS UNTIL WELL MIXED.
14. THE LANDSCAPE CONTRACTOR SHALL APPLY AN APPROVED PRE-EMERGENT HERBICIDE FOLLOWING MANUFACTURER'S RECOMMENDED APPLICATION RATES AND PROCEDURES FOLLOWING COMPLETION OF PLANTING, AND BARK MULCH.
15. THE LANDSCAPE CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL OTHER RELATED TRADES SUCH AS: LIGHTING, UTILITIES, SIGNAGE, AND PAVING.
16. THE LANDSCAPE CONTRACTOR SHALL INSURE POSITIVE DRAINAGE IN ALL PLANT BEDS.
17. FERTILIZER SHALL BE APPLIED TO ALL LANDSCAPING AREAS: AGRIFORM 10 GRAM TABLETS: 3 FOR EACH SHRUB, 6 FOR EACH TREE SHALL BE EVENLY SPACED AROUND THE ROOTBALL. BROADCAST GRANULAR FORM 16-16-16 AT A RATE OF 20 LBS. / 1,000 SQ. FT. OVER ALL GROUND COVER AREAS.

TOPSOIL NOTE:

1.Prior to placing topsoil, verify that sub-grade is of the proper depth to allow placement of topsoil and compost to meet finished grade.

2.Provide and place 12" of imported topsoil in all planting areas adjacent to the building and sidewalks/parking lot and place 6" of imported topsoil in all lawn areas. Existing soil on site shall be used for sub-grade and in all shrub beds not adjacent to the building, sidewalks and parking lot.

3.Imported topsoil shall be from supplier approved by Landscape Architect prior to bringing to site. It shall be free of noxious weeds, roots, stones over 1", and any other extraneous materials harmful to plant growth. Topsoil shall be well drained sand/silt/loam mix with less than 10% clay particles by volume. Submit sample prior to placement.

NOTE: MOUND ALL PLANT BEDS ON SITE A MIN. OF 6" ABOVE FINISH GRADE OF CURBS OR SIDEWALKS.

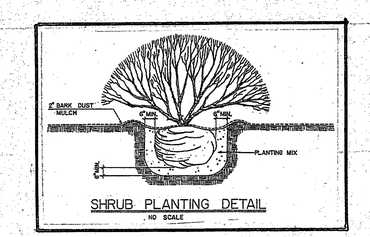
THE 3 BOULDERS SHALL BE OF GREY BASALT AND OF THE FOLLOWING DIMENSIONS:
1. 30"X30"X24" IN DEPTH
2. 24"X30"X 24"IN DEPTH
3. 24"X24"X18" IN DEPTH

NOTE:
All lawn areas to be hydro-seeded with JB Instant Lawn 'Sun and Shade' mix at the rate of 7 lbs. per 1,000 sq. ft. Verify all areas are to finish grade, smooth and uniform and weed free prior to hydro-seeding. Apply lime and fertilizer per JB Instant Lawn recommendations.

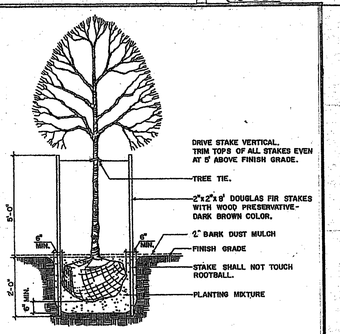
NOTE:
Reseed all disturbed areas outside of Bio-Swale with 7 pounds of perennial rye grass per 1,000 sq. ft. of area. This shall be done only after all areas are regraded into a smooth even surface and have been accepted by the Landscape Architect or owner prior to seeding.

NOTE:
Reseed all disturbed areas outside of Bio-Swale with 7 pounds of perennial rye grass per 1,000 sq. ft. of area. This shall be done only after all areas are regraded into a smooth even surface and have been accepted by the Landscape Architect or owner prior to seeding.

LANDSCAPE PLAN
1/16" = 1'-0"



SHRUB PLANTING DETAIL
NO SCALE



TREE STAKING DETAIL
NO SCALE

PLANT LEGEND

	BOTANICAL NAME	COMMON NAME	SIZE
TREES			
T1	ACER CIRCINATUM	VINE MAPLE	5'-6'
T2	ACER PAL. 'BLOODGOOD	BLGD.J. MAPLE (MULTI) 2" CAL.	8'-10'
T3	ACER R. 'RED SUNSET'	SAME (6' STANDARD)	2"CAL.
T4	ACER P. 'SHISHIGASHIRA'	SAME (MIN. 1-1/2"-2" CAL.)	6'-7'
T5	CARPINUS BET. FASTIGIATA	COLUMNAR HORNBEAM	8'-10'
T6	CHAMAECYPARIS N. 'PENDULA'	WEEPING ALASKAN CEDAR	7'-8'
T7	CHAMAECYPARIS OBTUSA COMPACTA	COMPACT HINOKI CYPRESS	5'-6'
T8	GINGKO 'GOLDEN COLONADE'	SAME (MIN. 8-10')	1.5" CAL.
T9	LAGERSTROEMIA 'TUSCARORA'	TUS. CRAPE MYRTLE MULTI(3)STEM	6'-7'
T10	PARROTIA P. 'VANESSA'	SAME 5' STANDARD 10' MIN. HT.	2" CAL.
T11	PINUS FLEXILIS 'VANDERWOLF'	VANDERWOLF PINE	7'-8'
T12	PYRUS CHANTICLEER	CHANTICLEER PEAR 6' STAND.	2" CAL.
SHRUBS			
S1	ABELIA 'KALEIDOSCOPE'	SAME	2 GAL.
S2	ABELIA 'SHERWOODII'	SAME	5 GAL.
S3	ARBUTUS UNEDO COMPACTA	COMPACT STRAWBERRY	5 GAL.
S4	BERBERIS T. 'CRIMSON PYGMY'	C.P. BARBERRY	2 GAL.
S5	BUXUS 'WINTER GEM'	WINTER GEM BOXWOOD	2 GAL.
S6	CALAMAGROSTIS 'KARL FORESTER'	SAME	2 GAL.
S7	CORNUS ALBA ELEGANTISSIMA	VARIEGATED REDTWIG	5 GAL.
S8	CORNUS S. KELSEYII	KELSEY DWARF DOGWOOD	2 GAL.
S9	COTONEASTER PARNEYI	SAME	5 GAL.
S10	EUONYMUS JAP. 'BUTTERSCOTCH	BUTTERSCOTCH EUONYMUS	2 GAL.
S11	EUONYMUS A. 'COMPACTA'	COMP. BURNING BUSH	5 GAL.
S12	FUCHSIA MAGELLANICA	HARDY FUCHSIA	2 GAL.
S13	HEMEROCALLIS 'RUBY STELLA'	RUBY STELLA DAYLILY	1 GAL.
S14	HEMEROCALLIS 'STELLA D'ORO'	STELLA D'ORO DAYLILY	1 GAL.
S15	ILEX C. 'SKY PENCIL'	SKY PENCIL HOLLY	5 GAL.
S16	MAHONIA AQUIF. COMPACTA	COMPACT OREGON GRAPE	2 GAL.
S17	NANDINA 'FIRE POWER'	SAME	2 GAL.
S18	NANDINA 'GULFSTREAM'	SAME	2 GAL.
S19	OSMANTHUS HETEROPHYLLA 'ATROPURPUREA'	SAME	5 GAL.
S20	PENNISETUM A. 'BURGUNDY BUNNY'	BUR. BUNNY DWARF FT. GRASS	2 GAL.
S21	PENNISETUM A. 'HAMELN'	DWARF FOUNTAIN GRASS	2 GAL.
S22	PHYSOCARPUS 'SUMMER WINE'	SAME	5 GAL.
S23	PIERIS PRELUDE	SAME	2 GAL.
S24	POLYSTICHUM MUNITUM	SWORD FERN	2 GAL.
S25	PRUNUS L. 'OTTO LUYKEN'	OTTO LUYKEN LAUREL	5 GAL.
S26	RAPHIOLEPIS UMBELLATA MINOR	SAME	5 GAL.
S27	RHODODENDRON 'JEAN MARIE'	SAME	24"-30"
S28	SARCOCOCCA CONFUSA	SAME	5 GAL.
S29	SPIREA 'MAGIC CARPET'	SAME	2 GAL.
GROUND COVER			
GC1	ARCTOSTAPHYLOS 'MASSACHUSETTS'	MASS. KINNIKINNIK 24" O.C.	1 GAL.

CHARLES MANGUM & ASSOCIATES
LANDSCAPE ARCHITECTURE
5144 - 38th Ave. S.E. Salem, Oregon 97317

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
SUSTAINABLE DESIGN CONSULTING
888 WILLAMETTE STREET, SUITE 500 EUGENE, OREGON 97401
TEL 541.345.0289 FAX 541.345.0298
www.carlsonveit.com

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
503.221.1474
kmdarchitects.com

Westech Engineering, Inc.
CONSULTING ENGINEERS & LAND SURVEYORS
CIVIL ENGINEERING SERVICES PROVIDED BY

project:
MARION COUNTY SHERIFF
CENTRAL DISTRICT/PAROLE & PROBATION OFFICES

revisions:

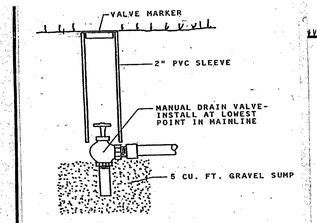
date:
project:
dwg file:
drawn by: CEM
checked by: CEM
copyright © 2016 Carlson Veit Architects P.C.

REGISTERED LANDSCAPE ARCHITECT
No. 52
Charles E. Mangum
OREGON

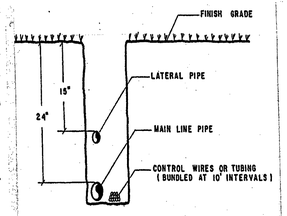
LANDSCAPE PLAN

sheet:
L1.0
of:

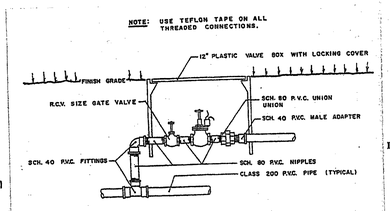
/2017 12:47:09 PM



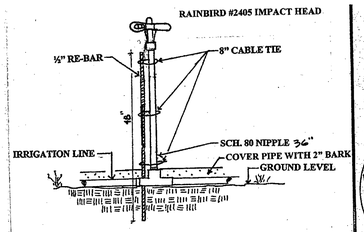
MANUAL DRAIN VALVE
NO SCALE



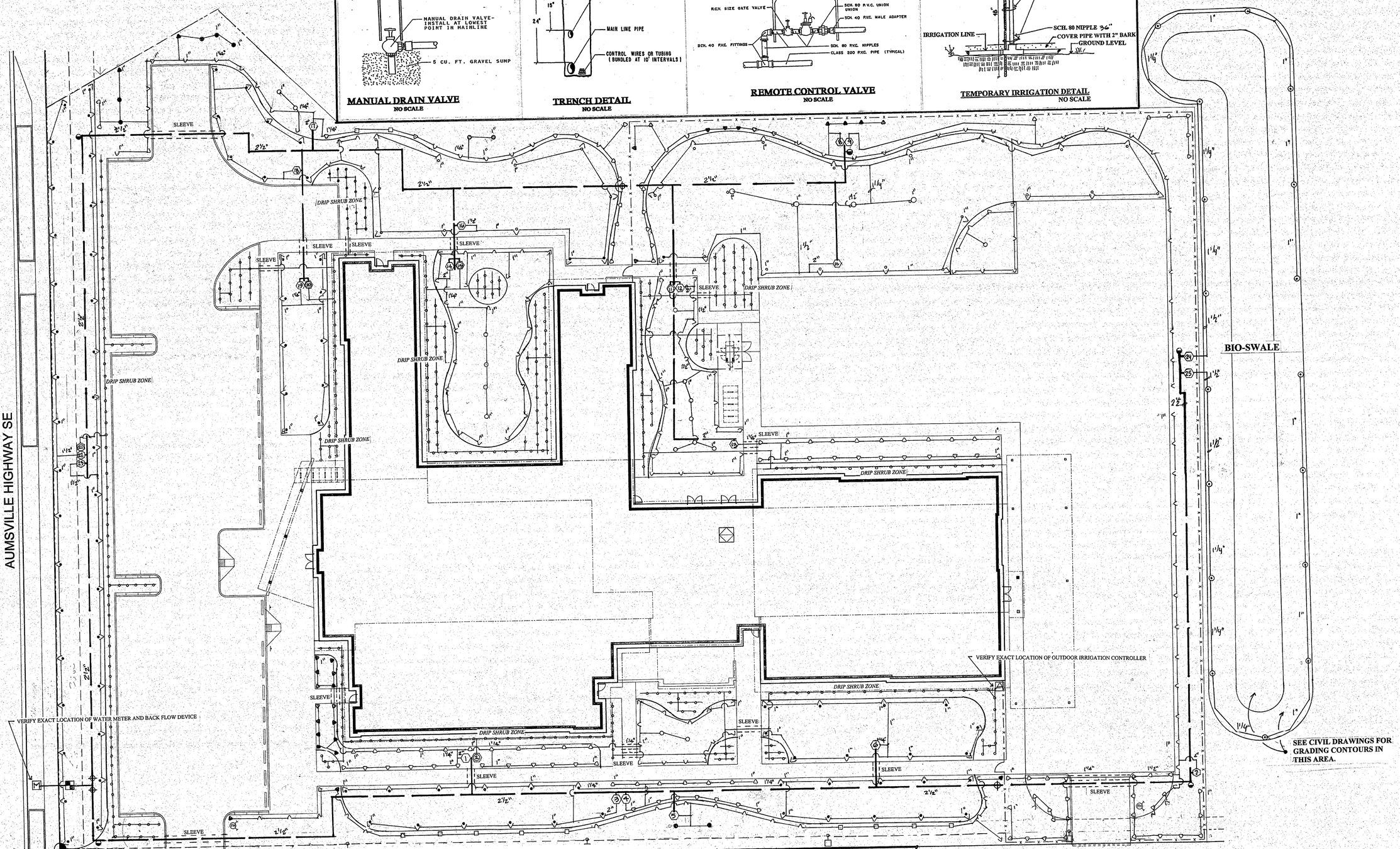
TRENCH DETAIL
NO SCALE



REMOTE CONTROL VALVE
NO SCALE



TEMPORARY IRRIGATION DETAIL
NO SCALE



IRRIGATION PLAN
SCALE: 1"=16'-0"

IRRIGATION LEGEND

Note: Shrub sprinklers to be 6" pop-up. Lawn sprinklers and rotors to be 4" pop-up.

- RAINBIRD #2045-PJ-08 IMPACT SPRINKLER ON 36" RISER @ BIO-SWALE.
- RAIN BIRD 1806 -8' POP-UP SPRINKLER. NOZZLE TYPE: F, H, ADJ., Q
- RAIN BIRD 1806 -10' POP-UP SPRINKLER. NOZZLE TYPE: F, H, ADJ., Q
- RAIN BIRD 1806 -12' POP-UP SPRINKLER. NOZZLE TYPE: F, H, ADJ., Q
- RAIN BIRD 1804 -SST, EST POP-UP LAWN SPRINKLER.
- RAIN BIRD 3504 ROTOR NOZZLE TYPE: 1.5 @ 1.50 G.P.M. ADJ., 360 DEG
- RAIN BIRD R-5004 PLUS ROTOR. NOZZLE TYPE: 1.5 @ 1.59 G.P.M. ADJ., 360 DEG
- RAIN BIRD PEB ELECTRIC CONTROL VALVE (1" = 5-24 G.P.M.) (1-1/2" =25-40 G.P.M.)
- RAIN BIRD XCZ-100-PRBR DRIP KIT. XFD-06-12-500 DRIP PIPE AND FITTINGS *ALL DRIP PIPE TO PROVIDE 2 G.P.H. TO EACH SHRUB AND 4 G.P.H. TO EACH TREE WHERE SHOWN. FEED ALL DRIP PIPE WITH CLASS 200 1" P.V.C. 1" P.V.C. IN ALL SLEEVES. LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DRIP FITTINGS NECESSARY TO MAKE ZONE OPERATIONAL.*
- RAIN BIRD MODULAR OUTDOOR IRRIGATION CONTROLLER ESP-LXME

- MAIN LINE SIZE: 2-1/2" CLASS 200
- LATERAL LINE SIZE: AS SHOWN CLASS 200
- WILKENS SERIES BACK FLOW DEVICE- *VERIFY EXISTING*
- SCH. 40 P.V.C. SLEEVES: 4"
- 3/4" MANUAL DRAIN. *INSTALL AT LOW POINTS OF IRRIGATION MAIN LINE FOR WINTERIZING SYSTEM.*
- 2-1/2" ISOLATION BALL VALVE

NOTE:
1. STUB ONE ADDITIONAL WIRE FROM CONTROLLER TO FARTHEST VALVE IN EACH DIRECTION. USE DIFFERENT COLOR WIRE THAN VALVE OR COMMON WIRE.
2. ALL PIPE TO BE MANUALLY DRAINED PRIOR TO FREEZING TEMPERATURES, OR APPROXIMATELY OCTOBER 15TH OF EACH YEAR.
3. SPRINKLER HEADS AND DRIP PIPE ARE DIAGRAMATIC. ADJUST HEADS, NOZZLE SIZES, DRIP LOCATIONS FOR OPTIMUM COVERAGE. DO NOT SPRAY THE BUILDING, SIDEWALKS, CARS, OR PARKING LOTS.
4. COORDINATE ALL SLEEVE LOCATIONS AND INSTALLATION WITH GENERAL CONTRACTOR.
5. SET CONTROLLER TO THE APPROPRIATE RUN TIME TO PROVIDE ADEQUATE WATER FOR OPTIMAL PLANT GROWTH.

VALVE LEGEND

VALVE	GPM	TYPE/LOCATION
1	30	1804 LAWN SOUTH
2	10	DRIP SOUTH
3	30	3500 LAWN SOUTH
4	11	1804 LAWN SOUTH
5	40	1806 SHRUB SOUTH
6	23	R5004 LAWN EAST
7	40	1806 SHRUB EAST
8	28	1806 SHRUB NORTH
9	30	1806 SHRUB NORTH
10	33	R5004 LAWN NORTH
11	10	DRIP NORTH
12	36	R5004 LAWN NORTH
13	18	1804 LAWN NORTH
14	38	1804 LAWN NORTH
15	10	DRIP NORTH
16	18	R5004 LAWN NORTH
17	42	1806 SHRUB NORTH
18	16	3500 LAWN NORTH
19	13	3500 LAWN WEST
20	10	DRIP WEST
21	10	DRIP WEST
22	26	R5004 LAWN NORTH
23	26	R5004 LAWN NORTH
24	30	BIO-SWALE IMPACTS
25	34	BIO-SWALE IMPACTS

REGISTERED No. 52 Charles E. Mangum OREGON LANDSCAPE ARCHITECT

PRELIMINARY

CARLSON VEIT ARCHITECTS P.C.
ARCHITECTURE • PLANNING • INTERIOR DESIGN
ARCHITECTS • FAX 503.295.2924 • www.carlsonveit.com
3998 RIVER ROAD NORTH,SALEM, OREGON 97303

consultants:
kmd 220 nw eighth avenue portland, oregon 97209 (503) 221-1474 architects+planners pc kmdarchitects.com

Westech Engineering, Inc. CIVIL ENGINEERING SERVICES PROVIDED BY CONSULTING ENGINEERS & PLANNERS

project:
MARION COUNTY SHERIFF
CENTRAL DISTRICT/PAROLE & PROBATION OFFICES

revisions:

DESIGN: CEM
DRAWN: SAT
DATE: 4-17-2017
dwg file:
drawn by:
checked by:

copyright © 2016 Carlson Veit Architects P.C.

PRELIMINARY IRRIGATION PLAN

sheet: L2.1
of:

GENERAL NOTES

CODES AND STANDARDS:

A. All materials and workmanship shall conform to the requirements of the 2014 Oregon Structural Specialty Code and 2012 Edition International Building Code including Reference Standards listed below:
- American National Standards Institute/American Society of Civil Engineers – (ANSI/ASCE 7-10)
- American Institute of Steel Construction (AISC 14th Edition)
- Specifications for the Design of Cold-Formed Steel Structural Members (AISI – S100-07,S2-10)
- American Welding Society Standards for Welding as modified by AISC Spec. (AWS D1.1 – 2004, AWS D1.3 – 1998)
- American Concrete Institute (ACI 301 – 2010, ACI 318 – 2011)
- Masonry Standards Joint Committee (MSJC/ACI 530 – 11)
- National Design Specifications for Wood Construction (NDS – 2012)
- American National Standards Institute/Truss Plate Institute (ANSI/TPI 1-2007)

DESIGN LOADS:

A. Roof Loads:
Dead Load = 20 psf
Snow Load = 30 psf (Min.) or p_f + Drift
p_g = 15 psf p_f = 12 psf
ce = 1.0 c_t = 1.0
Live Load = 65 psf Mech. Well

B. Wind Design Data:
Ultimate Wind Speed = 130 mph
Exposure = "C"
Risk Category IV
Alternate All Heights Method Used: (Section 1609.6 OSSC)
K_d = 0.85
G = 0.85
K_{zt} = 1.0

C. Seismic Design Data:
S_{DS} = 0.895 S_1 = 0.421
Site Class = C
S_{DS} = 0.622 S_{D1} = 0.387
Seismic Design Category D
Basic Seismic Force Resisting System:
– Plywood Shearwalls R = 6.5
Equivalent Lateral Force Analysis
Risk Category = IV

D. Importance Factors:
Snow (I_s) = 1.2
Seismic (I_e) = 1.5

GENERAL REQUIREMENTS:

A. It is the responsibility of the Builder/Contractor to obtain appropriate approvals and necessary permits from city, county, state, or federal agencies, as required.

B. Contractor shall be responsible for all construction methods, techniques, sequencing, and safety required to complete construction.

C. Contractor shall verify all dimensions and details prior to proceeding with construction. All discrepancies shall be approved by the Architect or Engineer of record.

D. Contractor shall verify all required penetrations on Architectural, Mechanical and Electrical plans. All dimensions shall be field verified as early as possible.

E. Contractor shall thoroughly review and redline all shop drawings prior to submittal to the engineer and architect. Submit shop drawings in a timely fashion to allow 10 business days for review by design team. All modifications or comments made during review do not relieve contractor from compliance with the requirements of the plans or specifications.

STRUCTURAL INSPECTION AND TESTING:

A. Contractor shall provide written statement of responsibility to the Building Official and owner prior to commencement of work as required by OSSC Section 1704.4.

B. All construction shall be inspected in conformance with the 2014 Oregon Structural Specialty Code.

C. All items noted as requiring special inspection per the 2014 Oregon Structural Specialty Code in accordance with Section 1704, shall be performed by a qualified person who can demonstrate competence for the particular type of construction being inspected. The special inspections shall be performed in addition to the inspections required by the Oregon Structural Specialty Code, the plans and specifications, the Architect of record, and the building officials.

REQUIRED SPECIAL INSPECTIONS

DESCRIPTION OF WORK IBC SECTION 1704	INSPECTION FREQUENCY CONTINUOUS[3]	PERIODIC[3]	COMMENTS
PREFAB. CONSTRUCTION (1704.2.5)			REF. NOTE 5
SHOP WELDING (1705.2.1 & 1705.2.2)[2]			
SINGLE PASS FILLET WELDS ≤ 5/16"		X	REF. NOTE 4
FIELD WELDING (1705.2.1 & 1705.2.2)[2]			
SINGLE PASS FILLET WELDS ≤ 5/16"		X	REF. NOTE 4
CONCRETE (1705.3)			
REINFORCING PLACEMENT		X	
ANCHOR BOLTS & INSERTS		X	
PREPARATION OF TEST SPECIMENS	X		
CONCRETE PLACEMENT	X		
STRUCTURAL MASONRY (1705.4)			
PRISM CONSTRUCTION	X		F'_m=1500 psi
REINFORCING PLACEMENT		X	
UNIT PLACEMENT		X	
GROUT SPACE	X		
GROUT PLACEMENT	X		
ANCHOR BOLTS & INSERTS		X	
SOILS (1705.6)			
GRADING, EXCAVATION & BACKFILL			BY GEOTECH
SOIL PREP PRIOR TO FOUNDATION PLACEMENT			BY GEOTECH
POST INSTALLED ANCHORS (1705.1.1)			
ADHESIVE ANCHOR INSTALLATION		X	REF. NOTE 6
MECHANICAL ANCHOR INSTALLATION		X	REF. NOTE 6

STRUCTURAL INSPECTION AND TESTING CONT.:

1. The items marked with an "X" shall be inspected in accordance with 2014 OSSC Section 1705 by a certified special inspector from an established testing agency. For material sampling and testing requirements, refer to the material sampling and testing section, the project specifications and the specific general notes sections. The testing agency shall send copies of all structural testing and inspection reports directly to the architect, engineer, contractor and building official. Any materials which fail to meet the project specifications shall immediately be brought to the attention of the architect. All discrepancies shall be brought to the immediate attention of the contractor for correction, then, if uncorrected, to the proper design authority and to the building official. The special inspector shall submit a final signed report stating whether the work requiring special inspection was to the best of the inspector's knowledge, in conformance with the approved plans and specifications and the applicable workmanship provisions of the code Special inspection testing requirements apply equally to all bidder designed components.
2. Special inspection is not required for work performed by an approved fabricator per 2014 OSSC Section 1704.2.5.2.
3. Continuous special inspection means that the special inspector is on the site at all times observing the work requiring the special inspection (2014 OSSC Section 1702.1). Periodic special inspection means that the special inspector is on the site at time intervals necessary to confirm that all work requiring special inspection is in compliance.
4. All welds shall be visually inspected.
5. Inspection for prefabricated construction shall be the same as if the material used in the construction took place on site. Continuous inspection will not be required during prefabrication if the approved agency certifies the construction and furnishes evidence of compliance.
6. Post Installed Anchors require periodic inspection (OSSC Table 1705.3) unless a more stringent requirement is imposed by the individual anchor's research report.

D. Owner or owners representative to retain an approved Special Inspector to observe and approve all required special inspection items.

E. Special inspection reports to be provided to the Building Official & Design Professionals in a timely manner and in accordance with OSSC Section 1704.2.4.

STRUCTURAL OBSERVATION PROGRAM:

A. Contractor is responsible for notifying the Registered Design Professional Responsible for Observation in advance.

B. Observation to be performed on a periodic basis.

C. A field report will be submitted to the building department following each site visit.

D. Items for Observation:
1. Concrete:
Foundation Rebar Placement
2. Structural Masonry:
CMU Rebar Placement
3. Wood:
Wall & Roof Framing
Plywood Nailing
4. Structural Steel:
Steel Framing

FOUNDATIONS:

A. All footings to rest on firm, undisturbed soil, or structural fill; free of organic material, and capable of supporting a minimum allowable bearing pressure of 2,000 psf. under combined dead and live loads. See Redmond Geotechnical Services Geotech Report No. 1543.001.G, dated Sept. 30, 2016.

B. Slabs-on-grade shall be underlain by a minimum of 6" of free- draining (less than 5% passing the No. 200 Sieve), well graded, crushed rock. The base course materials shall be compacted to at least 95% of maximum dry density.

CONCRETE:

A. All structural concrete shall conform to the following:

Location	Maximum Aggregate	Maximum Slump	Maximum Water/cement	Minimum F'_c
Foundation	1½"	6"	.46	3,000 psi
Slabs-on-grade	1½"	4"	.42	3,000 psi

B. Concrete mixes shall conform to ACI 318 Chapter 5.

C. Submit a copy of each concrete mix design and 30 break test records to the engineer prior to any delivery to job site.

D. Per ASTM F710 when a floor covering is to be installed over slab, a 10mil vapor retarder with a permeance of 0.1 shall be installed under slab.

REINFORCING STEEL:

A. All reinforcing steel shall be billet steel deformed bars conforming to ASTM A615, Grade 60, except use ASTM A706, Grade 60 bars where welding is required. (No. 3 bars may be Grade 40). Submit mill certificates for all bars requiring welding.

B. Fabrication and placement of reinforcing steel shall be in accordance with CRSI MSP-1-92 "Manual of Standard Practice" and Chapter 5 of ACI 318-11 "Specifications for Structural Concrete for Buildings".

C. All concrete slab reinforcing steel shall be supported at the required heights by approved bolsters prior to pouring slab concrete.

D. Reinforcing steel lap splices not otherwise indicated shall be ACI standard class B splices staggered between adjacent bars one lap length minimum.

Bar Size "D"	Development Factor	Development Length	Class B Lap Splice Length Bottom Bar	Top Bar
#3	48 x D	18"	23"	30"
#4	48 x D	24"	31"	41"
#5	48 x D	30"	39"	51"
#6	48 x D	36"	47"	61"
#7	60 x D	53"	68"	89"
#8	60 x D	60"	78"	101"

E. Provide corner bars same size and spacing as horizontal bars and project 48 diameters each way or 2'-0" x 2'-0" minimum unless detailed otherwise.

F. Provide (2)-#5 bars around all openings and recesses. Extend these bars 24 inches beyond the corner of the openings.

G. Contractor shall provide and cast in all necessary inserts.

H. All welded wire mesh shall be furnished in flat sheets and conform to ASTM A-185.

REINFORCING PROTECTION:

A. Concrete deposited against earth: 3 inches.

B. Concrete formed surfaces exposed to ground and weather:
#5 and smaller bar – 1½ inches
#6 and larger bar – 2 inches

C. Concrete surfaces not exposed to weather or in contact with the ground:
#11 and smaller bar – ¾ inches

D. Slabs = ¾ inches

MASONRY:

A. Concrete masonry units shall conform to ASTM C90, Grade "N", medium weight having a minimum compressive strength of 2000 psi at 28 days. (f'_m = 1,500 psi) Masonry units at time of placement shall have been air cured for a minimum of 28 days or kiln cured, with a maximum water absorption of 17pcf/unit and a linear shrinkage of 0.045 maximum.

B. Mortar shall be ASTM C270 type "S" with a minimum compressive strength of 1800 psi at 28 days for above grade masonry work. Below grade masonry shall be Type "M" mortar.

C. Grout fill all cells. Grout shall exceed a compressive strength of 2000 psi at 28 days in accordance with ASTM C476. Slump shall be 7" ±1". Submit copy of grout mix design and 30 break test records to the engineer prior to grout placement. Water/cement ratio shall not exceed 0.56.

D. All masonry construction shall conform with present OSHA requirements including those regarding the establishment of "limited access zones".

E. All masonry construction shall be in accordance with ACI 530.1-11 "Specification for Masonry Construction" and transporting of ready-mix grout in accordance with ASTM C94 "Standard Specification for Ready-Mix Concrete".

F. Masonry units shall be placed in courses of running bond.

G. Reinforcing steel shall be rail steel deformed bars conforming to ASTM A615, Grade 60. Use ASTM A706, Grade 60 where welding is required.

H. Provide knockout bond beam block for all horizontal bond beams and at the tops of each wall.

I. Provide corner bars same size and spacing as horizontal bars and project 48 diameters each way.

J. Provide (2)-#4 bars around all openings and recesses. Extend these bars 24" beyond the corner of openings.

K. Masonry walls shall be reinforced as follows, except where shown otherwise on plans:
6" walls – #4 vertical at 40" o.c.
– #5 horizontal continuous at 24" o.c. at centerline of wall hook bar at ends of walls.

MASONRY VENEER:

A. Anchored veneer supported by wood framing or cold-formed steel framing shall not exceed 30 feet in height. The weight above this height shall be supported on a non-combustible ledger at each story level above. Anchored veneer supported by concrete or masonry walls has no height limitations.

B. Approved anchors for masonry veneer shall comply with the prescriptive requirements of TMS 402-11 Section 6.2.2.5 with one anchor for each 2 sq.ft. of wall area. Maximum spacing of anchors are 32" on-center horizontally or 24" on-center vertically, provided that they do not exceed 2 sq. ft. per anchor.

C. Masonry anchors attached to wood framing, cold-formed framing, and concrete or masonry walls shall comply with TMS 402-11 Section 6.2.2.6, 6.2.2.7 and 6.2.2.8 respectively.

STRUCTURAL STEEL:

A. All structural steel wide flange members shall conform to structural steel designation ASTM A992. All steel plates in the special moment-resistant frames shall conform to structural steel designation ASTM A572 (50ksi). All other structural steel plates, angles and misc. shapes shall conform to structural steel designation ASTM A36.

B. All hollow structural sections (HSS) shall conform to ASTM A500, Grade B designation having a minimum yield strength of 46,000 psi for rectangular shapes and having a minimum yield strength of 42,000 psi for round shapes.

C. All structural steel pipe shall conform to ASTM A53, Grade B.

D. Fabrication and erection shall conform to the specifications set forth in AISC 360-10 "Specifications for Structural Steel Buildings," 2010, and AISC 303-10 "Code of Standard Practice for Steel Buildings and Bridges," 2010, and the "Standard Code for Arc and Gas Welding in Building Construction."

E. High strength bolts shall be ASTM A325-N, bearing-type connection designed with threads included in the shear plane. High strength bolts are not 'slip critical,' and therefore shall be 'snug tight.'

F. All other bolts not designated as high strength shall be ASTM A307, Grade A.

G. Galvanize all exterior bolts in accordance with ASTM A153.

H. Lock nuts shall be IFI 100, Grade B prevailing torque type.

I. Plain hardened washers shall be ASTM F436.

J. Beveled washers shall be ANSI B18.23.1.

K. Welding shall conform to AWS D1.1-04 "Structural Welding Code - Steel." Welding filler metal shall be AWS A5.1 or A5.5 E70XX electrodes or AWS A5.18 ER70S-X. All welding shall be performed by welders AWS certified within the past 2 years for the type of welding performed. Welder shall present evidence of qualification within the past two years. Weld electrode E70T-4 is prohibited.

L. After fabrication, but before installation, remove rust scale, grease and oil by wire brushing and chemical treatment.

M. Shop prime steel items with one heavy coat of rust inhibiting metal primer, unless steel is to be galvanized.

N. Galvanizing coat all exposed metal per ASTM A123, G60.

METAL DECKING:

A. Metal decking shall be ICBO approved ASTM A653, coating designated G60 galvanized sheet steel. Roof decking shall be wide rib type.

B. Welding shall be in accordance with AWS D1.3-04 "Structural Welding Code-Sheet Steel". Welding filler metal shall be AWS A5.1 or A5.5 E60XX electrodes. Welding shall be performed by welders AWS certified within the past 2 years for the type of welding performed.

STRUCTURAL WOOD:

A. All structural wood members shall be Coast Region Douglas Fir No.2 or better grade as noted in National Design Specifications for Stress Grade Lumber and its fastenings, unless noted otherwise. All posts shall be Douglas Fir #1 or better.

B. All studs to be Douglas Fir #2 or better as noted in National Design Specifications for Stress Grade Lumber.

C. The Contractor shall furnish and install all bolts, and plates as required to complete the job.

D. Washers shall be used under all bolt heads and nuts bearing on wood.

E. All wood members in contact with concrete or masonry shall be preservative treated.

F. Unless Noted Otherwise Headers are to be 4x8 DF/L #2 or better.

G. All nailing not shown shall be as called for in OSSC table 2304.9.1 fastening schedule.

H. All nailing into treated lumber shall be galvanized.

I. Laminating 2x members:
-Minimum of 3 rows 10d (0.148"x3") nails @ 12" o.c.
-If using 16d common nails, the number of nailing rows may be decreased by one.
-Side loaded beams shall be connected with Simpson SDS screws in two rows with spacing 16" o.c.

PLYWOOD:

A. Wall Sheathing:
15/32" Plywood wall sheathing APA rated 24/0 Exposure 1. Lay horizontal and block all edges. Attach with 8d galvanized common nails 6" O.C. edges & 12" O.C. field, unless noted otherwise in Shearwall Schedule.

B. Roof Sheathing:
5/8" plywood roof sheathing APA rated 40/20 Exterior Glue Exposure 1. W/ 10d galvanized common nails @ 6" O.C. edges and 12" O.C. field, unless noted otherwise on plans. Lay perpendicular to supports and stagger joints. (Block as required on plan)

C. Roof Sheathing:
¾" plywood roof sheathing APA rated 48/24 Exterior Glue CD-X W/ 10d common nails @ 6" O.C. edges and 12" O.C. field, unless noted otherwise on plans. Lay perpendicular to supports and stagger joints.

GLU-LAM BEAMS:

A. Beams to be built in accordance with "Standard Specifications for Structural Glued Laminated Members of the American Institute of Timber Construction".

B. Glue-laminated members shall be laminated from Coast Region Douglas Fir lumber and shall be 24F-V4 structural grade for single spans, and 24F-V8 Structural grade for continuous and cantilevered spans

C. STRESSES: F_b = 2,400 psi E= $1.8e^6$ F_v = 265 psi F_c = 650 psi

TRUSSES:

A. Truss Design Drawings and Truss Placement Diagram shall be stamped by an engineer licensed in the State of Oregon retained by the truss manufacturer.

B. Roof trusses to be designed to carry all loads noted in Chapter 16, Section 1608 of the 2012 IBC & Chapter 7 of ASCE 7-10.

C. Roof trusses to be designed to resist all axial loads as specified on the construction documents.

D. Truss manufacturer's design shall include all temporary required bracing and shoring for the erection and installation of the roof trusses.

E. Truss manufacturer's design shall include all blocking, bridging, fastening, and attaching devices to carry the specified loads including ply to ply truss connections.

F. Erection and installation of the roof trusses by the contractor shall be in accordance with the specifications and design set forth by the manufacturer.

G. The truss manufacturer shall supply all trusses, associated load transfer blocks, hangers, bracing, bridging, blocking, and beveled plates as required to complete the roof truss framing.

H. Each truss shall be attached to the double top plate of wall with Simpson HI clips U.O.N on construction documents.

I. Each girder truss shall be attached to a minimum double stud in wall below with Simpson LGT Girder Tiedown U.O.N on construction documents. Edge nail wall sheathing to double stud.

J. Make all bottom chord connections after dead load has been applied. Provide deflection capability unless truss designed for support by interior walls.

K. Truss manufacturer shall submit truss design drawings with all requirements as specified in Section 2304.1.1 of the 2012 I.B.C as follows:
1. Slope or depth, span and spacing per construction documents.
2. Location of all joints and support locations.
3. Number of plies if greater than one.
4. Required bearing widths assuming an allowable compression perpendicular to grain of 625 psi (DF #2).
5. Design loads as applicable including:
i. Top chord live load of 20 psf (min) or appropriate snow load.
- Cd = 1.25 for roof live load
- Cd = 1.15 for roof snow load
ii. Top chord dead load of 7 psf (min).
iii. Bottom chord live load of 10 psf (min). Need not be applied simultaneously with roof snow or live load.
iv. Bottom chord dead load of 10 psf (min).
v. Additional loads and locations, such as concentrated loads and their points of application.
vi. Environmental design criteria and loads (wind, rain, snow, seismic, etc).
6. Other lateral loads, including drag strut loads if specified on the construction documents.
7. Adjustments to wood member and metal connector plate design value for conditions of use.
8. Maximum reaction force and direction, including maximum uplift reaction forces where applicable.
9. Metal-connector-plate type, size and thickness or gage, and the dimensioned location of each metal connector plate except where symmetrically located relative to the joint interface.
10. Size, species and grade for each member to be specified by the truss manufacturer.
11. Truss-to-truss connections and truss field assembly requirements.
12. Calculated span-to-deflection ratio and maximum vertical and horizontal deflection for live and total loads with the maximum live load deflection limited to 1/240 of the span. Long term creep of 1.5 must be applied to dead load deflection.
13. Maximum axial tensile and compression forces in the truss members.
14. Required permanent individual truss member restraint location and the method and details of restraint/bracing to be used in accordance with Section 2303.4.1.2 to be designed and set forth in the truss design drawings by the Truss Design Professional.

Additional requirements for trusses spanning 60 feet or greater.

A. The owner shall contract with a qualified Registered Design Professional for the design of the temporary installation restraint/bracing and the permanent individual truss member restraint/bracing for all trusses with clear spans 60 feet or greater per Section 2303.4.1.3 of the 2012 I.B.C.

PRE-ENGINEERED LUMBER:

A. The joist manufacturer shall supply all joists, associated load transfer blocks, hangers, bracing, blocking and beveled plates as required to complete the roof joist.

B. Erection and installation shall be in accordance with the specifications set forth by the manufacturer.

C. Continuous LVL rim joists shall not be spliced over openings. Splice 3'-0" min. on either side of openings.

D. Stresses for Microlam LVL:
F_b = 2,600 psi E = $2.0e^6$ psi
F_v = 285 psi $F_{c\perp}$ = 750 psi

E. Stresses for Paralam PSL:
Beams:
F_b = 2,900 psi E = $2.2e^6$ psi
F_v = 290 psi $F_{c\perp}$ = 750 psi
Columns:
F_b = 2,400 psi E = $1.8e^6$ psi
F_v = 190 psi $F_{c\perp}$ = 425 psi

F. Stresses for TimberStrand LSL:
F_b = 2,325 psi E = $1.55e^6$
F_v = 310 psi $F_{c\perp}$ = 900 psi

G. Laminating 1¾" width pieces:
-Minimum of 3 rows 10d (0.148"x3") nails @ 12" o.c.
-Minimum of 4 rows 10d (0.148"x3") nails @ 12" o.c. for 14" or deeper.
-If using 16d common nails, the number of nailing rows may be decreased by one.
-Side loaded beams shall be connected with Simpson SDS screws in two rows with spacing 16" o.c.

PLYWOOD WEB JOISTS:

A. Joists shown on plans as "Red-I" to be "RedBUILT" or approved equal. Joist assembly to be tested under OSSC testing procedures.

B. Complete joist designs bearing the stamp of a professional engineer registered in the State of Oregon to be submitted for review.

C. Floor framing members shall be designed to support the specified loads and limit maximum total load deflection to 1/360 of the span and limit live load deflection to 1/480 of the span.

D. Joist manufacturer to provide all specialty items needed for a normal and complete installation of floor joists. The manufacturer shall supply all associated load transfer blocks, hangers, bracing, blocking, and beveled plates as required to finish the framing.

E. Alternate joist or truss system shall be tested. Results of load test on component parts, full scale tests on joists and an analysis of test results shall be submitted to the architect for review.

SHEAR WALL SCHEDULE NOTES:

A. Contractor shall provide shear transfer from diaphragm to shearwalls. (See appropriate details)

B. The allowable shear values are applicable to studs of Species Group II (Douglas-Fir, Southern Pine).

C. All nails referenced are common nails (i.e. 6d=0.113", 8d=0.131", 10d=0.148", 12d=0.148" and 16d=0.162"), unless referenced otherwise. Values of other standard construction fasteners will require spacing adjustments and must be approved by the engineer-of-record.

D. A.B. – Anchor Bolts

E. Where panels are applied on both sides of the wall and nail spacing is less than 6" o.c. on either side, panel edges shall be offset to fall on different framing members or framing shall be 3" nominal or thicker and nails on either side shall be staggered.

F. Minimum nail penetrations: 6d=1¼", 8d=1⅝", and 10d=1⅝".

G. Nails for gypsum wallboard can be cooler or wallboard nails.

ACCEPTABLE POST INSTALLED ANCHOR PRODUCTS:

A. The following anchor products have been approved by the ICC for use in cracked concrete. This list is provided for the contractor to use as a resource for alternate manufacturers and anchor types. If an alternate is desired from this list, the contractor is to notify the E.O.R. so that proper size and embedment may be specified.

B. Listed anchors may not be an equivalent to those specified in the plans.

Adhesive Anchors:
- Hilti HIT-HY 200
- Hilti HIT-RE 500-V3 Epoxy
- Simpson SET-XP Epoxy
- Simpson AT-XP Acrylic
- Dewalt AC200+ Acrylic
- Dewalt / Powers Pure 110+ Epoxy
- ITW Red Head EPCON G5 Epoxy
- ITW Red Head EPCON S7 Epoxy

Wedge Anchors / Expansion Anchors:
- Hilti Kwik Bolt TZ Expansion Anchor
- Hilti HSL-3 Heavy Duty Expansion Anchor
- Simpson Strong-Bolt 2 Wedge Anchor
- Dewalt / Powers Power-Stud+ SD1 Expansion Anchor
- Dewalt / Powers Power-Stud+ SD2 Expansion Anchor
- ITW Red Head Trubolt+ Wedge Anchor

Screw Anchors:
- Hilti Kwik HUS-EZ (KH-EZ) Screw Anchor
- Simpson Titen HD Screw Anchor
- Dewalt Screw-Bolt + Screw Anchor

SHEAR WALL SCHEDULE[1,2,3,4,6,7,8,9]
(NOT ALL WALL TYPES SHOWN MAY BE USED ON PROJECT)

WALL TYPE	STRUCTURAL PANEL SHEATHING	EDGE NAILING	FIELD NAILING	REMARKS	A35 CLIP DOUBLE TOP PLATE CONN.[5]	SILL PLATE CONN. (A.B.) ½"ø x10" LONG	SILL PLATE CONN. (A.B.) ⅝"ø x10" LONG	SOLE PLATE CONNECTION	SHEAR VALUE (plf) SEISMIC	SHEAR VALUE (plf) WIND
A	7/16" OSB or 15/32" PLYWOOD	0.131"ø x 2.5" NAILS @ 6" O.C.	0.131"ø x 2.5" NAILS @ 12" O.C.		24" O.C.	2'-8" O.C.[10]	4'-0" O.C.[10]	0.162"ø x 3½" NAILS @ 6" O.C.	260	344
B	7/16" OSB or 15/32" PLYWOOD	0.131"ø x 2.5" NAILS @ 4" O.C.	0.131"ø x 2.5" NAILS @ 12" O.C.		16" O.C.	1'-4" O.C.[10]	2'-8" O.C.[10]	0.162"ø x 3½" NAILS @ 4½" O.C.	380	515
C	7/16" OSB or 15/32" PLYWOOD[11]	0.131"ø x 2.5" NAILS @ 3" O.C.	0.131"ø x 2.5" NAILS @ 12" O.C.		12" O.C.	1'-4" O.C.[10]	2'-0" O.C.[10]	0.162"ø x 3½" NAILS @ 3½" O.C.	490	685
D	15/32" PLYWOOD[12]	0.148"ø x 3" NAILS @ 3" O.C.	0.148"ø x 3" NAILS @ 12" O.C.		9" O.C.	N/A	1'-4" O.C.[10]	(2) ROWS 0.162"ø x 3½" NAILS @ 6" O.C.	600	840
E	15/32" PLYWOOD[12]	0.148"ø x 3" NAILS @ 2" O.C.	0.148"ø x 3" NAILS @ 12" O.C.		8" O.C.	N/A	1'-4" O.C.[10]	(2) ROWS 0.162"ø x 3½" NAILS @ 5" O.C.	770	1032
F	½" G.W.B. MIN.	5d COOLER NAILS @ 4" O.C.	5d COOLER NAILS @ 12" O.C.	UNBLOCKED	48" O.C.	4'-0" O.C.	4'-0" O.C.	0.162"ø x 3½" NAILS @ 6" O.C.	125	125
G	½" G.W.B. MIN.	NO. 6 x 1¼" SCREWS @ 4" O.C.	NO. 6 x 1¼" SCREWS @ 4" O.C.	BLOCKED	48" O.C.	4'-0" O.C.	4'-0" O.C.	0.162"ø x 3½" NAILS @ 6" O.C.	160	160

NOTES:
1. BLOCK ALL EDGES OF SHEATHING, U.O.N.
2. DO NOT BREAK SHEATHING SKIN BY OVER DRIVING NAILS.
3. PRE-DRILL AS REQUIRED TO AVOID SPLITTING SILLS, ETC.
4. NAILS SHOULD BE LOCATED ⅜" CLEAR OF PANEL EDGES.
5. USE SIMPSON A35 CLIPS TO ATTACH BLOCKING OR GABLE TO TOP PLATE AT FLOOR LINE. AT ROOF LINE USE SIMPSON HI CLIPS AT EACH TRUSS (U.O.N.)
6. VALUES OF OTHER STANDARD CONSTRUCTION FASTENERS WILL REQUIRE SPACING ADJUSTMENTS AND MUST BE APPROVED BY THE ENGINEER-OF-RECORD.
7. USE HOT DIPPED GALVANIZED NAILS AT ALL EXTERIOR APPLICATIONS.
8. C-D, C-C SHEATHING, PLYWOOD PANEL SIDING, AND OTHER GRADES COVERED IN APA PLYWOOD DESIGN SPECIFICATION.
9. SHEATHING FACE GRAIN CAN BE APPLIED PERPENDICULAR OR PARALLEL TO WALL STUDS, PROVIDED STUDS ARE SPACED A MAXIMUM OF 16" OC.
10. 3"x3"x½" WASHER REQUIRED AT EACH A.B. PLACE WITHIN ½" OF STRUCTURAL PANEL SHEATHING.
11. ALL FRAMING MEMBERS RECEIVING EDGE NAILING FROM ABUTTING PANELS SHALL NOT BE LESS THAN A 3" NOMINAL OR THICKER MEMBER OR (2) 2" MEMBERS NAILED WITH 10d NAILS 4" OC STAGGERED. PANEL JOINT NAILING SHALL BE STAGGERED.
12. FRAMING AT ADJOINING PANEL EDGES SHALL BE 3" NOMINAL MEMBER OR WIDER AND NAILS SHALL BE STAGGERED WHERE NAILS ARE SPACED 2" OR LESS OC, OR WHERE 10d NAILS HAVE PENETRATION INTO FRAMING OF MORE THAN ½" ARE SPACED 3" OR LESS OC.

HOLDOWN SCHEDULE[1,2,3,4,5]
(NOT ALL HOLDOWN TYPES SHOWN MAY BE USED ON PROJECT)

MARK	HOLDOWN	ANCHOR BOLT	EMBED. LENGTH	ANCHOR SIZE	MINIMUM STEMWALL	MINIMUM MEMBER	ANCHORAGE TO WOOD	REMARKS	ALLOWABLE LOAD (WIND)	ALLOWABLE LOAD (SEISMIC)
1	HDU2	SSTB16	12⅝"	⅝"ø	6"	(2) 2x6[6]	(6) ¼"x2½"[7]		3,075#	2,550#
2	HDU4	SSTB20	16⅝"	⅝"ø	6"	(2) 2x6[6]	(10) ¼"x2½"[7]		4,315#	3,145#
3	HDU5	SSTB24	20⅝"	⅝"ø	6"	(2) 2x6[6]	(14) ¼"x2½"[7]		5,025#	3,740#
4	HDU8	SSTB28	24⅞"	⅞"ø	8"	4x6	(20) ¼"x2½"[7]		7,870#	7,870#
5	HDQ8	SSTB28	24⅞"	⅞"ø	8"	4x6[8]	(20) ¼"x3"[7]		9,230#	8,315#
6	HHDQ11	SBLX30	24"	1"ø	8"	6x6	(24) ¼"x2½"[7]		11,810#	11,470#
7	HDU2	N/A	N/A	⅝"ø	N/A	(2) 2x6[6]	(6) ¼"x2½"[7]	⅝"ø THREADED ROD THROUGH FLOOR TO HDU2 @ TOP OF LOWER WALL	3,075#	3,075#
8	MSTC28	N/A	N/A	N/A	N/A	(2) 2x6[6]	(12) 10d COMMON		1,155#	1,155#
9	MSTC40	N/A	N/A	N/A	N/A	(2) 2x6[6]	(28) 10d COMMON		2,695#	2,695#
10	MSTC52	N/A	N/A	N/A	N/A	(2) 2x6[6]	(44) 10d COMMON		4,235#	4,235#

▽ DENOTES LOCATION OF HOLDOWN AT BOTTOM OF WALL

NOTES:
1. HOLDOWNS BY SIMPSON STRONG-TIE COMPANY, INC. SEE SIMPSON CATALOG FOR PROPER INSTALLATION.
2. HARDMOUNT ALL HOLDOWN ANCHORS PRIOR TO CONCRETE POUR.
3. EDGE NAIL SHEATHING TO ALL POSTS OR BOUNDARY MEMBERS AT HOLDOWNS.
4. LOCATE HD WITHIN 6" OF END OF SHEAR PANEL.
5. INSTALL HD MINIMUM OF 5" CLEAR FROM CORNER.
6. LAMINATE STUDS WITH 16d NAILS AT 12" O.C. STAGGERED. CLINCH TIPS OF NAILS.
7. USE SIMPSON SDS ¼"ø WOOD SCREWS.
8. ASSUMES A DF SILL OR SOLE PLATE. 6x6 BOUNDARY MEMBER REQUIRED WITH HF SOLE PLATE.

consultants:
kmd – 220 nw eighth avenue, portland, oregon 97209, t 503.221.1474, kmdarch@kmdarch.com – ARCHITECTURE & INTERIOR DESIGN
Westech Engineering, Inc. – CIVIL ENGINEERING SERVICES PROVIDED BY – CONSULTING ENGINEERS & PLANNERS
CARLSON VEITT ARCHITECTS PC – ARCHITECTURE • INTERIOR DESIGN – 503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM – 3095 RIVER ROAD NORTH, SALEM, OREGON 97303 – MEMBER AMERICAN INSTITUTE OF ARCHITECTS
SÄZAN GROUP – MSC CONSULTING STRUCTURAL ENGINEERS – 3445 THE DALLES PLACE NE SUITE 120, SALEM, OREGON 97305, t 503.399.1399, www.msceng.com

REGISTERED PROFESSIONAL ENGINEER – OREGON – 83402 – DECEMBER 19, 2003 – CAMERON B. SWEARINGIN – EXPIRES: JUNE 30, 2018

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE PUBLIC SAFETY BUILDING
AUMSVILLE HIGHWAY
SALEM, OREGON

revisions:

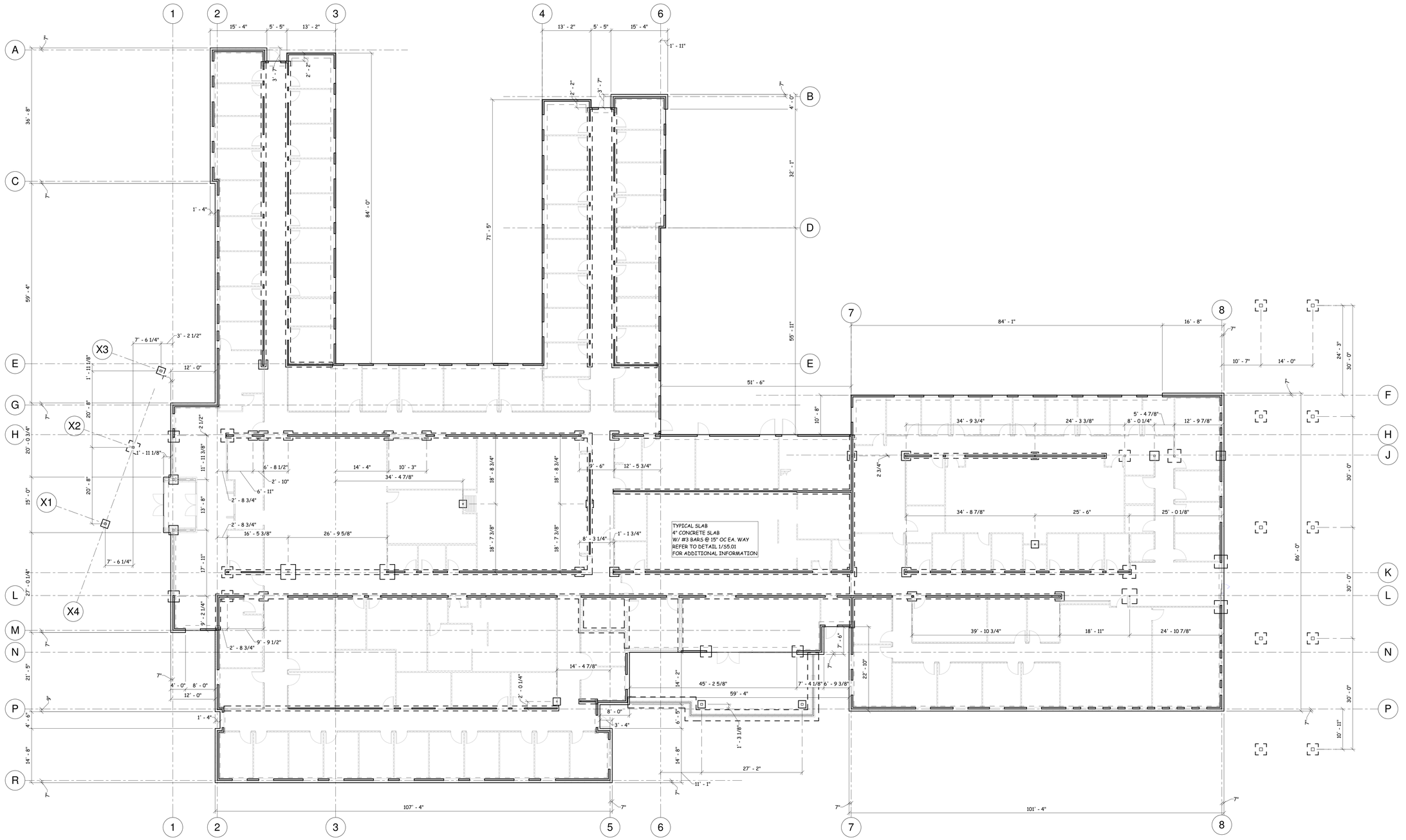
date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

copyright © 2017 MSC ENGINEERS, INC.

GENERAL NOTES

sheet: S-001
of:

G:\JOBS-2016\160652\160652-S001_06-12-17.dwg, 6/12/2017 8:40:03 AM, Station #4



1 / S-101 OVERALL FOUNDATION PLAN
3/32" = 1'-0"

ALL PERIMETER FOOTINGS 16" WIDE x 30" DEEP, U.O.N.
ALL INTERIOR FOOTINGS 16" WIDE x 24" DEEP, U.O.N.

6/12/2017 8:38:52 AM

REGISTERED PROFESSIONAL ENGINEER
65402
OREGON
December 19, 2003
CAMERON B. SWENARTON
EXPIRES: JUNE 30, 2018

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
1.503.221.1474
kmdarchitects.com

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURAL ENGINEERS, INC.
3431 TIPPERON PLACE NE SUITE 120
SALEM, OREGON 97305
(503) 581-7299
WEBSITE: www.msceng.com

CIVIL ENGINEERING SERVICES PROVIDED BY
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING

3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

copyright © 2017
MSC ENGINEERS, INC.

OVERALL FOUNDATION PLAN

sheet: S-101
of:

COLUMN SCHEDULE		
MARK	SIZE	MATERIAL
C1	(2) 2x4	H.F.#2/D.F.#2
C2	(2) 2x6	H.F.#2/D.F.#2
C3	(3) 2x6	H.F.#2/D.F.#2
C4	4x4	D.F.#2
C5	4x6	D.F.#2
C6	6x6	D.F.#1
C7	HSS3x3x1/4	A500 STEEL
C8	HSS3 1/2x3 1/2x1/4	A500 STEEL
C9	HSS6.5x6.5x1/4	A500 STEEL
C10	HSS7.5x3.5x1/4	A500 STEEL
C11	HSS7x7x1/4	A500 STEEL
C12	HSS10x10x1/4	A500 STEEL

FOUNDATION
- BEARING WALL
- NON-STRUCTURAL WALL
- LOCATION OF 6" WIDE MASONRY WALL
- HOLDOWN IDENTIFICATION

PAD FOOTING SCHEDULE		
FTG. MARK	FTG. SIZE	BOTTOM REINFORCING
PF1	2'-0"x2'-0"x10"	(3) #4 x1'-6" EA. WAY
PF2	2'-6"x2'-6"x10"	(3) #4 x2'-0" EA. WAY
PF3	3'-0"x3'-0"x12"	(4) #4 x2'-6" EA. WAY
PF4	3'-6"x3'-6"x12"	(5) #4 x3'-0" EA. WAY
PF5	4'-0"x4'-0"x14"	(6) #4 x3'-6" EA. WAY
PF6	4'-6"x4'-6"x14"	(6) #5 x4'-0" EA. WAY
PF7	2'-0"x2'-0"x5'-9"	SEE DETAIL 5/S-502
PF8	2'-0"x2'-0"x5'-9"	SEE DETAIL 5/S-502
PF9	3'-0"x3'-0"x5'-6"	SEE DETAIL 5/S-502
PF10	3'-0"x3'-0"x5'-9"	SEE DETAIL 5/S-502

NOTE: PER GEOTECHNICAL REQUIREMENTS
- ALL FOOTINGS TO BEAR 24" (MIN.) BELOW FINISH GRADE
- THICKENED FOOTINGS AS REQUIRED TO ACHIEVE MIN. EMBEDMENT

ALL PERIMETER FOOTINGS 16" WIDE x 30" DEEP, U.O.N.
ALL INTERIOR FOOTINGS 16" WIDE x 24" DEEP, U.O.N.

1 S-102 ENLARGED FOUNDATION PLAN - WEST
1/8" = 1'-0"

6/12/2017 8:28:55 AM

consultants:

kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
1.503.221.1474
kmdarchitects.com

CIVIL ENGINEERING SERVICES PROVIDED BY:
WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS & PLANNERS
3470 PARKERD PLACE NE SUITE 120
SALEM, OREGON 97301
PH (503) 399-1399
WEBSITE: www.mooregonengineering.com

MSC GROUP
CONSULTING STRUCTURAL ENGINEERS
SALEM, OREGON

SAZAN ENGINEERS INC

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

REGISTERED PROFESSIONAL ENGINEER — OREGON — JAMES M. CHAMBERLIN — 12-31-2018
EXPIRES: JUNE 30, 2018

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING

3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

Marion County OREGON

revisions:

date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS
copyright © 2017
MSC ENGINEERS, INC.

ENLARGED FOUNDATION PLAN - WEST

sheet: S-102
of:

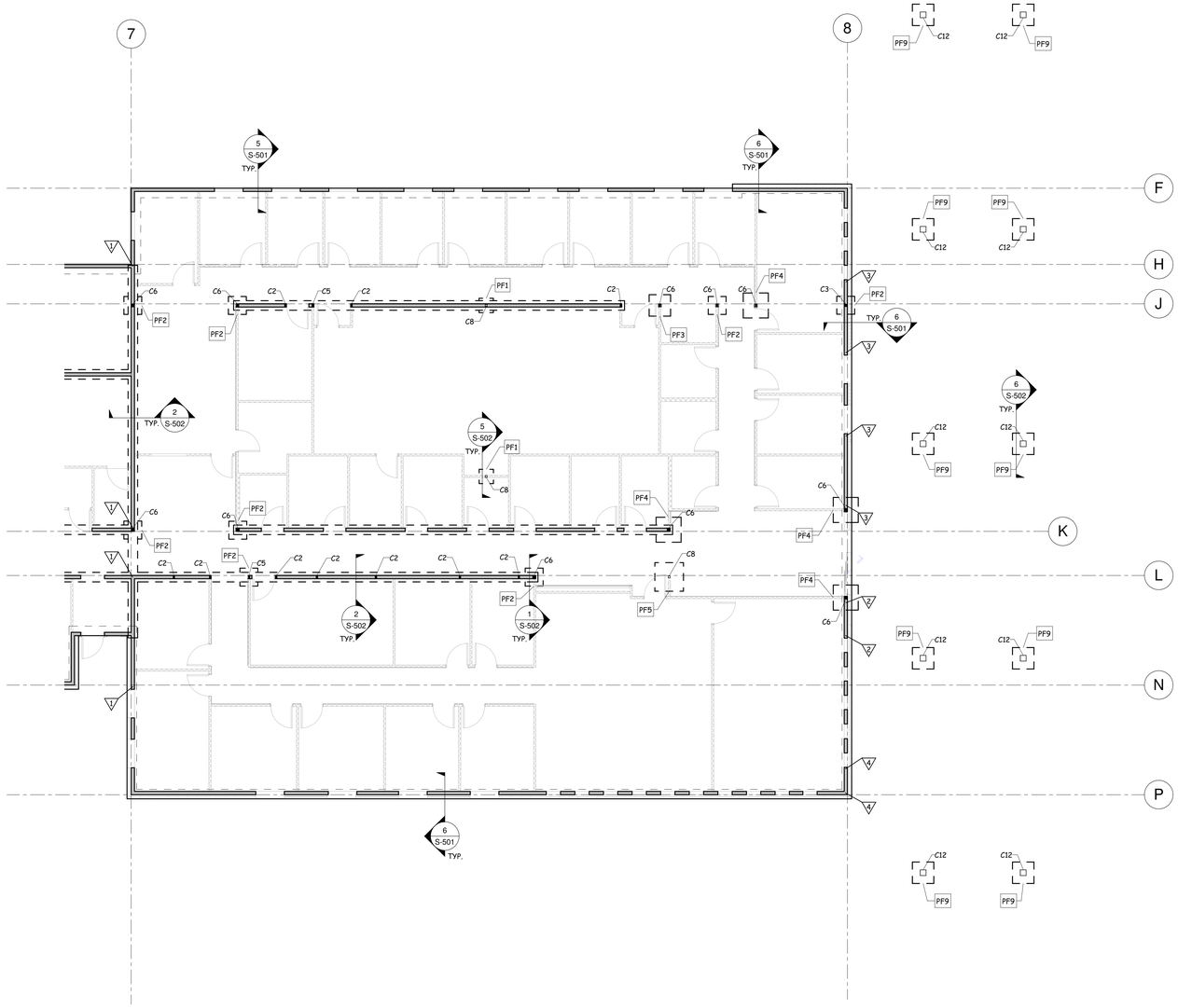
COLUMN SCHEDULE		
MARK	SIZE	MATERIAL
C1	(2) 2x4	H.F.#2/D.F.#2
C2	(2) 2x6	H.F.#2/D.F.#2
C3	(3) 2x6	H.F.#2/D.F.#2
C4	4x4	D.F.#2
C5	4x6	D.F.#2
C6	6x6	D.F.#1
C7	HSS3x3x1/4	A500 STEEL
C8	HSS3 1/2x3 1/2x1/4	A500 STEEL
C9	HSS5x5x3/16	A500 STEEL
C10	HSS5 1/2x5 1/2x1/4	A500 STEEL
C11	HSS7x7x3/16	A500 STEEL
C12	HSS10x10x1/4	A500 STEEL

FOUNDATION

- BEARING WALL
- NON-STRUCTURAL WALLS
- LOCATION OF 6" WIDE MASONRY WALL
- (#) HOLDOWN IDENTIFICATION

PAD FOOTING SCHEDULE		
FTG. MARK	FTG. SIZE	BOTTOM REINFORCING
PF1	2'-0"x2'-0"x10"	(3) #4 x1'-6" EA. WAY
PF2	2'-6"x2'-6"x10"	(3) #4 x2'-0" EA. WAY
PF3	3'-0"x3'-0"x12"	(4) #4 x2'-6" EA. WAY
PF4	3'-6"x3'-6"x12"	(5) #4 x3'-0" EA. WAY
PF5	4'-0"x4'-0"x13"	(5) #5 x3'-6" EA. WAY
PF6	4'-6"x4'-6"x14"	(6) #5 x4'-0" EA. WAY
PF7	2'-0"x2'-0"x5'-9"	SEE DETAIL 5/S-502
PF8	2'-0"x2'-0"x6'-9"	SEE DETAIL 5/S-502
PF9	3'-0"x3'-0"x5'-9"	SEE DETAIL 5/S-502
PF10	3'-0"x3'-0"x5'-9"	SEE DETAIL 5/S-502

NOTE: PER GEOTECHNICAL REQUIREMENTS
- ALL FOOTINGS TO BEAR 24" (MIN.) BELOW FINISH GRADE
- THICKEN PAD FOOTINGS AS REQUIRED TO ACHIEVE MIN. EMBEDMENT



1 S-103 ENLARGED FOUNDATION PLAN - EAST
1/8" = 1'-0"

ALL PERIMETER FOOTINGS 16" WIDE x 30" DEEP, U.O.N.
ALL INTERIOR FOOTINGS 16" WIDE x 24" DEEP, U.O.N.

6/12/2017 8:38:56 AM

OREGON REGISTERED PROFESSIONAL ENGINEER 81402 OREGON December 19, 2003 CAMERON B. SWENARTON
EXPIRES: JUNE 30, 2018

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc — 220 nw eighth avenue, portland, oregon 97209, 1.503.221.1474, kmdarch@kmdpc.com
SÄZÄN GROUP MSC CONSULTING STRUCTURAL ENGINEERS — STRUCTURAL ENGINEERS, MACC — 3431 SUNRIVER PLACE NE SUITE 120, BEND, OREGON 97701, PHONE/FAX: 541.389.7099, WEBSITE: www.msceng.com
Westech Engineering, Inc. — CIVIL ENGINEERING SERVICES PROVIDED BY — CONSULTING ENGINEERS & PLANNERS
Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

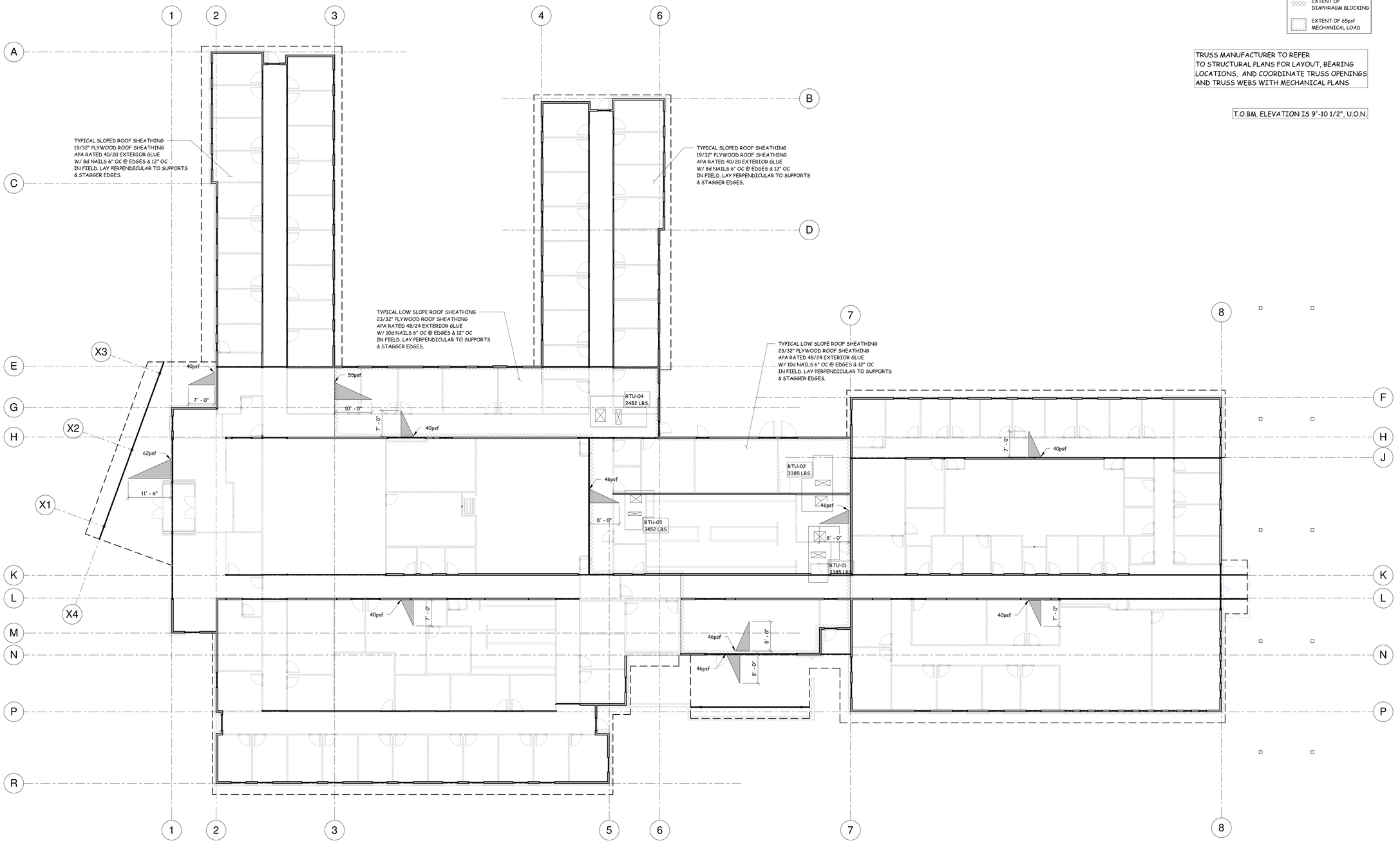
revisions:

date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

copyright © 2017
MSC ENGINEERS, INC.

ENLARGED FOUNDATION PLAN - EAST

sheet: S-103
of:



FRAMING

- SHEARWALL
- BEARING WALL
- LOCATION OF 6" WIDE MASONRY WALL
- NON-BEARING WALL
- SHEARWALL IDENTIFICATION
- HOLDOWN IDENTIFICATION
- G.T. GIRDER TRUSS
- SNOW DRIFT
- EXTENT OF DIAPHRAGM BLOCKING
- EXTENT OF 65psf MECHANICAL LOAD

TRUSS MANUFACTURER TO REFER TO STRUCTURAL PLANS FOR LAYOUT, BEARING LOCATIONS, AND COORDINATE TRUSS OPENINGS AND TRUSS WEBS WITH MECHANICAL PLANS

T.O.B.M. ELEVATION IS 9'-10 1/2", U.O.N.

1 S-201 OVERALL LOWER ROOF FRAMING PLAN
3/32" = 1'-0"

6/12/2017 8:58:08 AM

OREGON
REGISTERED PROFESSIONAL ENGINEER
65402
December 19, 2003
CAMERON B. SWENSON
EXPIRES: JUNE 30, 2018

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURAL ENGINEERS, INC.
3421 TYBERSON PLACE NE SUITE 120
SALEM, OREGON 97305
PHONE: 503.589.1099
WEBSITE: www.msceng@msceng.com

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com

Westech Engineering, Inc
CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING

3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

copyright © 2017
MSC ENGINEERS, INC.

OVERALL LOWER ROOF PLAN

sheet: S-201

of:

COLUMN SCHEDULE		
MARK	SIZE	MATERIAL
C1	(2) 2x4	H.F.#2/D.F.#2
C2	(2) 2x6	H.F.#2/D.F.#2
C3	(3) 2x6	H.F.#2/D.F.#2
C4	4x4	D.F.#2
C5	4x6	D.F.#2
C6	6x6	D.F.#1
C7	HSS3x3x1/4	A500 STEEL
C8	HSS3 1/2x3 1/2x1/4	A500 STEEL
C9	HSS5x5x3/16	A500 STEEL
C10	HSS5 1/2x5 1/2x1/4	A500 STEEL
C11	HSS7x7x3/16	A500 STEEL
C12	HSS10x10x1/4	A500 STEEL

FRAMING
- SHEARWALL
- BEARING WALL
- LOCATION OF 6" WIDE MASONRY WALL
- NON-BEARING WALL
- SHEARWALL IDENTIFICATION
- HOLDOWN IDENTIFICATION
- G.T. GIRDER TRUSS
- SNOW DRIFT
- EXTENT OF DIAPHRAGM BLOCKING
- EXTENT OF 65psf MECHANICAL LOAD

TRUSS MANUFACTURER TO REFER TO STRUCTURAL PLANS FOR LAYOUT, BEARING LOCATIONS, AND COORDINATE TRUSS OPENINGS AND TRUSS WEBS WITH MECHANICAL PLANS

T.O.BM. ELEVATION IS 9'-10 1/2", U.O.N.

1 S-202 ENLARGED LOWER ROOF FRAMING - WEST
1/8" = 1'-0"

6/12/2017 8:39:00 AM

consultants:
kmd architects+planners pc — 220 nw eighth avenue portland, oregon 97209 — 1.503.221.1474 — kmdarchitects.com
Westech Engineering, Inc. CONSULTING ENGINEERS & PLANNERS — CIVIL ENGINEERING SERVICES PROVIDED BY
SÄZAN GROUP — MSC CONSULTING STRUCTURAL ENGINEERS — STRUCTURAL ENGINEERS, INC. — 3431 SUNSET PLACE NE SUITE 120 — VANCOUVER, WA 98661 — PHONE: 360.750.7099 — WEBSITE: www.msceng.com
CARLSON VEIT ARCHITECTS PC — ARCHITECTURE • INTERIOR DESIGN — 503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM — 3095 RIVER ROAD NORTH, SALEM, OREGON 97303 — MEMBER AMERICAN INSTITUTE OF ARCHITECTS

project:
MARION COUNTY SHERIFF'S OFFICE PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

copyright © 2017 MSC ENGINEERS, INC.

LOWER ROOF FRAMING PLAN - WEST

sheet: S-202
of:

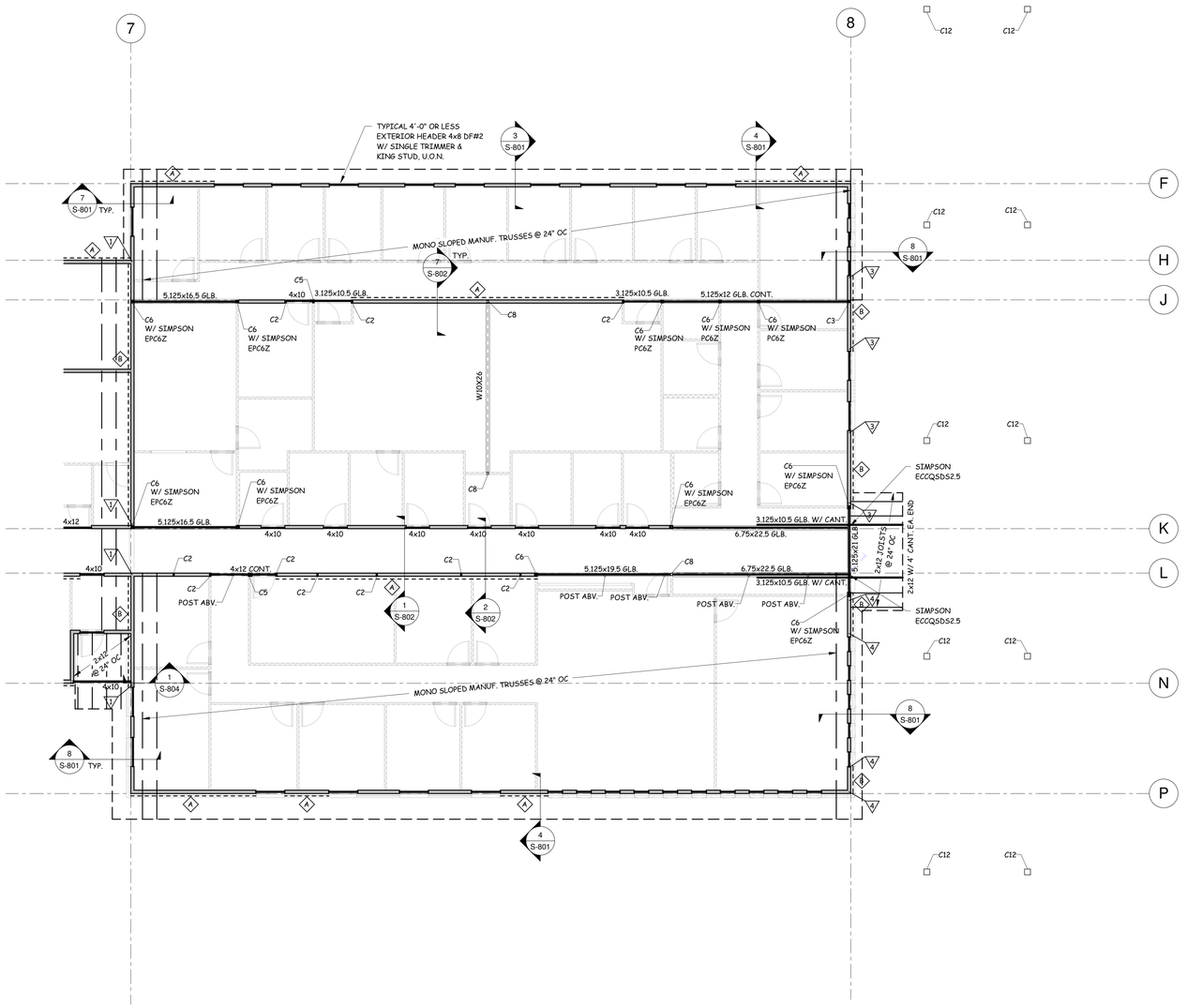
COLUMN SCHEDULE		
MARK	SIZE	MATERIAL
C1	(2) 2x4	H.F.#2/D.F.#2
C2	(2) 2x6	H.F.#2/D.F.#2
C3	(3) 2x6	H.F.#2/D.F.#2
C4	4x4	D.F.#2
C5	4x6	D.F.#2
C6	6x6	D.F.#1
C7	HSS3x3x1/4	A500 STEEL
C8	HSS3 1/2x3 1/2x1/4	A500 STEEL
C9	HSS5x5x3/16	A500 STEEL
C10	HSS5 1/2x5 1/2x1/4	A500 STEEL
C11	HSS7x7x3/16	A500 STEEL
C12	HSS10x10x1/4	A500 STEEL

FRAMING

- SHEARWALL
- BEARING WALL
- LOCATION OF 6" WIDE MASONRY WALL
- NON-BEARING WALL
- SHEARWALL IDENTIFICATION
- HOLDOWN IDENTIFICATION
- G.T. GIRDER TRUSS
- SNOW DRIFT
- EXTENT OF DIAPHRAGM BLOCKING
- EXTENT OF 65psf MECHANICAL LOAD

TRUSS MANUFACTURER TO REFER TO STRUCTURAL PLANS FOR LAYOUT, BEARING LOCATIONS, AND COORDINATE TRUSS OPENINGS AND TRUSS WEBS WITH MECHANICAL PLANS

T.O.BM. ELEVATION IS 9'-10 1/2", U.O.N.



1 S-203 ENLARGED LOWER ROOF FRAMING - EAST
1/8" = 1'-0"

6/12/2017 8:38:01 AM

OREGON REGISTERED PROFESSIONAL ENGINEER 81402 OREGON December 19, 2003 CAMERON B. SWENSON
EXPIRES: JUNE 30, 2018

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc — 220 nw eighth avenue portland, oregon 97209 — 1.503.221.1474 — kmdarch@kmdpc.com
SÄZAN GROUP — MSC CONSULTING STRUCTURAL ENGINEERS — STRUCTURAL ENGINEERS, MARCH — 3431 SUNSET BLVD STE 120 ROCKLIN, CA 95765 — PHONE: 916.797.1199 — WEBSITE: www.sazangroupengineer.com
Westech Engineering, Inc. — CIVIL ENGINEERING SERVICES PROVIDED BY — CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE PUBLIC SAFETY BUILDING

3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

copyright © 2017
MSC ENGINEERS, INC.

LOWER ROOF FRAMING PLAN - EAST

sheet: S-203

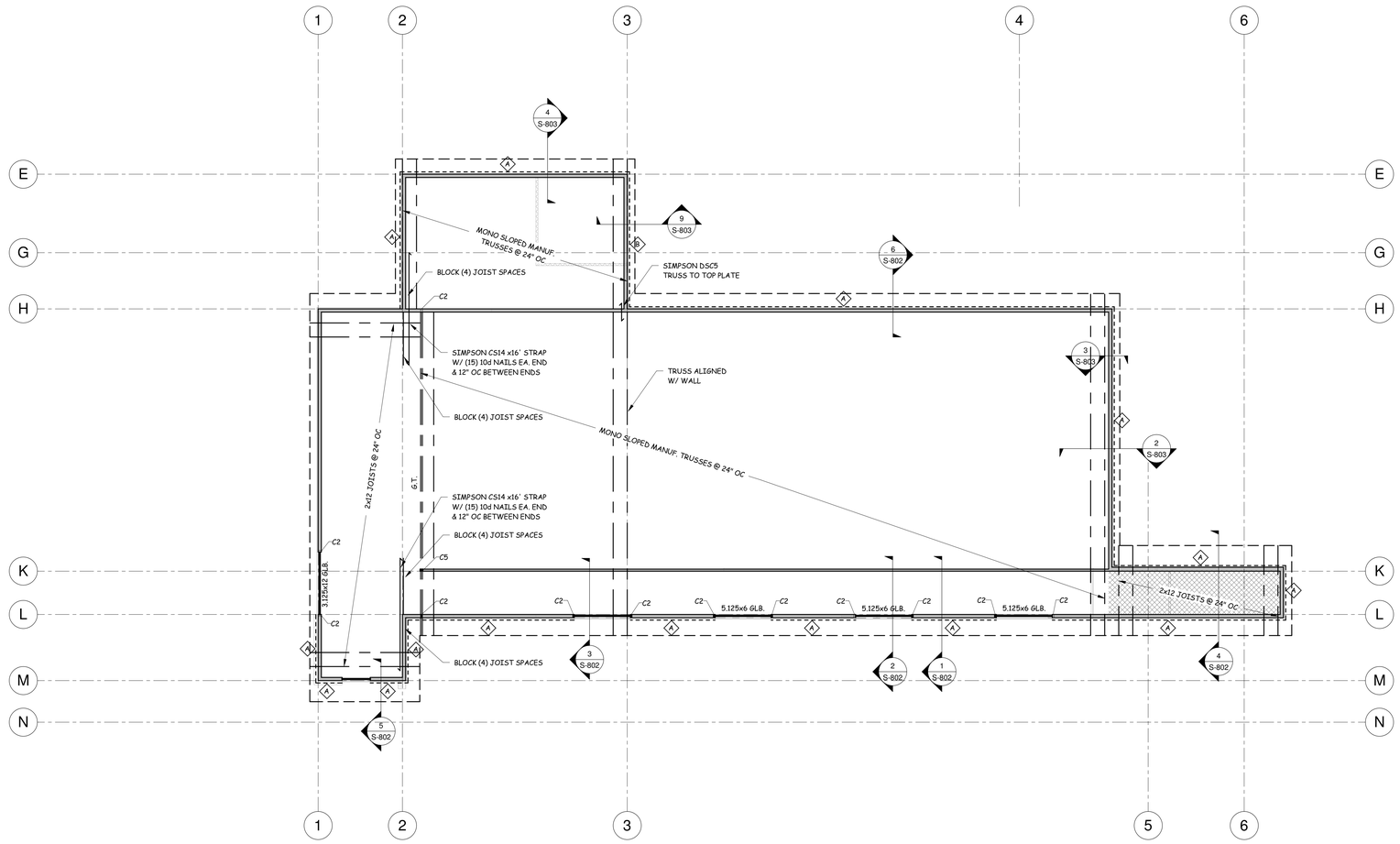
of:

COLUMN SCHEDULE		
MARK	SIZE	MATERIAL
C1	(2) 2x4	H.F.#2/D.F.#2
C2	(2) 2x6	H.F.#2/D.F.#2
C3	(3) 2x6	H.F.#2/D.F.#2
C4	4x4	D.F.#2
C5	4x6	D.F.#2
C6	6x6	D.F.#1
C7	HSS3x3x1/4	A500 STEEL
C8	HSS3 1/2x3 1/2x1/4	A500 STEEL
C9	HSS5x5x3/16	A500 STEEL
C10	HSS5 1/2x5 1/2x1/4	A500 STEEL
C11	HSS7x7x3/16	A500 STEEL
C12	HSS10x10x1/4	A500 STEEL

FRAMING

- SHEARWALL
- BEARING WALL
- LOCATION OF 6" WIDE MASONRY WALL
- NON-BEARING WALL
- SHEARWALL IDENTIFICATION
- HOLDOWN IDENTIFICATION
- G.T. GIRDER TRUSS
- SNOW DRIFT
- EXTENT OF DIAPHRAGM BLOCKING
- EXTENT OF 65psf MECHANICAL LOAD

TRUSS MANUFACTURER TO REFER TO STRUCTURAL PLANS FOR LAYOUT, BEARING LOCATIONS, AND COORDINATE TRUSS OPENINGS AND TRUSS WEBS WITH MECHANICAL PLANS



1 S-204 ENLARGED UPPER ROOF FRAMING PLAN - WEST
1/8" = 1'-0"

6/12/2017 8:39:02 AM

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURAL ENGINEERS, INC.
3431 TIPPERON PLACE NE SUITE 120
SALEM, OREGON 97309
PHONE: 503.399.1090
WEBSITE: www.sazangroupmsc.com

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com

Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

REGISTERED PROFESSIONAL ENGINEER
65402
OREGON
December 19, 2003
CAMERON B. SWENARTON
EXPIRES: JUNE 30, 2018

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING

3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

copyright © 2017
MSC ENGINEERS, INC.

UPPER ROOF FRAMING PLAN - WEST

sheet: S-204

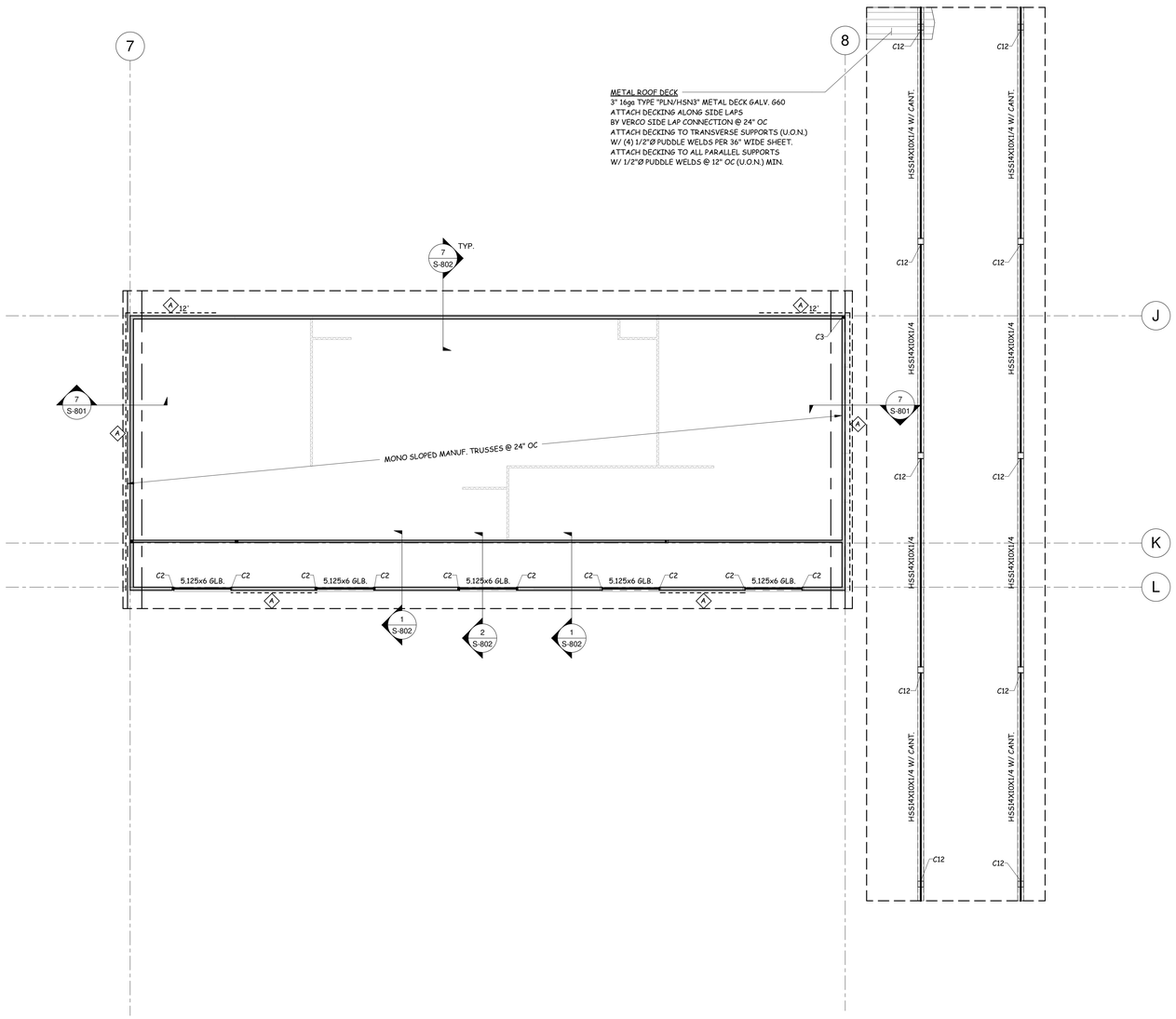
of:

COLUMN SCHEDULE		
MARK	SIZE	MATERIAL
C1	(2) 2x4	H.F.#2/D.F.#2
C2	(2) 2x6	H.F.#2/D.F.#2
C3	(3) 2x6	H.F.#2/D.F.#2
C4	4x4	D.F.#2
C5	4x6	D.F.#2
C6	6x6	D.F.#1
C7	HSS3x3x1/4	A500 STEEL
C8	HSS3 1/2x3 1/2x1/4	A500 STEEL
C9	HSS5x5x3/16	A500 STEEL
C10	HSS5 1/2x5 1/2x1/4	A500 STEEL
C11	HSS7x7x3/16	A500 STEEL
C12	HSS10x10x1/4	A500 STEEL

FRAMING

- SHEARWALL
- BEARING WALL
- LOCATION OF 6" WIDE MASONRY WALL
- NON-BEARING WALL
- SHEARWALL IDENTIFICATION
- HOLDOWN IDENTIFICATION
- G.T. GIRDER TRUSS
- SNOW DRIFT
- EXTENT OF DIAPHRAGM BLOCKING
- EXTENT OF 65psf MECHANICAL LOAD

TRUSS MANUFACTURER TO REFER TO STRUCTURAL PLANS FOR LAYOUT, BEARING LOCATIONS, AND COORDINATE TRUSS OPENINGS AND TRUSS WEBS WITH MECHANICAL PLANS



1 S-205 ENLARGED UPPER ROOF FRAMING PLAN - EAST
1/8" = 1'-0"

6/12/2017 8:39:03 AM

OREGON REGISTERED PROFESSIONAL ENGINEER 61502 OREGON December 19, 2003 CAMERON B. SWENSON
EXPIRES: JUNE 30, 2018

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc — 220 nw eighth avenue portland, oregon 97209 — t.503.221.1474 — kmdarchitects.com
SÄZAN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS — STRUCTURAL ENGINEERS, INC. — 3431 SUNSET BLVD STE 120 WEST LINN, OR 97068 — PHONE: 503.557.0199 — WEBSITE: www.msceng.com
CIVIL ENGINEERING SERVICES PROVIDED BY: Westech Engineering, Inc. — CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE PUBLIC SAFETY BUILDING

3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

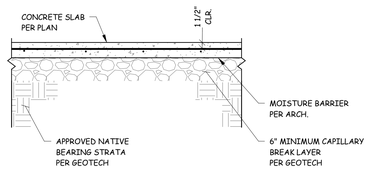
copyright © 2017 MSC ENGINEERS, INC.

UPPER ROOF FRAMING PLAN - EAST

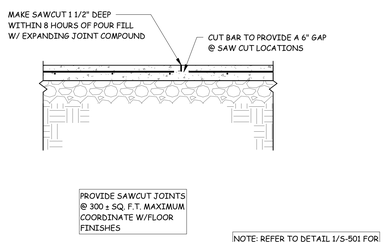
sheet: S-205

of:

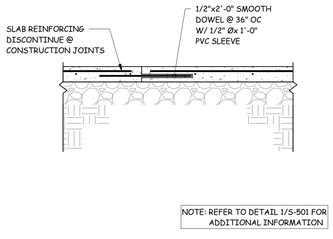
NOTE: FIBERMESH MAY BE SUBTITUTED FOR TEMPERATURE REINF. AT CONTRACTERS DISCRETION. CONTRACTOR TO SUBMIT TYPE AND QUANTITY OF FIBERMESH TO EOR FOR REVIEW AND APPROVAL.



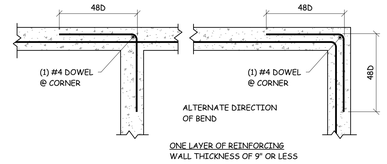
1 S-501 TYPICAL FLOOR SLAB CONSTRUCTION
3/4" = 1'-0"



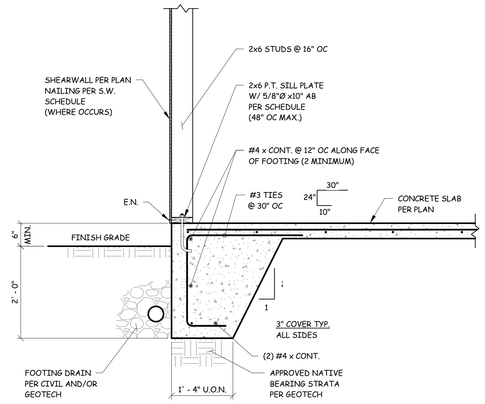
2 S-501 TYPICAL FLOOR SLAB SAW CUT
3/4" = 1'-0"



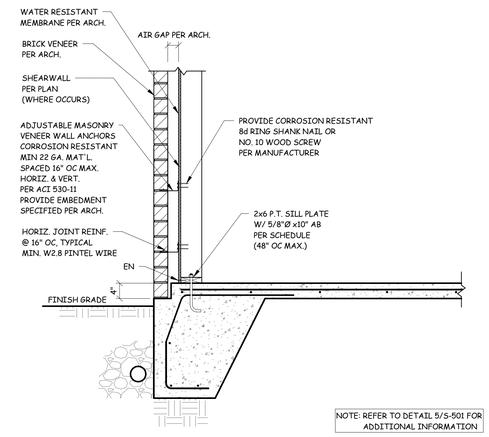
3 S-501 TYPICAL FLOOR SLAB CONSTRUCTION JOINT
3/4" = 1'-0"



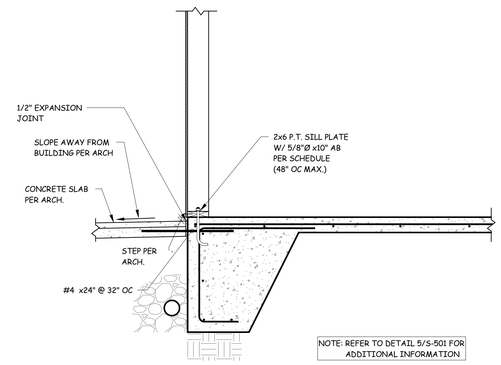
4 S-501 TYPICAL CONCRETE CORNER REBAR DETAIL
3/4" = 1'-0"



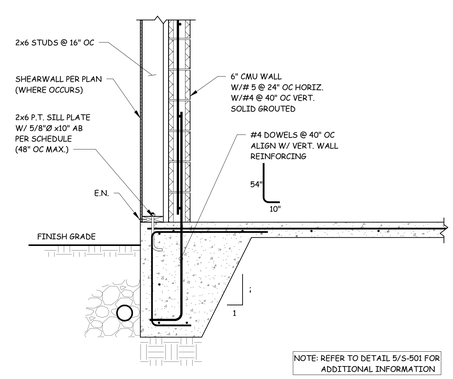
5 S-501 TYPICAL PERIMETER FOOTING W/O VENEER
3/4" = 1'-0"



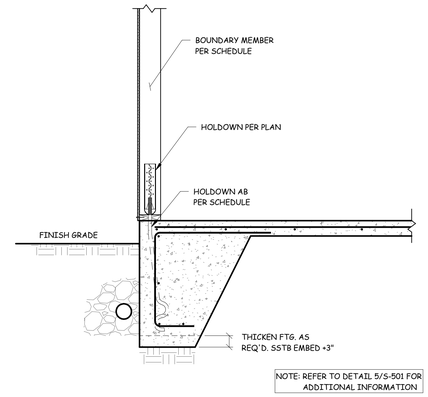
6 S-501 PERIMETER FOOTING W/ VENEER
3/4" = 1'-0"



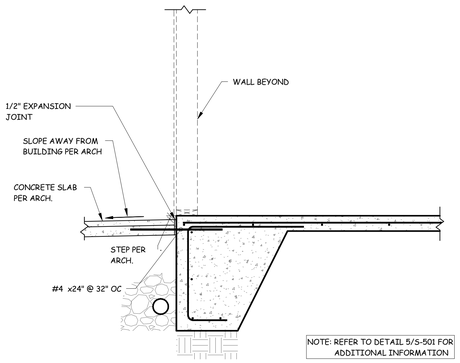
7 S-501 PERIMETER FOOTING @ PATIO
3/4" = 1'-0"



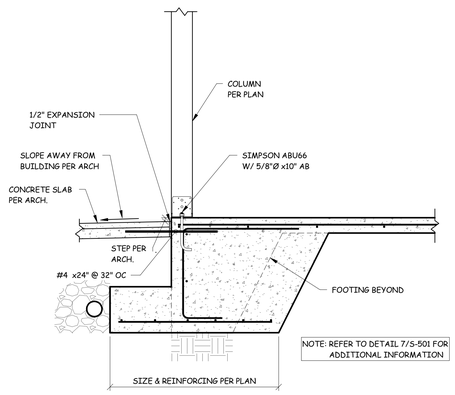
8 S-501 PERIMETER FOOTING W/CMU
3/4" = 1'-0"



9 S-501 SLAB EDGE @ HOLDOWN
3/4" = 1'-0"



10 S-501 SLAB EDGE @ OPENING
3/4" = 1'-0"



11 S-501 TYPICAL SLAB EDGE @ EXTERIOR PAD FOOTING
3/4" = 1'-0"

6/12/2017 8:39:04 AM

OREGON
REGISTERED PROFESSIONAL ENGINEER
65102
December 19, 2003
CAMERON B. SWENSON
EXPIRES: JUNE 30, 2018

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
SÄZAN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURAL ENGINEERS, INC.
3431 TIPSOO PLACE NE SUITE 120
SALEM, OREGON 97305
PHONE: 503.399.1399
WEBSITE: www.mscengineersinc.com
kmd architects + partners pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com
Westech Engineering, Inc
CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY
Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

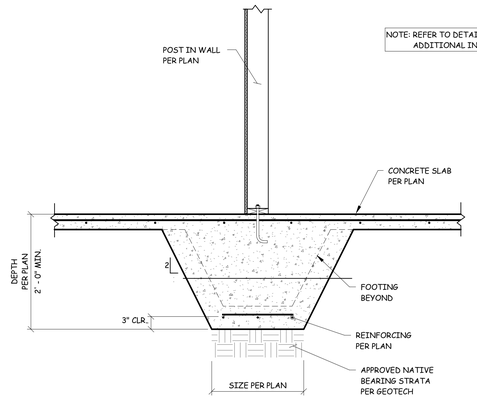
revisions:

date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

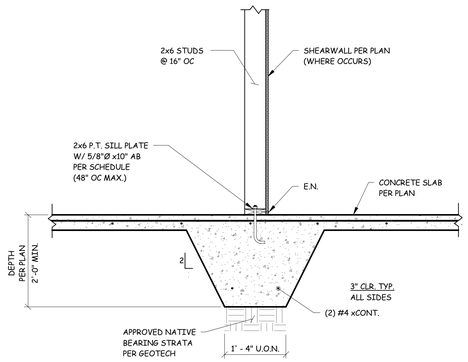
copyright © 2017
MSC ENGINEERS, INC.

FOUNDATION DETAILS

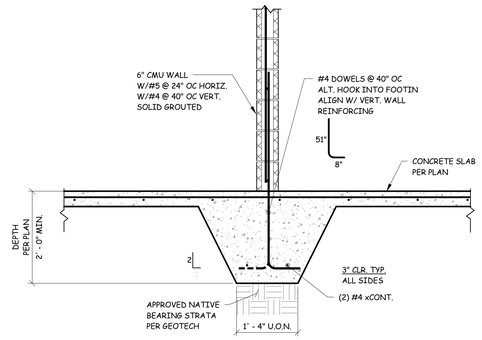
sheet: S-501
of:



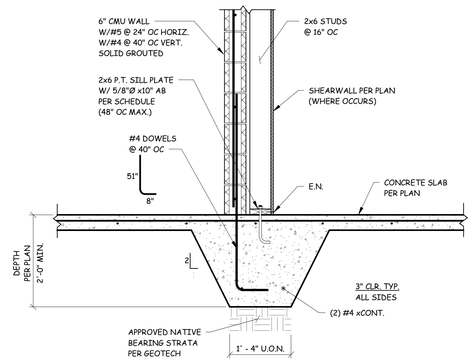
1 S-502 TYPICAL THICKENED CONCRETE PAD FOOTING @ IN WALL COLUMN
3/4" = 1'-0"



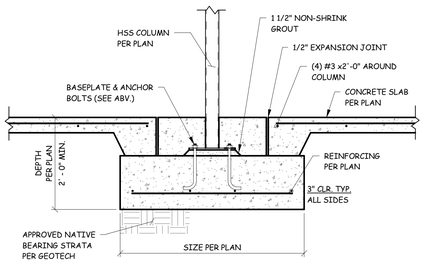
2 S-502 INTERIOR THICKENED SLAB FOOTING @ BEARING/SHEARWALLS
3/4" = 1'-0"



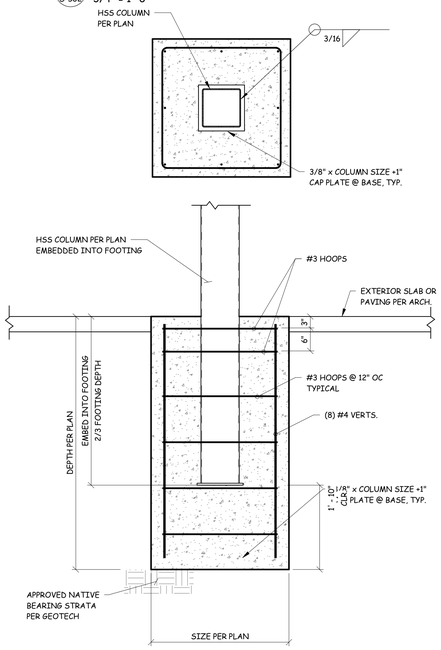
3 S-502 INTERIOR THICKENED SLAB FOOTING @ CMU WALL
3/4" = 1'-0"



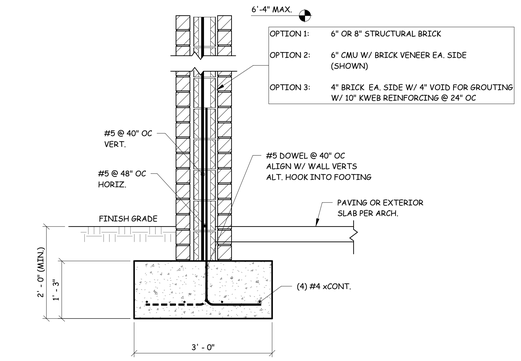
4 S-502 INTERIOR THICKENED SLAB FOOTING @ CORRIDOR
3/4" = 1'-0"



5 S-502 TYPICAL INTERIOR COLUMN FOOTING
3/4" = 1'-0"



6 S-502 TYPICAL EXTERIOR COLUMN AUGERED FOOTING
3/4" = 1'-0"



7 S-502 MASONRY WALL @ PATIO
3/4" = 1'-0"

6/12/2017 8:39:05 AM

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc — 220 nw eighth avenue portland, oregon 97209 — t 503.221.1474 — kmdarch@kpa.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS — STRUCTURAL ENGINEERS, INC. — 3431 SUNSET BLVD. STE 120 SALEM, OR 97304 — 503.585.2199 — WEBSITE: www.msceng.com
Westech Engineering, Inc. — CIVIL ENGINEERING SERVICES PROVIDED BY — CONSULTING ENGINEERS & PLANNERS

REGISTERED PROFESSIONAL ENGINEER — 61402 — OREGON — December 19, 2003 — CAMERON B. SWENARTON — EXPIRES: JUNE 30, 2018

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

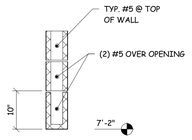
revisions:

date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

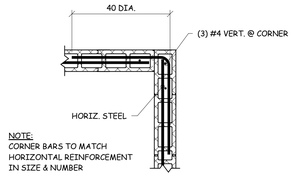
copyright © 2017 MSC ENGINEERS, INC.

FOUNDATION DETAILS

sheet: S-502
of:



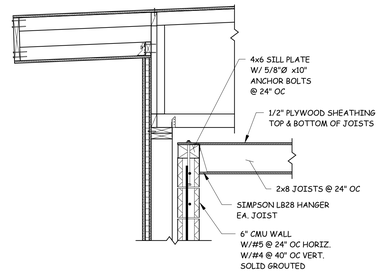
1 S-601 TYPICAL MASONRY LINTEL
3/4" = 1'-0"



2 S-601 2 TYPICAL MASONRY WALL CORNER
3/4" = 1'-0"

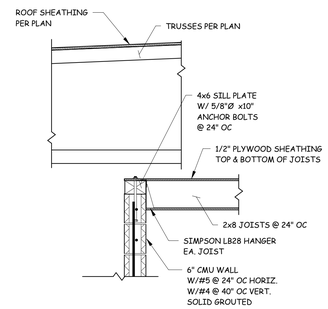
NOTE: WEB LAYOUT SHOWN IS SCHEMATIC ACTUAL WEB LAYOUT IS PER TRUSS MANUF.

NOTE: REFER TO DETAIL 3/S-801 FOR ADDITIONAL INFORMATION

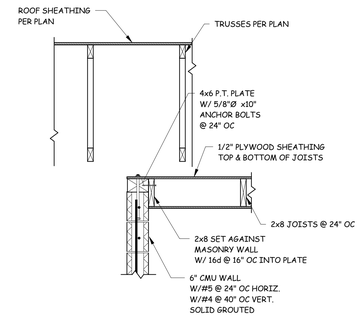


3 S-601 EXTERIOR WALL @ MASONRY W/ JOISTS PERPENDICULAR
3/4" = 1'-0"

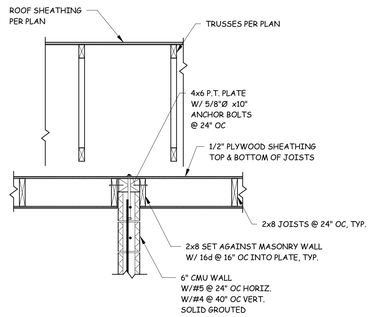
NOTE: WEB LAYOUT SHOWN IS SCHEMATIC ACTUAL WEB LAYOUT IS PER TRUSS MANUF.



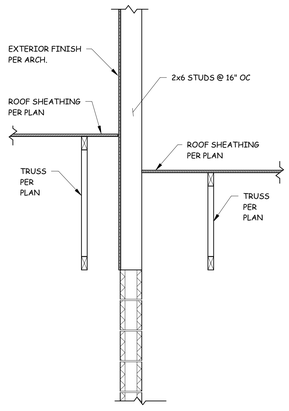
4 S-601 INTERIOR WALL @ MASONRY W/ JOISTS PERPENDICULAR
3/4" = 1'-0"



5 S-601 INTERIOR WALL @ MASONRY W/ JOISTS PARALLEL
3/4" = 1'-0"



6 S-601 INTERIOR WALL @ MASONRY W/ JOISTS PARALLEL
3/4" = 1'-0"



7 S-601 ROOF TRANSITION @ MASONRY WALL
3/4" = 1'-0"

6/12/2017 8:39:06 AM

OREGON REGISTERED PROFESSIONAL ENGINEER 81402 OREGON December 19, 2003 CAMERON B. SWENSON
EXPIRES: JUNE 30, 2018

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURAL ENGINEERS, INC.
3431 TIPSOO FLATS NE SUITE 120
SALEM, OR 97301
PHONE: 503.581.7399
WEBSITE: www.msceng@msceng.com

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com

Westech Engineering, Inc
CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING

3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

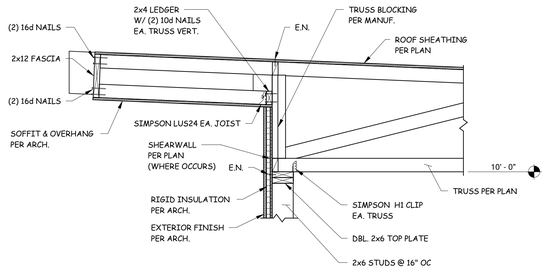
revisions:

date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

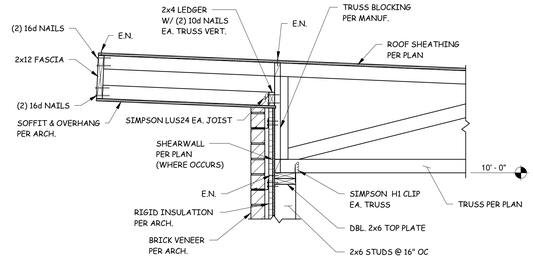
copyright © 2017
MSC ENGINEERS, INC.

MASONRY DETAILS

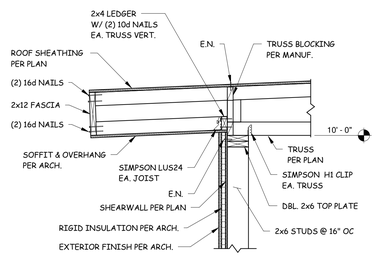
sheet: S-601
of:



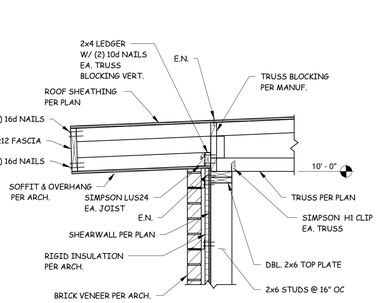
1 S-801 TYPICAL UPPER EAVE @ LOW ROOF
3/4" = 1'-0"



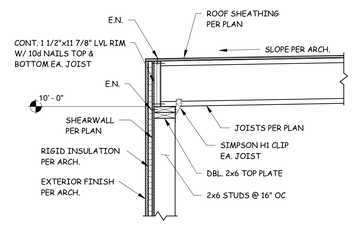
2 S-801 UPPER EAVE @ LOW ROOF W/ VENEER
3/4" = 1'-0"



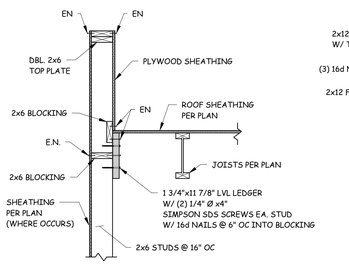
3 S-801 TYPICAL LOW EAVE @ LOW ROOF
3/4" = 1'-0"



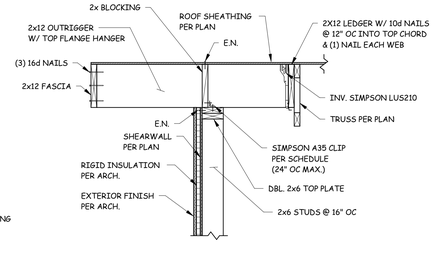
4 S-801 LOW EAVE @ LOW ROOF W/ VENEER
3/4" = 1'-0"



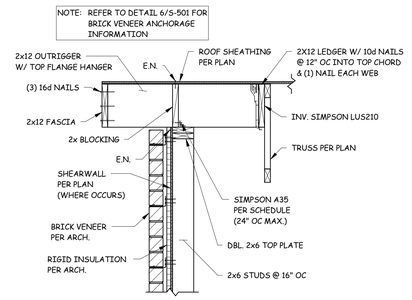
5 S-801 PERPENDICULAR ROOF JOIST @ EXTERIOR WALL
3/4" = 1'-0"



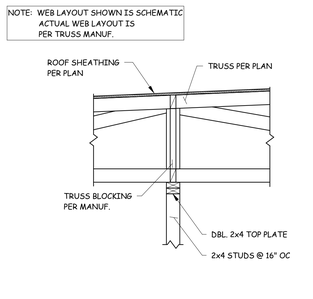
6 S-801 PARALLEL ROOF JOIST @ EXTERIOR WALL
3/4" = 1'-0"



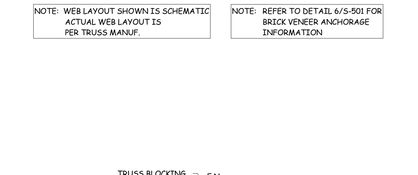
7 S-801 TYPICAL GABLE END
3/4" = 1'-0"

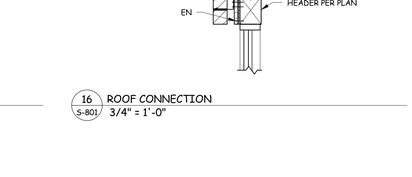


8 S-801 GABLE END W/ VENEER
3/4" = 1'-0"

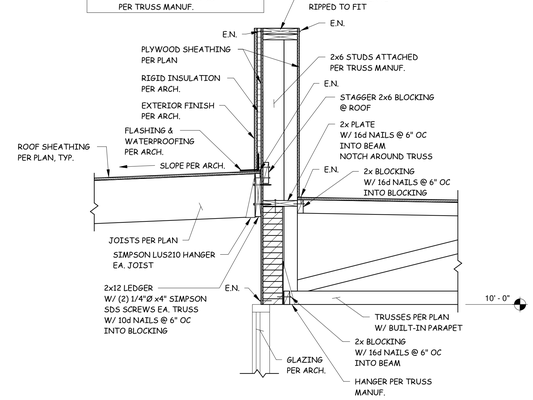


9 S-801 TRUSS CONNECTION @ INTERIOR BEARING
3/4" = 1'-0"

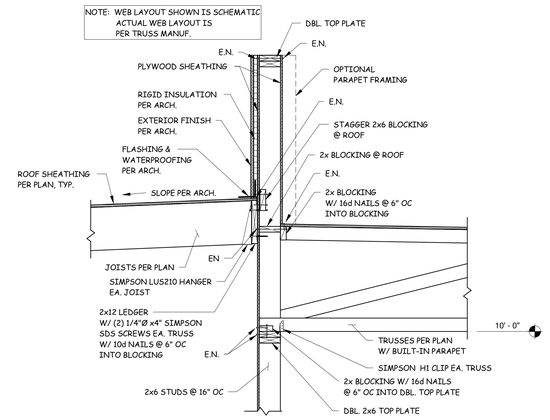




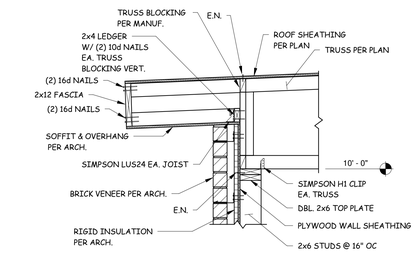
11 S-801 ROOF TRANSITION
3/4" = 1'-0"



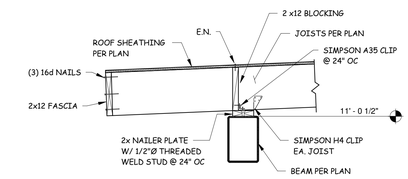
13 S-801 CANOPY JOIST CONNECTION @ BUILDING W/ GLAZING
3/4" = 1'-0"



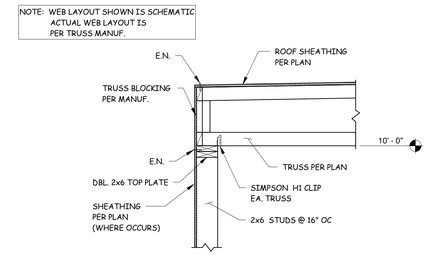
14 S-801 CANOPY JOIST CONNECTION @ BUILDING
3/4" = 1'-0"



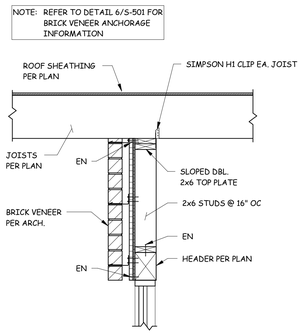
10 S-801 LOW EAVE CONNECTION
3/4" = 1'-0"



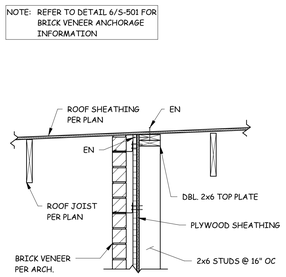
12 S-801 CANOPY JOIST CONNECTION @ BEAM
3/4" = 1'-0"



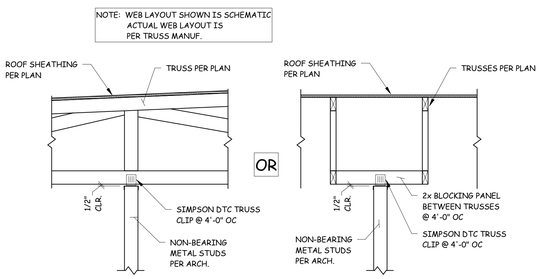
15 S-801 TRUSS CONNECTION @ EXTERIOR WALL
3/4" = 1'-0"



16 S-801 ROOF CONNECTION
3/4" = 1'-0"



17 S-801 ROOF CONNECTION
3/4" = 1'-0"



18 S-801 TYPICAL TRUSS @ NON-BEARING WALL
3/4" = 1'-0"

6/12/2017 8:39:08 AM

OREGON REGISTERED PROFESSIONAL ENGINEER 61402 December 19, 2003 CAMERON B. SWENARTON
EXPIRES: JUNE 30, 2018

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURAL ENGINEERS, INC.
3415 TIPPERON PLACE NE SUITE 120
LACEY, WA 98516
PHONE: 360.459.7399
WEBSITE: www.mscengineersnw.com
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t.503.221.1474
kmdarch@kdarch.com
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

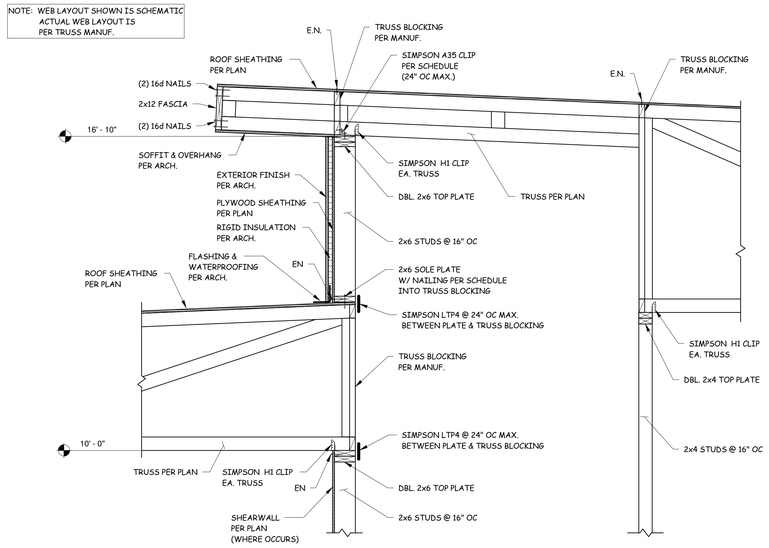
revisions:

date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

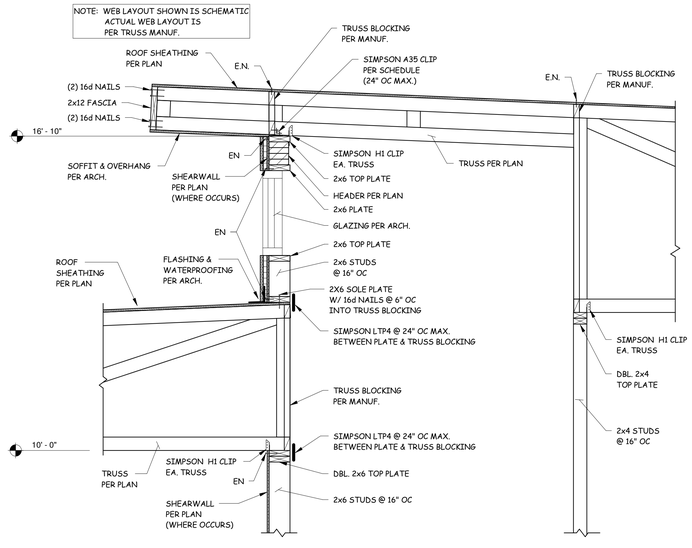
copyright © 2017
MSC ENGINEERS, INC.

ROOF FRAMING DETAILS

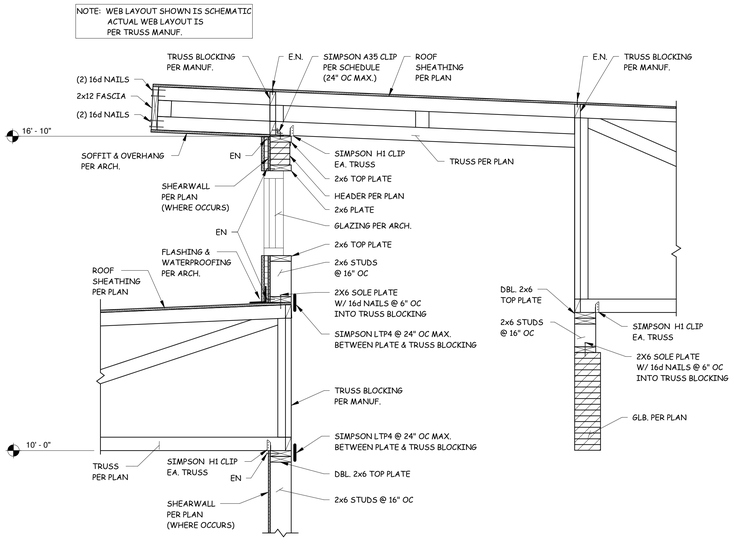
sheet: S-801
of:



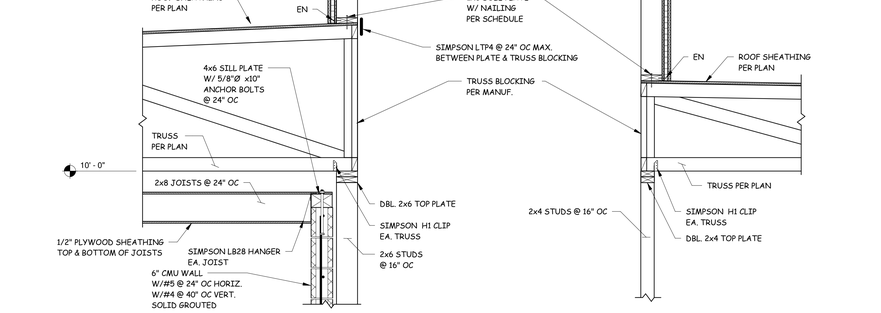
1 S-802 LOW ROOF CONNECTION @ UPPER ROOF
3/4" = 1'-0"



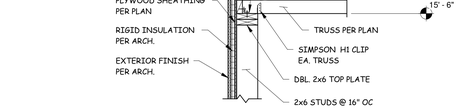
2 S-802 LOW ROOF CONNECTION @ UPPER ROOF W/ GLAZING
3/4" = 1'-0"



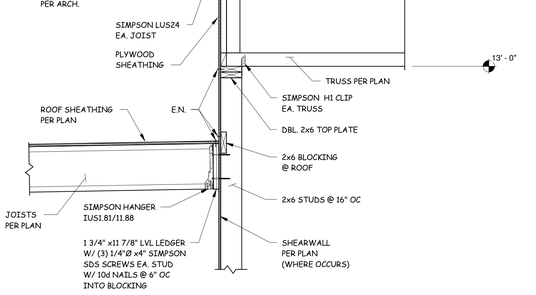
3 S-802 LOW ROOF CONNECTION @ UPPER ROOF W/ GLAZING W/ BEAM
3/4" = 1'-0"



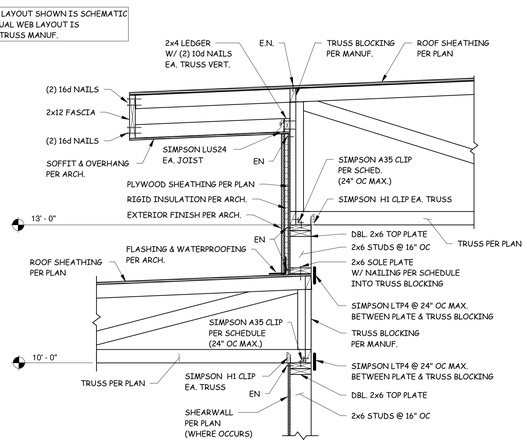
4 S-802 LOW ROOF CONNECTION @ UPPER ROOF
3/4" = 1'-0"



5 S-802 UPPER EAVE @ UPPER ROOF
3/4" = 1'-0"



6 S-802 LOWER EAVE @ UPPER ROOF W/ JOISTS
3/4" = 1'-0"



7 S-802 LOWER EAVE @ UPPER ROOF W/ TRUSSES
3/4" = 1'-0"

6/12/2017 8:35:11 AM

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURAL ENGINEERS, INC.
3431 TIPPERON PLACE NE SUITE 120
SALEM, OREGON 97305
PHONE/FAX: 503-399-1399
WEBSITE: www.msceng.com

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
1.503.221.1474
kmdarch@kdc.com

Westech Engineering, Inc
CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

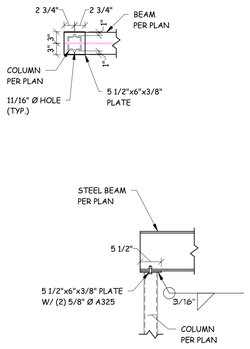
date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

copyright © 2017
MSC ENGINEERS, INC.

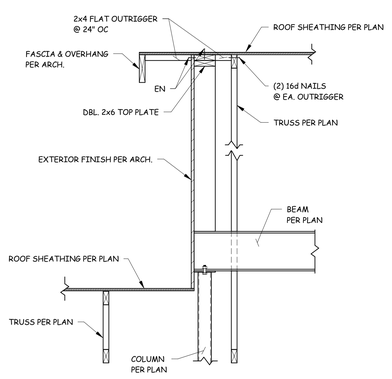
ROOF FRAMING DETAILS

sheet: S-802
of:

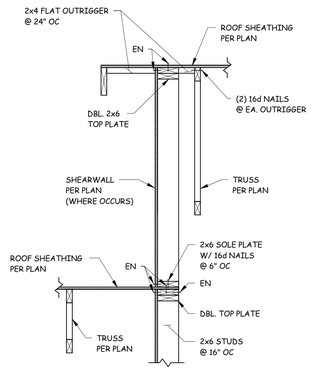
REGISTERED PROFESSIONAL ENGINEER
65402
OREGON
December 19, 2003
CAMERON B. SWENARTON
EXPIRES: JUNE 30, 2018



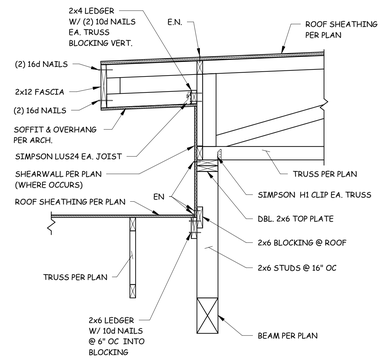
1 S-803 PARTITION BEAM CONNECTION
3/4" = 1'-0"



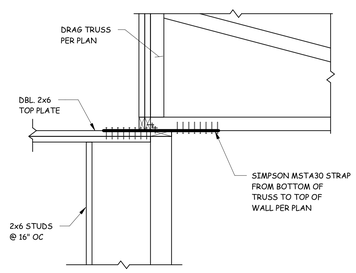
2 S-803 ROOF CONNECTION @ PARTITION BEAM
3/4" = 1'-0"



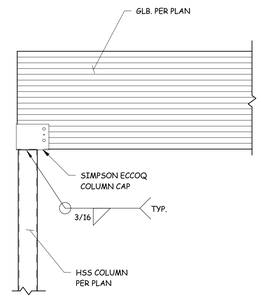
3 S-803 ROOF CONNECTION
3/4" = 1'-0"

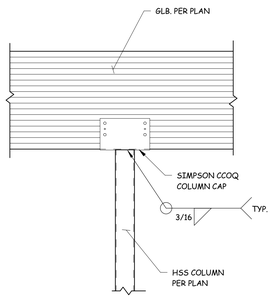


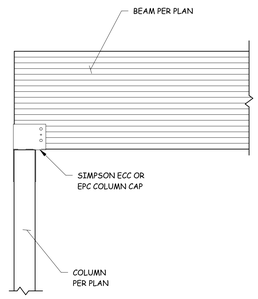
4 S-803 LOW ROOF CONNECTION @ TOWER
3/4" = 1'-0"

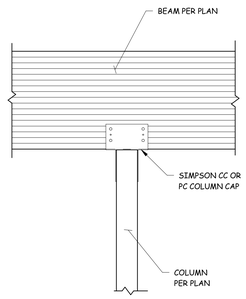


5 S-803 DIAPHRAGM CONTINUITY
3/4" = 1'-0"



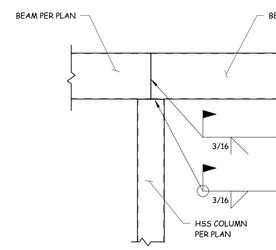


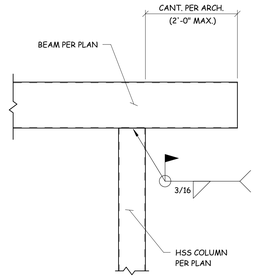




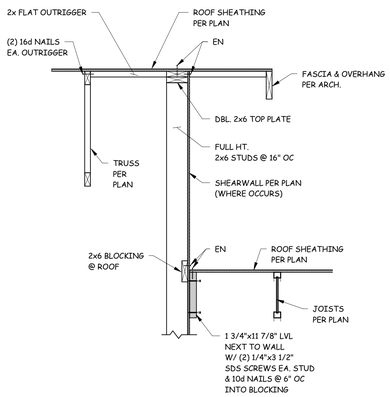
6 S-803 TYPICAL HSS COLUMN TO BEAM CONNECTION
3/4" = 1'-0"

7 S-803 TYPICAL WOOD COLUMN TO BEAM CONNECTION
3/4" = 1'-0"

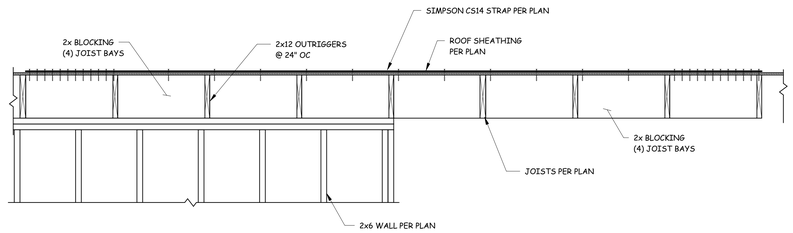




8 S-803 TYPICAL HSS COLUMN TO HSS BEAM CONNECTION
3/4" = 1'-0"



9 S-803 ROOF CONNECTION
3/4" = 1'-0"



10 S-803 STRAP CONNECTION
3/4" = 1'-0"

6/12/2017 8:39:11 AM

OREGON REGISTERED PROFESSIONAL ENGINEER
61502
OREGON
December 19, 2003
CAMERON B. SWENARTON
EXPIRES: JUNE 30, 2018

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
ENGINEERS, INC.
3431 TIPPERON PLACE NE SUITE 120
SALEM, OR 97305
503.589.1099
WEBSITE: www.sazangroupmsc.com

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
1.503.221.1474
kmdarchitects.com

Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING

3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

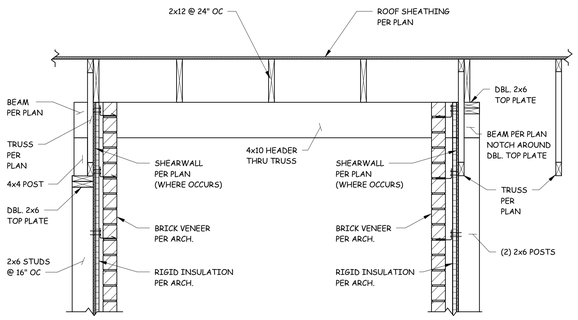
copyright © 2017
MSC ENGINEERS, INC.

ROOF FRAMING DETAILS

sheet:
S-803

of:

NOTE: REFER TO DETAIL 6/S-501 FOR BRICK VENEER ANCHORAGE INFORMATION



1 / S-804 ROOF CONNECTION
3/4" = 1'-0"

6/12/2017 8:39:12 AM

OREGON
REGISTERED PROFESSIONAL ENGINEER
65402
December 19, 2003
CAMERON B. SWENDRUD
EXPIRES: JUNE 30, 2018

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURAL ENGINEERS, INC.
3421 TYPESETTER PLACE NE SUITE 120
SALEM, OREGON 97305
PHONE: 503.399.1799
WEBSITE: www.msc-consultingengineers.com

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t.503.221.1474
kmdarchitects.com

CIVIL ENGINEERING SERVICES PROVIDED BY
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING

Marion County OREGON

3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

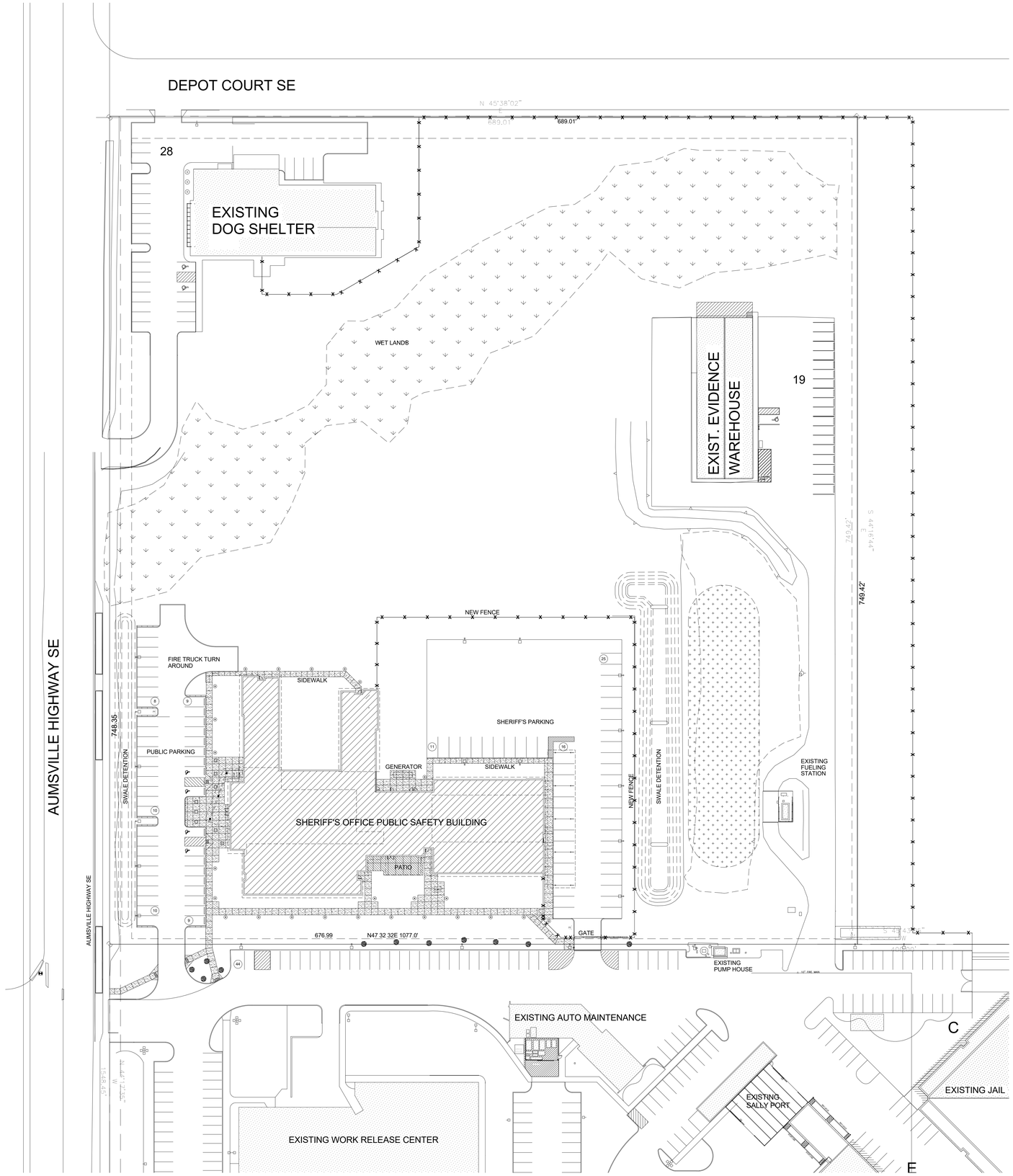
revisions:

date: 06/12/17
project: 160652
drawn by: SMC/CEM
checked by: CBS

copyright © 2017
MSC ENGINEERS, INC.

ROOF FRAMING DETAILS

sheet: S-804
of:



TRUE PROJECT

OVERALL SITE PLAN

1" = 40'-0"

REGISTERED ARCHITECT
MICHAEL J. VEIT
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:

kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com

SAZAN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
ENGINEERS PERFORMANCE
3431 SUNSET BLVD STE 120
ROCKLIN, CA 95765
PHONE: 916.780.7999
WEBSITE: www.msconsultingengineers.com

Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/2017
project: 05416
drawn by: GG
checked by: Checker

copyright © 2017
Carlson Veit Architects P.C.

OVERALL SITE PLAN

sheet:
A-100

SITE PLAN NOTES

1. 6'-0" HEIGHT CHAIN LINK FENCE
2. 4'-0" WIDE CHAIN LINK GATE
3. ZERO CURB RAMP
4. FLAG POLE - SEE DETAIL 6/A-501
5. MOTORIZED GATE
6. GATE KEYPAD ON STEEL POST
7. BIKE RACKS - SEE DETAIL 7/A-501
8. CONCRETE SIDEWALK
9. GENERATOR
10. TRANSFORMER
11. GAS METER
12. FDC & CONCRETE FIRE PROTECTION VAULT
13. 6" DIAMETER STEEL PIPE BOLLARDS - SEE DETAIL 1/A-501
14. CONCRETE PLANTERS - SEE DETAIL 4/A-501
16. 12' HT LIGHT POLES - SEE DETAIL 2/A-501
17. BUILDING SETBACK LINE
18. CONCRETE RAMP - MAX 1:12 SLOPE
19. EXISTING CURB
20. EXISTING CURB TO BE REMOVED
21. EXISTING TREE TO BE REMOVED AT NEW DRIVE
22. EXISTING PARKING STRIPES TO BE REMOVED
23. AREA OF TOPSOIL STORAGE
24. FUTURE CARPORT
25. STORM DRAINAGE SWALE
26. LANDSCAPING
27. PATIO SURFACE - PAVERS OFOI, CONTRACTOR TO FILL AND COMPACT SUBGRADE
28. PARTIAL HEIGHT MASONRY WALL, OFOI - CONTRACTOR TO PROVIDE FOOTING PER STRUCTURAL

PARKING

CITY OF SALEM ZONING:	PH (PUBLIC AND PRIVATE HEALTH SERVICES)
USE: PUBLIC SAFETY (EMERGENCY SERVICES)	
PARKING REQUIRED: 62 X 1.75=	30,980/500 = 62 SPACES MIN 109 SPACES MAX
PARKING PROVIDED:	98 SPACES TOTAL
ACCESSIBLE SPACES PROVIDED:	4
BICYCLE PARKING REQUIRED:	30,980/5,000 = 6 MIN
BICYCLE PARKING PROVIDED:	6 SPACES

AUMSVILLE HIGHWAY SE

EXISTING BIO-SWALE

EXISTING BIO-SWALE

EXISTING SIDEWALK

EXISTING BIO-SWALE

EXISTING WETLANDS

FIRE TRUCK TURN AROUND

46 PUBLIC PARKING STALLS

SHERIFF'S OFFICE PUBLIC SAFETY BUILDING

52 SHERIFF VEHICLE PARKING STALLS

AC PAVING (BID ALTERNATE)

CANOPY FOR 12 CARS (BID ALTERNATE)

AC (BID ALT.)

TYP OF 4

TYP OF 5

676.99 N47 32 32E 1077.0'

EXISTING PARKING

EXISTING DRIVEWAY

NEW DRIVEWAY

EXIST. AUTO MAINTENANCE

EXIST. PUMP HOUSE

EXIST. FUELING STATION

EXIST. WAREHOUSE

LOADING ZONE

ASPHALT ACCESS ROAD

10" FIRE MAIN

TRUE PROJECT

SITE PLAN

1" = 20'-0"

REGISTERED ARCHITECT — MICHAEL J. VEIT — SALEM, OREGON — STATE OF OREGON

CARLSON VEIT ARCHITECTS PC

ARCHITECTURE • INTERIOR DESIGN

503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM

3095 RIVER ROAD NORTH, SALEM, OREGON 97303

MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:

kmd architects+planners pc — 220 mw eighth avenue, portland, oregon 97209, 1.503.221.1474, kmdarchitects.com

SÄZÄN GROUP — CIVIL ENGINEERING SERVICES PROVIDED BY

MSC CONSULTING STRUCTURAL ENGINEERS — ENGINEERS | PLANNERS | SURVEYORS — 3431 TIPSOO PLACE NE SUITE 120, SALEM, OR 97305, PHONE: 503.399.1799, WEBSITE: www.msceng.com

Westech Engineering, Inc. — CONSULTING ENGINEERS & PLANNERS — CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE PUBLIC SAFETY BUILDING

3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/2017
project: 05416
drawn by: GG
checked by: Checker

copyright © 2017
Carlson Veit Architects P.C.

SITE PLAN

sheet: A-101

WALL TYPES

1. TYP EXTERIOR WALL, UON. BRICK VENEER AND SIDING PER ELEVATION OVER AIR SPACE, 1" RIGID INSULATION AND WEATHER BARRIER. 1/2" PLYWD SHEATHING. 2X6 WD STUDS @ 16" OC. (1) INSIDE LAYER 5/8" TYPE "X" GYP BD.
2. TYPICAL EXTERIOR WALL, UON. SIDING PER ELEVATION OVER 1" RIGID INSULATION AND WEATHER BARRIER. 1/2" PLYWD SHEATHING. 2X6 WD STUDS @ 16" OC. (1) INSIDE LAYER 5/8" TYPE "X" GYP BD.
3. TYPICAL EXTERIOR WALL, UON. LAP SIDING OVER CMU PER ELEVATION OVER 1" RIGID INSULATION AND WEATHER BARRIER. 1/2" PLYWD SHEATHING. 2X6 WD STUDS @ 16 OC. (1) INSIDE LAYER 5/8" TYPE "X" GYP BD.
4. STRUCTURAL INTERIOR WALL UON. 2X6 WD STUDS @ 16 OC (1) LAYER 5/8" GYP BD EACH SIDE.
5. STRUCTURAL INTERIOR WALL UON. 2X4 WD STUDS @ 16" OC (1) LAYER 5/8" GYP BD EACH SIDE.
6. 6" METAL STUD WALL, 24" OC (1) LAYER 5/8" GYP BOARD EA SIDE AND AC BATT. CONSTRUCT PER ACOUSTIC WALL DETAILS
7. 6" NOMINAL CMU WALL
8. TYP INTERIOR WALL UON. 3 5/8" METAL STUD WALL. 24" OC (1) LAYER 5/8" GYP BD EA SIDE & AC BATT. CONSTRUCT PER ACOUSTIC WALL DETAILS
9. CHAIR RAIL (HOLSTER GAURD), SEE DETAIL 4/A-505. SET BACK 4" FROM INTERSECTING OUTSIDE CORNER, TYP.

CONSTRUCTION NOTES

1. OPERABLE PARTITION
2. HOSE BIB - REFER TO MECH
3. MOP SINK - REFER TO PLBG
4. ACCESS LADDER
5. SHOE SHINE CABINET, OCE TO BUILD AND INSTALL.
6. PROVIDE BACKING IN WALL AT TV LOCATIONS. SEE SHEET A-702 FOR SPECIFIC LOCATIONS
7. ADA LOCKERS, NO BENCH
8. 3'-0" X 7'-0" HIGH GYP OPENING
9. STRUCTURAL COLUMN W/ GYP BD WRAP
10. ALIGN WALLS
11. 7/8" HAT CHANNEL FURRING ON CMU
12. PARTIAL HEIGHT MASONRY WALL & GATE, OFOI, CONTRACTOR TO PROVIDE FOOTING PER STRUCTURAL
13. PATIO PAVERS, OFOI
14. PATIO ROOF STRUTURE, BID ALTERNATE
15. 8'-0" x 8'-0" GYP OPENING
16. 1-HOUR RATED INTERIOR WALLS. (1) LAYER 5/8" TYPE X GYP BD BOTH SIDES, FROM FLOOR TO UNDERSIDE OF SHEATHING
17. AUTO DOOR OPERATOR PUSH PAD
18. PROVIDE BULLET RESISTANT PANEL WITHIN WALL ASSEMBLY, FROM FLOOR TO ABOVE CEILING
19. PROVIDE ONE-WAY VISION FILM TO GLASS

WEST FLOOR PLAN
1/8" = 1'-0"

REGISTERED ARCHITECT — MICHAEL JOHN VEIT — 12-14-2005 — EXPIRES: 12-31-2017 — SALEM, OREGON — STATE OF OREGON

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd ARCHITECTS + planners PC — 220 nw eighth avenue portland, oregon 97209 — 1.503.221.1474 — kmdarchitects.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS — 3431 SW BROOKS PLACE, NE SUITE 120 — PORTLAND, OR 97239 — PHONE: 503.227.3799 — WEBSITE: www.msconsultingengineers.com
WE Westech Engineering, Inc. CONSULTING ENGINEERS & PLANNERS — CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE PUBLIC SAFETY BUILDING

3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/2017
project: 05416
drawn by: MV
checked by: MJ

copyright © 2017
Carlson Veit Architects P.C.

WEST FLOOR PLAN

sheet: A-102

DOOR SCHEDULE

MARK	DOOR PANEL W	H	THK	TYPE	CONST	FINISH	GLASS	FRAME CONST	FRAME FINISH	DETAILS	HARDWARE	REMARKS
1200	6' - 0"	7' - 0"	0' - 1 3/4"	F	AL	AN	T	AL	AN	11-12/A503	1	
1200A	6' - 0"	7' - 0"	0' - 1 3/4"	F	AL	AN	T	AL	AN	11-12/A503	2	
1200B	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	5	
1203	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	4	
1204	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	9	
1206	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	PT	14/A-503	9	
1208	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1209	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1210	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1211	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1212	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1213	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1214	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1215	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1216	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1217	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1218	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1219	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1220	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1221	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1222	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1230	3' - 0"	7' - 0"	0' - 1 3/4"	C	SC	WT	-	HM	FF	14/A-503	9	
1231	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1232	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1234	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1235	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1236	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1237	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	6	
1238	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1239	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1240	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1241	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1243	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1244	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1245	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1246	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1247	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1248	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1249	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1250	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1251	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1252	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1253	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1254	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1262	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1263	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	12	
1264	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	9	
1265	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	12	
1266	3' - 0"	7' - 0"	0' - 1 3/4"	C	SC	WT	-	HM	FF	14/A-503	11	
1267	3' - 0"	7' - 0"	0' - 1 3/4"	C	SC	WT	-	HM	FF	14/A-503	11	
1268	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	12	
1269	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	12	
1270	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	9	
1275	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	4	
1276	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1277	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1278	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1279	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1280	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1281	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1282	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1283	3' - 0"	7' - 0"	0' - 1 3/4"	C	SC	WT	-	HM	FF	14/A-503	9	
1284	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1286	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1287	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1288	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1289	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1290	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1291	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1292	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1293	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1294	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1295	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1296	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	10	
1297	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	12	
1298	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	13	
1299	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	13	
1300	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	9	
1301	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	13	
1302	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	13	
1303	6' - 0"	7' - 0"	0' - 1 3/4"	F	AL	AN	-	AL	AN	11-12/A503	14	
1304A	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	10	
1306	3' - 0"	7' - 0"	0' - 1 3/4"	F	AL	AN	T	AL	AN	11-12/A503	16	
1306B	3' - 0"	7' - 0"	0' - 1 3/4"	F	AL	AN	T	AL	AN	11-12/A503	15	
1308	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1311	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1312	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1313	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	13	
1314	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1315	3' - 0"	7' - 0"	0' - 1 3/4"	C	SC	WT	-	HM	FF	14/A-503	11	
1315A	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	13	
1316	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1317	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1318	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1319	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1320	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1321	3' - 0"	7' - 0"	0' - 1 3/4"	C	SC	WT	-	HM	FF	14/A-503	11	
1322	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	9	
1323	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1325	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1326	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	12	
1327	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1328	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1329	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	12	
1330	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	12	
1331	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	13	
1332	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	13	
1333	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	13	
1334	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	13	
1335	3' - 0"	7' - 0"	0' - 1 3/4"	A	SC	WT	-	HM	FF	14/A-503	13	
1336	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	13	
1337	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	13	
1338	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	12	
1340	3' - 0"	7' - 0"	0' - 1 3/4"	C	SC	WT	-	HM	FF	14/A-503	12	
1341	3' - 0"	7' - 0"	0' - 1 3/4"	G	SC	WT	-	HM	FF	14/A-503	9	
1342	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1343	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1344	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1345	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1346	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1347	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1348	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1349	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1350	3' - 0"	7' - 0"	0' - 1 3/4"	B	SC	WT	-	HM	FF	14/A-503	9	
1351	3' - 0"	7' - 0"	0' - 1 3/4"	A	HS	FF	-	HM	FF	11-12/A503	17	
1351B	4' - 0"	7' - 0"	0' - 1 3/4"	A	HS	FF	-	HM	FF	11-12/A503	17	
1352	4' - 0"	7' - 0"	0' - 1 3/4"	A	HS	FF	-	HM	FF	11-12/A503	17	
1501	3' - 0"	7' - 0"	0' - 1 3/4"	C	AL	AN	T	AL	AN	11-12/A503	7	
1502A	3' - 0"	7' - 0"	0' - 1 3/4"	D	SC	WT	-	HM	FF	14/A-503	6	
1502B	3' - 0"	7' - 0"	0' - 1 3/4"	C	AL	AN	T	AL	AN	11-12/A503	7	
1503	3' - 0"	7' - 0"	0' - 1 3/4"	C	AL	AN	T	AL	FF	11-12/A503	7	
1505	3' - 0"	7' - 0"	0' - 1 3/4"	D	SC	WT	-	HM	FF	14/A-503	6	
1505A	3' - 0"	7' - 0"	0' - 1 3/4"	D	SC	WT	-	HM	FF	14/A-503	8	
1507	3' - 0"	7' - 0"	0' - 1 3/4"	C	AL	AN	T	AL	AN	11-12/A503	7	
1509	9' - 0"	7' - 4"	0' - 2"	E	AL	AN	T	AL	AN	11-12/A503	3	AUTO SLIDER
1510	3' - 0"	7' - 0"	0' - 1 3/4"	D	SC	WT	-	HM	FF	14/A-503	6	

WINDOW SCHEDULE

MARK	NOMINAL WINDOW SIZE WIDTH	HEIGHT	OPERATION TYPE	FRAME MATERIAL	FRAME FINISH	FRAME ELEVATION	GLASS THICKNESS	GLASS TYPE	GLASS COLOR	REMARKS
A	4' - 0"	4' - 0"	F	AL	AN			T	C	
B	2' - 0"	2' - 0"	F	AL	AN			-	C	
C	4' - 0"	5' - 2"	F	AL	AN			T	C	
D	4' - 0"	4' - 0"	F	AL	AN			T	C	
E	8' - 0"	1' - 9"	F	AL	AN			-	C	
F	5' - 0"	4' - 0"	F	HS	ME			-	C	
G	5' - 0"	4' - 0"	S	HS	ME			-	C	
J	5' - 6"	8' - 10"	F	AL	AN			T	C	
K	24' - 10"	8' - 10"	F	AL	AN			T	C	
L	10' - 8"	8' - 0"	F	AL	AN			T	C	
M	12' - 4"	10' - 0"	F	AL	AN			T/IN	C	
N	17' - 0"	13' - 9"	F	AL	AN			T	C	
P	4' - 0"	14' - 6"	F	AL	AN			T	C	

OPERATION TYPE
F = FIXED
SL = SLIDER

FRAME MATERIAL
AL = ALUMINUM
HS = HOLLOW STEEL

FRAME FINISH
FF = FACTORY FINISH
AN = ANODIZED ALUMINUM

FRAME ELEVATIONS
SEE WINDOW TYPES

GLASS THICKNESS
NUMBER REFERS TO OVERALL GLAZING THICKNESS.

GLASS TYPE
T = TEMPERED
IN = INSULATING
BRG = BULLET RESISTANT GLASS

GLASS COLOR
C = CLEAR

REMARKS
WINDOW NOTES &
GENERAL INFORMATION

WALL TYPES

1. TYP EXTERIOR WALL, UON. BRICK VENEER AND SIDING PER ELEVATION OVER AIR SPACE, 1" RIGID INSULATION AND WEATHER BARRIER, 1/2" PLYWD SHEATHING, 2X6 WD STUDS @ 16" OC. (1) INSIDE LAYER 5/8" TYPE "X" GYP BD.
2. TYPICAL EXTERIOR WALL, UON. SIDING PER ELEVATION OVER 1" RIGID INSULATION AND WEATHER BARRIER, 1/2" PLYWD SHEATHING. 2X6 WD STUDS @ 16" OC. (1) INSIDE LAYER 5/8" TYPE "X" GYP BD.
3. TYPICAL EXTERIOR WALL, UON. LAP SIDING OVER CMU PER ELEVATION OVER 1" RIGID INSULATION AND WEATHER BARRIER. 1/2" PLYWD SHEATHING. 2X6 WD STUDS @ 16 OC. (1) INSIDE LAYER 5/8" TYPE "X" GYP BD.
4. STRUCTURAL INTERIOR WALL UON. 2X6 WD STUDS @ 16 OC (1) LAYER 5/8" GYP BD EACH SIDE.
5. STRUCTURAL INTERIOR WALL UON. 2X4 WD STUDS @ 16" OC (1) LAYER 5/8" GYP BD EACH SIDE.
6. 6" METAL STUD WALL, 24" OC (1) LAYER 5/8" GYP BOARD EA SIDE AND AC BATT. CONSTRUCT PER ACOUSTIC WALL DETAILS
7. 6" NOMINAL CMU WALL
8. TYP INTERIOR WALL UON. 3 5/8" METAL STUD WALL. 24" OC (1) LAYER 5/8" GYP BD EA SIDE & AC BATT. CONSTRUCT PER ACOUSTIC WALL DETAILS
9. CHAIR RAIL (HOLSTER GAURD), SEE DETAIL 4/A-505. SET BACK 4" FROM INTERSECTING OUTSIDE CORNER, TYP.

CONSTRUCTION NOTES

1. OPERABLE PARTITION
2. HOSE BIB - REFER TO MECH
3. FLOOR DRAIN - REFER TO PLUMB
4. ALIGN WALLS
5. 6" STEEL BOLLARD, SEE DTL 1/A-501
6. PROVIDE BACKING IN WALL AT TV LOCATIONS. SEE SHEET A-702 FOR SPECIFIC LOCATIONS.
7. PROVIDE SECURITY GYPSUM BOARD AT INTERIOR SIDE OF ALL WALLS & CEILING OF ROOM

TYPE
SEE DOOR TYPES

CONSTRUCTION
SC = SOLID CORE WOOD
AL = ALUMINUM
HS = HOLLOW STEEL

FINISH
WT = WOOD TRANSPARENT
FF = FACTORY FINISH
AN = ANODIZED ALUMINUM

GLASS
T = TEMPERED
T/IN = TEMPERED INSULATING

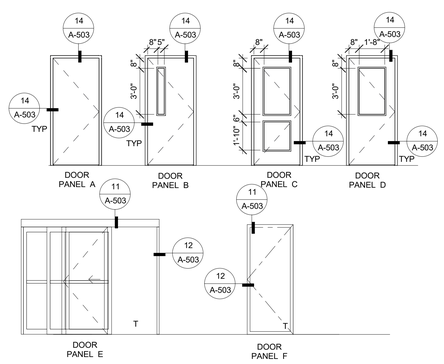
ELEVATION
SEE FRAME ELEVATIONS

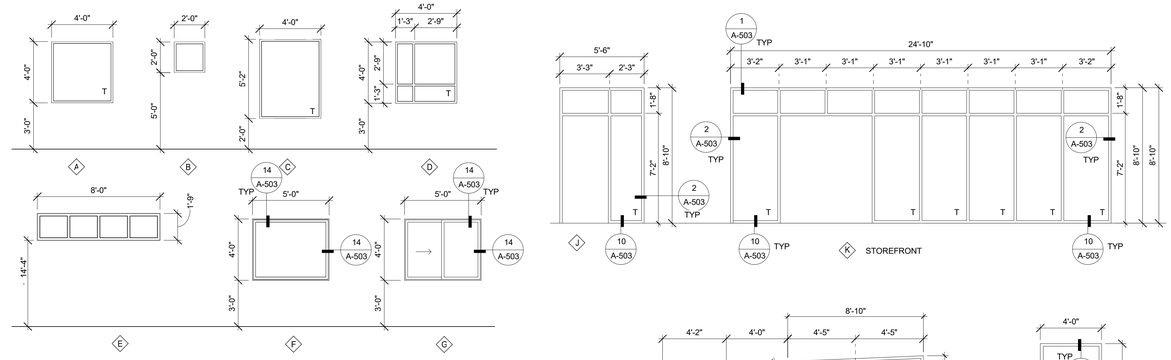
RATING
20, 25, 60, 90 MINUTES
FIRE RATING IN MINUTES

HARDWARE
REFER TO HARDWARE
GROUP IN HARDWARE SCHEDULE

REMARKS
DOOR NOTES &
GENERAL INFORMATION

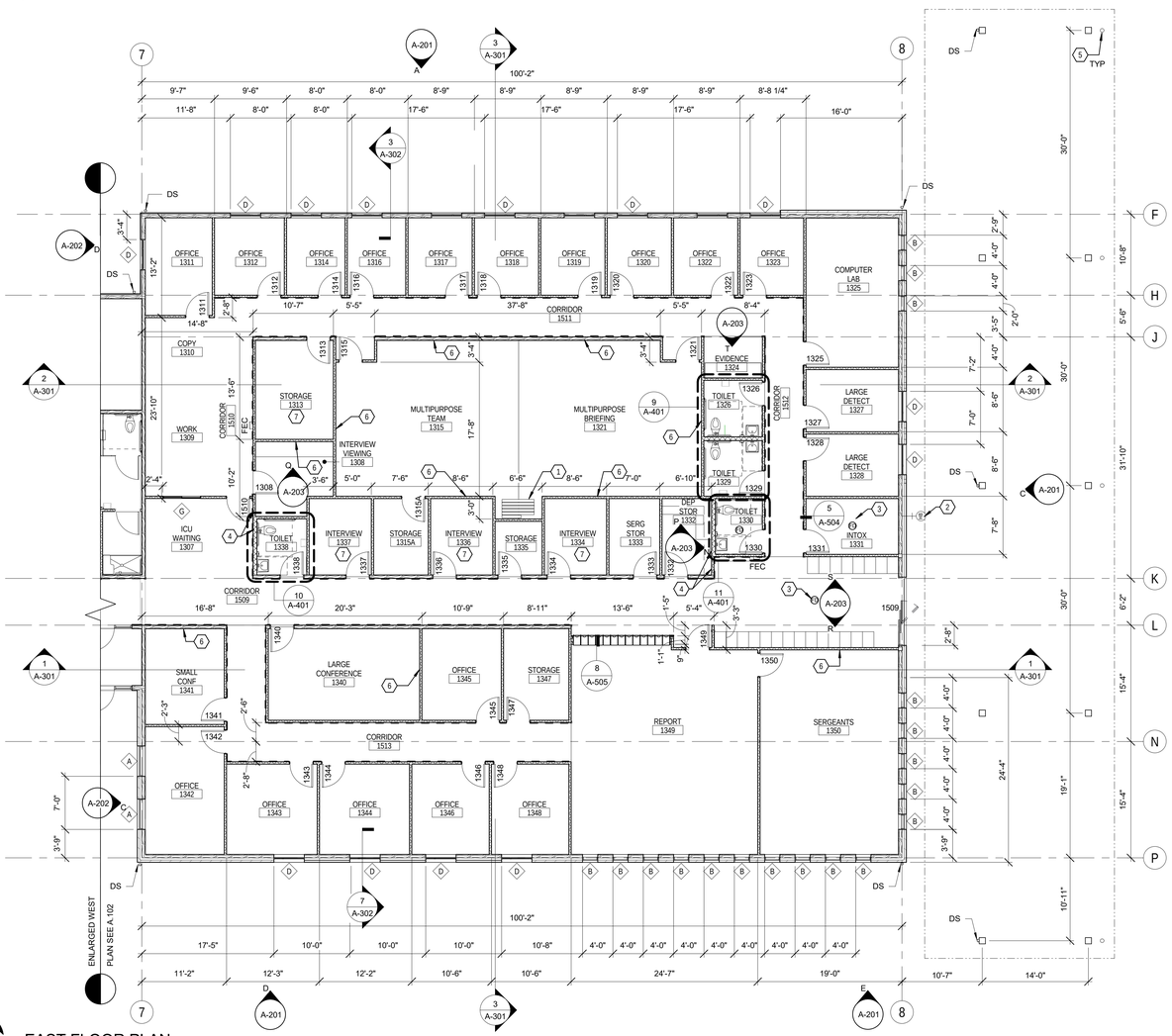
TYPE





WINDOW TYPES

1/4" = 1'-0"



EAST FLOOR PLAN
1/8" = 1'-0"

REGISTERED ARCHITECT
MICHAEL VEIT LANGE
OREGON
EXPIRES: 12/31/17
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd ARCHITECTS + partners pc
220 nw eighth avenue
portland, oregon
97209
1.503.221.1474
kmdarchitects.com

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURAL ENGINEERS, INC.
3431 SW STEVENS PLACE, NE SUITE 120
CORVALLIS, OR 97333
PHONE: 541-738-7399
WEBSITE: www.sazangroupmsc.com

Westech Engineering, Inc
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/2017
project: 05416
drawn by: MV
checked by: Checker

copyright © 2017
Carlson Veit Architects P.C.

EAST FLOOR PLAN

sheet: A-103

CEILING LEGEND

EXP NO CEILING - OPEN TO STRUCTURE	2X4 RECESSED LED LIGHT FIXTURE
ACT-1 2' X 4' SUSPENDED ACOUSTIC TILE CEILING AS SPECIFIED.	2X2 RECESSED LED LIGHT FIXTURE
	2X4 RECESSED LED LIGHT FIXTURE
	48" SURFACE MOUNT LED
	96" SURFACE MOUNT LED
INTERIOR GYPSUM BOARD	6" RECESSED DOWN LIGHT
	1X4 RECESSED LED LIGHT FIXTURE
	96" LONG PENDANT LED FIXTURE
SECURITY GYPSUM BOARD	RETURN AIR
	SUPPLY AIR
	SURFACE MOUNT EXIT SIGN
FIBER-CEMENT SOFFIT PANEL	9'-0" SPOT ELEVATION - CEILING HEIGHT
	UNDER CABINET LED LIGHT STRIP
METAL SOFFIT PANEL	LED LIGHT INSET ABOVE CUBBIES AND MAIL BOXES

CEILING NOTES

1. CENTER LAY IN CEILING GRID WITHIN ROOM UNLESS OTHERWISE NOTED.
2. REFER TO ELECTRICAL DRAWINGS & SPECIFICATIONS FOR LIGHT FIXTURE TYPES.
3. LOCATE SPRINKLER HEADS AT CENTER OF CEILING TILES.
4. ALL ROOMS TO HAVE 9'-0" HIGH CEILINGS UON.

CONSTRUCTION NOTES

1. GYP BD SOFFIT. SEE DTL
2. FIBER CEMENT SOFFIT PANEL W/1X2 BATTENS @ 4' - OC E.W.
3. ROOF HATCH
4. CONTINUOUS SOFFIT VENT STRIP @ END EAVE PERIMETER, TYP UON.

REFLECTED CEILING PLAN
3/32" = 1'-0"

REGISTERED ARCHITECT
MICHAEL J. VEIT
EXPIRES: 12/31/18
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc
220 mw eighth avenue
portland, oregon
97209
t.503.221.1474
kmdarchitects.com

SAZAN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
ENGINEERS PACIFIC, INC.
3431 TIBBETTS PLACE, NE SUITE 120
SALEM, OR 97305
PHONE/FAX: 503-399-1799
WEBSITE: www.msconsultingnwinc.com

CIVIL ENGINEERING SERVICES PROVIDED BY
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

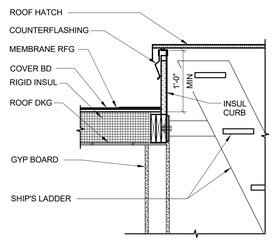
revisions:

date: 06/12/2017
project: 05416
drawn by: NB
checked by: Checker

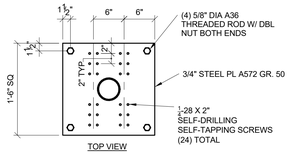
copyright © 2017
Carlson Veit Architects P.C.

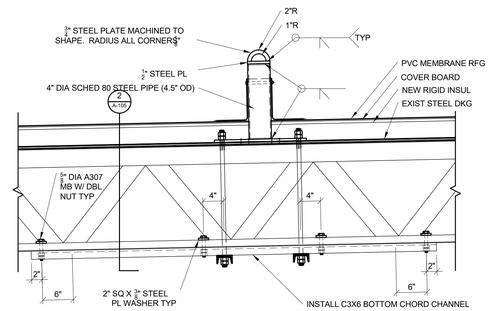
REFLECTED CEILING PLAN

sheet:
A-104

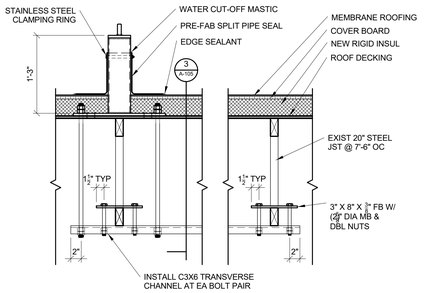


1 ROOF HATCH
1" = 1'-0"

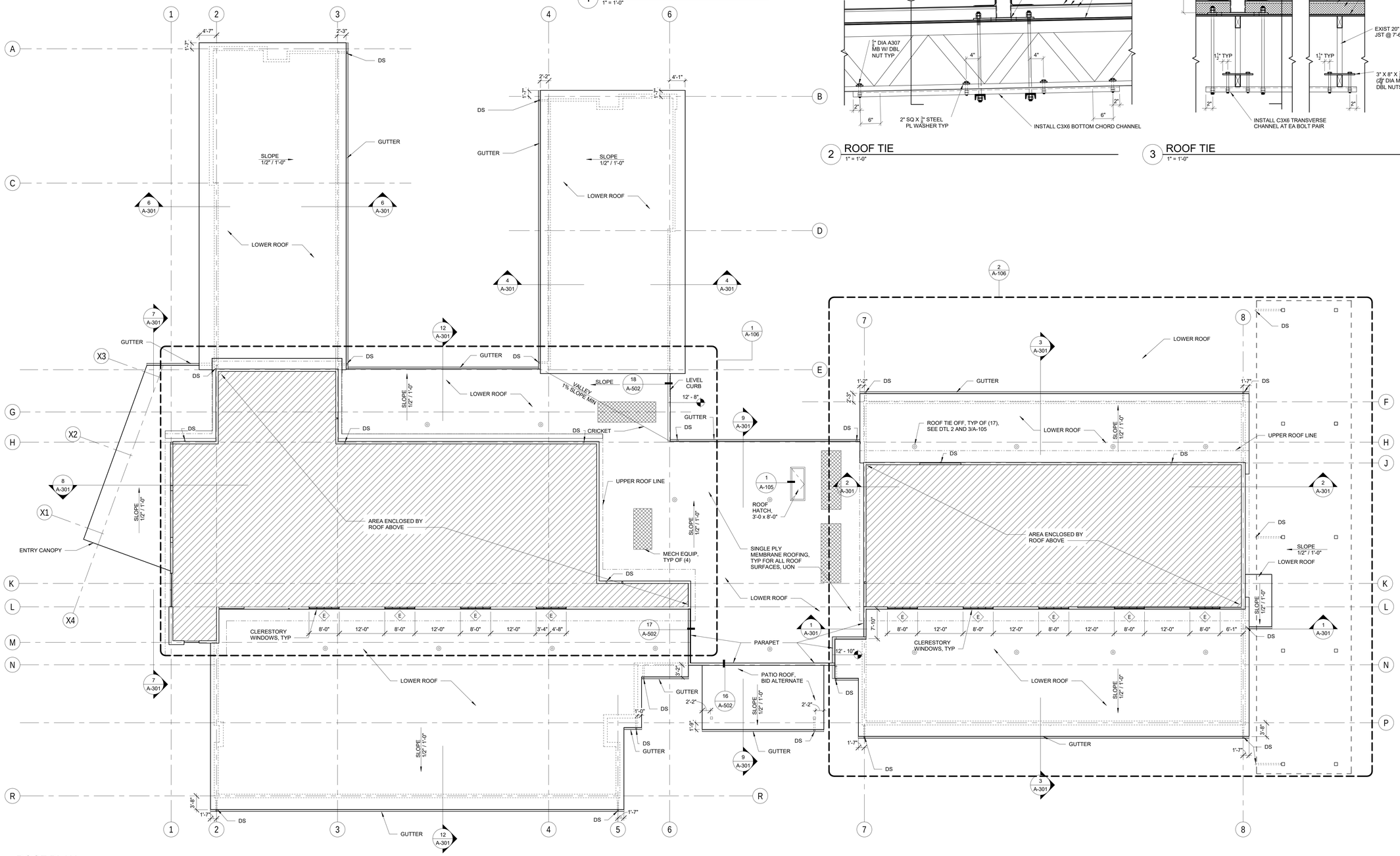




2 ROOF TIE
1" = 1'-0"



3 ROOF TIE
1" = 1'-0"



ROOF PLAN
3/32" = 1'-0"

REGISTERED ARCHITECT
MICHAEL VEIT RENEWAL 12/31/2018
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
ENGINEERS | PLANNERS
3431 TIMBERLINE PLACE NE SUITE 120
SALEM, OREGON 97305
WEBSITE: www.msconsultingnw.com
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t.503.221.1474
kmdarchitects.com
Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

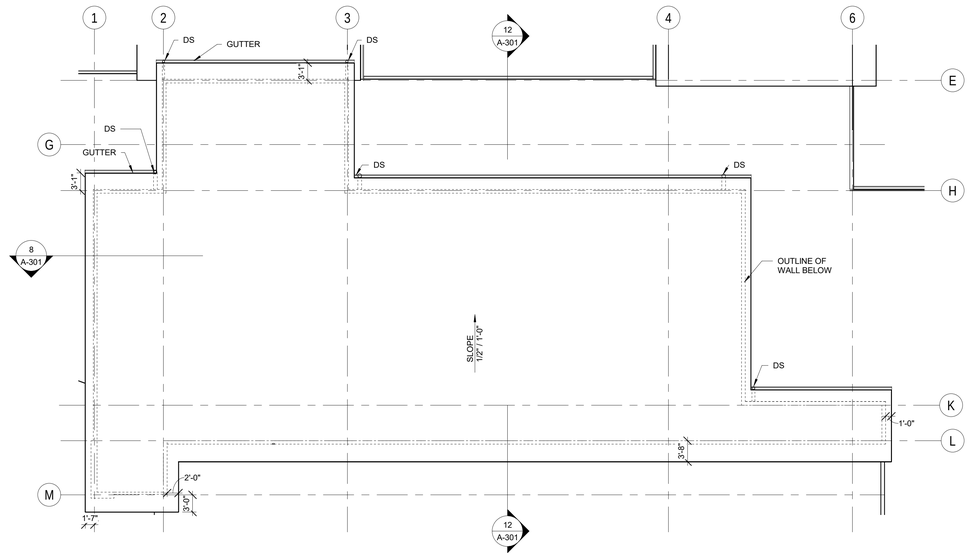
revisions:

date: 06/12/2017
project: 05416
drawn by: MV, PK
checked by: Checker

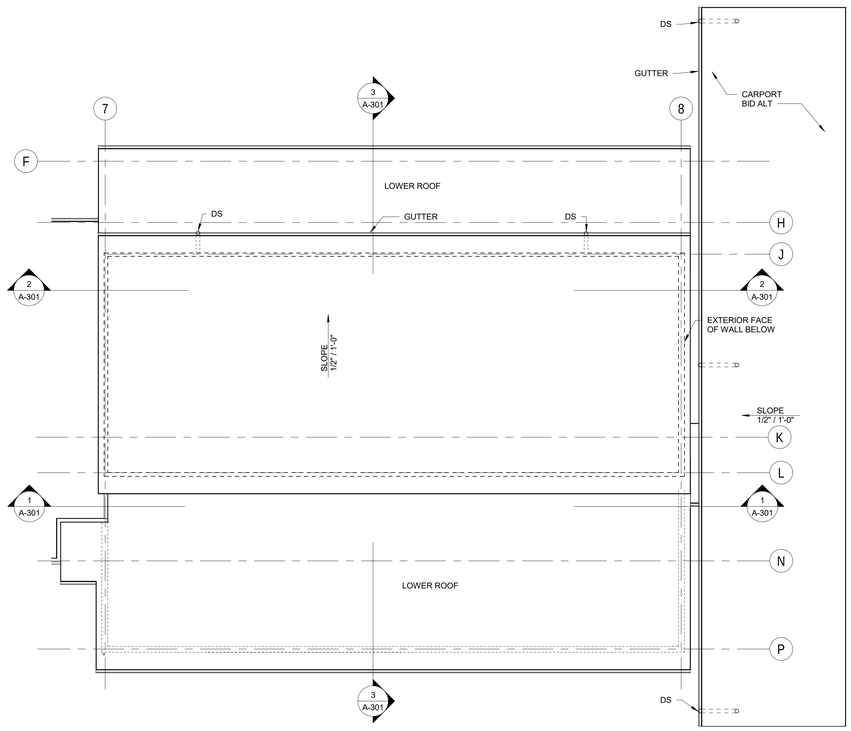
copyright © 2017
Carlson Veit Architects P.C.

ROOF PLAN - LOWER

sheet:
A-105



1 ROOF PLAN WEST UPPER
3/32" = 1'-0"



2 ROOF PLAN EAST UPPER
3/32" = 1'-0"

consultants:

kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
kmdarchitects.com

CIVIL ENGINEERING SERVICES PROVIDED BY
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS

SÄZÄN GROUP
CONSULTING STRUCTURAL ENGINEERS
MSC
STRUCTURAL ENGINEERS, INC.
3431 SUNSET BLVD. STE 200
WEST LINN, OR 97068
PHONE: 503.722.2799
WEBSITE: www.msceng.com

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

REGISTERED ARCHITECT
MICHAEL VANDERLINDE
SALEM, OREGON
STATE OF OREGON

Marion County
OREGON

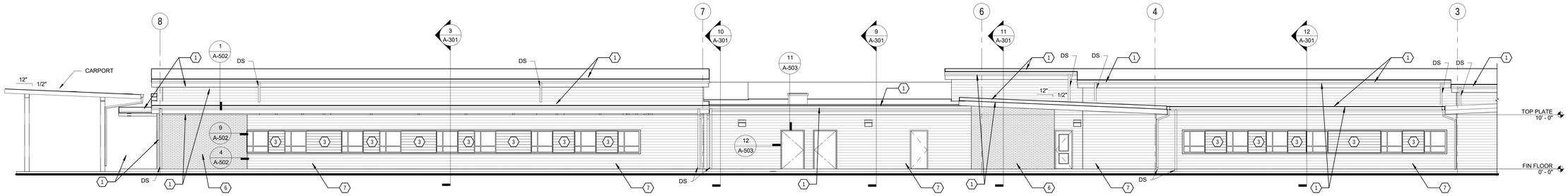
project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 ALMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

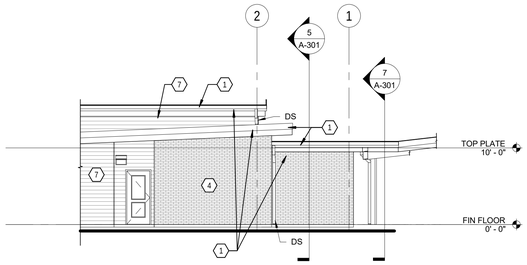
date: 06/12/2017
project: 05416
drawn by: MV, PK
checked by: Checker
copyright © 2017
Carlson Veit Architects P.C.

ROOF PLAN - UPPER

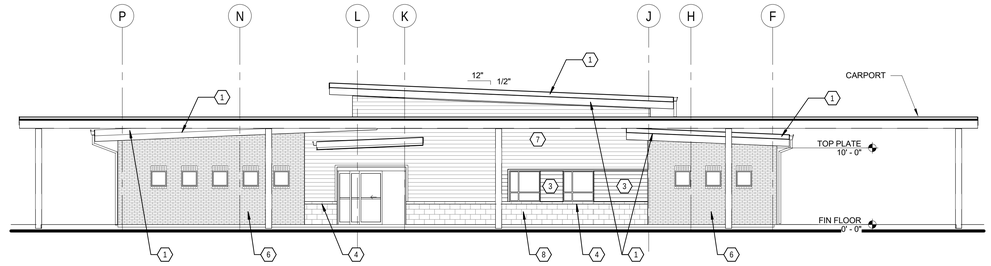
sheet:
A-106



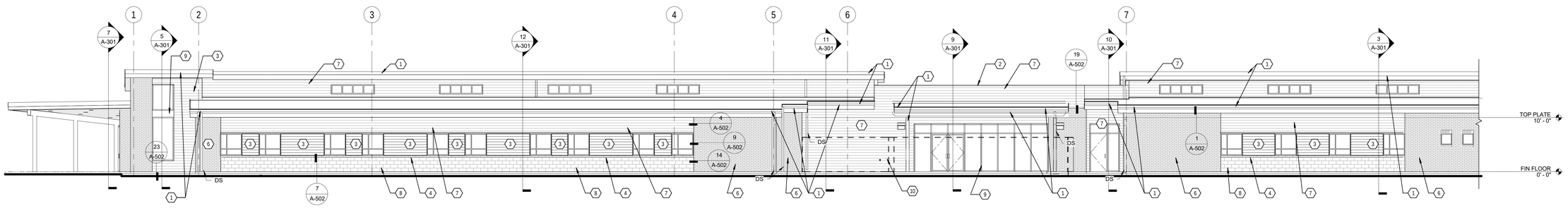
A NORTH ELEVATION PARTIAL
1/8" = 1'-0"



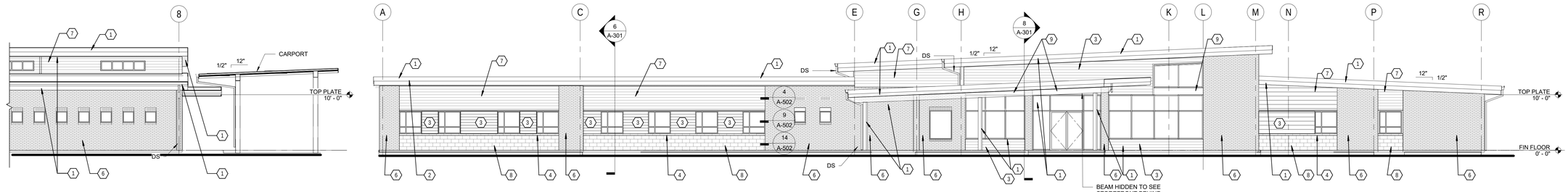
B NORTH ELEVATION PARTIAL
1/8" = 1'-0"



C EAST ELEVATION
1/8" = 1'-0"



D SOUTH ELEVATION PARTIAL
1/8" = 1'-0"



E SOUTH ELEVATION PARTIAL
1/8" = 1'-0"

F WEST ELEVATION
1/8" = 1'-0"

ELEVATION KEY NOTES

1. FASCIA TRIM/SOFFIT BD/STEEL BEAMS & COLUMNS -- SW 7052 "GRAY AREA"
2. MTL CAP FLASHING - PREFINISHED
3. LAP SIDING CEMENT FIBER SIDING W/ 6" EXPOSURE "STAINED CEDAR"
4. CMU CAP, WILLAMETTE GRAYSTONE "CHARCOAL" - GROUNDFACE
5. CONCRETE PLANTERS, BOARD FORM, SEALED CONCRETE
6. BRICK VENEER, HC MUDDOX "TULE FOG"
7. LAP SIDING W/ 6" EXPOSURE SW 7505 "MANOR HOUSE"
8. 4" CMU VENEER, WILLAMETTE GRAYSTONE "MIDNIGHT" - GROUNDFACE
9. ALUMINUM PANEL - ANODIZED
10. LINE OF PATIO WALL (REMOVED FOR CLARITY) OFOI

REGISTERED ARCHITECT — MICHAEL VEIT — OREGON — SALEM, OREGON — STATE OF OREGON

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP — CONSULTING STRUCTURAL ENGINEERS
MSC ENGINEERS, INC.
3431 TIMBERLINE PLACE NE SUITE 120
SALEM, OREGON 97305
PHONE/FAX: 503-581-1399
WEBSITE: www.msceng.com

consultants:
kmd architects + planners pc — 220 nw eighth avenue portland, oregon 97209 t.503.221.1474 kmdarchitects.com
Westech Engineering, Inc. — CIVIL ENGINEERING SERVICES PROVIDED BY — CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

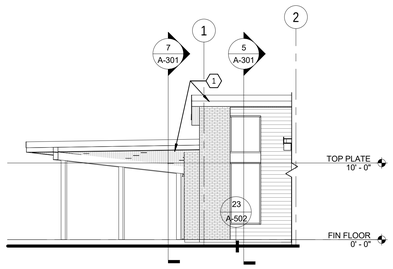
project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

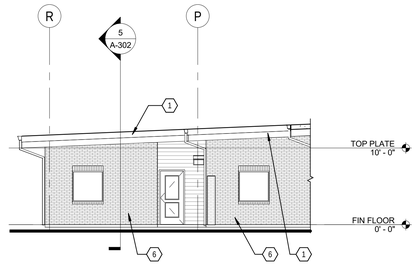
date: 06/12/2017
project: 05416
drawn by: MV
checked by: Checker
copyright © 2017 Carlson Veit Architects P.C.

EXTERIOR ELEVATIONS

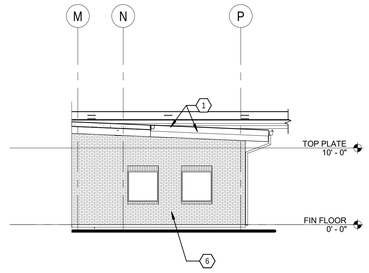
sheet: A-201



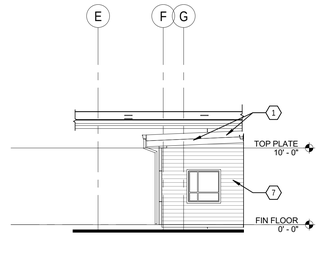
A SOUTH ELEVATION AT VESTIBULE
1/8" = 1'-0"



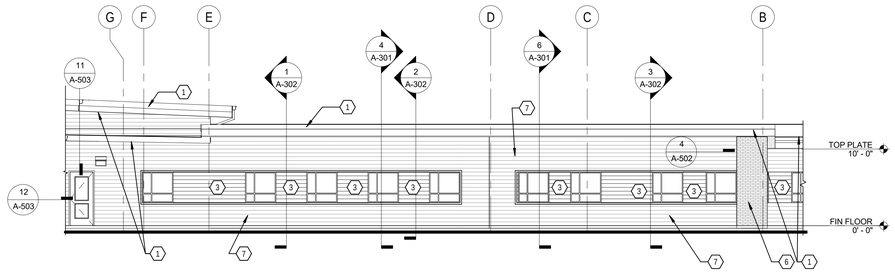
B EAST ELEVATION FLOOR PLAN WEST
1/8" = 1'-0"



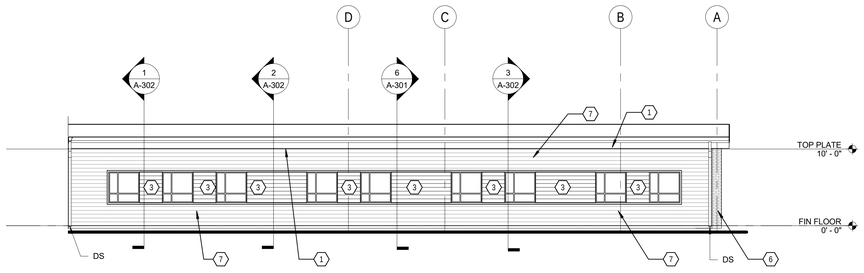
C WEST ELEVATION FLOOR PLAN WEST
1/8" = 1'-0"



D EAST ELEVATION FLOOR PLAN WEST
1/8" = 1'-0"



E EAST ELEVATION AT WEST WING
1/8" = 1'-0"



F EAST ELEVATION AT WING
1/8" = 1'-0"

G WEST ELEVATION AT WING
1/8" = 1'-0"

ELEVATION KEY NOTES

1. FASCIA TRIM/SOFFIT BD/STEEL BEAMS & COLUMNS -- SW 7052 "GRAY AREA"
2. MTL CAP FLASHING - PREFINISHED
3. LAP SIDING CEMENT FIBER SIDING W/ 6" EXPOSURE "STAINED CEDAR"
4. CMU CAP, WILLAMETTE GRAYSTONE "CHARCOAL" - GROUNDFACE
5. CONCRETE PLANTERS, BOARD FORM, SEALED CONCRETE
6. BRICK VENEER, HC MUDDOX "TULE FOG"
7. LAP SIDING W/ 6" EXPOSURE SW 7505 "MANOR HOUSE"
8. 4" CMU VENEER, WILLAMETTE GRAYSTONE "MIDNIGHT" - GROUNDFACE
9. ALUMINUM PANEL - ANODIZED
10. LINE OF PATIO WALL (REMOVED FOR CLARITY) OFOI

REGISTERED ARCHITECT
MICHAEL VEIT RENEWAL: 6/30/2018
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t.503.221.1474
kmdarchitects.com
CIVIL ENGINEERING SERVICES PROVIDED BY
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURAL | SEISMIC
3415 SW SHERMAN PLACE, NE SUITE 120
PORTLAND, OR 97210
PHONE: 503.224.7099
WEBSITE: www.sazangroupengineer.com

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

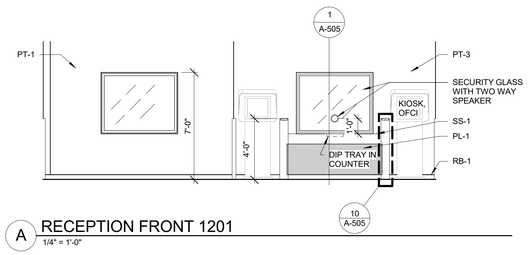
revisions:

date: 06/12/2017
project: 05416
drawn by: MV
checked by: Checker

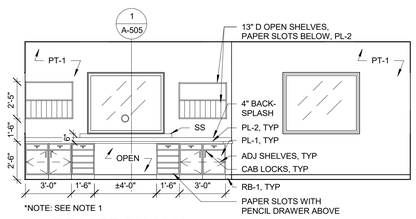
copyright © 2017
Carlson Veit Architects P.C.

EXTERIOR ELEVATIONS

sheet:
A-202

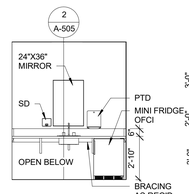


A RECEPTION FRONT 1201
1/4" = 1'-0"



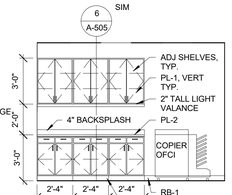
*NOTE: SEE NOTE 1

B RECEPTION 1201
1/4" = 1'-0"



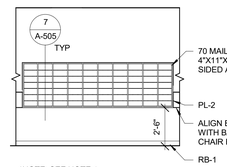
*NOTE: SEE NOTE 1

C LACTATION 1204
1/4" = 1'-0" 24" DEEP CAB



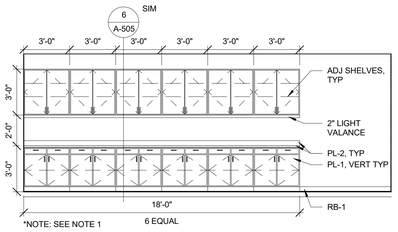
*NOTE: SEE NOTE 1

D COPY 1207
1/4" = 1'-0" 12" DEEP UPPERS 24" DEEP LOWERS



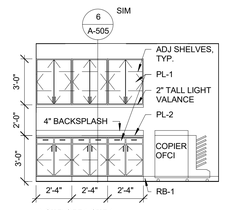
*NOTE: SEE NOTE 1

E PPO MAIL BOXES
1/4" = 1'-0"



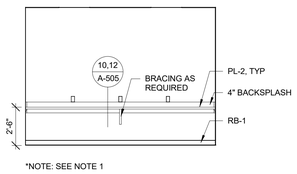
*NOTE: SEE NOTE 1

F CENTRAL MAIL 1261
1/4" = 1'-0" 12" DEEP UPPERS 24" DEEP LOWERS



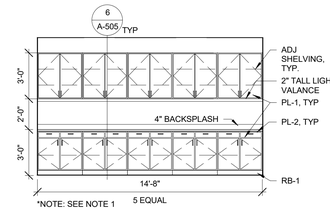
*NOTE: SEE NOTE 1

G COPY 1242
1/4" = 1'-0" 12" DEEP UPPERS 24" DEEP LOWERS



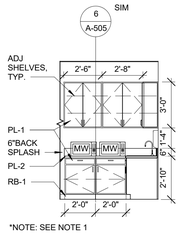
*NOTE: SEE NOTE 1

H EMPLOYEE RESOURCE 1276
1/4" = 1'-0"



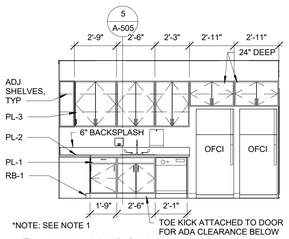
*NOTE: SEE NOTE 1

J COPY 1285
1/4" = 1'-0" 12" DEEP UPPERS 24" DEEP LOWERS



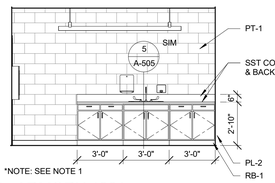
*NOTE: SEE NOTE 1

K BREAKROOM 1303
1/4" = 1'-0" 12" DEEP UPPERS 24" DEEP LOWERS



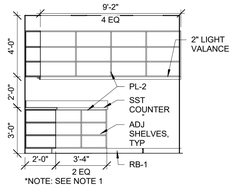
*NOTE: SEE NOTE 1

L BREAKROOM
1/4" = 1'-0" 12" DEEP UPPERS, UON 24" DEEP LOWERS



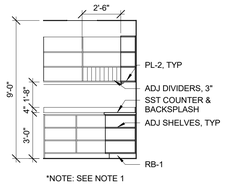
*NOTE: SEE NOTE 1

M ARMORY 1301
1/4" = 1'-0" 24" DEEP LOWERS



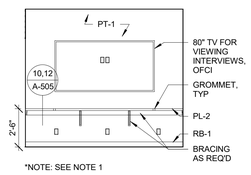
*NOTE: SEE NOTE 1

N DEP STG 1332
1/4" = 1'-0" 14" DEEP UPPERS 24" DEEP LOWERS



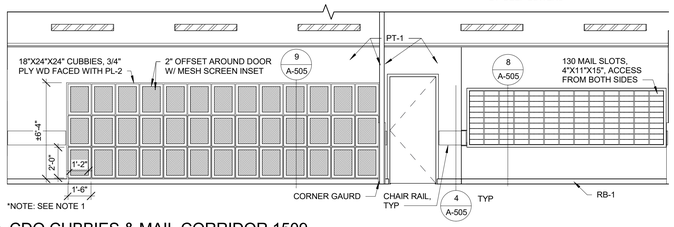
*NOTE: SEE NOTE 1

P DEP STG 1332
1/4" = 1'-0" 14" DEEP UPPERS 24" DEEP LOWERS



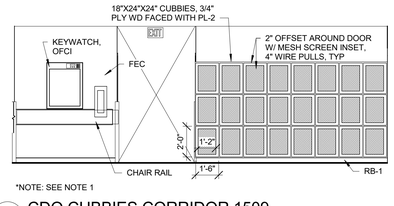
*NOTE: SEE NOTE 1

Q INTERVIEW VIEWING 1308
1/4" = 1'-0" 24" DEEP COUNTER



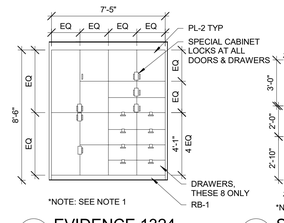
*NOTE: SEE NOTE 1

R CDO CUBBIES & MAIL CORRIDOR 1509
1/4" = 1'-0" 24" DEEP CUBBIES



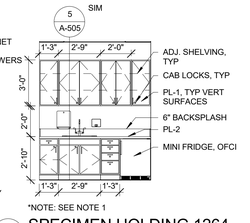
*NOTE: SEE NOTE 1

S CDO CUBBIES CORRIDOR 1509
1/4" = 1'-0" 24" DEEP CUBBIES



*NOTE: SEE NOTE 1

T EVIDENCE 1324
1/4" = 1'-0" 24" DEEP

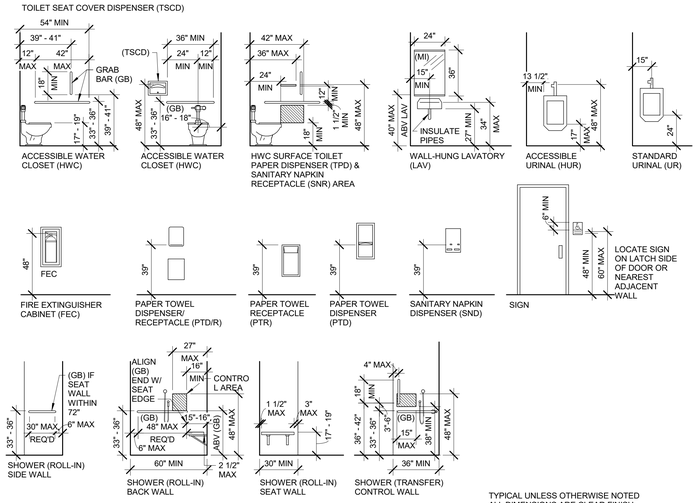


*NOTE: SEE NOTE 1

U SPECIMEN HOLDING 1264
1/4" = 1'-0" 12" DEEP UPPER 24" DEEP LOWERS

GENERAL NOTES

1. ALL LAMINATE CASEWORK TO BE PROVDED BY OREGON CORRECTIONS ENTERPRISES (OCE), OFCI. ELEVATIONS FOR REFERENCE ONLY.
2. UNDER CABINET LED LIGHT STRIPS PROVIDED AT UPPER CABINET LOCATIONS, WHERE NOTED.



ADA MOUNTING HEIGHTS
1/4" = 1'-0"

TYPICAL UNLESS OTHERWISE NOTED
ALL DIMENSIONS ARE CLEAR FINISH

REGISTERED ARCHITECT
MICHAEL J. VEIT
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc
220 mirabeau avenue
post office
97209
1.503.221.1474
kmdarchitects.com

SÄZAN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURES, INC.
3431 TIPSOO PLACE NE SUITE 120
SALEM, OREGON 97305
PHONE/FAX 503-399-1399
PRESIDENT: tom@sazangroupmsc.com

Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

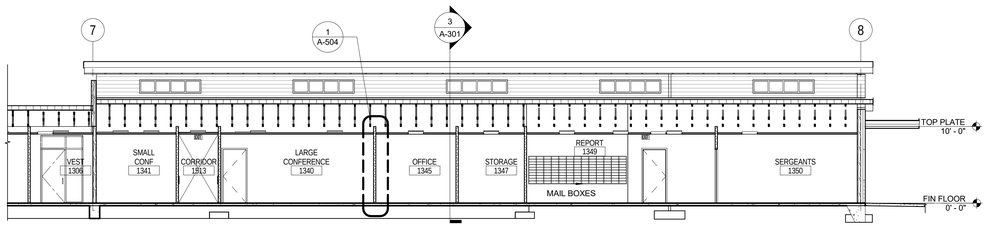
revisions:

date: 06/12/2017
project: 05416
drawn by: NB
checked by: Checker

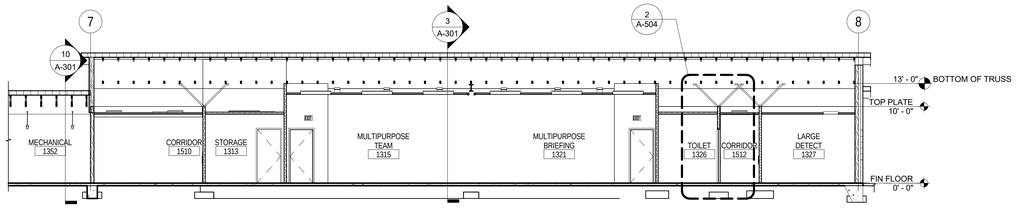
copyright © 2017
Carlson Veit Architects P.C.

INTERIOR ELEVATIONS

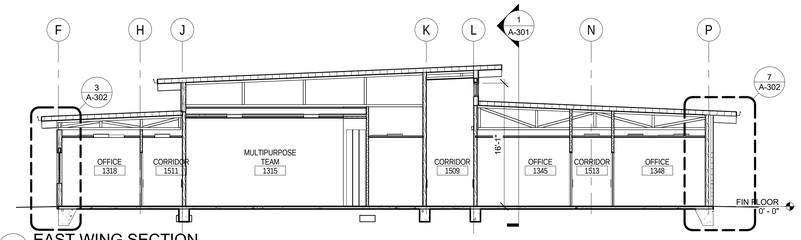
sheet: A-203



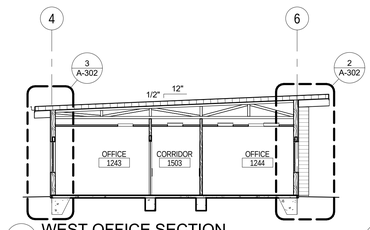
1 EAST WING SECTION
1/8" = 1'-0"



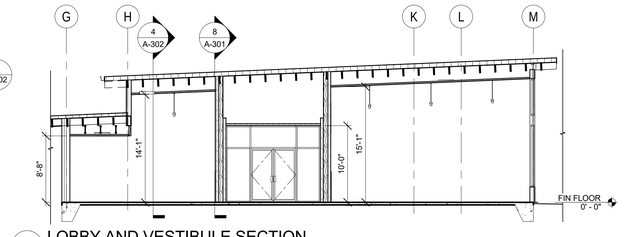
2 EAST WING SECTION
1/8" = 1'-0"



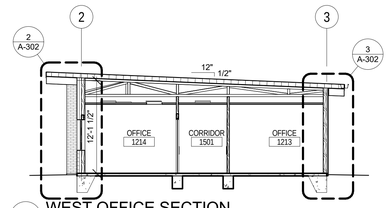
3 EAST WING SECTION
1/8" = 1'-0"



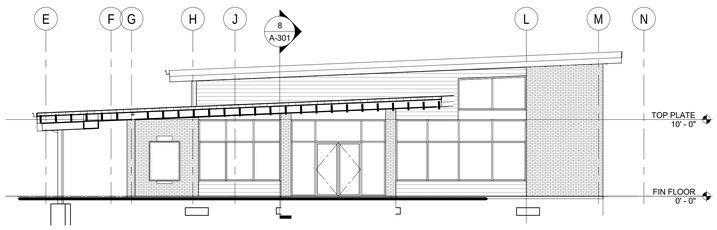
4 WEST OFFICE SECTION
1/8" = 1'-0"



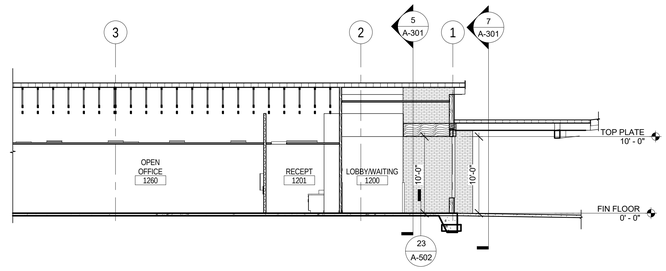
5 LOBBY AND VESTIBULE SECTION
1/8" = 1'-0"



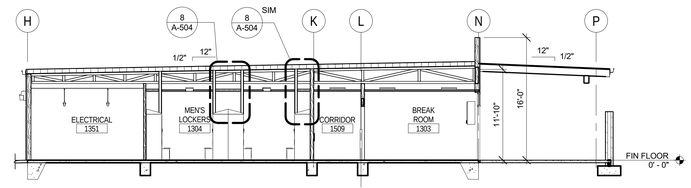
6 WEST OFFICE SECTION
1/8" = 1'-0"



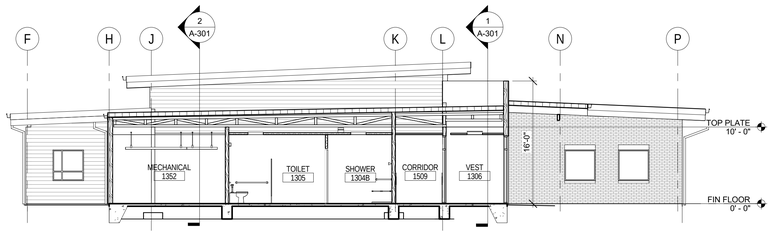
7 FRONT CANOPY ROOF SECTION
1/8" = 1'-0"



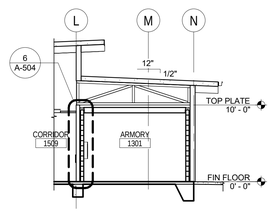
8 FRONT CANOPY & OPEN OFFICE SECTION
1/8" = 1'-0"



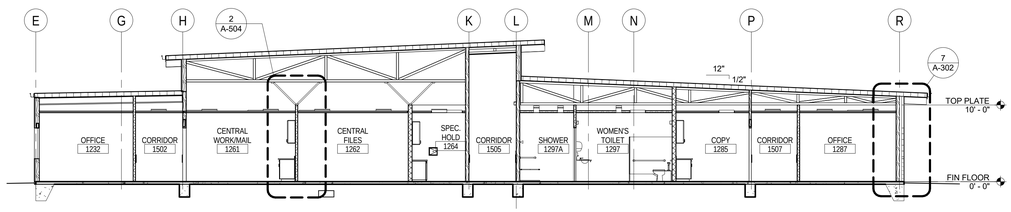
9 CENTER BUILDING SECTION
1/8" = 1'-0"



10 MECHANICAL, MEN'S LOCKER SECTION
1/8" = 1'-0"



11 ARMORY SECTION
1/8" = 1'-0"



12 WEST WING CENTER SECTION
1/8" = 1'-0"

REGISTERED ARCHITECT
MICHAEL J. VEIT
EXPIRES: 6/30/2018
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd ARCHITECTS + planners PC
220 nw eighth avenue
portland, oregon
97209
t.503.221.1474
kmdarchitects.com
SÄZAN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURAL PEERS, INC.
3431 TIPSOO TRACE NE SUITE 120
ALBUQUERQUE, NM
PHONE: 505.797.7799
WEBSITE: www.msengineer.com
Westech Engineering, Inc
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

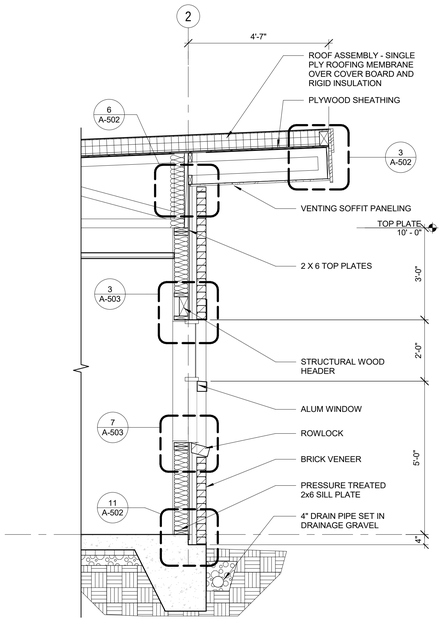
revisions:

date: 06/12/2017
project: 05416
drawn by: Author
checked by: Checker

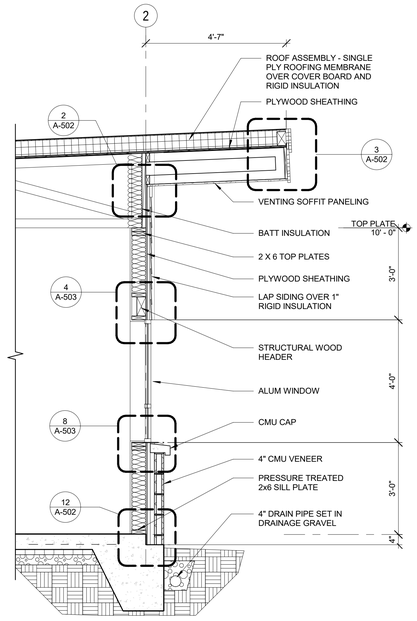
copyright © 2017
Carlson Veit Architects P.C.

BUILDING SECTIONS

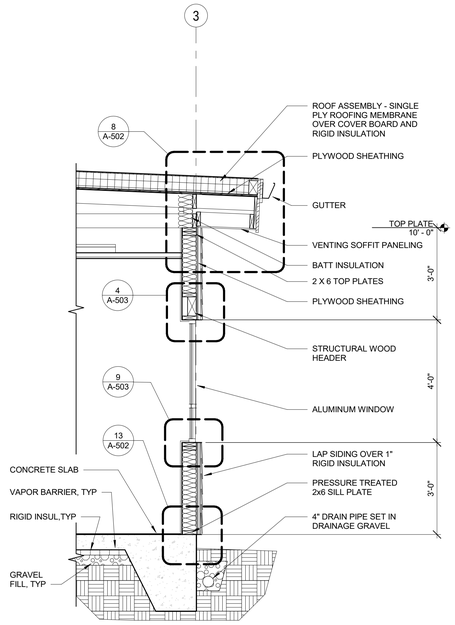
sheet:
A-301



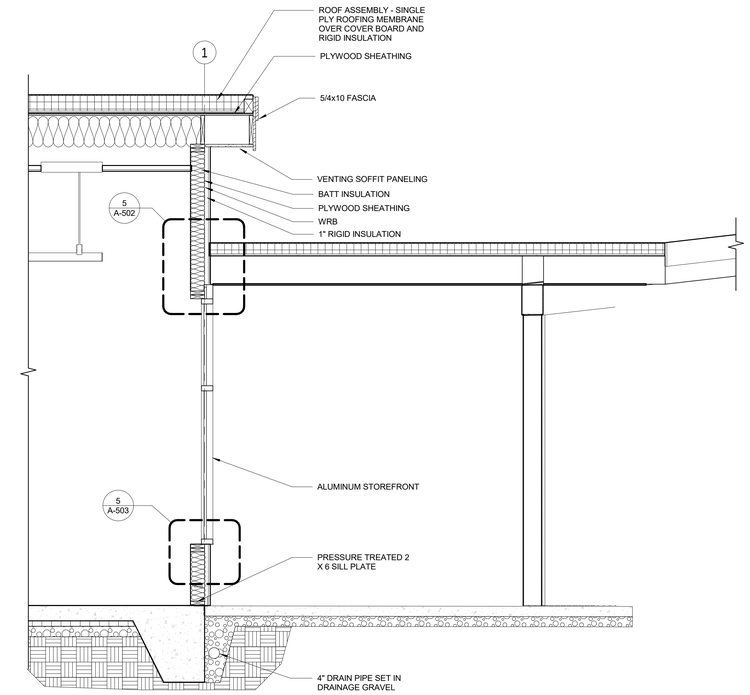
1 SECTION THROUGH BRICK VENEER
1/2" = 1'-0"



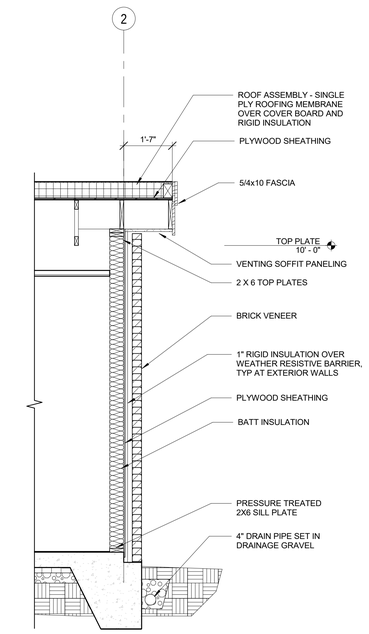
2 SECTION THROUGH CMU & LAP SIDING WALL
1/2" = 1'-0"



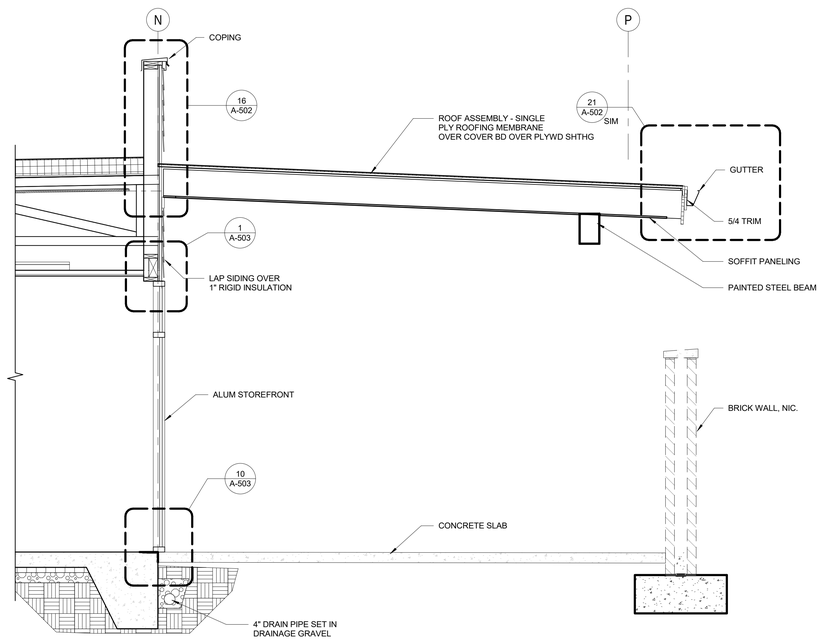
3 SECTION AT LOW WALL - LAP SIDING
1/2" = 1'-0"



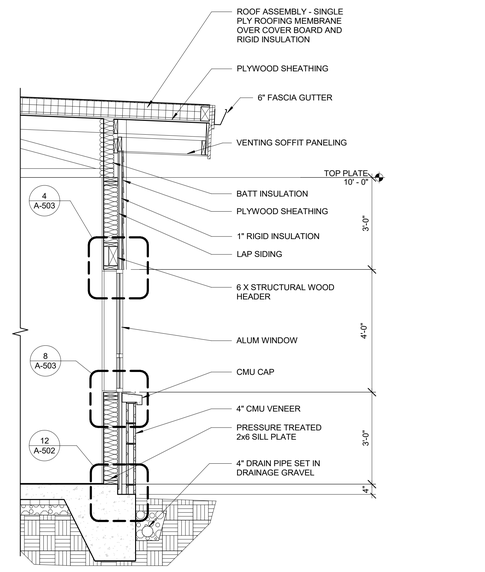
4 SECTION AT STOREFRONT
1/2" = 1'-0"



5 SECTION THROUGH BRICK VENEER
1/2" = 1'-0"



6 SECTION AT BREAK ROOM
1/2" = 1'-0"



7 SECTION THROUGH CMU AND LAP SIDING WALL
1/2" = 1'-0"

REGISTERED ARCHITECT
MICHAEL JOHN VEIT
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t.503.221.1474
kmdarch@kcts.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
ENGINEERS | PLANNERS | SURVEYORS
3431 TIBBETTS PLACE, NE SUITE 120
SALEM, OREGON 97305
PHONE/FAX: 503.390.7099
WEBSITE: www.msconsultingnw.com
Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 ALMSVILLE HIGHWAY SE
SALEM, OREGON

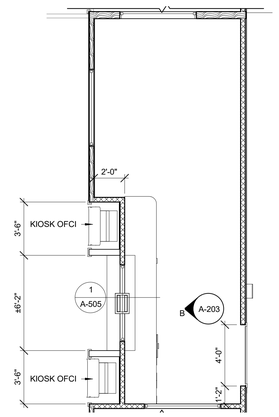
revisions:

date: 06/12/2017
project: 05416
drawn by: PK
checked by: MJ

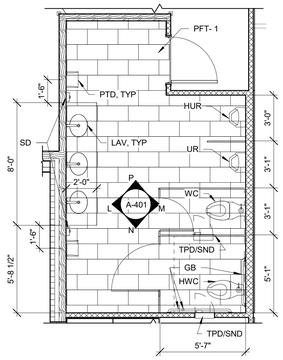
copyright © 2017
Carlson Veit Architects P.C.

WALL SECTIONS

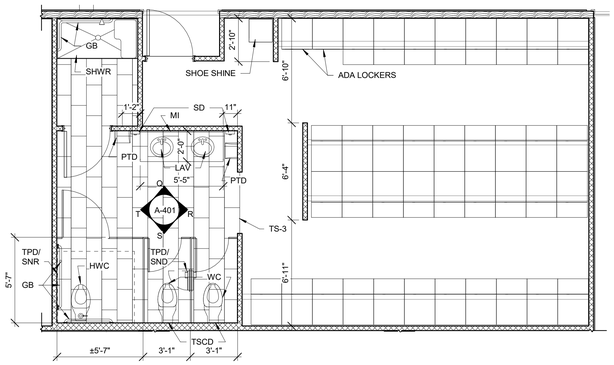
sheet:
A-302



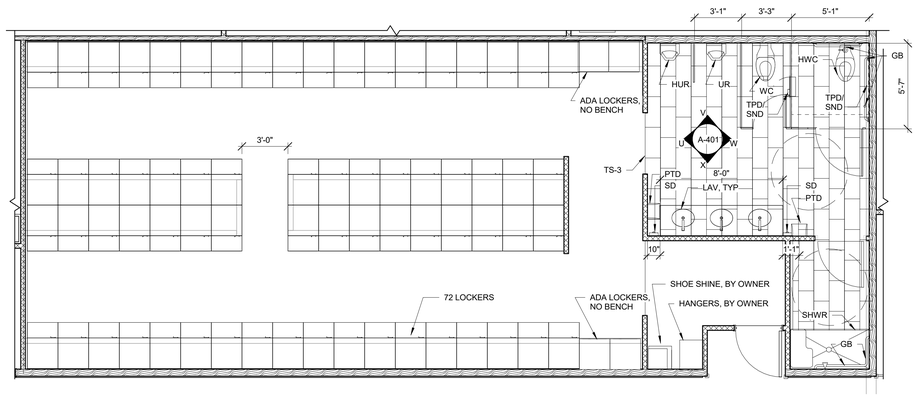
1 RECEPTION
1/4" = 1'-0"



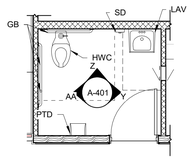
2 MENS 1275
1/4" = 1'-0"



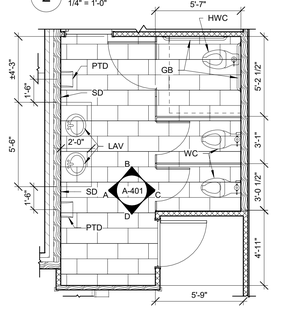
3 WOMENS LOCKER 1297
1/4" = 1'-0"



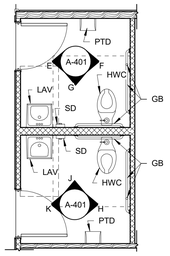
4 MENS LOCKER 1304
1/4" = 1'-0"



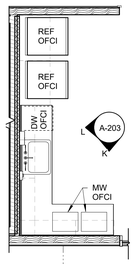
5 RESTROOM 1263
1/4" = 1'-0"



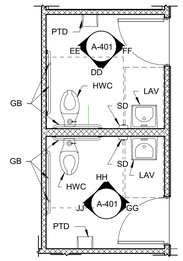
6 WOMENS 1203
1/4" = 1'-0"



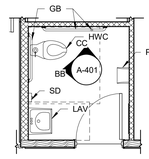
7 RESTROOMS 1268 & 1269
1/4" = 1'-0"



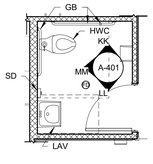
8 BREAK ROOM 1303
1/4" = 1'-0"



9 RESTROOMS 1326 & 1329
1/4" = 1'-0"



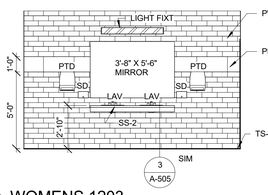
10 RESTROOM 1338
1/4" = 1'-0"



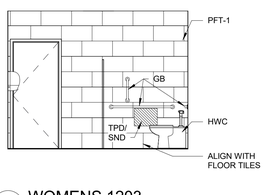
11 RESTROOM 1330
1/4" = 1'-0"

GENERAL NOTES

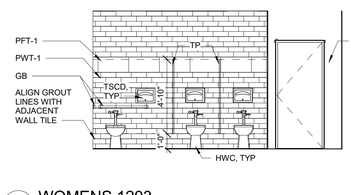
1. SEE FIXTURE MOUNTING HEIGHTS ON A-203 FOR ALL TOILET ACCESSORIES.
2. SEE SPECIFICATION SECTION 102813 FOR LIST OF TOILET ACCESSORIES, PROVIDE ALL NECESSARY BACKING..
3. ALL FLOOR AND WALL TILE TO BE INSTALLED AT 33% RUNNING BOND.
4. ALL QUARTZ COUNTERTOPS TO BE CFCI. RESTROOMS AND RECEPTION WHERE NOTED.



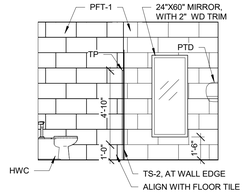
A WOMENS 1203
1/4" = 1'-0"



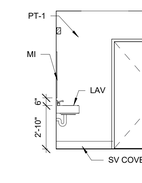
B WOMENS 1203
1/4" = 1'-0"



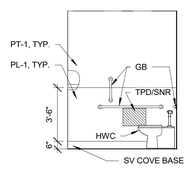
C WOMENS 1203
1/4" = 1'-0"



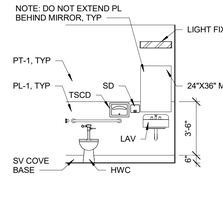
D WOMENS 1203 S
1/4" = 1'-0"



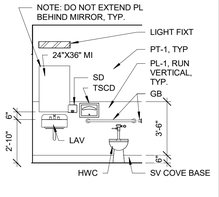
E TOILET 1268
1/4" = 1'-0"



F TOILET 1268 E
1/4" = 1'-0"

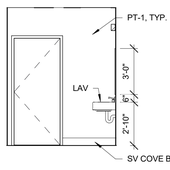


G TOILET 1268 S
1/4" = 1'-0"

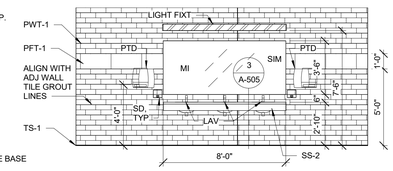


H TOILET 1269
1/4" = 1'-0"

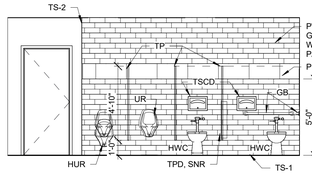
J TOILET 1269
1/4" = 1'-0"



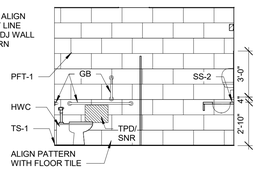
K TOILET 1269
1/4" = 1'-0"



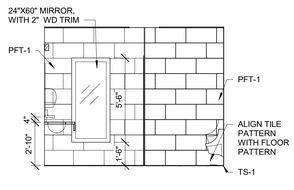
L MENS 1275
1/4" = 1'-0"



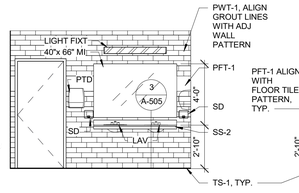
M MENS 1275
1/4" = 1'-0"



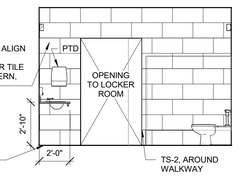
N MENS 1275
1/4" = 1'-0"



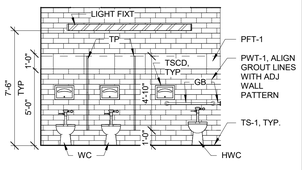
P MENS 1275
1/4" = 1'-0"



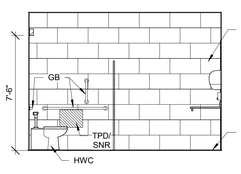
Q WOMENS 1297
1/4" = 1'-0"



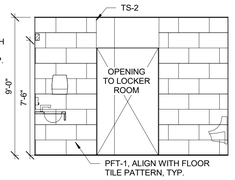
R WOMENS 1297 E
1/4" = 1'-0"



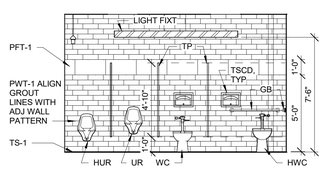
S WOMENS 1297 S
1/4" = 1'-0"



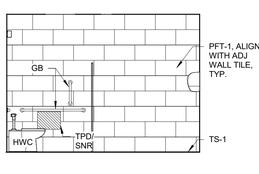
T WOMENS 1297 W
1/4" = 1'-0"



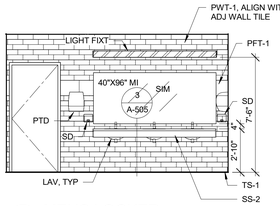
U MENS TOILET 1305
1/4" = 1'-0"



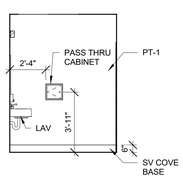
V MENS TOILET 1305
1/4" = 1'-0"



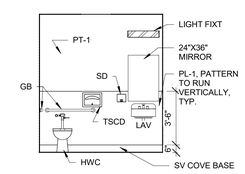
W MENS TOILET 1305
1/4" = 1'-0"



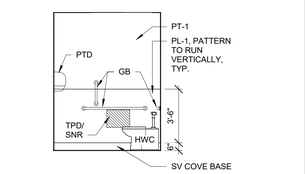
X MENS LOCKER
1/4" = 1'-0"



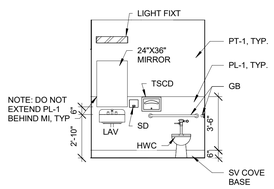
Y RESTROOM 1263 & 1265
1/4" = 1'-0"
NOTE: 1265 TO MIRROR ELEVATION



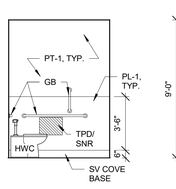
Z RESTROOM 1263 & 1265
1/4" = 1'-0"
NOTE: 1265 TO MIRROR ELEVATION



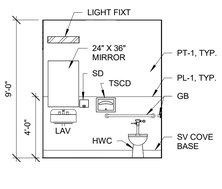
AA RESTROOM 1263 & 1265
1/4" = 1'-0"
NOTE: 1265 TO MIRROR ELEVATION



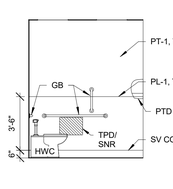
BB TOILET 1338
1/4" = 1'-0"



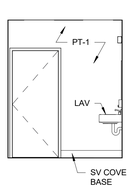
CC TOILET 1338
1/4" = 1'-0"



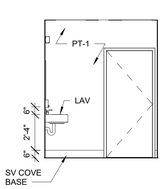
DD 1326 RESTROOM
1/4" = 1'-0"



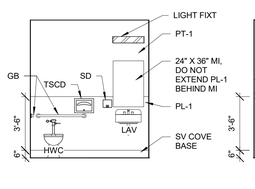
EE 1326 RESTROOM
1/4" = 1'-0"



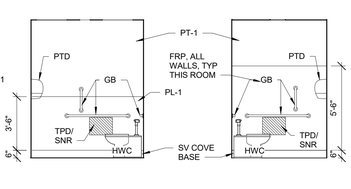
FF 1326 RESTROOM
1/4" = 1'-0"



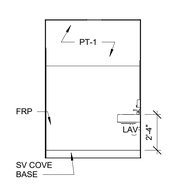
GG RESTROOM 1329
1/4" = 1'-0"



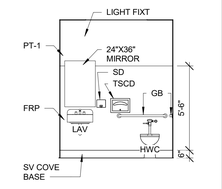
HH RESTROOM 1329
1/4" = 1'-0"



JJ RESTROOM 1329
1/4" = 1'-0"



KK RESTROOM 1330
1/4" = 1'-0"



LL RESTROOM 1330
1/4" = 1'-0"

MM RESTROOM 1330
1/4" = 1'-0"

REGISTERED ARCHITECT
MICHAEL VEIT EXPIRES: 12/31/17
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects + planners pc
220 nw eighth avenue
portland, oregon
97209
t.503.221.1474
kmdarchitects.com

SÄZÄN GROUP
CONSULTING STRUCTURAL ENGINEERS
MSC
STRUCTURAL ENGINEERS | PACIFIC
3431 TIBBETTS STREET, NE SUITE 120
SALEM, OREGON 97301
PHONE/FAX: 503-581-7399
WEBSITE: www.sazangroupnw.com

CIVIL ENGINEERING SERVICES PROVIDED BY
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 ALUMSVILLE HIGHWAY SE
SALEM, OREGON

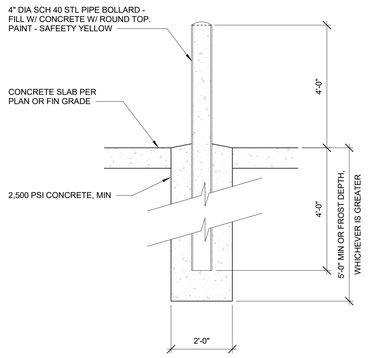
revisions:

date: 06/12/2017
project: 05416
drawn by: NB, MV, PK
checked by: GG, MJ, CC

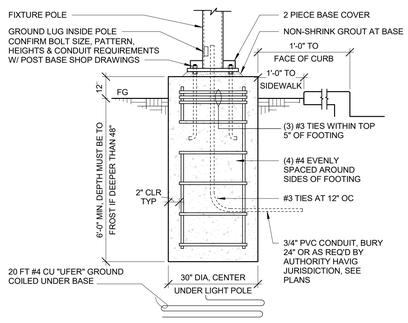
copyright © 2017
Carlson Veit Architects P.C.

LARGE SCALE
FLOOR PLANS &
ELEVATIONS

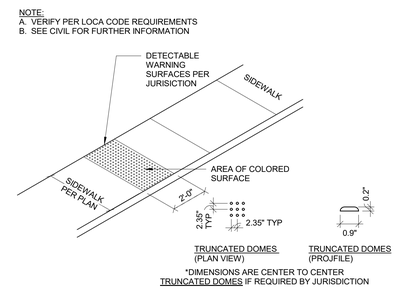
sheet:
A-401



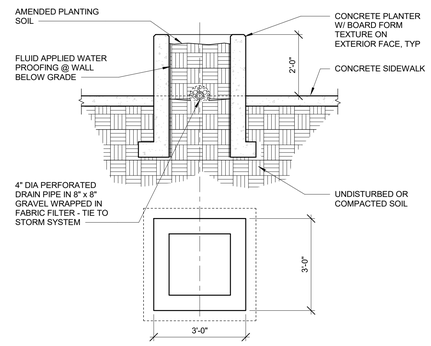
1 STEEL PIPE BOLLARD
1/2" = 1'-0"



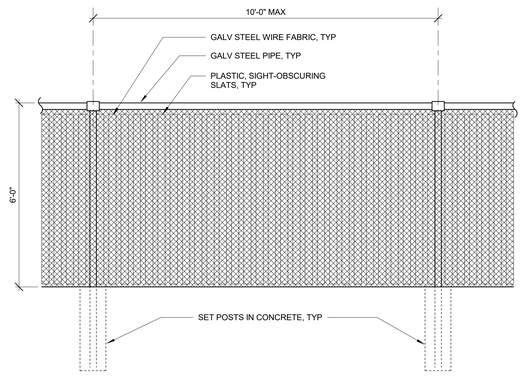
2 LIGHT POLE BASE DETAIL
1/4" = 1'-0"



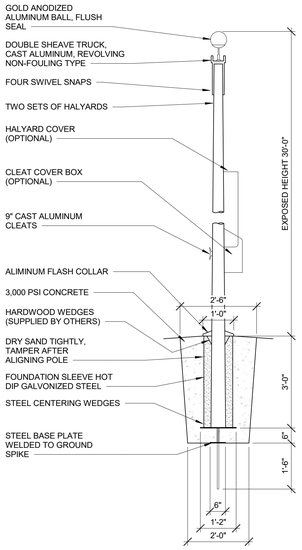
3 DETECTABLE WARNING TRACK
1/4" = 1'-0"



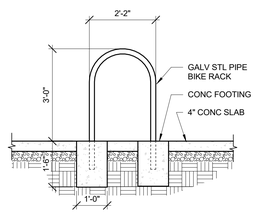
4 CONCRETE PLANTER
1/2" = 1'-0"



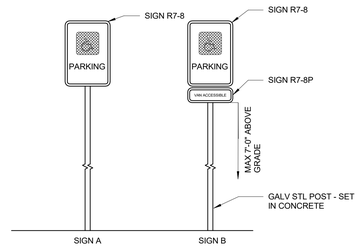
5 ELEVATION - SIGHT-OBSCURING FENCE
1/2" = 1'-0"



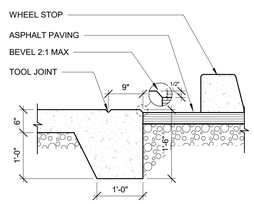
6 FLAGPOLE DETAIL
1/2" = 1'-0"



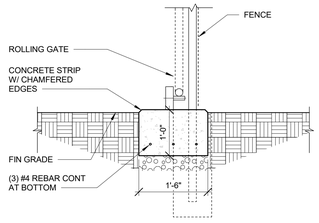
7 BIKE RACK DETAIL
1/2" = 1'-0"



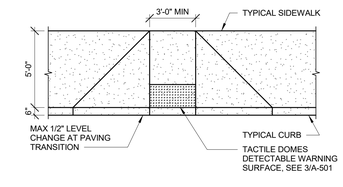
8 ACCESSIBLE PARKING SIGNAGE
1/4" = 1'-0"



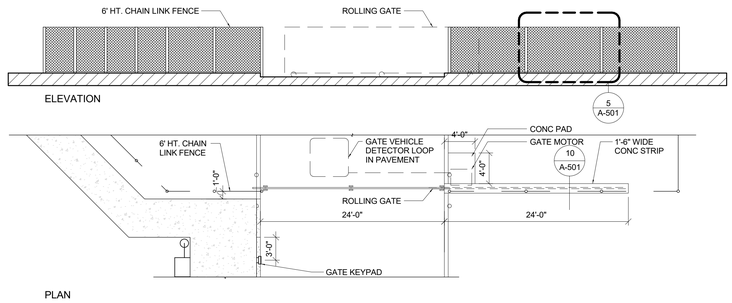
9 CONCRETE TO ASPHALT TRANSITION
3/4" = 1'-0"



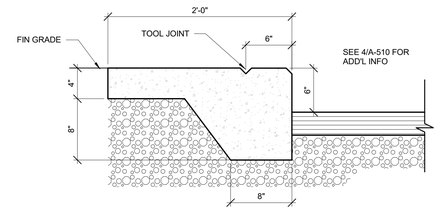
10 CONCRETE STRIP AT ROLLING GATE
3/4" = 1'-0"



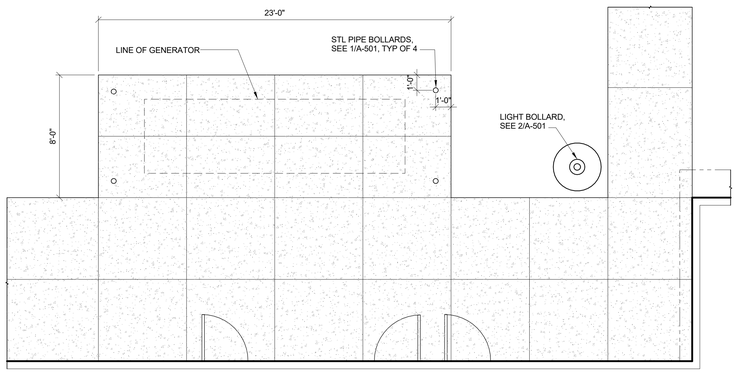
11 CURB RAMP DETAIL
1/4" = 1'-0"



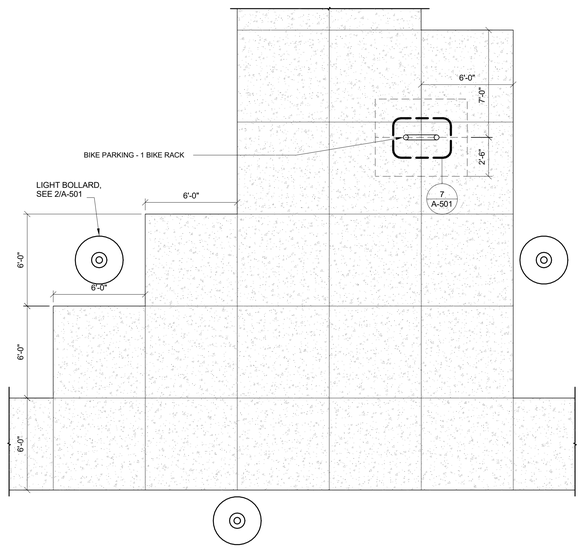
12 ROLLING GATE
1/8" = 1'-0"



13 2'-0" WIDE CONCRETE STRIP
1 1/2" = 1'-0"



14 GENERATOR PAD PLAN
1/4" = 1'-0"



15 BIKE STALL PLAN
1/4" = 1'-0"

16 ACCESSIBLE PARKING STALL
1/8" = 1'-0"

REGISTERED ARCHITECT
MICHAEL J. VEIT
SALEM, OREGON
EXPIRES: 12/31/17
STATE OF OREGON

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
SÄZÄN GROUP
220 mirabeau avenue
post office
97209
1.503.221.1474
kmarchitects.com
CONSULTING STRUCTURAL ENGINEERS
MSC
ENGINEERS, INC.
3430 SW BROOKS PLACE, NE SUITE 120
PORTLAND, OREGON 97239
PHONE: 503-227-1254
EMAIL: mscengr@mscengineers.com
kmd
architects+planners pc
CIVIL ENGINEERING SERVICES PROVIDED BY
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

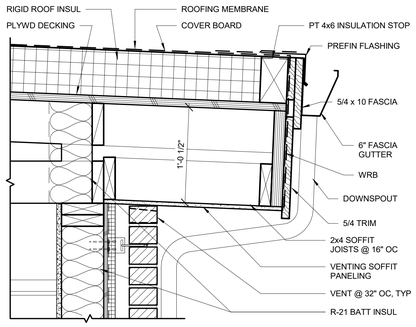
revisions:

date: 06/12/2017
project: 05416
drawn by: GG
checked by: Checker

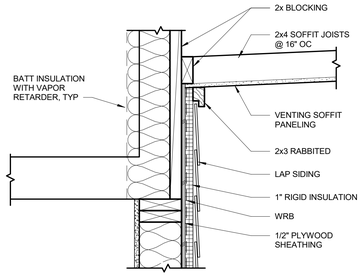
copyright © 2017
Carlson Veit Architects P.C.

SITE DETAILS

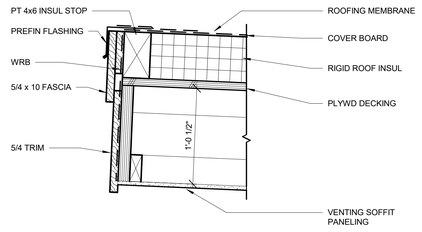
sheet:
A-501



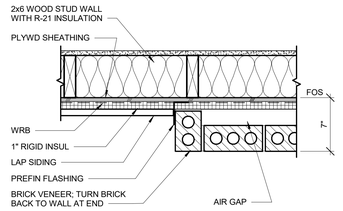
1 EAVE TO BRICK VENEER WALL
1 1/2" = 1'-0"



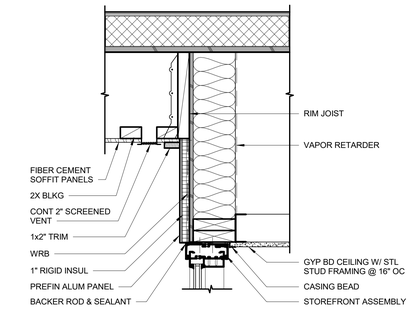
2 LAP SIDING WALL TO SOFFIT
1 1/2" = 1'-0"



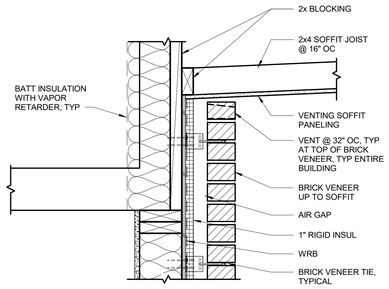
3 HIGH END ROOF EAVE
1 1/2" = 1'-0"



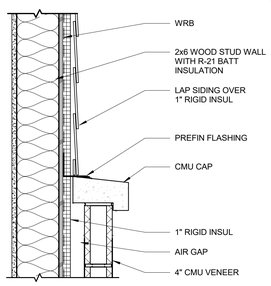
4 BRICK VENEER TO LAP SIDING
1 1/2" = 1'-0"



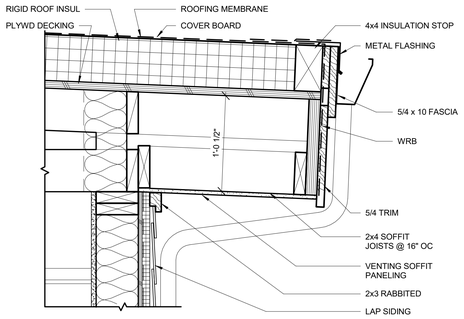
5 SOFFIT AT STOREFRONT ENTRY
1 1/2" = 1'-0"



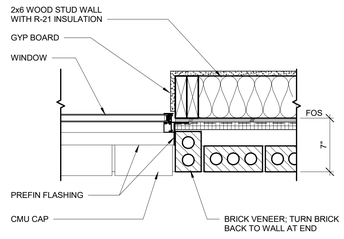
6 BRICK VENEER TO SOFFIT
1 1/2" = 1'-0"



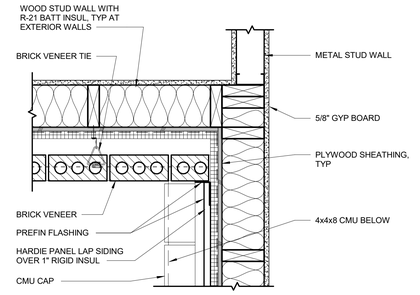
7 CMU WAINSCOT TO LAP SIDING
1 1/2" = 1'-0"



8 EAVE TO LAP SIDING WALL
1 1/2" = 1'-0"



9 BRICK EDGE AT WINDOW OPENING
1 1/2" = 1'-0"



10 SIDING TRANSITION AT INT CORNER
1 1/2" = 1'-0"

11 BRICK VENEER WALL BASE
1 1/2" = 1'-0"

12 CMU WALL BASE
1 1/2" = 1'-0"

13 LAP SIDING WALL BASE
1 1/2" = 1'-0"

14 BRICK VENEER TO CMU
1 1/2" = 1'-0"

15 ROOF TO WALL
1 1/2" = 1'-0"

16 PARAPET TO CANOPY
1 1/2" = 1'-0"

17 PARAPET BETWEEN ROOFS
1 1/2" = 1'-0"

18 TYPICAL PARAPET COPING
3" = 1'-0"

19 BRICK VENEER TO LAP SIDING - VERTICAL
1 1/2" = 1'-0"

20 CANOPY AT EAVE
1 1/2" = 1'-0"

21 CANOPY AT EAVE - S PATIO
1 1/2" = 1'-0"

22 CANOPY AT RAKE
1 1/2" = 1'-0"

23 ENTRY WALL DETAIL
1 1/2" = 1'-0"

REGISTERED ARCHITECT
MICHAEL J. JANSEN VEIT
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURES | MEP/FP | SPECIALTY
3431 TIPSOO PLACE NE SUITE 120
SALEM, OREGON 97305
PHONE: 503.399.1399 WEBSITE: www.msceng.com

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t.503.221.1474
kmdarchitects.com

Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

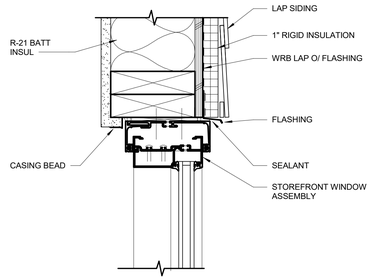
revisions:

date: 06/12/2017
project: 05416
drawn by: PK
checked by: MJ

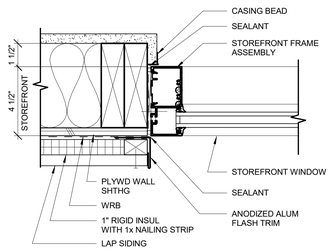
copyright © 2017
Carlson Veit Architects P.C.

EXTERIOR DETAILS

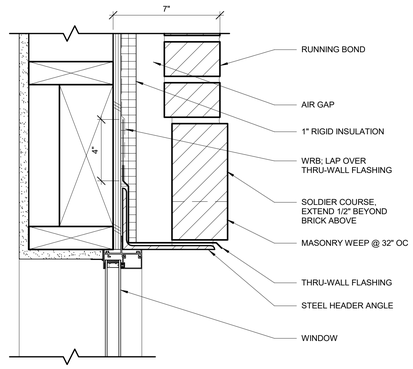
sheet:
A-502



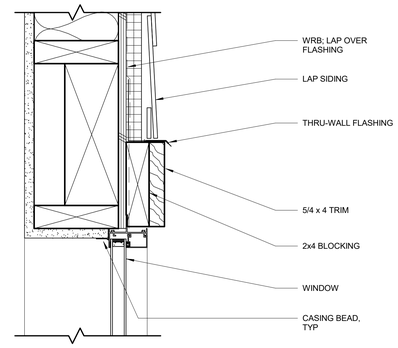
1 STOREFRONT HEAD
3" = 1'-0"



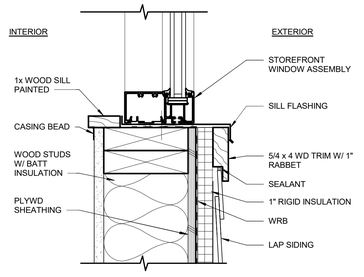
2 STOREFRONT JAMB
3" = 1'-0"



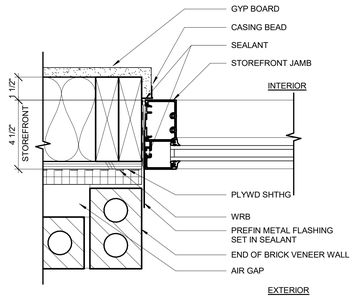
3 WINDOW HEAD AT BRICK VENEER
3" = 1'-0"



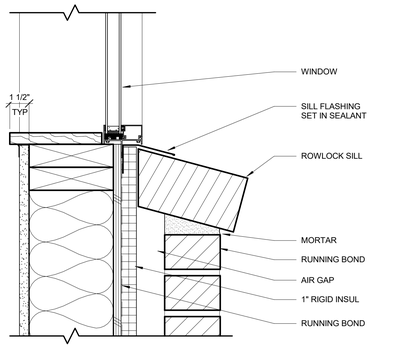
4 WINDOW HEAD AT LAP SIDING
3" = 1'-0"



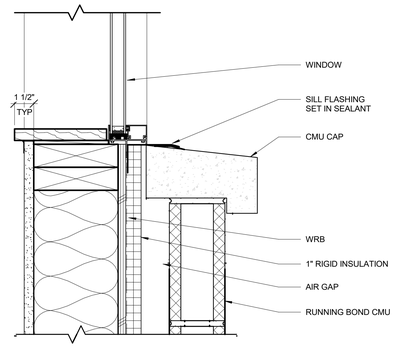
5 STOREFRONT SILL
3" = 1'-0"



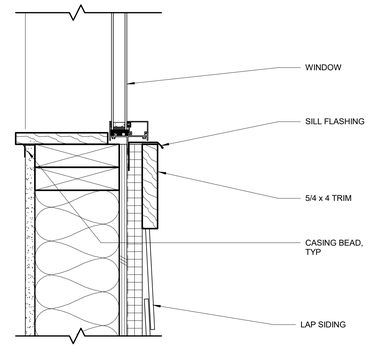
6 STORFRONT AT BRICK VENEER
3" = 1'-0"



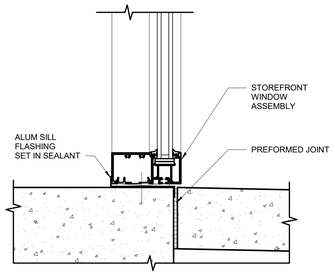
7 WINDOW SILL AT BRICK VENEER
3" = 1'-0"



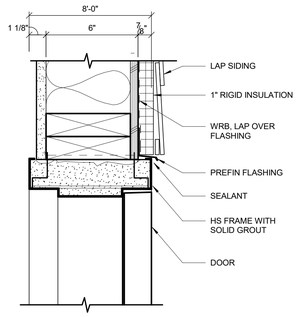
8 WINDOW SILL AT CMU WAINSCOT
3" = 1'-0"



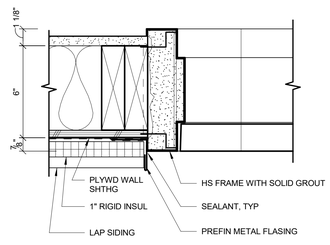
9 WINDOW SILL AT LAP SIDING
3" = 1'-0"



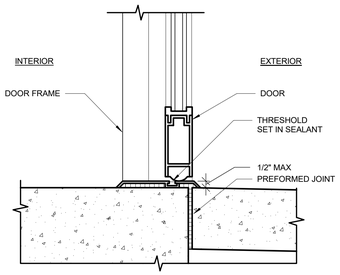
10 STOREFRONT SILL
3" = 1'-0"



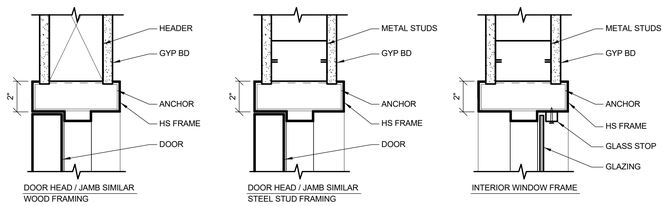
11 EXTERIOR DOOR HEAD
3" = 1'-0"



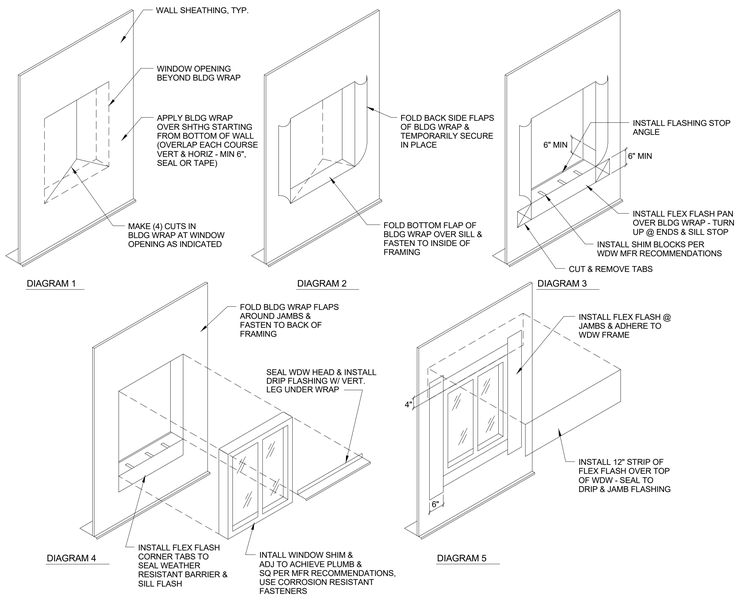
12 EXTERIOR DOOR JAMB
3" = 1'-0"



13 STOREFRONT DOOR SILL
3" = 1'-0"



14 HOLLOW STEEL FRAMES - INTERIOR
3" = 1'-0"



15 WINDOW FLASHING INSTALLATION
1/2" = 1'-0"

REGISTERED ARCHITECT
MICHAEL J. VEIT
EXPIRES: 12/31/18
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc
220 mc nabb avenue
portland, oregon
97209
t.503.221.1474
kmdarchitects.com

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURAL ENGINEERS, INC.
3431 TIBBETTS PLACE, NE SUITE 120
SALEM, OREGON 97305
PHONE/FAX: 503-399-1799
EMAIL: mscsalem@msceng.com

Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 ALMSVILLE HIGHWAY SE
SALEM, OREGON

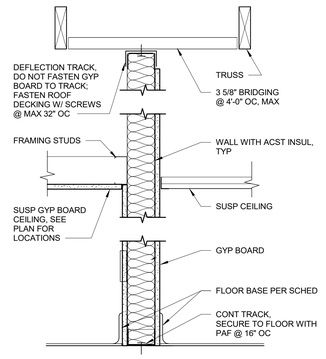
revisions:

date: 06/12/2017
project: 05416
drawn by: PK
checked by: MJ

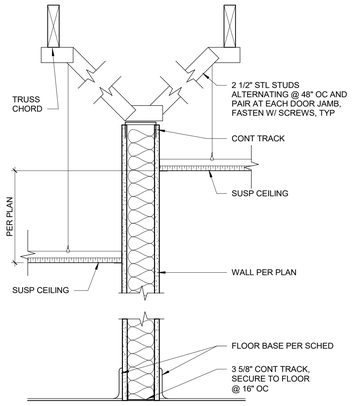
copyright © 2017
Carlson Veit Architects P.C.

DOOR & WINDOW DETAILS

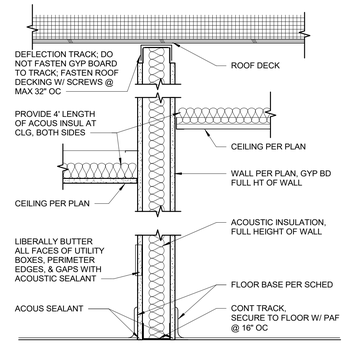
sheet: A-503



1 TYP WALL PERPENDICULAR TO TRUSS
1 1/2" = 1'-0"

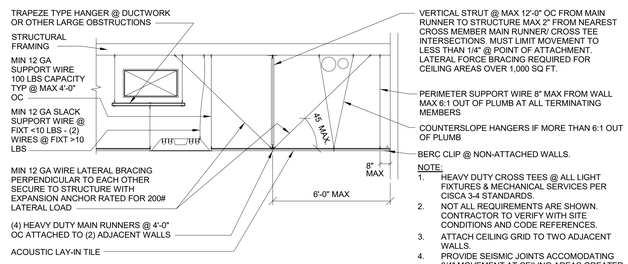


2 TYP BRACED WALL
1 1/2" = 1'-0"

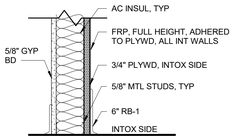


3 TYP AC WALL
1 1/2" = 1'-0"

CONSTRUCT SUSPENDED CEILINGS IN ACCORDANCE WITH NORTHWEST WALL & CEILING BUREAU - TECHNICAL BULLETIN 401.



4 SUSPENDED CEILING DETAIL
1/2" = 1'-0"



5 INTOX WALL DETAIL
1 1/2" = 1'-0"

6 ARMORY WALL SECTION
1 1/2" = 1'-0"

7 PARTITION WALL TRACK
1 1/2" = 1'-0"

8 SOFFIT AT LOCKERS
3/4" = 1'-0"

9 MONITOR MOUNT STUD WALL
3/4" = 1'-0"

REGISTERED ARCHITECT
MICHAEL J. JANSEN LANGE
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t.503.221.1474
kmdarch@kdcs.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
STRUCTURAL ENGINEERS, INC.
3431 SW SHERIDAN PLACE, NE SUITE 120
PORTLAND, OR 97239
PHONE/FAX: 503.227.1799
WEBSITE: www.msceng.com
Westech Engineering, Inc
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 ALMSVILLE HIGHWAY SE
SALEM, OREGON

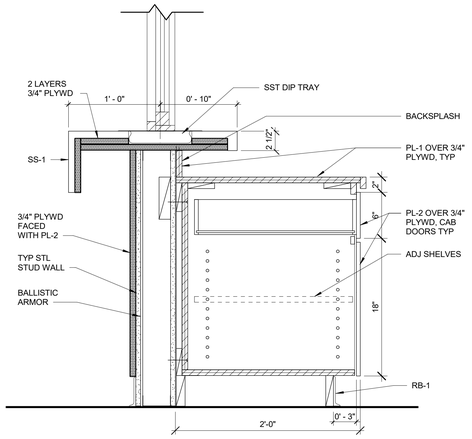
revisions:

date: 06/12/2017
project: 05416
drawn by: NB, PK
checked by: MJ

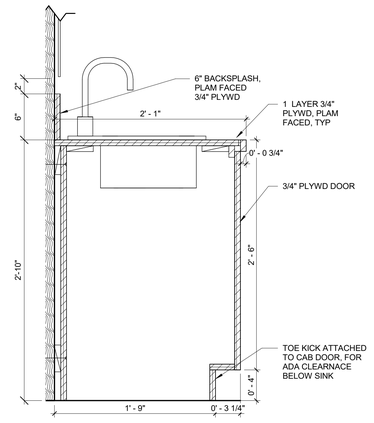
copyright © 2017
Carlson Veit Architects P.C.

INTERIOR DETAILS

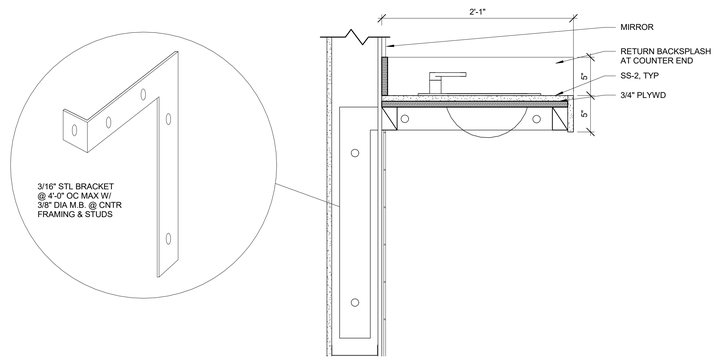
sheet:
A-504



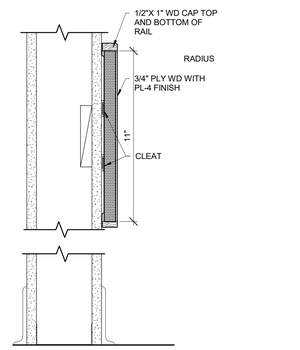
1 RECEPTION COUNTER
1 1/2" = 1'-0"



2 LACTATION ROOM
1 1/2" = 1'-0"

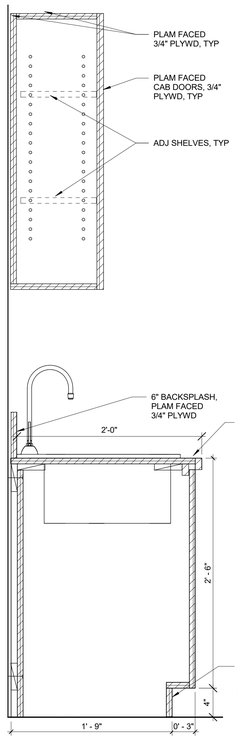


3 SINK DETAIL
1 1/2" = 1'-0"

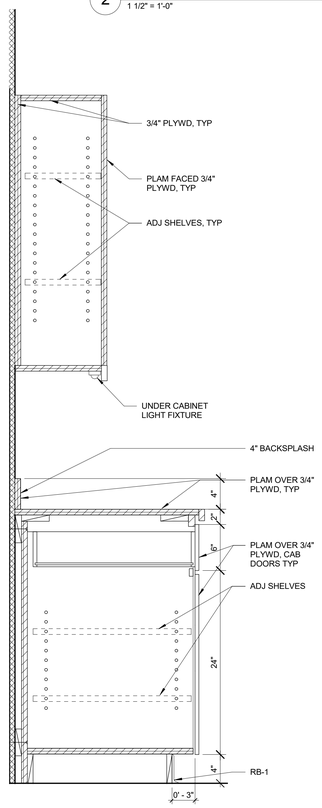


NOTE: DETAIL FOR REFERENCE ONLY. HOLSTER GAURD TO BE BUILT AND MOUNTED TO WALL BY OCE.

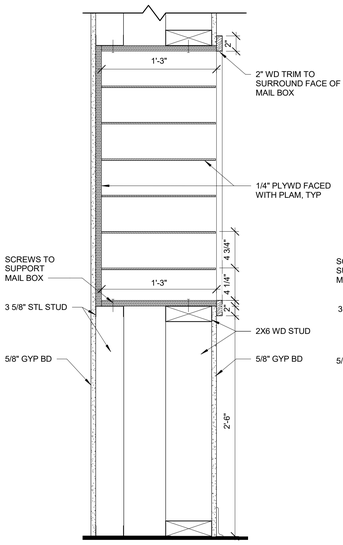
4 CHAIR RAIL (HOLSTER GUARD)
3" = 1'-0"



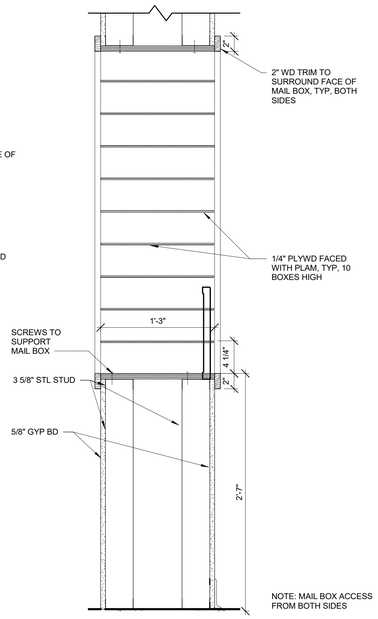
5 TYPICAL SINK CASEWORK
1 1/2" = 1'-0"



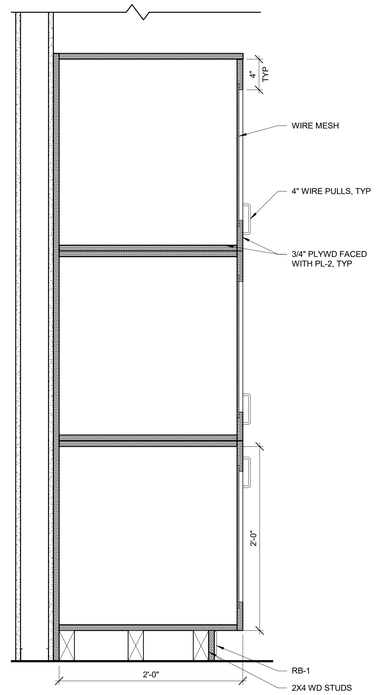
6 TYP WORK CASEWORK
1 1/2" = 1'-0"



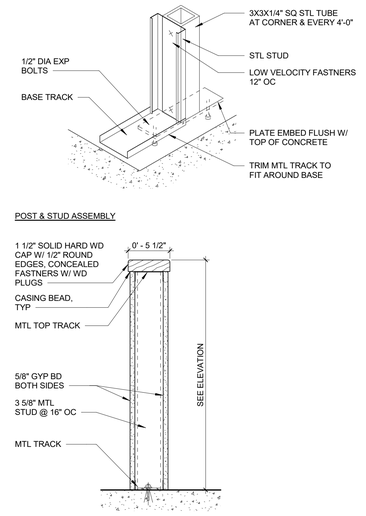
7 PPO MAILBOXES
1 1/2" = 1'-0"



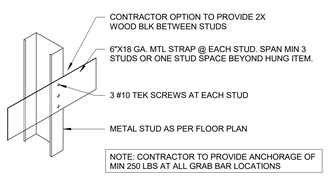
8 CDO MAIL BOXES
1 1/2" = 1'-0"



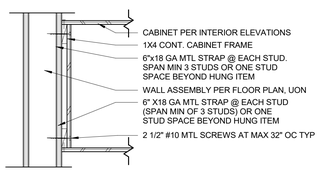
9 CUBBIE DETAIL
1 1/2" = 1'-0"



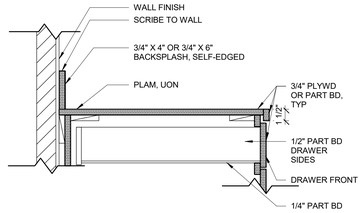
10 PARTIAL HEIGHT WALL
1 1/2" = 1'-0"



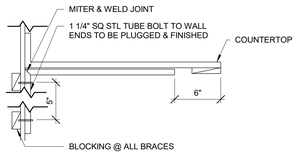
11 BACKING PLATE TYP AT CABINETRY
1 1/2" = 1'-0"



12 CABINET ANCHORAGE
1 1/2" = 1'-0"



13 COUNTERTOP DETAIL
1 1/2" = 1'-0"



14 TYPICAL BRACING
1 1/2" = 1'-0"

GENERAL NOTES

1. CASEWORK TO BE OFCI, CONTRACTOR TO COORDINATE OPENINGS IN CASEWORK AND COUNTERTOPS FOR PLUMBING, ELECTRICAL AND MECHANICAL. DETAILS FOR REFERENCE ONLY.

REGISTERED ARCHITECT
MICHAEL J. VEIT
EXPIRES: 12/31/17
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc — 220 nw eighth avenue portland, oregon 97209 — t 503.221.1474 — kmdarchitects.com
SÄZÄN GROUP — MSC CONSULTING STRUCTURAL ENGINEERS — ENGINEERS, INC. — 3431 SUNSET BLVD STE 120 STAYTON, OR 97383 — PHONE: 503.769.2349 — WEBSITE: www.msceng.com
Westech Engineering, Inc. CONSULTING ENGINEERS & PLANNERS — CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

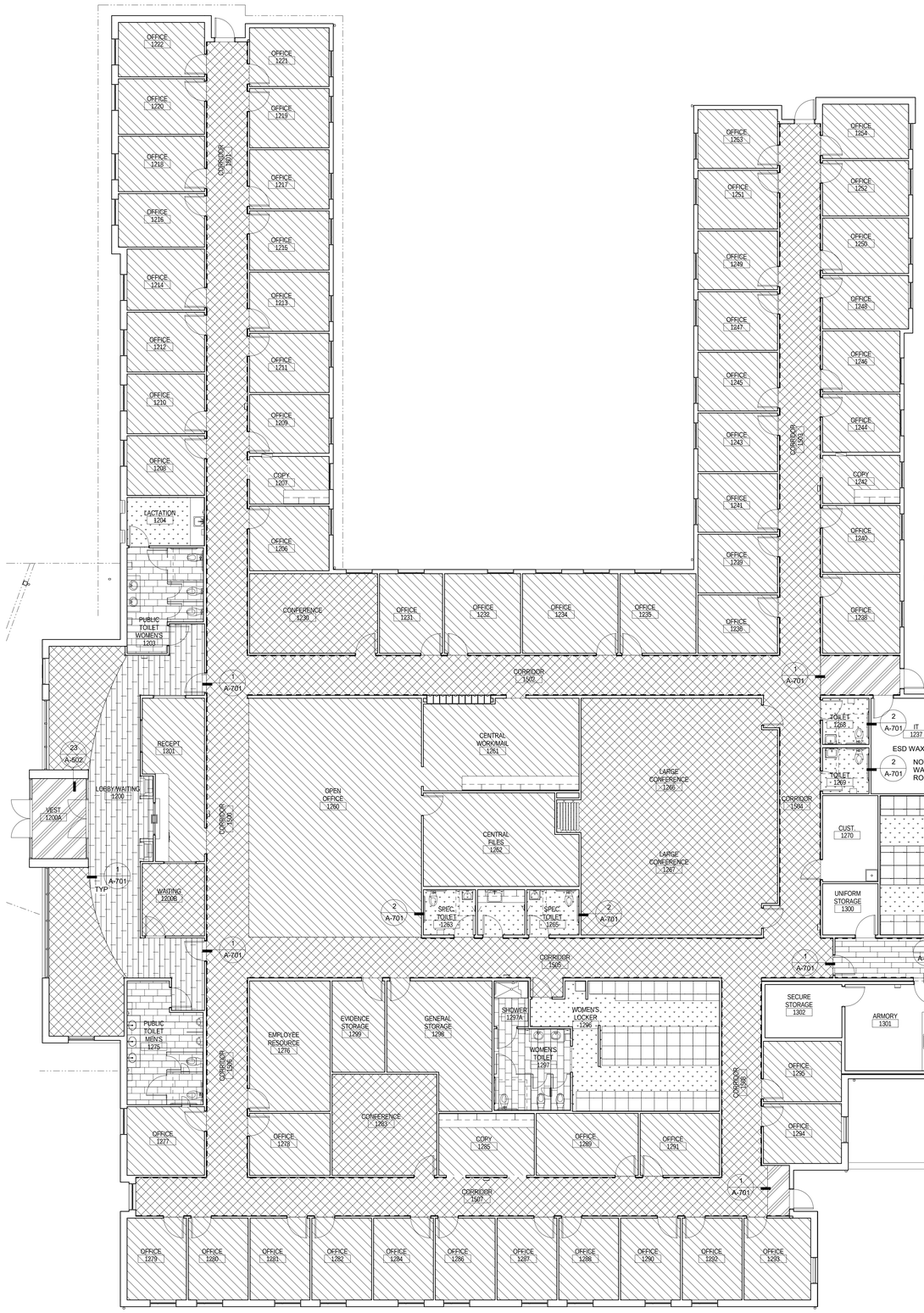
project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/2017
project: 05416
drawn by: NB
checked by: Checker
copyright © 2017 Carlson Veit Architects P.C.

INTERIOR DETAILS

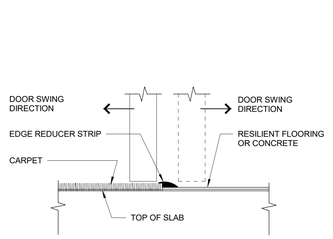
sheet: A-505



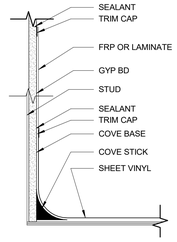
FINISH PLAN
1/8" = 1'-0"

FINISHES

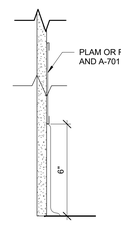
CODE	PRODUCT	MANUFACTURER	COLOR/ SIZE	NOTES/ LOCATION
PL-1	LAMINATE	ABET LAMINATI	649 GRAINWOOD	CASEWORK - VERITCAL SURFACES, GRAIN TO RUN VERTICAL
PL-2	LAMINATE	WILSONART	D91-60 SLATE GRAY	CASEWORK - HORIZONTAL SURFACES
PL-3	LAMINATE	ABET LAMINATI	130 LUCIDA	CASEWORK - VERITCAL SURFACES WHERE NOTED
PL-4	LAMINATE	WILSONART	4943-38 CLASSIC LINEN	CHAIR RAIL (HOLSTER GAURD) ONLY
SS-1	QUARTZ	CAMBRIA	TEMPLETON	RECEPTION COUNTER
SS-2	QUARTZ	CAESEAR STONE	4330 GINGER	RESTROOM COUNTERS
SST	STAINLESS STEEL			ARMORY, DEPUTY STG, NOTED ON ELEVATIONS
PT-1	PAINT	MILLER	0572 POWER LUNCH	FIELD COLOR EGGSHELL FINISH, CEILING COLOR FLAT FINISH
PT-2	PAINT	MILLER	0205 WOOD SHAWDOW	ACCENT COLOR, LOCATIONS NOTED ON A-702, EGGSHELL
PT-3	PAINT	MILLER	0415 FRENCH PEAR	ACCENT COLOR, LOCATIONS NOTED ON A-702, EGGSHELL
PT-4	PAINT	MILLER	0431 CLOVER PATCH	ACCENT COLOR, LOCATIONS NOTED ON A-702, EGGSHELL
PT-5	PAINT	MILLER	H0147A GROPIUS GRAY	DOOR FRAMES - HIGH GLOSS FINISH, ACCENT COLOR - EGGSHELL, LOCATIONS NOTED ON A-702
RB-1	RUBBER BASE	BURKE	BLACK BROWN 523	4" AT ALL CARPET & LVT, 6" AT SV AND SEALED CONCRETE LOCATIONS, UON.
CPT-1	CARPET TILE	SHAW	COLLIDE STILL 5T051 48505	18X36 BRICK INSTALLATION
CPT-2	CARPET TILE	SHAW	COLLIDE IGNITE 5T049 48505	18X36 BRICK INSTALLATION
WO	WALK -OFF MAT 1	MANNINGTON	RUFFIAN II	EBONY EARTH 1506, AREAS NOTED ON FINISH PLAN
WO2	WALK-OFF MAT 2	VANGELDER	FRONTRUNNER	GRID MATTING SYSTEM, 4' & 3' WIDTHS TO EQ 6' X 23', CORR 1509
LVT	INTERFACE	LEVELSET	A00207 WASHED WHEAT	25CM X 1M, ASHLAR INSTALLATION
PFT -1	PORCELAIN FLOOR TILE	DALTILE	SLATE ATTACHE SA09, MULTI GREEN	12X24, 33% RUNNING BOND, RESTROOMS, SEE A-401
PWT-1	PORCELAIN WALL TILE	DALTILE	MODERN DIMENSIONS K175	4.25X12.75, 33% RUNNING BOND, RESTROOMS WHERE NOTED
GRT	GROUT	LATICRETE	60 DUSTY GREY	RESTROOM FLOOR AND WALL TILE
ACP-1	ACOUSTIC PNLS	GILFORD OF MAINE	FR701 2100 PEARL 481	INTERVIEW ROOMS, UON
SV	SHEET VINYL	LONSEAL	LONECO 7233 LAVENDER TOPSEAL	SEE FINISH PLAN, RESTROOMS, LOCKER ROOMS, WET AREAS
SC	SEALED CONCRETE		CLEAR	SEE CONCRETE SPECIFICATION
TS-1	TRANSITION	SCHLUTER	STAINLESS STEEL DILEX	FLOOR TILE TO WALL TILE TRANSITION - RESTROOMS
TS-2	TRANSITION	SCHLUTER	STAINLESS STEEL RONDEC	WALL TILE TO GYP BD AT CORNERS - RESTROOMS
TS-3	TRANSITION	SCHLUTER	STAINLESS STEEL RENO-U	FLOOR TILE TO RESILIENT FLOORING
TP	TOILET PARITION	BOBRICK	SIERRA SERIES, FOREST GREEN SC04	RESTROOM TOILET PARITIONS
FRP	FIBER REINFORCED PLASTIC	MARLITE	P-151 LIGHT GRAY	INTOX AND RESTROOM 1330



1 FLOORING TRANSITION
3" = 1'-0"



2 COVE BASE DETAIL
3" = 1'-0"



3 RUBBER BASE DETAIL
3" = 1'-0"

MATERIAL LEGEND

- CARPET 1
- CARPET 2
- LVT
- TILE
- SHEET VINYL
- SEALED CONCRETE
- WALK-OFF MAT 1
- WALK-OFF MAT 2

CORNER GUARDS: SHOWN ON PLAN

NOTE 1: 3/4" PLY WD TO 8'-0" ALL WALLS

REGISTERED ARCHITECT — MICHAEL J. VEIT — SALEM, OREGON — STATE OF OREGON

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc — 220 nw eighth avenue, portland, oregon 97209 — 1.503.221.1474 — kmdarchitects.com
SÄZÄN GROUP — MSC CONSULTING STRUCTURAL ENGINEERS — 3431 SUNSWEEP DRIVE, SUITE 120, MEDFORD, OR 97504 — 541.779.7099 — WWW.SAZANGROUP.COM
Westech Engineering, Inc. — CIVIL ENGINEERING SERVICES PROVIDED BY — CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/2017
project: 05416
drawn by: NB
checked by: Checker

copyright © 2017
Carlson Veit Architects P.C.

FINISH PLAN

sheet: A-701

ROOM FINISH SCHEDULE

Room Number	Room Name	Floor Finish	Base Finish	Wall Finishes				Ceiling Finish	Comments
				North	East	South	West		
1200	LOBBY/WAITING	CPT-2/ LVT	RB-1	PT-1	PT-1	PT-3	PT-2	ACT/GYP PT-1	
1200A	VEST	WALK OFF	RB-1	PT-1		PT-1		GYP PT-1	
1200B	WAITING	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1201	RECEPT	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1203	PUBLIC TOILET WOMEN'S	PFT-1	COOR WALL TILE	PFT-1	PWT-1/PFT-1	PFT-1	PFWT-1/PFT-1	GYP PT-1	
1204	LACTATION	SV	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1206	OFFICE	CPT-1	RB1	PT-1	PT-1	PT-1	PT-1	ACT	
1207	COPY	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1208	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1209	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1210	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1211	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1212	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1213	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1214	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1215	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1216	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1217	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1218	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1219	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1220	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1221	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT1	ACT	
1222	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1230	CONFERENCE	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-3	ACT	
1231	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1232	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1234	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1235	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1236	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1237	IT	SC W/ ESD WAX FINISH	RB-1	PT-1	PT-1	PT-1	PT-1	OPEN ABOVE	3/4" FRT PLYWD TO 8'-0" HT ALL WALLS
1238	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1239	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1240	OFFICE	CPT-1	RB1	PT-1	PT-1	PT-1	PT-1	ACT	
1241	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1242	COPY	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1243	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1244	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1245	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1246	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1247	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1248	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1249	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1250	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1251	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1252	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1253	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1254	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1260	OPEN OFFICE	CPT-1	RB-1	PT-1	PT-3	PT-1	PT-1	ACT	
1261	CENTRAL WORK/MAIL	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1262	CENTRAL FILES	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1263	SPEC. TOILET	SV	COVE BASE	PT-1/PL-1	PT-1/PL-1	PT-1	PT-1	GYP PT-1	
1264	SPEC. HOLD	SV	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1265	SPEC. TOILET	SV	COVE BASE	PT-1/PL-1	PT-1	PT-1	PT-1/PL-1	GYP PT-1	
1266	LARGE CONFERENCE	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1267	LARGE CONFERENCE	CPT-2	RB-1	PT-1	PT-3	PT-1	PT-2	ACT	
1268	TOILET	SV	COVE BASE	PT-1	PT-1/PL-1	PT-1/PL-1	PT-1	GYP PT-1	
1269	TOILET	SV	COVE BASE	PT-1/PL-1	PT-1/PL-1	PT-1	PT-1	GYP PT-1	
1270	CUST.	SC	RB-1	PT-1	PT-1	PT-1	PT-1	OPEN ABOVE	
1275	PUBLIC TOILET MEN'S	PFT-1	COORD WALL TILE	PFT-1	PWT-1/PFT-1	PFT-1	PWT-1/PFT-1	GYP PT-1	
1276	EMPLOYEE RESOURCE	CPT-1	RB-1	PT-2	PT-1	PT-1	PT-1	ACT	
1277	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1278	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1279	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1280	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1281	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1282	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1283	CONFERENCE	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-3	ACT	
1284	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1285	COPY	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1286	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1287	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1288	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1289	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1290	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1291	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1292	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1293	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1294	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1295	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1296	WOMEN'S LOCKER	SV	COVE BASE	PT-1	PT-1	PT-1	PT-1	ACT	
1297	WOMEN'S TOILET	PFT-1	COOR WALL TILE	PWT-1/PFT-1	PFT-1	PWT-1/PFT-1	PFT-1	GYP PT-1	
1297A	SHOWER	PFT-1	PFT-1 6" BASE	SHOWER STALL	PT-1	PT-1	PT-1	GYP PT-1	
1298	GENERAL STORAGE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1299	EVIDENCE STORAGE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1300	UNIFORM STORAGE	SC	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1301	ARMORY	SC	RB-1	PT-1	PT-1	PT-1	PT-1	GYP PT-1	
1302	SECURE STORAGE	SC	RB-1	PT-1	PT-1	PT-1	PT-1	GYP PT-1	
1303	BREAK ROOM	LVT	RB-1	PT-1	PT-1	PT-3	PT-3	ACT	
1304	MEN'S LOCKERS	SV	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1304A	VEST	SV	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1304B	SHOWER	PFT-1	PFT-1 6" BASE	PT-1	PT-1	SHOWER STALL	PT-1	GYP	
1305	TOILET	PFT-1	COORD WALL TILE	PWT-1/PFT-1	PFT-1	PWT-1/PFT-1	PWT-1/PFT-1	GYP PT-1	
1306	VEST	WALKOFF	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1307	ICU WAITING	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-5	ACT	
1308	INTERVIEW VIEWING	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	SECURITY GYP PT-1	
1309	WORK	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-5	ACT	
1310	COPY	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1311	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1312	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1313	STORAGE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	SECURITY GYP PT-1	
1314	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1315	MULTIPURPOSE TEAM	CPT-2	RB-1	PT-2	PT-1	PT-3	PT-1	ACT	
1315A	STORAGE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	GYP	
1316	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1317	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1318	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1319	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1320	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1321	MULTIPURPOSE BRIEFING	CPT-2	RB-1	PT-2	PT-1	PT-3	PT-1	ACT	
1322	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1323	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1324	EVIDENCE	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1325	COMPUTER LAB	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1326	TOILET	SV	COVE BASE	PT-1	PT-1	PT-1/PL-1	PT-1/PL-1	GYP PT-1	
1327	LARGE DETECT	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1328	LARGE DETECT	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1329	TOILET	SV	COVE BASE	PT-1/PL-1	PT-1	PT-1	PT-1/PL-1	GYP PT-1	
1330	TOILET	SC	RB-1 6" BASE	PT-1/FRP	PT-1	PT-1	PT-1/FRP	SECURITY GYP PT-1	
1331	INTOX	SC	RB-1	PT-1	PT-1	PT-1	PT-1	SECURITY GYP PT-1	
1332	DEP STOR	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1333	SERG STOR	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1334	INTERVIEW	CPT-1	RB-1	PT-1, ACP-1 WALL PANELS	PT-1, ACP-1 WALL PANELS	PT-1, ACP-1 WALL PANELS	PT-1, ACP-1 WALL PANELS	SECURITY GYP PT-1	
1335	STORAGE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	GYP	
1336	INTERVIEW	CPT-1	RB-1	PT-1, ACP-1 WALL PANELS	PT-1, ACP-1 WALL PANELS	PT-1, ACP-1 WALL PANELS	PT-1, ACP-1 WALL PANELS	SECURITY GYP PT-1	
1337	INTERVIEW	CPT-1	RB-1	PT-1, ACP-1 WALL PANELS	PT-1, ACP-1 WALL PANELS	PT-1, ACP-1 WALL PANELS	PT-1, ACP-1 WALL PANELS	SECURITY GYP PT-1	
1338	TOILET	SV	COVE BASE	PT-1/PL-1	PT-1	PT-1	PT-1/PL-1	GYP PT-1	
1340	LARGE CONFERENCE	CPT-2	RB-1	PT-1	PT-3	PT-1	PT-1	ACT	
1341	SMALL CONF	CPT-2	RB-1	PT-3	PT-1	PT-1	PT-1	ACT	
1342	OFFICE	CPT-1	RB-1	PT1	PT-1	PT-1	PT-1	ACT	
1343	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1344	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	

ROOM FINISH SCHEDULE

Room Number	Room Name	Floor Finish	Base Finish	Wall Finishes				Ceiling Finish	Comments
				North	East	South	West		
1345	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1346	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1347	STORAGE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1348	OFFICE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1349	REPORT	LVT	RB-1	PT-1	PT-1	PT-1	PT-3	ACT	
1350	SERGEANTS	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT	
1351	ELECTRICAL	SC	RB-1	PT-1	PT-1	PT-1	PT-1	OPEN ABOVE	
1352	MECHANICAL	SC	RB-1	PT-1	PT-1	PT-1	PT-1	OPEN ABOVE	
1500	CORRIDOR	CPT-2	RB-1				PT-1	ACT	
1501	CORRIDOR	CPT-2	RB-1	PT-1	PT-2	PT-1	PT-1	ACT	
1502	CORRIDOR	CPT-2	RB-1	PT-1	PT-1	PT-2	PT-1	ACT	
1503	CORRIDOR	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-2	ACT	
1504	CORRIDOR	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-2	ACT	
1505	CORRIDOR	CPT-2	RB-1	PT-2	PT-1	PT-1	PT-1	GYP PT-1	
1506	CORRIDOR	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-2	ACT	
1507	CORRIDOR	CPT-2	RB-1	PT-2	PT-1	PT-1	PT-1	ACT	
1508	CORRIDOR	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-2	ACT	
1509	CORRIDOR	LVT/ SC/ WO2	RB-1	PT-2	PT-1	PT-1	PT-1	ACT/GYP PT-1	
1510	CORRIDOR	CPT-2	RB-1	PT-1	PT-2	PT-1	PT-1	ACT	
1511	CORRIDOR	CPT-2	RB-1	PT-1	PT-1	PT-2	PT-1	ACT	
1512	CORRIDOR	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-2	ACT	
1513	CORRIDOR	CPT-2	RB-1	PT-1	PT-1	PT-2	PT-2	ACT	

REGISTERED ARCHITECT
MICHAEL NEIL VEIT
EXPIRES: 12/31/2018
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc — 220 mirwaith avenue, portland, oregon 97209, 1.503.221.1474, kmdarchitects.com
SÄZÄN GROUP — MSC CONSULTING STRUCTURAL ENGINEERS — 3431 TIPSOO FLATS NE SUITE 120, SALEM, OREGON 97305, 503.399.1399, WEBSITE: www.sazangroupnw.com
Westech Engineering, Inc. — CONSULTING ENGINEERS & PLANNERS — CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/2017
project: 05416
drawn by: NB
checked by: Checker

copyright © 2017
Carlson Veit Architects P.C.

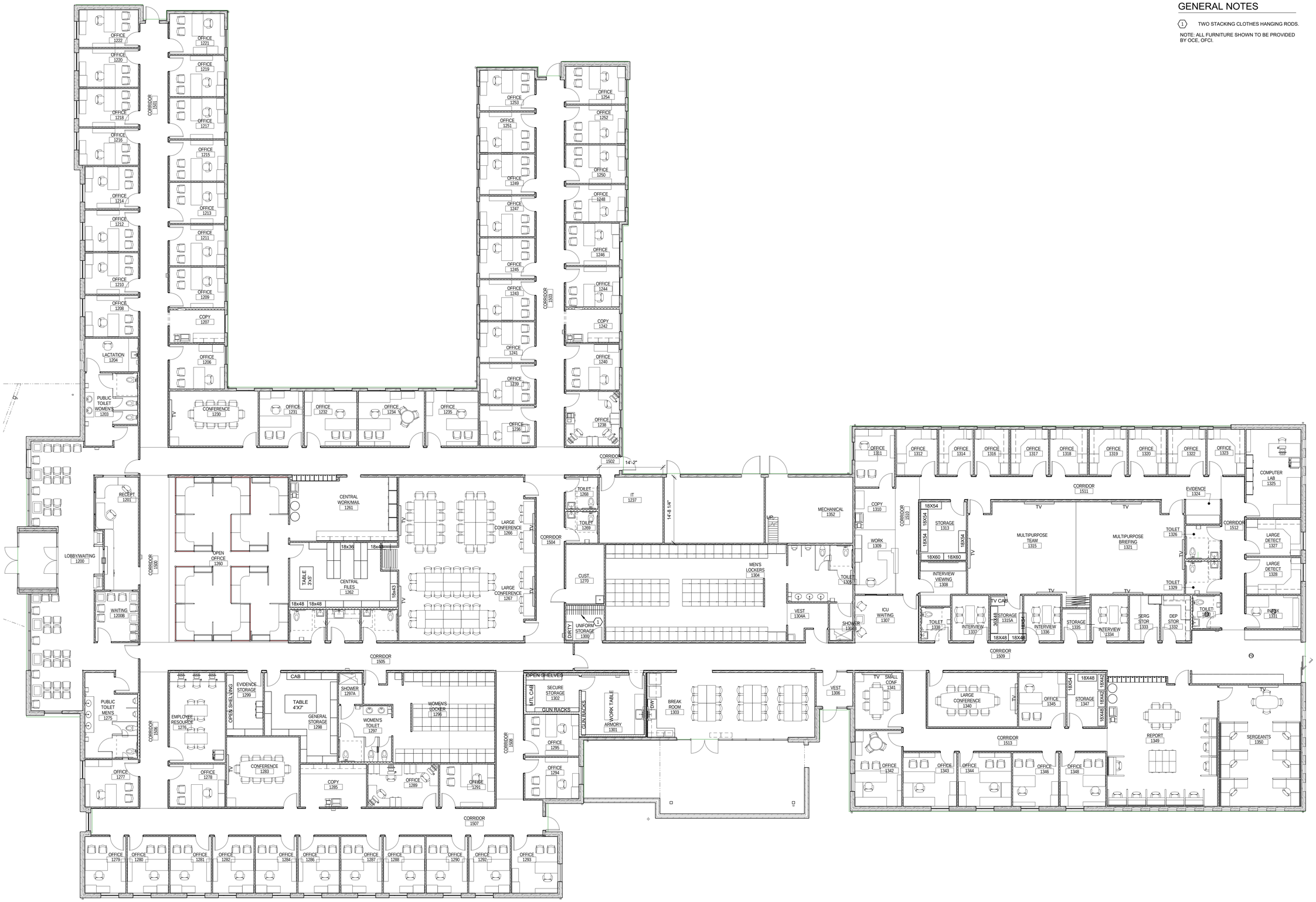
FINISH SCHEDULE

sheet:
A-702

GENERAL NOTES

1. TWO STACKING CLOTHES HANGING RODS.

NOTE: ALL FURNITURE SHOWN TO BE PROVIDED BY OCE, OFCI.



FURNITURE PLAN
1/8" = 1'-0"

REGISTERED ARCHITECT
MICHAEL J. VEIT
EXPIRES: 12/31/17
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

consultants:
kmd architects+planners pc — 220 nw eighth avenue, portland, oregon 97209, t 503.221.1474, kmdarchitects.com
SÄZÄN GROUP — MSC CONSULTING STRUCTURAL ENGINEERS — 3431 TIPSOO PLACE NE SUITE 120, SALEM, OR 97305, t 503.399.1799, www.sazangroupmsc.com
Westech Engineering, Inc. — CONSULTING ENGINEERS & PLANNERS — CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/2017
project: 05416
drawn by: NB
checked by: Checker

copyright © 2017
Carlson Veit Architects P.C.

FURNITURE PLAN

sheet: A-703

GENERAL NOTES

1. THE FULL SCOPE OF THE MECHANICAL WORK IS THE TOTAL OF WORK SHOWN ON THE PLANS AND CALLED FOR IN THE SPECIFICATIONS. IN CASE OF CONFLICT, THE SPECIFICATIONS SHALL GOVERN. PROVIDE A COMPLETE & FUNCTIONAL SYSTEM.
2. PERFORM ALL WORK IN ACCORDANCE WITH LOCAL CODES AND ORDINANCES. OBTAIN AND PAY FOR ALL REQUIRED PERMITS AND PAY FOR ALL FEES REQUIRED BY AUTHORITIES HAVING JURISDICTION. PAY ALL ROYALTIES OR FEES REQUIRED IN CONNECTION WITH THE USE OF PATENTED DEVICES AND SYSTEMS.
3. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR GENERAL CONSTRUCTION INCLUDING LOUVERS, CONCRETE EQUIPMENT PADS, FLASHING DETAILS, ETC. REFER TO ARCHITECTURAL DRAWINGS FOR ROOM ELEVATIONS, LOCATE MECHANICAL DEVICES SUCH AS TEMPERATURE SENSORS, HUMIDISTATS, PANELS, ETC. SO THAT THEY DO NOT CONFLICT WITH GENERAL CONSTRUCTION (WAINSCOT, DOOR HARDWARE, ETC.) NOR WITH ELECTRICAL SYSTEM (LIGHT SWITCHES, SPEAKERS, OUTLETS, ETC.).
4. COORDINATE WITH OTHER TRADES: A) REFER TO ELECTRICAL DRAWINGS FOR ELECTRICAL CHARACTERISTICS OF MECHANICAL EQUIPMENT (VOLTAGE, PHASE, HZ, ETC. B) PROVIDE ADEQUATE CLEARANCE OF MECHANICAL WORK FROM ELECTRICAL ITEMS. MAINTAIN MINIMUM ACCESS OF 6-INCHES ABOVE ELECTRICAL CABLE TRAYS AND 18-INCHES TO THE SIDE OF CABLE TRAYS.
5. ARRANGE EQUIPMENT SO THAT ACCESS CLEARANCES INDICATED BY DRAWINGS, REQUIRED BY CODES, OR RECOMMENDED BY MANUFACTURER ARE PROVIDED.
6. INSTALL MATERIALS AND SYSTEMS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND ACCEPTED SUBMITTALS. INSTALL MATERIAL IN PROPER RELATION TO ADJACENT CONSTRUCTION AND WITH UNIFORM APPEARANCE FOR EXPOSED WORK.
7. THOROUGHLY EXAMINE ALL AREAS WHERE EQUIPMENT, DUCTWORK, AND PIPING WILL BE INSTALLED AND REPORT ANY CONDITION THAT PREVENTS THE PROPER INSTALLATION OF THE MECHANICAL WORK.
8. COMPLY WITH WASHINGTON STATE ENERGY CODE SECTION C408.1.3 DOCUMENTATION REQUIREMENTS. INCLUDE THE DEVELOPMENT OF CONSTRUCTION AND AS-BUILT DRAWINGS, PROJECT MANUALS, AND SYSTEM BALANCING REPORTS.
9. PERTINENT TO SECTION C408.1.3 OF THE SAME CODE, THE HVAC CONTROL SYSTEM SHALL BE TESTED TO ENSURE THAT THE CONTROL DEVICES, EQUIPMENT AND SYSTEMS ARE CALIBRATED, ADJUSTED, AND OPERATE IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS. SEQUENCES OF OPERATION SHALL BE FUNCTIONALLY TESTED TO ENSURE THEY OPERATE IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS.
10. THE COMMISSIONING SPECIFICATION, INCLUDING ALL FUNCTIONAL TEST PROCEDURES, SHALL BE PROVIDED AND ENFORCED BY THE CONTRACTOR.
11. PROVIDE SEISMIC RESTRAINT IN ACCORDANCE WITH IBC AND ASCE STANDARD 7. SUBMIT CALCULATIONS BY LICENSED STRUCTURAL ENGINEER. PRODUCTS MAY CONFORM TO SMACNA SEISMIC RESTRAINT GUIDELINES.
12. PROVIDE A SINGLE SUBMITTAL OF ALL MECHANICAL EQUIPMENT AS SPECIFIED. AS A MINIMUM, SUBMIT PRODUCT DATA FOR ALL EQUIPMENT AND FIXTURES LISTED IN ACCOMPANYING SCHEDULES FOR APPROVAL.
13. USE EXPERIENCED INSTALLERS. DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
14. ARRANGEMENT OF SYSTEMS INDICATED ON THE DRAWINGS IS DIAGRAMMATIC, AND INDICATES THE MINIMUM REQUIREMENTS FOR PLUMBING AND MECHANICAL WORK. ADJUST BOX LOCATIONS, BASED ON FIELD MEASUREMENTS, TO AVOID INSTALLATION ABOVE DESKS. SITE CONDITIONS SHALL DETERMINE THE ACTUAL ARRANGEMENT OF THE WORK. TAKE FIELD MEASUREMENTS BEFORE PREPARING SHOP DRAWINGS, OBTAIN APPROVAL OF SHOP DRAWINGS BEFORE BEGINNING FABRICATION. BE RESPONSIBLE FOR ACCURACY OF DIMENSIONS AND LAYOUT. OVERHEAD PIPING AND DUCTWORK SHALL BE ARRANGED TO OBTAIN MAXIMUM HEAD ROOM. SHOP DRAWINGS SHALL BE STAMPED BY A LICENSED ENGINEER.
15. CLEAN AND PROTECT WORK FROM DAMAGE. RESTORE DAMAGED FINISHES. COVER ENDS OF PIPING AND DUCTWORK NOT ACTIVELY BEING WORKED ON.
16. MODIFY AND EXTEND EXISTING SERVICE TO ACCOMMODATE NEW WORK. RELOCATE EXISTING COMPONENTS AS REQUIRED FOR NEW SYSTEM. COORDINATE WITH BUILDING MANAGEMENT.
17. PROVIDE PRODUCTS OF ACCEPTABLE MANUFACTURERS, WHICH HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR THREE YEARS. DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
18. DO NOT CUT STRUCTURAL ELEMENTS WITHOUT PRIOR WRITTEN APPROVAL.
19. CONCEAL PIPING AND DUCTWORK TO THE GREATEST EXTENT PRACTICAL.
20. INSTRUCT OWNER IN PROPER OPERATION OF SYSTEMS.
21. DRAWINGS DO NOT SHOW ALL OFFSETS WHICH MAY BE REQUIRED. MAKE OFFSETS WITH FITTINGS WITH AS SMALL ANGLE OF OFFSET AS POSSIBLE; DO NOT USE TURNING VANES UNLESS SPECIFICALLY SHOWN. DUCTWORK & PIPING SHALL BE ROUTED TO AVOID ALL STRUCTURAL SUPPORTS, AND COORDINATE ALL WORK WITH WORK OF OTHER TRADES.
22. MATERIALS, METHODS, AND INSTALLATION SHALL COMPLY WITH THE PROVISIONS OF THE LATEST EDITION OF THE FOLLOWING CODES AS ADOPTED BY LOCAL JURISDICTION (CITY OF SALEM).

    OREGON STRUCTURAL SPECIALTY CODE (OSSC)
    OREGON MECHANICAL SPECIALTY CODE (OMSC)
    OREGON PLUMBING SPECIALTY CODE (OPSC)
    OREGON FIRE CODE (OFC)
    OREGON ENERGY EFFICIENCY SPECIALTY CODE (OEESC)

SHEETMETAL NOTES

1. PERFORM ALL SHEETMETAL WORK IN ACCORDANCE WITH CURRENT SMACNA STANDARDS.
2. DUCT SEALING SHALL MEET REQUIREMENTS LISTED IN CHAPTER 6 OF IMC AND WASHINGTON STATE ENERGY CODE. IN ADDITION, PROVIDE SEAL CLASS A FOR ALL DUCTWORK.
3. CONSTRUCT DUCTS WITH G-60 OR BETTER GALVANIZED STEEL (ASTM 527) LFQ, CHEM TREAT IN GENERAL.
4. CONSTRUCT RECTANGULAR DUCTWORK TO MEET ALL FUNCTIONAL CRITERIA DEFINED IN CHAPTER 11, OF THE SMACNA HVAC DUCT CONSTRUCTION STANDARDS. PROVIDE DIAGONAL CREASING OR BEADING ON ALL PANELS WIDER THAN 18-INCHES, AND PANELS LESS THAN 18 GAGE. CONSTRUCT ROUND AND FLAT OVAL DUCTWORK IN ACCORDANCE WITH CHAPTER 3 OF SMACNA HDCS.
5. DUCTMATE, METZ, OR W.D.C.I. DUCT CONNECTION SYSTEMS ARE ACCEPTABLE. DUCTS CONSTRUCTED USING THESE SYSTEMS WILL REFER TO THE MANUFACTURER'S GUIDELINES FOR SHEET GAGE, INTERMEDIATE REINFORCEMENT SIZE AND SPACING, AND JOINT REINFORCEMENTS.
6. PROVIDE COLLARS WHEREVER AN EXPOSED DUCT PASSES THROUGH A WALL, SLAB, OR CEILING--1-INCH WIDE, 18-GAGE ANGLE WITH MITERED CORNERS & SEAL WITH FIBERGLASS AND MASTIC.
7. SPIN-IN FITTINGS SHALL BE CONICAL TYPE WITH VOLUME DAMPER, AND QUADRANT; FLEX MASTER ELGEN OR EQUIVALENT.
8. ELBOWS IN RECTANGULAR OR SQUARE DUCTWORK SHALL HAVE AN INSIDE RADIUS EQUAL TO DIMENSION OF ELBOW IN THE PLANE OF THE TURN; OTHERWISE USE SQUARE ELBOWS WITH TURNING VANES.
9. ELBOWS IN ROUND DUCTWORK SHALL HAVE THE INSIDE RADIUS EQUAL TO DIMENSION OF ELBOW IN THE PLANE OF THE TURN. USE SEGMENTED, STANDING SEAM, PLEATED, OR STAMPED ELBOWS. ADJUSTABLE ELBOWS ARE ALLOWED IF RADIUS CONFORMS TO ABOVE.
10. SQUARE CORNER INSERTS (TURNING VANES) SHALL BE SMACNA FIG. 4.3 DOUBLE THICKNESS, RUNNER TYPE 2 WITH 2-1/8-INCH SPACING.
11. VOLUME DAMPERS ARE NOT SHOWN GENERALLY, INCLUDE A DAMPER IN THE DUCT TO EACH SUPPLY, EXHAUST, OR RETURN OPENING; ALSO IN EACH BRANCH DUCT WHERE THREE OR MORE OPENINGS ARE ASSOCIATED WITH THE BRANCH. LOCATE DAMPERS AT A POINT WHERE THE DUCT IS ACCESSIBLE AND AS FAR FROM THE OUTLET AS POSSIBLE. DO NOT PROVIDE VOLUME DAMPER ON SUPPLY DUCTWORK UPSTREAM OF TERMINAL UNITS. DAMPERS SHALL BE RUSKIN MD25 OR MDRS25.
12. THOROUGHLY CLEAN ALL DEBRIS FROM THE INSIDE OF ALL DUCTWORK AND PLENUMS. BLOW FREE ALL SMALL PARTICLES OF RUBBISH AND DUST.
13. MECHANICAL DRAWINGS SHOW APPROXIMATE LOCATIONS FOR GRILLES AND DIFFUSERS. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS AND ELEVATIONS FOR EXACT LOCATIONS. AFTER SHOP DRAWINGS ARE COMPLETED VERIFY EXACT LOCATION OF GRILLES AND DIFFUSERS IN THE FIELD. ENSURE THAT DIFFUSER AND GRILLE FRAMES MATCH CEILING TYPES AND FINISH PRIOR TO ORDERING.
14. CONNECT FLEXIBLE DUCTS TO METAL DUCTS WITH A SLIP JOINT MADE USING FIRE RESISTANT MASTIC AND CLAMP, IDEAL "SNAP-LOCK" OR VENTLOCK "SURETIGHT NO. 670" AT EACH END. SUPPORT IN ACCORDANCE WITH SMACNA 2005 HVAC DUCT CONSTRUCTION STANDARDS FIGURES 3-10 AND 3-11. DO NOT INSTALL WITH ABRUPT BENDS OR OFFSETS. MAXIMUM LENGTH 5-FEET. LOW PRESSURE INSULATED FLEXIBLE DUCT SHALL BE THERMAFLEX MK-E. HIGH PRESSURE INSULATED FLEXIBLE DUCT SHALL BE THERAMFLEX MK-C.

PIPING NOTES

1. SANITARY, WASTE, AND VENT PIPING (PLASTIC NOT ALLOWED) SHALL BE NO-HUB CAST IRON OR DWV COPPER.
2. HOT AND COLD WATER PIPING SHALL BE HARD DRAWN COPPER TUBING: TYPE L, ASSEMBLED WITH WROT COPPER FITTINGS AND LEAD-AND ANTIMONY-FREE SOLDER.
3. INSULATE ALL HOT AND COLD WATER PIPING WITH GLASS FIBER INSULATION WITH ALL SERVICE JACKET. USE HEAT BONDING TAPE TO CLOSE INSULATION, STAPLES AND PRESSURE TAPE ARE PROHIBITED.
4. PROVIDE ALL REQUIRED ACCESSORIES INCLUDING SHUT-OFFS AND CLEAN-OUTS. PROVIDE COMPONENTS WHICH PREVENT BACK-SIPHONAGE OR CROSS-CONNECTIONS. PROVIDE ISOLATION DEVICES TO REDUCE SOUND TRANSMISSION.
5. PROVIDE STOPS FOR EACH WATER CONNECTION TO EACH FIXTURE OR ITEM OF EQUIPMENT.
6. DISINFECT WATER DISTRIBUTION SYSTEM. FLUSH AND TEST ALL SYSTEMS FOR PROPER OPERATION. ADJUST SYSTEM TO PREVENT WATER HAMMER.
7. REFER TO PIPING DIAGRAMS AND DETAILS FOR REQUIRED FITTINGS, VALVES, ETC. FLOOR PLANS AND SECTIONS INDICATE EQUIPMENT LOCATIONS AND GENERAL PIPE ROUTING ONLY.

FIRE PROTECTION NOTES

1. MAKE FIELD MEASUREMENTS, COORDINATE WITH ALL OTHER WORK AND SHOW THE MODIFICATIONS REQUIRED ON SHOP DRAWINGS.
2. MODIFY FIRE PROTECTION SYSTEMS TO ALLOW INSTALLATION OF DUCTWORK, OTHER PIPING, AND ELECTRICAL WORK AS SHOWN ON APPROVED SHOP DRAWINGS. NEW ARRANGEMENT SHALL LOCATE PIPING AS HIGH AS POSSIBLE.
3. PROVIDE A COMPLETE FIRE SPRINKLER SYSTEM FOR THE ENTIRE PROJECT AREA.
4. FLOORS ARE CURRENTLY SERVED BY A COMPLETE AUTOMATIC SPRINKLER SYSTEM. PROVIDE NEW SPRINKLER HEADS, BRANCH PIPING TO SUIT NEW PARTITIONS & REQUIREMENTS OF FIRE DEPARTMENT. NEW HEADS SHALL BE LOCATED IN CENTER OF TILE.

ABBREVIATIONS

A	AIR, AMP
ACU	AIR CONDITIONING UNIT
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AL	ALUMINUM, ACOUSTICAL LINING
ARRGT	ARRANGEMENT
ATM	ATMOSPHERE
BC	BLOWER COIL
BDD	BACKDRAFT DAMPER
BFF	BELOW FINISHED FLOOR
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BLDG	BUILDING
BOB	BOTTOM OF BEAM
BOD	BOTTOM OF DUCT
BOS	BOTTOM OF STEEL
BTUH	BRITISH THERMAL UNITS PER HOUR
CAP	CAPACITY
CC	COOLING COIL
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CI	CAST IRON
CLG	CEILING, COOLING
CNTFGL	CENTRIFUGAL
CO	CLEANOUT
CONC	CONCRETE
COND	CONDENSATE
CONT	CONTINUE, CONTROL
COMP	COMPRESSOR
COP	COEFFICIENT OF PERFORMANCE
CP	CIRCULATING PUMP
CRU	CONDENSATE RETURN UNIT
CU	CONDENSING UNIT
CU FT	CUBIC FEET
CV	CONSTANT VOLUME
CVTR	CONVERTER
CW	COLD WATER
dB	DECIBELS
DB	DRY BULB
DCVA	DOUBLE CHECK VALVE ASSEMBLY
DEG	DEGREE
DF	DRINKING FOUNTAIN
DI	DE-IONIZED
DIA	DIAMETER
DMPR	DAMPER
DN	DOWN
DS	DOWNSPOUT
E	EXISTING
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EER	ENERGY EFFICIENCY RATING
EF	EXHAUST FAN
EFF	EFFICIENCY
EG	EXHAUST GRILLE
EL	ELEVATION
EQUIP	EQUIPMENT
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR, EXTERNAL
F	FAHRENHEIT, FIRE LINE
FD	FIRE DAMPER, FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FLA	FULL LOAD AMPS
FLR	FLOOR
FLTR	FILTER
FM	FLOW METER
FOB	FLAT ON BOTTOM
FO	FLAT OVAL
FOT	FLAT ON TOP
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FSD	FIRE SMOKE DAMPER
FT	FEET, FAN TERMINAL
FV	FACE VELOCITY
GA	GAGE
GAL	GALLONS
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
H	HUMIDIFIER, HEIGHT
HB	HOSE BIBB
HC	HEATING COIL
HD	HEAD
HEX	HEAT EXCHANGE
HOA	HAND-OFF-AUTOMATIC
HP	HORSEPOWER, HEAT PUMP
HTG	HEATING
HW	HOT WATER
HWC	HOT WATER CIRCULATING
HWP	HOT WATER PUMP
HWR	HOT WATER HEATING RETURN
HWS	HOT WATER HEATING SUPPLY
HZ	HERTZ
ID	INSIDE DIAMETER, INDIRECT DRAIN
IE	INVERT ELEVATION
IH	INTAKE HOOD
IN	INCH
INIT	INITIAL
INT	INTERIOR
IPLV	INTEGRATED PART LOAD VALUE
KW	KILOWATT
KWH	KILOWATT HOURS
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LB	POUND, LINEAR BAR
LBS	POUNDS
LD	LINEAR DIFFUSER
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MCA	MINIMUM CIRCUIT AMPACITY
MD	MANUAL DAMPER
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
MOCP	MAXIMUM OVER CURRENT PROTECTION
MOD	MOTOR OPERATED DAMPER
MTR	MOTOR
NC	NORMALLY CLOSED
NEG	NEGATIVE
NIC	NOT IN CONTRACT
NO	NUMBER, NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTDOOR AIR
OC	ON CENTER
OD	OUTSIDE DIAMETER
OPNG	OPENING
ORD	OVERFLOW ROOF DRAIN
P	PUMP, PLUMBING
PD	PRESSURE DROP
PH	PHASE
POC	POINT OF CONNECTION
POS	POSITIVE
PR	PUMPED RETURN
P/T	PRESSURE/TEMPERATURE
PVC	POLYVINYL CHLORIDE
QTY	QUANTITY
RA	RETURN AIR
RD	ROOF DRAIN
REF	REFERENCE
REQD	REQUIRED
RF	RETURN FAN
RG	RETURN GRILLE
RH	RELIEF HOOD, RELATIVE HUMIDITY
RPBFP	REDUCED PRESSURE BACKFLOW PREVENTER
RPM	REVOLUTIONS PER MINUTE
S	SOIL
SA	SUPPLY AIR
SD	STORM DRAIN, SMOKE DAMPER
SENS	SENSIBLE
SEER	SEASONAL ENERGY EFFICIENCY RATING
SF	SUPPLY FAN, SQUARE FEET
SG	SUPPLY GRILLE
SL	SOUNDLINING
SP	STATIC PRESSURE
SS	STAINLESS STEEL, SANITARY SEWER
T	THERMOSTAT
TEMP	TEMPERATURE
TG	TRANSFER GRILLE
TOD	TOP OF DUCT
TOT	TOTAL
TP	TRAP PRIMER, TOTAL PRESSURE
TSP	TOTAL STATIC PRESSURE
TU	TERMINAL UNIT
TYP	TYPICAL
UH	UNIT HEATER
UON	UNLESS OTHERWISE NOTED
V	VENT, VOLT
VA	VALVE
VAV	VARIABLE AIR VOLUME
VEL	VELOCITY
VFD	VARIABLE FREQUENCY DRIVE
VTR	VENT THROUGH ROOF
W	WASTE, WATER, WATT, WIDTH
WB	WET BULB
WG	WATER GAGE
WH	WATER HEATER, WALL HYDRANT
WTR	WATER

SYMBOLS LEGEND - GENERAL

SYMBOL	DESCRIPTION
#	DRAWING CONSTRUCTION ("FLAG") NOTE
X-XX	EQUIPMENT IDENTIFIER
	MATCHLINE
	REVISION CLOUD (ENCIRCLES DRAWING CHANGES MADE SINCE THE PREVIOUS RELEASE)
1	REVISION REFERENCE
	EXISTING TO BE REMOVED (HATCH)
	HEAVY LINEWEIGHT INDICATES NEW WORK
	LIGHT LINEWEIGHT INDICATES EXISTING INFORMATION
	POINT OF CONNECTION (POC) BETWEEN NEW AND EXISTING
	POINT OF CONNECTION
N	NORTH REFERENCE
X / XX.XX	DETAIL REFERENCE DETAIL IDENTIFICATION NUMBER SHEET WHERE DETAIL IS DRAWN
X / XX.XX	ELEVATION REFERENCE ELEVATION IDENTIFICATION NUMBER SHEET WHERE ELEVATION IS DRAWN
X / XX.XX	SECTION REFERENCE SECTION IDENTIFICATION NUMBER SHEET WHERE SECTION IS DRAWN

SYMBOLS LEGEND - PLUMBING

SYMBOL	DESCRIPTION
	BELOW GRADE SOIL OR WASTE
	SOIL OR WASTE ABOVE GRADE
	VENT
RL	RAIN LEADER
ORL	OVERFLOW RAIN LEADER
ID	INDIRECT DRAIN
	COLD WATER
	HOT WATER
	HOT WATER CIRCULATING
140°HW	140° POTABLE HOT WATER
120°HW	120° POTABLE HOT WATER
NP	NON-POTABLE WATER
F	FIRE
	NATURAL GAS
	REDUCER, CONCENTRIC
A	PIPE ANCHOR
	PIPE ALIGNMENT GUIDE
PS	PIPE SUPPORT
	EXPANSION JOINT IN PIPING
	FLEXIBLE CONNECTION IN PIPING
COTG	CLEANOUT TO GRADE
WCO	WALL CLEANOUT
CO	FLOOR CLEANOUT
HB	HOSE BIBB
AAV / MAV	AUTOMATIC AIR VENT, MANUAL AIR VENT
	FLOOR SINK
	FLOOR DRAIN
	CONTROL VALVE STATION
	THERMOMETER
	PRESSURE GAGE
P/T	PRESSURE/TEMPERATURE TEST PORT
	THERMOWELL
	AUTOMATIC CONTROL VALVE - TWO WAY (PNEUMATIC OPERATOR SHOWN)
	AUTOMATIC CONTROL VALVE - THREE WAY (ELECTRIC OPERATOR SHOWN)
	PRESSURE REGULATOR
	PRESSURE REDUCING REGULATOR
	ANGLE VALVE
	VALVE IN RISER
	WYE STRAINER, WYE STRAINER WITH CAPPED HOSE END BLOWDOWN VALVE
	GATE VALVE
	GLOBE VALVE
	BALL VALVE
	BUTTERFLY VALVE
	BALANCING OR PLUG VALVE
	NEEDLE VALVE
	PRESSURE REDUCING VALVE
	BALANCING/MEASURING VALVE
	RELIEF VALVE
	CHECK VALVE
	PIPE TURNING DOWN / AWAY
	PIPE TURNING UP / TOWARDS
	PIPE DOWN TEE, PIPE DOWN TEE / AWAY
	PIPE UP TEE / TOWARDS
	CAP
	PLUG
	UNION

REGISTERED PROFESSIONAL ENGINEER — OREGON — NOV. 10, 2015 — JOHN KOTAS — Expires: 6/30/17

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc — 220 nw eighth avenue, portland, oregon 97209, (503.227.1474), kmdarchitects.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
CIVIL ENGINEERING SERVICES PROVIDED BY Westech Engineering, Inc. CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016 Carlson Veit Architects P.C.

PLUMBING LEGEND, NOTES & ABBREVIATIONS

sheet: P0.01
of:

PLUMBING FIXTURE SCHEDULE

MARK	DESCRIPTION	ROUGH-IN CONNECTION IN					REMARKS
		W	V	CW	HW	TW	
FD-1	FLOOR DRAIN	3	1-1/2	--	--	--	ZURN MODEL #Z415B, CAST IRON BODY, 5" DIAMETER ADJUSTABLE NICKEL BRONZE STRAINER. PROVIDE WITH 1/2" TRAP PRIMER CONNECTION.
WH-1	HOSE BIBB - FREEZE PROOF	--	--	3/4	--	--	WOODFORD MODEL #67, AUTOMATIC DRAINING, ASSE 1052 APPROVED NIDEL MODEL #50HA HIGH FLOW DOUBLE CHECK BACKFLOW PREVENTER, 3/4" INLET AND OUTLET, HARDENED STAINLESS STEEL OPERATING STEM, ONE-PIECE VALVE PLUNGER TO CONTROL BOTH FLOW AND DRAIN FUNCTIONS, CHROME PLATED EXTERIOR FINISH, LOOSE TEE KEY TO BE FURNISHED WITH EACH HYDRANT. CONFIRM WALL THICKNESS.
L-1	LAVATORY, WALL MOUNTED	1-1/4	1-1/4	1/2	1/2	--	WALL HUNG, VITREOUS CHINA, ADA. T&S BRASS AND BRONZE WORKS B-2711 SINGLE LEVER FAUCET WITH TEMPERATURE LIMIT STOP
S-1	SINK	1-1/4*	1-1/4*	1/2	1/2	--	JUST SINKS MODEL #SLF-ADA-1613-A-GR, ADA COMPLIANT SINGLE COMPARTMENT – LEDGEBACK WITH INTEGRA-FLOW, SEAMLESS DIE-DRAWN CONSTRUCTION OF 18 GAUGE TYPE 304 STAINLESS STEEL. FULLY COATED UNDERSIDE, 6-1/2" DEEP STRAIGHT SIDED COMPARTMENT WITH 1-3/4" RADIUS CORNERS AND FRONT OVERFLOW, SELF-RIMMING TOP MOUNT WITH GRIP-RIM PLUS WITH STAINLESS STEEL MOUNTING CHANNELS, (3) HOLES ON 4" CENTERS, JUST SINKS MODEL #J-35-SSF DRAIN. ZURN MODEL #Z831A1-XL-P-3F, POLISHED CHROME-PLATED WIDESPREAD WITH ADJUSTABLE CENTERS, 3-1/2" CENTERLINE SWING GOOSENECK SPOUT, QUARTER TURN CERAMIC DISC CARTRIDGES, 0.5 GPM VANDAL-RESISTANT PRESSURE COMPENSATING FEMALE SPRAY OUTLET, 2-1/2" VANDAL-RESISTANT COLOR-CODED METAL LEVER HANDLES, MOUNTING HARDWARE AND 1/2" NPSM COUPLING NUTS FOR STANDARD LAVATORY RISERS, AND 1-1/4" POP-UP DRAIN.
WC-1	WATER CLOSET, FLOOR MOUNTED FLUSH VALVE TYPE	4	2	1-1/2"	--	--	FLOOR MOUNTED WATER CLOSET, MANUAL EXPOSED FLUSHOMETER, 1-1/2" TOP SPUD, SLOAN REGAL MODEL 110/111, 1.6 GALLONS PER FLUSH, CHROME PLATED
--	TRAP PRIMER	--	--	1/2	--	--	PRECISION PLUMBING PRODUCT MODEL P1-500, WILL PRIME 1-4 DRAINS USING DU-4/DU-U DISTRIBUTION SYSTEM.
--	WATER HAMMER ARRESTOR	--	--	--	--	--	ZURN WILKINS MODEL #1260XL, LEAD FREE WATER HAMMER ARRESTOR, CERTIFIED TO NSF/ANSI STANDARD 372, DEVICE SHALL BE PRE-CHARGED AND SEALED AT THE FACTORY. INSTALL PER PDI RECOMMENDATION.

REMARKS:
1. COORDINATE MOUNTING HEIGHTS AND HANDING WITH ARCHITECTURAL DRAWINGS AND FIELD CONDITIONS.
2. MANUFACTURER LISTED IS BASIS OF DESIGN. PROVIDE LISTED OR EQUAL APPROVED BY OWNER.

DOMESTIC HOT WATER CIRCULATOR (HWC) SCHEDULE

EQUIPMENT MARK	SERVICE	LOCATION	PUMP TYPE	BASIS OF DESIGN MANUFACTURER AND MODEL	TEMP (°F)	CAPACITY		SIZE (IN)		CONSTRUCTION		MOTOR					REMARKS
						GPM	TDH	SUCT	DISCH	BODY	FITTINGS	W	AMPS	VOLTS	PH	HZ	
HWC-01	WH-01	DECON/SCBA	IN-LINE	GRUNDFOS / ALPHA	140	3	12	1/2"	1/2"	CAST IRON	CAST IRON	45	0.65	115	1	60	1

1. COORDINATE WITH ELECTRICAL FOR POWER CONNECTION TYPE.

PLUMBING FIXTURE SCHEDULE

MARK	DESCRIPTION	ROUGH-IN CONNECTION IN					REMARKS
		W	V	CW	HW	TW	
FD-1	FLOOR DRAIN	3	1-1/2	--	--	--	ZURN MODEL #Z415B, CAST IRON BODY, 5" DIAMETER ADJUSTABLE NICKEL BRONZE STRAINER. PROVIDE WITH 1/2" TRAP PRIMER CONNECTION.
WH-1	HOSE BIBB - FREEZE PROOF	--	--	3/4	--	--	WOODFORD MODEL #67, AUTOMATIC DRAINING, ASSE 1052 APPROVED NIDEL MODEL #50HA HIGH FLOW DOUBLE CHECK BACKFLOW PREVENTER, 3/4" INLET AND OUTLET, HARDENED STAINLESS STEEL OPERATING STEM, ONE-PIECE VALVE PLUNGER TO CONTROL BOTH FLOW AND DRAIN FUNCTIONS, CHROME PLATED EXTERIOR FINISH, LOOSE TEE KEY TO BE FURNISHED WITH EACH HYDRANT. CONFIRM WALL THICKNESS.
L-1	LAVATORY, WALL MOUNTED	1-1/4	1-1/4	1/2	1/2	--	WALL HUNG, VITREOUS CHINA, ADA. T&S BRASS AND BRONZE WORKS B-2711 SINGLE LEVER FAUCET WITH TEMPERATURE LIMIT STOP
MS-1	MOP SINK	3	2	1/2	1/2	--	ZURN MODEL # Z5850-D3-RG, 28"X28" ENAMELED CAST IRON CORNER FLOOR SERVICE SINK, 8" HIGH FRONT CURB, LARGE FLAT BOTTOM WITH FLUTED CHANNELS FOR FAST DRAINAGE, INTEGRAL TILING BEAD, DRAIN WITH 3" IPS CONNECTION & REMOVABLE VINYL-COATED RIM GUARD, PROVIDE HOSE AND HOSE BRACKET, AND MOP HANGER, ZURN MODEL#Z841M1, AQUASPEC POLISHED CHROME-PLATED CAST BRASS SERVICE SINK FAUCET WITH QUARTER TURN CERAMIC DISC CARTRIDGES, ADJUSTABLE 2-1/2" LONG SWIVEL INLETS WITH INTEGRAL STOPS, CAST BRASS VACUUM BREAKER SPOUT, 3/4" HOSE THREADED OUTLET, 2-1/2" VANDAL RESISTANT COLOR-CODED BRASS LEVEL HANDLES, PAIL HOOK, & WALL BRACE.
S-1	SINK	1-1/4*	1-1/4*	1/2	1/2	--	JUST SINKS MODEL #SLF-ADA-1613-A-GR, ADA COMPLIANT SINGLE COMPARTMENT – LEDGEBACK WITH INTEGRA-FLOW, SEAMLESS DIE-DRAWN CONSTRUCTION OF 18 GAUGE TYPE 304 STAINLESS STEEL. FULLY COATED UNDERSIDE, 6-1/2" DEEP STRAIGHT SIDED COMPARTMENT WITH 1-3/4" RADIUS CORNERS AND FRONT OVERFLOW, SELF-RIMMING TOP MOUNT WITH GRIP-RIM PLUS WITH STAINLESS STEEL MOUNTING CHANNELS, (3) HOLES ON 4" CENTERS, JUST SINKS MODEL #J-35-SSF DRAIN. ZURN MODEL #Z831A1-XL-P-3F, POLISHED CHROME-PLATED WIDESPREAD WITH ADJUSTABLE CENTERS, 3-1/2" CENTERLINE SWING GOOSENECK SPOUT, QUARTER TURN CERAMIC DISC CARTRIDGES, 0.5 GPM VANDAL-RESISTANT PRESSURE COMPENSATING FEMALE SPRAY OUTLET, 2-1/2" VANDAL-RESISTANT COLOR-CODED METAL LEVER HANDLES, MOUNTING HARDWARE AND 1/2" NPSM COUPLING NUTS FOR STANDARD LAVATORY RISERS, AND 1-1/4" POP-UP DRAIN.
SH-1	SHOWER	1-1/4*	1-1/4*	1/2	1/2	--	FIBERFAB SIZE 60 X 37 IBER REINFORCED COMPOSITE CONSTRUCTION WITH GEL COAT SEAL, SHOWER ENCLOSURE, WITH ALL REQUIRED STAINLESS STEEL GRAB RAILS AND FOLD DOWN PHENOLIC SEAT. ADA COMPLIANT. ZURN Z7300 TEMP GUARD SINGLE HANDLE SHOWER VALVE WITH CERAMIC CONTROL CARTRIDGE. ZURN Z7000-HW HAND WALL SHOWER WITH SUPPLY ELBOW AND FLANGE, WITH 69" METAL HOSE AND 48" SLIDE BAR. FLOOR DRAIN GRID.
WC-1	WATER CLOSET, FLOOR MOUNTED FLUSH VALVE TYPE	4	2	1-1/2"	--	--	ZURN MODEL #Z5665-BWL, HET ELONGATED FLOOR MOUNTED ECOVANTAGE® FLUSH VALVE TOILET SYSTEM, ECOVANTAGE HIGH EFFICIENCY TOILET SYSTEM, VITREOUS CHINA, 1.6 GPF, ADA COMPLIANT, FLOOR MOUNTED, BOTTOM OUTLET TOILET WITH SIPHON JET FLUSHING ACTION AND ELONGATED FRONT RIM WITH 1-1/2" TOP SPUD, ZURN MODEL #Z5972-COMB CLOSET BOLT & WAX RING KIT, ZURN MODEL #Z5955SS-EL ELONGATED, STANDARD WHITE, OPEN FRONT TOILET SEAT, LESS COVER, WITH STAINLESS STEEL CHECK HINGE. SLOAN REGAL MODEL 110/111, 1.6 GALLONS PER FLUSH, CHROME PLATED, ADA COMPLIANT, ADJUSTABLE TAIL-PIECE, SPUD COUPLING AND FLANGE FOR TOP SPUD CONNECTION. VANDAL RESISTANT STOP CAP.
WC-2	WATER CLOSET, FLOOR MOUNTED FLUSH VALVE TYPE - ADA	4	2	1-1/2"	--	--	AS WC-1, EXCEPT INSTALLED TO BE ADA COMPLIANT.
--	TRAP PRIMER	--	--	1/2	--	--	PRECISION PLUMBING PRODUCT MODEL P1-500, WILL PRIME 1-4 DRAINS USING DU-4/DU-U DISTRIBUTION SYSTEM
--	WATER HAMMER ARRESTOR	--	--	--	--	--	ZURN WILKINS MODEL #1260XL, LEAD FREE WATER HAMMER ARRESTOR, CERTIFIED TO NSF/ANSI STANDARD 372, DEVICE SHALL BE PRE-CHARGED AND SEALED AT THE FACTORY. INSTALL PER PDI RECOMMENDATION.

REMARKS:
1. COORDINATE MOUNTING HEIGHTS AND HANDING WITH ARCHITECTURAL DRAWINGS AND FIELD CONDITIONS.
2. MANUFACTURER LISTED IS BASIS OF DESIGN. PROVIDE LISTED OR EQUAL APPROVED BY OWNER.

GAS WATER HEATER SCHEDULE

EQUIP. NO	LOCATION	SERVICE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN MODEL NUMBER	TANK DESCRIPTION	GAS TYPE NATURAL / PROPANE	VOLUME GALLONS	INPUT MBH	TEMP RISE DEG F	RECOVERY RATE GPH	LWT DEG F	GAS CONNECTION SIZE IN	FLUE DIAMETER IN	ELECTRICAL		DIMENSIONS DIAXHEIGHT IN	THERMAL EFFICIENCY	SHIPPING WEIGHT LBS	OPERATING WEIGHT LBS	REMARKS
														FLA	V/PH/HZ					
GWH-01, GWH-02	MECHANICAL ROOM	DOMESTIC HOT WATER	AO SMITH	BTH-199A	VERTICAL GLASS LINED	NATURAL GAS	100	199	100	783	140	3/4	4	5	120/1/60	28X75.5	96%	523	1,356	1,2

REMARKS:
1. PROVIDE CONCENTRIC VENT KIT
2. PROVIDE CONDENSATE NEUTRALIZER

TANK SCHEDULE

EQUIP. NO	LOCATION	SERVICE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN MODEL NUMBER	TYPE	MIN VOLUME GAL	MAX OPERATING PRESSURE PSIG	RELIEF VALVE SETTING PSIG	SYSTEM TEMPERATURE RANGE		INLET PIPE SIZE IN NPT	OUTLET PIPE SIZE NPT	DIA IN	HEIGHT IN	SHIPPING WEIGHT LBS	OPERATING WEIGHT LBS	REMARKS
									MIN DEG F	MAX DEG F							
ET-01	MECHANICAL ROOM	POTABLE WATER	WESSELS	TXA-85	BUTYL BLADDER	23	150	125	40	140	1	--	16	37	90	282	1

1. VERTICAL, PRE-CHARGED, FULL-ACCEPTANCE, CARBON STEEL 150# ASME VESSEL, STAINLESS STEEL 1" SYSTEM CONNECTION, AND HEAVY-DUTY, FDA APPROVED, REPLACEABLE BUTYL BLADDER.

SÄZÄN GROUP

FIXTURE UNIT CALCS

Project: Marion County PPO/CDO
Project No: 498-1606
Prepared by: JMK
Date:

FIXTURE	QTY.	CW FU		HW FU		DWV FU	
		EACH	TOTAL	EACH	TOTAL	EACH	TOTAL
BATHRUB OR COMBINATION BATH/SHOWER (FILL)	0	4.0	0.0	3.0	0	2.0	0
3/4" BATHTUB FILL VALVE	0	10.0	0.0	7.5	0	2.0	0
BIDET (1-1/2")	0	1.0	0.0	0.8	0	2.0	0
CLOTHES WASHER[4]	0	4.0	0.0	3.0	0	3.0	0
DENTAL UNIT, CUSPIDOR	0	1.0	0.0	--	--	1.0	0
DISHWASHER, DOMESTIC	1	1.5	1.5	1.1	1.125	2.0	2
DRINKING FOUNTAIN, WATER COOLER	0	0.5	0.0	--	--	0.5	0
DRINKING FOUNTAIN, WATER COOLER (ASSEMBMLY)	0	0.75	0.00	--	--	0.5	0
FOOD WASTE GRINDER, COMMERCIAL	0	--	--	--	--	3.0	0
FLOOR DRAIN, EMERGENCY	0	--	--	--	--	0.0	0
FLOOR DRAIN (2")	0	--	--	--	--	2.0	0
FLOOR DRAIN (3")	3	--	--	--	--	3.0	9
HOSE BIBB	1	2.5	2.5	--	--	--	0
Hose Bibb - ADDITIONAL[2]	6	1.0	6.0	--	--	--	0
INDIRECT WASTE DRAIN	1	--	--	--	--	0.0	0
LAVATORY	15	1.0	15.0	0.8	11.25	1.0	15
LAWN SPRINKLER, EACH HEAD[5]	0	1.0	0.0	--	--	--	0
MOBILE HOME, EACH (MINIMUM)	0	12.0	0.0	9.0	0	12.0	0
BAR SINK, PRIVATE	0	1.0	0.0	0.8	0	1.0	0
BAR SINK, PUBLIC	0	2.0	0.0	1.5	0	2.0	0
CLINIC FAUCET SINK	0	3.0	0.0	2.3	0	6.0	0
CLINIC SINK - FLUSHMETER VALVE	0	8.0	0.0	6.0	0	6.0	0
KITCHEN SINK - DOMESTIC W OR W/O DISHWASHER	4	1.5	6.0	1.1	4.5	2.0	8
LAUNDRY SINK	0	1.5	0.0	1.1	0	2.0	0
SERVICE SINK OR MOP BASIN, PRIVATE	0	1.5	0.0	1.1	0	3.0	0
SERVICE SINK OR MOP BASIN, PUBLIC	0	3.0	0.0	2.3	0	3.0	0
WASHUP SINKS, EACH SET OF FAUCETS	0	2.0	0.0	1.5	0	2.0	0
SHOWERS, PER HEAD	2	2.0	4.0	1.5	3	2.0	4
SHOWERS, , MULTIHEAD, EACH ADDITIONAL	0	2.0	0.0	1.5	0	1.0	0
URINAL - FLUSHOMETER VALVE (1.0 GPF)[3]	0	--	0	--	--	2.0	0
URINAL - FLUSHOMETER VALVE (1.0 GPF) (ASSEMBLY)[3]	0	--	0	--	--	5.0	0
URINAL - FLUSHOMETER VALVE (>1.0 GPF)[3]	2	--	0	--	--	2.0	4
URINAL - FLUSHOMETER VALVE (>1.0 GPF) (ASSEMBLY)[3]	0	--	0	--	--	6.0	0
URINAL - FLUSH TANK	0	2.0	0.0	--	--	2.0	0
URINAL - FLUSH TANK (ASSEMBLY)	0	3.0	0.0	--	--	5.0	0
WASH FOUNTAIN, CIRCULAR SPRAY	0	4.0	0.0	--	--	3.0	0
WATER CLOSET - GRAVITY TANK (1.6 GPF) (PRIVATE)	0	2.5	0.0	--	--	3.0	0
WATER CLOSET - GRAVITY TANK (1.6 GPF) (PUBLIC)	0	2.5	0.0	--	--	4.0	0
WATER CLOSET - GRAVITY TANK (1.6 GPF) (ASSEMBLY)	0	3.5	0.0	--	--	6.0	0
WATER CLOSET - FLUSHOMETER TANK (1.6 GPF) (Private)	0	2.5	0.0	--	--	3.0	0
WATER CLOSET - FLUSHOMETER TANK (1.6 GPF) (Public)	0	2.5	0.0	--	--	4.0	0
WATER CLOSET - FLUSHOMETER TANK (1.6 GPF) (ASSEMBLY)	0	3.5	0.0	--	--	6.0	0
WATER CLOSET - FLUSHOMETER VALVE (1.6 GPF) (Private)[3]	16	--	0	--	--	3.0	48
WATER CLOSET - FLUSHOMETER VALVE (1.6 GPF)(Public)[3]	0	--	0	--	--	4.0	0
WATER CLOSET - FLUSHOMETER VALVE (1.6 GPF)(ASSEMBLY)[3]	0	--	0	--	--	6.0	0
WATER CLOSET - GRAVITY TANK (>1.6 GPF) (Private)	0	3.0	0.0	--	--	4.0	0
WATER CLOSET - GRAVITY TANK (>1.6 GPF) (Public)	0	5.5	0.0	--	--	6.0	0
WATER CLOSET - GRAVITY TANK (>1.6 GPF) (ASSEMBLY)	0	7.0	0.0	--	--	8.0	0
WATER CLOSET - FLUSHOMETER VALVE (>1.6 GPF) (Private)[3]	0	--	0	--	--	4.0	0
WATER CLOSET - FLUSHOMETER VALVE (>1.6 GPF) (Public)[3]	0	--	0	--	--	6.0	0
WATER CLOSET - FLUSHOMETER VALVE (>1.6 GPF) (ASSEMBLY)[3]	0	--	0	--	--	8.0	0

CW GPM=	53
HW GPM=	44.3
CW WSFU	35
HW FU	19.875
DWV:	90

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

REGISTERED PROFESSIONAL ENGINEER
#26670PE
OREGON
NOV. 10, 2015
JOHN KOTAS
Expires: 6/30/17

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
(503.221.1474
fax (503.221.1478
www.kmdarchitects.com

Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

PLUMBING SCHEDULES

sheet:
P0.02
of:



GENERAL NOTES

1. NOTE 1 HERE.
2. NOTE 2 HERE.

FLAG NOTES

1. EXTEND STORM PIPE 5' BEYOND FOOTPRINT OF BUILDING. REFER TO CIVIL DRAWINGS FOR CONTINUATION.

PARTIAL FLOOR PLAN - AREA A - PLUMBING

SCALE: 1/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
#28672PE
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.227.1474
www.kmdpdx.com
CIVIL ENGINEERING SERVICES PROVIDED BY
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

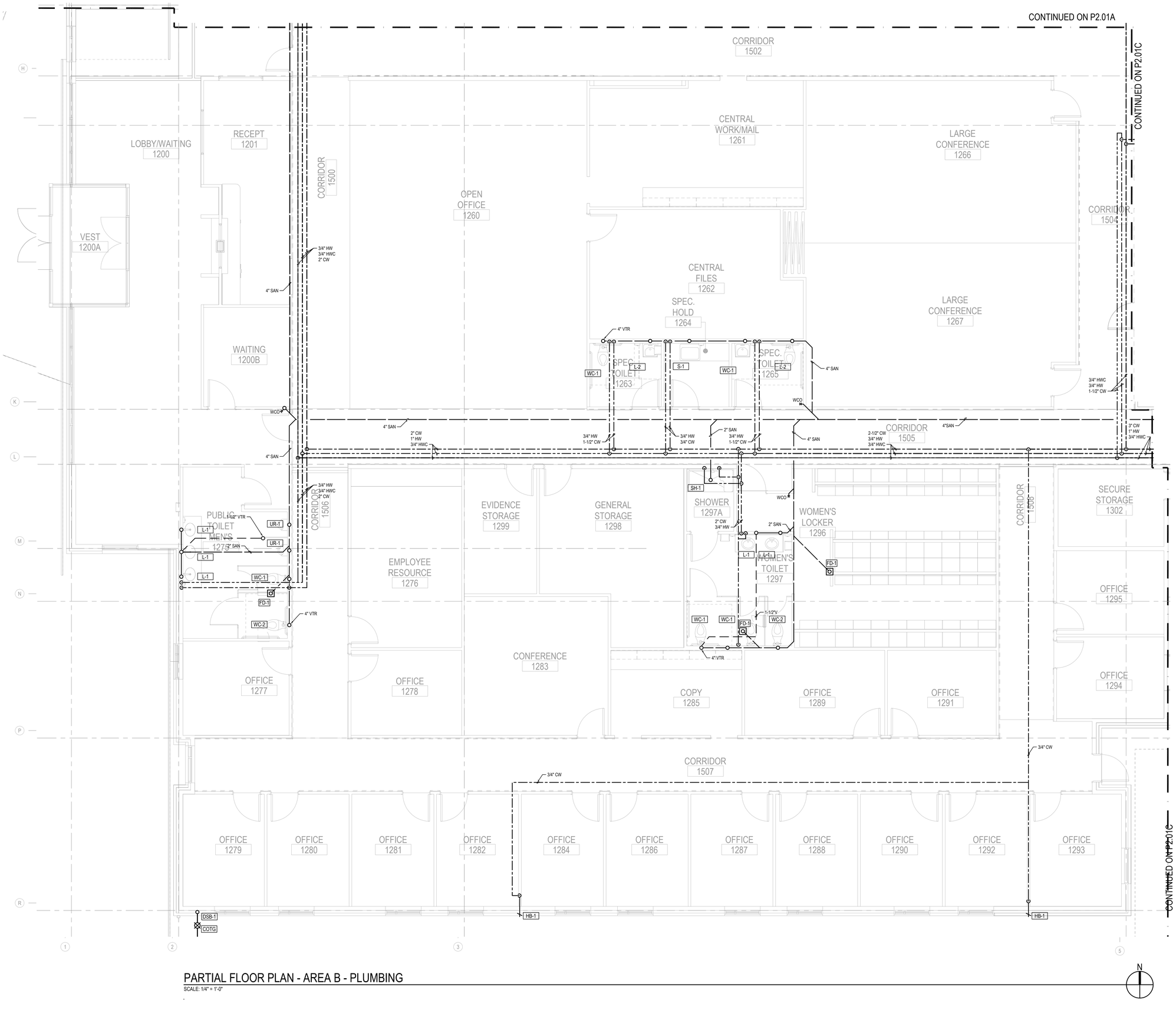
date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA A - PLUMBING

sheet:
P2.01A

of:



GENERAL NOTES

1. NOTE 1 HERE.
2. NOTE 2 HERE.

FLAG NOTES

7 EXTEND STORM PIPE 5' BEYOND FOOTPRINT OF BUILDING. REFER TO CIVIL DRAWINGS FOR CONTINUATION.

PARTIAL FLOOR PLAN - AREA B - PLUMBING

SCALE: 1/4" = 1'-0"

N

REGISTERED PROFESSIONAL ENGINEER
#086PE
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.223.1174
www.kmdpdx.com

Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

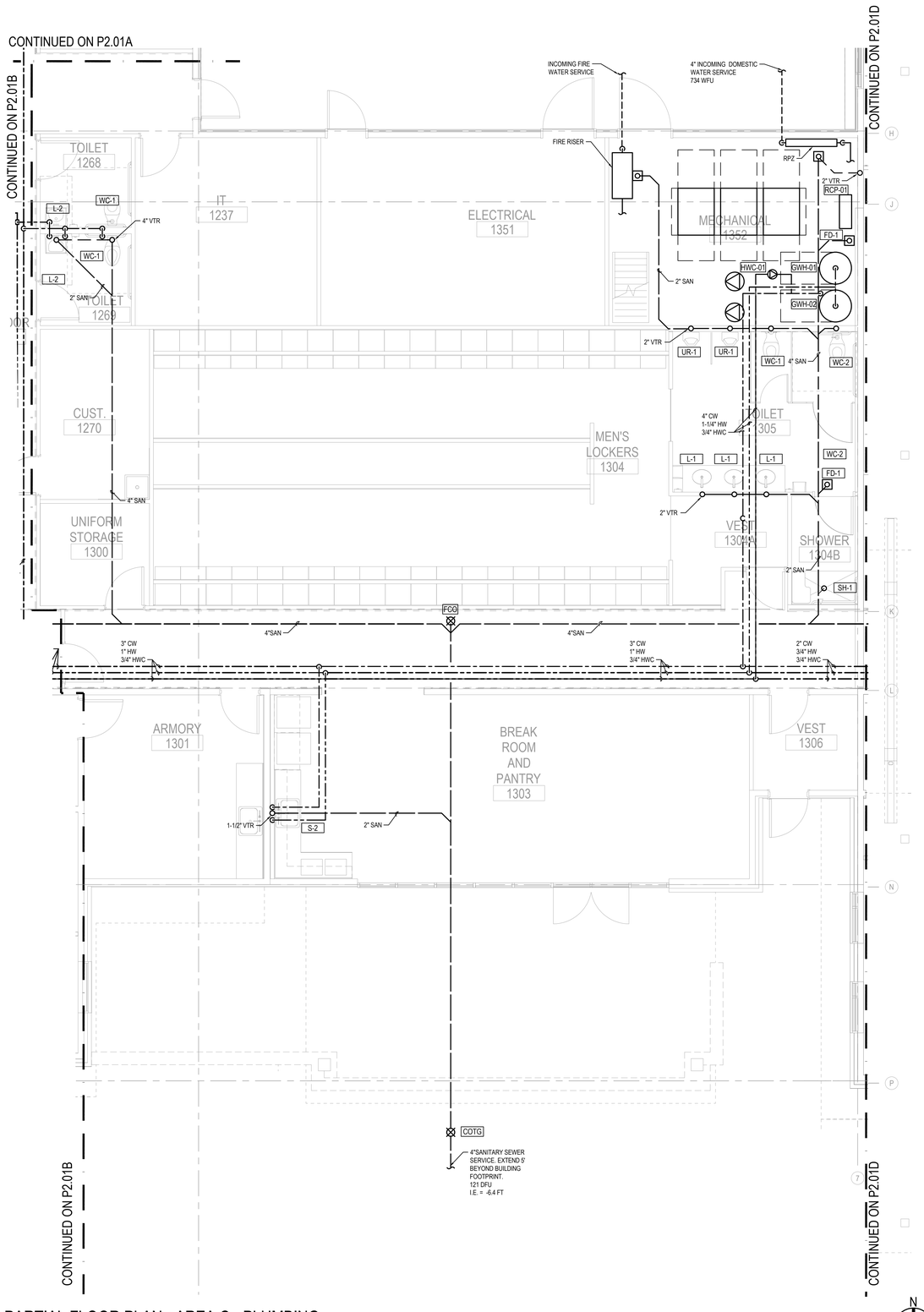
date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA B - PLUMBING

sheet:
P2.01B

of:



PARTIAL FLOOR PLAN - AREA C - PLUMBING

SCALE: 1/4" = 1'-0"

GENERAL NOTES

1. NOTE 1 HERE.
2. NOTE 2 HERE.

FLAG NOTES

1 EXTEND STORM PIPE 5' BEYOND FOOTPRINT OF BUILDING. REFER TO CIVIL DRAWINGS FOR CONTINUATION.

REGISTERED PROFESSIONAL ENGINEER
20867PE
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.227.1474
www.kmdpdx.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
CIVIL ENGINEERING SERVICES PROVIDED BY
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA C - PLUMBING

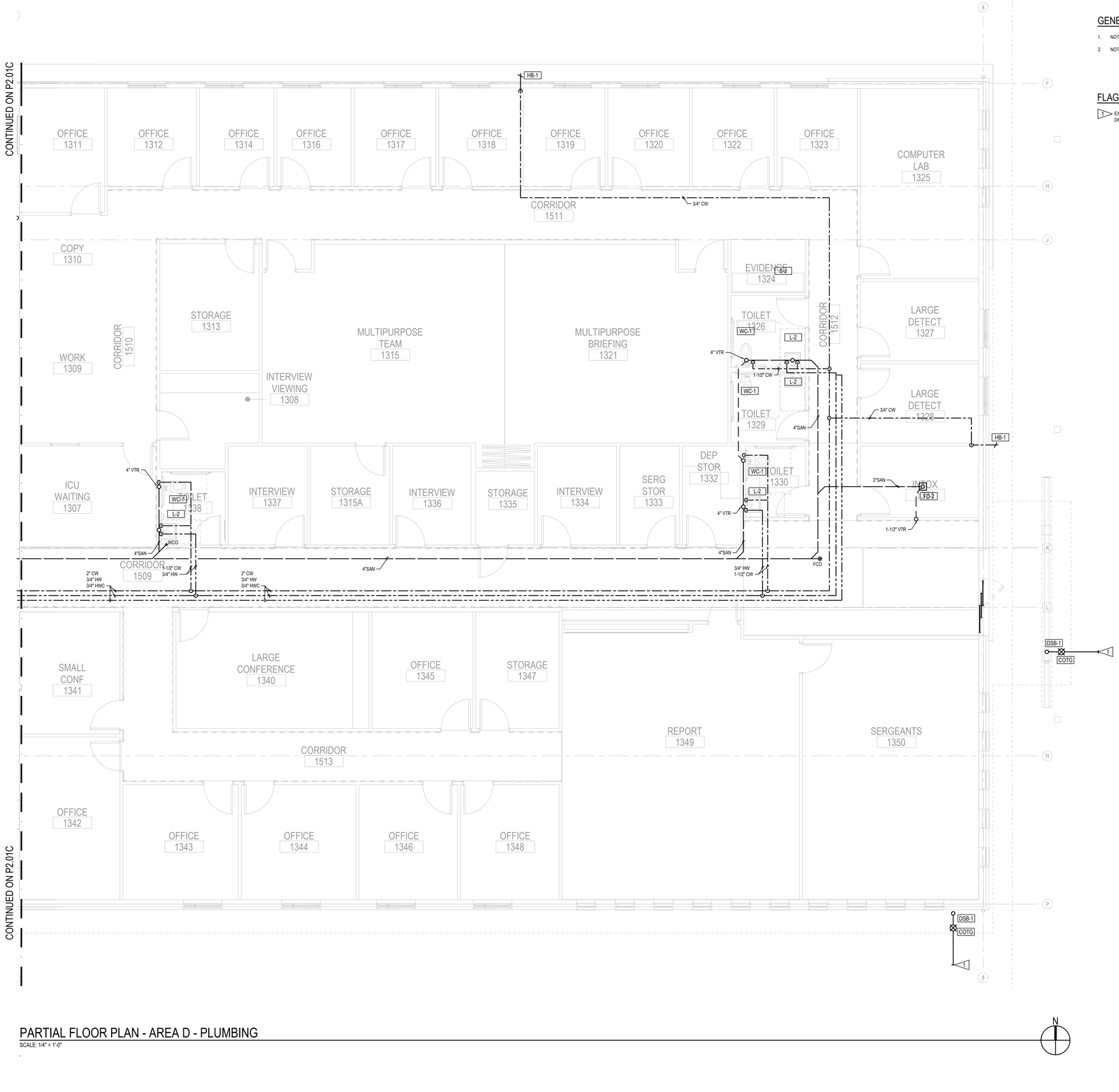
sheet:
P2.01C
of:

GENERAL NOTES

1. NOTE 1 HERE.
2. NOTE 2 HERE.

FLAG NOTES

1. EXTEND STORM PIPE 5' BEYOND FOOTPRINT OF BUILDING. REFER TO CIVIL DRAWINGS FOR CONTINUATION.



PARTIAL FLOOR PLAN - AREA D - PLUMBING

SCALE: 1/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
#20667PE
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
SÄZÄN GROUP
kmd architects+planners pc
220 nw eighth avenue, portland, oregon 97209, (503.227.1474, www.kmd.com)
CONSULTING STRUCTURAL ENGINEERS
MSC
Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

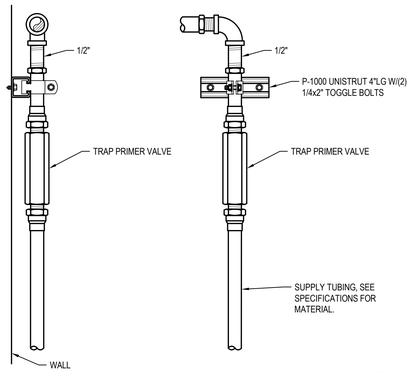
date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016 Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA D - PLUMBING

sheet:
P2.01D

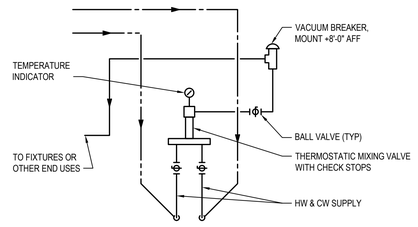
of:



TRAP PRIMER (SINGLE OUTLET) DETAIL 7

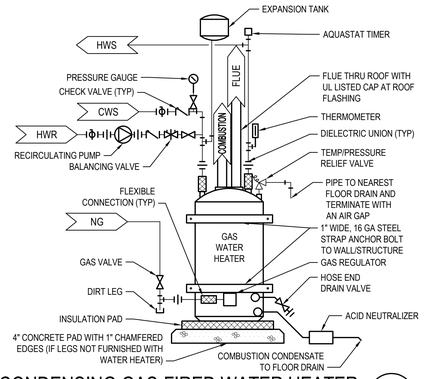
SCALE: NTS

.



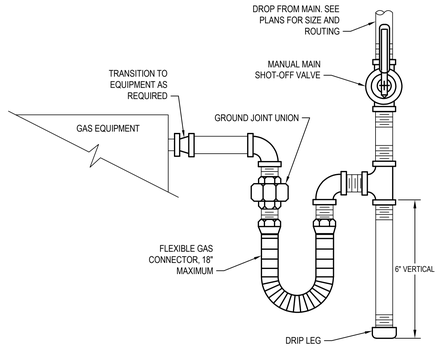
THERMOSTATIC MIXING VALVE DETAIL 4

SCALE: NTS



CONDENSING GAS-FIRED WATER HEATER DETAIL (WITH RECIRC PUMP) 1

SCALE: NTS



GAS LINE CONNECTION DETAIL 8

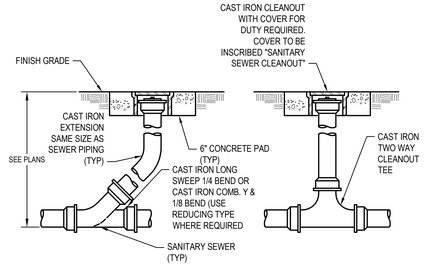
SCALE: NTS

.

NOT USED 5

SCALE: NTS

.



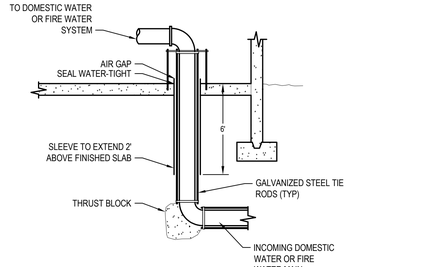
NOTES:

1. TWO WAY CLEANOUT IS REQUIRED WHERE SEWER LINE EXITS THE BUILDING AND AT ANY OTHER LOCATIONS NOTED ON PLANS.

CLEANOUT TO GRADE DETAIL 2

SCALE: NTS

.



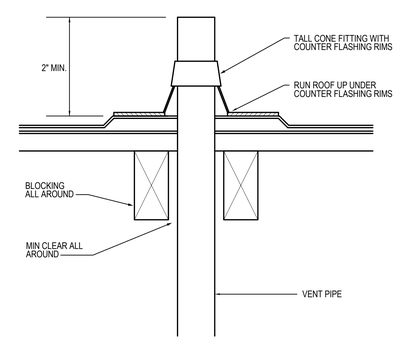
NOTES:

1. REFER TO DRAWINGS FOR LOCATION AND PIPE SIZES.
2. REFER TO SPRINKLER STATION DETAIL FOR FIRE SYSTEM INFORMATION.
3. PROVIDE ALL BRACKETS, SUPPORTS AND HANGERS AS REQUIRED.

WATER ENTRY PIPE DETAIL 6

SCALE: NTS

.



VENT THROUGH ROOF DETAIL 3

SCALE: NTS

.

REGISTERED PROFESSIONAL ENGINEER
#086705
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
(503.227.1474
www.kmdpdx.com
Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

Marion County OREGON

revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

PLUMBING DETAILS

sheet:
P4.01
of:

GENERAL NOTES

1. THE FULL SCOPE OF THE MECHANICAL WORK IS THE TOTAL OF WORK SHOWN ON THE PLANS AND CALLED FOR IN THE SPECIFICATIONS. IN CASE OF CONFLICT, THE SPECIFICATIONS SHALL GOVERN. PROVIDE A COMPLETE & FUNCTIONAL SYSTEM.
2. PERFORM ALL WORK IN ACCORDANCE WITH LOCAL CODES AND ORDINANCES. OBTAIN AND PAY FOR ALL REQUIRED PERMITS AND PAY FOR ALL FEES REQUIRED BY AUTHORITIES HAVING JURISDICTION. PAY ALL ROYALTIES OR FEES REQUIRED IN CONNECTION WITH THE USE OF PATENTED DEVICES AND SYSTEMS.
3. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR GENERAL CONSTRUCTION INCLUDING LOUVERS, CONCRETE EQUIPMENT PADS, FLASHING DETAILS, ETC. REFER TO ARCHITECTURAL DRAWINGS FOR ROOM ELEVATIONS, LOCATE MECHANICAL DEVICES SUCH AS TEMPERATURE SENSORS, HUMIDISTATS, PANELS, ETC. SO THAT THEY DO NOT CONFLICT WITH GENERAL CONSTRUCTION (WAINSCOT, DOOR HARDWARE, ETC.) NOR WITH ELECTRICAL SYSTEM (LIGHT SWITCHES, SPEAKERS, OUTLETS, ETC.).
4. COORDINATE WITH OTHER TRADES: A) REFER TO ELECTRICAL DRAWINGS FOR ELECTRICAL CHARACTERISTICS OF MECHANICAL EQUIPMENT (VOLTAGE, PHASE, HZ, ETC. B) PROVIDE ADEQUATE CLEARANCE OF MECHANICAL WORK FROM ELECTRICAL ITEMS. MAINTAIN MINIMUM ACCESS OF 6-INCHES ABOVE ELECTRICAL CABLE TRAYS AND 18-INCHES TO THE SIDE OF CABLE TRAYS.
5. ARRANGE EQUIPMENT SO THAT ACCESS CLEARANCES INDICATED BY DRAWINGS, REQUIRED BY CODES, OR RECOMMENDED BY MANUFACTURER ARE PROVIDED.
6. INSTALL MATERIALS AND SYSTEMS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND ACCEPTED SUBMITTALS. INSTALL MATERIAL IN PROPER RELATION TO ADJACENT CONSTRUCTION AND WITH UNIFORM APPEARANCE FOR EXPOSED WORK.
7. THOROUGHLY EXAMINE ALL AREAS WHERE EQUIPMENT, DUCTWORK, AND PIPING WILL BE INSTALLED AND REPORT ANY CONDITION THAT PREVENTS THE PROPER INSTALLATION OF THE MECHANICAL WORK.
8. COMPLY WITH WASHINGTON STATE ENERGY CODE SECTION C408.1.3 DOCUMENTATION REQUIREMENTS. INCLUDE THE DEVELOPMENT OF CONSTRUCTION AND AS-BUILT DRAWINGS, PROJECT MANUALS, AND SYSTEM BALANCING REPORTS.
9. PERTINENT TO SECTION C408.1.3 OF THE SAME CODE, THE HVAC CONTROL SYSTEM SHALL BE TESTED TO ENSURE THAT THE CONTROL DEVICES, EQUIPMENT AND SYSTEMS ARE CALIBRATED, ADJUSTED, AND OPERATE IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS. SEQUENCES OF OPERATION SHALL BE FUNCTIONALLY TESTED TO ENSURE THEY OPERATE IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS.
10. THE COMMISSIONING SPECIFICATION, INCLUDING ALL FUNCTIONAL TEST PROCEDURES, SHALL BE PROVIDED AND ENFORCED BY THE CONTRACTOR.
11. PROVIDE SEISMIC RESTRAINT IN ACCORDANCE WITH IBC AND ASCE STANDARD 7. SUBMIT CALCULATIONS BY LICENSED STRUCTURAL ENGINEER. PRODUCTS MAY CONFORM TO SMACNA SEISMIC RESTRAINT GUIDELINES.
12. PROVIDE A SINGLE SUBMITTAL OF ALL MECHANICAL EQUIPMENT AS SPECIFIED. AS A MINIMUM, SUBMIT PRODUCT DATA FOR ALL EQUIPMENT AND FIXTURES LISTED IN ACCOMPANYING SCHEDULES FOR APPROVAL.
13. USE EXPERIENCED INSTALLERS. DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
14. ARRANGEMENT OF SYSTEMS INDICATED ON THE DRAWINGS IS DIAGRAMMATIC, AND INDICATES THE MINIMUM REQUIREMENTS FOR PLUMBING AND MECHANICAL WORK. ADJUST BOX LOCATIONS, BASED ON FIELD MEASUREMENTS, TO AVOID INSTALLATION ABOVE DESKS. SITE CONDITIONS SHALL DETERMINE THE ACTUAL ARRANGEMENT OF THE WORK. TAKE FIELD MEASUREMENTS BEFORE PREPARING SHOP DRAWINGS, OBTAIN APPROVAL OF SHOP DRAWINGS BEFORE BEGINNING FABRICATION. BE RESPONSIBLE FOR ACCURACY OF DIMENSIONS AND LAYOUT. OVERHEAD PIPING AND DUCTWORK SHALL BE ARRANGED TO OBTAIN MAXIMUM HEAD ROOM. SHOP DRAWINGS SHALL BE STAMPED BY A LICENSED ENGINEER.
15. CLEAN AND PROTECT WORK FROM DAMAGE. RESTORE DAMAGED FINISHES. COVER ENDS OF PIPING AND DUCTWORK NOT ACTIVELY BEING WORKED ON.
16. MODIFY AND EXTEND EXISTING SERVICE TO ACCOMMODATE NEW WORK. RELOCATE EXISTING COMPONENTS AS REQUIRED FOR NEW SYSTEM. COORDINATE WITH BUILDING MANAGEMENT.
17. PROVIDE PRODUCTS OF ACCEPTABLE MANUFACTURERS, WHICH HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR THREE YEARS. DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
18. DO NOT CUT STRUCTURAL ELEMENTS WITHOUT PRIOR WRITTEN APPROVAL.
19. CONCEAL PIPING AND DUCTWORK TO THE GREATEST EXTENT PRACTICAL.
20. INSTRUCT OWNER IN PROPER OPERATION OF SYSTEMS.
21. DRAWINGS DO NOT SHOW ALL OFFSETS WHICH MAY BE REQUIRED. MAKE OFFSETS WITH FITTINGS WITH AS SMALL ANGLE OF OFFSET AS POSSIBLE; DO NOT USE TURNING VANES UNLESS SPECIFICALLY SHOWN. DUCTWORK & PIPING SHALL BE ROUTED TO AVOID ALL STRUCTURAL SUPPORTS; AND COORDINATE ALL WORK WITH WORK OF OTHER TRADES.
22. MATERIALS, METHODS, AND INSTALLATION SHALL COMPLY WITH THE PROVISIONS OF THE LATEST EDITION OF THE FOLLOWING CODES AS ADOPTED BY LOCAL JURISDICTION (CITY OF SALEM).

    OREGON STRUCTURAL SPECIALTY CODE (OSSC)
    OREGON MECHANICAL SPECIALTY CODE (OMSC)
    OREGON PLUMBING SPECIALTY CODE (OPSC)
    OREGON FIRE CODE (OFC)
    OREGON ENERGY EFFICIENCY SPECIALTY CODE (OEESC)

SHEETMETAL NOTES

1. PERFORM ALL SHEETMETAL WORK IN ACCORDANCE WITH CURRENT SMACNA STANDARDS.
2. DUCT SEALING SHALL MEET REQUIREMENTS LISTED IN CHAPTER 6 OF IMC AND WASHINGTON STATE ENERGY CODE. IN ADDITION, PROVIDE SEAL CLASS A FOR ALL DUCTWORK.
3. CONSTRUCT DUCTS WITH G-60 OR BETTER GALVANIZED STEEL (ASTM 527) LFQ, CHEM TREAT IN GENERAL.
4. CONSTRUCT RECTANGULAR DUCTWORK TO MEET ALL FUNCTIONAL CRITERIA DEFINED IN CHAPTER 11, OF THE SMACNA HVAC DUCT CONSTRUCTION STANDARDS. PROVIDE DIAGONAL CREASING OR BEADING ON ALL PANELS WIDER THAN 18-INCHES, AND PANELS LESS THAN 18 GAGE. CONSTRUCT ROUND AND FLAT OVAL DUCTWORK IN ACCORDANCE WITH CHAPTER 3 OF SMACNA HDCS.
5. DUCTMATE, METZ, OR W.D.C.I. DUCT CONNECTION SYSTEMS ARE ACCEPTABLE. DUCTS CONSTRUCTED USING THESE SYSTEMS WILL REFER TO THE MANUFACTURER'S GUIDELINES FOR SHEET GAGE, INTERMEDIATE REINFORCEMENT SIZE AND SPACING, AND JOINT REINFORCEMENTS.
6. PROVIDE COLLARS WHEREVER AN EXPOSED DUCT PASSES THROUGH A WALL, SLAB, OR CEILING--1-INCH WIDE, 18-GAGE ANGLE WITH MITERED CORNERS & SEAL WITH FIBERGLASS AND MASTIC.
7. SPIN-IN FITTINGS SHALL BE CONICAL TYPE WITH VOLUME DAMPER, AND QUADRANT; FLEX MASTER ELGEN OR EQUIVALENT.
8. ELBOWS IN RECTANGULAR OR SQUARE DUCTWORK SHALL HAVE AN INSIDE RADIUS EQUAL TO DIMENSION OF ELBOW IN THE PLANE OF THE TURN; OTHERWISE USE SQUARE ELBOWS WITH TURNING VANES.
9. ELBOWS IN ROUND DUCTWORK SHALL HAVE THE INSIDE RADIUS EQUAL TO DIMENSION OF ELBOW IN THE PLANE OF THE TURN. USE SEGMENTED, STANDING SEAM, PLEATED, OR STAMPED ELBOWS. ADJUSTABLE ELBOWS ARE ALLOWED IF RADIUS CONFORMS TO ABOVE.
10. SQUARE CORNER INSERTS (TURNING VANES) SHALL BE SMACNA FIG. 4.3 DOUBLE THICKNESS, RUNNER TYPE 2 WITH 2-1/8-INCH SPACING.
11. VOLUME DAMPERS ARE NOT SHOWN GENERALLY, INCLUDE A DAMPER IN THE DUCT TO EACH SUPPLY, EXHAUST, OR RETURN OPENING; ALSO IN EACH BRANCH DUCT WHERE THREE OR MORE OPENINGS ARE ASSOCIATED WITH THE BRANCH. LOCATE DAMPERS AT A POINT WHERE THE DUCT IS ACCESSIBLE; AS FAR FROM THE OUTLET AS POSSIBLE. DO NOT PROVIDE VOLUME DAMPER ON SUPPLY DUCTWORK UPSTREAM OF TERMINAL UNITS. DAMPERS SHALL BE RUSKIN MD25 OR MDRS25.
12. THOROUGHLY CLEAN ALL DEBRIS FROM THE INSIDE OF ALL DUCTWORK AND PLENUMS. BLOW FREE ALL SMALL PARTICLES OF RUBBISH AND DUST.
13. MECHANICAL DRAWINGS SHOW APPROXIMATE LOCATIONS FOR GRILLES AND DIFFUSERS. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS AND ELEVATIONS FOR EXACT LOCATIONS. AFTER SHOP DRAWINGS ARE COMPLETED VERIFY EXACT LOCATION OF GRILLES AND DIFFUSERS IN THE FIELD. ENSURE THAT DIFFUSER AND GRILLE FRAMES MATCH CEILING TYPES AND FINISH PRIOR TO ORDERING.
14. CONNECT FLEXIBLE DUCTS TO METAL DUCTS WITH A SLIP JOINT MADE USING FIRE RESISTANT MASTIC AND CLAMP, IDEAL "SNAP-LOCK" OR VENTLOCK "SURETIGHT NO. 670" AT EACH END. SUPPORT IN ACCORDANCE WITH SMACNA 2005 HVAC DUCT CONSTRUCTION STANDARDS FIGURES 3-10 AND 3-11. DO NOT INSTALL WITH ABRUPT BENDS OR OFFSETS. MAXIMUM LENGTH 5-FEET. LOW PRESSURE INSULATED FLEXIBLE DUCT SHALL BE THERMAFLEX MK-E. HIGH PRESSURE INSULATED FLEXIBLE DUCT SHALL BE THERAMFLEX MK-C.

PIPING NOTES

1. SANITARY, WASTE, AND VENT PIPING (PLASTIC NOT ALLOWED) SHALL BE NO-HUB CAST IRON OR DWV COPPER.
2. HOT AND COLD WATER PIPING SHALL BE HARD DRAWN COPPER TUBING: TYPE L, ASSEMBLED WITH WROT COPPER FITTINGS AND LEAD-AND ANTIMONY-FREE SOLDER.
3. INSULATE ALL HOT AND COLD WATER PIPING WITH GLASS FIBER INSULATION WITH ALL SERVICE JACKET. USE HEAT BONDING TAPE TO CLOSE INSULATION, STAPLES AND PRESSURE TAPE ARE PROHIBITED.
4. PROVIDE ALL REQUIRED ACCESSORIES INCLUDING SHUT-OFFS AND CLEAN-OUTS. PROVIDE COMPONENTS WHICH PREVENT BACK-SIPHONAGE OR CROSS-CONNECTIONS. PROVIDE ISOLATION DEVICES TO REDUCE SOUND TRANSMISSION.
5. PROVIDE STOPS FOR EACH WATER CONNECTION TO EACH FIXTURE OR ITEM OF EQUIPMENT.
6. DISINFECT WATER DISTRIBUTION SYSTEM. FLUSH AND TEST ALL SYSTEMS FOR PROPER OPERATION. ADJUST SYSTEM TO PREVENT WATER HAMMER.
7. REFER TO PIPING DIAGRAMS AND DETAILS FOR REQUIRED FITTINGS, VALVES, ETC. FLOOR PLANS AND SECTIONS INDICATE EQUIPMENT LOCATIONS AND GENERAL PIPE ROUTING ONLY.

FIRE PROTECTION NOTES

1. MAKE FIELD MEASUREMENTS, COORDINATE WITH ALL OTHER WORK AND SHOW THE MODIFICATIONS REQUIRED ON SHOP DRAWINGS.
2. MODIFY FIRE PROTECTION SYSTEMS TO ALLOW INSTALLATION OF DUCTWORK, OTHER PIPING, AND ELECTRICAL WORK AS SHOWN ON APPROVED SHOP DRAWINGS. NEW ARRANGEMENT SHALL LOCATE PIPING AS HIGH AS POSSIBLE.
3. PROVIDE A COMPLETE FIRE SPRINKLER SYSTEM FOR THE ENTIRE PROJECT AREA.
4. FLOORS ARE CURRENTLY SERVED BY A COMPLETE AUTOMATIC SPRINKLER SYSTEM. PROVIDE NEW SPRINKLER HEADS, BRANCH PIPING TO SUIT NEW PARTITIONS & REQUIREMENTS OF FIRE DEPARTMENT. NEW HEADS SHALL BE LOCATED IN CENTER OF TILE.

ABBREVIATIONS

A	AIR, AMP
ACU	AIR CONDITIONING UNIT
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AL	ALUMINUM, ACOUSTICAL LINING
ARRGT	ARRANGEMENT
ATM	ATMOSPHERE
BC	BLOWER COIL
BDD	BACKDRAFT DAMPER
BFF	BELOW FINISHED FLOOR
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BLDG	BUILDING
BOB	BOTTOM OF BEAM
BOD	BOTTOM OF DUCT
BOS	BOTTOM OF STEEL
BTUH	BRITISH THERMAL UNITS PER HOUR
CAP	CAPACITY
CC	COOLING COIL
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CI	CAST IRON
CLG	CEILING, COOLING
CNTFGL	CENTRIFUGAL
CO	CLEANOUT
CONC	CONCRETE
COND	CONDENSATE
CONT	CONTINUE, CONTROL
COMP	COMPRESSOR
COP	COEFFICIENT OF PERFORMANCE
CP	CIRCULATING PUMP
CRU	CONDENSATE RETURN UNIT
CU	CONDENSING UNIT
CU FT	CUBIC FEET
CV	CONSTANT VOLUME
CVTR	CONVERTER
CW	COLD WATER
dB	DECIBELS
DB	DRY BULB
DCVA	DOUBLE CHECK VALVE ASSEMBLY
DEG	DEGREE
DF	DRINKING FOUNTAIN
DI	DE-IONIZED
DIA	DIAMETER
DMPR	DAMPER
DN	DOWN
DS	DOWNSPOUT
E	EXISTING
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EER	ENERGY EFFICIENCY RATING
EF	EXHAUST FAN
EFF	EFFICIENCY
EG	EXHAUST GRILLE
EL	ELEVATION
EQUIP	EQUIPMENT
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR, EXTERNAL
F	FAHRENHEIT, FIRE LINE
FD	FIRE DAMPER, FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FLA	FULL LOAD AMPS
FLR	FLOOR
FLTR	FILTER
FM	FLOW METER
FOB	FLAT ON BOTTOM
FO	FLAT OVAL
FOT	FLAT ON TOP
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FSD	FIRE SMOKE DAMPER
FT	FEET, FAN TERMINAL
FV	FACE VELOCITY
GA	GAGE
GAL	GALLONS
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
H	HUMIDIFIER, HEIGHT
HB	HOSE BIBB
HC	HEATING COIL
HD	HEAD
HEX	HEAT EXCHANGE
HOA	HAND-OFF-AUTOMATIC
HP	HORSEPOWER, HEAT PUMP
HTG	HEATING
HW	HOT WATER
HWC	HOT WATER CIRCULATING
HWP	HOT WATER PUMP
HWR	HOT WATER HEATING RETURN
HWS	HOT WATER HEATING SUPPLY
HZ	HERTZ
ID	INSIDE DIAMETER, INDIRECT DRAIN
IE	INVERT ELEVATION
IH	INTAKE HOOD
IN	INCH
INIT	INITIAL
INT	INTERIOR
IPLV	INTEGRATED PART LOAD VALUE
KW	KILOWATT
KWH	KILOWATT HOURS
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LB	POUND, LINEAR BAR
LBS	POUNDS
LD	LINEAR DIFFUSER
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MCA	MINIMUM CIRCUIT AMPACITY
MD	MANUAL DAMPER
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
MOCP	MAXIMUM OVER CURRENT PROTECTION
MOD	MOTOR OPERATED DAMPER
MTR	MOTOR
NC	NORMALLY CLOSED
NEG	NEGATIVE
NIC	NOT IN CONTRACT
NO	NUMBER, NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTDOOR AIR
OC	ON CENTER
OD	OUTSIDE DIAMETER
OPNG	OPENING
ORD	OVERFLOW ROOF DRAIN
P	PUMP, PLUMBING
PD	PRESSURE DROP
PH	PHASE
POC	POINT OF CONNECTION
POS	POSITIVE
PR	PUMPED RETURN
P/T	PRESSURE/TEMPERATURE
PVC	POLYVINYL CHLORIDE
QTY	QUANTITY
RA	RETURN AIR
RD	ROOF DRAIN
REF	REFERENCE
REQD	REQUIRED
RF	RETURN FAN
RG	RETURN GRILLE
RH	RELIEF HOOD, RELATIVE HUMIDITY
RPBFP	REDUCED PRESSURE BACKFLOW PREVENTER
RPM	REVOLUTIONS PER MINUTE
S	SOIL
SA	SUPPLY AIR
SD	STORM DRAIN, SMOKE DAMPER
SENS	SENSIBLE
SEER	SEASONAL ENERGY EFFICIENCY RATING
SF	SUPPLY FAN, SQUARE FEET
SG	SUPPLY GRILLE
SL	SOUNDLINING
SP	STATIC PRESSURE
SS	STAINLESS STEEL, SANITARY SEWER
T	THERMOSTAT
TEMP	TEMPERATURE
TG	TRANSFER GRILLE
TOD	TOP OF DUCT
TOT	TOTAL
TP	TRAP PRIMER, TOTAL PRESSURE
TSP	TOTAL STATIC PRESSURE
TU	TERMINAL UNIT
TYP	TYPICAL
UH	UNIT HEATER
UON	UNLESS OTHERWISE NOTED
V	VENT, VOLT
VA	VALVE
VAV	VARIABLE AIR VOLUME
VEL	VELOCITY
VFD	VARIABLE FREQUENCY DRIVE
VTR	VENT THROUGH ROOF
W	WASTE, WATER, WATT, WIDTH
WB	WET BULB
WG	WATER GAGE
WH	WATER HEATER, WALL HYDRANT
WTR	WATER

SYMBOLS LEGEND - GENERAL

SYMBOL	DESCRIPTION
#	DRAWING CONSTRUCTION ("FLAG") NOTE
X-XX	EQUIPMENT IDENTIFIER
	MATCHLINE
	REVISION CLOUD (ENCIRCLES DRAWING CHANGES MADE SINCE THE PREVIOUS RELEASE)
A	REVISION REFERENCE
	EXISTING TO BE REMOVED (HATCH)
	HEAVY LINEWEIGHT INDICATES NEW WORK
	LIGHT LINEWEIGHT INDICATES EXISTING INFORMATION
	POINT OF CONNECTION (POC) BETWEEN NEW AND EXISTING
	POINT OF CONNECTION
N	NORTH REFERENCE
X / XX.XX	DETAIL REFERENCE DETAIL IDENTIFICATION NUMBER SHEET WHERE DETAIL IS DRAWN
X / XX.XX	ELEVATION REFERENCE ELEVATION IDENTIFICATION NUMBER SHEET WHERE ELEVATION IS DRAWN
X / XX.XX	SECTION REFERENCE SECTION IDENTIFICATION NUMBER SHEET WHERE SECTION IS DRAWN

SYMBOLS LEGEND - HVAC

SYMBOL	DESCRIPTION
	ROOFTOP EXHAUST FAN , ROOFTOP SUPPLY FAN
	CEILING SUPPLY DIFFUSER
	CEILING RETURN DIFFUSER
	CEILING EXHAUST DIFFUSER
	LINEAR SLOT DIFFUSER
	SIDE WALL REGISTER
BDD	BACKDRAFT DAMPER
	DAMPER (OPPOSED BLADE / PARALLEL BLADE)
M M	MOTOR OPERATED DAMPER
	LOUVER
	UNIT HEATER
	AIRFLOW, SUPPLY
	AIRFLOW, RETURN
T S	THERMOSTAT, TEMPERATURE SENSOR
H	HUMIDITY SENSOR
CO X	CARBON MONOXIDE SENSOR, CARBON DIOXIDE SENSOR
SD	SMOKE DETECTOR

SYMBOLS LEGEND - HVAC (CON'T)

SYMBOL	DESCRIPTION
	ROUND, 90° ELBOW, R/W OR R/D = 1.5
	RECTANGULAR, 90° ELBOW, R/W OR R/D = 1.5
	RECTANGULAR OR ROUND, 90° ELBOW, R/W OR R/D = 1.5
	SQUARE CORNER ELBOW WITH TURNING VANES
	45° BRANCH CONNECTION
	RECTANGULAR BRANCH TO RECTANGULAR DUCT CONNECTION WITH 45° TAPER
	ROUND OR RECTANGULAR BRANCH TO ROUND OR RECTANGULAR DUCT CONNECTION
	ROUND BRANCH TO RECTANGULAR DUCT CONNECTION
	ROUND BRANCH TO ROUND DUCT CONNECTION
	TRANSITION OR REDUCER - NOTED FOT (FLAT ON TOP) OR FOB (FLAT ON BOTTOM) IF REQUIRED
	RECTANGULAR TO ROUND TRANSITION
	SUPPLY AIR DUCT - TURNING TOWARD
	SUPPLY AIR DUCT - TURNING AWAY
	RETURN AIR DUCT - TURNING TOWARD
	RETURN AIR DUCT - TURNING AWAY
	EXHAUST AIR DUCT - TURNING TOWARD
	EXHAUST AIR DUCT - TURNING AWAY
	ROUND DUCT - TURNING TOWARD
	ROUND DUCT - TURNING AWAY
	FLAT-OVAL DUCT - TURNING TOWARD
	FLAT-OVAL DUCT - TURNING AWAY
R	INCLINE RISE (R) OR DROP (D) IN DIRECTION OF ARROW
	FLEXIBLE DUCT OR CONNECTION
	FLEXIBLE DUCT OR CONNECTION
	LINED DUCTWORK
AD AP	ACCESS DOOR (AD) OR ACCESS PANEL (AP)
	VOLUME DAMPER
FD FD	FIRE DAMPER (VERTICAL / HORIZONTAL)
SD SD	SMOKE DAMPER (VERTICAL / HORIZONTAL)
FSD FSD	FIRE SMOKE DAMPER (VERTICAL / HORIZONTAL)
RG-T 6x6 90° (TYP 2)	DIFFUSER TYPE MARK CONNECTION SIZE QUANTITY AIR FLOW (CFM)

REGISTERED PROFESSIONAL ENGINEER — 20867PE — OREGON — NOV. 10 2015 — JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc — 220 nw eighth avenue portland, oregon 97209 (503.222.1474 www.kmdpc.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
Westech Engineering, Inc. CIVIL ENGINEERING SERVICES PROVIDED BY — CONSULTING ENGINEERS SINCE 1947

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright© 2016
Carlson Veit Architects P.C.

MECHANICAL LEGEND, NOTES & ABBREVIATIONS

sheet: M0.01
of:

BOILER SCHEDULE

EQUIP. NO	LOCATION	SERVICE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN SERIES	BASIS OF DESIGN MODEL	TYPE	FUEL	EFFIC/IENCY (%)	BURNER INPUT (MBH)	TOTAL OUTPUT (MBH)	WATER FLOW RATE (GPM)	EWT (DEG F)	LWT (DEG F)	GAS CONN SIZE (IN)	COMBUSTION AIR/FLUE SIZE (IN/IN)	ELECTRICAL		OPERATING WEIGHT (LBS)	REMARKS
																MCA	V/PH/HZ		
B-01	MECHANICAL ROOM	HEATING WATER LOOP	ATH	KN	4	MODULATING CONDENSING	NG	92.5	399	369	18.5	120	140	1/2	4	4	120/1/60	1,000	1,2,3,4
B-02	MECHANICAL ROOM	HEATING WATER LOOP	ATH	KN	4	MODULATING CONDENSING	NG	92.5	399	369	18.5	120	140	1/2	4	4	120/1/60	1,000	1,2,3,4
B-03	MECHANICAL ROOM	HEATING WATER LOOP	ATH	KN	4	MODULATING CONDENSING	NG	92.5	399	369	18.5	120	140	1/2	4	4	120/1/60	1,000	1,2,3,4

1. BOILER SYSTEM SHALL PROVIDE N+1 REDUNDNANCY
2. ACCESSORIES TO INCLUDE THERMOMETERS, ASME RATED SAFETY PRESSURE RELIEF VALVES, HIGH LIMIT AQUASTATS, LOW WATER CUT-OFF, GAS PRESSURE REGULATORS, PILOT SAFETY CONTROLS, MANUAL GAS SHUT-OFF VALVES, WATER TEMPERATURE AQUASTAT, CONDENSATE NEUTRALIZER (JIM BOILERWORKS NB-4 OR EQUAL), FACTORY WIRED CONTROLS AND PANEL, WIRELESS OUTDOOR TEMPERATURE SENSOR, & INTERGRATION TO BAS.
3. TESTED IN STRICT ACCORDANCE WITH PROVISIONS OF ALL APPLICABLE SECTIONS OF ANSI/ASME, NFPA, AGA, UL, AND ABMA CODES AND STANDARDS. COMPLIANT WITH STATE, FEDERAL, AND LOCAL CODE REQUIREMENTS.
4. SEISMICALLY RESTRAIN BOILERS TO HOUSE KEEPING PAD.

PUMP SCHEDULE

EQUIP. NO	LOCATION	SERVICE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN MODEL NUMBER	TYPE	FLOW (GPM)	HEAD (FT)	CONNECTION SIZE (IN)	ELECTRICAL				WEIGHT (LBS)	REMARKS
									SPEED (RPM)	MOTOR (HP)	FLA / LRA	V/PH/HZ		
HWP-01	MECHANICAL ROOM	HEATING HOT WATER	BELL AND GOSSETT	2.5x2.5x9.5C SERIES e-80	IN-LINE MOUNTED CENTRIFUGAL	200	80	2 1/2	1,750	7 1/2	--	460/3/60	280	1-3
HWP-02	MECHANICAL ROOM	HEATING HOT WATER	BELL AND GOSSETT	2.5x2.5x9.5C SERIES e-80	IN-LINE MOUNTED CENTRIFUGAL	200	80	2 1/2	1,750	7 1/2	--	460/3/60	280	1-3

REMARKS:
1. PROVIDE INTEGRATED VARIABLE FREQUENCY DRIVE AND VFD/SENSORLESS CONTROLLER FOR EACH MOTOR. INTERFACE WITH DDC SYSTEM.
2. INSTALL AS PER MANUFACTURERS RECOMMENDATIONS.
3. PROVIDE AND INSTALL ALL VALVING AS REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM.

ENERGY RECOVERY VENTILATOR SCHEDULE

EQUIP. NO	LOCATION	SERVICE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN SERIES	AIR VELOCITY (FPM)	SUPPLY AIRFLOW (CFM)	SUPPLY FAN MOTOR (HP)	EXTERNAL STATIC IN WC	RELIEF AIRFLOW (CFM)	RELIEF FAN MOTOR (HP)	MODE	ENERGY RECOVERY WHEEL - OUTDOOR AIR					ENERGY RECOVERY WHEEL - EXHAUST AIR					DX COOLING COIL							HYDRONIC HEATING COIL								ELECTRICAL				WEIGHT LBS	REMARKS
												AIRFLOW (CFM)	EAT DB (DEG F)	EAT WB (DEG F)	LAT DB (DEG F)	LAT WB (DEG F)	AIRFLOW (CFM)	EAT DB (DEG F)	EAT WB (DEG F)	LAT DB (DEG F)	LAT WB (DEG F)	COOLING LOAD		AIR			EER	HEATING LOAD (MBH)	EAT		LAT		WATER			ROTOR MOTOR (HP)	MCA	MOCP	SINGLE POINT V/PH/HZ		
																						TOTAL LOAD (MBH)	SENSIBLE LOAD (MBH)	EAT DB (DEG F)	EAT WB (DEG F)	LAT DB (DEG F)	LAT WB (DEG F)			DB (DEG F)	DB (DEG F)	EWT (DEG F)	LWT (DEG F)	FLOW RATE (GPM)	MAX PD (FT)					
RTU-01,02	ROOF	CDO	AAON	RN-016-3	488	9,700	10	1.5	9,700	10	SUMMER	2,234	92	69	79.4	63.9	2,234	75	62	87.6	67.3	207.29	170.29	76.03	62.47	57.5	55.4	11.8	104.4	67.2	53.3	140	130	21	1.2	0.16	60	70	460/3/60	3,385	1,2,3
											WINTER	2,234	23	20	57.8	47.6	2,234	70	55	35.2	30.8																				
RTU-03	ROOF	PPO NORTH	AAON	RN-016-3	503	10,000	10	1.5	9,500	10	SUMMER	2,169	92	69	79.4	63.9	2,150	75	62	87.6	67.3	200.16	172.03	76.32	62.6	57.94	55.79	11.8	155	66.4	80.6	140	120	18	0.9	0.16	69	90	460/3/60	3,452	1,2,3
											WINTER	2,169	23	20	57.9	47.7	2,169	70	55	35.1	30.8																				
RTU-04	ROOF	PPO SOUTH	AAON	RN-013-3	445	6,500	7.5	1.5	5,800	3	SUMMER	1,502	92	69	79.9	64.2	1,502	75	62	87.1	67	158.2	151.46	77.33	63.03	55.45	54.44	12	110	67.4	83	140	120	12	2.3	0.08	43	50	460/3/60	2,482	1,2,3
											WINTER	1,502	23	20	57.9	47.7	1,502	70	55	36.6	32.2																				

REMARKS:
1. PROVIDE VARIABLE FREQUENCY DRIVES ON SUPPLY AND EXHAUST FANS.
2. PROVIDE 2" DEEP MERV 8 PRE-FILTER PRIOR TO SUPPLY AND EXHAUST FANS
3. PROVIDE SEIZMICALLY RATED VIBRATION ISOLATING ROOF CURB.

EXPANSION TANK SCHEDULE

EQUIP. NO	LOCATION	SERVICE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN MODEL NUMBER	TYPE	TANK VOL (GAL)	CHARGE PRESS (PSI)	MAX OPER PRESS (PSI)	CONNECTION SIZE (IN)	EMPTY WEIGHT (LBS)	REMARKS
ET-01	MECHANICAL ROOM	HEATING HOT WATER	WESSELS	N.A-300	BLADDER	79	12	125	1 1/2	225	1-3

REMARKS:
1. SUPPORT ON REINFORCED CONCRETE PAD (VERTICAL INSTALLATION)
2. PROVIDE AUTOMATIC AIR VENT
3. ALLOW MINIMUM OF 18" CLEARANCE FOR SYSTEM PIPING

DIFFUSER-GRILLE SCHEDULE

EQUIP. NO	LOCATION	SERVICE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN SERIES	DESCRIPTION	MAXIMUM SOUND PRESSURE (NC)	REMARKS
CD-1	CEILING	SUPPLY DIFFUSER	TITUS	MCD	4-WAY ADJUSTABLE, MODULAR CORE DIFFUSER	30	1,2,3
SWG-1	WALL	SUPPLY GRILLE	TITUS	300RL	DOUBLE DEFLECTION GRILLE	30	1,3,4
DG-1	DUCT	SUPPLY GRILLE	TITUS	300RL	DOUBLE DEFLECTION GRILLE	30	1,3,4
RG-1	CEILING	RETURN GRILLE	TITUS	50F	EGGCRATE RETURN GRILLE	30	1,3,5
EG-1	CEILING	EXHAUST GRILLE	TITUS	350FL	SINGLE DEFLECTION GRILLE	30	1,6

REMARKS:
1. SEE MECHANICAL FLOOR PLANS FOR DUCT SIZE AND CFM
2. STEEL, WHITE, ROUND NECK, SEE MECHANICAL FLOOR PLANS FOR NECK SIZE
3. BORDER TO MATCH CEILING TYPE
4. STEEL, WHITE, 3/4" BLADE SPACING
5. STEEL, WHITE, CORE ONLY IN ACT, 1/2"X1/2"X1/2" GRID
6. ALUMINUM, WHITE, FOR GWB CEILING, 3/4" BLADE SPACING, 35 DEG. FIXED DEFLECTION

SINGLE DUCT TERMINAL UNIT SCHEDULE (HOT WATER)

EQUIP. NO	LOCATION	SERV CE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN SERIES	PRIMARY AIR		HYDRONIC HEATING COIL						MAXIMUM SOUND PRESSURE OUTLET (NC)	MAXIMUM SOUND PRESSURE RADIATED (NC)	OPERATING WEIGHT (LBS)	REMARKS
					INLET SIZE (IN)	MAX AIRFLOW (CFM)	MIN AIRFLOW (CFM)	TOTAL LOAD (MBH)	WATER FLOWRATE (GPM)	MAX PD (IN WG)	EWT (DEG F)	LWT (DEG F)	EAT (DEG F)	LAT (DEG F)				
VAV-01	AS SHOWN	1222	TITUS	DESV	04	160	48	3.5	1.0	0.2	120	111.2	55	91.9	35	30	20	1
VAV-02	AS SHOWN	1221	TITUS	DESV	04	150	45	3.8	1.0	0.2	120	111.6	55	93.4	35	30	20	1
VAV-03	AS SHOWN	1216 1219 1220	TITUS	DESV	08	480	144	8.4	2.0	0.61	120	111.6	55	90.2	35	30	23	1
VAV-04	AS SHOWN	1215 1217 1219	TITUS	DESV	06	330	99	6.9	5.0	2.54	120	117.2	55	93.5	35	30	20	1
VAV-05	AS SHOWN	1209 1211 1213	TITUS	DESV	06	330	99	7	5.0	2.54	120	117.2	55	93.5	35	30	20	1
VAV-06	AS SHOWN	1208 1210 1212 1214	TITUS	DESV	08	640	192	12.8	2.9	1.09	120	111.2	55	94.3	35	30	23	1
VAV-07	AS SHOWN	1203 1204	TITUS	DESV	08	440	132	14.4	4.4	2.48	120	113.5	55	94.6	35	30	23	1
VAV-08	AS SHOWN	1206 1207	TITUS	DESV	04	220	66	4.3	1.0	0.2	120	110.7	55	90.6	35	30	20	1
VAV-09	AS SHOWN	1253	TITUS	DESV	04	210	63	4.5	1.0	0.2	120	110.9	55	91.2	35	30	20	1
VAV-10	AS SHOWN	1254	TITUS	DESV	04	150	45	3.8	1.0	0.21	120	112.7	55	96.2	35	30	20	1
VAV-11	AS SHOWN	1248 1250 1252	TITUS	DESV	05	330	99	6.6	2.3	0.58	120	114.1	55	90.8	35	30	20	1
VAV-12	AS SHOWN	1245 1247 1249 1251	TITUS	DESV	08	640	192	11.2	2.1	0.57	120	109.3	55	94.7	35	30	23	1
VAV-13	AS SHOWN	1242 1244 1246	TITUS	DESV	06	330	99	6.6	3.4	1.23	120	116.1	55	93	35	30	20	1
VAV-14	AS SHOWN	1239 1241 1243	TITUS	DESV	08	480	144	7.4	2.3	0.75	120	113.4	55	94	35	30	23	1
VAV-15	AS SHOWN	1238 1240	TITUS	DESV	04	220	66	4.5	1.3	0.26	120	112.8	55	94.5	35	30	20	1
VAV-16	AS SHOWN	1231 1232	TITUS	DESV	06	280	84	5.6	2.3	0.62	120	115.2	55	94.7	35	30	20	1
VAV-17	AS SHOWN	1234 1235	TITUS	DESV	05	290	87	5.5	2.6	0.74	120	115.7	55	95.5	35	30	20	1
VAV-18	AS SHOWN	1501	TITUS	DESV	06	400	120	3.8	1.0	0.2	120	110.7	55	90.6	35	30	20	1
VAV-19	AS SHOWN	1503	TITUS	DESV	06	400	120	3.5	2.7	2.95	120	117.4	55	81.9	35	30	20	1
VAV-20	AS SHOWN	1261	TITUS	DESV	04	200	60	4.8	1.5	0.32	120	113.6	55	95.2	35	30	20	1
VAV-21	AS SHOWN	1265	TITUS	DESV	07	520	156	15.5	7.6	7.17	120	115.9	55	95.8	35	30	23	1
VAV-22	AS SHOWN	1267	TITUS	DESV	08	520	156	15.4	7.0	5.99	120	115.6	55	95.5	35	30	23	1
VAV-23	AS SHOWN	1262 1264	TITUS	DESV	06	300	90	5.2	1.9	0.41	120	114.4	55	94.9	35	30	20	1
VAV-24	AS SHOWN	1200B 1201	TITUS	DESV	06	320	96	8.3	1.5	0.44	120	108.9	55	95.3	35	30	20	1
VAV-25	AS SHOWN	1260	TITUS	DESV	08	600	180	11.3	2.4	0.75	120	110.6	55	95.8	35	30	23	1
VAV-26	AS SHOWN	1506 1507 1508	TITUS	DESV	08	500	150	5.2	7.0	5.99	120	115.6	55	95.5	35	30	23	1
VAV-27	AS SHOWN	1200	TITUS	DESV	12	1,120	336	14.5	1.5	0.86	120	100	55	95	35	30	38	1
VAV-28	AS SHOWN	1275 1277	TITUS	DESV	06	310	93	12.4	6.3	7.1	120	116.1	55	95.1	35	30	20	1
VAV-29	AS SHOWN	1276 1278	TITUS	DESV	06	255	76.5	3	1.0	0.2	120	112.7	55	96.8	35	30	20	1
VAV-30	AS SHOWN	1296 1297	TITUS	DESV	08	450	135	1	0.5	0.26	120	106.9	55	77.3	35	30	23	1
VAV-31	AS SHOWN	1302	TITUS	DESV	04	50	15	1.1	0.5	0.19	120	114.8	55	95.2	35	30	20	1
VAV-32	AS SHOWN	1294 1295	TITUS	DESV	04	150	45	5.4	2.1	0.5	120	114.8	55	94.8	35	30	20	1
VAV-33	AS SHOWN	1279	TITUS	DESV	04	200	60	6.1	6.5	4.27	120	118.1	55	96.6	35	30	20	1
VAV-34	AS SHOWN	1280 1281 1282	TITUS	DESV	06	450	135	8	1.3	0.35	120	107.9	55	94.9	35	30	20	1
VAV-35	AS SHOWN	1284 1286 1287	TITUS	DESV	06	450	135	8	1.2	0.29	120	106.8	55	93.8	35	30	20	1
VAV-36	AS SHOWN	1285 1289 1291	TITUS	DESV	04	225	67.5	4	1.0	0.2	120	111.6	55	93.4	35	30	20	1
VAV-37	AS SHOWN	1288 1290 1292	TITUS	DESV	06	450	135	7.6	1.2	0.28	120	107.1	55	95	35	30	20	1
VAV-38	AS SHOWN	1293	TITUS	DESV	04	200	60	3.5	1.0	0.2	120	112.2	55	95	35	30	20	1
VAV-39	AS SHOWN	1301	TITUS	DESV	06	250	75	1.7	0.5	0.2	120	111.2	55	82	35	30	20	1
VAV-40	AS SHOWN	1303	TITUS	DESV	08	620	186	10.3	1.8	0.43	120	108.6	55	95.4	35	30	23	1
VAV-41	AS SHOWN	1311	TITUS	DESV	04	210	63	4..4	1.3	0.28	120	113.3	55	95.5	35	30	20	1
VAV-42	AS SHOWN	1312 1314 1316	TITUS	DESV	06	330	99	8	1.2	0.29	120	106.8	55	93.8	35	30	20	1
VAV-43	AS SHOWN	1317 1315 1319	TITUS	DESV	06	330	99	7.8	1.2	0.29	120	107	55	94.5	35	30	20	1
VAV-44	AS SHOWN	1320 1322 1323	TITUS	DESV	06	330	99	7.8	1.2	0.29	120	107	55	94.5	35	30	20	1
VAV-45	AS SHOWN	1325	TITUS	DESV	05	300	90	7.3	1.2	0.27	120	107.3	55	95.8	35	30	20	1
VAV-46	AS SHOWN	1321	TITUS	DESV	07	500	150	9.9	1.8	0.43	120	109	55	96.5	35	30	23	1
VAV-47	AS SHOWN	1341	TITUS	DESV	04	200	60	3.3	1.0	0.2	120	112.7	55	96.8	35	30	20	1
VAV-48	AS SHOWN	1340	TITUS	DESV	06	250	75	5.2	1.9	0.41	120	114.4	55	94.9	35	30	20	1
VAV-49	AS SHOWN	1345 1347	TITUS	DESV	04	175	52.5	4	1.0	0.2	120	111.8	55	94	35	30	20	1
VAV-50	AS SHOWN	1327 1329 1331	TITUS	DESV	08	480	144	3.4	0.5	0.26	120	106.8	55	76.8	35	30	23	1
VAV-51	AS SHOWN	1333	TITUS	DESV	06	450	135	8.7	1.7	0.55	120	109.6	55	95.1	35	30	20	1
VAV-52	AS SHOWN	1349	TITUS	DESV	06	450	135	7.1	4.2	1.88	120	116.6	55	92.4	35	30	20	1
VAV-53	AS SHOWN	1346 1348	TITUS	DESV	06	320	96	5.1	1.6	0.33	120	113.5	55	94.2	35	30	20	1
VAV-54	AS SHOWN	1343 1344	TITUS	DESV	06	320	96	5.4	2.9	0.93	120	116.2	55	96.5	35	30	20	1
VAV-55	AS SHOWN	1342	TITUS	DESV	06	250	75	4.7	1.6	0.33	120	114.2	55	96.2	35	30	20	1
VAV-56	AS SHOWN	1332 1333 1334 1335	TITUS	DESV	06	300	90	5.4	2.9	0.93	120	116.2	55	96.5	35	30	20	1
VAV-57	AS SHOWN	1315A 1336 1337	TITUS	DESV	04	150	45	4.5	1.3	0.26	120	112.8	55	94.5	35	30	20	1
VAV-58	AS SHOWN	1308 1313	TITUS	DESV	04	150	45	3.7	1.0	0.2	120	112.7	55	96.6	35	30	20	1
VAV-59	AS SHOWN	1238	TITUS	DESV	04	75	22.5	1.7	1.3	0.74	120	117.4	55	95.1	35	30	20	1
VAV-60	AS SHOWN	1230	TITUS	DESV	05	300	90	8.2	1.5	0.47	120	109.3	55	95.8	35	30	20	1
VAV-61	AS SHOWN	1304 1305	TITUS	DESV	06	300	90	2.4	0.5	0.2	120	110.4	55	79.5	35	30	20	1
VAV-62	AS SHOWN	1298 1299	TITUS	DESV	04	225	67.5	3.3	1.0	0.2	120	112.7	55	96.8	35	30	20	1
VAV-63	AS SHOWN	1283	TITUS	DESV	04	225	67.5	5	1.7	0.34	120	114	55	95.1	35	30	20	1
VAV-64	AS SHOWN	1307 1309 1310	TITUS	DESV	06	300	90	5.5	2.6	0.74	120	115.7	55	95.5	35	30	20	1
VAV-65	AS SHOWN	1270	TITUS	DESV	04	75	22.5	1	0.5	0.19	120	114.8	55	95.2	35	30	20	1
VAV-66	AS SHOWN	1263 1265 1268 1269 1300 1500 1504 1505	TITUS	DESV	10	760	228	14.8	2.2	0.43	120	106.3	55	94	35	30	30	1
VAV-67	AS SHOWN	1315	TITUS	DESV	08	500	150	12.5	3.1	1.21	120	111.8	55	95.4	35	30	23	1
VAV-68	AS SHOWN	1338 1513	TITUS	DESV	10	500	150	5.6	1.5	0.26	120	110.9	55	96.7	35	30	30	1
VAV-69	AS SHOWN	1324 1326 1329 1330 1510 1511 1512	TITUS	DESV	10	525	157.5	7.9	1.8	0.33	120	111.1	55	95.4	35	30	30	1
VAV-70	AS SHOWN	1502	TITUS	DESV	10	525	157.5	6.5	1.5	0.26	120	110	55	94.4	35	30	30	1

REMARKS:
1. PROVIDE MINIMUM CLEAR SERVICE ACCESS REQUIREMENTS

FAN SCHEDULE

EQUIP NO.	LOCATION	SERVICE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN SERIES	TYPE	DRIVE TYPE	WHEEL CLASS	WHEEL TYPE	AIRFLOW (CFM)	TOTAL SP (IN WG)	FAN RPM	MOTOR (BHP)	MOTOR (HP)	VFD YES/NO	V/PH/HZ	MAXIMUM SOUND POWER INLET/ OUTLET (dBA)	OPERATING WEIGHT (LBS)	REMARKS
EF-01	ROOF	TOILET EXHAUST	GREENHECK	G-095-VG	CENTRIFUGAL DOWNBLAST	DIRECT	I		525	0.75	1,702	0.15	1/4	NO	120/1/60	60	28	2
EF-02	ROOF	TOILET EXHAUST	GREENHECK	G-095-VG	CENTRIFUGAL DOWNBLAST	DIRECT	I		350	0.75	1,550	0.10	1/4	NO	120/1/60	61	28	2
EF-03	ROOF	TOILET EXHAUST	GREENHECK	G-097-VGA	CENTRIFUGAL DOWNBLAST	DIRECT	I		100	0.75	1,346	0.05	1/4	NO	120/1/60	52	35	1
EF-04	ROOF	TOILET EXHAUST	GREENHECK	G-095-VG	CENTRIFUGAL DOWNBLAST	DIRECT	I		550	0.75	1,710	0.15	1/4	NO	120/1/60	52	26	2
EF-05	ROOF	TOILET EXHAUST	GREENHECK	G-085-VG	CENTRIFUGAL DOWNBLAST	DIRECT	I		200	0.75	1,725	0.070	1/4	NO	120/1/60	57	26	1

REMARKS:
1. PROVIDE MANUFACTURER'S ROOF CURB, BACKDRAFT DAMPER, DISCONNECT SWITCH AND VIBRATION ISOLATION.

SPLIT SYSTEM FAN COIL SCHEDULE

EQUIP. NO	LOCATION	SERVICE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN SERIES	TYPE	FAN		COOLING CAPACITY			HEATING CAPACITY		ELECTRICAL DATA			MAXIMUM SOUND PRESSURE (dBA)	OPERATING WEIGHT (LBS)	REMARKS
						CFM	EXT SP IN WG	COOLING LOAD		OA DESIGN TEMP (DEG F)	TOTAL LOAD (MBH)	OA DESIGN TEMP (DEG F)	MCA	MOCP	V/PH/HZ			
								TOTAL LOAD (MBH)	SENSIBLE LOAD (MBH)									
FC-1	IT ROOM	IT ROOM	LG	LSN240HEV1	WALL	600	-	24	--	95	24.2	47	0.2	--	208/1/60	45	28	1,2
FC-2	IT ROOM	IT ROOM	LG	LSN240HEV1	WALL	600	-	24	--	95	24.2	47	0.2	--	208/1/60	45	28	1,2

REMARKS:
1. PROVIDE WITH INTEGRAL CONDENSATE PUMP AND SINGLE POINT POWER CONNECTION. PROVIDE WALL MOUNTED CONTROLLER, ONE PER FAN COIL. ROUTE CONDENSATE TO DISCAHRGE AT AN APPROVED LOCATION.
2. PROVIDE SINGLE POINT POWER CONNECTION. PROVIDE WALL MOUNTED CONTROLLER.

HEAT PUMP SCHEDULE

EQUIP. NO	LOCATION	SERVICE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN SERIES	COOLING CAPACITY			HEATING CAPACITY			ELECTRICAL DATA			MAXIMUM SOUND PRESSURE (dBA)	OPERATING WEIGHT (LBS)	REMARKS
					TOTAL LOAD (MBH)	OA DESIGN TEMP (DEG F)	EER	TOTAL LOAD (MBH)	OA DESIGN TEMP (DEG F)	HSPF	MCA	MOCP	V/PH/HZ			
HP-1	ROOF	FC-1	LG	LSU240HEV1	24	95	10.76	24.2	47	9	15	20	208/1/60	53	95	1-5
HP-2	ROOF	FC-2	LG	LSU240HEV1	24	95	10.76	24.2	47	9	15	20	208/1/60	53	95	1-5

REMARKS:
1. PROVIDE FACTORY MOTOR STARTERS. SEE ELECTRICAL DRAWINGS FOR SEPARATE DISCONNECT SWITCH
2. PROVIDE 120V/1Ø CONVENIENCE OUTLET ON A SEPARATE CIRCUIT UNLESS OUTLET IS AVAILABLE WITHIN 25 FEET OF EQUIPMENT PER 2008 NEC 210.63
3. COMPRESSOR FOR OUTDOOR UNIT TO BE OPERATING WITH VARIABLE SPEED DRIVE (VSD)
4. UNIT TO BE CAPABLE OF LOW AMBIENT COOLING. PROVIDE ALL ACCESSORIES AS REQUIRED BY MANUFACTURER FOR THIS OPTION.
5. SYSTEM MUST BE INSTALLED BY A CONTRACTOR CERTIFIED WITH THE HEAT PUMP MANUFACTURER. SECURE TO CONCRETE BASE. SEE ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION.

AIR SEPARATOR SCHEDULE

EQUIP. NO	LOCATION	SERVICE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN MODEL NUMBER	HEIGHT (IN)	VENT CONN (IN)	BLOW DOWN CONN (IN)	MAX OPER TEMP (DEG F)	EMPTY WEIGHT (LBS)	REMARKS
AS-01	MECHANICAL ROOM	HEATING HOT WATER	ROLAIRTROL	RL-4F	32	4	2	350	155	1-3

REMARKS:
1. PROVIDE WITH INTEGRAL STRAINER
2. SUPPORT INDEPENDENTLY FROM STRUCTURE ABOVE
3. PROVIDE HIGH CAPACITY AUTOMATIC AIR VENT

REGISTERED PROFESSIONAL ENGINEER
#26670PE
OREGON
NOV. 10, 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
kmd architects+planners pc 220 nw eighth avenue portland, oregon 97209 (503.221.1474 kmdarch.com
Westech Engineering, Inc. CIVIL ENGINEERING SERVICES PROVIDED BY CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

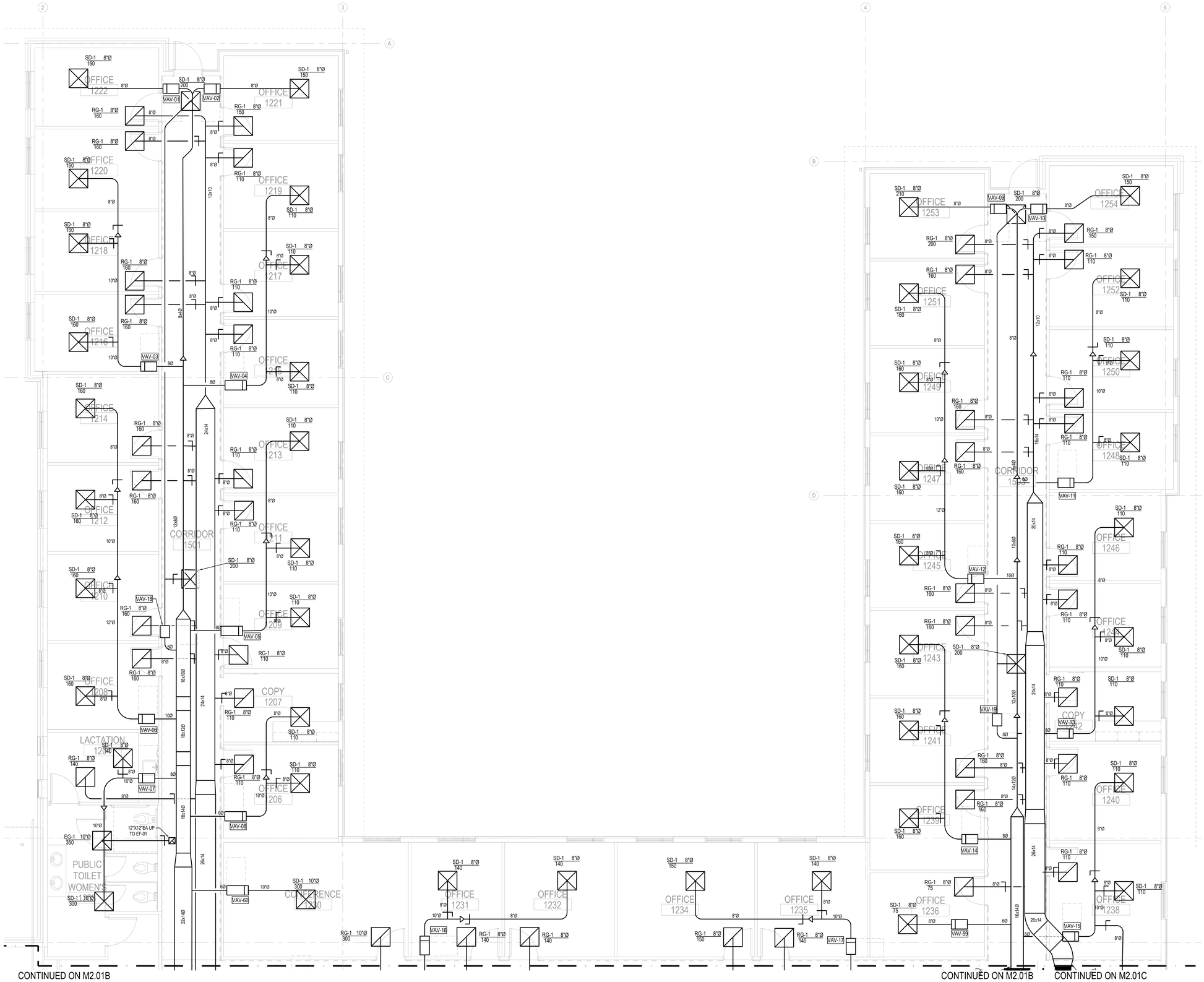
revisions:
1
2
3
4
5

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright© 2016
Carlson Veit Architects P.C.

MECHANICAL SCHEDULES

sheet:
M0.02
of:



GENERAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC IN NATURE. CONTRACTOR TO PROVIDE FITTINGS AS REQUIRED FOR A COMPLETE SYSTEM.
2. COORDINATE DUCTWORK ROUTING WITH STRUCTURAL. ROUTE DUCTS IN JOIST POCKETS TIGHT TO BOTTOM OF DECK.
3. SEE MP2.01A FOR THERMOSTAT LOCATIONS.
4. EXPOSED DUCTWORK SHALL BE FLAT OVAL.

PARTIAL FLOOR PLAN - AREA A - HVAC

SCALE: 1/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
#9867PE
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS

Consultants:
kmd architects+planners pc
220 nw eighth avenue portland, oregon 97209
t 503.227.1474 www.kmdpdx.com
CIVIL ENGINEERING SERVICES PROVIDED BY:
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

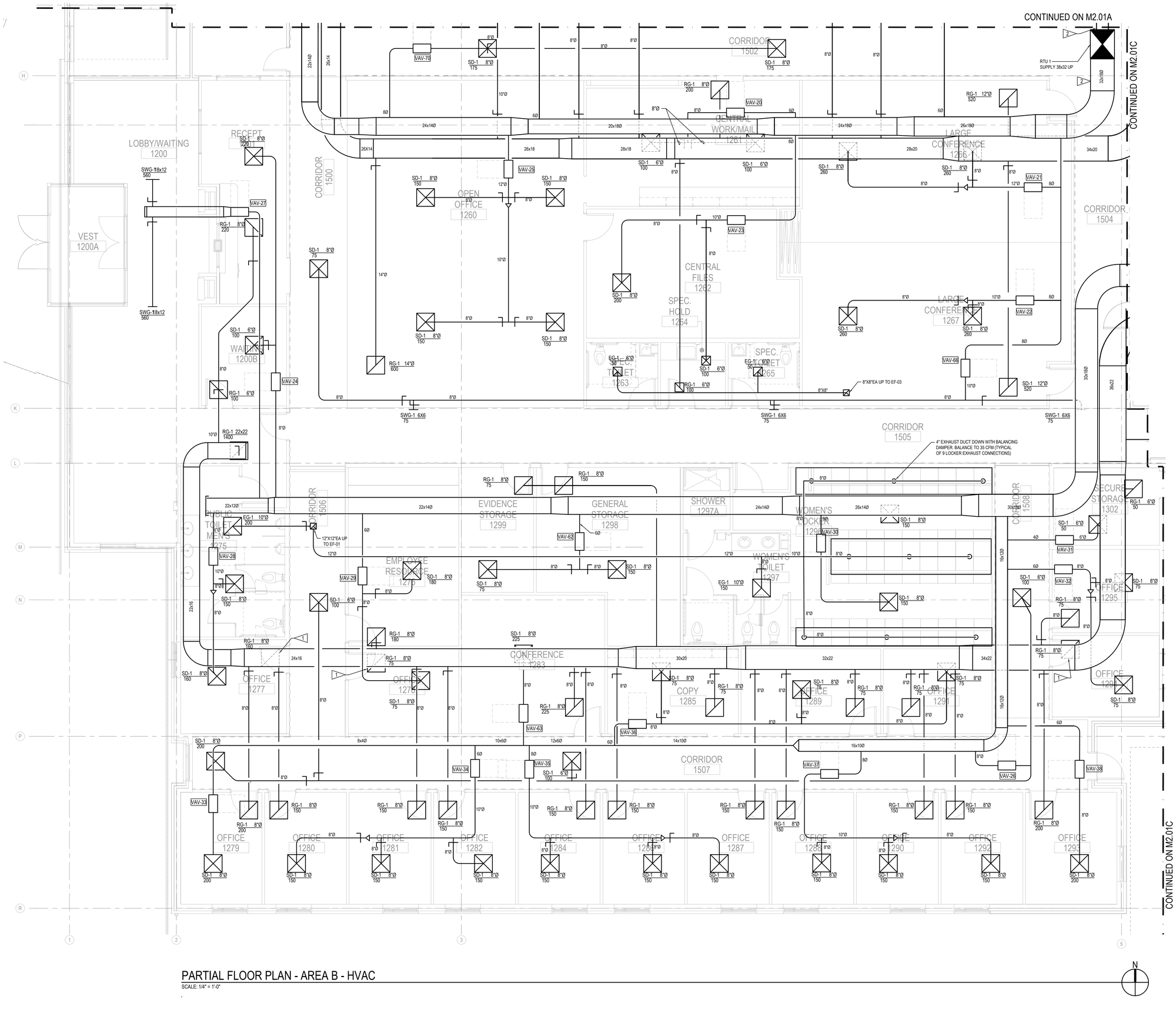
date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA A - HVAC

sheet:
M2.01A

of:



GENERAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC IN NATURE. CONTRACTOR TO PROVIDE FITTINGS AS REQUIRED FOR A COMPLETE SYSTEM.
2. COORDINATE DUCTWORK ROUTING WITH STRUCTURAL. ROUTE DUCTS IN JOIST POCKETS TIGHT TO BOTTOM OF DECK.
3. SEE M2.01A FOR THERMOSTAT LOCATIONS.
4. EXPOSED DUCTWORK SHALL BE FLAT OVAL.

FLAG NOTES

1. RG-1 CONNECT TO UNDERSIDE OF 24X20 RA DUCT WITH MANUAL BALANCING DAMPER.
2. TRANSITION WITH MITERED TURNING VANE ELBOW.

PARTIAL FLOOR PLAN - AREA B - HVAC

SCALE: 1/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
20867PE
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
(503.227.1474
www.kmd-arch.com
SÄZÄN GROUP
CONSULTING STRUCTURAL ENGINEERS
MSC
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY:

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

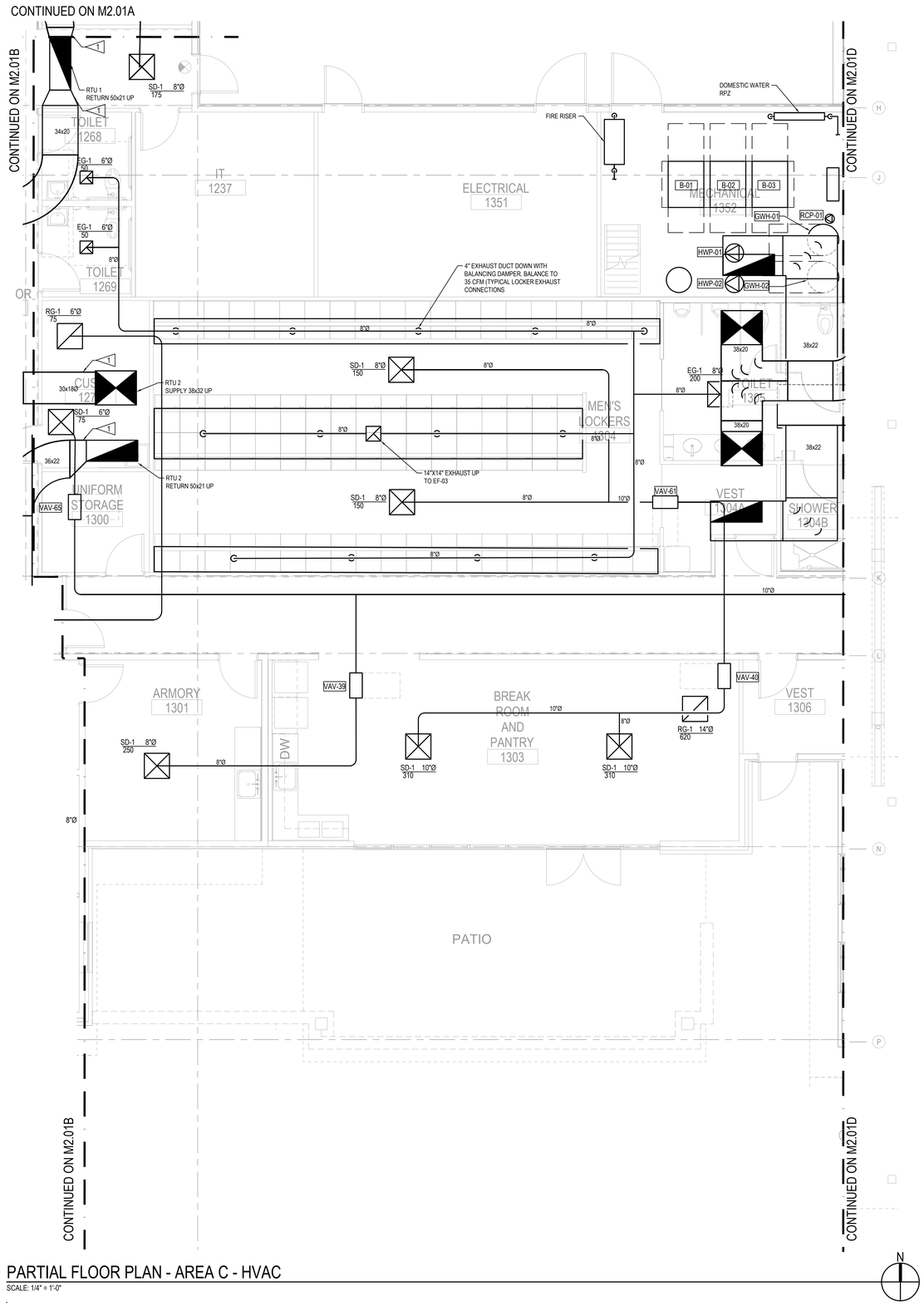
revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA B - HVAC

sheet:
M2.01B
of:



PARTIAL FLOOR PLAN - AREA C - HVAC

SCALE: 1/4" = 1'-0"

GENERAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC IN NATURE. CONTRACTOR TO PROVIDE FITTINGS AS REQUIRED FOR A COMPLETE SYSTEM.
2. COORDINATE DUCTWORK ROUTING WITH STRUCTURAL. ROUTE DUCTS IN JOIST POCKETS TIGHT TO BOTTOM OF DECK.
3. SEE M2.01A FOR THERMOSTAT LOCATIONS.
4. EXPOSED DUCTWORK SHALL BE FLAT OVAL.

FLAG NOTES

TRANSITION WITH MITERED TURNING VANE ELBOW.

REGISTERED PROFESSIONAL ENGINEER
20867PE
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.227.1474
www.kmdpdx.com

Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

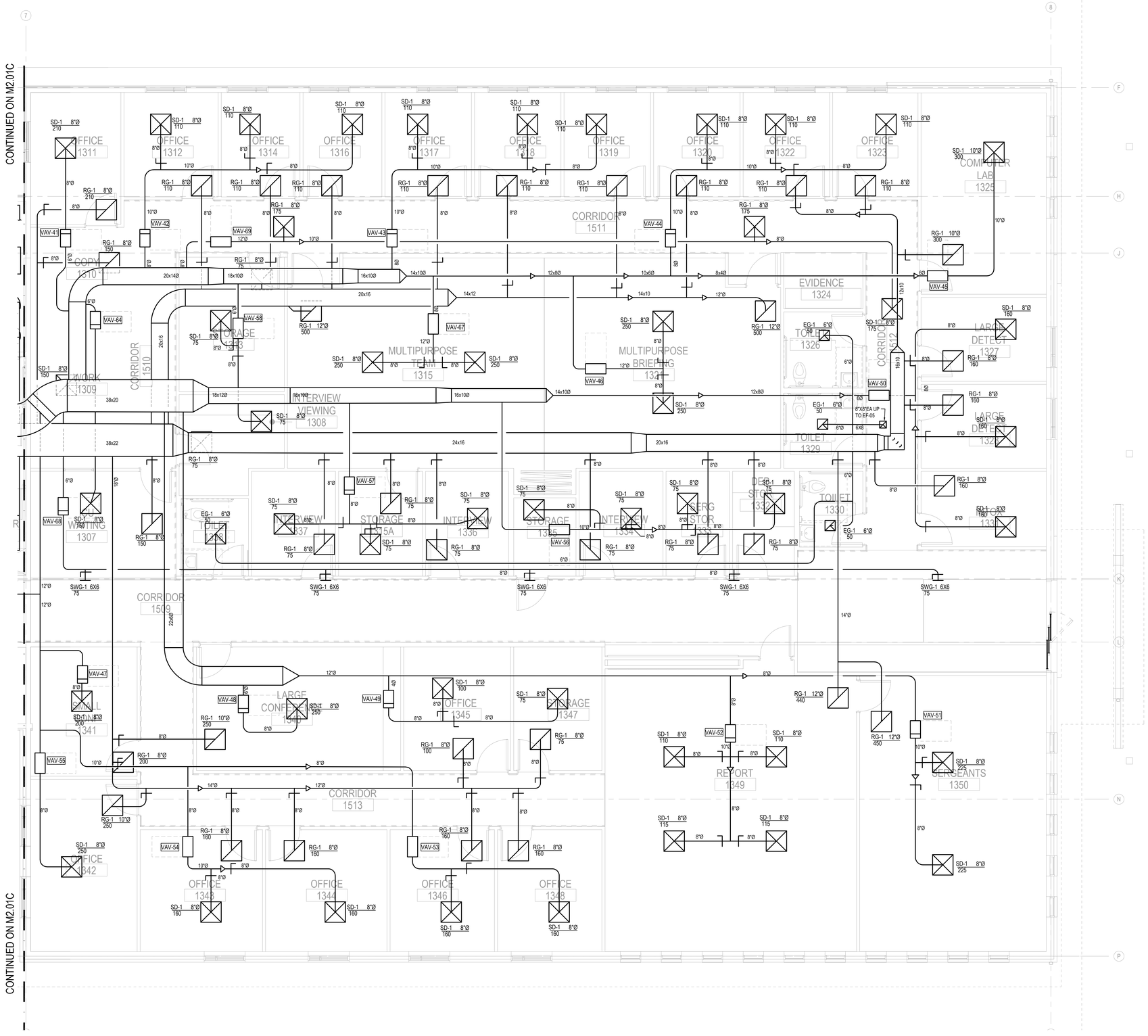
revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA C - HVAC

sheet:
M2.01C
of:



GENERAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC IN NATURE. CONTRACTOR TO PROVIDE FITTINGS AS REQUIRED FOR A COMPLETE SYSTEM.
2. COORDINATE DUCTWORK ROUTING WITH STRUCTURAL. ROUTE DUCTS IN JOIST POCKETS TIGHT TO BOTTOM OF DECK.
3. SEE MP2.01A FOR THERMOSTAT LOCATIONS.
4. EXPOSED DUCTWORK SHALL BE FLAT OVAL.

PARTIAL FLOOR PLAN - AREA D - HVAC

SCALE: 1/4" = 1'-0"

N

REGISTERED PROFESSIONAL ENGINEER
20867PE
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SAZAN GROUP
CONSULTING STRUCTURAL ENGINEERS
MSC

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.227.1474
www.kmd.com

Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

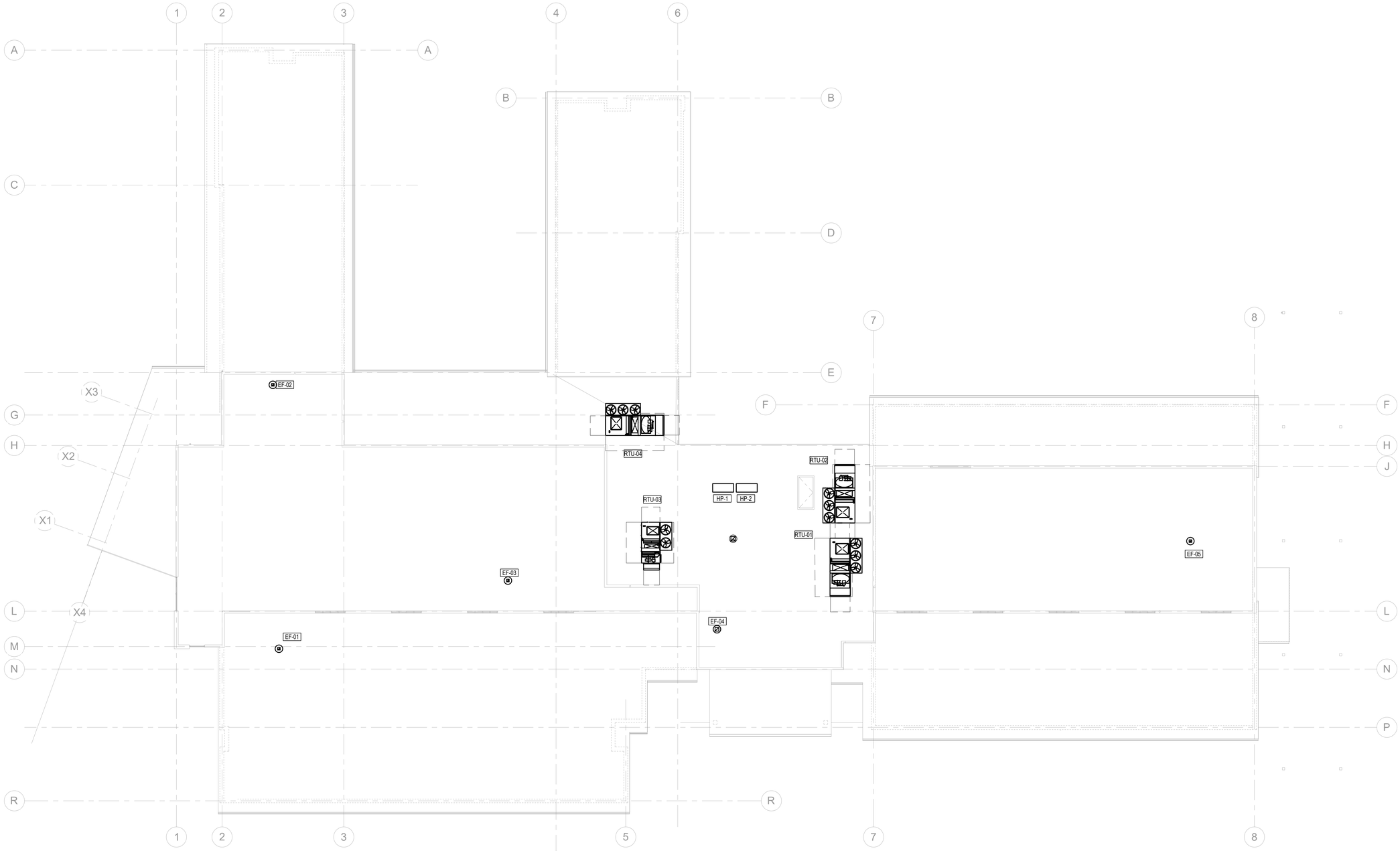
date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA D - HVAC

sheet:
M2.01D

of:



MECHANICAL ROOF PLAN

SCALE: 3/32" = 1'-0"

N

REGISTERED PROFESSIONAL ENGINEER
20867PE
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
(503.227.1474
www.kmdpdx.com

SÄZÄN GROUP

MSC CONSULTING STRUCTURAL ENGINEERS

Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

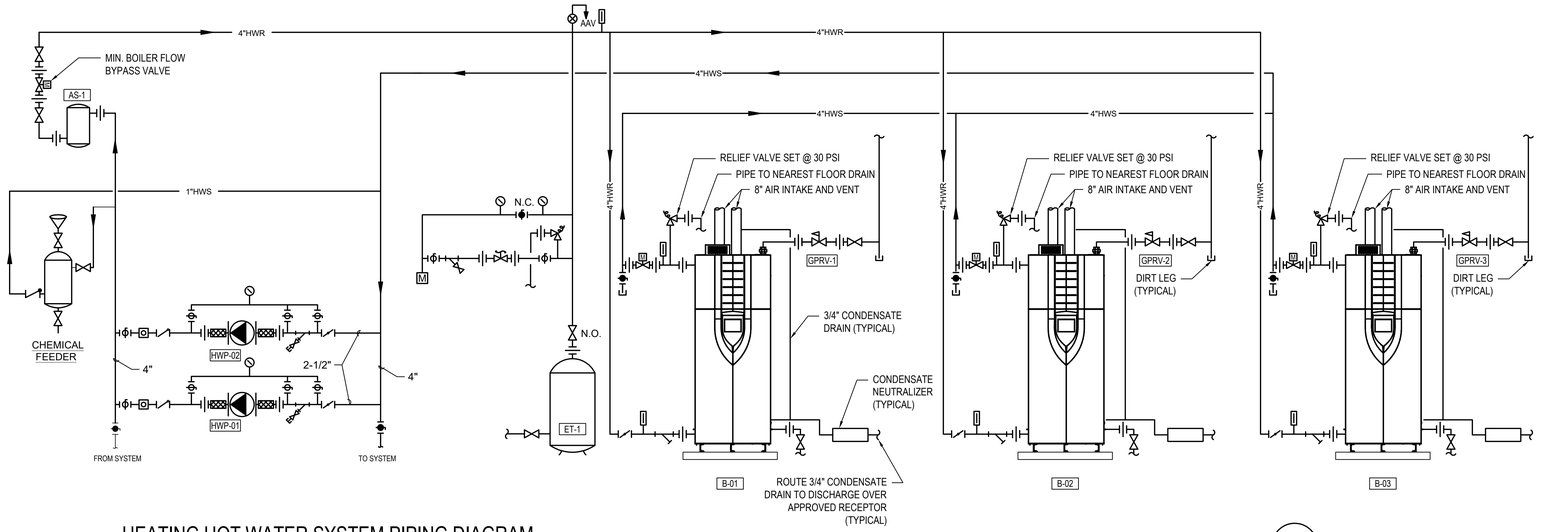
revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

MECHANICAL ROOF PLAN

sheet:
M2.02
of:



HEATING HOT WATER SYSTEM PIPING DIAGRAM

SCALE: NTS

1

REGISTERED PROFESSIONAL ENGINEER
#086705
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
(503.227.1474
www.kmdpdx.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

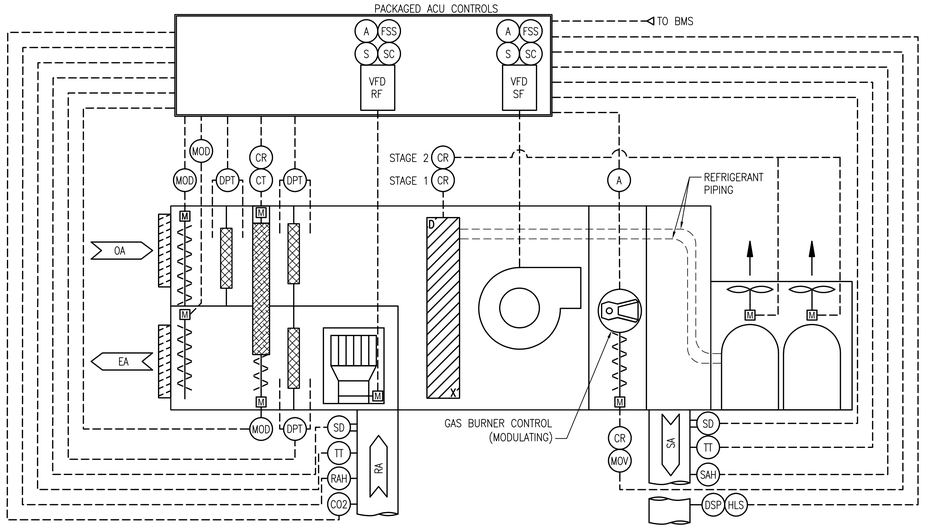
revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright© 2016
Carlson Veit Architects P.C.

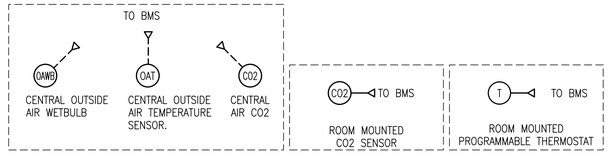
MECHANICAL
DIAGRAMS

sheet:
M4.01
of:



GENERAL NOTE

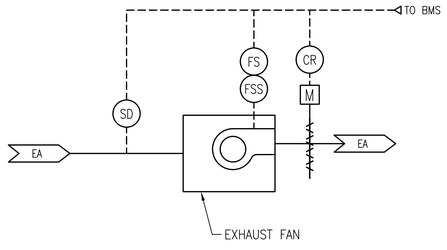
1. DUCT STATIC PRESSURE SENSOR LOCATED 2/3 DOWNSTREAM SUPPLY DUCT.
2. DUCT STATIC PRESSURE HI LIMIT SWITCH HARDWIRED INTERLOCK TO THE SAFETY CIRCUIT & AUXILIARY CONTACT TO BMS.



PACKAGED ACU - DDC WITH ENERGY WHEEL P&ID

SCALE: NTS

1

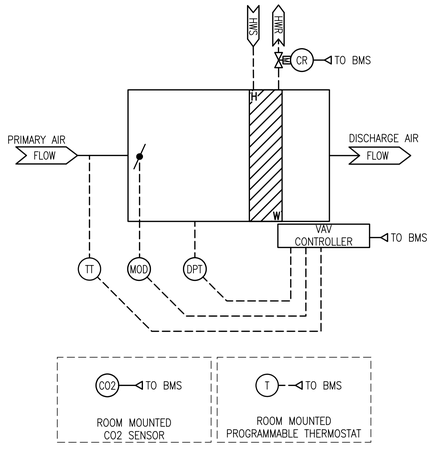


NOTE:
1. PROVIDE OCCUPANCY SCHEDULE TO CONTROL FAN START/STOP

EXHAUST FAN - DDC TOILET ROOM P&ID

SCALE: NTS

2



VAV BOX (HW REHEAT) P&ID

SCALE: NTS

3

REGISTERED PROFESSIONAL ENGINEER
#086705
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc
220 nw eighth avenue portland, oregon 97209
(503.227.1474
www.kmdarch.com
SÄZÄN GROUP
CIVIL ENGINEERING SERVICES PROVIDED BY
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS
MSC CONSULTING STRUCTURAL ENGINEERS

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

Marion County OREGON

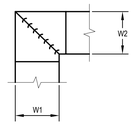
revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

MECHANICAL P&ID

sheet:
M4.02
of:

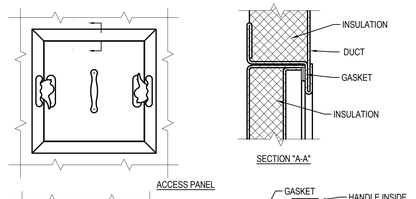


NOTES:

1. ALL VANE ELBOWS SHALL BE CONSTRUCTED AND INSTALLED AS DETAILED BY SMACNA.
2. WHEN W1 DOES NOT EQUAL W2, VANE SHALL BE SINGLE THICKNESS VANE TYPE REGARDLESS OF 'W' DIMENSION.
3. ALL SINGLE THICKNESS VANES SHALL HAVE A 2" RADIUS, 1 1/2" MAXIMUM SPACE BETWEEN VANES AND A 3/4" TRAILING EDGE.
4. WHEN 'W' EQUALS 'W2' AND 'W1' IS GREATER THAN 20" VANES SHALL BE DOUBLE VANE TYPE.

TURNING VANE ELBOW DETAIL 12

SCALE: NTS



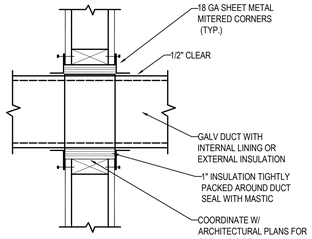
ACCESS DOOR

NOTES:

1. LATCHES SHALL BE OF THE WEDGE TYPE TO CLOSE DOORS TIGHTLY.
2. HINGES ON THE ACCESS DOORS SHALL HAVE NON-CORROSIVE PINS.
3. SEE SMACNA 2005, FIGURE 9-15

DUCT ACCESS PANEL AND DOOR DETAIL 10

SCALE: NTS

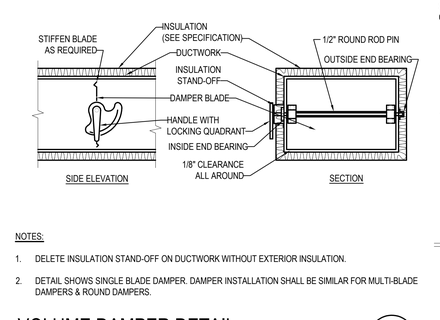


NOTE:

1. SUPPORT DUCT FROM HANGERS

DUCT PENETRATION DETAIL NON FIRE RATED WALL 7

SCALE: NTS

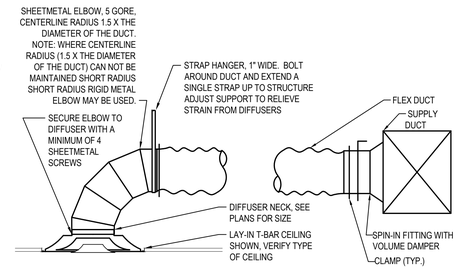


NOTES:

1. DELETE INSULATION STAND-OFF ON DUCTWORK WITHOUT EXTERIOR INSULATION.
2. DETAIL SHOWS SINGLE BLADE DAMPER. DAMPER INSTALLATION SHALL BE SIMILAR FOR MULTI-BLADE DAMPERS & ROUND DAMPERS.

VOLUME DAMPER DETAIL 4

SCALE: NTS

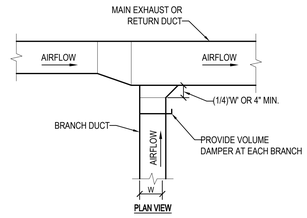


NOTES:

1. SET DIFFUSER FOR HORIZONTAL THROW.
2. ADJUST THROW FOR POSITION IN SPACE FOR ONE, TWO, THREE, OR FOUR-WAY THROWS.

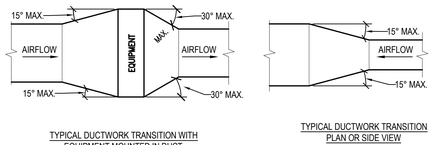
CEILING DIFFUSER DETAIL 1

SCALE: NTS



EXHAUST OR RETURN BRANCH DUCTWORK DETAIL 13

SCALE: NTS

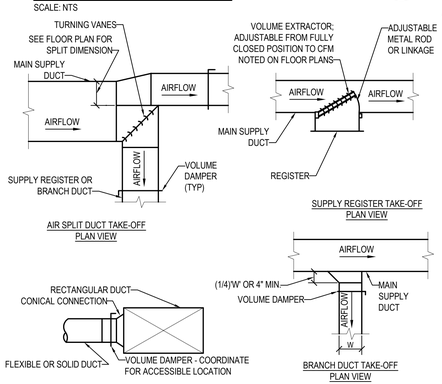


NOTES:

1. UNLESS OTHERWISE INDICATED ON PLANS, MAXIMUM ANGLES SHOWN SHALL APPLY.

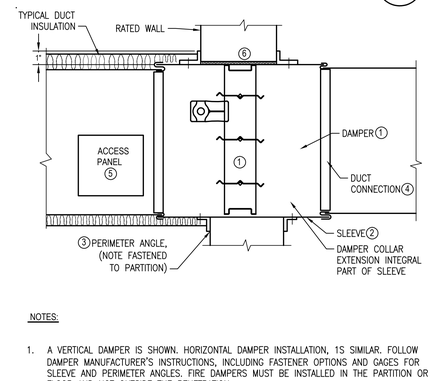
DUCTWORK TRANSITIONS (WITH EQUIPMENT MOUNTED IN DUCT) 11

SCALE: NTS



SUPPLY DUCTWORK TAKE-OFFS DETAIL 8

SCALE: NTS

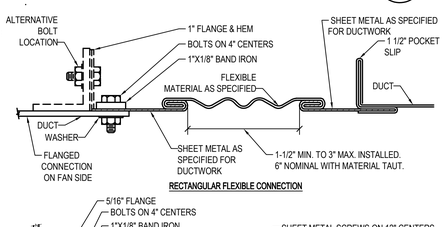


NOTES:

1. A VERTICAL DAMPER IS SHOWN. HORIZONTAL DAMPER INSTALLATION, 1S SIMILAR. FOLLOW DAMPER MANUFACTURER'S INSTRUCTIONS, INCLUDING FASTENER OPTIONS AND GAGES FOR SLEEVE AND PERIMETER ANGLES. FIRE DAMPERS MUST BE INSTALLED IN THE PARTITION OR FLOOR AND NOT OUTSIDE THE PENETRATION.
2. GALVANIZED SLEEVE: GAGE NOT LESS THAN CONNECTING DUCT. FASTEN SLEEVE TO DAMPER FRAME AND TO PERIMETER ANGLES.
3. PERIMETER ANGELS: GALVANIZED STEEL, NOT LESS THAN 1 1/2"X1 1/2", 14 GAGE, TO PROVIDE 1" MINIMUM OVERLAP OF OPENING ON ALL 4 SIDES.
4. BREAKAWAY DUCT CONNECTION: CONTRACTOR'S OPTION OF TYPES SHOWN IN SMACNA.
5. ACCESS PANELS: SIZE AND LOCATION TO PERMIT SERVICING THE FUSIBLE LINK OR LINKS AND ACTUATOR.
6. PROVIDE 1/4" TO 1/2" CLEARANCE ON HEIGHT AND WIDTH. FILL OPEN SPACE WITH ROCK WOOL FIRESTOP FIBER.
7. ALL DUCT WORK RISERS WHICH ARE RUN EXPOSED, SUCH AS THRU ATTIC FLOORS AND MECHANICAL ROOM FLOORS, SHALL BE PROVIDED WITH 3" HIGH CONCRETE CURB AROUND OPENING FOR DUCT.

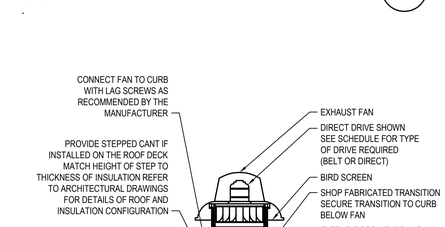
FIRE/SMOKE DAMPER (WALL-MOUNTED) DETAIL 6

SCALE: NTS



FAN FLEXIBLE DUCT CONNECTION DETAIL 5

SCALE: NTS

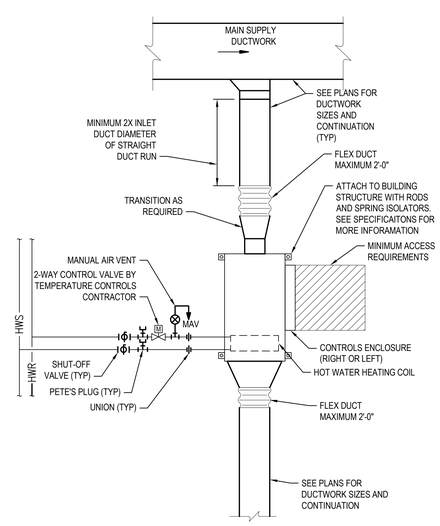


NOTE:

1. PROVIDE WATERTIGHT SEAL AT ROOF PENETRATION.
2. USE ROOF CURB AS TEMPLATE FOR CUTTING ROOF OPENING.
3. ADJUST DUCT RISER AS REQUIRED TO MATCH ROOF CURB OPENING.

DOWNBLAST EXHAUST FAN DETAIL 2

SCALE: NTS



VAV (HW) REHEAT TERMINAL UNIT DETAIL 3

SCALE: NTS

HANGER SIZES FOR RECTANGULAR DUCT

MAXIMUM HALF OF DUCT PERIMETER	PAIRING AT 10'-0" SPACING		PAIRING AT 8'-0" SPACING		PAIRING AT 5'-0" SPACING		PAIRING AT 4'-0" SPACING	
	STRAP	ROD	STRAP	ROD	STRAP	ROD	STRAP	ROD
$\frac{P}{2}$ = 72"	1" X 22 GA	1/4"	1" X 22 GA	1/4"	1" X 22 GA	1/4"	1" X 22 GA	1/4"
$\frac{P}{2}$ = 96"	1" X 18 GA	3/8"	1" X 20 GA	1/4"	1" X 22 GA	1/4"	1" X 22 GA	1/4"
$\frac{P}{2}$ = 120"	1" X 16 GA	3/8"	1" X 18 GA	3/8"	1" X 22 GA	1/4"	1" X 22 GA	1/4"
$\frac{P}{2}$ = 168"	1 1/2" X 16 GA	1/2"	1" X 16 GA	3/8"	1" X 18 GA	3/8"	1" X 18 GA	3/8"
$\frac{P}{2}$ = 192"			1 1/2" X 16 GA	1/2"	1" X 16 GA	3/8"	1" X 16 GA	3/8"
$\frac{P}{2}$ = 193"	SPECIAL ANALYSIS REQUIRED							

WHEN STRAPS ARE LAP JOINED,USE THESE MINIMUM FASTENERS:	SINGLE HANGER MAXIMUM ALLOWABLE LOAD:
1"X 18,20,22 GA - TWO =10 1"X 16 GA - TWO 1/4" DIA 1 1/2"X 16 GA - TWO 3/8" DIA 1 1/2"X 16 GA - TWO 3/8" DIA	1"X 22 GA - 260# 1/4" DIA 270# 1"X 20 GA - 320# 3/8" DIA 680# 1"X 18 GA - 420# 1/2" DIA 1250# 1"X 16 GA - 700# 5/8" DIA 2000# 1 1/2"X 16 GA - 1100# 3/4" DIA 3000#

NOTES:

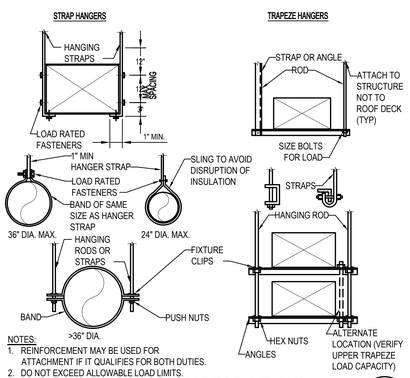
1. DIMENSIONS OTHER THAN GAGE ARE IN INCHES.
2. TABLES ALLOW FOR DUCT WEIGHT, 1/2 LB/SF INSULATION WEIGHT AND NORMAL REINFORCEMENT AND TRAPEZE WEIGHT, BUT NO EXTERNAL LOADS!
3. CONSULT AISI LIGHT GAGE STEEL DESIGN MANUAL AND AISI STEEL CONSTRUCTION MANUAL FOR CRITERIA FOR DESIGN OF OTHER HANGERS.
4. STRAPS ARE GALVANIZED STEEL; OTHER MATERIALS ARE UNCOATED STEEL.
5. ALLOWABLE LOADS LISTED ASSUME THAT DUCTS ARE 16 GA MAXIMUM.

HANGER SIZES FOR ROUND DUCT

DUCT DIAMETER	STRAP HANGERS	MAXIMUM SPACING
UP THRU 26"	ONE 1" X 22 GA	12 FT
27" THRU 36"	ONE 1" X 18 GA	12 FT
37" THRU 50"	ONE 1" X 16 GA	12 FT
51" THRU 60"	TWO 1" X 18 GA	12 FT
61" THRU 84"	TWO 1" X 16 GA	12 FT

NOTES:

1. EXTERNAL LOADS ARE NOT ACCOUNTED FOR



NOTES:

1. REINFORCEMENT MAY BE USED FOR ATTACHMENT IF IT QUALIFIES FOR BOTH DUTIES.
2. DO NOT EXCEED ALLOWABLE LOAD LIMITS.

DUCT SUPPORT / HANGING DETAIL 9

SCALE: NTS

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

REGISTERED PROFESSIONAL ENGINEER
#26672PE
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
(503.227.1474
www.kmdpc.com

Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 ALMSVILLE HIGHWAY SE
SALEM, OREGON

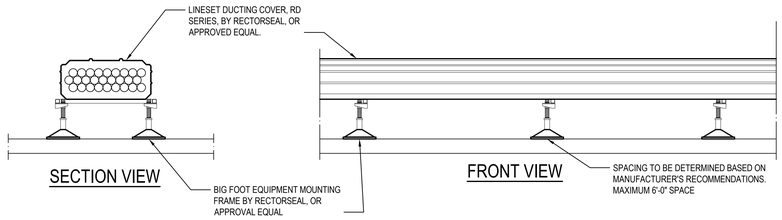
revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

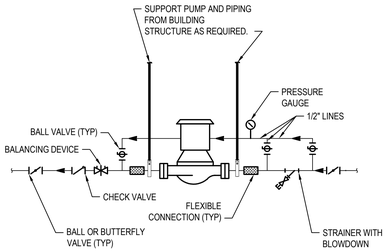
MECHANICAL DETAILS

sheet: M5.01
of:

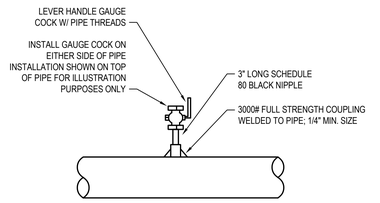


MAXIMUM LINE SET CAPACITY				
DUCT SERIES	WIDTH (IN)	HEIGHT (IN)	QTY OF TUBING	COMMENTS
RD300	11 7/8"	0'-5 1/8"	8	1
RD450	1'-5 3/4"	0'-5 1/8"	12	1
RD600	1'-11 5/8"	0'-5 1/8"	19	1
RD900	2'-11 3/8"	0'-5 1/8"	25	1
1. THESE VALUES ARE BASED ON 3/8" & 5/8" LIQUID / GAS LINE SETS WITH 1/2" THICK INSULATION. SEE MANUFACTURER'S DATA FOR OTHER SIZES.				

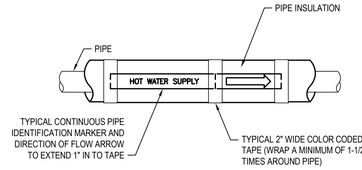
REFRIGERANT PIPING SUPPORT
SCALE: NTS
10



INLINE PUMP DETAIL
SCALE: NTS
7

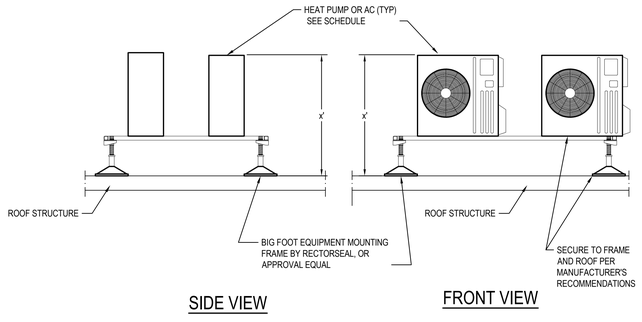


GAUGE PIPING DETAIL
SCALE: NTS
4

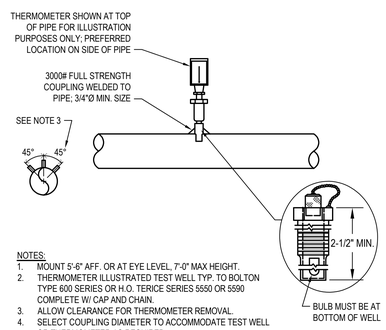


NOTE:
1. APPLY A CONTINUOUS COATING OF CONTACT CEMENT TO THE LABEL TO ENSURE PERMANENT ADHESION.
2. REFER TO SPECIFICATION FOR COLOR CODING OF SERVICES.
3. REFER TO SPECIFICATION FOR LOCATION REQUIREMENTS AND MAXIMUM INTERVAL SPACING.

PIPE IDENTIFICATION DETAIL
SCALE: NTS
1

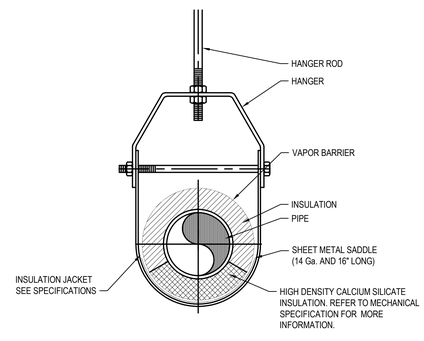


HEAT PUMP OR AC UNIT SUPPORT DETAIL
SCALE: NTS
11

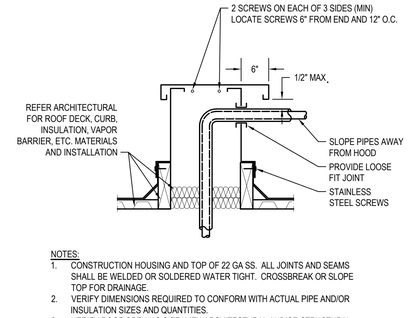


NOTES:
1. MOUNT 5'-6" AFF. OR AT EYE LEVEL, 7'-0" MAX HEIGHT.
2. THERMOMETER ILLUSTRATED TEST WELL TYP. TO BOLTON TYPE 600 SERIES OR H.O. TERICE SERIES 5550 OR 5590 COMPLETE W/ CAP AND CHAIN.
3. ALLOW CLEARANCE FOR THERMOMETER REMOVAL.
4. SELECT COUPLING DIAMETER TO ACCOMMODATE TEST WELL OR THERMOMETER AS REQUIRED.

THERMOMETER PIPING DETAIL
SCALE: NTS
8



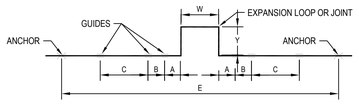
INSULATED PIPE HANGER DETAIL
SCALE: NTS
5



NOTES:
1. CONSTRUCTION HOUSING AND TOP OF 22 GA SS. ALL JOINTS AND SEAMS SHALL BE WELDED OR SOLDERED WATER TIGHT. CROSSBREAK OR SLOPE TOP FOR DRAINAGE.
2. VERIFY DIMENSIONS REQUIRED TO CONFORM WITH ACTUAL PIPE AND/OR INSULATION SIZES AND QUANTITIES.
3. VERIFY ROOF OPENING SIZE WITH ARCHITECTURAL AND/OR STRUCTURAL.

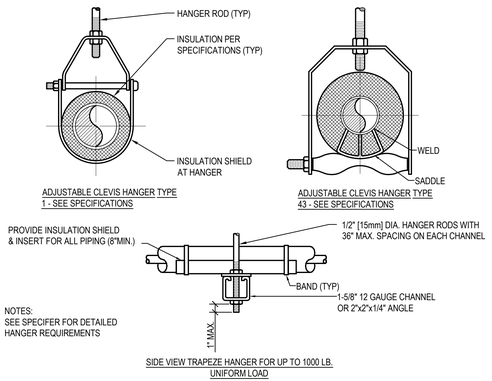
ROOF PENETRATION DETAIL - PIPING
SCALE: NTS
2

LOOP SIZING DATA:
1. USE THESE FORMULAS FOR TRMPERATURE DIFFERENCES NOT EXCEEDING 230° F. FOR OTHER CONDITIONS USE THE ASHRAE GUIDE DATA BOOK.
2. LENGTH OF PIPE IN LOOP "L" INCHES = 2Y+W
3. FOR LENGTH "L" USE FOLLWING FORMULAS:
   A) STEEL PIPE L= 2.67 $\sqrt{D \times E}$
   B) COPPER PIPE L= 3.15 $\sqrt{D \times E}$
4. D = DIAMETER
5. E = DISTANCE BETWEEN ANCHORS
6. W = 0.25 OF L



ACTUAL DIAMETER INCHES	NOMINAL PIPE SIZE INCHES	MAXIMUM DISTANCE INCHES		MAXIMUM SPACING BETWEEN GUIDES
		A	B	
1.32	1	8	24	10'
1.68	1.2	8	24	10'
1.92	1.6	8	36	15'
2.40	2	8	36	15'
2.92	2.6	10	48	20'
3.56	3.2	12	48	20'
4.56	4	16	60	30'
6.72	6	24	120	35'
8.76	8	30	120	45'
10.92	10	40	144	60'
12.96	12	48	144	70'
14.24	14	56	144	70'
16.24	16	64	180	80'
18.28	18	72	180	85'
20.32	20	80	240	90'
24.40	24	96	240	105'

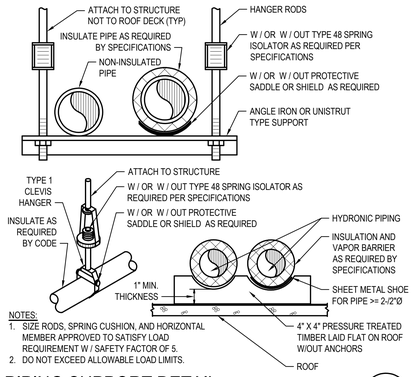
PIPE LOOP AND GUIDE DETAIL
SCALE: NTS
12



MAXIMUM SUPPORT SPACING																			
NOM. SIZE IN.	THRU 3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
PIPE FT.	7	7	7	9	10	11	12	14	16	17	19	22	23	25	27	28	30	32
TUBING FT.	5 FT	6	7	8	8	9	10	12	13	14	15	-	-	-	-	-	-	-
NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.																			

PIPE HANGER DETAIL
SCALE: NTS
9

NOT USED
SCALE: NTS
6



NOTES:
1. SIZE RODS, SPRING CUSHION, AND HORIZONTAL MEMBER APPROVED TO SATISFY LOAD REQUIREMENT W / SAFETY FACTOR OF 5.
2. DO NOT EXCEED ALLOWABLE LOAD LIMITS.

PIPING SUPPORT DETAIL
SCALE: NTS
3

REGISTERED PROFESSIONAL ENGINEER
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc
220 nw eighth avenue portland, oregon 97209
(503.221.1474)
kmdarch.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
Westech Engineering, Inc. CONSULTING SCIENTISTS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

Marion County OREGON

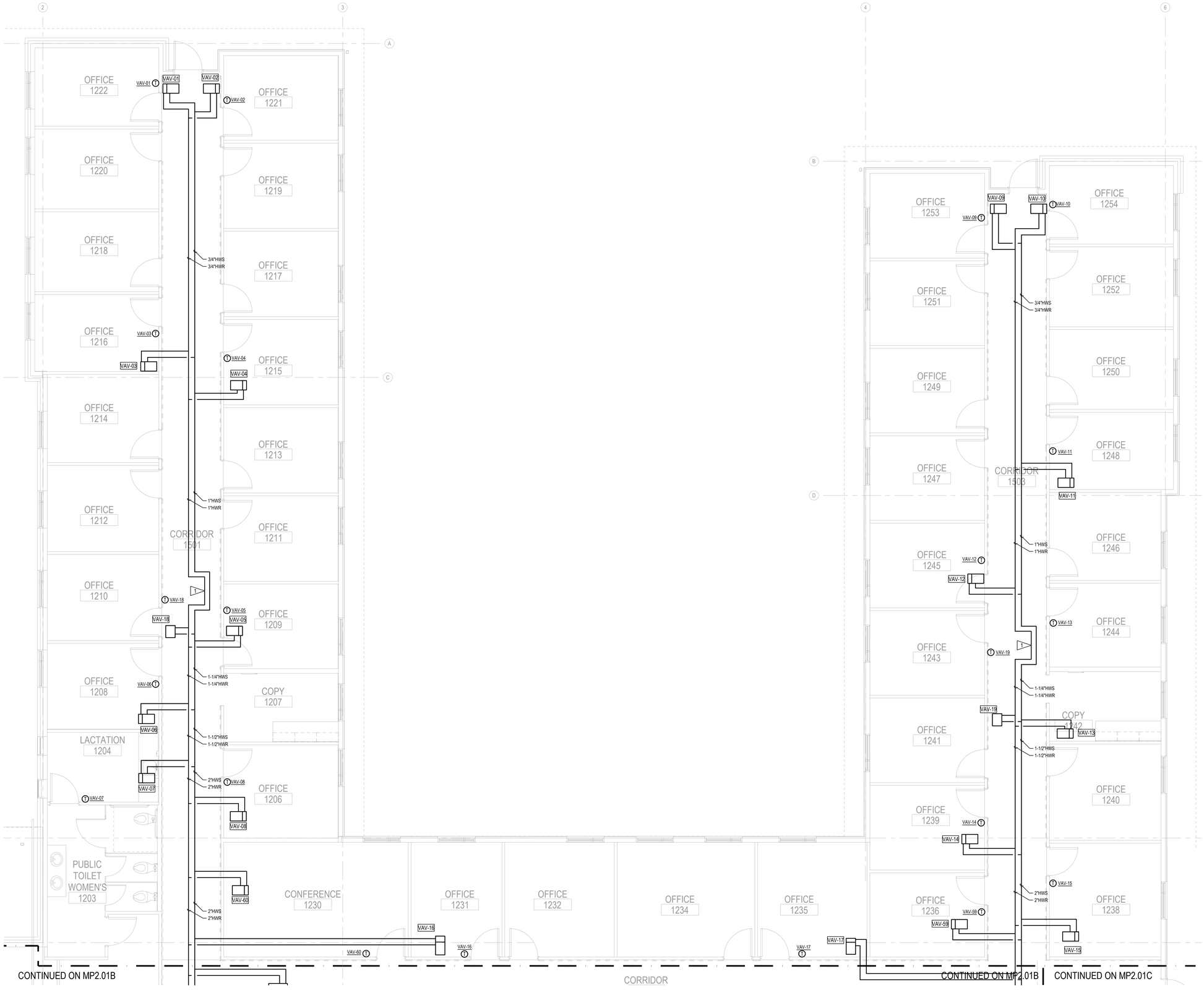
revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

MECHANCIAL DETAILS

sheet: M5.02
of:



PARTIAL FLOOR PLAN - AREA A - MECHANICAL PIPING

SCALE: 1/4" = 1'-0"

GENERAL NOTES

1. HWS & HWR BRANCH PIPING TO TERMINAL UNIT REHEAT COILS SHALL BE 3/4" UNLESS NOTED OTHERWISE.

FLAG NOTES

1. EXPANSION LOOP SHOWN IS DIAGRAMMATIC. ALL EXPANSION LOOPS, ANCHORS AND GUIDES TO BE PROVIDED BY CONTRACTOR AS REQUIRED. SEE SPECIFICATION FOR ADDITIONAL INFORMATION.

REGISTERED PROFESSIONAL ENGINEER
#086705
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.227.1474
www.kmdpdx.com

Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

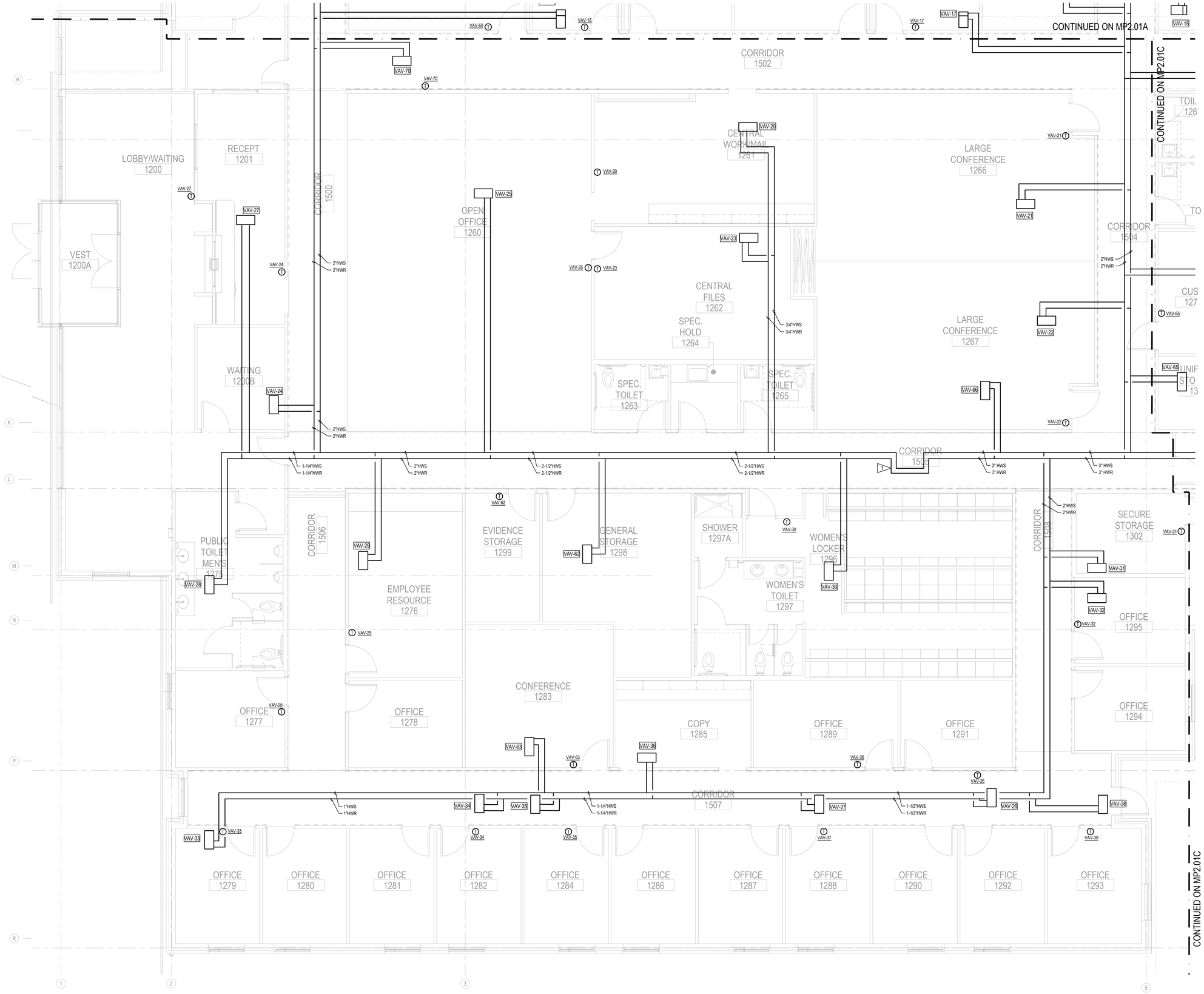
date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA A - MECHANICAL PIPING

MP2.01A

of:



GENERAL NOTES

1. HWS & HWR BRANCH PIPING TO TERMINAL UNIT REHEAT COILS SHALL BE 3/4" UNLESS NOTED OTHERWISE.

FLAG NOTES

7 EXPANSION LOOP SHOWN IS DIAGRAMMATIC. ALL EXPANSION LOOPS, ANCHORS AND GUIDES TO BE PROVIDED BY CONTRACTOR AS REQUIRED. SEE SPECIFICATION FOR ADDITIONAL INFORMATION.

PARTIAL FLOOR PLAN - AREA B - MECHANICAL PIPING

SCALE: 1/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
#86670PE
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.227.1474
www.kmda.com

Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

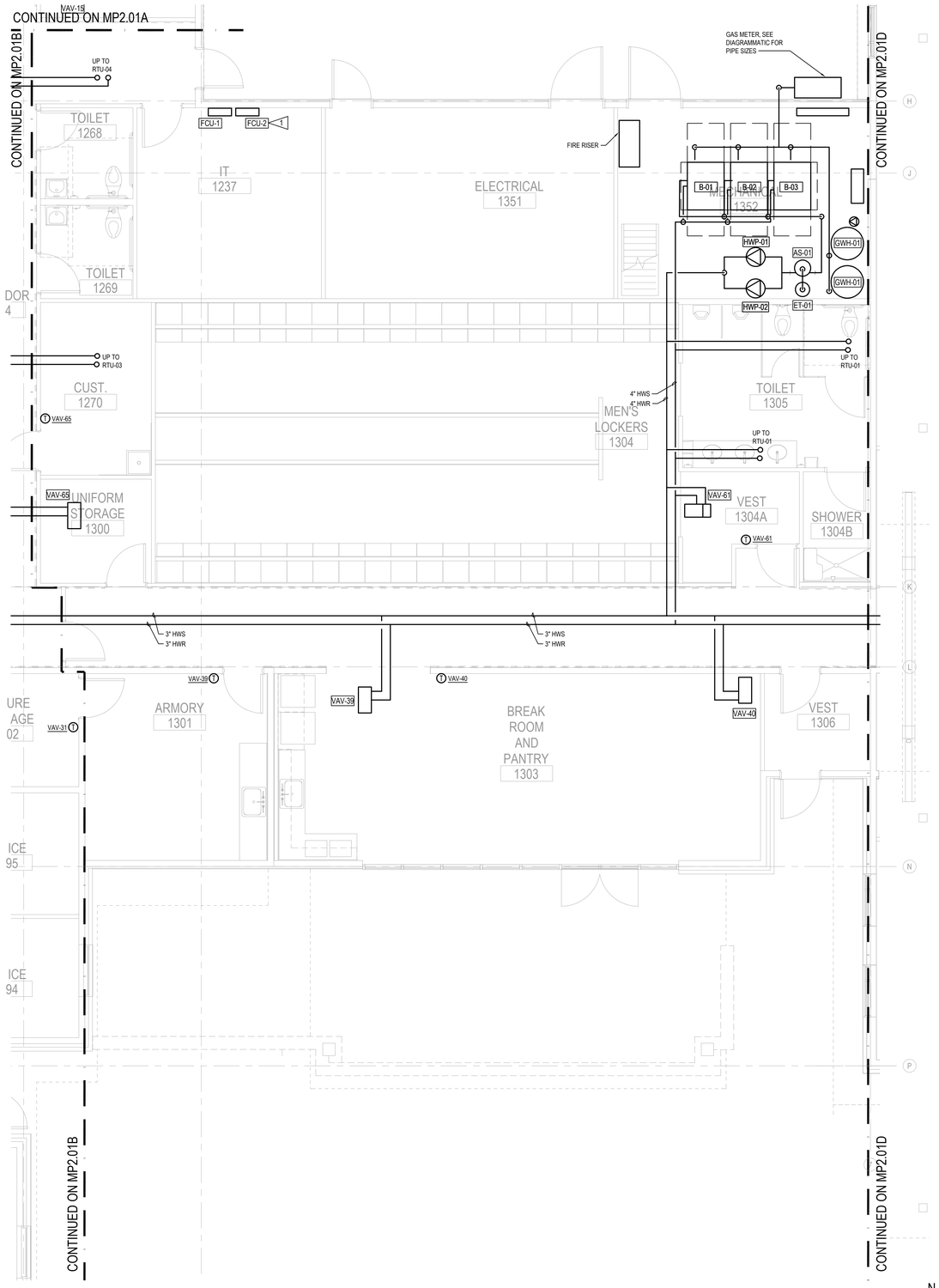
date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA B - MECHANICAL PIPING

MP2.01B

of:



PARTIAL FLOOR PLAN - AREA C - MECHANICAL PIPING

SCALE: 1/4" = 1'-0"

GENERAL NOTES

1. HWS & HWR BRANCH PIPING TO TERMINAL UNIT REHEAT COILS SHALL BE 3/4" UNLESS NOTED OTHERWISE.

FLAG NOTES

1. ROUTE REFRIGERANT PIPING UP TO CONDENSING UNITS. SIZE AS PER MANUFACTURER REQUIREMENTS.

REGISTERED PROFESSIONAL ENGINEER
#086775
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
kmd architects+planners pc 220 nw eighth avenue portland, oregon 97209 t 503.227.1474 www.kmdpdx.com
Westech Engineering, Inc. CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

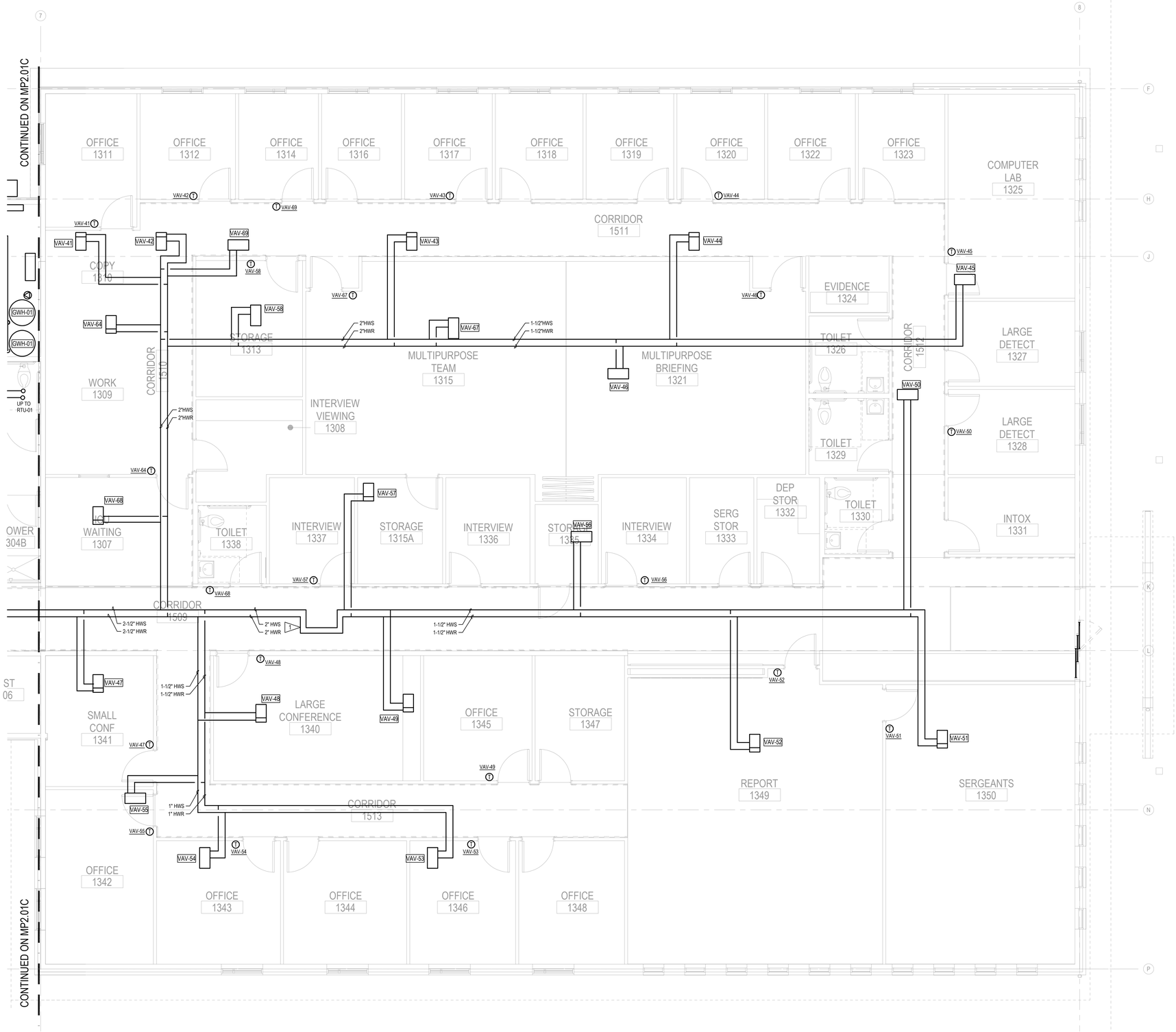
date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA C - MECHANICAL PIPING

sheet:
MP2.01C

of:



GENERAL NOTES

1. HWS & HWR BRANCH PIPING TO TERMINAL UNIT REHEAT COILS SHALL BE 3/4" UNLESS NOTED OTHERWISE.

FLAG NOTES

7 EXPANSION LOOP SHOWN IS DIAGRAMMATIC. ALL EXPANSION LOOPS, ANCHORS AND GUIDES TO BE PROVIDED BY CONTRACTOR AS REQUIRED. SEE SPECIFICATION FOR ADDITIONAL INFORMATION.

PARTIAL FLOOR PLAN - AREA D - MECHANICAL PIPING

SCALE: 1/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
20867PE
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
CONSULTING STRUCTURAL ENGINEERS
MSC

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.227.1474
www.kmdpdx.com
CIVIL ENGINEERING SERVICES PROVIDED BY
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

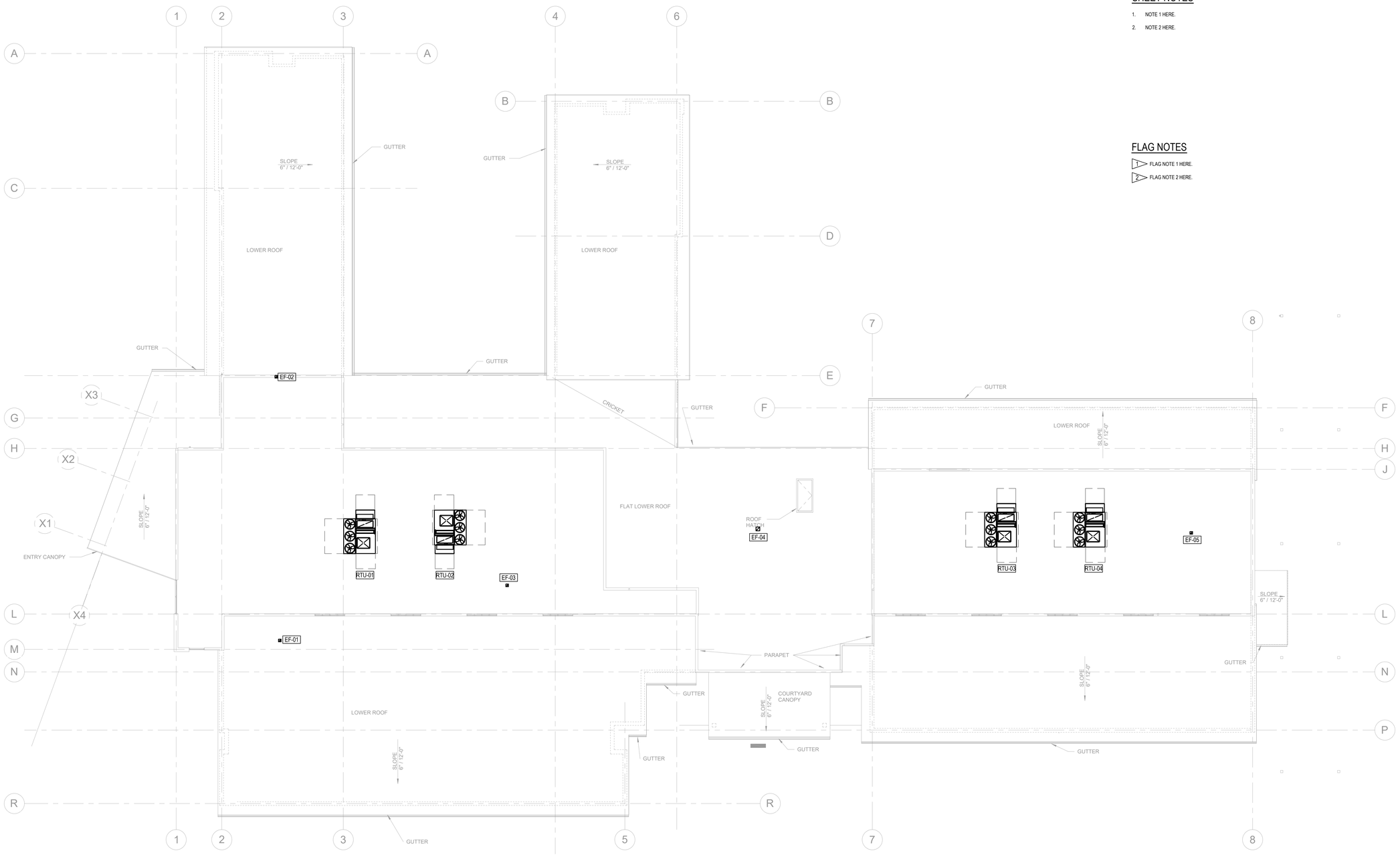
date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA D - MECHANICAL PIPING

MP2.01D

of:



SHEET NOTES

1. NOTE 1 HERE.
2. NOTE 2 HERE.

FLAG NOTES

1 FLAG NOTE 1 HERE.

2 FLAG NOTE 2 HERE.

MECHANICAL ROOF PLAN

SCALE: 3/32" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
20867PE
OREGON
NOV. 10 2015
JOHN KOTAS
Expires: 6/30/17

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.227.1474
www.kmd.com

Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by:

copyright © 2016
Carlson Veit Architects P.C.

MECHANICAL ROOF PLAN

sheet:
M2.02
of:

ABBREVIATIONS

@	AT	MECH	MECHANICAL
A/C	AIR CONDITIONING(ER)		
A (AMP)	AMPERE	MH	METAL HALIDE / MANHOLE
AC	ABOVE COUNTER, ALTERNATING CURRENT	MIN	MINIMUM
AFF	ABOVE FINISHED FLOOR	MISC	MISCELLANEOUS
AHJ	LOCAL AUTHORITY HAVING JURISDICTION	MLO	MAIN LUG ONLY
AIC	AMPERES INTERRUPTING	MOCP	MAXIMUM OVERCURRENT PROTECTION
AL or ALUM	ALUMINUM	MS	MAGNETIC STARTER
ALT	ALTERNATE	MTD	MOUNTED
ANN	ANNUNCIATOR	MTG	MOUNTING
ARCH	ARCHITECT; ARCHITECTURAL	MTR	MOTOR
AUTO	AUTOMATIC		
AUX	AUXILIARY	(N)	NEW
AWG	AMERICAN WIRE GAUGE	N	NORTH; NEUTRAL
		N/A	NOT APPLICABLE
BKBD	BACKBOARD	NC	NORMALLY CLOSED
BKR	BREAKER	NEC	NATIONAL ELECTRICAL CODE
BLDG	BUILDING	NEMA	NATIONAL ELECTRIC MANUFACTURERS ASSOCIATION
		NESC	NATIONAL ELECTRICAL SAFETY CODE
C	CONDUIT	NEUT	NEUTRAL
CAB	CABINET	NFPA	NATIONAL FIRE PROTECTION AGENCY
CAP	CAPACITY	NIC	NOT IN CONTRACT
CB	CIRCUIT BREAKER	NO	NORMALLY OPEN
CKT	CIRCUIT	NTS	NOT TO SCALE
CLG	CEILING		
CLR	CLEAR	OC	ON CENTER
COL	COLUMN	OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
COM	COMMUNICATION	OL	OVERLOAD
CT	CURRENT TRANSFORMER	OS	OPTIONAL STANDBY
CU	COPPER		
		P	POLE; PHASE; PRIMARY
DISC SW	DISCONNECT SWITCH	PA	PUBLIC ADDRESS
DISC	DISCONNECT	PAR	PARALLEL
DN	DOWN	PB	PULL BOX
DWG	DRAWING	PE	PHOTO ELECTRIC
		PF	POWER FACTOR
(E)	EXISTING TO REMAIN	PGE	PORTLAND GENERAL ELECTRIC
E	EAST	PH	PHASE
EDH	ELECTRIC DUCT HEATER	PIV	POST INDICATOR VALVE
EF	EXHAUST FAN	PNL	PANEL
EGC	EQUIPMENT GROUNDING CONDUCTOR	POC	POINT OF CONNECTION
EL	ELEVATION	PWR	POWER
ELEC	ELECTRIC(AL)		
ELEV	ELEVATOR	QTY	QUANTITY
EM	EMERGENCY		
EMT	ELECTRICAL METALLIC TUBING	(R1)	RELOCATE
ENCL	ENCLOSURE	(R2)	RELOCATED (NEW LOCATION)
ENTR	ENTRANCE	RAD	RADIUS
EP	EXPLOSION PROOF	RECPT	RECEPTACLE
EPO	EMERGENCY POWER OFF	REF	REFRIGERATOR
EQUIP/EQP	EQUIPMENT	RLA	RUNNING LOAD AMPS
EWC	ELECTRIC WATER COOLER	RPM	REVOLUTIONS PER MINUTE
EWH	ELECTRIC WATER HEATER		
EXH	EXHAUST	S	SOUTH
EXT	EXTERIOR	SEC	SECURITY; SECOND (ARY)
EXIST	EXISTING	SD	SMOKE DETECTOR
		SECT	SECTION
F	FAHRENHEIT/FUSE	SF	SUPPLY FAN
FA	FIRE ALARM	SHT	SHEET
FC	FOOTCANDLE	SPEC	SPECIFICATION
FCP	FIRE ALARM SYSTEM CONTROL PANEL	SPD	SURGE PROTECTIVE DEVICE
FCU	FAN COIL UNIT	SQ	SQUARE
FD	FIRE DAMPER	SW	SWITCH
FDR	FEEDER	SWBD	SWITCHBOARD
FIXT	FIXTURE	SYM	SYMMETRICAL
FLA	FULL LOAD AMPS	SYS	SYSTEM
FSA	FIRE SYSTEM ANNUNCIATOR		
FSD	FIRE/SMOKE DAMPER	T	THERMOSTAT
FTB	FLUIDIZED THERMAL BACKFILL	TB	TERMINAL BOX
		TC	TIME CLOCK
GEC	GROUNDING ELECTRODE CONDUCTOR	TEL	TELEPHONE
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	TV	TELEVISION
		TYP	TYPICAL
H	HEIGHT		
HOA	HAND OFF AUTOMATIC	UBC	UNIFORM BUILDING CODE
HP	HORSEPOWER	UFC	UNIFORM FIRE CODE
HR	HOUR	UG	UNDERGROUND
HT	HEIGHT	UH	UNIT HEATER
HW	HOT WATER	UL	UNDERWRITERS LABORATORIES
HZ	HERTZ	UON	UNLESS OTHERWISE NOTED
		UV	UNIT VENTILATOR
IBC	INTERNATIONAL BUILDING CODE		
IC	INTERCOM	V	VOLT
IESNA	ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA	VAV	VARIABLE AIR VOLUME
		VEL	VELOCITY
IEEE	INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS	VFD	VARIABLE FREQUENCY DRIVE
IG	ISOLATED GROUND	VM	VOLTMETER
IMC	INTERMEDIATE METAL CONDUIT	VOL	VOLUME
JB or J-BOX	JUNCTION BOX	W	WATT, WEST
		W/	WITH
KCMIL	THOUSAND CIRCULAR MILLS	W/O	WITHOUT
KVA	KILOVOLT AMPERES	WHM	WATTHOUR METER
KVAR	KILOVOLT AMPERES REACTIVE	WP	WEATHERPROOF
KW	KILOWATT		
KWH	KILOWATT HOUR	(X)	DEMOLISH
		X	REACTANCE
LBS	POUNDS	XFMR	TRANSFORMER
LF	LINEAR FEET (FEET)	XMTR	TRANSMITTER
LRA	LOCKED ROTOR AMPS		
LS	LIFE SAFETY	Z	IMPEDANCE
LT	LIGHT		
LTG	LIGHTING	&	AND
LV	LOW VOLTAGE	I.E.:	THAT IS
		I.G.:	FOR EXAMPLE
MAG	MAGNETIC	#	NUMBER
MAN	MANUAL		
MAX	MAXIMUM		
MCA	MINIMUM CIRCUIT AMPACITY		
MCB	MAIN CIRCUIT BREAKER		

GENERAL NOTES

1. ALL FINAL LOCATIONS AND ARRANGEMENTS OF LIGHTING FIXTURES SHALL BE OBTAINED FROM THE ARCHITECTURAL REFLECTED CEILING PLAN.
2. COORDINATE ALL ELECTRICAL DEVICE LOCATIONS (SWITCHES, RECEPTACLES, ETC.) WITH ARCHITECTURAL.
3. COORDINATE CONNECTION REQUIREMENTS FOR MECHANICAL EQUIPMENT WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN. THIS INCLUDES, BUT IS NOT LIMITED TO, OVER CURRENT PROTECTION, CONDUCTORS, RACEWAYS, AND OTHER CIRCUITING EQUIPMENT REQUIRED FOR COMPLETE INSTALLATION. MODIFY ELECTRICAL AS REQUIRED TO ACCOMMODATE, CONNECT AND COMPLETE ALL MECHANICAL EQUIPMENT.
4. SEE MECHANICAL DRAWINGS AND SPECIFICATIONS FOR ALL INTERLOCK WIRING REQUIREMENTS BETWEEN MOTORS, MINIMUM CONTROL WIRING SHALL BE #14 AND MAY BE RUN IN SAME CONDUIT AS MOTOR FEEDERS.
5. PROVIDE EQUIPMENT GROUNDING CONDUCTOR (GREEN WIRE) IN ALL RACEWAYS.
6. PROVIDE A SEPARATE NEUTRAL CONDUCTOR FOR EACH PHASE CONDUCTOR. DO NOT SHARE NEUTRALS.
7. MINIMUM CONDUCTOR SIZE IS #12 AWG AND MINIMUM CONDUIT SIZE IS 3/4"C UNLESS NOTED OTHERWISE.
8. IN GENERAL, WIRE COUNTS ARE NOT INDICATED ON PLANS. FOR EACH 20 AMP 120 VOLT OR 277 VOLT CIRCUIT, PROVIDE 1 #12 CONDUCTOR, 1 #12 NEUTRAL CONDUCTOR, AND 1 #12 GROUNDING CONDUCTOR. ALL WORK SHALL COMPLY WITH NEC 300-17. GROUND WIRE SHALL BE GREEN SHEATHED. WHERE WIRE SIZES/COUNTS ARE INDICATED ON THE DRAWINGS, PROVIDE THESE CIRCUIT CONDUCTORS (INCLUDING NEUTRAL AND GROUNDING CONDUCTORS FOR THE PORTION OF THE CIRCUIT IN WHICH THEY SHARE A COMMON CONDUIT).
9. DO NOT COMBINE MORE THAN THREE SINGLE-PHASE CIRCUITS INTO A SINGLE CONDUIT. IN ALL CASES OF TWO OR THREE CIRCUITS IN A SINGLE HOME RUN CONDUIT, COMBINE CIRCUITS OF THREE DIFFERENT PHASES, CONSISTENT WITH GENERAL NOTE 9 ABOVE. IN ALL CASES OF TWO OR THREE CIRCUITS IN A SINGLE HOME RUN CONDUIT, THE CIRCUITS MAY SHARE A SINGLE GROUNDING CONDUCTOR FOR THE PORTION OF THE CIRCUIT IN WHICH THEY SHARE A COMMON CONDUIT.
10. DO NOT INSTALL ELECTRICAL BOXES IN RATED WALLS CLOSER TO EACH OTHER THAN 2'-0". PROVIDE "PADDY" PADS OR EQUIVALENT ON EACH BOX INSTALLED.
11. SEAL ALL PENETRATIONS OF FIRE WALLS IN ACCORDANCE WITH DIVISION 1. SEAL EXISTING PENETRATIONS OF EXISTING WALLS. SEAL PENETRATIONS OF EXISTING WALLS MADE UNDER THIS CONTRACT. SEAL PENETRATIONS OF NEW WALLS BY CONDUITS PROVIDED UNDER THIS CONTRACT. SEAL PENETRATIONS OF NEW WALLS BY EXISTING CONDUITS.
12. VISIT THE SITE BEFORE SUBMITTING A BID TO OBSERVE EXISTING CONDITIONS.
13. ELECTRICAL EQUIPMENT ARRANGEMENT IN ELECTRICAL ROOM IS BASE ON ONE MANUFACTURER. COORDINATE SPACE REQUIREMENTS WITH EQUIPMENT SUPPLIER. MAINTAIN CLEARANCE REQUIREMENTS, AS PER NEC AND PER EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.
14. ELECTRICAL LAYOUT DRAWINGS ARE PARTIALLY DIAGRAMMATIC. REFER TO ARCHITECTURAL, STRUCTURAL, MECHANICAL AND HVAC DRAWINGS FOR GUIDANCE ON DIMENSIONS, CEILING HEIGHTS, DOOR SWINGS, ROOM FINISHES, STRUCTURAL AND ARCHITECTURAL DETAILS, LOCATIONS OF DUCTS, PIPES AND STRUCTURAL STEEL. INSTALL THE ELECTRICAL SYSTEMS WITHOUT INTERFERING WITH DUCTS, PIPES, STRUCTURAL STEEL, OR OTHER SYSTEMS. LOCATE LIGHTING SYMMETRICALLY IN PROPER RELATION TO FINISHED AREAS EXCEPT WHERE DIMENSIONED ON THE DRAWINGS OR LOCATED ON REFLECTED CEILING PLANS.
15. PROVIDE ADDITIONAL SUPPORTS FOR SWITCHES, STARTERS, RACEWAYS AND OTHER ELECTRICAL EQUIPMENT WHERE THE BUILDING STRUCTURE IS NOT SUITABLE FOR DIRECT MOUNTING.
16. A NUMERAL BESIDE A BRANCH CIRCUIT OUTLET ON WIRING PLANS INDICATES PANELBOARD BRANCH CIRCUIT CONNECTION.
17. SYMBOLS IN THE LEGENDS ARE APPLICABLE GENERALLY. FOR EXACT REQUIREMENTS REFER TO THE SCHEDULES, LAYOUTS, DETAILS AND SPECIFICATIONS.
18. CONDUITS AND CABLE TRAYS SHALL MAINTAIN A MINIMUM CLEARANCE OF 1'-0" FROM HOT WATER AND STEAM PIPES. ALL OTHER PIPING CLEARANCES SHALL BE A MINIMUM OF SIX (6) INCHES.
19. B.O.D. & B.O.T. DO NOT INDICATE BOTTOM OF REQUIRED HANGERS & SUPPORT MATERIALS FOR DUCT AND TRAY.
20. GENERATOR IS A NEC 700 EMERGENCY SYSTEM.

SYMBOLS LEGEND - GENERAL

SYMBOL	DESCRIPTION
	EXISTING TO BE REMOVED
	HEAVY LINEWEIGHT INDICATES NEW WORK
	LIGHT LINEWEIGHT INDICATES EXISTING INFORMATION
	POINT OF CONNECTION (POC) BETWEEN NEW AND EXISTING
XX / XDN	EQUIPMENT IDENTIFIER XX = ABBREVIATION Y = EQUIPMENT SCHEDULE NUMBER
	DRAWING CONSTRUCTION ("FLAG") NOTE
X-XX	EQUIPMENT IDENTIFIER
XXX	RACEWAY/CABLE/CONDUCTOR ROUTING IDENTIFIER- REFER TO RACEWAY/CABLE/CONDUCTOR SCHEDULE
	MATCHLINE
	REVISION CLOUD (ENCIRCLES DRAWING CHANGES MADE SINCE THE PREVIOUS RELEASE)
	REVISION REFERENCE
X / XX.XX	DETAIL REFERENCE DETAIL IDENTIFICATION NUMBER SHEET WHERE DETAIL IS DRAWN
X / XX.XX	ELEVATION REFERENCE ELEVATION IDENTIFICATION NUMBER SHEET WHERE ELEVATION IS DRAWN
X / XX.XX	SECTION REFERENCE SECTION IDENTIFICATION NUMBER SHEET WHERE SECTION IS DRAWN
N	NORTH REFERENCE

SYMBOLS LEGEND - RACEWAY

SYMBOL	DESCRIPTION
HR A-1,3,5	HOMERUN INDICATES NEUTRAL CONDUCTOR BRANCH CIRCUIT NUMBERS PANEL DESIGNATION INDICATES HOT CONDUCTOR INDICATES GROUNDING CONDUCTOR
	MINIMUM 3/4" CONDUIT CONCEALED IN CEILING SPACE OR IN WALL MINIMUM 3/4" WITH #12 AWG CONDUCTORS WITH DEDICATED NEUTRAL EACH CIRCUIT, UNLESS OTHERWISE NOTED ON PLAN. PROVIDE EQUIPMENT GROUNDING CONDUCTORS SIZED PER NFPA 70.
	FLEXIBLE METAL CONDUIT
	CONDUIT - CONCEALED IN OR UNDER FLOOR
UG	CONDUIT - ROUTED UNDERGROUND
LV	LOW-VOLTAGE WIRING (CLASS B)
	CONDUIT OR CABLE VERTICAL DOWN
	CONDUIT OR CABLE VERTICAL UP
	CONDUIT STUB - TERMINATE WITH BUSHING OR CAP IF UNDERGROUND
	BREAK LINE
	CONDUIT SEAL
	EXPANSION FITTING
	CABLE TRAY
	CONDUCTORS - CONNECTED
	CONDUCTORS - NOT CONNECTED
	JUNCTION BOX
	SURFACE MOUNTED RACEWAY

SYMBOLS LEGEND - SECURITY

SYMBOL	DESCRIPTION
CR WP	CARD READER WP = WEATHERPROOF
K WP	KEYPAD WP = WEATHERPROOF
MS	MOTION DETECTOR - INFRARED TYPE UNLESS OTHERWISE NOTED
ES	ELECTRIC DOOR STRIKE
DC	DOOR/WINDOW CONTACT
H	ADA DOOR OPERATION PUSHBUTTON
REX	REQUEST TO EXIT
WP	CCTV CAMERA - FIXED TYPE WP = WEATHERPROOF
WP	CCTV CAMERA - PAN/TILT/ZOOM TYPE WP = WEATHERPROOF
P	ALARM PUSHBUTTON P = WITH PILOT LIGHT
AV	ALARM BUZZER
AV	ALARM BUZZER WITH STROBE
A	ALARM BELL
A	ALARM BELL WITH STROBE
A	ALARM HORN WITH CHIME
BG	BREAK GLASS SENSOR

SYMBOLS LEGEND - POWER

SYMBOL	DESCRIPTION
	480Y/277V, 3Ø, 4W PANELBOARD
	208Y/120V, 3Ø, 4W PANELBOARD
	EQUIPMENT CABINET - TYPE AS NOTED
	GROUND BAR
	SINGLE RECEPTACLE NEMA 5-20R, +18" AFF UON
D	DUPLEX RECEPTACLE NEMA 5-20R, +18" AFF UON (D = DEDICATED CIRCUIT)
	DOUBLE DUPLEX RECEPTACLE NEMA 5-20R, +18" AFF UON
T	TAMPER RESISTANT RECEPTACLE NEMA 5-20R, +18" AFF UON
	RECEPTACLE NEMA 5-20R WITH GROUND FAULT CIRCUIT INTERRUPTER, +18" AFF UON
	SPLIT WIRED DUPLEX RECEPTACLE NEMA 5-20R, +18" AFF UON
IG	DUPLEX RECEPTACLE NEMA 5-20R, ISOLATED GROUND, +18" AFF UON
	RECEPTACLE NEMA 5-20R, ABOVE COUNTER.
	RECEPTACLE NEMA 5-20R WITH GROUND FAULT CIRCUIT INTERRUPTER, ABOVE COUNTER. COORDINATE WITH CASEWORK SHOP DRAWINGS AND ARCHITECTURAL DRAWINGS.
T T	TAMPER RESISTANT RECEPTACLE NEMA 5-20R WITH GROUND FAULT CIRCUIT INTERRUPTER, ABOVE COUNTER. COORDINATE WITH CASEWORK SHOP DRAWINGS AND ARCHITECTURAL DRAWINGS.
	RECEPTACLE NEMA 5-20R, CONNECTED TO EMERGENCY CIRCUIT, +18" AFF UON
	RECEPTACLE NEMA 5-20R MOUNTED ABOVE COUNTER. COORDINATE WITH CASEWORK SHOP DRAWINGS AND ARCHITECTURAL DRAWINGS.
	SPECIAL PURPOSE RECEPTACLE TYPE AS SHOWN ON PLANS
	SINGLE SERVICE OR COMBINATION FLUSH FLOOR POKE THRU. REFER TO FLOOR PLANS FOR DEVICES.
	SINGLE SERVICE OR COMBINATION FLUSH MOUNTED FLOOR BOX. REFER TO FLOOR PLANS FOR DEVICES.
	CEILING-MOUNTED DUPLEX RECEPTACLE, NEMA 5-20R
	POWER/COMM POLE - FLOOR TO CEILING
	SURFACE MOUNTED FLOOR BOX (PEDESTAL TYPE)
	PUSH BUTTON
	JUNCTION BOX

SYMBOLS LEGEND - SWITCHES

SYMBOL	DESCRIPTION
$	SINGLE-POLE WALL SWITCH - MOUNT SWITCHES AT 48" AFF. TO CL, UON.
$xx	WALL SWITCH - MOUNT SWITCHES AT +48" AFF. TO CL, UON. D = DIMMER 3 = 3-WAY 4 = 4-WAY K = KEYED LV = LOW-VOLTAGE OS = OCCUPANCY SENSOR TYPE OP = OCCUPANCY/PHOTOELECTRIC TYPE WP = WEATHERPROOF x = LOWER CASE LETTER INDICATES SWITCHING GROUP ANY COMBINATION OF SWITCH TYPES CAN BE USED (IE. 3K = 3-WAY KEYED SWITCH)
DL	DAYLIGHTING SENSOR
OS	CEILING MOUNTED OCCUPANCY SENSOR WITH POWER PACK - PASSIVE INFRARED TYPE UNLESS NOTED U = ULTRASONIC DT = DUAL TECHNOLOGY
OS	OCCUPANCY SENSOR WALL MOUNTED
PC	PHOTOELECTRIC CONTROL CEILING MOUNTED
PC	PHOTOELECTRIC CONTROL WALL MOUNTED
TC	TIME CLOCK - TYPE AS NOTED
PP	LIGHTING CONTROL SYSTEM POWER PACK
SB	SWITCH BYPASS DEVICE
ICS1-1	ILLUMINATION CONTROL STATION
R	RELAY

SYMBOLS LEGEND - COMMUNICATIONS

SYMBOL	DESCRIPTION
	COMMUNICATIONS OUTLET # = NUMBER OF COMMUNICATION PORTS. (IE 1,2,3) W = SINGLE COMMUNICATIONS PORT WALL MOUNTED AT +54" AFF P = PAYPHONE, WALL MOUNTED AT +48" AFF
D	INTERCOM OUTLET D = DESK MOUNTED W = WALL MOUNTED AT +54" AFF
M D	COMMUNICATIONS MICROPHONE D = DESK MOUNTED W = WALL MOUNTED AT +48" AFF
WAP	COMPUTER NETWORK WIRELESS ACCESS POINT, CEILING MOUNTED
	PAINTED FIRE RESISTANT 3/4" PLYWOOD BACKBOARD
	19" COMMUNICATIONS RACK - FLOOR MOUNTED
	19" COMMUNICATIONS RACK - WALL MOUNTED
2/1	COMMUNICATIONS - OUTLET TOP # = DATA CONNECTIONS BOTTOM # = VOICE CONNECTIONS
P	PROJECTOR

SYMBOLS LEGEND - LIGHTING

SYMBOL	DESCRIPTION
A1 / a	FIXTURE TYPE DESIGNATION SWITCH LEG DESIGNTION
NL	SHADING INDICATES LIGHT FIXTURE ON EMERGENCY CIRCUIT OR WITH BATTERY BACKUP BALLAST NL = NIGHT LIGHT
	2x4 LIGHT FIXTURE
	1x4 LIGHT FIXTURE
	2x2 LIGHT FIXTURE
	WALL MOUNTED LIGHT FIXTURE
	UNDER-CABINET LIGHT FIXTURE
	LINEAR WALL WASH LIGHT FIXTURE
	STRIP LIGHT FIXTURE
	DOWNLIGHT FIXTURE
	WALL MOUNTED LIGHT FIXTURE
	WALL WASH LIGHT FIXTURE
	WALL MOUNTED DIRECTIONAL LIGHT FIXTURE
	DECORATIVE PENDENT LIGHT FIXTURE
	TRACK LIGHT - LENGTH AS INDICATED ON PLANS NUMBER OF LIGHT FIXTURES AS SHOWN
	POLE-MOUNTED LIGHT FIXTURE NUMBER OF FIXTURES AS SHOWN ON PLANS
	IN-GROUND LANDSCAPE LIGHT FIXTURE
	ILLUMINATED EXIT SIGN - SINGLE FACE ARROW INDICATES DIRECTION OF EGRESS, UNIVERSAL MOUNT
	ILLUMINATED EXIT SIGN - DOUBLE FACE ARROW INDICATES DIRECTION OF EGRESS, UNIVERSAL MOUNT
	BATTERY-POWERED EMERGENCY WALLPACK
	COMBINATION BATTERY POWERED EMERGENCY WALLPACK AND ILLUMINATED EXIT SIGN

SYMBOLS LEGEND - ONE-LINE DIAGRAM

SYMBOL	DESCRIPTION
	TRANSFORMER
M	METER
	SEPARABLE CONNECTOR
XX	DRAWOUT AC TYPE POWER CIRCUIT BREAKER
CB	CIRCUIT BREAKER
G	CIRCUIT BREAKER WITH GROUND FAULT PROTECTION
XXX	FEEDER TAG - REFER TO FEEDER SCHEDULE
XXX	PANELBOARD
	TRANSFER SWITCH (AUTO)
M	MOTOR CONNECTION
M	STARTER 3-POLE, NEMA SIZE 1 MINIMUM UNLESS NOTED OTHERWISE
	COMBINATION STARTER HP RATED, 3-POLE, NEMA SIZE 1 MINIMUM UNLESS NOTED OTHERWISE. OVERCURRENT PROTECTION AS REQUIRED BY EQUIPMENT MANUFACTURER OR AS NOTED.
	DISCONNECT SWITCH 3-POLE UNLESS NOTED OTHERWISE
	FUSED DISCONNECT SWITCH 3-POLE UNLESS NOTED OTHERWISE - OVERCURRENT PROTECTION AS REQUIRED BY EQUIPMENT MANUFACTURER OR AS NOTED

SYMBOLS LEGEND - AUDIO VISUAL / CLOCK

SYMBOL	DESCRIPTION
TV	TV OUTLET

SYMBOLS LEGEND - SITE

SYMBOL	DESCRIPTION
T	TRANSFORMER
PB	PULLBOX - SIZE AS INDICATED OR AS REQUIRED BY CODE
HH	HANDHOLE
MH	MANHOLE
	POLE-MOUNTED LIGHT FIXTURE NUMBER OF FIXTURES AS SHOWN ON PLANS
	IN-GROUND LANDSCAPE LIGHT FIXTURE

SYMBOLS LEGEND - GROUNDING

SYMBOL	DESCRIPTION
	GROUND CONNECTION
	GROUND ROD
	GROUND WELL
	AIR TERMINAL

REGISTERED PROFESSIONAL ENGINEER
90651PE
OREGON
JULY 8, 2015
BRADLEY W. MEYER
Expires: 12/31/18

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc
220 nw eighth avenue portland, oregon 97209
t 503.221.1474 www.kmd.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
Westech Engineering, Inc. CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

Marion County OREGON

revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

ELECTRICAL LEGEND, NOTES & ABBREVIATIONS

sheet:
E0.01
of:

LUMINAIRE SCHEDULE

TYPE	MANUFACTURER	SERIES	DESCRIPTION	
L01	LITHONIA COOPER	2RTL4 SERIES METALUX 24AC SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	2'x4' LED RECESSED TROFFER 4000 3500K 85 CONFIRM WITH ARCHITECT RECESSED 73 UNIVERSAL 0-10V DIMMING, DLC LISTED
L012	LITHONIA COOPER	2RTL2 SERIES METALUX 22AC SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	2'x2' LED RECESSED TROFFER 3300 3500K 82 CONFIRM WITH ARCHITECT RECESSED 35 UNIVERSAL 0-10V DIMMING, DLC LISTED
L012H	LITHONIA COOPER	2RTL2 SERIES METALUX 22AC SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	2'x2' LED RECESSED TROFFER 3300 3500K 82 CONFIRM WITH ARCHITECT RECESSED FOR HARD LID CEILING 35 UNIVERSAL 0-10V DIMMING, DLC LISTED
L02	LITHONIA COOPER	2GTL SERIES 24GR SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	2'x4' LED RECESSED TROFFER 4800 3500K 88 CONFIRM WITH ARCHITECT RECESSED 43 UNIVERSAL 0-10V DIMMING, DLC LISTED, DRY WALL FRAME KIT
L03	FINELITE PRUDENTIAL	HP-4 SERIES BIONIC SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	4' LINEAR WALL MOUNTED INDIRECT/DIRECT LED 5800, BOOST STANDARD OUTPUT UP AND DOWN 3500K 80 CONFIRM WITH ARCHITECT SURFACE 56 UNIVERSAL 0-10V DIMMING, ETO APPROVED
L03P	FINELITE PRUDENTIAL	HP-4 SERIES BIONIC SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	4' LINEAR WALL MOUNTED INDIRECT/DIRECT LED 5800, BOOST STANDARD OUTPUT UP AND DOWN 3500K 80 CONFIRM WITH ARCHITECT PENDANT 56 UNIVERSAL 0-10V DIMMING, ETO APPROVED
L03R	FINELITE PRUDENTIAL	HP-4 SERIES BIONIC SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	4' LINEAR RECESSED LINEAR LED 1917, BOOST STANDARD OUTPUT 3500K 80 CONFIRM WITH ARCHITECT RECESSED 19 UNIVERSAL 0-10V DIMMING, ETO APPROVED
L04	CORELITE LITHONIA	DIVIDE DSI SERIES LBLED SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	1'x4' SURFACE MOUNTED LED LIGHT FIXTURE 3600 3500K 85 CONFIRM WITH ARCHITECT SURFACE 38 UNIVERSAL 0-10V DIMMING, DLC LISTED, DAMP LISTED
L04R	CORELITE LITHONIA	DIVIDE DRI SERIES BLT SERIES LED	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	1'x4' RECESSED MOUNTED LED LIGHT FIXTURE 3000 3500K 85 CONFIRM WITH ARCHITECT SURFACE 24 UNIVERSAL 0-10V DIMMING, DLC LISTED, DIFFUSE OPTIC
L05	LITHONIA HALO	LDN6 SERIES PD630 SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	6" RECESSED LED DOWNLIGHT 1000 3500K 80 CONFIRM WITH ARCHITECT RECESSED 36 UNIVERSAL 0-10V DIMMING, DLC LISTED, DAMP LISTED
L06	LITHONIA HALO	LDN6 SERIES PD630 SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	6" RECESSED LED DOWNLIGHT 1000 3500K 80 CONFIRM WITH ARCHITECT RECESSED 36 UNIVERSAL 0-10V DIMMING, DLC LISTED, WET LISTED
L08	LITHONIA METALUX	ZL2N SERIES SNLED SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: LENS:	4' SURFACE MOUNTED LED STRIP FIXTURE 3000 3500K 80 CONFIRM WITH ARCHITECT SURFACE 42 UNIVERSAL MEDIUM DIFFUSE
L08E	LITHONIA METALUX	ZL2N SERIES SNLED SERIES	TYPE:	SAME AS L08 EXCEPT; PROVIDE EMERGENCY BATTERY PACK FOR 1400 LUMIN OUTPUT
L08HA	KENALL	MILLENIUM STRETCH SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	1' X 4' SURFACE MOUNTED LED HIGH ABUSE WRAP AROUND FIXTURE 5014 3500K 85 WHITE SURFACE 49 UNIVERSAL 0-10V DIMMING, DLC LISTED OR ETO APPROVED

LUMINAIRE SCHEDULE

TYPE	MANUFACTURER	SERIES	DESCRIPTION	
L09	FINELITE SELUX	HP-2 SERIES M36 SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	2' WALL MOUNTED LED VANITY FIXTURE 1200 3500K 80 CONFIRM WITH ARCHITECT SURFACE 24 UNIVERSAL 0-10V DIMMING, DAMP LISTED, DLC LISTED OR ETO APPROVED
L10	LITHONIA COOPER	2GTL4 SERIES METALUX 22FR LED	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	2'x4' LED RECESSED TROFFER 3100 3500K 85 CONFIRM WITH ARCHITECT RECESSED 31 UNIVERSAL 0-10V DIMMING, DLC LISTED
L102	LITHONIA COOPER	2GTL4 SERIES METALUX 22FR LED	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	2'x2' LED RECESSED TROFFER 3300 3500K 85 WHITE RECESSED 35 UNIVERSAL 0-10V DIMMING, DLC LISTED
L11	MCGRAW-EDISON LITHONIA	ISS IMPACT ELITE LED WSQ LED SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	WALL MOUNTED EXTERIOR LED FIXTURE 2260 4000K 70 CONFIRM WITH ARCHITECT SURFACE 26 277V TYPE II, INTEGRAL OCCUPANCY SENSOR, WET LISTED, DLC LISTED
L12	MCGRAW-EDISON LITHONIA	GLEON SERIES DSX2 SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES: POLE:	POLE MOUNTED AREA LED LIGHT 21000 4000K 70 CONFIRM WITH ARCHITECT SURFACE 188 277V TYPE IVM, INTEGRAL D MMING OCCUPANCY SENSOR, WET LISTED, DLC LISTED , 25' POLE 25' LENGTH, STEEL, STRAIGHT, SQUARE, CONFIRM FINISH WITH ARCHITECT
L13	MCGRAW-EDISON LITHONIA	GLEON SERIES DSX2 SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES: POLE:	POLE MOUNTED PEDESTRIAN LED LIGHT 8400 4000K 70 CONFIRM WITH ARCHITECT POLE MOUNTED 102 277V TYPE V, INTEGRAL DIMMING OCCUPANCY SENSOR, WET LISTED, DLC LISTED , 12' POLE 12' LENGTH, STEEL, STRAIGHT, SQUARE, CONFIRM FINISH WITH ARCHITECT
L14	LITHONIA COLUMBIA LIGHTING	FEM LED LXEM SERIES	TYPE: LMS: CCT: CRI: LENS: FINISH: MOUNTING: INPUT WATTS VOLTAGE: FEATURES:	4' SURFACE MOUNTED LOW-PROFILE ENCLOSED AND GASKETED LED LIGHT 4000 4000K 80 POLYCARBONATE, LOW-PROFILE CLEAR CONFIRM WITH ARCHITECT SURFACE 30 277V WET LISTED
LU24	LITHONIA HALO	UCLD SERIES HU10 SERIES	TYPE: LMS: CCT: CRI: FINISH: MOUNTING: INPUT WATTS VOLTAGE:	24" UNDER CABINET MOUNTED LED FIXTURE 740 3000K 90 WHITE SURFACE, LENGTH AS SHOWN ON DRAWINGS 12.5 120V
X01	LITHONIA SURE-LITES	EDG SERIES EU SERIES	TYPE: HOUSING: MOUNTING: LENS: FINISH: INPUT WATTS VOLTAGE:	EDGE LIT LED EXIT SIGN ALUMINUM AS SHOWN ON DRAWINGS SINGLE FACE WHITE W/ RED LETTERS 3 UNIVERSAL
X02	LITHONIA SURE-LITES	EDG SERIES EU SERIES	TYPE: HOUSING: MOUNTING: LENS: FINISH: INPUT WATTS VOLTAGE:	EDGE LIT LED EXIT SIGN ALUMINUM AS SHOWN ON DRAWINGS DOUBLE FACE WHITE W/ RED LETTERS 3 UNIVERSAL

REGISTERED PROFESSIONAL ENGINEER
90651PE
BRADLEY W. MEYER
Expires: 12/31/18

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.227.1474
www.kmdpc.com
Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

Marion County OREGON

revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

LUMINAIRE SCHEDULE

sheet:
E0.02
of:

"LCP" LIGHTING CONTROL PANEL SCHEDULE

RELAY	PANEL / CIRCUIT	LOAD (VA)	LUMINARIE TYPE	DESCRIPTION / LOCATION	NOTES
R1	4AA-1-1	3875	L03, L05, L10	PAROLE AND PROBATION CORRIDOR	3
R2	4AA-1-3	224	L012, L102	PAROLE AND PROBATION CORRIDOR	3
R3	4AA-1-3	229	L012, L102	PAROLE AND PROBATION CORRIDOR	3
R4	4AA-1-3	496	L012, L102	PAROLE AND PROBATION CORRIDOR	3
R5	4AA-1-3	600	L012, L102	PAROLE AND PROBATION CORRIDOR	3
R6	4AA-1-3	105	L012, L102	PAROLE AND PROBATION CORRIDOR	3
R7	4AA-1-9	2550	L012, L102, L05, L06, L08	PAROLE AND PROBATION CORRIDOR	2
R8	E4AA-1-6	704	L14	SITE PARKING CAR PORT	2
R9	LS4AA-1-3	1260	L012, L102, L01, L05, L06, L08	CORRIDOR EGRESS	1,3,4
R10	LS4AA-1-5	1232	L012, L102, L01, L05, L06, L08	CORRIDOR EGRESS	1,3,4
R11	E4AA-1-2	670	L012, L102, L01, L05, L06, L08	EAST SIDE CORRIDORS	3,4
R12	E4AA-1-2	670	L012, L102, L01, L05, L06, L08	EAST SIDE OFFICES	3,4
R13	E4AA-1-2	670	L012, L102, L01, L05, L06, L08	EAST MULTI-PURPOSE, OFFICES	3,4
R14	E4AA-1-2	670	L012, L102, L01, L05, L06, L08	EAST MULTI-PURPOSE, OFFICES	3,4
R15	E4AA-1-12	1750	L03P, L05	FRONT LOBBY	3,4
R16	4AA-1-9	2550	L13	SITE PEDESTRIAN LIGHTING	2
R17	4AA-1-11	1128	L12	PARKING LOT LIGHTING WEST	2
R18	4AA-1-2	264	L11	BUILDING EXTERIOR LIGHTS	2
R19	LS4AA-1-1	342	L11	BUILDING EXTERIOR LIGHTS	1,2,4
R20	4AA-1-13	1692	L12	PARKING LOT LIGHTING EAST	2
R21	SPARE				
R22	SPARE				
R23	SPARE				
R24	SPARE				

NOTES:
1. PROVIDE SEPARATION BETWEEN NORMAL AND EMERGENCY CIRCUITS.
2. PROVIDE DUSK TO DAWN OPERATIONS WITH A PHOTOCELL LOCATED ON THE ROOF. COORDINATE FINAL LOCATION WITH CONTRACTOR PRIOR TO ROUGH-IN.
3. COORDINATE SCHEDULING OF FIXTURES WITH OWNER.
4. PROVIDE UL924 RELAY TO ENERGIZE LIGHTS ONCE LOSS OF POWER IS SENSED. LIGHTS SHOULD TURN ON REGARDLESS OF THE SWITCH BEING ENERGIZED.

MECHANICAL EQUIPMENT SCHEDULE

TAG	DESCRIPTION	LOAD	VOLT	PH	DISCONNECT SWITCH				E-POWER	NOTES
					SIZE	FUSED	UNFUSED	ENCLOSURE		
RTU-01	ROOFTOP UNIT #1	60 MCA	480	3	100A	X		NEMA 3R	N	3
RTU-02	ROOFTOP UNIT #2	60 MCA	480	3	100A	X		NEMA 3R	N	3
RTU-03	ROOFTOP UNIT #3	69 MCA	480	3	100A	X		NEMA 3R	Y	3
RTU-04	ROOFTOP UNIT #4	43 MCA	480	3	100A	X		NEMA 3R	Y	3
B-01	BOILER #1	4 MCA	120	1	30A		X	NEMA 1	Y	3
B-02	BOILER #2	4 MCA	120	1	30A		X	NEMA 1	Y	3
B-03	BOILER #3	4 MCA	120	1	30A		X	NEMA 1	Y	3
HWP-01	HOT WATER PUMP #1	7 1/2 HP	480	3	30A		X	NEMA 1	Y	3
HWP-02	HOT WATER PUMP #2	7 1/2" HP	480	3	30A		X	NEMA 1	Y	3
HWC-01	HOT WATER CIRCULATOR PUMP #1	.65 A	120	1	30A		X	NEMA 1	Y	3
GWH-01	GAS WATER HEATER #1	5 A	120	1	30A		X	NEMA 1	Y	3
GWH-02	GAS WATER HEATER #2	5 A	120	1	30A		X	NEMA 1	Y	3
FC-1	FAN COIL UNIT #1	0.2 MCA	208	1	30A		X	NEMA 1	Y	2
HP-1	CONDENSING UNIT #1	15 MCA	208	1	30A	X		NEMA 3R	Y	3
FC-2	FAN COIL UNIT #2	0.2 MCA	208	1	30A		X	NEMA 1	Y	2
HP-2	CONDENSING UNIT #2	15 MCA	208	1	30A	X		NEMA 3R	Y	3
EF-01	EXHAUST FAN #01	1/4 HP	120	1	30A		X	NEMA 3R	N	3
EF-02	EXHAUST FAN #02	1/4 HP	120	1	30A		X	NEMA 3R	N	3
EF-03	EXHAUST FAN #03	1/4 HP	120	1	30A		X	NEMA 3R	N	3
EF-04	EXHAUST FAN #04	1/4 HP	120	1	30A		X	NEMA 3R	N	3
EF-05	EXHAUST FAN #05	1/4 HP	120	1	30A		X	NEMA 3R	Y	3

MECHANICAL EQUIPMENT SCHEDULE NOTES:
1. MOTOR RATED SWITCH.
2. FAN COIL UNIT POWERED FROM THE CONDENSING UNIT.
3. DISCONNECT PROVIDED AND INSTALLED BY DIV. 26. PROVIDE FUSES PER MANUFACTURERS RECOMMENDATIONS. COORDINATE FINAL LOCATION WITH CONTRACTOR PRIOR TO ROUGH-IN.
4. VFD PROVIDED BY DIV. 23 AND INSTALLED BY DIV. 26. PROVIDE FUSES PER MANUFACTURERS RECOMMENDATIONS. COORDINATE FINAL LOCATION WITH CONTRACTOR PRIOR TO ROUGH-IN.
5. VFD PROVIDED AND INSTALLED BY DIV. 26. PROVIDE FUSES PER MANUFACTURERS RECOMMENDATIONS. COORDINATE FINAL LOCATION WITH CONTRACTOR PRIOR TO ROUGH-IN.

REGISTERED PROFESSIONAL ENGINEER 90651PE BRADLEY W. MOON
Expires: 12/31/18

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc, 220 nw eighth avenue portland, oregon 97209, (503.227.1474, kmdarchitects.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
CIVIL ENGINEERING SERVICES PROVIDED BY: Westech Engineering, Inc. CONSULTING ENGINEERS & PLANNERS

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

Marion County OREGON

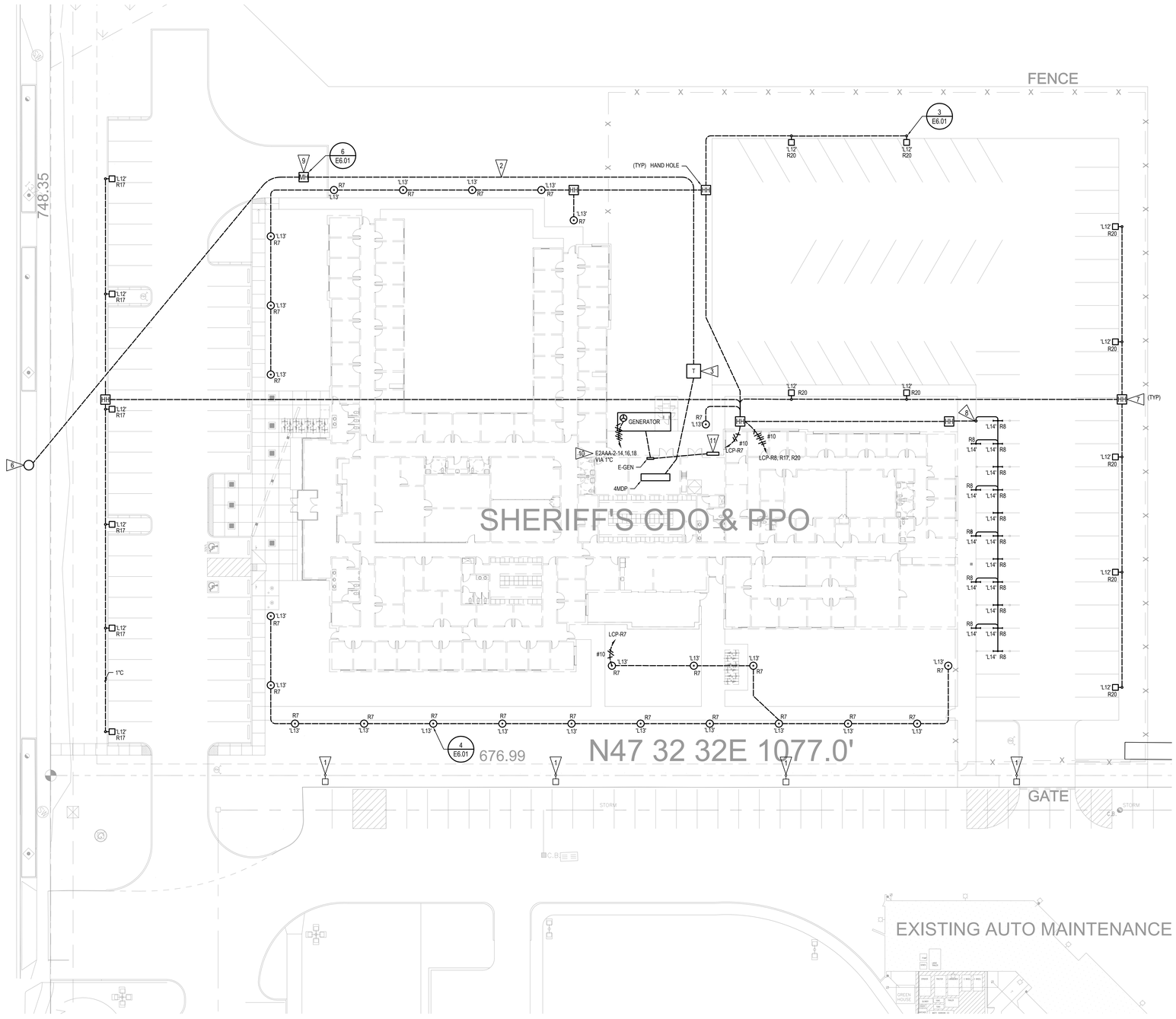
revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

ELECTRICAL EQUIPMENT SCHEDULES

sheet: E0.03
of:



ELECTRICAL SITE PLAN

SCALE: 1" = 20'-0"

SHEET NOTES

1. MINIMUM UNDERGROUND CONDUIT SIZE IS 1"C UNLESS OTHERWISE NOTED.
2. POLE MOUNTED PARKING AND PEDESTRIAN LIGHTING TO BE EQUIPPED WITH INTEGRAL DIMMING OCCUPANCY SENSORS TO PROVIDE REDUCTION OF POWER CONSUMPTION DURING "DUSK-TO-DAWN' OPERATIONS.

FLAG NOTES

1. EXISTING TO REMAIN.
2. PRIMARY SERVICE CONDUITS. COORDINATE WITH PGE FOR FINAL REQUIREMENTS PRIOR TO INSTALLATION.
3. PROVIDE AND INSTALL A 5106 VAULT WITH A 5106-T-2436P TOP. COORDINATE EXACT LOCATION WITH PGE PRIOR TO INSTALL.
4. NOT USED.
5. NOT USED.
6. UTILITY POLE PROVIDING POWER TO THE SITE. CONFIRM LOCATION WITH PGE PRIOR TO INSTALLING CONDUIT.
7. PROVIDE 12"×18" HAND HOLE FOR EXTERIOR LIGHTING CIRCUIT.
8. STUB UNDERGROUND CONDUIT AT COLUMN. COORDINATE WITH ARCHITECTURAL AND CIVIL FOR EXACT LOCATION OF COLUMN PRIOR TO INSTALLATION. EXTEND CONDUIT AND CIRCUIT TO LIGHTING ONCE PARKING COVER IS CONSTRUCTED.
9. PROVIDE 660-PGE PULL VAULT FOR PGE PRIMARY. COORDINATE WITH PGE FOR FINAL REQUIREMENTS.
10. PROVIDE CIRCUITS AS SHOWN FOR GENERATOR BLOCK HEATER,/PUMP, BATTERY CHARGER AND ANTI-CONDENSATE HEATER. COORDINATE FINAL REQUIREMENTS WITH GENERATOR MANUFACTURER PRIOR TO INSTALLATION.
11. QUICK-CONNECT DOUBLE-THROW SAFETY SWITCH FOR ROLL UP TEMPORARY GENERATOR CONNECTION. BASIS OF DESIGN: EATON 600V, 600A QUICK-CONNECT DOUBLE-THROW SAFETY SWITCH. OUTDOOR RATED NEMA 3R ENCLOSURE.

REGISTERED PROFESSIONAL ENGINEER 90651PE BRADLEY W. MEYER 8/31/18 OREGON

Expires: 12/31/18

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
kmd architects+planners pc 220 nw eighth avenue portland, oregon 97209 (503.221.1474 kmdarch.com
Westech Engineering, Inc. CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

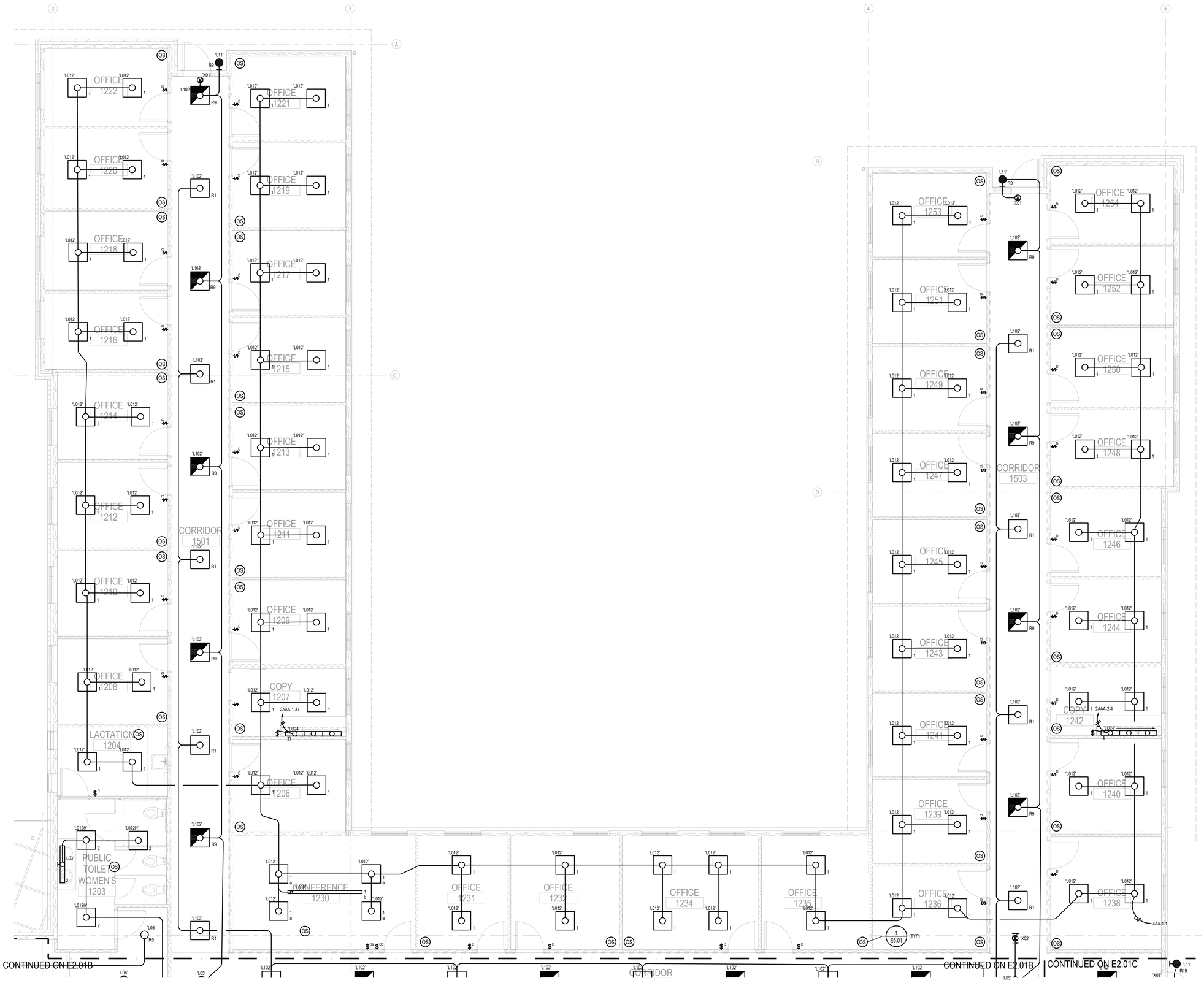
copyright © 2016
Carlson Veit Architects P.C.

ELECTRICAL SITE PLAN

sheet:
E1.01
of:

SHEET NOTES

1. PROVIDE AN UNSWITCHED HOT CONDUCTOR FOR ALL EXIT SIGNS, TYPICAL.



PARTIAL FLOOR PLAN - AREA A - LIGHTING

SCALE: 1/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
90651PE
OREGON
JULY 8, 2015
BRADLEY W. MEYER

Expires: 12/31/18

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.227.1474
www.kmdpc.com

SÄZÄN GROUP

MSC CONSULTING STRUCTURAL ENGINEERS

CIVIL ENGINEERING SERVICES PROVIDED BY
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

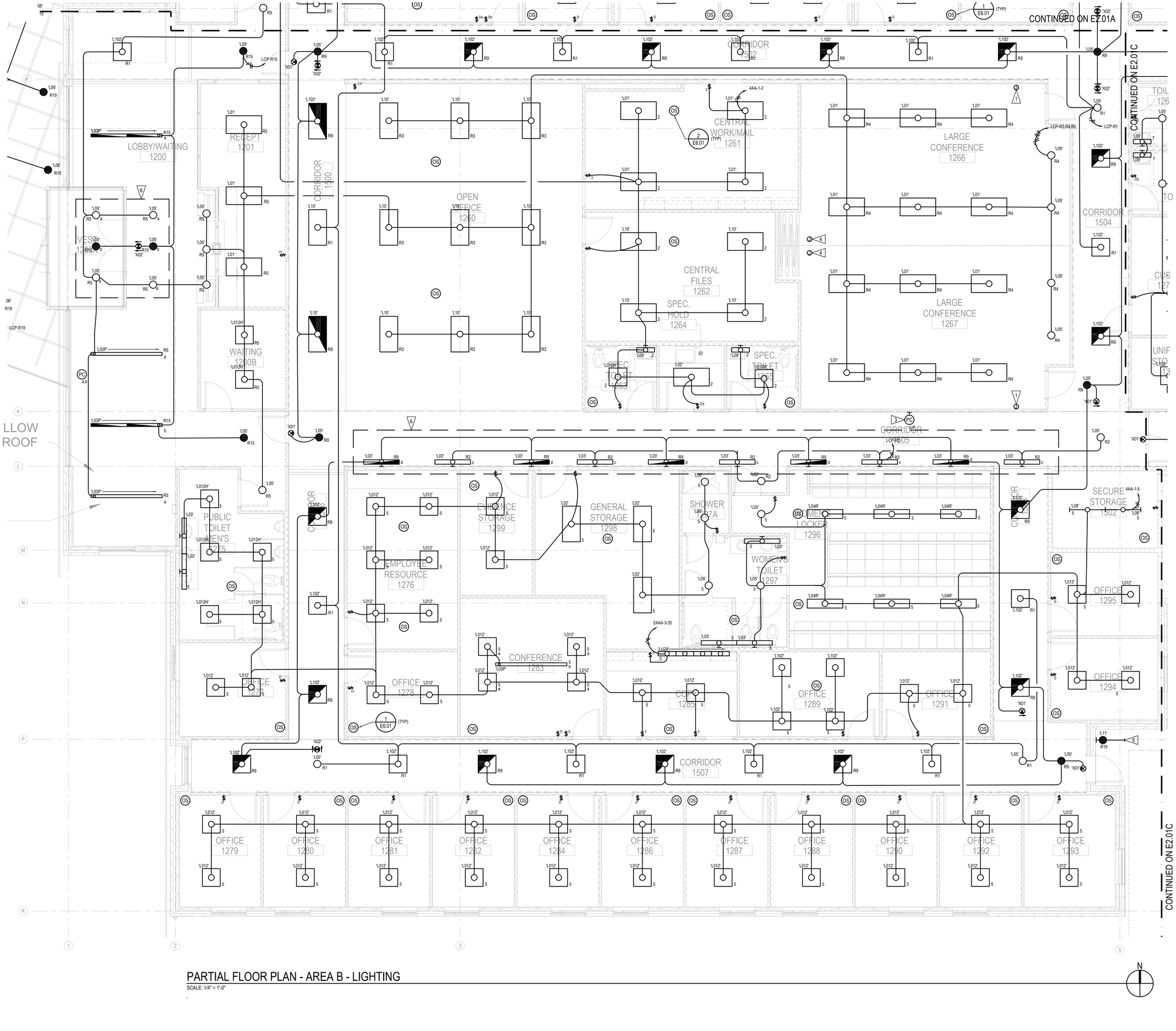
date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA A - LIGHTING

sheet:
E2.01A

of:



PARTIAL FLOOR PLAN - AREA B - LIGHTING

SCALE: 1/4" = 1'-0"

SHEET NOTES

1. PROVIDE AN UNSWITCHED HOT CONDUCTOR FOR ALL EXIT SIGNS, TYPICAL.

FLAG NOTES

1. PROVIDE LUTRON GRAFIK EYE 3000 INTEGRATED LIGHTING SYSTEM CONTROLLER, OR APPROVED EQUAL.
2. PROVIDE LUTRON CONTROL WALLSTATION, OR APPROVED EQUAL.
3. MOUNT PHOTOCELL AT SAME HEIGHT AS WALL MOUNTED LIGHT FIXTURES IN THE EAST/WEST CORRIDOR.
4. PROVIDE JUNCTION BOX AND REQUIRED CONDUIT FOR LIGHTING CONTROL INFRARED PARTITION SENSORS FOR ROOM COMBINE OPERATION.
5. SEE SECTOR 'C' FOR HOME RUN CONTINUATION.
6. DAYLIGHTING ZONE. LUMINAIRES IN THIS AREA TO BE CONTROLLED BY PHOTOCELL AS SHOWN.

REGISTERED PROFESSIONAL ENGINEER 90651PE BRADLEY W. MEEKER
Bradley W. Meeker
Expires: 12/31/18

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS

Consultants:
kmd architects+planners pc 220 nw eighth avenue portland, oregon 97209 (503.227.1474 www.kmd.com
Westech Engineering, Inc. CIVIL ENGINEERING SERVICES PROVIDED BY CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

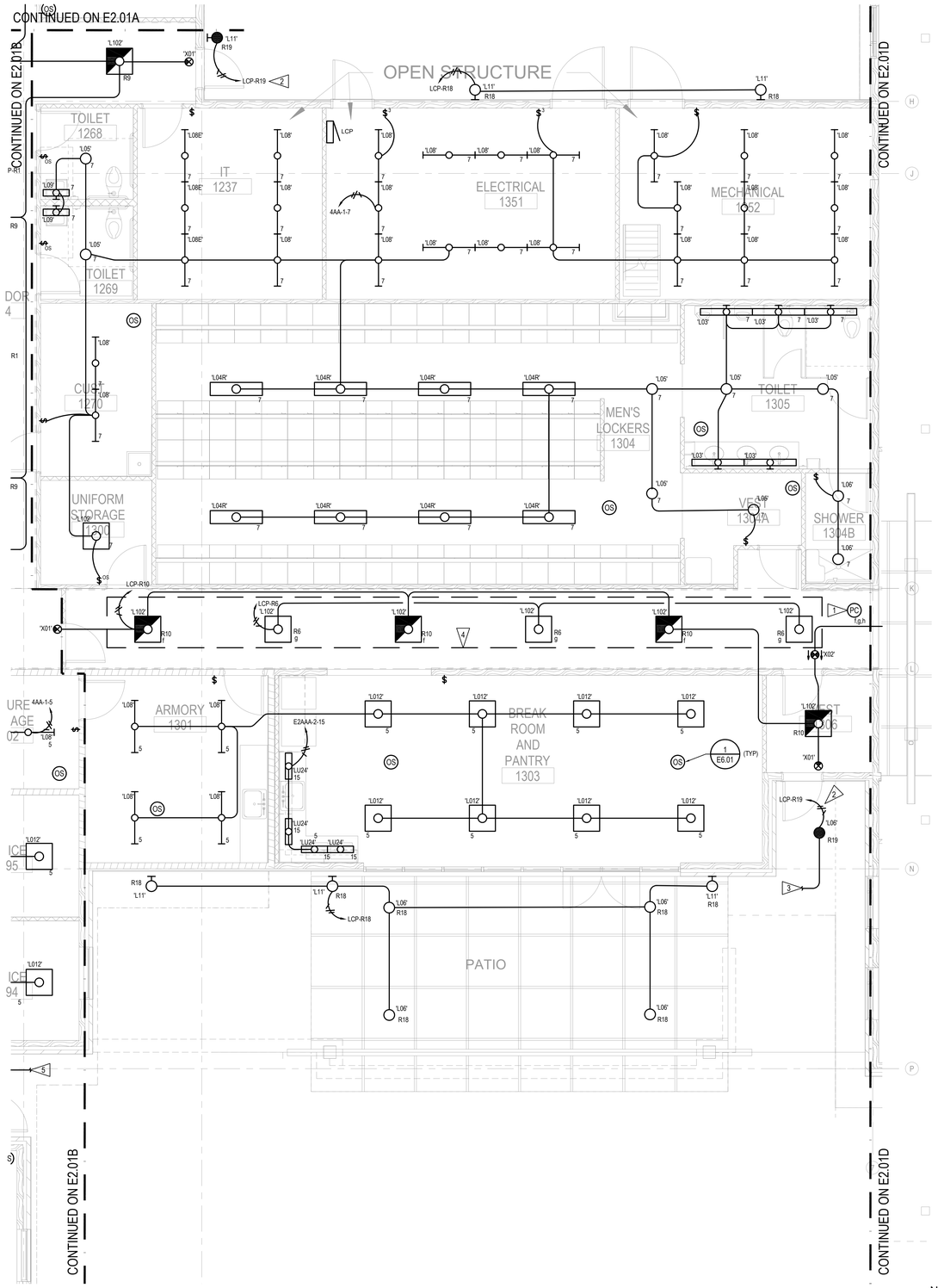
revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA B - LIGHTING

sheet:
E2.01B
of:



PARTIAL FLOOR PLAN - AREA C - LIGHTING

SCALE: 1/4" = 1'-0"

SHEET NOTES

1. PROVIDE AN UNSWITCHED HOT CONDUCTOR FOR ALL EXIT SIGNS, TYPICAL.

FLAG NOTES

1. MOUNT PHOTOCELL AT SAME HEIGHT AS WALL MOUNTED LIGHT FIXTURES IN THE EASTWEST CORRIDOR. SEE SHEET E2.01D FOR ADDITIONAL FIXTURES TO BE CONTROLLED ON THIS PHOTOCELL.
2. HOME RUN SHOWN IN MULTIPLE LOCATIONS FOR CLARITY. SEE ADJOINING SECTORS FOR CONTINUATION.
3. SEE SECTOR 'B' FOR HOME RUN CONTINUATION.
4. DAYLIGHTING ZONE. LUMINAIRES IN THIS AREA TO BE CONTROLLED BY PHOTOCELL AS SHOWN.

REGISTERED PROFESSIONAL ENGINEER
90651PE
OREGON
JULY 8, 2015
BRADLEY W. MEYER
Expires: 12/31/18

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.227.1474
www.kmdpdx.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
WE Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

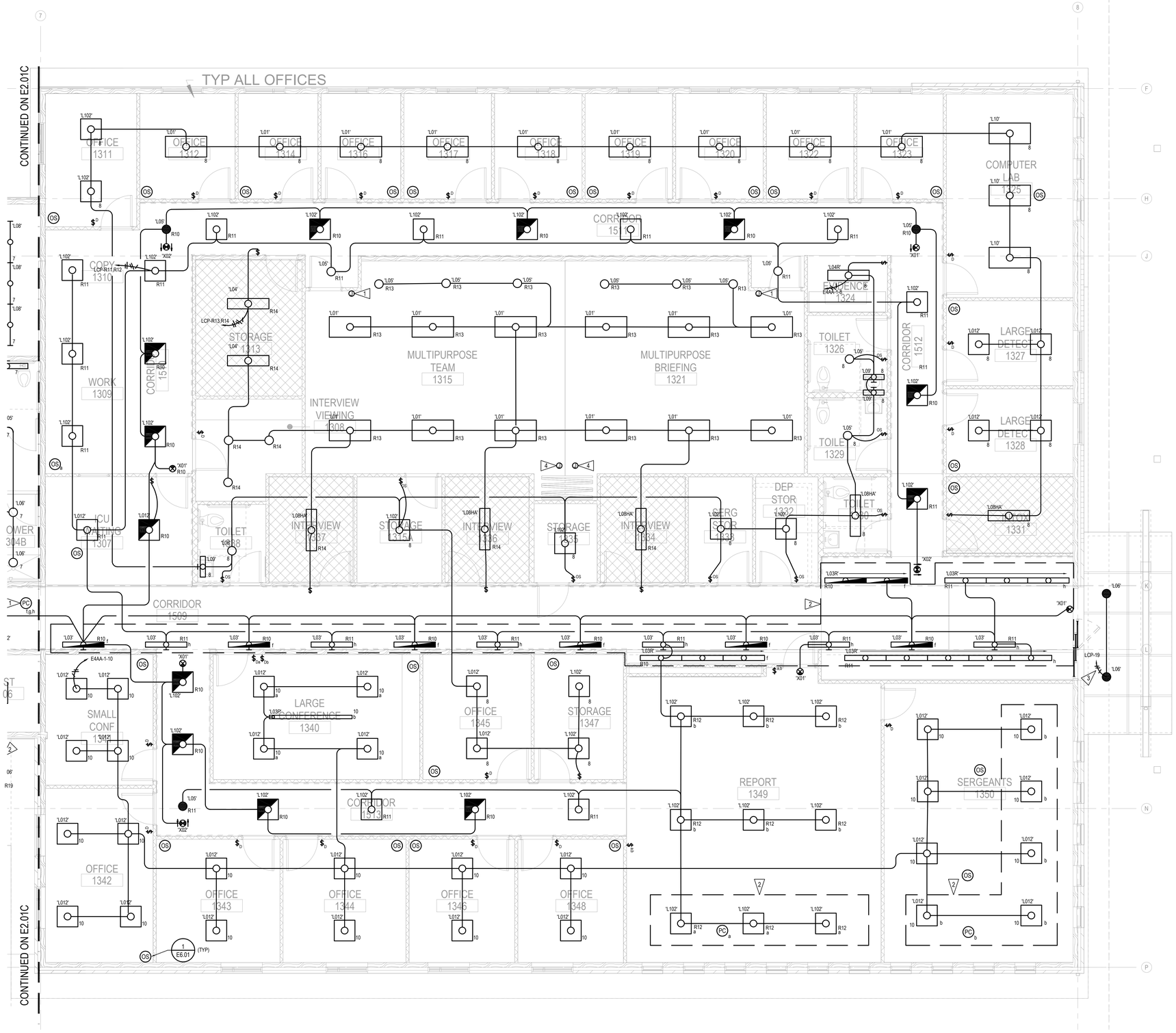
date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA C - LIGHTING

sheet:
E2.01C

of:



SHEET NOTES

1. PROVIDE AN UNSWITCHED HOT CONDUCTOR FOR ALL EXIT SIGNS, TYPICAL.

FLAG NOTES

1. PROVIDE LUTRON GRAFIK EYE 3000 INTEGRATED LIGHTING SYSTEM CONTROLLER, OR APPROVED EQUAL.
2. DAYLIGHTING ZONE. LUMINAIRES IN THIS AREA TO BE CONTROLLED BY PHOTOCELL AS SHOWN.
3. HOME RUN SHOWN IN MULTIPLE LOCATIONS FOR CLARITY. SEE ADJOINING SECTORS FOR CONTINUATION.
4. PROVIDE JUNCTION BOX AND REQUIRED CONDUIT FOR LIGHTING CONTROL INFRARED PARTITION SENSORS FOR ROOM COMBINE OPERATION.

PARTIAL FLOOR PLAN - AREA D - LIGHTING

SCALE: 1/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER 90651PE BRADLEY W. MEYER
Expires: 12/31/18

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
Consultants:
kmd architects+planners pc 220 nw eighth avenue portland, oregon 97209 t 503.227.1474 www.kmdpdx.com
Westech Engineering, Inc. CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

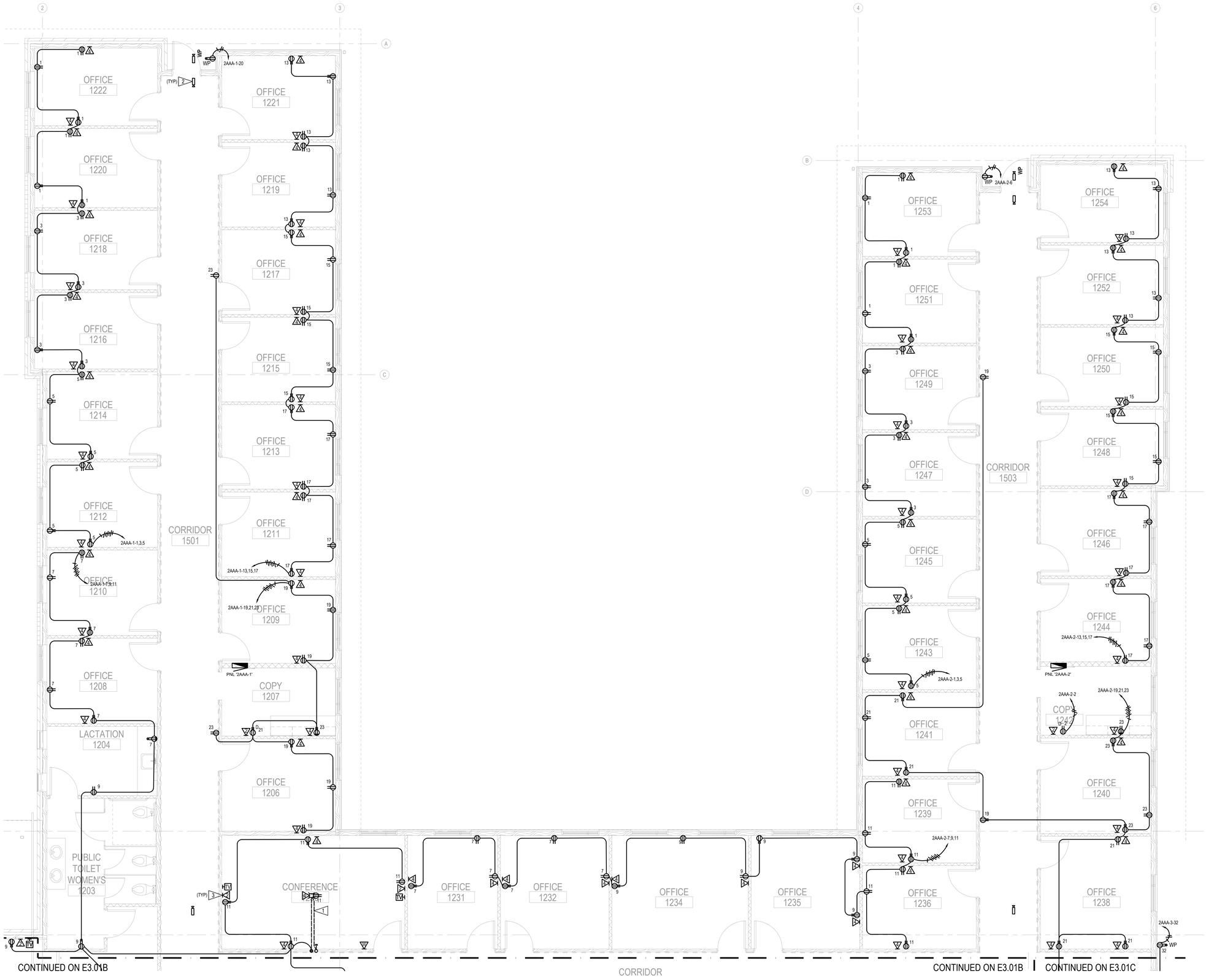
date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA D - LIGHTING

sheet:
E2.01D

of:



FLAG NOTES

1. PROVIDE 1-1/2" CONDUIT FOR DATA AND 3/4" CONDUIT FOR POWER.
2. SECURITY SYSTEM PROVIDED BY OTHERS. PROVIDE JUNCTION BOX IN ACCESSIBLE CEILING SPACE FOR SECURITY CAMERAS. COORDINATE WITH SECURITY SYSTEMS DESIGNER FOR FINAL LOCATIONS AND REQUIREMENTS.
3. PROVIDE BACKBOX FOR DATA SYSTEMS SIZED FOR THE NUMBER OF OUTLETS SHOWN. DATA SYSTEMS ACTIVE EQUIPMENT, CABLING AND OUTLETS DESIGNED AND PROVIDED BY OTHERS.

PARTIAL FLOOR PLAN - AREA A - POWER/SIGNAL

SCALE: 1/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
90651PE
JULY 8, 2015
BRADLEY W. MEIER
Expires: 12/31/18

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.221.1474
www.kmdpdx.com
SÄZÄN GROUP
CIVIL ENGINEERING SERVICES PROVIDED BY
Westech Engineering, Inc.
CONSULTING ENGINEERS IN FLA/NV/OR
MSC CONSULTING STRUCTURAL ENGINEERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

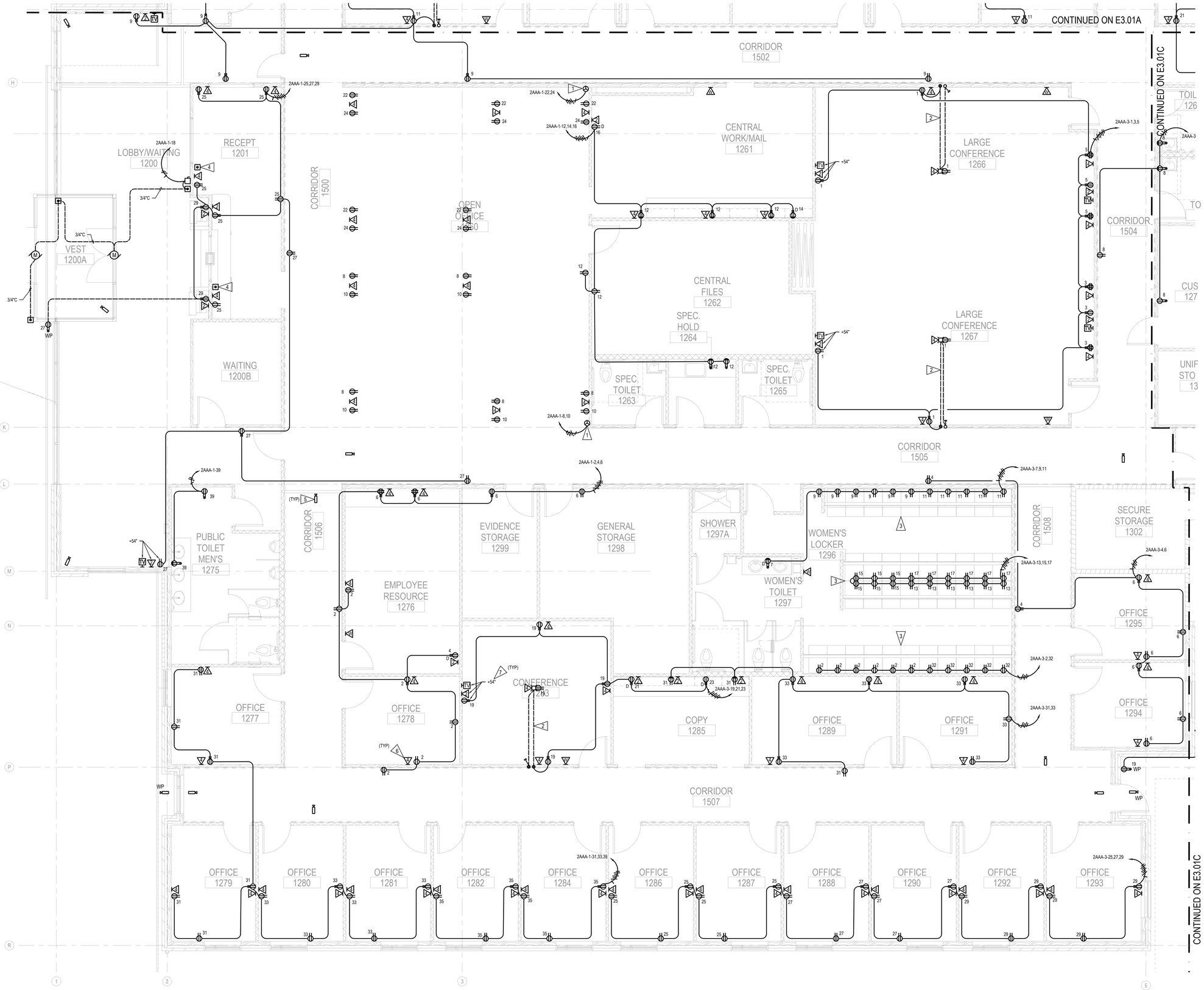
date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA A - POWER & SIGNAL

sheet:
E3.01A

of:



FLAG NOTES

1. PROVIDE FURNITURE WHIP CONNECTIONS FOR ELECTRIFIED PARTITIONS. QUANTITIES OF RECEPTACLES AND DATA SHOWN FOR INTENT ONLY. COORDINATE WITH OWNER FOR QUANTITY AND LOCATIONS OF RECEPTACLE AND DATA OUTLETS. COORDINATE WIRING WITH ELECTRIFIED FURNITURE MANUFACTURER.
2. PROVIDE 1-1/2" CONDUIT FOR DATA AND 3/4" CONDUIT FOR POWER.
3. COORDINATE LOCATION OF RECEPTACLES AND CONDUIT ROUTING WITH ARCHITECT AND OWNER PRIOR TO ROUGH-IN.
4. PROVIDE BACKBOX AND CONDUIT FOR PANIC BUTTON. COORDINATE FINAL LOCATION OF PANIC BUTTON WITH OWNER PRIOR TO ROUGH-IN.
5. SECURITY SYSTEM PROVIDED BY OTHERS. PROVIDE JUNCTION BOX IN ACCESSIBLE CEILING SPACE FOR SECURITY CAMERAS. COORDINATE WITH SECURITY SYSTEMS DESIGNER FOR FINAL LOCATIONS AND REQUIREMENTS.
6. PROVIDE BACKBOX FOR DATA SYSTEMS SIZED FOR THE NUMBER OF OUTLETS SHOWN. DATA SYSTEMS ACTIVE EQUIPMENT, CABLING AND OUTLETS DESIGNED AND PROVIDED BY OTHERS.
7. COORDINATE FINAL MOUNTING HEIGHTS WITH ARCHITECT AND A/V INSTALLER PRIOR TO ROUGH IN.

PARTIAL FLOOR PLAN - AREA B - POWER/SIGNAL

SCALE: 1/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
90651PE
OREGON
JULY 8, 2015
BRADLEY W. MEYER

Expires: 12/31/18

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
(503.227.1474
kmdarchitects.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS IN PLANNING

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

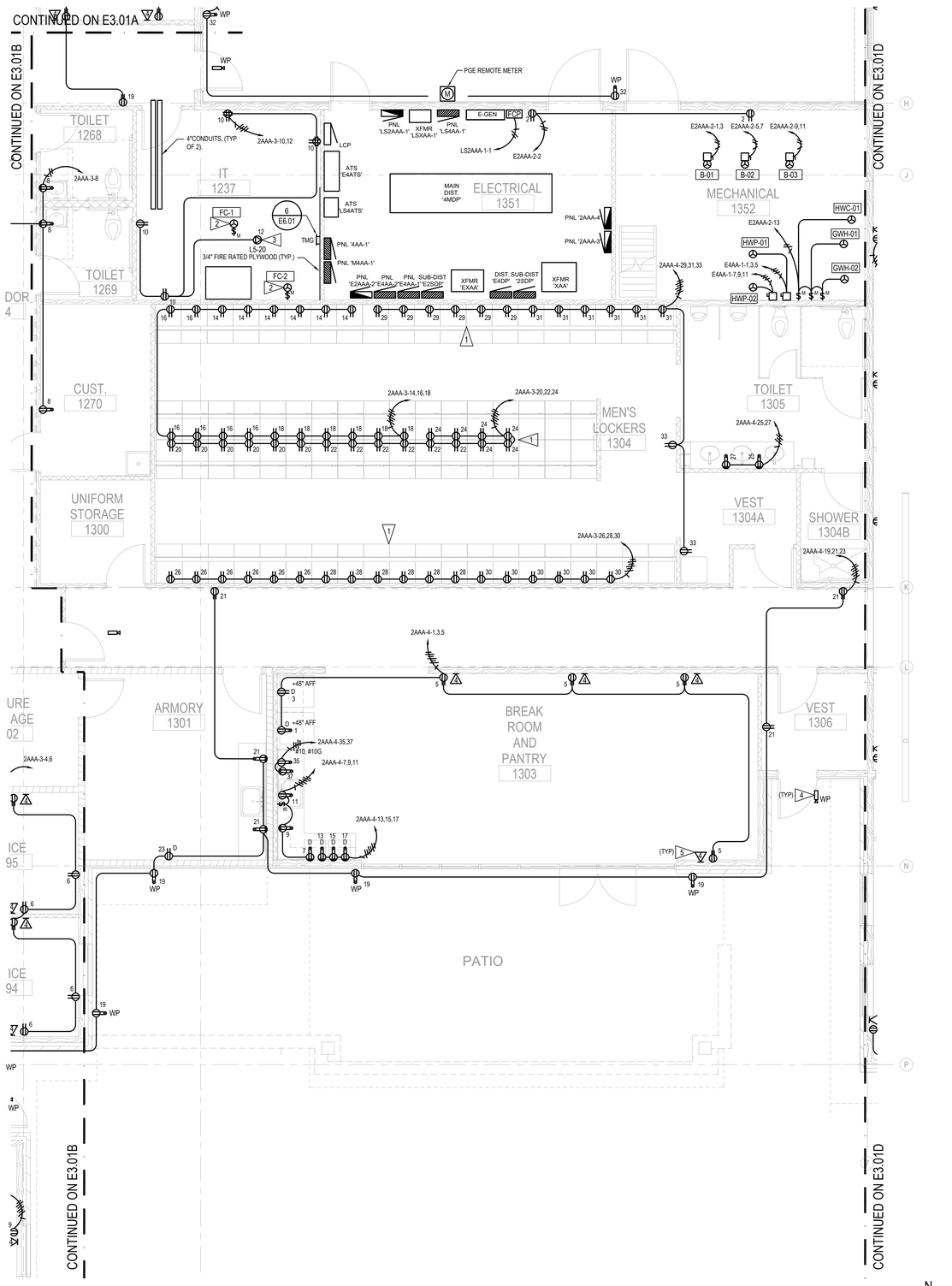
revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA B - POWER & SIGNAL

sheet:
E3.01B
of:



PARTIAL FLOOR PLAN - AREA C - POWER/SIGNAL

SCALE: 1/4" = 1'-0"

FLAG NOTES

1. COORDINATE LOCATION OF RECEPTACLES AND CONDUIT ROUTING IN LOCKERS WITH ARCHITECT AND OWNER PRIOR TO ROUGH-IN.
2. PROVIDE CONDUIT FOR INTERCONNECTS BETWEEN THE CONDENSING UNITS 'CU-01' AND 'CU-02' LOCATED ON THE ROOF AND THE FAN COIL UNIT IN THE IT ROOM. PROVIDE INTERCONNECT WIRING BETWEEN THE TWO UNITS AS REQUIRED.
3. COORDINATE LOCATION WITH OWNERS IT REPRESENTATIVE PRIOR TO INSTALLATION.
4. SECURITY SYSTEM PROVIDED BY OTHERS. PROVIDE JUNCTION BOX IN ACCESSIBLE CEILING SPACE FOR SECURITY CAMERAS. COORDINATE WITH SECURITY SYSTEMS DESIGNER FOR FINAL LOCATIONS AND REQUIREMENTS.
5. PROVIDE BACKBOX FOR DATA SYSTEMS SIZED FOR THE NUMBER OF OUTLETS SHOWN. DATA SYSTEMS ACTIVE EQUIPMENT, CABLING AND OUTLETS DESIGNED AND PROVIDED BY OTHERS.

REGISTERED PROFESSIONAL ENGINEER
90651PE
OREGON
JULY 8, 2015
BRADLEY W. MEYER
Expires: 12/31/18

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
CONSULTING STRUCTURAL ENGINEERS
MSC

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
(503.221.1474
www.kmdpc.com

CIVIL ENGINEERING SERVICES PROVIDED BY:
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS

Marion County
OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

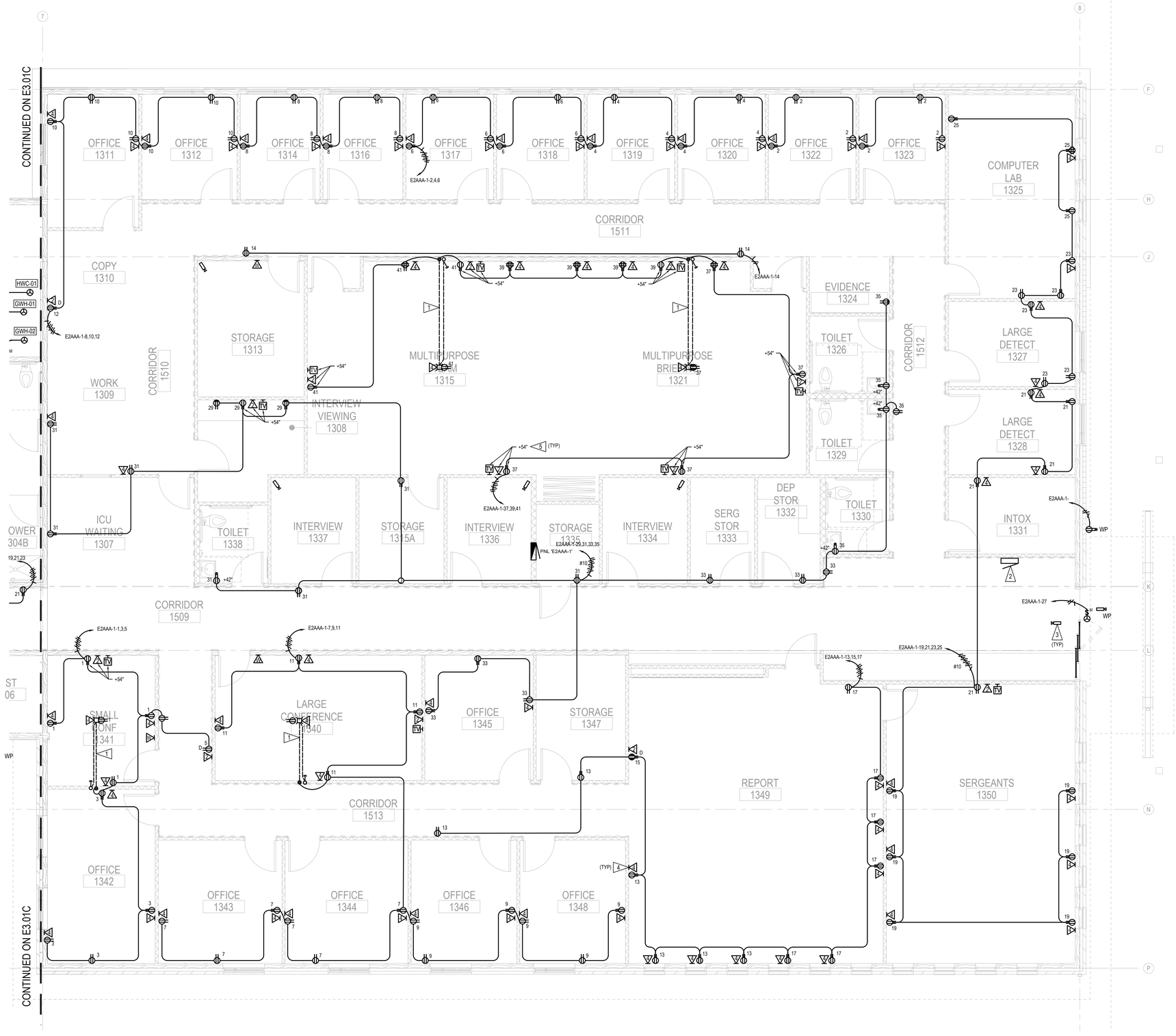
revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA C - POWER & SIGNAL

sheet:
E3.01C
of:



FLAG NOTES

1. PROVIDE 1-1/2" CONDUIT FOR DATA AND 3/4" CONDUIT FOR POWER.
2. GENERATOR REMOTE ANNUNCIATOR PANEL. VERIFY CONNECTION REQUIREMENTS WITH GENERATOR MANUFACTURER. COORDINATE FINAL LOCATION WITH ARCHITECT AND MARION COUNTY.
3. SECURITY SYSTEM PROVIDED BY OTHERS. PROVIDE JUNCTION BOX IN ACCESSIBLE CEILING SPACE FOR SECURITY CAMERAS. COORDINATE WITH SECURITY SYSTEMS DESIGNER FOR FINAL LOCATIONS AND REQUIREMENTS.
4. PROVIDE BACKBOX FOR DATA SYSTEMS SIZED FOR THE NUMBER OF OUTLETS SHOWN. DATA SYSTEMS ACTIVE EQUIPMENT, CABLING AND OUTLETS DESIGNED AND PROVIDED BY OTHERS.
5. COORDINATE FINAL MOUNTING HEIGHTS WITH ARCHITECT AND A/V INSTALLER PRIOR TO ROUGH IN.

PARTIAL FLOOR PLAN - AREA D - POWER/SIGNAL

SCALE: 1/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
90651PE
OREGON
JULY 8, 2015
BRADLEY W. MEYER
Expires: 12/31/18

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc
220 nw eighth avenue portland, oregon 97209
t 503.227.1474 www.kmdpc.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
Westech Engineering, Inc. CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

PARTIAL FLOOR PLAN - AREA D - POWER & SIGNAL

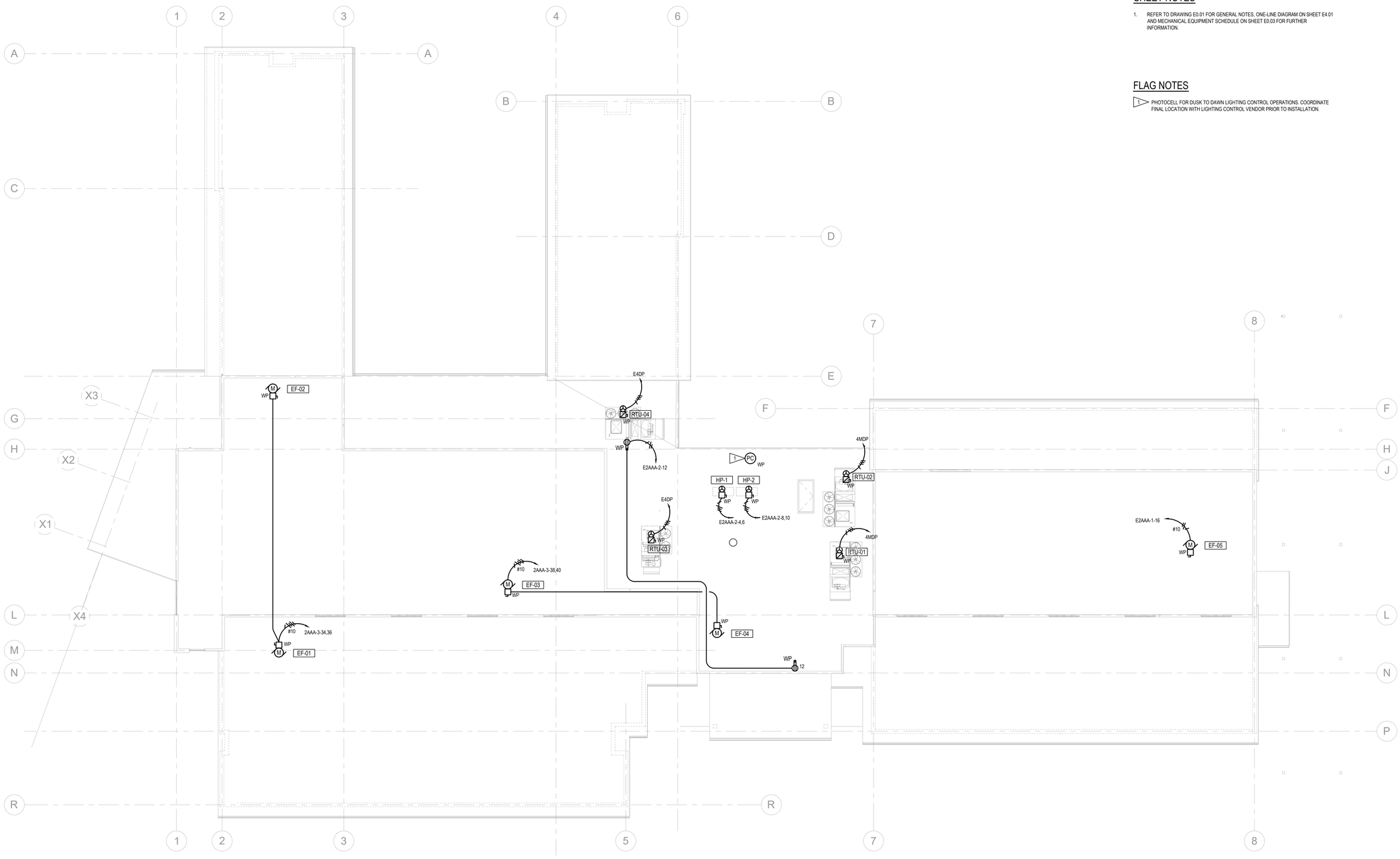
sheet:
E3.01D
of:

SHEET NOTES

1. REFER TO DRAWING E0.01 FOR GENERAL NOTES, ONE-LINE DIAGRAM ON SHEET E4.01 AND MECHANICAL EQUIPMENT SCHEDULE ON SHEET E0.03 FOR FURTHER INFORMATION.

FLAG NOTES

1 PHOTOCELL FOR DUSK TO DAWN LIGHTING CONTROL OPERATIONS. COORDINATE FINAL LOCATION WITH LIGHTING CONTROL VENDOR PRIOR TO INSTALLATION.



ELECTRICAL ROOF PLAN

SCALE: 3/32" = 1'-0"

.

REGISTERED PROFESSIONAL ENGINEER
90651PE
RENEWAL: 6/30/18
BRADLEY W. MEYER
Expires: 12/31/18

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
t 503.227.1474
kmdarchitects.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
WE Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & PLANNERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

ELECTRICAL ROOF PLAN

sheet:
E3.02
of:

DEMAND LOAD CALCULATION

PANEL 4MDP

VOLTAGE: **277/480 V** PHASE: **3** DATE: **6/9/2017**

PROJECT: **498-1606 MARION COUNTY SHERIFF PNP AND CDO**

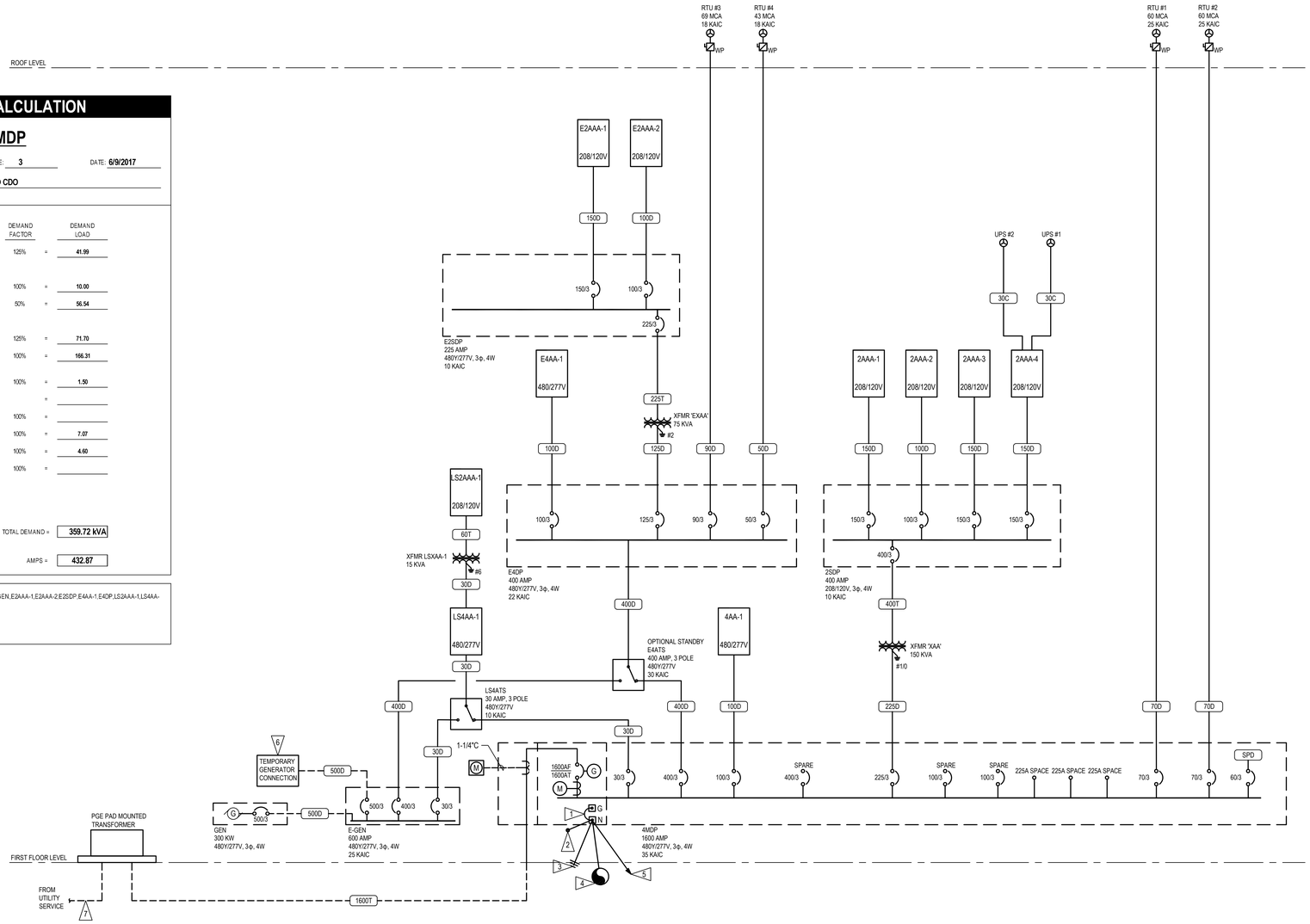
DESCRIPTION	CONNECTED LOAD		DEMAND FACTOR		DEMAND LOAD
LIGHTING	33.59	X	125%	=	41.99
RECEPTACLES					
THRU 10 kVA	10.00	X	100%	=	10.00
OVER 10 kVA	113.08	X	50%	=	56.54
MOTORS/COMPRESSORS					
LARGEST	57.36	X	125%	=	71.70
OTHERS	166.31	X	100%	=	166.31
RESISTIVE HEATING/A.C.	1.50	X	100%	=	1.50
KITCHEN (EQUIP COUNT= 0):		X		=	
COMPUTER LOAD		X	100%	=	
MISCELLANEOUS	7.07	X	100%	=	7.07
APPLIANCE	4.60	X	100%	=	4.60
APPLIANCE (DIVERSIFIED LOAD)		X	100%	=	

TOTAL CONNECTED = **393.52 kVA** TOTAL DEMAND = **359.72 kVA**

AMPS = **432.87**

NOTES:

SUMMARIZED LOADS: 2AAA-1,2AAA-2,2AAA-3,2AAA-4,2SDP,4AA-1,4MDP,E-GEN,E2AAA-1,E2AAA-2,E2SDP,E4AA-1,E4DP,LS2AA-1,LS4AA-1



FLAG NOTES

1. #1/0 AWG CU MAIN BONDING JUMPER PER NEC 250-28.
2. #1/0 AWG CU EQUIPMENT BONDING JUMPER PER NEC 250-120.
3. #4 AWG CU CONDUCTOR TO GROUNDING ELECTRODE SYSTEM PER NEC 250-52 (A)(5).
4. #1/0 AWG CU CONDUCTOR TO INTERIOR METAL PIPING SYSTEM PER NEC 250. 104.
5. #1/0 TO METAL FRAME OF BUILDING.
6. QUICK-CONNECT DOUBLE-THROW SAFETY SWITCH FOR TEMPORARY ROLL UP TEMPORARY GENERATOR CONNECTION. BASIS OF DESIGN: EATON 600V, 600A QUICK-CONNECT DOUBLE-THROW SAFETY SWITCH. OUTDOOR RATED NEMA 3R ENCLOSURE.
7. PRIMARY SERVICE FEEDER FROM PGE. COORDINATE FINAL CONDUIT AND TRENCH REQUIREMENTS WITH PGE PRIOR TO BID.

FEEDER SCHEDULE - LOW VOLTAGE (600V)

FDR	WIRE AND CONDUIT SIZE
20C	(3) #12, (1) #12 GND, 3/4"C
30C	(3) #10, (1) #10 GND, 3/4"C
30D	(4) #10, (1) #10 GND, 3/4"C
50D	(4) #6, (1) #10 GND, 1-1/4"C
60D	(4) #4, (1) #8 GND, 1-1/4"C
60T	(4) #4, (1) #6 GND, 1-1/4"C
70D	(4) #4, (1) #8 GND, 1-1/4"C
90D	(4) #2, (1) #8 GND, 1-1/4"C
100D	(4) #1, (1) #8 GND, 1-1/2" C
125D	(4) #1, (1) #6 GND, 1-1/2"C
150D	(4) #1/0, (1) #6 GND, 2"C
225D	(4) #4/0, (1) #4 GND, 2-1/2"C
225T	(4) #4/0, (1) #2 GND, 2-1/2"C
400D	(4) #500 KCM, (1) #3 GND, 3-1/2"C
400T	2 SETS, (4) #3/0, (1) #1/0 GND, 2"C
500D	2 SETS, (4) #250 KCM, (1) #2 GND, 2-1/2"C
1600D	5 SETS, (4) #400 KCM, (1) #4/0 GND, 3"C
1600T	5 SETS, (4) #400 KCM, 250 KCM GND, 3-1/2"C

ONE-LINE DIAGRAM

SCALE: NTS

1

REGISTERED PROFESSIONAL ENGINEER
90651PE
OREGON
JULY 8, 2015
BRADLEY W. MEYER
Expires: 12/31/18

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
(503.221.1474
www.kmd-a.com
Westech Engineering, Inc.
CIVIL ENGINEERING SERVICES PROVIDED BY
CONSULTING ENGINEERS & LAND SURVEYORS

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

Marion County OREGON

revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

ONE-LINE DIAGRAM

sheet:
E4.01
of:

PANEL 'LS2AAA-1' SCHEDULE

LOCATION: ELECTRICAL ROOM | FED FROM: PANEL LS4AA-1 | VOLTAGE: 120/208 3-PH, 4-WIRE
GROUNDING: EQUIPMENT GROUND BUS | NEUTRAL: 100% RATED | TYPE: BOLT-IN C/B | MOUNTING: SURFACE | SKIRTS: NONE | DOOR-IN-DOOR | NEMA 1 | AIC RATING: 10 KA

60 A MAIN CIRCUIT BREAKER

CKT #	ITEM	NOTE	AMPS	POLE	LEFT	A	B	C	RIGHT	AMPS	POLE	NOTE	ITEM	CKT #
1	FIRE ALARM CONTROL PANEL - ELEC 1351		20	1	1,000	•	—	—		20	1		SPARE	2
3	SPARE		20	1		—	•	—		20	1		SPARE	4
5	SPARE		20	1		—	—	•		20	1		SPARE	6
7	SPARE		20	1		•	—	—		20	1		SPARE	8
9	SPARE		20	1		—	•	—		20	1		SPARE	10
11	SPARE		20	1		—	—	•		20	1		SPARE	12
						A	B	C						
	Total Connected Phase Load (VA):				1,000									
	Total Connected Phase Load (Amps):				8									

	Conn	D.F.	Dmnd
Appliance or Dedicated Circuit:	1.00	1.00	1.00
Computer Loads:		1.00	
Appliance (Diversified Load):		1.00	
Electric Heat:		1.00	
Kitchen Equip (Count =):		1.00	
Lighting:		1.25	
Motors and Compressors:		1.00	
Largest Motor:		1.25	
Miscellaneous:		1.00	
Receptacle:		1.00	
Receipt Over 10 kVA:		0.50	
Totals:	1.00		1.00
Demand Amps:			2.78

NOTES:
1.
2.
3.
4.
5.

PANEL '4AA-1' SCHEDULE

LOCATION: ELECTRICAL ROOM | FED FROM: PANEL 4MDP | VOLTAGE: 277/480 3-PH, 4-WIRE
GROUNDING: EQUIPMENT GROUND BUS | NEUTRAL: 100% RATED | TYPE: BOLT-IN C/B | MOUNTING: SURFACE | SKIRTS: NONE | DOOR-IN-DOOR | NEMA 1 | AIC RATING: 22 KA

100 A MAIN LUGS

CKT #	ITEM	NOTE	AMPS	POLE	LEFT	A	B	C	RIGHT	AMPS	POLE	NOTE	ITEM	CKT #
1	L-PAROLE AND PROBATION CORR./N. WING		20	1	3,515	•	—	—	450	20	1		L-CENTERAL MAIL 1261	2
3	L-PAROLE AND PROBATION WEST AND CENTRAL		20	1	2,539	—	•	—	264	20	1		L-BUILDING EXTERIOR N/S	4
5	L-PAROLE AND PROBATION SOUTH		20	1	2,975	—	—	•		20	1		SPARE	6
7	L-PAROLE AND PROBATION - NORTHEAST		20	1	2,132	•	—	—		20	1		SPARE	8
9	L - SITE PEDESTRIAN LIGHTING		20	1	2,550	—	•	—		20	1		SPARE	10
11	L-PARKING LOT LIGHTING		20	1	1,126	—	—	•		20	1		SPARE	12
13	L-PARKING LOT LIGHTING		20	1	1,692	•	—	—		20	1		SPARE	14
15	SPARE		20	1		—	•	—		20	1		SPARE	16
17	SPARE		20	1		—	—	•		20	1		SPARE	18
19	SPARE		20	1		•	—	—		20	1		SPARE	20
21	SPARE		20	1		—	•	—		20	1		SPARE	22
23	SPARE		20	1		—	—	•		20	1		SPARE	24
25	SPARE		20	1		•	—	—		20	1		SPARE	26
27	SPARE		20	1		—	•	—		20	1		SPARE	28
29	SPARE		20	1		—	—	•		20	1		SPARE	30
31	SPARE		20	1		•	—	—		20	1		SPARE	32
33	SPARE		20	1		—	•	—		20	1		SPARE	34
35	SPARE		20	1		—	—	•		20	1		SPARE	36
37	SPARE		20	1		•	—	—		20	1		SPARE	38
39	SPARE		20	1		—	•	—		20	1		SPARE	40
41	SPARE		20	1		—	—	•		20	1		SPARE	42
						A	B	C						
	Total Connected Phase Load (VA):				7,789		5,353		4,103					
	Total Connected Phase Load (Amps):				28		19		15					

	Conn	D.F.	Dmnd
Appliance or Dedicated Circuit:		1.00	
Computer Loads:		1.00	
Appliance (Diversified Load):		1.00	
Electric Heat:		1.00	
Kitchen Equip (Count =):		1.00	
Lighting:	17.25	1.25	21.56
Motors and Compressors:		1.00	
Largest Motor:		1.25	
Miscellaneous:		1.00	
Receptacle:		1.00	
Receipt Over 10 kVA:		0.50	
Totals:	17.25		21.56
Demand Amps:			25.94

NOTES:
1.
2.
3.
4.
5.

PANEL 'E4AA-1' SCHEDULE

LOCATION: ELECTRICAL ROOM | VOLTAGE: 277/480 3-PH, 4-WIRE
GROUNDING: EQUIPMENT GROUND BUS | NEUTRAL: 100% RATED | TYPE: BOLT-IN C/B | MOUNTING: SURFACE | SKIRTS: NONE | DOOR-IN-DOOR | NEMA 1 | AIC RATING: 18 KA

100 A MAIN LUGS

CKT #	ITEM	NOTE	AMPS	POLE	LEFT	A	B	C	RIGHT	AMPS	POLE	NOTE	ITEM	CKT #
1	HWP-01 MECHANICAL 1362		30	3	3,050	•	—	—	2,680	20	1		L-CORRIDOR, SOUTHWEST	2
3	-		-	-	3,050	—	•	—	2,472	20	1		L-CORRIDOR, SOUTHEAST	4
5	-		-	-	3,050	—	—	•	704	20	1		L-SITE CAR PORT	6
7	HWP-02 MECHANICAL 1362		30	3	3,050	•	—	—	1,485	20	1		L-OFFICES NORTHEAST	8
9	-		-	-	3,050	—	•	—	1,104	20	1		L-OFFICES SOUTHEAST	10
11	-		-	-	3,050	—	—	•	1,750	20	1		L-FRONT LOBBY	12
13	SPARE		20	1		•	—	—		20	1		SPARE	14
15	SPARE		20	1		—	•	—		20	1		SPARE	16
17	SPARE		20	1		—	—	•		20	1		SPARE	18
19	SPARE		20	1		•	—	—		20	1		SPARE	20
21	SPARE		20	1		—	•	—		20	1		SPARE	22
23	SPARE		20	1		—	—	•		20	1		SPARE	24
25	SPARE		20	1		•	—	—		20	1		SPARE	26
27	SPARE		20	1		—	•	—		20	1		SPARE	28
29	SPARE		20	1		—	—	•		20	1		SPARE	30
						A	B	C						
	Total Connected Phase Load (VA):				10,265		9,676		8,554					
	Total Connected Phase Load (Amps):				37		35		31					

	Conn	D.F.	Dmnd
Appliance or Dedicated Circuit:		1.00	
Computer Loads:		1.00	
Appliance (Diversified Load):		1.00	
Electric Heat:		1.00	
Kitchen Equip (Count =):		1.00	
Lighting:	10.20	1.25	12.74
Motors and Compressors:	9.15	1.00	9.15
Largest Motor:	9.15	1.25	11.44
Miscellaneous:		1.00	
Receptacle:		1.00	
Receipt Over 10 kVA:		0.50	
Totals:	28.50		33.33
Demand Amps:			40.11

NOTES:
1.
2.
3.
4.
5.

PANEL 'LS4AA-1' SCHEDULE

LOCATION: ELECTRICAL ROOM | FED FROM: PANEL 4MDP | VOLTAGE: 277/480 3-PH, 4-WIRE
GROUNDING: EQUIPMENT GROUND BUS | NEUTRAL: 100% RATED | TYPE: BOLT-IN C/B | MOUNTING: SURFACE | SKIRTS: NONE | DOOR-IN-DOOR | NEMA 1 | AIC RATING: 10 KA

30 A MAIN CIRCUIT BREAKER

CKT #	ITEM	NOTE	AMPS	POLE	LEFT	A	B	C	RIGHT	AMPS	POLE	NOTE	ITEM	CKT #
1	BUILDING EXTERIOR LTG		20	1	342	•	—	—		30	3		XFMR LSXAA-1	2
3	L-CORRIDOR 1509, 1511, 1513		20	1	2,645	—	•	—		-	-		-	4
5	L-CORRIDOR 1505, 1500, 1502		20	1	2,965	—	—	•		-	-		-	6
7	SPARE		20	1		•	—	—		20	1		SPACE	8
9	SPARE		20	1		—	•	—		20	1		SPACE	10
11	SPARE		20	1		—	—	•		20	1		SPACE	12
13	SPARE		20	1		•	—	—		20	1		SPACE	14
15	SPARE		20	1		—	•	—		20	1		SPACE	16
17	SPARE		20	1		—	—	•		20	1		SPACE	18
19	SPARE		20	1		•	—	—		20	1		SPACE	20
21	SPARE		20	1		—	•	—		20	1		SPACE	22
23	SPARE		20	1		—	—	•		20	1		SPACE	24
						A	B	C						
	Total Connected Phase Load (VA):				342		2,645		2,965					
	Total Connected Phase Load (Amps):				1		10		11					

Panel LS4AA-1 | Panels: LS4AA-1, LS2AAA-1

	Conn	D.F.	Dmnd	Conn	D.F.	Dmnd	
Appliance or Dedicated Circuit:		1.00		1.00	1.00	1.00	Appliance or Dedicated Circuit
Computer Loads:		1.00			1.00		Continuous Loads
Appliance (Diversified Load):		1.00			1.00		Appliance (Diversified Load)
Electric Heat:		1.00			1.00		Electric Heat
Kitchen Equip (Count =):		1.00			1.00		Kitchen Equip (Count =)
Lighting:	5.95	1.25	7.44	5.95	1.25	7.44	Lighting
Motors and Compressors:		1.00			1.00		Motors and Compressors
Largest Motor:		1.25			1.25		Largest Motor
Miscellaneous:		1.00			1.00		Miscellaneous
Receptacle:		1.00			1.00		Receptacle
Receipt Over 10 kVA:		0.50			0.50		Receipt Over 10 kVA
Totals:	5.95		7.44	5.95		8.44	**Totals**
Demand Amps:			8.95			10.16	**Demand Amps**

NOTES:
1.
2.
3.
4.
5.

PANEL '2AAA-1' SCHEDULE

LOCATION: ELECTRICAL ROOM | FED FROM: PANEL 2SDP | VOLTAGE: 120/208 3-PH, 4-WIRE
GROUNDING: EQUIPMENT GROUND BUS | NEUTRAL: 100% RATED | TYPE: BOLT-IN C/B | MOUNTING: SURFACE | SKIRTS: NONE | DOOR-IN-DOOR | NEMA 1 | AIC RATING: 10 KA

225 A MAIN LUGS

CKT #	ITEM	NOTE	AMPS	POLE	LEFT	A	B	C	RIGHT	AMPS	POLE	NOTE	ITEM	CKT #
1	R-OFFICE 1220, OFFICE 1222		20	1	1,080	•	—	—	1,080	20	1		R-COR. 1505 &1507, OFFICE 1278, EMPL 1276	2
3	R-OFFICE 1216, OFFICE 1218		20	1	1,080	—	•	—	1,500	20	1		R-EMPLOYEE RESOURCE 1278 COPIER	4
5	R-OFFICE 1212, OFFICE 1214		20	1	1,080	—	—	•	1,080	20	1		R-EMPL. 1276, EVID. 1299, GEN STOR. 1258	6
7	R-OFFICE 1208, OFFICE 1210		20	1	1,080	•	—	—	900	20	1		R-OPEN OFFICE 1260	8
9	R-LBY 1200, WMN'S TLT 1203, COR 1502, LAC 1204		20	1	1,080	—	•	—	900	20	1		R-OPEN OFFICE 1260	10
11	R-CONFERENCE 1200		20	1	900	—	—	•	1,260	20	1		R-SPEC 1264, OPEN OFF. 1260, CENT WRK 1261	12
13	R-OFFICE 1219, OFFICE 1221		20	1	1,080	•	—	—	1,000	20	1		R-CENTRAL WORK/MAIL 1261	14
15	R-OFFICE 1215, OFFICE 1217		20	1	1,080	—	•	—	1,500	20	1		R-CENTRAL WORK/MAIL 1261 COPIER	16
17	R-OFFICE 1211, OFFICE 1213		20	1	1,080	—	—	•	1,000	20	1		WEST ENTRY DOOR OPERATOR	18
19	R-OFFICE 1206, OFFICE 1209		20	1	1,080	•	—	—	180	20	1		R-EXTERIOR RECPT	20
21	R-OFFICE 1207 COPIER		20	1	1,500	—	•	—	900	20	1		R-OPEN OFFICE 1260	22
23	R-OFFICE 1207, CORR. 1501, EXTERIOR		20	1	720	—	—	•	900	20	1		R-OPEN OFFICE 1257	24
25	R-RECEPT 1201		20	1	1,080	•	—	—	696	20	1		EF-5	26
27	R-COR. 1500 & 1505, LBY 1200, MEN'S 1275, EXT		20	1	1,080	—	•	—		20	1		SPARE	28
29	R-LOBBY 1200 K/GSK		20	1	1,000	—	—	•		20	1		SPARE	30
31	R-OFFICE 1277, OFFICE 1279		20	1	1,080	•	—	—		20	1		SPARE	32
33	R-OFFICE 1280, OFFICE 1281		20	1	1,080	—	•	—		20	1		SPARE	34
35	R-OFFICE 1282, OFFICE 1284		20	1	1,080	—	—	•		20	1		SPARE	36
37	L-COPY 1207		20	1	50	•	—	—		20	1		SPARE	38
39	SPARE		20	1		—	•	—		20	1		SPARE	40
41	SPARE		20	1		—	—	•		20	1		SPARE	42
						A	B	C						
	Total Connected Phase Load (VA):				10,386		11,700		10,100					
	Total Connected Phase Load (Amps):				87		98		84					

	Conn	D.F.	Dmnd
Appliance or Dedicated Circuit:		1.00	
Computer Loads:		1.00	
Appliance (Diversified Load):		1.00	
Electric Heat:		1.00	
Kitchen Equip (Count =):		1.00	
Lighting:	0.05	1.25	0.06
Motors and Compressors:	0.70	1.00	0.70
Largest Motor:	1.00	1.25	1.25
Miscellaneous:		1.00	
Receptacle:	10.00	1.00	10.00
Receipt Over 10 kVA:	20.44	0.50	10.22
Totals:	32.19		22.23
Demand Amps:			61.75

NOTES:
1.
2.
3.
4.
5.

PANEL '2AAA-2' SCHEDULE

LOCATION: ELECTRICAL ROOM | FED FROM: PANEL 2SDP | VOLTAGE: 120/208 3-PH, 4-WIRE
GROUNDING: EQUIPMENT GROUND BUS | NEUTRAL: 100% RATED | TYPE: BOLT-IN C/B | MOUNTING: SURFACE | SKIRTS: NONE | DOOR-IN-DOOR | NEMA 1 | AIC RATING: 10 KA

100 A MAIN LUGS

CKT #	ITEM	NOTE	AMPS	POLE	LEFT	A	B	C	RIGHT	AMPS	POLE	NOTE	ITEM	CKT #
1	R-OFFICE 1251, OFFICE 1253		20	1	1,080	•	—	—	1,500	20	1		R-OFFICE 1242 COPIER	2
3	R-OFFICE 1247, OFFICE 1249		20	1	1,080	—	•	—	50	20	1		L-1242 COPY	4
5	R-OFFICE 1243, OFFICE 1245		20	1	1,080	—	—	•	180	20	1		R-EXTERIOR RECPT	6
7	R-OFFICE 1231, OFFICE 1232		20	1	1,080	•	—	—		20	1		SPARE	8
9	R-OFFICE 1234, OFFICE 1236		20	1	1,080	—	•	—		20	1		SPARE	10
11	R-OFFICE 1238, OFFICE 1239		20	1	1,080	—	—	•		20	1		SPARE	12
13	R-OFFICE 1252, OFFICE 1254		20	1	1,080	•	—	—		20	1		SPARE	14
15	R-OFFICE 1248, OFFICE 1250		20	1	1,080	—	•	—		20	1		SPARE	16
17	R-OFFICE 1244, OFFICE 1246		20	1	1,080	—	—	•		20	1		SPARE	18
19	R-CORR. 1502 & 1503, EXTERIOR		20	1	900	•	—	—		20	1		SPARE	20
21	R-OFFICE 1238, OFFICE 1241		20	1	1,080	—	•	—		20	1		SPARE	22
23	R-OFFICE 1240, OFFICE 1242		20	1	720	—	—	•		20	1		SPARE	24
25	SPARE		20	1		•	—	—		20	1		SPARE	26
27	"		20	1		—	•	—		20	1		SPARE	28
29	"		20	1		—	—	•		20	1		SPARE	30
						A	B	C						
	Total Connected Phase Load (VA):				5,640		4,370		4,140					
	Total Connected Phase Load (Amps):				47		36		35					

	Conn	D.F.	Dmnd
Appliance or Dedicated Circuit:		1.00	
Computer Loads:		1.00	
Appliance (Diversified Load):		1.00	
Electric Heat:		1.00	
Kitchen Equip (Count =):		1.00	
Lighting:	0.05	1.25	0.06
Motors and Compressors:		1.00	
Largest Motor:		1.25	
Miscellaneous:		1.00	
Receptacle:	10.00	1.00	10.00
Receipt Over 10 kVA:	4.10	0.50	2.05
Totals:	14.15		12.11
Demand Amps:			33.65

NOTES:
1.
2.
3.
4.
5.

PANEL '2AAA-3' SCHEDULE

LOCATION: ELECTRICAL ROOM | FED FROM: PANEL 2SDP | VOLTAGE: 120/208 3-PH, 4-WIRE
GROUNDING: EQUIPMENT GROUND BUS | NEUTRAL: 100% RATED | TYPE: BOLT-IN C/B | MOUNTING: SURFACE | SKIRTS: NONE | DOOR-IN-DOOR | NEMA 1 | AIC RATING: 10 KA

225 A MAIN LUGS

CKT #	ITEM	NOTE	AMPS	POLE	LEFT	A	B	C	RIGHT	AMPS	POLE	NOTE	ITEM	CKT #
1	R-LARGE CONFERENCE 1266 & 1267		20	1	1,080	•	—	—	1,080	20	1		R-WOMENS LOCKER 1296	2
3	R-LARGE CONFERENCE 1267		20	1	1,080	—	•	—	1,080	20	1		R-WOMENS LOCKER 1296, CORRIDOR 1508	4
5	R-LARGE CONFERENCE 1266		20	1	1,080	—	—	•	1,080	20	1		R-OFFICE 1294, OFFICE 1295	6
7	R-WOMEN'S TLT 1297		20	1	1,500	•	—	—	900	20	1		R-CORR. 1504, CUST. 1270, TLT 1268 & 1269, IT 1042	8
9	R-WOMEN'S LOCKER 1296		20	1	1,080	—	•	—	900	20	1		R-IT OFFICE 1237	10
11	R-WOMEN'S LOCKER 1296		20	1	1,080	—	—	•	1,000	20	1		R-IT 1042	12
13	R-WOMEN'S LOCKER 1296		20	1	1,080	•	—	—	1,080	20	1		R-MEN LOCKER 1304	14
15	R-WOMEN'S LOCKER 1296		20	1	1,080	—	•	—	1,080	20	1		R-MEN LOCKER 1304	16
17	R-WOMEN'S LOCKER 1296		20	1	1,080	—	—	•	1,080	20	1		R-MEN LOCKER 1304	18
19	R-CONFERENCE 1283		20	1	900	•	—	—	1,080	20	1		R-MEN LOCKER 1304	20
21	R-COPY 1285		20	1	1,500	•	—	—	1,080	20	1		R-MEN LOCKER 1304	22
23	R-COPY 1286		20	1	1,000	—	•	—	1,080	20	1		R-MEN LOCKER 1304	24
25	R-OFFICE 1286, OFFICE 1287		20	1	1,080	•	—	—	1,080	20	1		R-MEN LOCKER 1304	26
27	R-OFFICE 1288, OFFICE 1290		20	1	1,080	—	•	—	1,080	20	1		R-MEN LOCKER 1304	28
29	R-OFFICE 1292, OFFICE 1293		20	1	1,080	—	—	•	1,080	20	1		R-MEN LOCKER 1304	30
31	R-COPY 1285, CORRIDOR 1507		20	1	540	•	—	—	360	20	1		R-EXTERIOR RECPT	32
33	R-OFFICE 1289, OFFICE 1291		20	1	1,080	—	•	—	696	15	1		EF-1	34
35	L-COPY 1285		20	1	50	—	—	•	696	15	1		EF-2	36
37	SPARE		20	1		•	—	—	696	15	1		EF-3	38
39	SPARE		20	1		—	•	—	696	15	1		EF-4	40
41	SPARE		20	1		—	—	•		20	1		SPARE	42
						A	B	C						
	Total Connected Phase Load (VA):				12,456		13,512		11,388					
	Total Connected Phase Load (Amps):				104		113		95					

	Conn	D.F.	Dmnd
Appliance or Dedicated Circuit:		1.00	
Computer Loads:		1.00	
Appliance (Diversified Load):		1.00	
Electric Heat:		1.00	
Kitchen Equip (Count =):		1.00	
Lighting:	0.05	1.25	0.06
Motors and Compressors:	2.09	1.00	2.09
Largest Motor:	0.70	1.25	0.87
Miscellaneous:		1.00	
Receptacle:	10.00	1.00	10.00
Receipt Over 10 kVA:	24.52	0.50	12.26
Totals:	37.35		25.28
Demand Amps:			70.22

NOTES:
1.
2.
3.
4.
5.

PANEL '2AAA-4' SCHEDULE

LOCATION: ELECTRICAL ROOM | FED FROM: PANEL 2SDP | VOLTAGE: 120/208 3-PH, 4-WIRE
GROUNDING: EQUIPMENT GROUND BUS | NEUTRAL: 100% RATED | TYPE: BOLT-IN C/B | MOUNTING: SURFACE | SKIRTS: NONE | DOOR-IN-DOOR | NEMA 1 | AIC RATING: 10 KA

225 A MAIN LUGS

CKT #	ITEM	NOTE	AMPS	POLE	LEFT	A	B	C	RIGHT	AMPS	POLE	NOTE	ITEM	CKT #
1	BREAK ROOM 1303 REFRIGERATOR		20	1	800	•	—	—	180	20	1		R-RTU RECEPTACLE ON ROOF	2
3	BREAK ROOM 1303 REFRIGERATOR		20	1	800	—	•	—		20	1		SPARE	4
5	R-BREAK ROOM 1303		20	1	720	—	—	•		20	1		SPARE	6
7	R-BREAK ROOM 1303		20	1	1,500	•	—	—		20	1		SPARE	8
9	R-BREAK ROOM 1303		20	1	180	—	•	—		20	1		SPARE	10
11	R-BREAK ROOM 1303 GARBAGE DISPOSAL		20	1	1,200	—	—	•		20	1		SPARE	12
13	R-BREAK ROOM 1303		20	1	1,500	•	—	—		20	1		SPARE	14
15	R-BREAK ROOM 1303		20	1	1,500	—	•	—		20	1		SPARE	16
17	R-BREAK ROOM 1303		20	1	1,500	—	—	•		20	1		SPARE	18
19	R-EXTERIOR COURTYARD		20	1	720	•	—	—		20	1		SPARE	20
21	R-VEST 1305, CORR 1505, ARMORY 1301		20	1	900	—	•	—		20	1		SPARE	22
23	R-ARMORY 1301		20	1	1,000	—	—	•		20	1		SPARE	24
25	R-TOILET 1305		20	1	1,500	•	—	—		20	1		SPARE	26
27	R-TOILET 1305		20	1	1,500	—	•	—		20	1		SPARE	28
29	R-MENS LOCKER 1304		20	1	1,080	—	—	•		20	1		SPARE	30
31	R-MENS LOCKER 1304		20	1	1,080	•	—	—		20	1		SPARE	32
33	R-MENS LOCKER 1304, VEST 1304A, EXTERIOR		20	1	720	—	•	—		20	1		SPARE	34
35	BREAK ROOM 1303 DISHWASHER		25	1	2,000	—	—	•		20	1		SPARE	36
37	R-BREAK ROOM 1303		20	1	180	•	—	—		20	1		SPARE	38
39	SPARE		20	1		—	•	—		20	1		SPARE	40
41	SPARE		20	1		—	—	•		20	1		SPARE	42
						A	B	C						
	Total Connected Phase Load (VA):				7,460		5,600		7,500					
	Total Connected Phase Load (Amps):				62		47		63					

	Conn	D.F.	Dmnd
Appliance or Dedicated Circuit:	3.60	1.00	3.60
Computer Loads:		1.00	
Appliance (Diversified Load):		1.00	
Electric Heat:		1.00	
Kitchen Equip (Count =):		1.00	
Lighting:		1.25	
Motors and Compressors:		1.00	
Largest Motor:		1.25	
Miscellaneous:		1.00	
Receptacle:	10.00	1.00	10.00
Receipt Over 10 kVA:	6.96	0.50	3.48
Totals:	20.56		17.08
Demand Amps:			47.44

NOTES:
1.
2.
3.
4.
5.

REGISTERED PROFESSIONAL ENGINEER 9065PE BRADLEY W. MECKLEY
Bradley W. Meckley
Expires: 12/31/18

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc — 220 nw eighth avenue, portland, oregon 97209, (503.227.1474), www.kmd.com
Westech Engineering, Inc. — CONSULTING ENGINEERS & SURVEYORS — CIVIL ENGINEERING SERVICES PROVIDED BY
SAZAN GROUP — CONSULTING STRUCTURAL ENGINEERS
MSC — MECHANICAL ENGINEERS

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:
1.
2.
3.
4.
5.

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

PANEL SCHEDULES

sheet: E5.01
of:

DEMAND LOAD CALCULATION

PANEL E-GEN

VOLTAGE: 277/480 V | PHASE: 3 | DATE: 6/9/2017

PROJECT: 498-1606 MARION COUNTY SHERIFF PNP AND CDO

DESCRIPTION	CONNECTED LOAD		DEMAND FACTOR		DEMAND LOAD
LIGHTING	16.20	X	125%	=	20.25
RECEPTACLES					
THRU 10 kVA	10.00	X	100%	=	10.00
OVER 10 kVA	17.06	X	50%	=	8.53
MOTORS/COMPRESSORS					
LARGEST	57.36	X	125%	=	71.70
OTHERS	62.07	X	100%	=	62.07
RESISTIVE HEATING/A.C.	1.50	X	100%	=	1.50
KITCHEN (EQUIP COUNT= 0):		X		=	
COMPUTER LOAD		X	100%	=	
MISCELLANEOUS	7.07	X	100%	=	7.07
APPLIANCE	1.00	X	100%	=	1.00
APPLIANCE (DIVERSIFIED LOAD)		X	100%	=	

TOTAL CONNECTED = 172.25 kVA | TOTAL DEMAND = 182.11 kVA

AMPS = 219.15

NOTES:
SUMMARIZED LOADS: E-GEN,E2AAA-1,E2AAA-2,E2AAA-3,E2SDP,E4AA-1,E4DP,LS2AAA-1,LS4AA-1

DEMAND LOAD CALCULATION

PANEL E4DP

VOLTAGE: 277/480 V | PHASE: 3 | DATE: 6/9/2017

PROJECT: 498-1606 MARION COUNTY SHERIFF PNP AND CDO

DESCRIPTION	CONNECTED LOAD		DEMAND FACTOR		DEMAND LOAD
LIGHTING	10.25	X	125%	=	12.81
RECEPTACLES					
THRU 10 kVA	10.00	X	100%	=	10.00
OVER 10 kVA	17.06	X	50%	=	8.53
MOTORS/COMPRESSORS					
LARGEST	57.36	X	125%	=	71.70
OTHERS	62.07	X	100%	=	62.07
RESISTIVE HEATING/A.C.	1.50	X	100%	=	1.50
KITCHEN (EQUIP COUNT= 0):		X		=	
COMPUTER LOAD		X	100%	=	
MISCELLANEOUS	7.07	X	100%	=	7.07
APPLIANCE		X	100%	=	
APPLIANCE (DIVERSIFIED LOAD)		X	100%	=	

TOTAL CONNECTED = 165.30 kVA | TOTAL DEMAND = 173.67 kVA

AMPS = 208.99

NOTES:
SUMMARIZED LOADS: E2AAA-1,E2AAA-2,E2AAA-3,E2SDP,E4AA-1,E4DP

DEMAND LOAD CALCULATION

PANEL E2SDP

VOLTAGE: 120/208 V | PHASE: 3 | DATE: 6/9/2017

PROJECT: 498-1606 MARION COUNTY SHERIFF PNP AND CDO

DESCRIPTION	CONNECTED LOAD		DEMAND FACTOR		DEMAND LOAD
LIGHTING	0.05	X	125%	=	0.06
RECEPTACLES					
THRU 10 kVA	10.00	X	100%	=	10.00
OVER 10 kVA	17.06	X	50%	=	8.53
MOTORS/COMPRESSORS					
LARGEST	3.12	X	125%	=	3.90
OTHERS	4.90	X	100%	=	4.90
RESISTIVE HEATING/A.C.	1.50	X	100%	=	1.50
KITCHEN (EQUIP COUNT= 0):		X		=	
COMPUTER LOAD		X	100%	=	
MISCELLANEOUS	7.07	X	100%	=	7.07
APPLIANCE		X	100%	=	
APPLIANCE (DIVERSIFIED LOAD)		X	100%	=	

TOTAL CONNECTED = 43.70 kVA | TOTAL DEMAND = 35.96 kVA

AMPS = 99.88

NOTES:
SUMMARIZED LOADS: E2AAA-1,E2AAA-2

DEMAND LOAD CALCULATION

PANEL 2SDP

VOLTAGE: 120/208 V | PHASE: 3 | DATE: 6/9/2017

PROJECT: 498-1606 MARION COUNTY SHERIFF PNP AND CDO

DESCRIPTION	CONNECTED LOAD		DEMAND FACTOR		DEMAND LOAD
LIGHTING	0.15	X	125%	=	0.19
RECEPTACLES					
THRU 10 kVA	10.00	X	100%	=	10.00
OVER 10 kVA	86.02	X	50%	=	43.01
MOTORS/COMPRESSORS					
LARGEST	1.00	X	125%	=	1.25
OTHERS	3.48	X	100%	=	3.48
RESISTIVE HEATING/A.C.		X	100%	=	
KITCHEN (EQUIP COUNT= 0):		X		=	
COMPUTER LOAD		X	100%	=	
MISCELLANEOUS		X	100%	=	
APPLIANCE	3.60	X	100%	=	3.60
APPLIANCE (DIVERSIFIED LOAD)		X	100%	=	

TOTAL CONNECTED = 104.25 kVA | TOTAL DEMAND = 61.53 kVA

AMPS = 170.91

NOTES:
SUMMARIZED LOADS: 2AAA-1,2AAA-2,2AAA-3,2AAA-4,2SDP

PANEL 'E2AAA-1' SCHEDULE

LOCATION: ELECTRICAL ROOM | FED FROM: PANEL E2SDP | VOLTAGE: 120/208 3-PH, 4-WIRE
GROUNDING: EQUIPMENT GROUND BUS | NEUTRAL: 100% RATED | TYPE: BOLT-IN C/B | DOOR-IN-DOOR | MOUNTING: SURFACE | NEMA 1 | SKIRTS: NONE | AIC RATING: 10 KA

225 A MAIN LUGS

CKT #	ITEM	NOTE	AMPS	POLE	LEFT	A	B	C	RIGHT	AMPS	POLE	NOTE	ITEM	CKT #
1	R-SMALL CONFERENCE 1341		20	1	900	•	—	—	1,080	20	1		R-OFFICE 1322, OFFICE 1323	2
3	R-OFFICE 1342		20	1	720	—	•	—	1,080	20	1		R-OFFICE 1319, OFFICE 1320	4
5	R-CORRIDOR 1513 COPIER		20	1	1,500	—	—	•	1,080	20	1		R-OFFICE 1317, OFFICE 1318	6
7	R-OFFICE 1343, OFFICE 1344		20	1	1,080	•	—	—	1,080	20	1		R-OFFICE 1314, OFFICE 1316	8
9	R-OFFICE 1340, OFFICE 1348		20	1	1,080	—	•	—	1,080	20	1		R-OFFICE 1311, OFFICE 1312	10
11	R-LARGE CONFERENCE 1340		20	1	900	—	—	•	1,500	20	1		R-COPY 1310,COPIER	12
13	R-CORR. 1513, REPORT 1349		20	1	1,080	•	—	—	360	20	1		R-CORRIDOR 1511	14
15	R-REPORT 1349 COPIER		20	1	1,500	—	•	—		20	1		SPARE	16
17	R-REPORT 1349		20	1	1,080	—	—	•		20	1		SPARE	18
19	R-SERGEANTS 1350		20	1	1,080	•	—	—		20	1		SPARE	20
21	R-SERG 1350,CORR 1505,EXT.INTOX 1331,DET 1328		20	1	1,080	—	•	—		20	1		SPARE	22
23	R-DETECT 1327, LAB 1325		20	1	1,080	—	—	•		20	1		SPARE	24
25	R-LAB 1325, CORRIDOR 1511		20	1	1,080	•	—	—		20	1		SPARE	26
27	EAST EXTERIOR DOOR		20	1	500	—	•	—		20	1		SPARE	28
29	R-INTERVIEW V EWING 1308		20	1	540	—	—	•		20	1		SPARE	30
31	R-WRK 1309,WAIT 1307,COR 1506,STOR 1315A&1335		20	1	1,080	•	—	—		20	1		SPARE	32
33	R-OFFICE 1345, SERG. STORAGE 1333		20	1	720	—	•	—		20	1		SPARE	34
35	R-STOR 1332,COR. 1512,TLT 1326,TLT 1329,TLT 1330		20	1	1,080	—	—	•		20	1		SPARE	36
37	R-MULTI-PURPOSE 1315,1321		20	1	500	•	—	—		20	1		SPARE	38
39	R-MULTI-PURPOSE 1315,1322		20	1	500	—	•	—		20	1		SPARE	40
41	R-MULTI-PURPOSE 1315,1323		20	1	500	—	—	•		20	1		SPARE	42

	A	B	C
Total Connected Phase Load (VA):	9,320	8,260	9,260
Total Connected Phase Load (Amps)	78	69	77

	Conn	D.F.	Dmnd
Appliance or Dedicated Circuit:		1.00	
Computer Loads:		1.00	
Appliance (Diversified Load):		1.00	
Electric Heat:		1.00	
Kitchen Equip (Count =):		1.00	
Lighting:		1.25	
Motors and Compressors:		1.00	
Largest Motor:	0.50	1.25	0.63
Miscellaneous:		1.00	
Receptacle:	10.00	1.00	10.00
Recept Over 10 kVA:	16.34	0.50	8.17
Totals:	26.84		18.80
Demand Amps:			52.21

NOTES:
1.
2.
3.
4.
5.

PANEL 'E2AAA-2' SCHEDULE

LOCATION: ELECTRICAL ROOM | FED FROM: PANEL E2SDP | VOLTAGE: 120/208 3-PH, 4-WIRE
GROUNDING: EQUIPMENT GROUND BUS | NEUTRAL: 100% RATED | TYPE: BOLT-IN C/B | DOOR-IN-DOOR | MOUNTING: SURFACE | NEMA 1 | SKIRTS: NONE | AIC RATING: 10 KA

100 A MAIN LUGS

CKT #	ITEM	NOTE	AMPS	POLE	LEFT	A	B	C	RIGHT	AMPS	POLE	NOTE	ITEM	CKT #
1	B-01 - MECHANICAL 1352		20	2	728	•	—	—	360	20	1		R-MECHANICAL 1352, ELECTRICAL 1351	2
3	-		-	-	728	—	•	—	1,560	20	2		HP-01 ROOF	4
5	B-02 - MECHANICAL 1352		20	2	728	—	—	•	1,560	-	-		-	6
7	-		-	-	728	•	—	—	1,560	20	2		HP-02 ROOF	8
9	B-03 - MECHANICAL 1352		20	2	728	—	•	—	1,560	-	-		-	10
11	-		-	-	728	—	—	•	360	20	1		R-ROOF	12
13	GWH-01, GWH-02, HVAC-01 MECHANICAL 1352		20	1	1,278	•	—	—	1,500	20	1		GENERATOR BLOCK HEATER	14
15	L-BREAK ROOM 1309		20	1	50	—	•	—	1,200	20	1		GENERATOR BATTERY	16
17	SPARE		20	1		—	—	•	1,500	20	1		GENERATOR ANTI-CONDENSATE HEATER	18
19	SPARE		20	1		•	—	—		20	1		SPARE	20
21	SPARE		20	1		—	•	—		20	1		SPARE	22
23	SPARE		20	1		—	—	•		20	1		SPARE	24
25	SPARE		20	1		•	—	—		20	1		SPARE	26
27	SPARE		20	1		—	•	—		20	1		SPARE	28
29	SPARE		20	1		—	—	•		20	1		SPARE	30
31	SPARE		20	1		•	—	—		20	1		SPARE	32
33	SPARE		20	1		—	•	—		20	1		SPARE	34
35	SPARE		20	1		—	—	•		20	1		SPARE	36
37	SPARE		20	1		•	—	—		20	1		SPARE	38
39	SPARE		20	1		—	•	—		20	1		SPARE	40
41	SPARE		20	1		—	—	•		20	1		SPARE	42

	A	B	C
Total Connected Phase Load (VA):	6,154	5,826	4,876
Total Connected Phase Load (Amps)	51	49	41

	Conn	D.F.	Dmnd
Appliance or Dedicated Circuit:		1.00	
Computer Loads:		1.00	
Appliance (Diversified Load):		1.00	
Electric Heat:	1.50	1.00	1.50
Kitchen Equip (Count =):		1.00	
Lighting:	0.05	1.25	0.06
Motors and Compressors:	4.40	1.00	4.40
Largest Motor:	3.12	1.25	3.90
Miscellaneous:	7.07	1.00	7.07
Receptacle:	0.72	1.00	0.72
Recept Over 10 kVA:		0.50	
Totals:	16.86		17.05
Demand Amps:			49.02

NOTES:
1.
2.
3.
4.
5.

REGISTERED PROFESSIONAL ENGINEER 9065 PE BRADLEY W. MECHAM 8/31/2015
Expires: 12/31/18

CARLSON VEIT ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc, 220 nw eighth avenue, portland, oregon 97209, t 503.227.1474, kmdarch.com
SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
Westech Engineering, Inc. CONSULTING ENGINEERS & PLANNERS, CIVIL ENGINEERING SERVICES PROVIDED BY

project: MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

Marion County OREGON

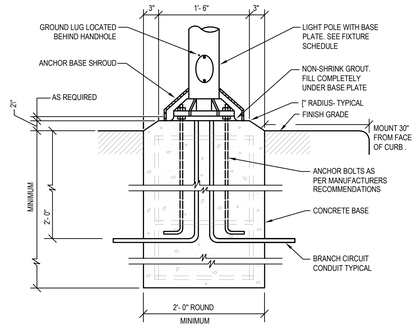
revisions:
1.
2.
3.
4.
5.

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

PANEL SCHEDULES

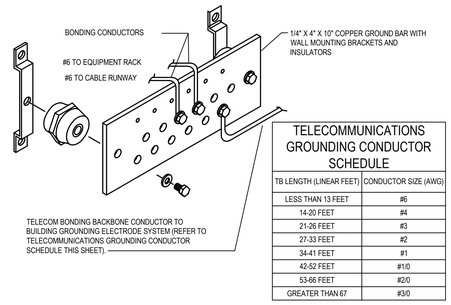
sheet: E5.02
of:



NOTE:
ALL POLES FOR POLE MOUNTED LIGHTING SHALL BE AS INDICATED ON DETAIL THIS DRAWING. POLE, ANCHOR BOLTS, AND FOUNDATION SHALL BE DESIGNED BY A REGISTERED STRUCTURAL ENGINEER AND COORDINATED WITH THE LIGHTING FIXTURE TYPE AND CONFIGURATION BEING PROVIDE, TAKING INTO ACCOUNT MOUNTING HEIGHT, MAXIMUM PROJECTED AREA, MOUNTING ARM LENGTH, QUANTITY OF FIXTURES AND 100 MPH BASIC, AND 130 MPH GUST WIND VELOCITY. CONTRACTOR SHALL FURNISH FINAL POLE BASE DESIGN TO ARCHITECT WITH LIGHTING FIXTURE SUBMITTALS. POLE FOUNDATION IS MINIMUM REQUIREMENT. CONTRACTOR SHALL VERIFY SOIL CONDITIONS WHICH MAY AFFECT FOUNDATION SIZE.

LIGHT POLE FLUSHED BASE
SCALE: NTS

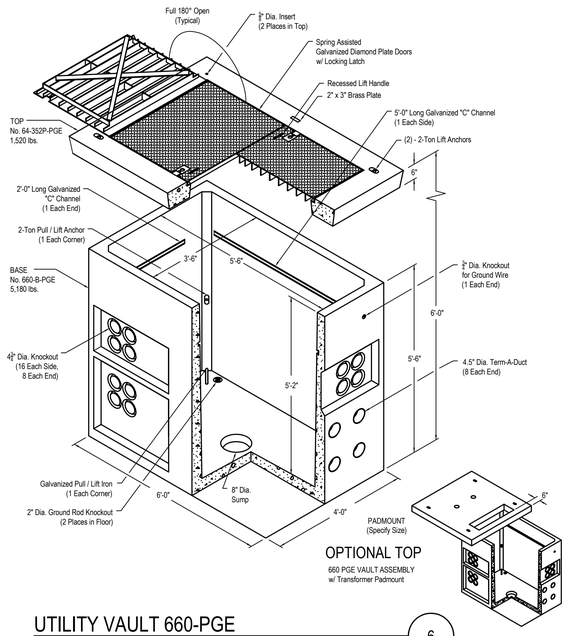
4



TELECOMMUNICATIONS GROUNDING CONDUCTOR SCHEDULE	
TB LENGTH (LINEAR FEET)	CONDUCTOR SIZE (AWG)
LESS THAN 13 FEET	#6
14-20 FEET	#4
21-26 FEET	#3
27-33 FEET	#2
34-41 FEET	#1
42-52 FEET	#1/0
53-66 FEET	#2/0
GREATER THAN 67	#3/0

GROUND BUS BAR ASSEMBLY DETAIL
SCALE: NTS

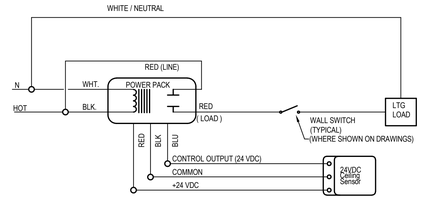
5



UTILITY VAULT 660-PGE
SCALE: NTS

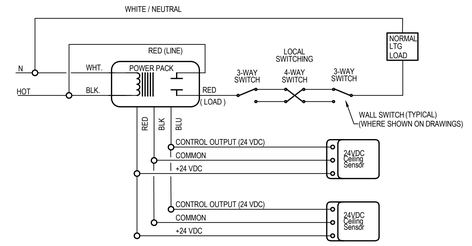
6

NOTE: WHERE USED IN CONJUNCTION WITH PAD-MOUNTED, OIL-FILLED TRANSFORMER,



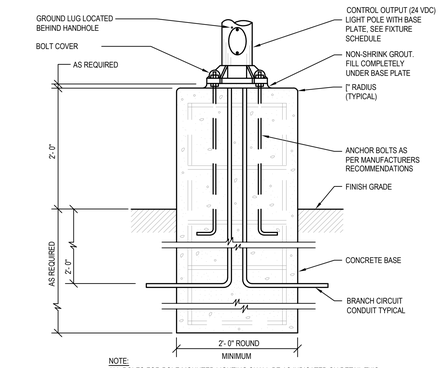
OCCUPANCY SENSOR WIRING DIAGRAM FOR OFFICE AND CONFERENCE ROOM
SCALE: NTS

1



OCCUPANCY SENSOR WIRING DIAGRAM FOR OPEN OFFICE
SCALE: NTS

2



NOTE:
ALL POLES FOR POLE MOUNTED LIGHTING SHALL BE AS INDICATED ON DETAIL THIS DRAWING. POLE, ANCHOR BOLTS, AND FOUNDATION SHALL BE DESIGNED BY A REGISTERED STRUCTURAL ENGINEER AND COORDINATED WITH THE LIGHTING FIXTURE TYPE AND CONFIGURATION BEING PROVIDE, TAKING INTO ACCOUNT MOUNTING HEIGHT, MAXIMUM PROJECTED AREA, MOUNTING ARM LENGTH, QUANTITY OF FIXTURES AND 100 MPH BASIC, AND 130 MPH GUST WIND VELOCITY. CONTRACTOR SHALL FURNISH FINAL POLE BASE DESIGN TO ARCHITECT WITH LIGHTING FIXTURE SUBMITTALS. POLE FOUNDATION IS MINIMUM REQUIREMENT. CONTRACTOR SHALL VERIFY SOIL CONDITIONS WHICH MAY AFFECT FOUNDATION SIZE.

LIGHT POLE RAISED BASE
SCALE: NTS

3

REGISTERED PROFESSIONAL ENGINEER
90651PE
OREGON
JULY 8, 2015
BRADLEY W. MEYER
Expires: 12/31/18

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

Consultants:
kmd architects+planners pc
220 nw eighth avenue
portland, oregon
97209
(503.221.1474
www.kmd.com

SÄZÄN GROUP
MSC CONSULTING STRUCTURAL ENGINEERS
Westech Engineering, Inc.
CONSULTING ENGINEERS & PLANNERS
CIVIL ENGINEERING SERVICES PROVIDED BY

Marion County OREGON

project:
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING
3610 AUMSVILLE HIGHWAY SE
SALEM, OREGON

revisions:

date: 06/12/17
project: A-SP-05416
dwg file: 05416
drawn by: AS
checked by: BWM

copyright © 2016
Carlson Veit Architects P.C.

ELECTRICAL DETAILS

sheet:
E6.01
of:

MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING

PROJECT MANUAL

June 12, 2017

Project Address:
3610 Aumsville Hwy SE
Salem, Oregon 97317

Architect's Project Number:
05416

REGISTERED ARCHITECT
MICHAEL W. JUNGE
SALEM, OREGON
STATE OF OREGON

CARLSON VEIT
ARCHITECTS PC
ARCHITECTURE • INTERIOR DESIGN
503-390-0281 • FAX 503-390-2459 • WWW.CARLSONVEIT.COM
3095 RIVER ROAD NORTH, SALEM, OREGON 97303
MEMBER AMERICAN INSTITUTE OF ARCHITECTS

PROJECT DIRECTORY
MARION COUNTY SHERIFF'S OFFICE
PUBLIC SAFETY BUILDING

Owner:
Marion County
555 Court Street NE
Salem, Oregon 97301

Project Manager:
Day CPM
12745 SW Beaverdam Road, Suite 120
Beaverton, Oregon 97005
503 641-4100
Fax 503 641-4101

Architect:
Carlson Veit Architects P.C.
3095 River Road N.
Salem, Oregon 97303
503 390-0281
Fax 503 390-2459

Consulting Architect:
KMD Architects
222 Vallejo Street
San Francisco, CA
415 398-5191

Civil Engineer:
Westech Engineering, Inc.
3841 Fairview Industrial Dr., SE Suite 100
Salem, Oregon 97302
503 585-2474
Fax 503 585-3986

Structural Engineer:
MSC Engineers, Inc.
3470 Pipebend Place NE, Suite 120
Salem, Oregon 97301
503 399-1399
Fax 503 399-8259

Mechanical/Electrical Engineer:
Sazan Group, Inc.
111 SW Fifth Avenue, Suite 2120
Portland, Oregon 97204
503 416-2400

Geotechnical Engineer:
Redmond Geotechnical Services
P.O. Box 20547
Portland, Oregon 97294
503 285-0598
Fax 503 286-7176

The following Specifications have been organized under the format of the Construction Specifications Institute (CSI). Section numbers listed are for identification, and may not be consecutive. The Contractor shall check his copy of the Specifications against the Table of Contents to be sure his copy is complete.

Section No.	Section Title	Pages
	DIVISION 00 – PROCUREMENT AND CONTRACTING	
00 01 15	List of Drawing Sheets	see Sheet G-001
00 61 13	Performance and Payment Bond Form	6
00 72 00	General Conditions	1
	Marion County General Conditions for Public Improvement Projects	28
00 73 36	Equal Employment Opportunity Requirements	3
00 73 43	Wage Rate Requirements	1
	Prevailing Wage Rates, January 1, 2017	73
00 73 46	Wage Determination Schedule	2
	DIVISION 01 - GENERAL REQUIREMENTS	
01 11 00	Summary of Work	2
01 23 00	Alternates	1
01 25 00	Substitution Procedures	1
	Substitution Request Form	1
01 31 19	Project Meetings	2
01 33 00	Submittal Procedures	2
01 42 00	References	2
01 45 00	Quality Control	3
01 50 00	Temporary Facilities and Controls	4
01 55 26	Temporary Traffic Control	2
01 56 39	Temporary Tree & Plant Protection	2
01 60 00	Product Requirements	2
01 71 23	Field Engineering	1
01 73 29	Cutting and Patching	2
01 74 19	Construction Waste Management & Disposal	3
01 74 23	Final Cleaning	1
01 77 00	Closeout Procedures	2
01 78 23	Operation and Maintenance Data	3
01 78 36	Warranties and Bonds	1
01 78 39	Project Record Documents	2
01 81 00	Building Commissioning	3
	DIVISION 02 – EXISTING CONDITIONS	
02 21 13.15	Survey Work During Construction, by Contractor	3
	DIVISION 03 - CONCRETE	
03 11 00	Concrete Forming	3
03 20 00	Concrete Reinforcing	3
03 30 00	Cast-In-Place Concrete	6
	DIVISION 04 - MASONRY	
04 05 13	Masonry Mortaring and Grouting	4
04 20 00	Unit Masonry	5
	DIVISION 05 - METALS	
05 31 00	Steel Decking	4
05 40 00	Cold–Formed Metal Framing	4
05 50 00	Metal Fabrications	4
05 51 33	Metal Ladders	2

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES
06 05 73 Wood Treatment 2
06 10 00 Rough Carpentry 5
06 17 00 Shop-Fabricated Structural Wood 5
06 17 36 Shop-Fabricated Trusses and Joists 2
06 17 53 Shop Fabricated Wood Trusses 3
06 18 00 Glued-Laminated Construction 2
06 20 00 Finish Carpentry 4
06 41 16 Plastic Laminate-Clad Architectural Cabinets 4
06 61 00 Solid Surface Fabrications 3
06 65 00 Plastic Paneling 2

DIVISION 07 - THERMAL AND MOISTURE PROTECTION
07 11 00 Dampproofing 2
07 19 00 Water Repellents 2
07 21 00 Thermal Insulation 2
07 25 00 Weather Barriers 4
07 40 00 Metal Soffit Panels 2
07 53 00 Elastomeric Membrane Roofing 6
07 60 00 Flashing and Sheet Metal 5
07 72 00 Roof Accessories 2
07 84 00 Firestopping 2
07 92 00 Joint Sealants 2

DIVISION 08 - OPENINGS
08 11 13 Hollow Metal Doors and Frames 3
08 14 00 Wood Doors 2
08 31 13 Access Doors & Frames 2
08 41 13 Aluminum Framed Entrances & Storefronts 3
08 42 29 Automatic Entrances 2
08 51 13 Aluminum Windows 3
08 71 00 Door Hardware 15
08 71 13 Power Door Operators 2
08 80 00 Glazing 3

DIVISION 09 -FINISHES
09 29 00 Gypsum Board 5
09 30 13 Ceramic Tiling 5
09 51 00 Acoustical Ceilings 3
09 65 00 Resilient Flooring 4
09 68 00 Carpeting 3
09 80 00 Acoustic Treatment 3
09 90 00 Painting & Coating 5

DIVISION 10- SPECIALTIES
10 11 16 Marker Boards and Tack Boards 3
10 14 00 Signage 2
10 21 13 Toilet Compartments 2
10 22 26 Operable Partitions 2
10 28 13 Toilet Accessories 3
10 51 13 Metal Lockers 2
10 80 00 Other Specialties 3

DIVISION 12 - FURNISHINGS
12 20 00 Window Treatments 3

DIVISION 21 – FIRE SUPPRESSION
21 05 00 Common Work Results for Fire Suppression 4
21 05 23 General-Duty Valves for Water-Based Fire-Suppression Piping 4
21 0553 Identification for Fire Suppression Piping and Equipment 2

DIVISION 22 - PLUMBING
22 05 13 Common Motor Requirements for Plumbing Equipment 1
22 05 16 Expansion Fittings and Loops for Plumbing Piping 1
22 05 19 Meters and Gages for Plumbing Piping 2
22 05 23 General-Duty Valves for Plumbing Piping 3
22 05 48 Vibration and Seismic Controls for Plumbing Piping and Equipment 1
22 05 53 Identification for Plumbing Piping and Equipment 2
22 07 19 Plumbing Piping Insulation 3
22 10 05 Plumbing Piping 6
22 10 06 Plumbing Piping Specialties 3
22 30 00 Plumbing Equipment 3
22 40 00 Plumbing Fixtures 2

DIVISION 23 – HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)
23 05 13 Common Motor Requirements for HVAC Equipment 2
23 05 16 Expansion Fittings and Loops for HVAC Piping 2
23 05 19 Meters and Gages for HVAC Piping 3
23 05 23 General-Duty Valves for HVAC Piping 5
23 05 48 Vibration and Seismic Controls for HVAC Piping and Equipment 5
23 05 53 Identification for HVAC Piping and Equipment 3
23 05 93 Testing, Adjusting, and Balancing for HVAC 7
23 07 13 Duct Insulation 2
23 07 16 HVAC Equipment Insulation 2
23 09 13 Instrumentation and Control Devices for HVAC 3
23 09 23 Direct-Digital Control System for HVAC 9
23 11 23 Facility Natural-Gas Piping 4
23 21 13 Hydronic Piping 6
23 21 14 Hydronic Specialties 4
23 21 23 Hydronic Pumps 2
23 25 00 HVAC Water Treatment 2
23 31 00 HVAC Ducts and Casings 2
23 33 00 Air Duct Accessories 3
23 34 23 Power Ventilators 1
23 36 00 Air Terminal Units 4
23 37 00 Air Outlets and Inlets 2
23 52 16 Condensing Boilers 4
23 72 23 Packaged Air-to-Air Energy Recovery Units 5
23 81 27 Small Split-System Heating and Cooling 2

DIVISION 26 - ELECTRICAL
26 05 19 Low-Voltage Electrical Power Conductors and Cables 6
26 05 26 Grounding and Bonding for Electrical Systems 5
26 05 29 Hangers and Supports for Electrical Systems 4
26 05 34 Conduit 7
26 05 37 Boxes 5
26 05 53 Identification for Electrical Systems 6
26 05 73 Power System Studies 5
26 09 23 Lighting Control Devices 8
26 21 00 Low-Voltage Electrical Service Entrance 2
26 22 00 Low-Voltage Transformers 4
26 24 13 Switchboards 7
26 24 16 Panelboards 6
26 27 17 Equipment Wiring 2
26 27 26 Wiring Devices 6

26 28 18 Enclosed Switches 3
26 32 13 Engine Generators 9
26 36 00 Transfer Switches 6
26 43 00 Surge Protective Devices 2
26 51 00 Interior Lighting 4
26 56 00 Exterior Lighting 4

DIVISION 27 – COMMUNICATIONS
By Marion County

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY
28 3110 Fire Detection and Alarm 13

DIVISION 31 – EARTHWORK
31 10 00 Site Clearing 1
31 20 00 Earth Moving 5
31 25 00 Erosion and Sedimentation Controls 3
31 62 16 Steel Piles 2

DIVISION 32 – EXTERIOR IMPROVEMENTS
32 12 16 Asphalt Paving 4
32 16 13 Concrete Curbs and Gutters 2
32 31 13 Chain Link Fences and Gates 3
32 32 23 Segmental Retaining Walls 3
32 80 00 Irrigation 5
32 90 00 Planting 7

DIVISION 33 - UTILITIES
33 11 00 Water Utility Distribution Piping 3
33 30 00 Sanitary Sewerage Utilities 3
33 40 00 Storm Drainage Utilities 3
33 46 00 Subdrainage 3

END OF CONTENTS

PERFORMANCE AND PAYMENT BOND

The Performance and Payment Bond as called for in the “Marion County General Conditions for Public Improvement Contracts”, a copy of which is herein included to inform Bidders of its content and wording.

END OF SECTION

STANDARD FORM

"Marion County General Conditions for Public Improvement Contracts", are hereby made part of these Specifications. The Contractor and all Subcontractors shall read and be governed by them. Copies of "General Conditions" may be obtained from the Owner.

CONFLICTS

In case of conflict between the General Conditions, these specifications, or the Drawings, the conflict shall be identified and the Architect will make a written interpretation.

END OF SECTION

Exhibit A

Marion County

GENERAL CONDITIONS

FOR
PUBLIC IMPROVEMENT CONTRACTS

January 27, 2017 Edition

Changes to the General Conditions (including any additions, deletions or substitutions) should only be made by Supplemental General Conditions, unless the General Conditions are specifically modified in the Public Improvement Agreement (which has a higher order of precedence under Section A.3 of the General Conditions). The text of these General Conditions should not otherwise be altered.

MARION COUNTY
GENERAL CONDITIONS FOR PUBLIC IMPROVEMENT CONTRACTS
JANUARY 27, 2017

TABLE OF SECTIONS

SECTION A
GENERAL PROVISIONS

A.1 DEFINITION OF TERMS
A.2 SCOPE OF WORK
A.3 INTERPRETATION OF CONTRACT DOCUMENTS
A.4 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE
A.5 INDEPENDENT CONTRACTOR STATUS
A.6 RETIREMENT SYSTEM STATUS AND TAXES
A.7 GOVERNMENT EMPLOYMENT STATUS

SECTION B
ADMINISTRATION OF THE CONTRACT

B.1 OWNER'S ADMINISTRATION OF THE CONTRACT
B.2 CONTRACTOR'S MEANS AND METHODS
B.3 MATERIALS AND WORKMANSHIP
B.4 PERMITS
B.5 COMPLIANCE WITH GOVERNMENT LAWS AND REGULATIONS
B.6 SUPERINTENDENCE
B.7 INSPECTION
B.8 SEVERABILITY
B.9 ACCESS TO RECORDS
B.10 WAIVER
B.11 SUBCONTRACTS AND ASSIGNMENT
B.12 SUCCESSORS IN INTEREST
B.13 OWNER'S RIGHT TO DO WORK
B.14 OTHER CONTRACTS
B.15 GOVERNING LAW
B.16 LITIGATION
B.17 ALLOWANCES
B.18 SUBMITTALS, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
B.19 SUBSTITUTIONS
B.20 USE OF PLANS AND SPECIFICATIONS
B.21 FUNDS AVAILABLE AND AUTHORIZED
B.22 NO THIRD PARTY BENEFICIARIES

SECTION C
WAGES AND LABOR

C.1 MINIMUM WAGES RATES ON PUBLIC WORKS
C.2 PAYROLL CERTIFICATION; ADDITIONAL RETAINAGE; FEE REQUIREMENTS
C.3 PROMPT PAYMENT AND CONTRACT CONDITIONS
C.4 PAYMENT FOR MEDICAL CARE
C.5 HOURS OF LABOR

SECTION D
CHANGES IN THE WORK

D.1 CHANGES IN THE WORK
D.2 DELAYS
D.3 CLAIMS REVIEW PROCESS

SECTION E
PAYMENTS

E.1 SCHEDULE OF VALUES
E.2 APPLICATIONS FOR PAYMENT
E.3 PAYROLL CERTIFICATION REQUIREMENT
E.4 DUAL PAYMENT SOURCES
E.5 RETAINAGE
E.6 FINAL PAYMENT

SECTION F
JOB SITE CONDITIONS

F.1 USE OF PREMISES
F.2 PROTECTION OF WORKERS, PROPERTY AND THE PUBLIC
F.3 CUTTING AND PATCHING
F.4 CLEANING UP
F.5 ENVIRONMENTAL CONTAMINATION
F.6 ENVIRONMENTAL CLEAN-UP
F.7 FORCE MAJEURE

SECTION G
INDEMNITY, BONDING AND INSURANCE

G.1 RESPONSIBILITY FOR DAMAGES/INDEMNITY
G.2 PERFORMANCE AND PAYMENT SECURITY; PUBLIC WORKS BOND
G.3 INSURANCE

SECTION H
SCHEDULE OF WORK

H.1 CONTRACT PERIOD
H.2 SCHEDULE
H.3 PARTIAL OCCUPANCY OR USE

SECTION I
CORRECTION OF WORK

I.1 CORRECTIONS OF WORK BEFORE FINAL PAYMENT
I.2 WARRANTY WORK

SECTION J
SUSPENSION AND/OR TERMINATION OF THE WORK

J.1 OWNER'S RIGHT TO SUSPEND THE WORK
J.2 CONTRACTOR'S RESPONSIBILITIES
J.3 COMPENSATION FOR SUSPENSION
J.4 OWNER'S RIGHT TO TERMINATE CONTRACT
J.5 TERMINATION FOR CONVENIENCE
J.6 ACTION UPON TERMINATION

SECTION K
CONTRACT CLOSE-OUT

K.1 RECORD DRAWINGS
K.2 OPERATION AND MAINTENANCE MANUALS
K.3 AFFIDAVIT/RELEASE OF LIENS AND CLAIMS
K.4 COMPLETION NOTICES
K.5 TRAINING
K.6 EXTRA MATERIALS
K.7 ENVIRONMENTAL CLEAN-UP
K.8 CERTIFICATE OF OCCUPANCY
K.9 OTHER CONTRACTOR RESPONSIBILITIES
K.10 SURVIVAL

SECTION L
LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

L.1 LAWS TO BE OBSERVED
L.2 FEDERAL AGENCIES
L.3 STATE AGENCIES
L.4 LOCAL AGENCIES

MARION COUNTY
GENERAL CONDITIONS FOR PUBLIC IMPROVEMENT CONTRACTS
("General Conditions")

SECTION A
GENERAL PROVISIONS

A.1 DEFINITION OF TERMS

In the Contract Documents the following terms shall be as defined below:

ARCHITECT/ENGINEER, means the Person appointed by the Owner to make drawings and specifications and, to provide contract administration of the Work contemplated by the Contract to the extent provided herein or by supplemental instruction of Owner (under which Owner may delegate responsibilities of the Owner's Authorized Representative to the Architect/Engineer), in accordance with ORS Chapter 671 (Architects) or ORS Chapter 672 (Engineers) and administrative rules adopted thereunder.

CHANGE ORDER, means a written order issued by the Owner's Authorized Representative to the Contractor requiring a change in the Work within the general scope of the Contract Documents, issued under the changes provisions of Section D.1 including Owner's written change directives as well as changes reflected in a writing executed by the parties to this Contract and, if applicable, establishing a Contract Price or Contract Time adjustment for the changed Work.

CLAIM, means a demand by Contractor pursuant to Section D.3 for review of the denial of Contractor's initial request for an adjustment of Contract terms, payment of money, extension of Contract Time or other relief, submitted in accordance with the requirements and within the time limits established for review of Claims in these General Conditions.

CONTRACT, means the written agreement between the Owner and the Contractor comprised of the Contract Documents which describe the Work to be done and the obligations between the parties.

CONTRACT DOCUMENTS, means the Solicitation Document and addenda thereto, the Marion County Public Improvement Agreement Form, General Conditions, Supplemental General Conditions, if any, the accepted Offer, Plans, Specifications, amendments and Change Orders.

CONTRACT PERIOD, as set forth in the Contract Documents, means the total period of time beginning with the issuance of the Notice to Proceed and concluding upon Final Completion.

CONTRACT PRICE, means the total of the awarded Offer amount, as increased or decreased by the price of approved alternates and Change Orders.

CONTRACT TIME, means any incremental period of time allowed under the Contract to complete any portion of the Work as reflected in the project schedule.

CONTRACTOR, means the Person awarded the Contract for the Work contemplated.

DAYS, are calendar days, including weekdays, weekends and holidays, unless otherwise specified.

DIRECT COSTS, means, unless otherwise provided in the Contract Documents, the cost of materials, including sales tax, cost of delivery; cost of labor, including social security, old age and unemployment insurance, and fringe benefits required by agreement or custom; worker's compensation insurance; project specific insurance (including, without limitation, Builder's Risk Insurance and Builder's Risk Installation Floater); bond premiums, rental cost of equipment, and machinery required for execution of the work; and the additional costs of field personnel directly attributable to the Work.

FINAL COMPLETION, means the final completion of all requirements under the Contract, including Contract Closeout as described in Section K but excluding Warranty Work as described in Section I.2, and the final payment and release of all retainage, if any, released.

FORCE MAJEURE, means an act, event or occurrence caused by fire, riot, war, acts of God, nature, sovereign, or public enemy, strikes, freight embargoes or any other act, event or occurrence that is beyond the control of the party to this Contract who is asserting Force Majeure.

NOTICE TO PROCEED, means the official written notice from the Owner stating that the Contractor is to proceed with the Work defined in the Contract Documents. Notwithstanding the Notice to Proceed, Contractor shall not be authorized to proceed with the Work until all initial Contract requirements, including the Contract, performance bond and payment bond, and certificates of insurance, have been fully executed and submitted to Owner in a suitable form.

OFFER, means a bid in connection with an invitation to bid and a proposal in connection with a request for proposals.

OFFEROR, means a bidder in connection with an invitation to bid and a proposer in connection with a request for proposals.

OVERHEAD, means those items which may be included in the Contractor's markup (general and administrative expense and profit) and that shall not be charged as Direct Cost of the Work, including without limitation such Overhead expenses as wages or salary of personnel above the level of foreman (i.e., superintendents and project managers), expenses of Contractor's offices at the job site (e.g. job trailer) including expenses of personnel staffing the job site office, and Commercial General Liability Insurance and Automobile Liability Insurance.

OWNER, means Marion County acting by and through the governmental entity identified in the Solicitation Document.

OWNER'S AUTHORIZED REPRESENTATIVE, means those individuals identified in writing by the Owner to act on behalf of the Owner for this project. Owner may elect, by written notice to Contractor, to delegate certain duties of the Owner's Authorized Representative to more than one party, including without limitation, to an Architect/Engineer. However, nothing in these General Conditions is intended to abrogate the separate design professional responsibilities of Architects under ORS Chapter 671 or of Engineers under ORS Chapter 672.

PERSON, means an entity doing business as a sole proprietorship, a partnership, a joint venture, a corporation, a limited liability company or partnership, or any other entity possessing the legal capacity to contract.

PLANS, means the drawings which show the location, type, dimensions, and details of the Work to be done under the Contract.

PUNCHLIST, means the list of Work yet to be completed or deficiencies which need to be corrected in order to achieve Final Completion of the Contract.

RECORD DOCUMENT, means the as-built Plans, Specifications, testing and inspection records, product data, samples, manufacturer and distributor/supplier warranties evidencing transfer to Owner, operational and maintenance manuals, shop drawings, Change Orders, correspondence, certificate(s) of occupancy, and other documents listed in Subsection B.9.1 of these General Conditions, recording all Services performed.

SOLICITATION DOCUMENT, means an invitation to bid or request for proposal or request for quotes.

SPECIFICATION, means any description of the physical or functional characteristics of the Work, or of the nature of a supply, service or construction item. Specifications may include a description of any requirement for inspecting, testing or preparing a supply, service or construction item for delivery and the quantities or qualities of materials to be furnished under the Contract. Specifications generally will state the results or products to be obtained and may, on occasion, describe the method and manner of doing the work to be performed. Specifications may be incorporated by reference and/or may be attached to the Contract.

SUBCONTRACTOR, means a Person having a direct contract with the Contractor, or another Subcontractor, to perform one or more items of the Work.

SUBSTANTIAL COMPLETION, means the date when the Owner accepts in writing the construction, alteration or repair of the improvement to real property or any designated portion thereof as having reached that state of completion when it may be used or occupied for its intended purpose. Substantial Completion of facilities with operating systems occurs only after thirty (30) continuous Days of successful, trouble-free operation of the operating systems as provided in Section K.4.2.

SUBSTITUTIONS, means items that in function, performance, reliability, quality, and general configuration are the same or better than the product(s) specified. Approval of any substitute item shall be solely determined by the Owner's Authorized Representative. The decision of the Owner's Authorized Representative is final.

SUPPLEMENTAL GENERAL CONDITIONS, means those conditions that remove from, add to, or modify these General Conditions. Supplemental General Conditions may be included in the Solicitation Document or may be a separate attachment to the Contract.

WORK, means the furnishing of all materials, equipment, labor, transportation, services and incidentals necessary to successfully complete any individual item or the entire Contract and the carrying out of duties and obligations imposed by the Contract Documents.

A.2 SCOPE OF WORK

The Work contemplated under this Contract includes all labor, materials, transportation, equipment and services for, and incidental to, the completion of all construction work in connection with the project described in the Contract Documents. The Contractor shall perform all Work necessary so that the project can be legally occupied and fully used for the intended use as set forth in the Contract Documents.

A.3 INTERPRETATION OF CONTRACT DOCUMENTS

A.3.1 Unless otherwise specifically defined in the Contract Documents, words which have well-known technical meanings or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. Contract Documents are intended to be complementary. Whatever is called for in one, is interpreted to be called for in all. However, in the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following descending order of precedence:

1. Contract amendments and Change Orders, with those of later date having precedence over those of an earlier date;
2. The Supplemental General Conditions;
3. The Marion County Public Improvement Agreement Form;
4. The General Conditions
5. The Plans and Specifications
6. The Solicitation Document and any addenda thereto;
7. The accepted Offer.

A.3.2 In the case of an inconsistency between Plans and Specifications or within either document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Owner or Owner's Authorized Representative's interpretation in writing.

A.3.3 If the Contractor finds discrepancies in, or omissions from the Contract Documents, or if the Contractor is in doubt as to their meaning, the Contractor shall at once notify the Owner or Owner's Authorized Representative. Matters concerning performance under, and interpretation of requirements of, the Contract Documents will be decided by the Owner's Authorized Representative, who may delegate that duty in some instances to the Architect/Engineer. Responses to Contractor's requests for interpretation of Contract Documents will be made in writing by Owner's Authorized Representative (or the Architect/Engineer) within any time limits agreed upon or otherwise with reasonable promptness.

Interpretations and decisions of the Owner's Authorized Representative (or Architect/Engineer) will be consistent with the intent of and reasonably inferable from the Contract Documents. Contractor shall not proceed without direction in writing from the Owner's Authorized Representative (or Architect/Engineer).

A.3.4 References to standard specifications, manuals, codes of any technical society, organization or association, to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, laws or regulations in effect in the jurisdiction where the project is occurring on the first published date of the Solicitation Document, except as may be otherwise specifically stated.

A.4 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE

A.4.1 It is understood that the Contractor, before submitting an Offer, has made a careful examination of the Contract Documents; has become fully informed as to the quality and quantity of materials and the character of the Work required; and has made a careful examination of the location and conditions of the Work and the sources of supply for materials. The Owner will in no case be responsible for any loss or for any unanticipated costs that may be suffered by the Contractor as a result of the Contractor's failure to acquire full information in advance in regard to all conditions pertaining to the Work. No oral agreement or conversation with any officer, agent, or personnel of the Owner, or with the Architect/Engineer either before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained.

A.4.2 Should the Plans or Specifications fail to particularly describe the materials, kind of goods, or details of construction of any aspect of the Work, Contractor shall have the duty to make inquiry of the Owner and Architect/Engineer as to what is required prior to performance of the Work. Absent Specifications to the contrary, the materials or processes that would normally be used to produce first quality finished Work shall be considered a part of the Contract requirements.

A.4.3 Any design errors or omissions noted by the Contractor shall be reported promptly to the Owner's Authorized Representative, including without limitation, any nonconformity with applicable laws, statutes, ordinances, building codes, rules and regulations.

A.4.4 If the Contractor believes that additional cost or Contract Time is involved because of clarifications or instructions issued by the Owner's Authorized Representative (or Architect/Engineer) in response to the Contractor's notices or requests for information, the Contractor must submit a written request to the Owner's Authorized Representative, setting forth the nature and specific extent of the request, including all time and cost impacts against the Contract as soon as possible, but no later than thirty (30) Days after receipt by Contractor of the clarifications or instructions issued. If the Owner's Authorized Representative denies Contractor's request for additional compensation, additional Contract Time, or other relief that Contractor believes results from the clarifications or instructions, the Contractor may proceed to file a Claim under Section D.3, Claims Review Process. If the Contractor fails to perform the obligations of Sections A.4.1 to A.4.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations.

A.5 INDEPENDENT CONTRACTOR STATUS

The service or services to be performed under this Contract are those of an independent contractor as defined in ORS 670.600. Contractor represents and warrants that it is not an officer, employee or agent of the Owner.

A.6 RETIREMENT SYSTEM STATUS AND TAXES

Contractor represents and warrants that it is not a contributing member of the Public Employees' Retirement System and will be responsible for any federal or state taxes applicable to payment received under this Contract. Contractor will not be eligible for any benefits from these Contract payments of federal Social Security, employment insurance, workers' compensation or the Public Employees' Retirement System, except as a self-employed individual. Unless the Contractor is subject to backup withholding, Owner will not withhold from such payments any amount(s) to cover Contractor's federal or state tax obligations.

A.7 GOVERNMENT EMPLOYMENT STATUS

A.7.1 If this payment is to be charged against federal funds, Contractor represents and warrants that it is not currently employed by the Federal Government. This does not preclude the Contractor from holding another contract with the Federal Government.

A.7.2 Contractor represents and warrants that Contractor is not an employee of the Marion County for purposes of performing Work under this Contract.

SECTION B
ADMINISTRATION OF THE CONTRACT

B.1 OWNER'S ADMINISTRATION OF THE CONTRACT

B.1.1 The Owner's Authorized Representative will provide administration of the Contract as described in the Contract Documents (1) during construction (2) until final payment is due and (3) during the one-year period for correction of Work. The Owner's Authorized Representative will act on behalf of the Owner to the extent provided in the Contract Documents, unless modified in writing in accordance with other provisions of the Contract. In performing these tasks, the Owner's Authorized Representative may rely on the Architect/Engineer or other consultants to perform some or all of these tasks.

B.1.2 The Owner's Authorized Representative will visit the site at intervals appropriate to the stage of the Contractor's operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. The Owner's Authorized Representative

will not make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Owner's Authorized Representative will neither have control over or charge of, nor be responsible for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work.

B.1.3 Except as otherwise provided in the Contract Documents or when direct communications have been specifically authorized, the Owner and Contractor shall endeavor to communicate with each other through the Owner's Authorized Representative or designee about matters arising out of or relating to the Contract. Communications by and with the Architect/Engineer's consultants shall be through the Architect/Engineer. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner's Authorized Representative.

B.1.4 Based upon the Architect/Engineer's evaluations of the Contractor's Application for Payment, or unless otherwise stipulated by the Owner's Authorized Representative, the Architect/Engineer will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

B.2 CONTRACTOR'S MEANS AND METHODS; MITIGATION OF IMPACTS

B.2.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures.

B.2.2 The Contractor is responsible to protect and maintain the Work during the course of construction and to mitigate any adverse impacts to the project, including those caused by authorized changes, which may affect cost, schedule, or quality.

B.2.3 The Contractor is responsible for the actions of all its personnel, laborers, suppliers, and Subcontractors on the project. The Contractor shall enforce strict discipline and good order among Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of persons who are unfit or unskilled for the tasks assigned to them.

B.2.4 Contractor agrees that it will commence performance of the Work in a timely manner and will achieve the Contract Times in the Contract Documents.

B.3 MATERIALS AND WORKMANSHIP

B.3.1 The intent of the Contract Documents is to provide for the construction and completion in every detail of the Work described. All Work shall be performed in a professional manner and unless the means or methods of performing a task are specified elsewhere in the Contract Documents, Contractor shall employ methods that are generally accepted and used by the industry, in accordance with industry standards.

B.3.2 The Contractor is responsible to perform the Work as required by the Contract Documents. Defective Work shall be corrected at the Contractor's expense.

B.3.3 Work done and materials furnished shall be subject to inspection and/or observation and testing by the Owner's Authorized Representative to determine if they conform to the Contract Documents. Inspection of the Work by the Owner's Authorized Representative does not relieve the Contractor of responsibility for the Work in accordance with the Contract Documents.

B.3.4 Contractor shall furnish adequate facilities, as required, for the Owner's Authorized Representative to have safe access to the Work including without limitation walkways, railings, ladders, tunnels, and platforms. Producers, suppliers, and fabricators shall also provide proper facilities and access to their facilities.

B.3.5 The Contractor shall furnish Samples of materials for testing by the Owner's Authorized Representative and include the cost of the Samples in the Contract Price.

B.4 PERMITS

Contractor shall obtain and pay for all necessary permits and licenses, except for those specifically excluded in the Supplemental General Conditions, for the construction of the Work, for temporary obstructions, enclosures, opening of streets for pipes, walls, utilities, environmental Work, etc., as required for the project. Contractor shall be responsible for all violations of the law, in connection with the construction or caused by obstructing streets, sidewalks or otherwise. Contractor shall give all requisite notices to public authorities. The Contractor shall pay all royalties and license fees. The Contractor shall defend all suits or claims for infringement of any patent or other proprietary rights and save harmless and blameless from loss, on account thereof, the State of Oregon, and its departments, divisions, members and employees.

B.5 COMPLIANCE WITH GOVERNMENT LAWS AND REGULATIONS

B.5.1 Contractor shall comply with all federal, state and local laws, codes, regulations and ordinances applicable to the Work and the Contract. Failure to comply with such requirements shall constitute a breach of Contract and shall be grounds for Contract termination. Without limiting the generality of the foregoing, Contractor expressly agrees to comply with the following as applicable: i) Title VI and VII of Civil Rights Act of 1964, as amended; (ii) Section 503 and 504 of the Rehabilitation Act of 1973, as amended; (iii) the Health Insurance Portability and Accountability Act of 1996; (iv) the Americans with Disabilities Act of 1990, as amended; (v) ORS Chapter 659A; as amended (vi) all regulations and administrative rules established pursuant to the foregoing laws; and (vii) all other applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations. Owner's performance under the Contract is conditioned upon Contractor's compliance with the provisions of ORS 279C.505, 279C.510, 279C.515,

279C.520, and 279C.530, which are incorporated by reference herein.

B.5.2 Contractor shall comply with all applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations; and

(a) Contractor shall not discriminate against Disadvantaged, Minority, Women or Emerging Small Business enterprises, as those terms are defined in ORS 200.005, or a business enterprise that is owned or controlled by or that employs a disabled veteran, as that term is defined in ORS 408.225**,** in the awarding of subcontracts.

(b) Contractor shall maintain, in current and valid form, all licenses and certificates required by law, regulation, or this Contract when performing the Work.

B.5.3 Unless contrary to federal law, Contractor shall certify that it shall not accept a bid from Subcontractors to perform Work as described in ORS 701.005 under this Contract unless such Subcontractors are registered with the Construction Contractors Board in accordance with ORS 701.035 to 701.055 at the time they submit their bids to the Contractor.

B.5.4 Unless contrary to federal law, Contractor shall certify that each landscape contractor, as defined in ORS 671.520(2), performing Work under this Contract holds a valid landscape contractor's license issued pursuant to ORS 671.560.

B.5.5 The following notice is applicable to Contractors who perform excavation Work. ATTENTION: Oregon law requires you to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. You may obtain copies of the rules by calling the center at (503)232-1987.

B.5.6 Failure to comply with any or all of the requirements of B.5.1 through B.5.5 shall be a breach of Contract and constitute grounds for Contract termination. Damages or costs resulting from such noncompliance shall be the responsibility of Contractor.

B.6 SUPERINTENDENCE

Contractor shall keep on the site, during the progress of the Work, a competent superintendent and any necessary assistants who shall be satisfactory to the Owner and who shall represent the Contractor on the site. Directions given to the superintendent by the Owner's Authorized Representative shall be confirmed in writing to the Contractor.

B.7 INSPECTION

B.7.1 Owner's Authorized Representative shall have access to the Work at all times.

B.7.2 Inspection of the Work will be made by the Owner's Authorized Representative at its discretion. The Owner's Authorized Representative will have authority to reject Work that does not conform to the Contract Documents. Any Work found to be not in conformance with the Contract Documents, in the discretion of the Owner's Authorized Representative, shall be removed and replaced at the Contractor's expense.

B.7.3 Contractor shall make or obtain at the appropriate time all tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work. The Contractor shall give the Owner's Authorized Representative timely notice of when and where tests and inspections are to be made so that the Owner's Authorized Representative may be present for such procedures. Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Owner's Authorized Representative.

B.7.4 As required by the Contract Documents, Work done or material used without inspection or testing by the Owner's Authorized Representative may be ordered removed at the Contractor's expense.

B.7.5 If directed to do so any time before the Work is accepted, the Contractor shall uncover portions of the completed Work for inspection. After inspection, the Contractor shall restore such portions of Work to the standard required by the Contract. If the Work uncovered is unacceptable or was done without sufficient notice to the Owner's Authorized Representative, the uncovering and restoration shall be done at the Contractor's expense. If the Work uncovered is acceptable and was done with sufficient notice to the Owner's Authorized Representative, the uncovering and restoration will be paid for as a Change Order.

B.7.6 If any testing or inspection reveals failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Owner's Authorized Representative's and Architect/Engineer's services and expenses, shall be at the Contractor's expense.

B.7.7 When the United States government participates in the cost of the Work, or the Owner has an agreement with other public or private organizations, or if any portion of the Work is being performed for a third party or in close proximity to third party facilities, representatives of these organizations have the right to inspect the Work affecting their interests or property. Their right to inspect shall not make them a party to the Contract and shall not interfere with the rights of the parties of the Contract. Instructions or orders of such parties shall be transmitted to the Contractor, through the Owner's Authorized Representative.

B.8 SEVERABILITY

If any provision of this Contract is declared by a court to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected and the rights and obligations of the parties shall be construed and enforced as if the Contract did not contain the particular

provision held to be invalid.

B.9 ACCESS TO RECORDS

B.9.1 Contractor shall keep, at all times on the Work site, one record copy of the complete Contract Documents, including the Plans, Specifications, Change Orders and addenda, in good order and marked currently to record field changes and selections made during construction, and one record copy of Shop Drawings, Product Data, Samples and similar submittals, and shall at all times give the Owner's Authorized Representative access thereto.

B.9.2 Contractor shall retain and the Owner and its duly authorized representatives shall have access to, for a period not less than ten (10) years, all Record Documents, financial and accounting records, and other books, documents, papers and records of Contractor which are pertinent to the Contract including records pertaining to Overhead and indirect costs, for the purpose of making audit, examination, excerpts and transcripts. If for any reason, any part of the Contract is involved in litigation, Contractor shall retain all such records until all litigation is resolved. The Owner and/or its agents shall continue to be provided full access to the records during litigation.

B.10 WAIVER

Failure of the Owner to enforce any provision of this Contract shall not constitute a waiver or relinquishment by the Owner of the right to such performance in the future nor of the right to enforce any other provision of this Contract.

B.11 SUBCONTRACTS AND ASSIGNMENT

B.11.1 Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound by the terms and conditions of these General Conditions, and to assume toward the Contractor all of the obligations and responsibilities which the Contractor assumes toward the Owner thereunder, unless (1) the same are clearly inapplicable to the subcontract at issue because of legal requirements or industry practices, or (2) specific exceptions are requested by Contractor and approved in writing by Owner. Where appropriate, Contractor shall require each Subcontractor to enter into similar agreements with sub-subcontractors at any level.

B.11.2 At Owner's request, Contractor shall submit to Owner prior to their execution either Contractor's form of subcontract, or the subcontract to be executed with any particular Subcontractor. If Owner disapproves such form, Contractor shall not execute the form until the matters disapproved are resolved to Owner's satisfaction. Owner's review, comment upon or approval of any such form shall not relieve Contractor of its obligations under this Agreement or be deemed a waiver of such obligations of Contractor.

B.11.3 Contractor shall not assign, sell, or transfer its rights, or delegate its responsibilities under this Contract, in whole or in part, without the prior written approval of the Owner. No such written approval shall relieve Contractor of any obligations of this Contract, and any transferee shall be considered the agent of the Contractor and bound to perform in accordance with the Contract Documents. Contractor shall remain liable as between the original parties to the Contract as if no assignment had occurred.

B.12 SUCCESSORS IN INTEREST

The provisions of this Contract shall be binding upon and shall accrue to the benefit of the parties to the Contract and their respective permitted successors and assigns.

B.13 OWNER'S RIGHT TO DO WORK

Owner reserves the right to perform other or additional work at or near the project site with other forces than those of the Contractor. If such work takes place within or next to the project site, Contractor will coordinate work with the other contractors or forces, cooperate with all other contractors or forces, carry out the Work in a way that will minimize interference and delay for all forces involved, place and dispose of materials being used so as not to interfere with the operations of another, and join the Work with the work of the others in an acceptable manner and perform it in proper sequence to that of the others. The Owner's Authorized Representative will resolve any disagreements that may arise between or among Contractor and the other contractors over the method or order of doing all work (including the Work). In case of unavoidable interference, the Owner's Authorized Representative will establish work priority (including the Work) which generally will be in the sequence that the contracts were awarded.

B.14 OTHER CONTRACTS

In all cases and at any time, the Owner has the right to execute other contracts related to or unrelated to the Work of this Contract. The Contractor of this Contract will fully cooperate with any and all other contractors without additional cost to the Owner in the manner described in section B.13.

B.15 GOVERNING LAW

This Contract shall be governed by and construed in accordance with the laws of the State of Oregon without regard to principles of conflict of laws.

B.16 LITIGATION

Any Claim between Owner and Contractor that arises from or relates to this Contract and that is not resolved through the Claims Review Process in Section D.3 shall be brought and conducted solely and exclusively within the Circuit Court of Marion County for the State of Oregon; provided, however, if a Claim must be brought in a federal forum, then it shall be brought and conducted solely and exclusively within the United States District Court for the District of Oregon. In no event shall this section be construed as a waiver by the Marion County on any form of defense or immunity, whether sovereign immunity, governmental immunity, immunity based on the Eleventh Amendment to the Constitution of the United States or otherwise, from any claim or from the jurisdiction of any court. CONTRACTOR BY EXECUTION OF THIS CONTRACT HEREBY CONSENTS TO THE IN PERSONAM JURISDICTION OF THE COURTS REFERENCED IN THIS SECTION B.16.

B.17 ALLOWANCES

B.17.1 The Contractor shall include in the Contract Price all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such

amounts and by such persons or entities as the Owner may direct.

B.17.2 Unless otherwise provided in the Contract Documents:

(a) when finally reconciled, allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

(b) Contractor's costs for unloading and handling at the site, labor, installation costs, Overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Price but not in the allowances;

(c) whenever costs are more than or less than allowances, the Contract Price shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (i) the difference between actual costs and the allowances under Section B.17.2(a) and (2) changes in Contractor's costs under Section B.17.2(b).

(d) Unless Owner requests otherwise, Contractor shall provide to Owner a proposed fixed price for any allowance work prior to its performance.

B.18 SUBMITTALS, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

B.18.1 The Contractor shall prepare and keep current, for the Architect's/Engineer's approval (or for the approval of Owner's Authorized Representative if approval authority has not been delegated to the Architect/Engineer), a schedule and list of submittals which is coordinated with the Contractor's construction schedule and allows the Architect/Engineer reasonable time to review submittals. Owner reserves the right to finally approve the schedule and list of submittals. Submittals include, without limitation, Shop Drawings, Product Data, and Samples which are described below:

(a) Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor (including any sub-subcontractor), manufacturer, supplier or distributor to illustrate some portion of the Work.

(b) Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

(c) Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

B.18.2 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review of submittals by the Architect/Engineer is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, or for approval of safety precautions or, unless otherwise specifically stated by the Architect/Engineer, of any construction means, methods, techniques, sequences or procedures, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect/Engineer's review of the Contractor's submittals shall not relieve the Contractor of its obligations under the Contract Documents. The Architect/Engineer's approval of a specific item shall not indicate approval of an assembly of which the item is a component. Informational submittals upon which the Architect/Engineer is not expected to take responsive action may be so identified in the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the Architect/Engineer without action.

B.18.3 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect/Engineer Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect/Engineer without action.

B.18.4 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

B.18.5 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect/Engineer.

B.18.6 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect/Engineer's review or approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect/Engineer in writing of such deviation at the time of submittal and (i) the Architect/Engineer has given written approval to the specific deviation as a minor change in the Work, or (ii) a Change Order has been executed by Owner authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar by the Architect/Engineer's review or approval thereof.

B.18.7 In the event that Owner elects not to have the obligations and duties described under this Section

B.18 performed by the Architect/Engineer, or in the event no Architect/Engineer is employed by Owner on the project, all obligations and duties assigned to the Architect/Engineer hereunder shall be performed by the Owner's Authorized Representative.

B.19 SUBSTITUTIONS

The Contractor may make Substitutions only with the consent of the Owner, after evaluation by the Owner's Authorized Representative and only in accordance with a Change Order. Substitutions shall be subject to the requirements of the bid documents. By making requests for Substitutions, the Contractor represents that the Contractor has personally investigated the proposed substitute product; represents that the Contractor will provide the same warranty for the Substitution that the Contractor would for the product originally specified unless approved otherwise; certifies that the cost data presented is complete and includes all related costs under this Contract including redesign costs, and waives all claims for additional costs related to the Substitution which subsequently become apparent; and will coordinate the installation of the accepted Substitution, making such changes as may be required for the Work to be completed in all respects.

B.20 USE OF PLANS AND SPECIFICATIONS

Plans, Specifications and related Contract Documents furnished to Contractor by Owner or Owner's Architect/Engineer shall be used solely for the performance of the Work under this Contract.Contractor and its Subcontractors and suppliers are authorized to use and reproduce applicable portions of such documents appropriate to the execution of the Work, but shall not claim any ownership or other interest in them beyond the scope of this Contract, and no such interest shall attach. Unless otherwise indicated, all common law, statutory and other reserved rights, in addition to copyrights, are retained by Owner.

B.21 FUNDS AVAILABLE AND AUTHORIZED

Owner reasonably believes at the time of entering into this Contract that sufficient funds are available and authorized for expenditure to finance the cost of this Contract within the Owner's appropriation or limitation. Contractor understands and agrees that, to the extent that in the event the Board of Commissioners of the County reduces, changes, eliminates or otherwise modifies the funding the cost of this contract, the CONTRACTOR agrees to abide by any such decision, including termination of this agreement.

B.22 NO THIRD PARTY BENEFICIARIES

Owner and Contractor are the only parties to this Contract and are the only parties entitled to enforce its terms. Nothing in this Contract gives, is intended to give, or shall be construed to give or provide any benefit or right, whether directly, indirectly, or otherwise, to third persons unless such third persons are individually identified by name herein and expressly described as intended beneficiaries of the terms of this Contract.

SECTION C
WAGES AND LABOR

C.1 MINIMUM WAGE RATES ON PUBLIC WORKS

Contractor shall comply fully with the provisions of ORS 279C.800 through 279C.870. Documents establishing those conditions, as determined by the Commissioner of the Bureau of Labor and Industries (BOLI), are included as attachments to or are incorporated by reference in the Contract Documents. Contractor shall pay workers at not less than the specified minimum hourly rate of wage, and shall include that requirement in all subcontracts.

C.2 PAYROLL CERTIFICATION; ADDITIONAL RETAINAGE; FEE REQUIREMENTS

C.2.1 In accordance with ORS 279C.845, the Contractor and every Subcontractor shall submit written certified statements to the Owner's Authorized Representative, on the form prescribed by the Commissioner of the Bureau of Labor and Industries, certifying the hourly rate of wage paid each worker which the Contractor or the Subcontractor has employed on the project and further certifying that no worker employed on the project has been paid less than the prevailing rate of wage or less than the minimum hourly rate of wage specified in the Contract, which certificate and statement shall be verified by the oath of the Contractor or the Subcontractor that the Contractor or Subcontractor has read the certified statement, that the Contractor or Subcontractor knows the contents of the certified statement and that to the Contractor's or Subcontractor's best knowledge and belief the certified statement is true. The certified statements shall set out accurately and completely the payroll records for the prior week including the name and address of each worker, the worker's correct classification, rate of pay, daily and weekly number of hours worked, deductions made and actual wages paid. Certified statements for each week during which the Contractor or Subcontractor has employed a worker on the project shall be submitted once a month, by the fifth business day of the following month.

The Contractor and Subcontractors shall preserve the certified statements for a period of ten (10) years from the date of completion of the Contract.

C.2.2 Pursuant to ORS 279C.845(7),the Owner shall retain 25 percent of any amount earned by the Contractor on this public works project until the Contractor has filed the certified statements required by section C.2.1. The Owner shall pay to the Contractor the amount retained under this subsection within 14 days after the Contractor files the required certified statements, regardless of whether a Subcontractor has failed to file certified statements.

C.2.3 Pursuant to ORS 279C.845(8), the Contractor shall retain 25 percent of any amount earned by a first-tier Subcontractor on this public works project until the first-tier Subcontractor has filed with the Owner the certified statements required by C.2.1. Before paying any amount retained under this subsection, the Contractor shall verify that the first-tier Subcontractor has filed the certified statement, Within 14 days after the first-tier Subcontractor files the required certified statement the Contractor shall pay the first-tier Subcontractor any amount retained under this subsection.

C.2.4 In accordance with statutory requirements, and administrative rules promulgated by the Commissioner of the Bureau of Labor and Industries, the fee required by ORS 279C.825(1) will be paid by Owner to the Commissioner.

C.3 PROMPT PAYMENT AND CONTRACT CONDITIONS

C.3.1 Pursuant to ORS 279C.505 and as a condition to Owner's performance hereunder, the Contractor shall:

C.3.1.1 Make payment promptly, as due, to all persons supplying to Contractor labor or materials for the prosecution of the Work provided for in this Contract.

C.3.1.2 Pay all contributions or amounts due the State Industrial Accident Fund from such Contractor or Subcontractor incurred in the performance of the Contract.

C.3.1.3 Not permit any lien or claim to be filed or prosecuted against the Owner on account of any labor or material furnished. Contractor will not assign any claims that Contractor has against Owner, or assign any sums due by Owner, to Subcontractors, suppliers, or manufacturers, and will not make any agreement or act in any way to give Subcontractors a claim or standing to make a claim against the Owner.

C.3.1.4 Pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.

C.3.1.5 Demonstrate that an employee drug testing program is in place as follows:

(a) Contractor represents and warrants that Contractor has in place at the time of the execution of this Contract, and shall maintain during the term of this Contract, a Qualifying Employee Drug Testing Program for its employees that includes, at a minimum, the following:

(1) A written employee drug testing policy,

(2) Required drug testing for all new Subject Employees or, alternatively, required testing of all Subject Employees every 12 months on a random selection basis, and

(3) Required testing of a Subject Employee when the Contractor has reasonable cause to believe the Subject Employee is under the influence of drugs.

A drug testing program that meets the above requirements will be deemed a "Qualifying Employee Drug Testing Program." For the purposes of this section, an employee is a "Subject Employee" only if that employee will be working on the project job site.

(b) Contractor shall require each Subcontractor providing labor for the project to:

(1) Demonstrate to the Contractor that it has a Qualifying Employee Drug Testing Program for the Subcontractor's Subject Employees, and represent and warrant to the Contractor that the Qualifying Employee Drug Testing Program is in place at the time of subcontract execution and will continue in full force and effect for the duration of the subcontract, or

(2) Require that the Subcontractor's Subject Employees participate in the Contractor's Qualifying Employee Drug Testing Program for the duration of the subcontract.

C.3.2 Pursuant to ORS 279C.515, and as a condition to Owner's performance hereunder, Contractor agrees:

C.3.2.1 If Contractor fails, neglects or refuses to pay promptly a person's claim for labor or services that the person provides to the Contractor or a Subcontractor in connection with the project as such claim becomes due, the proper officer that represents the Owner may pay the amount of the claim and charge the amount of the payment against funds due or to become due Contractor under this Contract. Paying a claim in this manner shall not relieve the Contractor or the Contractor's surety from obligation with respect to an unpaid claim.

C.3.2.2 If the Contractor or a first-tier Subcontractor fails, neglects or refuses to pay a person that provides labor or materials in connection with the public contract for a public improvement within thirty (30) Days after receiving payment from Owner or a contractor, the contractor or first-tier Subcontractor owes the person the amount due plus interest charges that begin at the end of the 10-Day period within which payment is due under ORS 279C.580(4) and that end upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.580. The rate of interest on the amount due is nine percent per annum. The amount of interest may not be waived.

C.3.2.3 If the Contractor or a Subcontractor fails, neglects or refuses to pay a person that provides labor or materials in connection with the Contract, the person may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580. Every contract related to this Contract must contain a similar clause.

C.3.3 Pursuant to ORS 279C.580, Contractor shall include in each subcontract for property or services the Contractor enters into with a first-tier Subcontractor, including a material supplier, for the purpose of performing a construction contract:

(a) A payment clause that obligates the Contractor to pay the first-tier Subcontractor for satisfactory performance under the subcontract within ten (10) Days out of amounts the Owner pays to the Contractor under the Contract;

(b) A clause that requires the Contractor to provide the first-tier Subcontractor with a standard form that the first-tier Subcontractor may use as an application for payment or as another method by which the Subcontractor may claim a payment due from the Contractor;

(c) A clause that requires the Contractor, except as otherwise provided in this paragraph, to use the same form and regular administrative procedures for processing payments during the entire term of the subcontract. The Contractor may change the form or the regular administrative procedures the Contractor uses for processing payments if the Contractor:

(1) Notifies the Subcontractor in writing at least 45 days before the date on which the Contractor makes the change; and

(2) Includes with the written notice a copy of the new or changed form or a description of the new or changed procedure.

(d) An interest penalty clause that obligates the Contractor, if the Contractor does not pay the first-tier Subcontractor within thirty (30) Days after receiving payment from Owner, to pay the first-tier Subcontractor an interest penalty on amounts due in each payment the Contractor does not make in accordance with the payment clause included in the subcontract under paragraph (a) of this subsection. Contractor or first-tier Subcontractor is not obligated to pay an interest penalty if the only reason that the Contractor or first-tier Subcontractor did not make payment when payment was due is that the Contractor or first-tier Subcontractor did not receive payment from Owner or Contractor when payment was due. The interest penalty applies to the period that begins on the day after the required payment date and that ends on the date on which the amount due is paid; and is computed at the rate specified in ORS 279C.515(2).

(e) A clause which requires each of Contractor's Subcontractors to include, in each of their contracts with lower-tier Subcontractors or suppliers, provisions to the effect that the first-tier Subcontractor shall pay its lower-tier Subcontractors and suppliers in accordance with the provisions of paragraphs (a) through (d) above and requiring each of their Subcontractors and suppliers to include such clauses in their subcontracts and supply contracts.

C.3.4 All employers, including Contractor, that employ subject workers who work under this contract in the Marion County shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its Subcontractors complies with these requirements.

C.4 PAYMENT FOR MEDICAL CARE

Pursuant to ORS 279C.530, and as a condition to Owner's performance hereunder, Contractor shall promptly, as due, make payment to any person, partnership, association or corporation furnishing medical, surgical, and hospital care or other needed care and attention, incident to sickness or injury, to the employees of such Contractor, all sums of which the Contractor agrees to pay for such services and all moneys and sums which the Contractor has collected or deducted from the wages of personnel pursuant to any law, contract or agreement for the purpose of providing or paying for such services.

C.5 HOURS OF LABOR

As a condition to Owner's performance hereunder, Contractor shall comply with ORS 279C.520, as amended from time to time and incorporated herein by this reference:

Pursuant to ORS 279C.520 and as a condition to Owner's performance hereunder, no person shall be employed to perform Work under this Contract for more than ten (10) hours in any one day or forty (40) hours in any one week, except in cases of necessity, emergency or where public policy absolutely requires it. In such instances, Contractor shall pay the employee at least time and a half pay:

(a) For all overtime in excess of eight (8) hours a day or forty (40) hours in any one week when the work week is five consecutive Days, Monday through Friday; or

(b) For all overtime in excess of ten (10) hours a day or forty (40) hours in any one week when the work week is four consecutive Days, Monday through Friday; and

(c) For all Work performed on Saturday and on any legal holiday specified in ORS 279C.540.

This section C.5 will not apply to Contractor's Work under this Contract if Contractor is currently a party to a collective bargaining agreement with any labor organization.

This Section C.5 shall not excuse Contractor from completion of the Work within the time required under this Contract.

SECTION D
CHANGES IN THE WORK

D.1 CHANGES IN WORK

D.1.1 The terms of this Contract shall not be waived, altered, modified, supplemented or amended in any manner whatsoever without prior written approval of the Owner's Authorized Representative, and then only in a manner consistent with the Change Order provisions of this Section D.1 and after any necessary approvals required by public contracting laws have been obtained. Otherwise, a formal contract amendment is required, which shall not be effective until its execution by the parties to this Contract and all approvals required by public contracting laws have been obtained.

D.1.2 It is mutually agreed that changes in Plans, quantities, or details of construction are inherent in the nature of construction and may be necessary or desirable during the course of construction. Within the general scope of this Contract, the Owner's Authorized Representative may at any time, without notice to the sureties and without impairing the Contract, require changes consistent with this Section D.1. All Change Order Work shall be executed under the conditions of the Contract Documents. Such changes may include, but are not limited to:

(a) Modification of specifications and design.

(b) Increases or decreases in quantities.

(c) Increases or decreases to the amount of Work.

(d) Addition or elimination of any Work item.

(e) Change in the duration of the project.

(f) Acceleration or delay in performance of Work.

(g) Deductive changes.

Deductive changes are those that reduce the scope of the Work, and shall be made by mutual agreement whenever feasible, as determined by Owner. In cases of suspension or partial termination under Section J, Owner reserves the right to unilaterally impose a deductive change and to self-perform such Work, for which the provisions of B.13 (Owner's Right to Do Work) shall then apply.

Adjustments in compensation shall be made under the provisions of D.1.3, in which costs for deductive changes shall be based upon a Direct Costs adjustment together with the related percentage markup specified for profit, Overhead and other indirect costs, unless otherwise agreed to by Owner.

D.1.3 The Owner and Contractor agree that Change Order Work shall be administered and compensated according to the following:

(a) *Unit pricing* may be utilized at the Owner's option when unit prices or solicitation alternates were provided that established the cost for additional Work, and a binding obligation exists under the Contract on the parties covering the terms and conditions of the additional Work.

(b) If the Owner elects not to utilize unit pricing, or in the event that unit pricing is not available or appropriate, f*ixed pricing* may be used for Change Order Work. In fixed pricing the basis of payments or total price shall be agreed upon in writing between the parties to the Contract, and shall be established before the Work is done whenever feasible. The mark-ups set forth in D.1.3(c) shall be utilized by the parties as a guide in establishing fixed pricing, and will not be exceeded by Owner without adequate justification. Cost and price data relating to Change Orders shall be supplied by Contractor to Owner upon request, but Owner shall be under no obligation to make such requests.

(c) In the event that unit pricing and fixed pricing are not utilized, then Change Order Work shall be performed on a *cost reimbursement* basis for Direct Costs. Such Work shall be compensated on the basis of the actual, reasonable and allowable cost of labor, equipment, and material furnished on the Work performed. In addition, the following markups shall be added to the Contractor's or Subcontractor's Direct Costs as full compensation for profit, Overhead and other indirect costs for Work directly performed with the Contractor's or Subcontractor's own forces:

On Labor..... 15%
On Equipment..... 10%
On Materials..... 10%

When Change Order Work under D.1.3(c) is invoiced by an authorized Subcontractor at any level, each ascending tier Subcontractor or Contractor will be allowed a 5% supplemental mark-up on each piece of subcontract Work covered by such Change Order.

Payments made to the Contractor shall be complete compensation for Overhead, profit, and all costs that were incurred by the Contractor or by other forces furnished by the Contractor, including Subcontractors, for Change Order Work. Owner may establish a maximum cost for Change Order Work under this Section D.1.3(c), which shall not be exceeded for reimbursement without additional written authorization from Owner. Contractor shall not be required to complete such Change Order Work without additional authorization.

D.1.4 Any necessary adjustment of Contract Time that may be required as a result of a Change Order must be agreed upon by the parties before the start of the Change Order Work unless Owner's Authorized Representative authorizes Contractor to start the Work before agreement on Contract Time adjustment. Contractor shall submit any request for additional compensation (and additional Contract Time if Contractor was authorized to start Work before an adjustment of Contract Time was approved) as soon as possible but no later than thirty (30) Days after receipt of the Change Order. If Contractor's request for additional compensation or adjustment of Contract Time is not made within the thirty (30) day time limit, Contractor's requests pertaining to that Change Order are barred. The thirty (30) day time limit for making requests shall not be extended for any reason, including without limitation Contractor's claimed inability to determine the amount of additional compensation or adjustment of Contract Time, unless an extension is granted in writing by Owner. If the Owner's Authorized Representative denies Contractor's request for additional compensation or adjustment of Contract Time, Contractor may proceed to file a Claim under Section D.3, Claims Review Process. No other reimbursement, compensation, or payment will be made, except as provided in Section D.1.5 for impact claims.

D.1.5 If any Change Order Work under Section D.1.3 causes an increase or decrease in the Contractor's cost of, or the Contract Time required for the performance of, any other part of the Work under this Contract, the Contractor must submit a written request to the Owner's Authorized Representative, setting forth the nature and specific extent of the request, including all time and cost impacts against the Contract as soon as possible, but no later than thirty (30) Days after receipt of the Change Order by Contractor.

The thirty (30) day time limit applies to claims of Subcontractors, suppliers, or manufacturers that may be affected by the Change Order and that request additional compensation or an extension of Contract Time to perform; Contractor has responsibility for contacting its Subcontractors, suppliers, or manufacturers within the thirty (30) day time limit, and including their requests with Contractor's requests. If the request involves Work to be completed by Subcontractors, or materials to be furnished by suppliers or manufacturers, such requests shall be submitted to the Contractor in writing with full analysis and justification for the compensation and additional Contract Time

requested. The Contractor will analyze and evaluate the merits of the requests submitted by Subcontractors, suppliers, and manufacturers to Contractor prior to including those requests and Contractor's analysis and evaluation of those requests with Contractor's requests for additional compensation or Contract Time that Contractor submits to the Owner's Authorized Representative. Failure of Subcontractors, suppliers, manufacturers or others to submit their requests to Contractor for inclusion with Contractor's requests submitted to Owner's Authorized Representative within the time period and by the means described in this section shall constitute a waiver of these Subcontractor claims. The Owner's Authorized Representative and the Owner will not consider direct requests or claims from Subcontractors, suppliers, manufacturers or others not a party to this Contract. The consideration of such requests and claims under this section does not give any person, not a party to the Contract the right to bring a claim against the Marion County, whether in this claims process, in litigation, or in any dispute resolution process.

If the Owner's Authorized Representative denies the Contractor's request for additional compensation or an extension of Contract Time, the Contractor may proceed to file a Claim under Section D.3, Claims Review Process.

D.1.6 No request or Claim by the Contractor for additional costs or an extension of Contract Time shall be allowed if made after receipt of final payment application under this Contract. Contractor agrees to submit its final payment application within ninety (90) days after Substantial Completion, unless written extension is granted by Owner. Contractor shall not delay final payment application for any reason, including without limitation nonpayment of Subcontractors, suppliers, manufacturers or others not a party to this Contract, or lack of resolution of a dispute with Owner or any other person of matters arising out of or relating to the Contract. If Contractor fails to submit its final payment application within ninety (90) days after Substantial Completion, and Contractor has not obtained written extension by Owner, all requests or Claims for additional costs or an extension of Contract Time shall be waived.

D.1.7 It is understood that changes in the Work are inherent in construction of this type. The number of changes, the scope of those changes, and the effect they have on the progress of the original Work cannot be defined at this time. The Contractor is notified that numerous changes may be required and that there will be no compensation made to the Contractor directly related to the number of changes. Each change will be evaluated for extension of Contract Time and increase or decrease in compensation based on its own merit.

D.2 DELAYS

D.2.1 Delays in construction include "Avoidable Delays", which are defined in Section D.2.1.1, and "Unavoidable Delays", which are defined in Section D.2.1.2. The effect of Avoidable Delays is described in Section D.2.2 and the effect of Unavoidable Delays is described in Section D.2.3.

D.2.1.1 Avoidable Delays include any delays other than Unavoidable Delays, and include delays that otherwise would be considered Unavoidable Delays but that:

(a) Could have been avoided by the exercise of care, prudence, foresight, and diligence on the part of the Contractor or its Subcontractors.

(b) Affect only a portion of the Work and do not necessarily prevent or delay the prosecution of other parts of the Work nor the completion of the whole Work within the Contract Time.

(c) Do not impact activities on the accepted critical path schedule.

(d) Are associated with the reasonable interference of other contractors employed by the Owner that do not necessarily prevent the completion of the whole Work within the Contract Time.

D.2.1.2 Unavoidable Delays include delays other than Avoidable Delays that are:

(a) Caused by any actions of the Owner, Owner's Authorized Representative, or any other employee or agent of the Owner, or by separate contractor employed by the Owner.

(b) Caused by any site conditions which differ materially from what was represented in the Contract Documents or from conditions that would normally be expected to exist and be inherent to the construction activities defined in the Contract Documents. The Contractor shall notify the Owner's Authorized Representative immediately of differing site conditions before the area has been disturbed, but not more than fourteen (14) days after the condition has been encountered. The Owner's Authorized Representative will investigate the area and make a determination as to whether or not the conditions differ materially from either the conditions stated in the Contract Documents or those which could reasonably be expected in execution of this particular Contract. If Contractor and the Owner's Authorized Representative agree that a differing site condition exists, any additional compensation or additional Contract Time will be determined based on the process set forth in Section D.1.5 for Change Order Work. If the Owner's Authorized Representative disagrees that a differing site condition exists and denies Contractor's request for additional compensation or Contract Time, Contractor may proceed to file a Claim under Section D.3, Claims Review Process.

(c) Caused by Force Majeure acts, events or occurrences that could not have been avoided by the exercise of care, prudence, foresight, and diligence on the part of the Contractor or its Subcontractors.

(d) Caused by adverse weather conditions. Any adverse weather conditions must be substantiated by documentary evidence that weather conditions were abnormal for the specific time period claimed, could not have been anticipated by the Contractor, and adversely impacted the project in a manner that could not be avoided by rescheduling the Work or by implementing measures to protect against the weather so that the Work could proceed. A

rain, windstorm, high water, or other natural phenomenon for the specific locality of the Work, which might reasonably have been anticipated from the previous 10-year historical records of the general locality of the Work, shall not be construed as abnormal. The parties agree that rainfall greater than the following levels cannot be reasonably anticipated:

(i) Daily rainfall equal to, or greater than, 0.50 inch during a month when the monthly rainfall exceeds the normal monthly average by twenty-five percent (25 %) or more.

(ii) daily rainfall equal to, or greater than, 0.75 inch at any time.

The Office of the Environmental Data Service of the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce nearest the project site shall be considered the official agency of record for weather information.

D.2.2 Except as otherwise provided in ORS 279C.315, Contractor shall not be entitled to additional compensation or additional Contract Time for Avoidable Delays.

D.2.3 In the event of Unavoidable Delays, based on principles of equitable adjustment, Contractor may be entitled to the following:

(a) Contractor may be entitled to additional compensation or additional Contract Time, or both, for Unavoidable Delays described in Section D.2.1.2 (a) and (b).

(b) Contractor may be entitled to additional Contract Time for Unavoidable Delays described in Section D.2.1.2(c) and (d).

In the event of any requests for additional compensation or additional Contract Time, or both, as applicable, arising under this Section D.2.3 for Unavoidable Delays, other than requests for additional compensation or additional Contract Time for differing site conditions for which a review process is established under Section D.2.1.2 (b), Contractor shall submit a written notification of the delay to the Owner's Authorized Representative within two (2) Days of the occurrence of the cause of the delay. This written notification shall state the cause of the potential delay, the project components impacted by the delay, and the anticipated additional Contract Time or the additional compensation, or both, as applicable, resulting from the delay. Within seven (7) Days after the cause of the delay has been mitigated, or in no case more than thirty (30) Days after the initial written notification, the Contractor shall submit to the Owner's Authorized Representative, a complete and detailed request for additional compensation or additional Contract Time, or both, as applicable, resulting from the delay.
If the Owner's Authorized Representative denies Contractor's request for additional compensation or adjustment of Contract Time, the Contractor may proceed to file a Claim under Section D.3, Claims Review Process.

If Contractor does not timely submit the notices required under this Section D.2., then unless otherwise prohibited by law, Contractor's Claim shall be barred.

D.3 CLAIMS REVIEW PROCESS

D.3.1 All Contractor Claims shall be referred to the Owner's Authorized Representative for review. Contractor's Claims, including Claims for additional compensation or additional Contract Time, shall be submitted in writing by Contractor to the Owner's Authorized Representative within five (5) Days after a denial of Contractor's initial request for an adjustment of Contract terms, payment of money, extension of Contract Time or other relief, provided that such initial request has been submitted in accordance with the requirements and within the time limits established in these General Conditions. Within thirty (30) Days after the initial Claim, Contractor shall submit to the Owner's Authorized Representative, a complete and detailed description of the Claim (the "Detailed Notice") that includes all information required by Section D.3.2. Unless the Claim is made in accordance with these time requirements, it shall be waived.

D.3.2 The Detailed Notice of the Claim shall be submitted in writing by Contractor and shall include a detailed, factual statement of the basis of the Claim, pertinent dates, Contract provisions which support or allow the Claim, reference to or copies of any documents which support the Claim, the dollar value of the Claim, and the Contract Time extension requested for the Claim. If the Claim involves Work to be completed by Subcontractors, the Contractor will analyze and evaluate the merits of the Subcontractor claim prior to forwarding it and that analysis and evaluation to the Owner's Authorized Representative. The Owner's Authorized Representative and the Owner will not consider direct claims from Subcontractors, suppliers, manufacturers, or others not a party to this Contract. Contractor agrees that it will make no agreement, covenant, or assignment, nor will it commit any other act that will permit or assist any Subcontractor, supplier, manufacturer, or other to directly or indirectly make a claim against Owner.

D.3.3 The Owner's Authorized Representative will review all Claims and take one or more of the following preliminary actions within ten (10) Days of receipt of the Detailed Notice of a Claim: (1) request additional supporting information from the Contractor; (2) inform the Contractor and Owner in writing of the time required for adequate review and response; (3) reject the Claim in whole or in part and identify the reasons for rejection; (4) based on principles of equitable adjustment, recommend approval of all or part of the Claim; or (5) propose an alternate resolution.

D.3.4 The Owner's Authorized Representative's decision shall be final and binding on the Contractor unless appealed by written notice to the Owner within fifteen (15) Days of receipt of the decision. The Contractor must present written documentation supporting the Claim within fifteen (15) Days of the notice of appeal. After receiving the appeal documentation, the Owner, through its Chief Administrative Officer (CAO), shall review the materials and render a decision within thirty (30) Days after receiving the appeal documents.

D.3.5 The decision of the Owner shall be final and binding unless the Contractor delivers to the Owner its requests for mediation, which shall be a non-binding process, within fifteen (15) Days of the date of the Owner's decision.

D.3.6 The parties are fully committed to working with each other throughout the Project and agree to communicate regularly with each other at all times so as to avoid or minimize disputes or disagreements. If disputes or disagreements do arise, Contractor and Owner each commit to resolving such disputes or disagreements in an amicable, professional and expeditious manner so as to avoid unnecessary losses, delays and disruptions to the Work.

D.3.7 The mediation process will be considered to have commenced as of the date the Contractor delivers the request. Both parties acknowledge and agree that participation in mediation is a prerequisite to commencement of litigation of any disputes relating to the Contract. Both parties further agree to exercise their best efforts in good faith to resolve all disputes within sixty (60) Days of the commencement of the mediation through the mediation process set forth herein.

In the event that a lawsuit must be filed within this sixty (60) day period in order to preserve a cause of action, the parties agree that notwithstanding the filing, they shall proceed diligently with the mediation to its conclusion prior to actively prosecuting the lawsuit, and shall seek from the Court in which the lawsuit is pending such stays or extensions, including the filing of an answer, as may be necessary to facilitate the mediation process. Further, in the event settlements are reached on any issues through mediation, the parties agree to promptly submit the appropriate motions and orders documenting the settlement to the Court for its signature and filing.

D.3.6 The mediator shall be an individual mutually acceptable to both parties, but in the absence of agreement each party shall select a temporary mediator and the temporary mediators shall jointly select the permanent mediator. Each party shall pay its own costs for the time and effort involved in mediation. The cost of the mediator shall be split equally between the two parties. Both parties agree to exercise their best effort in good faith to resolve all disputes in mediation. Participation in mediation is a mandatory requirement of both the Owner and the Contractor. The schedule, time and place for mediation will be mutually acceptable, or, failing mutual agreement, shall be as established by the mediator. The parties agree to maintain the confidentiality of mediation, if any, and shall execute all necessary documents to give effect to such confidentiality to the extent allowed by law. In any event, the parties shall not subpoena the mediator or otherwise require the mediator to produce records, notes or work product, or to testify in any future proceedings as to information disclosed or representations made in the course of mediation, except to the extent disclosure is required by law.

D.3.7 Owner may at any time and at its discretion issue a construction change directive adding to, modifying or reducing the scope of Work. Contractor and Owner shall negotiate the need for any additional compensation or additional Contract Time related to the change, subject to the procedures for submitting requests or Claims for additional compensation or additional Contract Time established in this Section D. Unless otherwise directed by Owner's Authorized Representative, Contractor shall proceed with the Work while any request or Claim is pending, including but not limited to, a request or Claim for additional compensation or additional Contract Time resulting from Work under a Change Order or construction change directive. Regardless of the review period or the final decision of the Owner's Authorized Representative, the Contractor shall continue to diligently pursue the Work as identified in the Contract Documents. In no case is the Contractor justified or allowed to cease Work without a written stop work order from the Owner or Owner's Authorized Representative.

SECTION E
PAYMENTS

E.1 SCHEDULE OF VALUES

The Contractor shall submit, at least ten (10) Days prior to submission of its first application for progress payment, a schedule of values ("Schedule of Values") for the contracted Work. This schedule will provide a breakdown of values for the contracted Work and will be the basis for progress payments. The breakdown will demonstrate reasonable, identifiable, and measurable components of the Work. Unless objected to by the Owner's Authorized Representative, this schedule shall be used as the basis for reviewing Contractor's applications for payment. If objected to by Owner's Authorized Representative, Contractor shall revise the schedule of values and resubmit the same for approval of Owner's Authorized Representative.

E.2 APPLICATIONS FOR PAYMENT

E.2.1 Owner shall make progress payments on the Contract monthly as Work progresses. Payments shall be based upon estimates of Work completed and the Schedule of Values. All payments shall be approved by the Owner's Authorized Representative. A progress payment shall not be considered acceptance or approval of any Work or waiver of any defects therein. Owner shall pay to Contractor interest on the progress payment, not including retainage, due the Contractor. The interest shall commence thirty (30) Days after the receipt of invoice ("application for payment") from the Contractor or fifteen (15) Days after the payment is approved by the Owner's Authorized Representative, whichever is the earlier date. The rate of interest shall equal three times the discount rate on 90-day commercial paper in effect at the Federal Reserve Bank in the Federal Reserve district that includes Oregon on the date that is thirty (30) Days after receipt of the application for payment from the Contract or fifteen (15) Days after the payment is approved by the Owner, whichever is the earlier date, but the rate of interest shall not exceed thirty (30) percent. Notwithstanding the foregoing, in instances when an application for payment is filled out incorrectly, or when there is any defect or impropriety in any submitted application or when there is a good faith dispute, Owner shall so notify the Contractor within fifteen (15) Days stating the reason or reasons the application for payment is defective or improper or the reasons for the dispute. A defective or improper application for payment, if corrected by the Contractor within seven (7) Days of being notified by the Owner, shall not cause a payment to be made later than specified in this section unless interest is also paid. Accrual of interest will be postponed when payment on the principal is delayed because of disagreement between the Owner and the Contractor.

Owner reserves the right, instead of requiring the Contractor to correct or resubmit a defective or improper application for payment, to reject the

defective or improper portion of the application for payment and pay the remainder of the application for payment that is correct and proper. Owner makes this election, the Contractor will be required to arrange to receive EFT/ACH payments.

E.2.2 Contractor shall submit to the Owner's Authorized Representative, an application for each payment and, if required, receipts or other vouchers showing payments for materials and labor, including payments to Subcontractors. Contractor shall include, in its application for payment, a schedule of the percentages of the various parts of the Work completed, based on the Schedule of Values which shall aggregate to the payment application total, and shall include, on the face of each copy thereof, a certificate in substantially the following form:

"I, the undersigned, hereby certify that the above bill is true and correct, and the payment therefore, has not been received.

Signed: _____"

E.2.3 Generally, applications for payment will be accepted only for materials that have been installed. Under special conditions, applications for payment for stored materials will be accepted at Owner's sole discretion. Such a payment, if made, will be subject to the following conditions:

(a) The request for stored material shall be submitted at least thirty (30) Days in advance of the application for payment on which it appears. Applications for payment shall be entertained for major equipment, components or expenditures only.

(b) The Contractor shall submit applications for payment showing the quantity and cost of the material stored.

(c) The material shall be stored in a bonded warehouse and Owner's Authorized Representative shall be granted the right to access the material for the purpose of removal or inspection at any time during the Contract Period.

(d) The Contractor shall name the Owner as co-insured on the insurance policy covering the full value of the property while in the care and custody of the Contractor until it is installed. A certificate noting this coverage shall be issued to the Owner.

(e) Payments shall be made for materials only. The submitted amount of the application for payment shall be reduced by the cost of transportation and for the cost of an inspector to check the delivery at out of town storage sites. The cost of said inspection shall be borne solely by the Contractor.

(f) Within sixty (60) Days of the application for payment, the Contractor shall submit evidence of payment covering the material stored.

(g) Payment for stored materials shall in no way indicate acceptance of the materials or waive any rights under this Contract for the rejection of the Work or materials not in conformance with the Contract Documents.

(h) All required documentation must be submitted with the respective application for payment.

E.2.4 The Owner reserves the right to withhold all or part of a payment, or may nullify in whole or part any payment previously made, to such extent as may be necessary in the Owner's opinion to protect the Owner from loss because of:

(a) Work that is defective and not remedied, or that has been demonstrated or identified as failing to conform with the Contract Documents,

(b) third party claims filed or evidence reasonably indicating that such claims will likely be filed unless security acceptable to the Owner is provided by the Contractor;

(c) failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment (in which case Owner may issue checks made payable jointly to Owner and such unpaid persons under this provision, or directly to Subcontractors and suppliers at any level under Section C.3.2.1);

(d) reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Price;

(e) damage to the Owner or another contractor;

(f) reasonable evidence that the Work will not be completed within the Contract Time required by the Contract, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;

(g) failure to carry out the Work in accordance with the Contract Documents; or

(h) assessment of liquidated damages, when withholding is made for offset purposes.

E.2.5 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

(a) Take that portion of the Contract Price properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Price allocated to that portion of the Work in the Schedule of Values, less retainage as provided in Section E.5. Pending final determination of cost to the Owner of changes in the Work, no amounts for changes in the Work can be included in application for payment until the Contract Price has been adjusted by Change Order;

(b) Add that portion of the Contract Price properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner pursuant to Section E.2.3, suitably stored off the site at a location agreed upon in writing), less retainage as provided in Section E.5;

(c) Subtract the aggregate of previous payments made by the Owner; and

(d) Subtract any amounts for which the Owner's Authorized Representative has withheld or nullified payment as provided in the Contract Documents.

E.2.6 Contractor's applications for payment may not include requests for payment for portions of the Work for which the Contractor does not intend to pay to a Subcontractor or material supplier.

E.2.7 The Contractor warrants to Owner that title to all Work covered by an application for payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an application for payment all Work for which payments are received from the Owner shall be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

E.2.8 If Contractor disputes any determination by Owner's Authorized Representative with regard to any application for payment, Contractor nevertheless shall continue to prosecute expeditiously the Work. No payment made hereunder shall be or be construed to be final acceptance or approval of that portion of the Work to which such partial payment relates or shall relieve Contractor of any of its obligations hereunder.

E.3 PAYROLL CERTIFICATION REQUIREMENT

Payroll certification is required before payments are made on the Contract. Refer to Section C.2 for this information.

E.4 DUAL PAYMENT SOURCES

Contractor shall not be compensated for Work performed under this Contract from any state agency other than the agency that is a party to this Contract.

E.5 RETAINAGE

E.5.1 Retainage shall be withheld and released in accordance with ORS 279C.550 to 279C.580:

E.5.1.1 Owner may reserve as retainage from any progress payment an amount not to exceed five percent of the payment. As Work progresses, Owner may reduce the amount of the retainage and may eliminate retainage on any remaining monthly Contract payments after 50 percent of the Work under the Contract is completed if, in the Owner's opinion, such Work is progressing satisfactorily. Elimination or reduction of retainage shall be allowed only upon written application by the Contractor, which application shall include written approval of Contractor's surety; except that when the Work is 97-1/2 percent completed the Owner may, at its discretion and without application by the Contractor, reduce the retained amount to 100 percent of the value of the Work remaining to be done. Upon receipt of written application by the Contractor, Owner shall respond in writing within a reasonable time.

E.5.1.2 Alternatives to cash retainage are available to Contractor as provided in ORS 279C.560

E.5.1.3 The retainage held by Owner shall be included in and paid to the Contractor as part of the final payment of the Contract Price. The Owner shall pay to Contractor interest at the rate of one and one-half percent per month on the final payment due Contractor, interest to commence thirty (30) Days after the Work under the Contract has been completed and accepted and to run until the date Contractor shall notify Owner in writing when the Contractor considers the Work complete and Owner shall, within fifteen (15) Days after receiving the written notice, either accept the Work or notify the Contractor of Work yet to be performed on the Contract. If Owner does not within the time allowed notify the Contractor of Work yet to be performed to fulfill contractual obligations, the interest provided by this subsection shall commence to run thirty (30) Days after the end of the 15-Day period.

E.5.1.4 In accordance with the provisions of ORS 279C.560, if the Owner accepts bonds, securities or other instruments deposited as provided in paragraphs (a) and (c) of subsection E.5.1.2, the Owner shall reduce the moneys held as retainage in an amount equal to the value of the bonds, securities and other instruments and pay the amount of the reduction to the Contractor in accordance with ORS 279C .570.

E.5.1.5 Contractor agrees that if Contractor elects to reserve a retainage from any progress payment due to any Subcontractor or supplier, such retainage shall not exceed five percent of the payment, and such retainage withheld from Subcontractors and suppliers shall be subject to the same terms and conditions stated in Subsection E.5 as apply to Owner's retainage from any progress payment due to Contractor. Provided, however, if in accordance with the provisions of ORS 279C.560 the Contractor has deposited bonds, securities or other instruments or has elected to have the Owner deposit accumulated retainage in an interest-bearing account, the Contractor shall comply with the provisions of ORS 701.435 respecting the deposit of bonds, securities or other instruments by Subcontractors and suppliers and the sharing of interest earnings with Subcontractors and suppliers.

E.5.2 As provided in subsections C.2.2 and C.2.3, additional retainage in the amount of 25% of amounts earned shall be withheld and released in accordance with ORS 279C.845(7) when the Contractor fails to file

certified statements as required by section C.2.1.

E.6 FINAL PAYMENT

E.6.1 Upon completion of all the Work under this Contract, the Contractor shall notify the Owner's Authorized Representative, in writing, that Contractor has completed Contractor's part of the Contract and shall request final payment. Upon receipt of such notice the Owner's Authorized Representative will inspect the Work, and if acceptable, submit to the Owner a recommendation as to acceptance of the completed Work and the final estimate of the amount due the Contractor. If the Work is not acceptable, Owner will notify Contractor within fifteen (15) Days of Contractor's request for final payment. Upon approval of this final estimate by the Owner and compliance by the Contractor with provisions in Section K. 3 AFFIDAVIT/RELEASE OF LIENS AND CLAIMS, and other provisions as may be applicable, the Owner shall pay to the Contractor all monies due under the provisions of these Contract Documents.

E.6.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Owner's Authorized Representative (1) a notarized affidavit/release of liens and claims in a form satisfactory to Owner that states that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least thirty (30) Days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

E.6.3 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final application for payment.

SECTION F
JOB SITE CONDITIONS

F.1 USE OF PREMISES

Contractor shall confine equipment, storage of materials and operation of Work to the limits indicated by Contract Documents, law, ordinances, permits or directions of the Owner's Authorized Representative. Contractor shall follow the Owner's Authorized Representative's instructions regarding use of premises, if any.

F.2 PROTECTION OF WORKERS, PROPERTY, AND THE PUBLIC

F.2.1 Contractor shall maintain continuous and adequate protection of all of the Work from damage, and shall protect the Owner's Authorized Representative, workers and property from injury or loss arising in connection with this Contract. Contractor shall remedy acceptably to the Owner, any damage, injury, or loss, except such as may be directly due to errors in the Contract Documents or caused by authorized representatives or personnel of the Owner. Contractor shall adequately protect adjacent property as provided by law and the Contract Documents.

F.2.2 Contractor shall take all necessary precautions for the safety of all personnel on the job site, and shall comply with the Contract Documents and all applicable provisions of federal, state and municipal safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the Work is being performed. Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for protection of workers and the public against any hazards created by construction. Contractor shall designate a responsible employee or associate on the Work site, whose duty shall be the prevention of accidents. The name and position of the person designated shall be reported to the Owner's Authorized Representative. The Owner's Authorized Representative has no responsibility for Work site safety. Work site safety is the responsibility of the Contractor.

F.2.3 Contractor shall not enter upon private property without first obtaining permission from the property owner or its duly authorized representative. Contractor shall be responsible for the preservation of all public and private property along and adjacent to the Work contemplated under the Contract and shall use every precaution necessary to prevent damage thereto. In the event the Contractor damages any property, the Contractor shall at once notify the property owner and make, or arrange to make, full restitution. Contractor shall immediately and in writing, report to the Owner's Authorized Representative, all pertinent facts relating to such property damage and the ultimate disposition of the claim for damage.

.

F.2.4 Contractor is responsible for protection of adjacent work areas including impacts brought about by activities, equipment, labor, utilities, and materials on the site.

F.2.5 Contractor shall at all times direct its activities in such a manner as to minimize adverse effects on the environment. Handling of all materials will be conducted so no release will occur that may pollute or become hazardous.

F.2.6 In an emergency affecting the safety of life or of the Work or of adjoining property, the Contractor, without special instruction or authorization from the Owner's Authorized Representative, shall act reasonably to prevent threatened loss or injury, and shall so act, without appeal, if instructed by the Owner's Authorized Representative. Any compensation claimed by the Contractor on account of emergency work shall be determined in accordance with
Section D.

F.3 CUTTING AND PATCHING

F.3.1 Contractor shall be responsible for coordinating all cutting, fitting, or patching of the Work to make its several parts come together properly and fit to receive or be received by work of other contractors or Subcontractors shown upon, or reasonably implied by, the Contract Documents.

F.3.2 Contractor shall be responsible for restoring all cut, fitted, or patched surfaces to an original condition; provided, however, that if a different condition is specified in the Contract Documents, then Contractor shall be responsible for restoring such surfaces to the condition specified in the Contract Documents.

F.4 CLEANING UP

From time to time as may be ordered by the Owner the Contractor shall, at its own expense, clean up and remove all refuse and unused materials of any kind resulting from the Work. If Contractor fails to do so within twenty-four hours after notification by the Owner the work may be done by others and the cost charged to the Contractor and deducted from payment due the Contractor.

F.5 ENVIRONMENTAL CONTAMINATION

F.5.1 Contractor will be held responsible for and shall indemnify, defend (with counsel of Owner's choice) and hold harmless Owner from and against any costs, expenses, damages, claims, and causes of action, (including attorney fees), or any of them, resulting from all spills, releases, discharges, leaks and disposal of environmental pollution, including storage, transportation, and handling during the performance of the Contract which occur as a result of, or are contributed by, the negligence or actions of Contractor or its personnel, agents, or Subcontractors or any failure to perform in accordance with the Contract Documents (except to the extent otherwise void under ORS 30.140). Nothing in this section F.5.1 shall limit Contractor's responsibility for obtaining insurance coverages required under Section G.3 of these General Conditions, and Contractor shall take no action that would void or impair such coverages

F.5.1.1 Contractor agrees to promptly dispose of such spills, releases, discharge or leaks to the satisfaction of Owner and proper regulatory agencies in a manner that complies with applicable federal, state, and local laws and regulations. Cleanup shall be at no cost to the Owner and be performed by properly qualified personnel.

F.5.1.2 Contractor shall obtain the Owner's written consent prior to bringing onto the Work site any (i) environmental pollutants or (ii) hazardous substances or materials, as the same or reasonably similar terms are used in any applicable federal, state, or local statutes, rules or ordinances. Notwithstanding such written consent from the Owner, the Contractor, at all times, shall:

(a) properly handle, use and dispose of all environmental pollutants and hazardous substances or materials brought onto the Work site, in accordance with all applicable federal, state, or local statutes, rules, or ordinances;

(b) be responsible for any and all spills, releases, discharges, or leaks of (or from) environmental pollutants or hazardous substances or materials which Contractor has brought onto the Work site; and

(c) promptly clean up, without cost to the Owner, such spills, releases, discharges, or leaks to the Owner's satisfaction and in compliance with all applicable federal, state, or local statutes, rules or ordinances.

F.5.2 Contractor shall report all reportable quantity releases to applicable federal, state, and local regulatory and emergency response agencies. Reportable quantities are found in 40 CFR Part 302, Table 302.4 for hazardous substances and in OAR
340-142-0050 for all products addressed therein. Upon discovery, regardless of quantity, Contractor must telephonically report all releases to the Owner. A written follow-up report shall be submitted to Owner within 48 hours of the telephonic report. Such written report shall contain, as a minimum:

(a) Description of items released (identity, quantity, manifest no., and all other documentation required by law.)

(b) Whether amount of items released is EPA/DEQ
reportable, and, if so, when it was reported.

(c) Exact time and location of release, including a description of the area involved.

(d) Containment procedures initiated.

(e) Summary of communications about the release Contractor has had with members of the press or State officials other than Owner.

(f) Description of cleanup procedures employed or to be employed at the site, including disposal location of spill residue.

(g) Personnel injuries, if any, resulting from, or aggravated by, the release.

F.6 ENVIRONMENTAL CLEAN-UP

F.6.1 Unless disposition of environmental pollution is specifically a part of this Contract, or was caused by the Contractor (reference F.5 Environmental Contamination), Contractor shall immediately notify Owner of any hazardous substance(s) which Contractor discovers or encounters during performance of the Work required by this Contract. "Hazardous substance(s)" means any hazardous, toxic and radioactive materials and those substances defined as "hazardous substances," "hazardous materials," "hazardous wastes," "toxic substances," or other similar designations in any federal, state, or local law, regulation, or ordinance, including without limitation asbestos, polychlorinated biphenyl (PCB), or petroleum, and any substances, materials or wastes regulated in 40 CFR, Part 261 and defined as hazardous in 40 CFR S 261.3. In addition to notifying Owner of any hazardous substance(s) discovered or encountered, Contractor shall immediately cease working in any particular area of the project where a hazardous substance(s) has been discovered or encountered if continued work in such area would present a risk or danger to the health or well being of Contractor's or any Subcontractor's work force.

F.6.2 Upon being notified by Contractor of the presence of hazardous substance(s) on the project site, Owner shall arrange for the proper disposition of such hazardous substance(s).

F.7 FORCE MAJEURE

A party to this Contract shall not be held responsible for delay or default due to Force Majeure acts, events or occurrences unless they could have been avoided by the exercise of reasonable care, prudence, foresight, and diligence by that party. The Owner may terminate this Contract upon written notice after determining that delay or default caused by Force Majeure acts, events or occurrences will reasonably prevent successful performance of the Contract.

SECTION G
INDEMNITY, BONDING, AND INSURANCE

G.1 RESPONSIBILITY FOR DAMAGES / INDEMNITY

G.1.1 Contractor shall be responsible for all damage to property, injury to persons, and loss, expense, inconvenience, and delay that may be caused by, or result from, the carrying out of the Work to be done under this Contract, or from any act, omission or neglect of the Contractor, its Subcontractors, personnel, or agents.

G.1.2 Contractor agrees to indemnify, defend (with counsel approved by Owners), reimburse and hold harmless Owners, their partners, owners, board members, officers, employees, agents and volunteers (the "Indemnified Parties") for, from and against any and all threatened, alleged or actual all claims, suits, allegations, damages, liabilities, costs, expenses, losses and judgments, including, but not limited to, those which relate to personal or real property damage (including to the Project itself or otherwise), personal injury or death, attorney and expert/consultant fees and costs, and both economic and non-economic losses, to the extent caused by the negligence, breach of contract, breach of warranty (express or implied), or other act or omission of Contractor, its employees, Consultants and SubContractors, or anyone for whose acts Contractor is responsible (the Indemnitor). If claims are asserted against any of the Indemnified Parties by an employee of the Indemnitor, the Contractor's indemnification obligation and other obligations under this section shall not be limited by any limitation on the amount or type of damages, compensation, or benefits payable to the employee by or for the Indemnitor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

G.2 PERFORMANCE AND PAYMENT SECURITY; PUBLIC WORKS BOND

G.2.1 When the Contract Price is $100,000 or more (or $50,000 or more in the case of Contracts for highways, bridges and other transportation projects) the Contractor shall furnish and maintain in effect at all times during the Contract Period, a performance bond in a sum equal to the Contract Price, and a separate payment bond also in a sum equal to the Contract Price. The bonds may be required if the Contract Price is less than the above thresholds, if required by the Contract Documents.

G.2.2 Bond forms furnished by the Owner and notarized by awarded Contractor's surety company authorized to do business in Oregon are the only acceptable forms of performance and payment security, unless otherwise specified in the Contract Documents.

G.2.3 Before execution of the Contract Contractor shall file with the Construction Contractors Board, and maintain in full force and effect, the separate public works bond required by Oregon Laws 2005, Chapter 360, and OAR 839-025-0015, unless otherwise exempt under those provisions. The Contractor shall also include in every subcontract a provision requiring the Subcontractor to have a public works bond filed with the Construction Contractors Board before starting Work, unless otherwise exempt, and shall verify that the Subcontractor has filed a public works bond before permitting the Subcontractor to start Work.

G.3 INSURANCE

G.3.1 Primary Coverage: Insurance carried by Contractor under this Contract shall be the primary coverage and non-contributory with any

other insurance and self- insurance, and the Owner's insurance is excess and solely for damages or losses for which the Owner is responsible. The coverages indicated are minimums unless otherwise specified in the Contract Documents.

G.3.2 Workers' Compensation: All employers, including Contractor, that employ subject workers who work under this contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. This shall include Employer's Liability Insurance with coverage limits of not less than $100,000 for each accident. Contractors who perform the Work without the assistance or labor of any employee need not obtain such coverage if the Contractor certifies so in writing. Contractor shall ensure that each of its Subcontractors complies with these requirements. The Contractor shall require proof of such Workers' Compensation by receiving and keeping on file a certificate of insurance from each Subcontractor or anyone else directly employed by either the Contractor or its Subcontractors.

G.3.3 Builder's Risk Insurance:

G.3.3.1 Builder's Risk: During the term of this Contract, for new construction the Contractor shall obtain and keep in effect Builder's Risk insurance on an all risk form, including earthquake and flood, for an amount equal to the full amount of the Contract. Any deductible shall not exceed $50,000 for each loss, except the earthquake and flood deductible shall not exceed 2 percent of each loss or $50,000, whichever is more. The policy will include as loss payees the Owner, the Contractor and its Subcontractors as their interests may appear.

G.3.3.2 Builder's Risk Installation Floater: For other than new construction the Contractor shall obtain and keep in effect during the term of this Contract, a Builder's Risk Installation Floater for coverage of the Contractor's labor, materials and equipment to be used for completion of the Work performed under this Contract. The minimum amount of coverage to be carried shall be equal to the full amount of the Contract. This insurance shall include as loss payees the Owner, the Contractor and its Subcontractors as their interests may appear.

G.3.3.3 Such insurance shall be maintained until Owner has occupied the facility.

G.3.3.4 A loss insured under the Builder's Risk insurance shall be adjusted by the Owner and made payable to the Owner for the insureds, as their interests may appear. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner. The Owner shall have power to adjust and settle a loss with insurers.

G.3.4 Liability Insurance:

G.3.4.1 Commercial General Liability: Contractor shall obtain, at Contractor's expense, and keep in effect during the term of this Contract, Commercial General Liability Insurance covering bodily injury and property damage in a form and with coverages that are satisfactory to the State. This insurance shall include personal injury liability, products and completed operations, and contractual liability coverage for the indemnity provided under this Contract (to the extent contractual liability coverage for the indemnity is available in the marketplace), and shall be issued on an occurrence basis. Contractor shall provide proof of insurance of not less than combined single limit, or the equivalent, of not less than: ☐ $200,000; ☐ $500,000; ☐ $1,000,000; ☒ $2,000,000 each occurrence for Bodily Injury and Property Damage. The policy, or an endorsement or amendment to the policy, must provide that the County and its agents, board members, officers, employees and volunteers are "additional insureds", but only with respect to the Contractor's Services to be provided under this Contract.

G.3.4.2 Automobile Liability: Contractor shall obtain, at Contractor's expense, and keep in effect during the term of this Contract, Automobile Liability Insurance covering owned, non-owned and/or hired vehicles, as applicable. The coverage may be written in combination with the Commercial General Liability Insurance. Contractor shall provide proof of insurance of not less than the amounts ☐ Minimum amounts required by the Oregon Financial Responsibility Law (ORS 806.060 and 806.070); ☐ $200,000; ☒ $500,000; or ☐ $1,000,000 per occurrence, for Bodily Injury and Property Damage, including coverage for all owned, hired or non-owned vehicles, as applicable. The policy, or an endorsement or amendment to the policy, must provide that the County and its board members, officers, agents, employees and volunteers are "additional insureds", but only with respect to the Consultant's Services to be provided under this Contract.

G.3.4.3 "Tail" Coverage: If any of the required liability insurance is arranged on a "claims made" basis, "tail" coverage will be required at the completion of this Contract for a duration of 24 months or the maximum time period available in the marketplace if less than 24 months. Contractor will be responsible for furnishing certification of "tail" coverage as described or continuous "claims made" liability coverage for 24 months following Final Completion. Continuous "claims made" coverage will be acceptable in lieu of "tail" coverage, provided its retroactive date is on or before the effective date of this Contract. This will be a condition of the final acceptance of Work or services and related warranty (if any).

G.3.5 Excess/Umbrella Insurance: A combination of primary and excess/umbrella insurance is acceptable to meet the minimum coverage requirements for Commercial General Liability and Automobile Liability Insurance. In such case, the insurance certificate must include a list of the policies that fall under the excess/umbrella insurance. Sample wording is "The Excess/Umbrella policy is excess over primary Commercial General Liability and

primary Automobile Liability Insurance."

G.3.6 Additional Insured: The liability insurance coverage, except Professional Liability if included, required for performance of this Contract shall include the Marion County, its departments, divisions, officers, and employees, as Additional Insureds but only with respect to the Contractor's activities to be performed under this Contract.

If Contractor cannot obtain an insurer to name the Marion County, its departments, divisions, officers and employees as Additional Insureds, Contractor shall obtain at Contractor's expense, and keep in effect during the term of this Contract, Owners and Contractors Protective Liability Insurance, naming the Marion County, its departments, divisions, officers and employees as Named Insureds with not less than a $1,500,000.00 limit per occurrence. This policy must be kept in effect for 12 months following Final Completion. As evidence of coverage, Contractor shall furnish the actual policy to Owner prior to execution of the Contract.

G.3.7 Certificate(s) of Insurance: As evidence of the insurance coverage required by this Contract, the Contractor shall furnish certificate(s) of insurance to the Owner prior to execution of the Contract. The certificate(s) will specify all of the parties who are Additional Insureds or Loss Payees. Insurance coverage required under this Contract shall be obtained from insurance companies or entities acceptable to the Owner that are allowed to provide such insurance under Oregon law. Eligible insurers include admitted insurers that have been issued a certificate of authority from the Oregon Department of Consumer and Business Services authorizing them to do an insurance business in the state of Oregon, and certain non-admitted surplus lines insurers that satisfy the requirements of applicable Oregon law and are approved by the Owner. The Contractor shall be financially responsible for all deductibles, self-insured retentions and/or self-insurance included hereunder. Any deductible, self- insured retention and/or self-insurance in excess of $50,000 shall be approved by the Owner in writing prior execution of the Contract and is subject to Owner's approval. The Contractor shall immediately notify the Owner's Authorized Representative in writing of any change in insurance coverage.

SECTION H
SCHEDULE OF WORK

H.1 CONTRACT PERIOD

H.1.1 **Time is of the essence on this Contract**. The Contractor shall at all times carry on the Work diligently, without delay and punctually fulfill all requirements herein. Contractor shall commence Work on the site within fifteen (15) Days of Notice to Proceed, unless directed otherwise.

H.1.2 Unless specifically extended by Change Order, all Work shall be complete by the date contained in the Contract Documents. The Owner shall have the right to accelerate the completion date of the Work, which may require the use of overtime. Such accelerated Work schedule shall be an acceleration in performance of Work under Section D.1.2 (f) and shall be subject to the Change Order process of Section D.1.

H.1.3 The Owner shall not waive any rights under the Contract by permitting the Contractor to continue or complete in whole or in part the Work after the date described in Section H.1.2 above.

H.2 SCHEDULE

H.2.1 Contractor shall provide, by or before the pre-construction conference, a detailed schedule for review and acceptance by the Owner. The submitted schedule must illustrate Work by significant project components, significant labor trades, long lead items, broken down by building and/or floor where applicable. Each schedule item shall account for no greater than 5 % of the monetary value of the project or 5 % of the available Contract Time. Schedules with activities of less than one day or valued at less than 1% of the Contract will be considered too detailed and will not be accepted. Schedules lacking adequate detail, or unreasonably detailed, will be rejected. Included within the schedule are the following: Notice to Proceed, Substantial Completion, and Final Completion. Schedules will be updated monthly and submitted with the monthly payment application. Acceptance of the Schedule by the Owner does not constitute agreement by the Owner, as to the Contractor's sequencing, means, methods, or allocated Contract Time. Any positive difference between the Contractor's scheduled completion and the Contract completion date is float owned by the Owner. Owner reserves the right to negotiate the float if it is deemed to be in Owner's best interest to do so. In no case shall the Contractor make a request for additional compensation for delays if the Work is completed within the Contract Time but after Contractor's scheduled completion.

H.3 PARTIAL OCCUPANCY OR USE

H.3.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage, provided such occupancy or use is consented to by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have reasonably accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, insurance or self-insurance, maintenance, heat, utilities, and damage to the Work, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents with respect to such portion of the Work. Approval by the Contractor to partial occupancy or use shall not be unreasonably withheld. Immediately prior to such partial occupancy or use, the Owner and Contractor shall jointly inspect the area to be occupied or portion of the Work to be used in order to

determine and record the condition of the Work. Partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

SECTION I
CORRECTION OF WORK

I.1 CORRECTION OF WORK BEFORE FINAL PAYMENT

The Contractor warrants to the Owner that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects, and that the Work will conform to the requirements of the Contract Documents. Work failing to conform to these requirements shall be deemed defective. Contractor shall promptly remove from the premises and replace all defective materials and equipment as determined by the Owner's Authorized Representative, whether incorporated in the Work or not. Removal and replacement shall be without loss or expense to the Owner, and Contractor shall bear the cost of repairing all Work destroyed or damaged by such removal or replacement. Contractor shall be allowed a period of no longer than thirty (30)Days after Substantial Completion for completion of defective (punch list) work, unless otherwise agreed. At the end of that period, or earlier if requested by the Contractor, Owner shall arrange for inspection of the Work by the Architect/Engineer. Should the Work not be complete, and all corrections made, the costs for all subsequent re-inspections shall be borne by the Contractor. If Contractor fails to complete the punch list work within the above time period, Owner may perform such work and Contractor shall reimburse Owner all costs of the same within ten (10) days after demand without affecting Contractor's obligations.

I.2 WARRANTY WORK

I.2.1 Neither the final certificate of payment nor any provision of the Contract Documents shall relieve the Contractor from responsibility for defective Work and, unless a longer period is specified, Contractor shall correct all defects that appear in the Work within a period of one year from the date of issuance of the written notice of Substantial Completion by the Owner except for latent defects which will be remedied by the Contractor at any time they become apparent.

The Owner shall give Contractor notice of defects with reasonable promptness. Contractor shall perform such warranty work within a reasonable time after Owner's demand. If Contractor fails to complete the warranty work within such period as Owner determines reasonable, or at any time in the event of warranty work consisting of emergency repairs, Owner may perform such work and Contractor shall reimburse Owner all costs of the same within ten (10) Days after demand without affecting Contractors obligations.

I.2.2 This provision does not negate guarantees or warranties for periods longer than one year including without limitation such guarantees or warranties required by other sections of the Contract Documents for specific installations, materials, processes, equipment or fixtures.

I.2.3 In addition to Contractor's warranty, manufacturer's warranties shall pass to the Owner and shall not take effect until affected Work has been accepted in writing by the Owner's Authorized Representative.

I.2.4 The one-year period for correction of Work shall be extended with respect to portions of Work performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work, and shall be extended by corrective Work performed by the Contractor pursuant to this Section, as to the Work corrected. The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

I.2.5 Nothing contained in this Section I.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the period for correction of Work as described in this Section I.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

I.2.6 If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Price will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

SECTION J
SUSPENSION AND/OR TERMINATION OF THE WORK

J.1 OWNER'S RIGHT TO SUSPEND THE WORK

J.1.1 The Owner and/or the Owner's Authorized Representative has the authority to suspend portions or all of the Work due to the following causes:

(a) Failure of the Contractor to correct unsafe conditions;

(b) Failure of the Contractor to carry out any provision of the Contract;

(c) Failure of the Contractor to carry out orders;

(d) Conditions, in the opinion of the

Owner's Authorized Representative, which are unsuitable for performing the Work;

(e) Time required to investigate differing site conditions;

(f) Any reason considered to be in the public interest.

J.1.2 The Owner shall notify Contractor and the Contractor's Surety in writing of the effective date and time of the suspension and Owner shall notify Contractor and Contractor's surety in writing to resume Work.

J.2 CONTRACTOR'S RESPONSIBILITIES

J.2.1 During the period of the suspension, Contractor is responsible to continue maintenance at the project just as if the Work were in progress. This includes, but is not limited to, protection of completed Work, maintenance of access, protection of stored materials, temporary facilities, and clean-up.

J.2.2 When the Work is recommenced after the suspension, the Contractor shall replace or renew any Work damaged during the suspension, remove any materials or facilities used as part of temporary maintenance, and complete the project in every respect as though its prosecution had been continuous and without suspension.

J.3 COMPENSATION FOR SUSPENSION

J.3.1 Depending on the reason for suspension of the Work, the Contractor or the Owner may be due compensation by the other party. If the suspension was required due to acts or omissions of Contractor, the Owner may assess the Contractor actual costs of the suspension in terms of administration, remedial work by the Owner's forces or another contractor to correct the problem associated with the suspension, rent of temporary facilities, and other actual costs related to the suspension. If the suspension was caused by acts or omissions of the Owner, the Contractor shall be due compensation which shall be defined using Section D, Changes in Work. If the suspension was required through no fault of the Contractor or the Owner, neither party owes the other for the impact.

J.4 OWNER'S RIGHT TO TERMINATE CONTRACT

J.4.1 The Owner may, without prejudice to any other right or remedy, and after giving Contractor seven (7) Days' written notice and an opportunity to cure, terminate the Contract in whole or in part under the following conditions:

(a) If Contractor should voluntarily or involuntarily, seek protection under the United States Bankruptcy Code and Contractor as debtor-in- possession or the Trustee for the estate fails to assume the Contract within a reasonable time;

(b) If Contractor should make a general assignment for the benefit of Contractor's creditors;

(c) If a receiver should be appointed on account of Contractor's insolvency;

(d) If Contractor should repeatedly refuse or fail to supply an adequate number of skilled workers or proper materials to carry on the Work as required by the Contract Documents, or otherwise fail to perform the Work in a timely manner;

(e) If Contractor should repeatedly fail to make prompt payment to Subcontractors or for material or labor, or should disregard laws, ordinances or the instructions of the Owner or its Authorized Representative; or

(f) If Contractor is otherwise in material breach of any part of the Contract.

J.4.2 At any time that any of the above occurs, Owner may exercise all rights and remedies available to Owner at law or in equity, and in addition, Owner may take possession of the premises and of all materials and appliances and finish the Work by whatever method it may deem expedient. In such case, the Contractor shall not be entitled to receive further payment until the Work is completed. If the Owner's cost of finishing the Work exceeds the unpaid balance of the Contract Price, Contractor shall pay the difference to the Owner.

J.5 TERMINATION FOR CONVENIENCE

J.5.1 Owner may terminate the Contract in whole or in part whenever Owner determines that termination of the Contract is in the best interest of the public.

J.5.2 The Owner will provide the Contractor with seven (7) Days' prior written notice of a termination for public convenience. After such notice, the Contractor shall provide the Owner with immediate and peaceful possession of the premises and materials located on and off the premises for which the Contractor received progress payment under Section E. Compensation for Work terminated by the Owner under this provision will be according to Section E. In no circumstance shall Contractor be entitled to lost profits for Work not performed due to termination.

J.6 ACTION UPON TERMINATION

J.6.1 Upon receiving a notice of termination, and except as directed otherwise by the Owner, Contractor shall immediately cease placing further subcontracts or orders for materials, services, or facilities. In addition, Contractor shall terminate all subcontracts or orders to the extent they relate to the Work terminated and, with the prior written approval of the Owner, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts and orders.

J.6.2 As directed by the Owner, Contractor shall upon termination transfer title and deliver to the Owner all Record Documents, information, and other property that, if the Contract had

been completed, would have been required to be furnished to the Owner.

SECTION K
CONTRACT CLOSE OUT

K.1 RECORD DOCUMENTS

As a condition of final payment (refer also to section E.6), Contractor shall comply with the following: Contractor shall provide to Owner's Authorized Representative, two sets of Record Documents of the entire project. Record Documents shall depict the project as constructed and shall reflect each and every change, modification, and deletion made during the construction. Record Documents are part of the Work and shall be provided prior to the Owner's issuance of final payment. Record Documents include all modifications to the Contract Documents unless otherwise directed.

K.2 OPERATION AND MAINTENANCE MANUALS

As part of the Work, Contractor shall submit two completed operation and maintenance manuals ("O & M Manuals") and one (1) digital copy for review by the Owner's Authorized Representative prior to submission of any pay request for more than 75% of the Work. No payments beyond 75% will be made by the Owner until the 0 & M Manuals have been received. The O & M Manuals shall contain a complete set of all submittals, all product data as required by the specifications, training information, phone list of consultants, manufacturers, installer and suppliers, manufacturer's printed data, record and shop drawings, schematic diagrams of systems, appropriate equipment indices, warranties and bonds. The Owner's Authorized Representative shall review and return one O & M Manual for any modifications or additions required. Prior to submission of its final pay request, Contractor shall deliver two (2) complete and approved sets and one (1) digital copy of O & M Manuals to the Owner's Authorized Representative.

K.3 AFFIDAVIT/RELEASE OF LIENS AND CLAIMS

As a condition of final payment, the Contractor shall submit to the Owner's Authorized Representative a notarized affidavit/release of liens and claims form, in a form satisfactory to Owner, which states that all Subcontractors and suppliers have been paid in full, all disputes with property owners have been resolved, all obligations on the project have been satisfied, all monetary claims and indebtedness have been paid, and that, to the best of the Contractor's knowledge, there are no claims of any kind outstanding against the project. The Contractor shall indemnify, defend (with counsel of Owner's choice) and hold harmless the Owner from all claims for labor and materials finished under this Contract. The Contractor shall furnish complete and valid releases or waivers, satisfactory to the Owner, of all liens arising out of or filed in connection with the Work.

K.4 COMPLETION NOTICES

K.4.1 Contractor shall provide Owner notice of both Substantial and Final Completion. The certificate of Substantial Completion shall state the date of Substantial Completion, the responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and the time within which the Contractor shall finish all items on the punchlist accompanying the Certificate. Both completion notices must be signed by the Contractor and the Owner to be valid. The Owner shall provide the final signature on the notices. The notices shall take effect on the date they are signed by the Owner.

K.4.2 Substantial Completion of a facility with operating systems (e.g., mechanical, electrical, HVAC) shall be that degree of completion that has provided a minimum of thirty (30) continuous Days of successful, trouble-free operation, which period shall begin after all performance and acceptance testing has been successfully demonstrated to the Owner's Authorized Representative. All equipment contained in the Work, plus all other components necessary to enable the Owner to operate the facility in the manner that was intended, shall be complete on the Substantial Completion date. The Contractor may request that a punch list be prepared by the Owner's Authorized Representative with submission of the request for the Substantial Completion notice.

K.5 TRAINING

As part of the Work, and prior to submission of the request for final payment, the Contractor shall schedule with the Owner's Authorized Representative, training sessions for all equipment and systems, as required in the individual specifications sections. Contractor shall schedule training sessions at least four weeks in advance of the date of training to allow Owner personnel adequate notice. The O & M Manual shall be used as a basis for training. Training shall be a formal session, held after the equipment and/or system is completely installed and operational in its normal operating environment.

K.6 EXTRA MATERIALS

As part of the Work, Contractor shall provide spare parts, extra maintenance materials, and other materials or products in the quantities specified in the specifications, prior to final payment. Delivery point for extra materials shall be designated by the Owner's Authorized Representative.

K.7 ENVIRONMENTAL CLEAN-UP

As part of the Final Completion notice, or as a separate written notice submitted with or before the notice of Final Completion, the Contractor shall notify the Owner that all environmental pollution clean-up performed as a part of this Contract has been disposed of in accordance with all applicable rules, regulations, laws, and statutes of all agencies having jurisdiction over such environmental pollution. The notice shall reaffirm the indemnification given under Section F.5.1 above.

K.8 CERTIFICATE OF OCCUPANCY

The Contractor shall not be granted Final Completion or receive final payment if the Owner has not received an unconditioned certificate of occupancy from the appropriate state and/or local building officials, unless failure to obtain an unconditional certificate of

occupancy is due to the fault or neglect of Owner.

K.9 OTHER CONTRACTOR RESPONSIBILITIES

The Contractor shall be responsible for returning to the Owner all items issued during construction such as keys, security passes, site admittance badges, and all other pertinent items. The Contractor shall be responsible for notifying the appropriate utility companies to transfer utility charges from the Contractor to the Owner. The utility transfer date shall not be before Substantial Completion and may not be until Final Completion, if the Owner does not take beneficial use of the facility and the Contractor's forces continue with the Work.

K.10 SURVIVAL

All warranty and indemnification provisions of this Contract, and all of Contractor's other obligations under this Contract that are not fully performed by the time of Final Completion or termination, shall survive Final Completion or any termination of the Contract

SECTION L
LEGAL RELATIONS & RESPONSIBILITIES

L.1 LAWS TO BE OBSERVED

In compliance with ORS 279C.525, Sections L.2 through L.4 contain lists of federal, state and local agencies of which the Owner has knowledge that have enacted ordinances or regulations relating to environmental pollution and the preservation of natural resources that may affect the performance of the Contract:

L.2 FEDERAL AGENCIES

Agriculture, Department of Forest Service
Soil Conservation Service
Coast Guard
Defense,
Department of
Army Corps of
Engineers Energy,
Department of
Federal Energy Regulatory Commission
Environmental Protection Agency
Health and Human Services, Department of
Housing and Urban Development,
Department of Solar Energy and Energy
Conservation Bank Interior, Department of
Bureau of Land
Management Bureau of
Indian Affairs Bureau of
Mines
Bureau of Reclamation
Geological Survey
Minerals Management
Service U.S. Fish and
Wildlife Service Labor,
Department of
Mine Safety and Health Administration
Occupation Safety and Health
Administration Transportation,
Department of
Federal Highway Administration
Water Resources Council

L.3 STATE AGENCIES

Administrative Services, Department of
Agriculture, Department of
Soil and Water Conservation Commission
Columbia River Gorge Commission
Energy, Department of
Environmental Quality, Department of
Fish and Wildlife, Department of
Forestry, Department of
Geology and Mineral Industries, Department of
Human Resources, Department of
Consumer and Business Services, Department of
Land Conservation and Development Commission
Parks and Recreation, Department of
State Lands, Division of
Water Resources Department of

L.4 LOCAL AGENCIES

City Councils
County Courts
County Commissioner, Board of
Design Commissions
Historical Preservation Commission
Planning Commissions

(Contractor's name) (Signature) certifies conformance to the applicable Federal Acts, Executive Orders and Oregon Statutes and Regulations concerning Affirmative Action toward equal employment opportunities. All information and reports required by Federal or Oregon State Governments, having responsibility for enforcement of such laws, shall be supplied to the District upon request for purposes of investigation to ascertain compliance with such acts, regulations and orders.

STATUTORY PROVISIONS

Under Oregon Law the following clauses must be inserted in all public construction contracts:

a) The contractor shall make payment promptly, as due, to all persons supplying at such contractor labor or material for the prosecution of the work provided for in such contract. ORS 279.312.

b) The contractor shall pay all contributions or amounts due the Industrial Accident Fund from such contractor or subcontractor incurred in the performance of the contract. ORS 279.312.

c) The contractor shall not permit any lien or claim to be filed or prosecuted against the state, county, school district, municipality, municipal corporation or subdivision thereof, on account of any labor or material furnished. ORS 279.312.

d) The contractor shall pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.

e) If the contractor fails, neglects or refuses to make prompt payment of any claim for labor or services furnished to the contractor a subcontractor by any person in connection with the public contract as such claim becomes due, the proper officer or officers representing the state, county, school district, municipality,
municipal corporation or subdivision thereof, as the case may be, may pay such claim to the person furnishing the labor or services and charge the amount of the payment against funds due or to become due the contractor by reason of his contract. The payment of a claim in the manner authorized in this section shall not relieve the contractor or his surety from his or its obligation with respect to any unpaid claims. ORS 279.314.

f) No person shall be employed more than eight hours in any one day, or 40 hours in any one week, except in cases of necessity, emergency, or where the public policy absolutely requires it, and in such cases the laborer shall be paid at least time and a half for all overtime in excess of eight hours a day and for work performed on Saturday and any legal holiday specified in ORS 187.010, except Veterans Day. However, when specifically agreed to under a written labor-management negotiated labor agreement, a laborer may be paid at least time and a half pay for work performed on Veterans Day or on any legal holiday specified in ORS 187.020. ORS 279.316.

g) Contractor shall comply with all federal, state and local agencies (as listed below) that have enacted statutes, ordinances or regulations dealing with the prevention of environmental pollution and the preservation of natural resources that affect the performance of the contract. If the contractor is delayed or must undertake additional work by reason of existing regulations or ordinances of agencies not set forth in this contract or due to the enactment of new or the amendment of existing statutes, ordinances or regulations relating to the prevention of environmental pollution and the preservation of natural resources that affect the project occurring after the submission of his bid, the Owner shall grant a time extension and issue a change order setting forth the additional work that must be undertaken. The change order shall not invalidate the contract and there shall be, in addition to a reasonable adjustment in the contract price to compensate the successful bidder for all costs and expenses incurred, including overhead and profits, as a result of such delay or additional work. ORS 279.318. (Oregon Laws 1975, Chapter 771,19)

Federal Agencies:
Department of Agriculture

Forest Service
Soil Conversation Service
Department of Defense
Army Corps of Engineers

Environmental Protection Agency

Department of Interior
Bureau of Sport Fisheries and Wildlife
Bureau of Outdoor Recreation
Bureau of Land Management
Bureau of Indian Affairs
Bureau of Reclamation
Department of Labor
Occupational Safety and Health Administration

Department of Transportation
Coast Guard
Federal Highway Administration

State Agencies:
Department of Agriculture
Department of Environmental Quality
Department of Fish and Wildlife
Department of Forestry
Department of Geology and Mineral Industries
Department of Human Resources
Land Conservation and Development Commission
Soil and Water Conservation Commission
State Engineer
State Land Board
Water Resources Board

Local Agencies:
City Council
County Court
Board of County Commissioners
Port Districts
Metropolitan Service Districts
County Service Districts
Sanitary Districts
Water Districts
Fire Protection Districts

h) The contractor shall promptly, as due, make payment to any person, co-partnership, association or corporation, furnishing medical, surgical and hospital care or other needed care and attention, incident to sickness or injury, to the employees of such contractor, of all sums which the contractor agrees to pay for such services and all moneys and sums which the contractor collected or deducted from the wages of his employees pursuant to any law, contract or agreement of the purpose of providing or paying for such service. ORS 279.320.

i) The contractor shall pay workmen on the project not less than the prevailing hourly wage rate, as provided in ORS 279.348 to 279.356.

j) The contractor certifies that he/she is a resident bidder as defined in ORS 279.029.

k) The contractor certifies that all employers working under the contract are subject employers that will comply with ORS 656.017.

l) All sums due the State Unemployment Compensation Fund from the contractor or any subcontractor in connection with the performance of the contract shall be promptly paid.

m) The contract may be canceled at the election of the district for any willful failure on the part of the contractor to faithfully perform the contract in accordance with its terms.

END OF SECTION

PREVAILING WAGE RATES

"Prevailing Wage Rates for Public Works Contracts in Oregon", effective date January 1, 2017, plus any issued updates, published by the Oregon Bureau of Labor and Industries will apply to this project.

A copy of the document is included herein to inform Bidders of its content and wording as required by (ORS 279.352).

END OF SECTION

PREVAILING WAGE RATES

for

Public Works Contracts in Oregon

OREGON BUREAU OF LABOR AND INDUSTRIES

Brad Avakian
Commissioner
Bureau of Labor and Industries

Effective: January 1, 2017

BRAD AVAKIAN
COMMISSIONER

CHRISTIE HAMMOND
DEPUTY COMMISSIONER

BUREAU OF LABOR AND INDUSTRIES

January 1, 2017

In January and July of each year, the Bureau of Labor and Industries publishes the prevailing wage rates that are required to be paid to workers on non-residential public works projects in the state of Oregon. Quarterly updates are published in April and October.

A separate publication, entitled "*Definitions of Covered Occupations for Public Works Contracts in Oregon*," provides occupational definitions used to classify the duties performed on public works projects.

These publications are available electronically on the bureau's website at www.oregon.gov/boli. In order to contain costs and preserve limited budget resources, BOLI is no longer automatically mailing copies of these publications to contracting agencies, contractors, and other interested parties. Those on the agency's mailing list will receive an email notification whenever the publications are amended in the future. One complimentary hard copy of each PWR publication is available upon request by emailing BOLI at pwremail@boli.state.or.us or calling 971-673-0838. Additional copies are available at cost, plus postage.

Also available on the bureau's website is a link to the federal Davis-Bacon rates. This link is posted in order to assist contractors and public agencies in determining which rates to pay on projects in Oregon subject to BOTH the state PWR and federal Davis-Bacon Act. The higher of the wage rates must be paid on such projects.

Unless specifically exempted by state law, prevailing wage rates are the minimum wages that must be paid to all workers employed on all public works. These rates are determined using data collected from a statewide construction industry wage survey of occupations and crafts performing commercial building and heavy and highway construction in 14 geographic regions of the state.

ORS 279C.830 requires that the applicable wage rates be incorporated into all bid specifications for public works contracts subject to the PWR law. A statement incorporating the applicable prevailing wage rate publication and any amendments thereto or Davis-Bacon wage rate determination into the specifications *by reference* will satisfy these requirements. Such reference must include the title of the applicable wage rates publication or determination and the date of the publication or determination as well as the date of any applicable amendments. A provision that prevailing wage rates must be paid must also appear in the contract.

Generally, the rates in effect at the time the bid specifications are first advertised are those that apply for the duration of the project. There are some exceptions to this rule. For example, if during the bidding process, the prevailing wage rates change, the public agency has the option of amending the bid specifications to reflect such changes. If a Construction Manager/General Contractor (CM/GC) is used on the project, the rates in effect at the time the CM/GC contract becomes a public works contract are the applicable rates to be used for the duration of the project. (See OAR 839-025-0020 for more information.) Note that the applicable rates for purposes of compliance with the federal Davis-Bacon Act may be different than the applicable rates for purposes of compliance with Oregon's prevailing wage rate laws. The effective federal rates will be those as determined under 29 CFR 1.6.

If you have any questions regarding application of the state PWR law or the applicable rates to be paid on any project, contact the bureau's Prevailing Wage Coordinator in Portland at (971) 673-0839.



Brad Avakian
Commissioner
Bureau of Labor and Industries

TABLE OF CONTENTS

JANUARY 1, 2017

How to Look up a Rate/BOLI Offices 1

Public Works Bonds 2

PWR Survey Wage Rate Appeal Process 3

PWR Required Postings 4

Map of Prevailing Wage Rate Regions 5

Occupations by Regions

Region 1 - Clatsop, Columbia and Tillamook Counties 6
Region 2 - Clackamas, Multnomah and Washington Counties 8
Region 3 - Polk, Marion and Yamhill Counties 10
Region 4 - Benton, Lincoln and Linn Counties 12
Region 5 - Lane County 14
Region 6 - Douglas County 16
Region 7 - Coos and Curry Counties 18
Region 8 - Jackson and Josephine Counties 20
Region 9 - Hood River, Sherman and Wasco Counties 22
Region 10 - Crook, Deschutes and Jefferson Counties 24
Region 11 - Klamath and Lake Counties 26
Region 12 - Gilliam, Grant, Morrow, Umatilla and Wheeler Counties 28
Region 13 - Baker, Union and Wallowa Counties 30
Region 14 - Harney and Malheur Counties 32

Appendix 35

List of Ineligible Contractors 54

Forms 59

BOLI forms necessary to comply with ORS 279C.800 through ORS 279C.870 may be found in the back of this booklet. Contractors are encouraged to use and keep on file the forms provided as master copies for use on future prevailing wage rate projects.

All of the information in this booklet can be accessed and printed from the Internet at: www.oregon.gov/BOLI

Pursuant to ORS 279C.800 to ORS 279C.870, the prevailing wage rates contained in this booklet have been adopted for use on public works contracts in Oregon. Additional copies of this booklet are available at cost, plus postage.

HOW TO LOOK UP A RATE

1. **When was the project first advertised for bid?**
   For purposes of compliance with Oregon's prevailing wage rate laws, the rates in effect at the time the bid specifications are first advertised are those that apply for the duration of the project. (See OAR 839-025-0020(6) for information about projects using a CM/GC.)

2. **What type of work is being performed by the employee?**
   Using the booklet, *Definitions of Covered Occupations* find the definition that most closely matches the actual work being performed by the worker. If you have any questions about work classifications, contact BOLI at the number below.

3. **Where is the work being performed – what region?**
   Find the occupation in the correct region pages associated with the county where the project construction is taking place.

4. **Is there a rate listed next to the classification?**
   If so, use it. The prevailing wage rate is made up of an hourly base rate and an hourly fringe rate; it is the combination of these two amounts that must be paid to the worker.

5. **If the book directs you to "See Appendix," go to the back of the book and use the rate listed in the Appendix pages.** It may include a group number, shift differential, hazard pay and/or zone pay which are added to the hourly base rate.

6. **Apprentices** must be paid the full fringe rate in those regions where the appendix rate does not apply. However, if the book directs you to "See Appendix," and the worker is registered in a bona fide apprenticeship program, **you may contact BOLI at (971) 673-0839** for the applicable hourly fringe rate.

7. **If you still don't know CALL BOLI at (971) 673-0839.**

For specific information or questions regarding the prevailing wage law, you may obtain a "Prevailing Wage Rate Laws" handbook by contacting the nearest Oregon Bureau of Labor and Industries office listed below. An order form is in the back of this booklet.

BOLI Office Locations

Eugene	1400 Executive Parkway, Suite 200 Eugene, OR 97401	(541) 686-7623
Portland	800 NE Oregon St., #1045 Portland, OR 97232	(971) 673-0761
Salem	3865 Wolverine St. NE, Bldg. E-1 Salem, OR 97305	(503) 378-3292

PUBLIC WORKS BONDS

EVERY CONTRACTOR AND SUBCONTRACTOR who works on public works projects subject to the prevailing wage rate (PWR) law is required to file a **$30,000 "PUBLIC WORKS BOND"** with the Construction Contractor's Board (CCB). (ORS 279C.836) This includes flagging and landscaping companies, temporary employment agencies, and sometimes sole proprietors.

- This bond is to be **USED EXCLUSIVELY FOR UNPAID WAGES** determined to be due by the Bureau of Labor and Industries (BOLI).
- The bond **MUST** be filed **BEFORE STARTING WORK** on a prevailing wage rate project.
- The bond is in effect **CONTINUOUSLY** (do not have to have one per project).
- **BEFORE PERMITTING A SUBCONTRACTOR TO START WORK** on a public works project, **CONTRACTORS MUST VERIFY** their subcontractors have either filed the bond, or have elected not to file a public works bond due to a bona fide exemption.
- A public works bond is in addition to any other required bond the contractor or subcontractor is required to obtain.

Exemptions:

- Allowed for contractors that are certified disadvantaged, minority, women or emerging small business enterprises, for the first FOUR years of certification;
    - Exempt contractor must still file written verification of certification with the CCB, and give the CCB written notice that they elect not to file a bond.
- For projects with a total project cost of $100,000 or less, a public works bond is not required. (Note this is the total project cost, not an individual contract amount.)
    - The Prime Contractor must give written notice to the public agency that they elect not to file a public works bond.
    - Subcontractors must give written notice to the prime contractor that they elect not to file a public works bond.
- Emergency projects, as defined in ORS 279A.010(f).

ORS 279C.830(3) and (4) require:

That the **specifications** for every contract for public works shall contain a provision stating that the contractor and every subcontractor must have a public works bond filed with the CCB before starting work on the project, unless otherwise exempt.

Every contract awarded by a contracting agency shall contain a provision requiring the contractor:

- To have a public works bond filed with the CCB before starting work on the project, unless otherwise exempt;
- To include in every subcontract a provision requiring the subcontractor to have a public works bond filed with the CCB before starting work on the project unless otherwise exempt.

PWR SURVEY WAGE RATE APPEAL PROCESS

1) Anyone wishing to challenge or appeal a survey rate determination should submit their request in writing to the commissioner.

2) The appeal should include:
   a) a complete description of the "problem," including the affected trade(s), and documentation or evidence (if available) supporting why the rate determination is incorrect
   b) recommendations for how the rate could be more accurately determined.

3) The written appeal will be reviewed by the Wage and Hour Division which will recommend to the commissioner a course of action and proposed time frame for addressing the issue (such as a recommendation that further information be obtained, an investigation or study of the matter be conducted, a rate amendment or correction be issued, the next survey be modified, etc.).

4) The commissioner will review the division's recommendation and either approve, disapprove or modify the recommendation. (The PWR Advisory Committee may be consulted in some matters as deemed appropriate by the commissioner.)

5) The requesting party will be notified of the commissioner's decision.

PWR REQUIRED POSTINGS

ALL CONTRACTORS AND SUBCONTRACTORS

PREVAILING WAGE RATES

Each and every contractor and subcontractor engaged in work on a public works must post the applicable prevailing wage rates for that project in a conspicuous place at the work site so workers have ready access to the information. ORS 279C.840(4); OAR 839-025-0033(1).

DETAILS OF FRINGE BENEFIT PROGRAMS

When a contractor or subcontractor provides for or contributes to a health and welfare plan or a pension plan, or both, for the contractor or subcontractor's employees who are working on a public works project, the details of all fringe benefit plans or programs must be posted on the work site. The posting must include a description of the plan or plans, information about how and where claims can be made and where to obtain more information. The notice must be posted in a conspicuous place at the work site in the same location as the prevailing wage rates (see above). ORS 279C.840(5); OAR 839-025-0033(2)

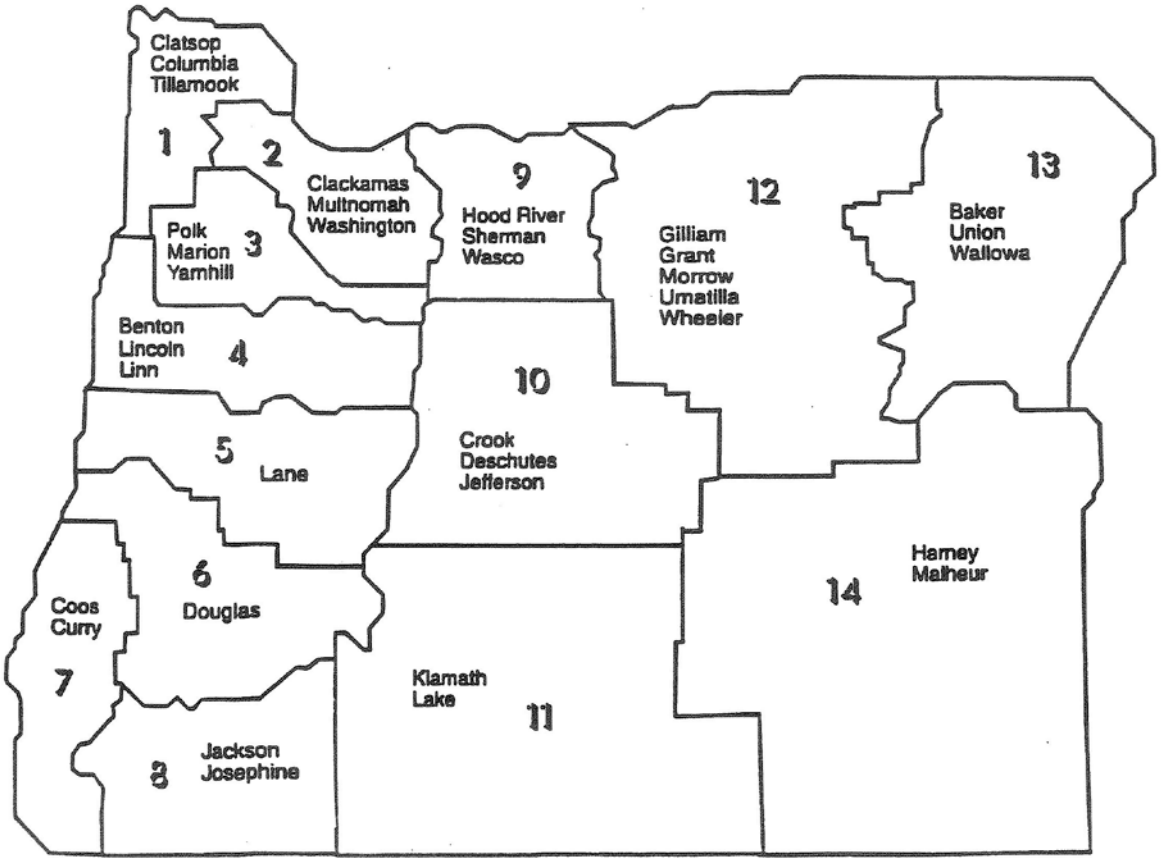
WORK SCHEDULE

Contractors and subcontractors must give workers the regular work schedule (days of the week and number of hours per day) in writing, before beginning work on the project. Contractors and subcontractors may provide the schedule at the time of hire, prior to starting work on the contract, or by posting the schedule in a location frequented by employees, along with the prevailing wage rate information and any fringe benefit information. If an employer fails to give written notice of the worker's schedule, the work schedule will be presumed to be a five-day schedule. The schedule may only be changed if the change is intended to be permanent and is not designed to evade the PWR overtime requirements. ORS 279C.540(2); OAR 839-025-0034.

PREVAILING WAGE RATES

OCCUPATIONS
BY
REGIONS

PREVAILING WAGE RATE REGIONS



Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Asbestos Worker/Insulator	See Appendix	See Appendix
Boilermaker	See Appendix	See Appendix
Bricklayer/Stonemason	See Appendix	See Appendix
Bridge and Highway Carpenter (See Carpenter Group 5)	See Appendix	See Appendix
Carpenter Group 1 & 2	See Appendix	See Appendix
Cement Mason	See Appendix	See Appendix
Diver	See Appendix	See Appendix
Diver Tender	See Appendix	See Appendix
Dredger	See Appendix	See Appendix
Drywall, Lather, Acoustical Carpenter & Ceiling Installer	$32.59	$14.29
Drywall Taper	$28.67	$13.41
Electrician	See Appendix	See Appendix
Elevator Constructor, Installer and Mechanic	See Appendix	See Appendix
Fence Constructor (Non-metal)	$23.96	$10.46
Fence Erector (Metal)	$20.50	$5.09
Flagger (See Laborer Group 3)	See Appendix	See Appendix
Glazier	$29.81	$13.94
Hazardous Materials Handler/Mechanic	See Appendix	See Appendix
Highway and Parking Striper	See Appendix	See Appendix
Ironworker	See Appendix	See Appendix
Laborer Group 1	See Appendix	See Appendix
Laborer Group 2	See Appendix	See Appendix
Laborer Group 3	See Appendix	See Appendix
Landscape Laborer/Technician	$17.16	$4.17
Limited Energy Electrician	$30.03	$10.49
Line Constructor	See Appendix	See Appendix
Marble Setter	See Appendix	See Appendix
Millwright Group 1 & 2 (See Carpenter Group 3 & 4)	See Appendix	See Appendix
Painter	$21.36	$8.27
Piledriver (See Carpenter Group 6)	See Appendix	See Appendix
Plasterer and Stucco Mason	$23.05	$17.99
Plumber/Pipefitter/Steamfitter	See Appendix	See Appendix
Power Equipment Operator Group 1	See Appendix	See Appendix
Power Equipment Operator Group 1A	See Appendix	See Appendix
Power Equipment Operator Group 1B	See Appendix	See Appendix
Power Equipment Operator Group 2	See Appendix	See Appendix
Power Equipment Operator Group 3	See Appendix	See Appendix
Power Equipment Operator Group 4	See Appendix	See Appendix
Power Equipment Operator Group 5	See Appendix	See Appendix
Power Equipment Operator Group 6	See Appendix	See Appendix

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Roofer	$24.43	$8.76
Sheet Metal Worker	See Appendix	See Appendix
Soft Floor Layer	$24.29	$10.91
Sprinkler Fitter	See Appendix	See Appendix
Tender to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier)	See Appendix	See Appendix
Tender to Plasterer and Stucco Mason	$25.36	$12.02
Testing, Adjusting, and Balancing (TAB) Technician	$31.17	$10.12
Tilesetter/Terrazzo Worker: Hard Tilesetter	See Appendix	See Appendix
Tile, Terrazzo, and Marble Finisher	See Appendix	See Appendix
Truck Driver – All Groups	$20.54	$7.16

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Asbestos Worker/Insulator	See Appendix	See Appendix
Boilermaker	$33.92	$23.34
Bricklayer/Stonemason	See Appendix	See Appendix
Bridge & Highway Carpenter (See Carpenter Group 5)	See Appendix	See Appendix
Carpenter Group 1 & 2	See Appendix	See Appendix
Cement Mason	See Appendix	See Appendix
Diver	See Appendix	See Appendix
Diver Tender	See Appendix	See Appendix
Dredger	$39.81	$13.93
Drywall, Lather, Acoustical Carpenter & Ceiling Installer	See Appendix	See Appendix
Drywall Taper (See Painter & Drywall Taper)	See Appendix	See Appendix
Electrician	See Appendix	See Appendix
Elevator Constructor, Installer and Mechanic	See Appendix	See Appendix
Fence Constructor (Non-metal)	$23.96	$10.46
Fence Erector (Metal)	$20.50	$5.09
Flagger (See Laborer Group 3)	See Appendix	See Appendix
Glazier	See Appendix	See Appendix
Hazardous Materials Handler/Mechanic	$20.16	$8.43
Highway and Parking Striper	$26.11	$8.20
Ironworker	See Appendix	See Appendix
Laborer Group 1	See Appendix	See Appendix
Laborer Group 2	See Appendix	See Appendix
Laborer Group 3	See Appendix	See Appendix
Landscape Laborer/Technician	$17.16	$4.17
Limited Energy Electrician	See Appendix	See Appendix
Line Constructor	See Appendix	See Appendix
Marble Setter	$24.15	$18.58
Millwright Group 1 & 2	$29.32	$10.68
Painter	$21.36	$8.27
Piledriver (See Carpenter Group 6)	See Appendix	See Appendix
Plasterer and Stucco Mason	See Appendix	See Appendix
Plumber/Pipefitter/Steamfitter	See Appendix	See Appendix
Power Equipment Operator Group 1	See Appendix	See Appendix
Power Equipment Operator Group 1A	See Appendix	See Appendix
Power Equipment Operator Group 1B	See Appendix	See Appendix
Power Equipment Operator Group 2	See Appendix	See Appendix
Power Equipment Operator Group 3	See Appendix	See Appendix
Power Equipment Operator Group 4	See Appendix	See Appendix
Power Equipment Operator Group 5	See Appendix	See Appendix
Power Equipment Operator Group 6	See Appendix	See Appendix

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Roofer	See Appendix	See Appendix
Sheet Metal Worker	See Appendix	See Appendix
Soft Floor Layer	$24.29	$10.91
Sprinkler Fitter	See Appendix	See Appendix
Tenders to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier)	See Appendix	See Appendix
Tender to Plasterer and Stucco Mason	See Appendix	See Appendix
Testing, Adjusting, and Balancing (TAB) Technician	$31.17	$10.12
Tilesetter/Terrazzo Worker: Hard Tilesetter	See Appendix	See Appendix
Tile, Terrazzo, and Marble Finisher	See Appendix	See Appendix
Truck Driver – All Groups	$20.54	$7.16

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Asbestos Worker/Insulator	See Appendix	See Appendix
Boilermaker	$33.92	$23.34
Bricklayer/Stonemason	See Appendix	See Appendix
Bridge and Highway Carpenter (See Carpenter Group 5)	See Appendix	See Appendix
Carpenter Group 1 & 2	See Appendix	See Appendix
Cement Mason	See Appendix	See Appendix
Diver	See Appendix	See Appendix
Diver Tender	See Appendix	See Appendix
Dredger	See Appendix	See Appendix
Drywall, Lather, Acoustical Carpenter & Ceiling Installer	See Appendix	See Appendix
Drywall Taper (See Painter & Drywall Taper)	See Appendix	See Appendix
Electrician	See Appendix	See Appendix
Elevator Constructor, Installer and Mechanic	See Appendix	See Appendix
Fence Constructor (Non-metal)	$23.96	$10.46
Fence Erector (Metal)	$20.50	$5.09
Flagger (See Laborer Group 3)	See Appendix	See Appendix
Glazier	See Appendix	See Appendix
Hazardous Materials Handler/Mechanic	See Appendix	See Appendix
Highway and Parking Striper	See Appendix	See Appendix
Ironworker	$31.96	$18.48
Laborer Group 1	See Appendix	See Appendix
Laborer Group 2	See Appendix	See Appendix
Laborer Group 3	See Appendix	See Appendix
Landscape Laborer/Technician	$17.16	$4.17
Limited Energy Electrician	$30.03	$10.49
Line Constructor	See Appendix	See Appendix
Marble Setter	$24.15	$18.58
Millwright Group 1 & 2	$29.32	$10.68
Painter	$21.36	$8.27
Piledriver (See Carpenter Group 6)	See Appendix	See Appendix
Plasterer and Stucco Mason	See Appendix	See Appendix
Plumber/Pipefitter/Steamfitter	See Appendix	See Appendix
Power Equipment Operator Group 1	See Appendix	See Appendix
Power Equipment Operator Group 1A	See Appendix	See Appendix
Power Equipment Operator Group 1B	See Appendix	See Appendix
Power Equipment Operator Group 2	See Appendix	See Appendix
Power Equipment Operator Group 3	See Appendix	See Appendix
Power Equipment Operator Group 4	See Appendix	See Appendix
Power Equipment Operator Group 5	See Appendix	See Appendix
Power Equipment Operator Group 6	See Appendix	See Appendix

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Roofer	See Appendix	See Appendix
Sheet Metal Worker	$32.29	$12.84
Soft Floor Layer	See Appendix	See Appendix
Sprinkler Fitter	See Appendix	See Appendix
Tender to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier)	See Appendix	See Appendix
Tender to Plasterer and Stucco Mason	$25.36	$12.02
Testing, Adjusting, and Balancing (TAB) Technician	$31.17	$10.12
Tilesetter/Terrazzo Worker: Hard Tilesetter	See Appendix	See Appendix
Tile, Terrazzo, and Marble Finisher	See Appendix	See Appendix
Truck Driver – All Groups	$20.54	$7.16

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Asbestos Worker/Insulator	See Appendix	See Appendix
Boilermaker	$33.92	$23.34
Bricklayer/Stonemason	See Appendix	See Appendix
Bridge and Highway Carpenter (See Carpenter Group 5)	See Appendix	See Appendix
Carpenter Group 1 & 2	See Appendix	See Appendix
Cement Mason	See Appendix	See Appendix
Diver	See Appendix	See Appendix
Diver Tender	See Appendix	See Appendix
Dredger	$39.81	$13.93
Drywall, Lather, Acoustical Carpenter & Ceiling Installer	See Appendix	See Appendix
Drywall Taper (See Painter & Drywall Taper)	See Appendix	See Appendix
Electrician	See Appendix	See Appendix
Elevator Constructor, Installer and Mechanic	See Appendix	See Appendix
Fence Constructor (Non-metal)	$23.96	$10.46
Fence Erector (Metal)	$20.50	$5.09
Flagger (See Labor Group 3)	See Appendix	See Appendix
Glazier	See Appendix	See Appendix
Hazardous Materials Handler/Mechanic	See Appendix	See Appendix
Highway and Parking Striper	See Appendix	See Appendix
Ironworker	See Appendix	See Appendix
Laborer Group 1	See Appendix	See Appendix
Laborer Group 2	See Appendix	See Appendix
Laborer Group 3	See Appendix	See Appendix
Landscape Laborer/Technician	$17.16	$4.17
Limited Energy Electrician	$30.03	$10.49
Line Constructor	See Appendix	See Appendix
Marble Setter	See Appendix	See Appendix
Millwright Group 1 & 2	$29.32	$10.68
Painter	$21.36	$8.27
Piledriver (See Carpenter Group 6)	See Appendix	See Appendix
Plasterer and Stucco Mason	See Appendix	See Appendix
Plumber/Pipefitter/Steamfitter	$40.86	$18.52
Power Equipment Operator Group 1	See Appendix	See Appendix
Power Equipment Operator Group 1A	See Appendix	See Appendix
Power Equipment Operator Group 1B	See Appendix	See Appendix
Power Equipment Operator Group 2	See Appendix	See Appendix
Power Equipment Operator Group 3	See Appendix	See Appendix
Power Equipment Operator Group 4	See Appendix	See Appendix
Power Equipment Operator Group 5	See Appendix	See Appendix
Power Equipment Operator Group 6	See Appendix	See Appendix

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Roofer	See Appendix	See Appendix
Sheet Metal Worker	$32.29	$12.84
Soft Floor Layer	See Appendix	See Appendix
Sprinkler Fitter	$31.35	$11.89
Tenders to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier)	See Appendix	See Appendix
Tender to Plasterer and Stucco Mason	$25.36	$12.02
Testing, Adjusting, and Balancing (TAB) Technician	$31.17	$10.12
Tilesetter/Terrazzo Worker: Hard Tilesetter	See Appendix	See Appendix
Tile, Terrazzo, and Marble Finisher	See Appendix	See Appendix
Truck Driver – All Groups	$20.54	$7.16

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Asbestos Worker/Insulator	See Appendix	See Appendix
Boilermaker	See Appendix	See Appendix
Bricklayer/Stonemason	See Appendix	See Appendix
Bridge and Highway Carpenter (See Carpenter Group 5)	See Appendix	See Appendix
Carpenter Group 1 & 2	See Appendix	See Appendix
Cement Mason	See Appendix	See Appendix
Diver	See Appendix	See Appendix
Diver Tender	See Appendix	See Appendix
Dredger	See Appendix	See Appendix
Drywall, Lather, Acoustical Carpenter & Ceiling Installer	See Appendix	See Appendix
Drywall Taper (See Painter & Drywall Taper)	See Appendix	See Appendix
Electrician	See Appendix	See Appendix
Elevator Constructor, Installer and Mechanic	See Appendix	See Appendix
Fence Constructor (Non-metal)	$23.96	$10.46
Fence Erector (Metal)	$20.50	$5.09
Flagger (See Laborer Group 3)	See Appendix	See Appendix
Glazier	See Appendix	See Appendix
Hazardous Materials Handler/Mechanic	See Appendix	See Appendix
Highway and Parking Striper	$26.11	$8.20
Ironworker	See Appendix	See Appendix
Laborer Group 1	See Appendix	See Appendix
Laborer Group 2	See Appendix	See Appendix
Laborer Group 3	See Appendix	See Appendix
Landscape Laborer/Technician	$17.16	$4.17
Limited Energy Electrician	$30.03	$10.49
Line Constructor	See Appendix	See Appendix
Marble Setter	See Appendix	See Appendix
Millwright Group 1 & 2	$29.32	$10.68
Painter	$21.36	$8.27
Piledriver (See Carpenter Group 6)	See Appendix	See Appendix
Plasterer and Stucco Mason	See Appendix	See Appendix
Plumber/Pipefitter/Steamfitter	See Appendix	See Appendix
Power Equipment Operator Group 1	See Appendix	See Appendix
Power Equipment Operator Group 1A	See Appendix	See Appendix
Power Equipment Operator Group 1B	See Appendix	See Appendix
Power Equipment Operator Group 2	See Appendix	See Appendix
Power Equipment Operator Group 3	See Appendix	See Appendix
Power Equipment Operator Group 4	See Appendix	See Appendix
Power Equipment Operator Group 5	See Appendix	See Appendix
Power Equipment Operator Group 6	See Appendix	See Appendix

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Roofer	$24.43	$8.76
Sheet Metal Worker	$32.29	$12.84
Soft Floor Layer	$24.29	$10.91
Sprinkler Fitter	$31.35	$11.89
Tender to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier)	See Appendix	See Appendix
Tender to Plasterer and Stucco Mason	$25.36	$12.02
Testing, Adjusting, and Balancing (TAB) Technician	$31.17	$10.12
Tilesetter/Terrazzo Worker: Hard Tilesetter	See Appendix	See Appendix
Tile, Terrazzo, and Marble Finisher	See Appendix	See Appendix
Truck Driver – All Groups	$20.54	$7.16

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Asbestos Worker/Insulator	See Appendix	See Appendix
Boilermaker	$33.92	$23.34
Bricklayer/Stonemason	See Appendix	See Appendix
Bridge and Highway Carpenter (See Carpenter Group 5)	See Appendix	See Appendix
Carpenter Group 1 & 2	$30.07	$12.08
Cement Mason	See Appendix	See Appendix
Diver	See Appendix	See Appendix
Diver Tender	See Appendix	See Appendix
Dredger	See Appendix	See Appendix
Drywall, Lather, Acoustical Carpenter & Ceiling Installer	See Appendix	See Appendix
Drywall Taper (See Painter & Drywall Taper)	See Appendix	See Appendix
Electrician	$38.05	$14.97
Elevator Constructor, Installer and Mechanic	See Appendix	See Appendix
Fence Constructor (Non-metal)	$23.96	$10.46
Fence Erector (Metal)	$20.50	$5.09
Flagger	$21.03	$10.45
Glazier	See Appendix	See Appendix
Hazardous Material Handler/Mechanic	$20.16	$8.43
Highway and Parking Striper	See Appendix	See Appendix
Ironworker	See Appendix	See Appendix
Laborer Group 1	$24.25	$10.01
Laborer Group 2	$24.86	$10.62
Laborer Group 3	$22.35	$11.30
Landscape Laborer/Technician	$17.16	$4.17
Limited Energy Electrician	$30.03	$10.49
Line Constructor	See Appendix	See Appendix
Marble Setter	$24.15	$18.58
Millwright Group 1 & 2	$29.32	$10.68
Painter	$21.36	$8.27
Piledriver (See Carpenter Group 6)	See Appendix	See Appendix
Plasterer and Stucco Mason	$23.05	$17.99
Plumber/Pipefitter/Steamfitter	$40.86	$18.52
Power Equipment Operator Group 1	See Appendix	See Appendix
Power Equipment Operator Group 1A	See Appendix	See Appendix
Power Equipment Operator Group 1B	See Appendix	See Appendix
Power Equipment Operator Group 2	See Appendix	See Appendix
Power Equipment Operator Group 3	See Appendix	See Appendix
Power Equipment Operator Group 4	See Appendix	See Appendix
Power Equipment Operator Group 5	See Appendix	See Appendix
Power Equipment Operator Group 6	See Appendix	See Appendix

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Roofer	$24.43	$8.76
Sheet Metal Worker	See Appendix	See Appendix
Soft Floor Layer	See Appendix	See Appendix
Sprinkler Fitter	$31.35	$11.89
Tender to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier)	$26.59	$11.17
Tender to Plasterer and Stucco Mason	$25.36	$12.02
Testing, Adjusting, and Balancing (TAB) Technician	$31.17	$10.12
Tilesetter/Terrazzo Worker: Hard Tilesetter	$27.41	$16.72
Tile, Terrazzo, and Marble Finisher	$22.33	$13.21
Truck Driver – All Groups	$20.54	$7.16

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Asbestos Worker/Insulator	See Appendix	See Appendix
Boilermaker	$33.92	$23.34
Bricklayer/Stonemason	See Appendix	See Appendix
Bridge and Highway Carpenter (See Carpenter Group 5)	See Appendix	See Appendix
Carpenter Group 1 & 2	See Appendix	See Appendix
Cement Mason	See Appendix	See Appendix
Diver	See Appendix	See Appendix
Diver Tender	See Appendix	See Appendix
Dredger	$39.81	$13.93
Drywall, Lather, Acoustical Carpenter & Ceiling Installer	See Appendix	See Appendix
Drywall Taper (See Painter & Drywall Taper)	See Appendix	See Appendix
Electrician	See Appendix	See Appendix
Elevator Constructor, Installer and Mechanic	See Appendix	See Appendix
Fence Constructor (Non-metal)	$23.96	$10.46
Fence Erector (Metal)	$20.50	$5.09
Flagger (See Laborer Group 3)	See Appendix	See Appendix
Glazier	See Appendix	See Appendix
Hazardous Materials Handler/Mechanic	$20.16	$8.43
Highway and Parking Striper	$26.11	$8.20
Ironworker	$31.96	$18.48
Laborer Group 1	See Appendix	See Appendix
Laborer Group 2	See Appendix	See Appendix
Laborer Group 3	See Appendix	See Appendix
Landscape Laborer/Technician	$17.16	$4.17
Limited Energy Electrician	$30.03	$10.49
Line Constructor	See Appendix	See Appendix
Marble Setter	$24.15	$18.58
Millwright Group 1 & 2	$29.32	$10.68
Painter	$21.36	$8.27
Piledriver (See Carpenter Group 6)	See Appendix	See Appendix
Plasterer and Stucco Mason	$23.05	$17.99
Plumber/Pipefitter/Steamfitter	See Appendix	See Appendix
Power Equipment Operator Group 1	See Appendix	See Appendix
Power Equipment Operator Group 1A	See Appendix	See Appendix
Power Equipment Operator Group 1B	See Appendix	See Appendix
Power Equipment Operator Group 2	See Appendix	See Appendix
Power Equipment Operator Group 3	See Appendix	See Appendix
Power Equipment Operator Group 4	See Appendix	See Appendix
Power Equipment Operator Group 5	See Appendix	See Appendix
Power Equipment Operator Group 6	See Appendix	See Appendix

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Roofer	$24.43	$8.76
Sheet Metal Worker	See Appendix	See Appendix
Soft Floor Layer	$24.29	$10.91
Sprinkler Fitter	See Appendix	See Appendix
Tender to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier)	See Appendix	See Appendix
Tender to Plasterer and Stucco Mason	See Appendix	See Appendix
Testing, Adjusting, and Balancing (TAB) Technician (See Sheet Metal Worker or Plumber/Pipefitter/Steamfitter)	See Appendix	See Appendix
Tilesetter/Terrazzo Worker: Hard Tilesetter	See Appendix	See Appendix
Tile, Terrazzo, and Marble Finisher	$22.33	$13.21
Truck Driver – All Groups	$20.54	$7.16

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Asbestos Worker/Insulator	See Appendix	See Appendix
Boilermaker	$33.92	$23.34
Bricklayer/Stonemason	$32.33	$14.78
Bridge and Highway Carpenter (See Carpenter Group 5)	See Appendix	See Appendix
Carpenter Group 1 & 2	See Appendix	See Appendix
Cement Mason	$27.56	$13.72
Diver	See Appendix	See Appendix
Diver Tender	See Appendix	See Appendix
Dredger	See Appendix	See Appendix
Drywall, Lather, Acoustical Carpenter & Ceiling Installer	See Appendix	See Appendix
Drywall Taper (See Painter & Drywall Taper)	See Appendix	See Appendix
Electrician	See Appendix	See Appendix
Elevator Constructor, Installer and Mechanic	See Appendix	See Appendix
Fence Constructor (Non-metal)	$23.96	$10.46
Fence Erector (Metal)	$20.50	$5.09
Flagger	$21.03	$10.45
Glazier	$29.81	$13.94
Hazardous Materials Handler/Mechanic	$20.16	$8.43
Highway and Parking Striper	$26.11	$8.20
Ironworker	See Appendix	See Appendix
Laborer Group 1	$24.25	$10.01
Laborer Group 2	$24.86	$10.62
Laborer Group 3	$22.35	$11.30
Landscape Laborer/Technician	$17.16	$4.17
Limited Energy Electrician	$30.03	$10.49
Line Constructor	See Appendix	See Appendix
Marble Setter	See Appendix	See Appendix
Millwright Group 1 & 2	$29.32	$10.68
Painter	$21.36	$8.27
Piledriver (See Carpenter Group 6)	See Appendix	See Appendix
Plasterer and Stucco Mason	$23.05	$17.99
Plumber/Pipefitter/Steamfitter	See Appendix	See Appendix
Power Equipment Operator Group 1	See Appendix	See Appendix
Power Equipment Operator Group 1A	See Appendix	See Appendix
Power Equipment Operator Group 1B	See Appendix	See Appendix
Power Equipment Operator Group 2	See Appendix	See Appendix
Power Equipment Operator Group 3	See Appendix	See Appendix
Power Equipment Operator Group 4	See Appendix	See Appendix
Power Equipment Operator Group 5	See Appendix	See Appendix
Power Equipment Operator Group 6	See Appendix	See Appendix

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Roofer	$24.43	$8.76
Sheet Metal Worker	$32.29	$12.84
Soft Floor Layer	$24.29	$10.91
Sprinkler Fitter	$31.35	$11.89
Tender to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier)	$26.59	$11.17
Tender to Plasterer and Stucco Mason	$25.36	$12.02
Testing, Adjusting, and Balancing (TAB) Technician (See Sheet Metal Worker or Plumber/Pipefitter/Steamfitter in Appendix)	See Appendix	See Appendix
Tilesetter/Terrazzo Worker: Hard Tilesetter	$27.41	$16.72
Tile, Terrazzo, and Marble Finisher	$22.33	$13.21
Truck Driver – All Groups	$20.54	$7.16

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Asbestos Worker/Insulator	See Appendix	See Appendix
Boilermaker	See Appendix	See Appendix
Bricklayer/Stonemason	See Appendix	See Appendix
Bridge and Highway Carpenter (See Carpenter Group 5)	See Appendix	See Appendix
Carpenter Group 1 & 2	$30.07	$12.08
Cement Mason	See Appendix	See Appendix
Diver	See Appendix	See Appendix
Diver Tender	See Appendix	See Appendix
Dredger	See Appendix	See Appendix
Drywall, Lather, Acoustical Carpenter & Ceiling Installer	See Appendix	See Appendix
Drywall Taper (See Painter & Drywall Taper)	See Appendix	See Appendix
Electrician	See Appendix	See Appendix
Elevator Constructor, Installer and Mechanic	See Appendix	See Appendix
Fence Constructor (Non-metal)	$23.96	$10.46
Fence Erector (Metal)	$20.50	$5.09
Flagger (See Laborer Group 3)	See Appendix	See Appendix
Glazier	See Appendix	See Appendix
Hazardous Materials Handler/Mechanic	$20.16	$8.43
Highway and Parking Striper	See Appendix	See Appendix
Ironworker	See Appendix	See Appendix
Laborer Group 1	See Appendix	See Appendix
Laborer Group 2	See Appendix	See Appendix
Laborer Group 3	See Appendix	See Appendix
Landscape Laborer/Technician	$17.16	$4.17
Limited Energy Electrician	See Appendix	See Appendix
Line Constructor	See Appendix	See Appendix
Marble Setter	See Appendix	See Appendix
Millwright Group 1 & 2	$29.32	$10.68
Painter	See Appendix	See Appendix
Piledriver (See Carpenter Group 5)	See Appendix	See Appendix
Plasterer and Stucco Mason	See Appendix	See Appendix
Plumber/Pipefitter/Steamfitter	See Appendix	See Appendix
Power Equipment Operator Group 1	See Appendix	See Appendix
Power Equipment Operator Group 1A	See Appendix	See Appendix
Power Equipment Operator Group 1B	See Appendix	See Appendix
Power Equipment Operator Group 2	See Appendix	See Appendix
Power Equipment Operator Group 3	See Appendix	See Appendix
Power Equipment Operator Group 4	See Appendix	See Appendix
Power Equipment Operator Group 5	See Appendix	See Appendix
Power Equipment Operator Group 6	See Appendix	See Appendix

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Roofer	$24.43	$8.76
Sheet Metal Worker	See Appendix	See Appendix
Soft Floor Layer	See Appendix	See Appendix
Sprinkler Fitter	See Appendix	See Appendix
Tender to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier)	See Appendix	See Appendix
Tender to Plasterer and Stucco Mason	$25.36	$12.02
Testing, Adjusting, and Balancing (TAB) Technician (See Sheet Metal Worker or Plumber/Pipefitter/Steamfitter)	See Appendix	See Appendix
Tilesetter/Terrazzo Worker: Hard Tilesetter	See Appendix	See Appendix
Tile, Terrazzo, and Marble Finisher	See Appendix	See Appendix
Truck Driver – All Groups	$20.54	$7.16

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Asbestos Worker/Insulator	See Appendix	See Appendix
Boilermaker	See Appendix	See Appendix
Bricklayer/Stonemason	See Appendix	See Appendix
Bridge and Highway Carpenter	$34.18	$14.57
Carpenter Group 1 & 2	$30.07	$12.08
Cement Mason	See Appendix	See Appendix
Diver	See Appendix	See Appendix
Diver Tender	See Appendix	See Appendix
Dredger	See Appendix	See Appendix
Drywall, Lather, Acoustical Carpenter & Ceiling Installer	See Appendix	See Appendix
Drywall Taper (See Painter & Drywall Taper)	See Appendix	See Appendix
Electrician	See Appendix	See Appendix
Elevator Constructor, Installer and Mechanic	See Appendix	See Appendix
Fence Constructor (Non-metal)	$23.96	$10.46
Fence Erector (Metal)	$20.50	$5.09
Flagger	$21.03	$10.45
Glazier	$29.81	$13.94
Hazardous Materials Handler/Mechanic	$20.16	$8.43
Highway and Parking Striper	$26.11	$8.20
Ironworker	See Appendix	See Appendix
Laborer Group 1	$24.25	$10.01
Laborer Group 2	$24.86	$10.62
Laborer Group 3	22.35	$11.30
Landscape Laborer/Technician	$17.16	$4.17
Limited Energy Electrician	$30.03	$10.49
Line Constructor	See Appendix	See Appendix
Marble Setter	$24.15	$18.58
Millwright Group 1 & 2	$29.32	$10.68
Painter	$21.36	$8.27
Piledriver (See Carpenter Group 6)	See Appendix	See Appendix
Plasterer and Stucco Mason	$23.05	$17.99
Plumber/Pipefitter/Steamfitter	See Appendix	See Appendix
Power Equipment Operator Group 1	See Appendix	See Appendix
Power Equipment Operator Group 1A	See Appendix	See Appendix
Power Equipment Operator Group 1B	See Appendix	See Appendix
Power Equipment Operator Group 2	See Appendix	See Appendix
Power Equipment Operator Group 3	See Appendix	See Appendix
Power Equipment Operator Group 4	See Appendix	See Appendix
Power Equipment Operator Group 5	See Appendix	See Appendix
Power Equipment Operator Group 6	See Appendix	See Appendix

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Roofer	$24.43	$8.76
Sheet Metal Worker	See Appendix	See Appendix
Soft Floor Layer	$24.29	$10.91
Sprinkler Fitter	$31.35	$11.89
Tender to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier)	$26.59	$11.17
Tender to Plasterer and Stucco Mason	$25.36	$12.02
Testing, Adjusting, and Balancing (TAB) Technician (See Sheet Metal Worker or Plumber/Pipefitter/Steamfitter)	See Appendix	See Appendix
Tilesetter/Terrazzo Worker: Hard Tilesetter	$27.41	$16.72
Tile, Terrazzo, and Marble Finisher	$22.33	$13.21
Truck Driver – All Groups	$20.54	$7.16

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Asbestos Worker/Insulator	See Appendix	See Appendix
Boilermaker	$33.92	$23.34
Bricklayer/Stonemason	$32.33	$14.78
Bridge and Highway Carpenter	$34.18	$14.57
Carpenter Group 1 & 2	$30.07	$12.08
Cement Mason	$27.56	$13.72
Diver	See Appendix	See Appendix
Diver Tender	See Appendix	See Appendix
Dredger	See Appendix	See Appendix
Drywall, Lather, Acoustical Carpenter & Ceiling Installer	$32.59	$14.29
Drywall Taper (See Painter & Drywall Taper)	See Appendix	See Appendix
Electrician	See Appendix	See Appendix
Elevator Constructor, Installer and Mechanic	See Appendix	See Appendix
Fence Constructors (Non-metal)	$23.96	$10.46
Fence Erector (Metal)	$20.50	$5.09
Flagger (See Laborer Group 3)	See Appendix	See Appendix
Glazier	$29.81	$13.94
Hazardous Materials Handler/Mechanic	$20.16	$8.43
Highway and Parking Striper	$26.11	$8.20
Ironworker	$31.96	$18.48
Laborer Group 1	See Appendix	See Appendix
Laborer Group 2	See Appendix	See Appendix
Laborer Group 3	See Appendix	See Appendix
Landscape Laborer/Technician	$17.16	$4.17
Limited Energy Electrician	$30.03	$10.49
Line Constructor	See Appendix	See Appendix
Marble Setter	See Appendix	See Appendix
Millwright Group 1 & 2 (See Carpenter Group 3 & 4)	See Appendix	See Appendix
Painter	$21.36	$8.27
Piledriver	$34.84	$14.48
Plasterer and Stucco Mason	$23.05	$17.99
Plumber/Pipefitter/Steamfitter	$40.86	$18.52
Power Equipment Operator Group 1	See Appendix	See Appendix
Power Equipment Operator Group 1A	See Appendix	See Appendix
Power Equipment Operator Group 1B	See Appendix	See Appendix
Power Equipment Operator Group 2	See Appendix	See Appendix
Power Equipment Operator Group 3	See Appendix	See Appendix
Power Equipment Operator Group 4	See Appendix	See Appendix
Power Equipment Operator Group 5	See Appendix	See Appendix
Power Equipment Operator Group 6	See Appendix	See Appendix

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Roofer	$24.43	$8.76
Sheet Metal Worker	$32.29	$12.84
Soft Floor Layer	$24.29	$10.91
Sprinkler Fitter	$31.35	$11.89
Tender to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier)	$26.59	$11.17
Tender to Plasterer and Stucco Mason	$25.36	$12.02
Testing, Adjusting, and Balancing (TAB) Technician	$31.17	$10.12
Tilesetter/Terrazzo Worker: Hard Tilesetter	$27.41	$16.72
Tile, Terrazzo, and Marble Finisher	$22.33	$13.21
Truck Driver – All Groups	$20.54	$7.16

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Asbestos Worker/Insulator	See Appendix	See Appendix
Boilermaker	See Appendix	See Appendix
Bricklayer/Stonemason	See Appendix	See Appendix
Bridge and Highway Carpenter (See Carpenter Group 5)	See Appendix	See Appendix
Carpenter Group 1 & 2	See Appendix	See Appendix
Cement Mason	See Appendix	See Appendix
Diver	See Appendix	See Appendix
Diver Tender	See Appendix	See Appendix
Dredger	See Appendix	See Appendix
Drywall, Lather, Acoustical Carpenter & Ceiling Installer	See Appendix	See Appendix
Drywall Taper	$28.67	$13.41
Electrician	See Appendix	See Appendix
Elevator Constructor, Installer and Mechanic	See Appendix	See Appendix
Fence Constructor (Non-metal)	$23.96	$10.46
Fence Erector (Metal)	$20.50	$5.09
Flagger (See Laborer Group 3)	See Appendix	See Appendix
Glazier	$29.81	$13.94
Hazardous Materials Handler/Mechanic	See Appendix	See Appendix
Highway and Parking Striper	See Appendix	See Appendix
Ironworker	See Appendix	See Appendix
Laborer Group 1	See Appendix	See Appendix
Laborer Group 2	See Appendix	See Appendix
Laborer Group 3	See Appendix	See Appendix
Landscape Laborer/Technician	$17.16	$4.17
Limited Energy Electrician	$30.03	$10.49
Line Constructor	See Appendix	See Appendix
Marble Setter	See Appendix	See Appendix
Millwright Group 1 & 2	$29.32	$10.68
Painter	See Appendix	See Appendix
Piledriver (See Carpenter Group 6)	See Appendix	See Appendix
Plasterer and Stucco Mason	See Appendix	See Appendix
Plumber/Pipefitter/Steamfitter	See Appendix	See Appendix
Power Equipment Operator Group 1	See Appendix	See Appendix
Power Equipment Operator Group 1A	See Appendix	See Appendix
Power Equipment Operator Group 1B	See Appendix	See Appendix
Power Equipment Operator Group 2	See Appendix	See Appendix
Power Equipment Operator Group 3	See Appendix	See Appendix
Power Equipment Operator Group 4	See Appendix	See Appendix
Power Equipment Operator Group 5	See Appendix	See Appendix
Power Equipment Operator Group 6	See Appendix	See Appendix

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Roofer	$24.43	$8.76
Sheet Metal Worker	See Appendix	See Appendix
Soft Floor Layer	$24.29	$10.91
Sprinkler Fitter	See Appendix	See Appendix
Tenders to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier)	See Appendix	See Appendix
Tender to Plasterer and Stucco Mason	$25.36	$12.02
Testing, Adjusting, and Balancing (TAB) Technician (See Sheet Metal Worker or Plumber/Pipefitter/Steamfitter)	See Appendix	See Appendix
Tilesetter/Terrazzo Worker: Hard Tilesetter	$27.41	$16.72
Tile, Terrazzo, and Marble Finisher	$22.33	$13.21
Truck Driver – All Groups	$20.54	$7.16

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Asbestos Worker/Insulator	See Appendix	See Appendix
Boilermaker	$33.92	$23.34
Bricklayer/Stonemason	See Appendix	See Appendix
Bridge and Highway Carpenter (See Carpenter Group 5)	See Appendix	See Appendix
Carpenter Group 1 & 2	$30.07	$12.08
Cement Mason	$27.56	$13.72
Diver	See Appendix	See Appendix
Diver Tender	See Appendix	See Appendix
Dredger	See Appendix	See Appendix
Drywall, Lather, Acoustical Carpenter & Ceiling Installer	$32.59	$14.29
Drywall Taper	$28.67	$13.41
Electrician	$38.05	$14.97
Elevator Constructor, Installer and Mechanic	See Appendix	See Appendix
Fence Constructor (Non-metal)	$23.96	$10.46
Fence Erector (Metal)	$20.50	$5.09
Flagger	$21.03	$10.45
Glazier	See Appendix	See Appendix
Hazardous Materials Handler/Mechanic	$20.16	$8.43
Highway and Parking Striper	$26.11	$8.20
Ironworker	See Appendix	See Appendix
Laborer Group 1	$24.25	$10.01
Laborer Group 2	$24.86	$10.62
Laborer Group 3	$22.35	$11.30
Landscape Laborer/Technician	$17.16	$4.17
Limited Energy Electrician	$30.03	$10.49
Line Constructor	$44.80	$14.96
Marble Setter	See Appendix	See Appendix
Millwright Group 1 & 2	$29.32	$10.68
Painter	$21.36	$8.27
Piledriver (See Carpenter Group 6)	See Appendix	See Appendix
Plasterer and Stucco Mason	$23.05	$17.99
Plumber/Pipefitter/Steamfitter	See Appendix	See Appendix
Power Equipment Operator Group 1	See Appendix	See Appendix
Power Equipment Operator Group 1A	See Appendix	See Appendix
Power Equipment Operator Group 1B	See Appendix	See Appendix
Power Equipment Operator Group 2	See Appendix	See Appendix
Power Equipment Operator Group 3	See Appendix	See Appendix
Power Equipment Operator Group 4	See Appendix	See Appendix
Power Equipment Operator Group 5	See Appendix	See Appendix
Power Equipment Operator Group 6	See Appendix	See Appendix

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Roofer	$24.43	$8.76
Sheet Metal Worker	See Appendix	See Appendix
Soft Floor Layer	$24.29	$10.91
Sprinkler Fitter	$31.35	$11.89
Tenders to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier)	$26.59	$11.17
Tender to Plasterer and Stucco Mason	$25.36	$12.02
Testing, Adjusting, and Balancing (TAB) Technician	$31.17	$10.12
Tilesetter/Terrazzo Worker: Hard Tilesetter	$27.41	$16.72
Tile, Terrazzo, and Marble Finisher	See Appendix	See Appendix
Truck Driver – All Groups	$20.54	$7.16

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Asbestos Worker/Insulator	See Appendix	See Appendix
Boilermaker	$33.92	$23.34
Bricklayer/Stonemason	$32.33	$14.78
Bridge and Highway Carpenter	$34.18	$14.57
Carpenter Group 1 & 2	$30.07	$12.08
Cement Mason	See Appendix	See Appendix
Diver	See Appendix	See Appendix
Diver Tender	See Appendix	See Appendix
Dredger	See Appendix	See Appendix
Drywall, Lather, Acoustical Carpenter & Ceiling Installer	$32.59	$14.29
Drywall Taper	$28.67	$13.41
Electrician	$38.05	$14.97
Elevator Constructor, Installer and Mechanic	See Appendix	See Appendix
Fence Constructor (Non-metal)	$23.96	$10.46
Fence Erector (Metal)	$20.50	$5.09
Flagger	$21.03	$10.45
Glazier	$29.81	$13.94
Hazardous Materials Handler/Mechanic	$20.16	$8.43
Highway and Parking Striper	$26.11	$8.20
Ironworker	$31.96	$18.48
Laborer Group 1	$24.25	$10.01
Laborer Group 2	$24.86	$10.62
Laborer Group 3	$22.35	$11.30
Landscape Laborer/Technician	$17.16	$4.17
Limited Energy Electrician	$30.03	$10.49
Line Constructor	See Appendix	See Appendix
Marble Setter	See Appendix	See Appendix
Millwright Group 1 & 2	$29.32	$10.68
Painter	$21.36	$8.27
Piledriver	$34.84	$14.48
Plasterer and Stucco Mason	$23.05	$17.99
Plumber/Pipefitter/Steamfitter	$40.86	$18.52
Power Equipment Operator Group 1	$36.48	$13.40
Power Equipment Operator Group 1A	$40.91	$14.10
Power Equipment Operator Group 1B	$41.84	$13.90
Power Equipment Operator Group 2	$33.07	$12.72
Power Equipment Operator Group 3	$31.79	$11.18
Power Equipment Operator Group 4	$30.88	$11.40
Power Equipment Operator Group 5	$28.88	$9.49
Power Equipment Operator Group 6	$27.70	$11.98

Using the booklet, Definitions of Covered Occupations, find the definition that most closely matches the actual work being performed by the worker.

OCCUPATION	BASIC HOURLY RATE	FRINGE RATE
Roofer	$24.43	$8.76
Sheet Metal Worker	$32.29	$12.84
Soft Floor Layer	$24.29	$10.91
Sprinkler Fitter	See Appendix	See Appendix
Tenders to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier)	$26.59	$11.17
Tender to Plasterer and Stucco Mason	$25.36	$12.02
Testing, Adjusting, and Balancing (TAB) Technician	$31.17	$10.12
Tilesetter/Terrazzo Worker: Hard Tilesetter	$27.41	$16.72
Tile, Terrazzo, and Marble Finisher	See Appendix	See Appendix
Truck Driver – All Groups	$20.54	$7.16

APPENDIX

JANUARY 1, 2017

Collectively Bargained Rates

(To be used only when referred to in the Regions pages 6-33)

JANUARY 1, 2017 APPENDIX

The Appendix rates are Collectively Bargained Rates to be used ONLY for Regions/Trades specified in pages 6 through 33. Refer to pages 6 through 33 BEFORE using rates in this section.
Rates in this section may include premium pay such as shift differential, hazard pay and/or a zone pay differential which is added to the hourly base rate.

Using the booklet, Definitions of Covered Occupations, find the definition and group number, if applicable, that most closely matches the actual work being performed by the worker.

Asbestos Worker/Insulator 38
Boilermaker 38
Bricklayer/Stonemason 38
Bridge and Highway Carpenter (See Carpenter Group 5) 38
Carpenter 38
Cement Mason 39
Diver 40
Diver Tender 40
Dredger 40
Drywall, Lather, Acoustical Carpenter & Ceiling Installer 41
Drywall Taper (See Painter & Drywall Taper) 45
Electrician 41
Elevator Constructor, Installer and Mechanic 43
Glazier 43
Hazardous Materials Handler 43
Highway/Parking Striper 43
Ironworker 44
Laborer 44
Limited Energy Electrician 44
Line Constructor 45
Marble Setter 45
Millwright Group 1 & 2 (See Carpenter Group 3 & 4) 38
Painter 45
Piledriver (See Carpenter Group 6) 38
Plasterer and Stucco Mason 46
Plumber/Pipefitter/Steamfitter 46
Power Equipment Operator 47
Roofer 48
Sheet Metal Worker 48
Soft Floor Layer 49
Sprinkler Fitter 49
Tender to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier) 49
Tender to Plasterer and Stucco Mason 49
Testing and Balancing (TAB) Technician 50
Tilesetter/Terrazzo Worker: Hard Tilesetter 50
Tile, Terrazzo, and Marble Finisher 50
Truck Driver 50

MAP: Power Equipment Operator, Zone 1 52

TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE

ASBESTOS WORKER/INSULATOR

	45.42	**20.77**
Firestop Containment	**28.92**	**14.53**

BOILERMAKER	**36.69**	**28.75**

BRICKLAYER/STONEMASON

	34.79	**20.10**

(This trade is tended by "Tenders to Mason Trades")

(Add $1.00 per hour to Fringe for Refractory repair work)

CARPENTER

Zone 1 (Base Rate)

Group 1	**35.67**	**15.67**
Group 2	**35.82**	**15.67**
Group 3	**36.18**	**15.67**
Group 4	**36.37**	**15.67**
Group 5	**36.18**	**15.67**
Group 6	**36.71**	**15.67**

Zone Differential for Carpenters
(Add to Zone 1 Base Rate)

Zone 2	**.85** per hour
Zone 3	**1.25** per hour
Zone 4	**1.70** per hour
Zone 5	**2.00** per hour
Zone 6	**3.00** per hour
Zone 7	**5.00** per hour

Zone 1: Projects located within 30 miles of the respective city hall of the cities listed.
Zone 2: More than 30 miles but less than 40 miles.
Zone 3: More than 40 miles but less than 50 miles.
Zone 4: More than 50 miles but less than 60 miles.
Zone 5: More than 60 miles but less than 70 miles.
Zone 6: More than 70 miles but less than 100 miles.
Zone 7: More than 100 miles.

CARPENTER (continued)

Reference Cities for Group 1 and 2 Carpenters

Albany	Goldendale	Madras	Roseburg
Astoria	Grants Pass	Medford	Salem
Baker City	Hermiston	Newport	The Dalles
Bend	Hood River	Ontario	Tillamook
Brookings	Klamath Falls	Pendleton	Vancouver
Burns	La Grande	Portland	
Coos Bay	Lakeview	Port Orford	
Eugene	Longview	Reedsport	

Group 3 (Millwright Group-I)

Group 4 (Millwright Group-II)

Zones for Groups 3 and 4 Carpenter are determined by the distance between the project site and **either**

1) The worker's residence; ***or***

2) City Hall of a reference city listed for the appropriate group shown, whichever is closer

Reference Cities for Group 3 and 4 Carpenters

Eugene	Medford	Portland	Vancouver
Longview	North Bend	The Dalles	

Group 5 (Bridge & Highway Carpenter)

Group 6 (Piledriver)

Zones for Groups 5 and 6 Carpenter are determined by the distance between the project site and **either**

1) The worker's residence; ***or***

2) City Hall of a reference city listed for the appropriate group shown, whichever is closer

Reference Cities for Group 5 and 6 Carpenters

Bend	Longview	North Bend
Eugene	Medford	Portland

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time, best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE	TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE

CARPENTER (continued)

Welders receive $.75/hour above their group's rate.

When working with creosote and other toxic, treated wood and steel material, workers shall receive $.25/hour premium pay for minimum of eight (8) hours.

When working in sheet pile coffer dams or cells up to the external water level, Group 6 workers shall receive $.15/hour premium pay for minimum of eight (8) hours.

CEMENT MASON

(This trade is tended by "Concrete Laborer")

Area 1 & 2

Group 1	**31.00**	**18.87**
Group 2	**31.68**	**18.87**
Group 3	**31.68**	**18.87**
Group 4	**32.35**	**18.87**

Reference Counties for Area 1 & 2

Clackamas	Hood River	Sherman	Wheeler
Clatsop	Marion	Tillamook	Yamhill
Columbia	Morrow	Umatilla	
Gilliam	Multnomah	Wasco	
Grant	Polk	Washington	

Area 3

Group 1	**27.90**	**18.87**
Group 2	**28.58**	**18.87**
Group 3	**28.58**	**18.87**
Group 4	**29.25**	**18.87**

Reference Counties for Area 3

Benton	Lane	Lincoln	Linn

Area 4

Group 1	**26.35**	**18.87**
Group 2	**27.03**	**18.87**
Group 3	**27.03**	**18.87**
Group 4	**27.70**	**18.87**

Reference Counties for Area 4

Baker	Deschutes	Jefferson	Malheur
Coos	Douglas	Josephine	Union
Crook	Harney	Klamath	Wallowa
Curry	Jackson	Lake	

CEMENT MASON (continued)

Zone Differential for Cement Mason
(Add to Basic Hourly Rate)

Zone A	**3.00** per hour
Zone B	**5.00** per hour
Zone C	**10.00** per hour

Zone A: Projects located 60-79 miles of the respective city hall of the Reference Cities listed below.
Zone B: Projects located 80-99 miles of the respective city hall of the Reference Cities listed below.
Zone C: Projects located 100 or more miles of the respective city hall of the Reference Cities listed below.

Reference Cities for Zones A-C (Cement Mason)

Bend	Eugene	Portland	The Dalles
Corvallis	Medford	Salem	Vancouver

When a contractor takes current employees to a project that is located more than 59 miles from the City Hall of the Reference City that is closest to the contractor's place of business, Zone Pay is to be paid for the distance between the City Hall of the identified Reference City and the project site.

"Contractor's place of business" shall include not only contractor's principal place of business but also contractor's area office(s) that support contractor's operations in a geographical region. Such area office(s) shall not include project offices(s) established for the duration of a particular project.

If a current employee lives nearer to a Reference City that is located closer to the project than is the Reference City located closest to the contractor's place of business, Zone Pay shall be calculated using the Reference City located nearer to the current employee's residence.

Note: All miles are to be determined on the basis of road miles using the normal route (shortest time – best road), from the City Hall of the Reference City closest to the contractor's place of business and the project, or, City Hall of the Reference City closest to the current employee's residence and the project.

TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE

DIVER & DIVER TENDER

Zone 1 (Base Rate)

DIVER	**85.26**	**15.67**
DIVER TENDER	**41.26**	**15.67**

1) For those workers who reside within a reference city below, their zone pay shall be computed from the city hall of the city wherein they reside.

2) For those workers who reside nearer to a project than is the city hall of any reference city below, the mileage from their residence may be used in computing their zone pay differential.

3) The zone pay for all other projects shall be computed from the city hall of Portland.

Zone Differential for Diver/Diver Tender
(Add to Zone 1 Base Rate)

Zone 2	**.85** per hour
Zone 3	**1.25** per hour
Zone 4	**1.70** per hour
Zone 5	**2.00** per hour
Zone 6	**3.00** per hour
Zone 7	**5.00** per hour

Zone 1: Projects located within 30 miles of city hall of the reference cities listed.
Zone 2: More than 30 miles, but less than 40 miles.
Zone 3: More than 40 miles, but less than 50 miles.
Zone 4: More than 50 miles, but less than 60 miles.
Zone 5: More than 60 miles, but less than 70 miles.
Zone 6: More than 70 miles, but less than 100 miles.
Zone 7: More than 100 miles from the city hall of employee's home local.

Reference Cities for Diver/Diver Tender

Astoria	Klamath Falls	Newport	Roseburg
Bend	Longview	North Bend	Salem
Eugene	Medford	Portland	The Dalles

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time, best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

DIVER & DIVER TENDER (continued)

Depth Pay and Enclosure Pay are added to the Divers' Basic Hourly Rate to obtain the Total Hourly Rate for the Diver.

Basic Hourly Rate	+	Hourly Depth Pay	+	Hourly Enclosure Pay	=	Diver Total Hourly Pay Rate

Diver Depth Pay:

Depth of Dive	Hourly Depth Pay
50-100 ft.	$1.00 per foot over 50 feet
101-150 ft.	$1.50 per foot over 100 feet
151-200 ft.	$2.00 per foot over 150 feet

Depth shall be figured from the surface to the actual depth where the diving work is being performed.

Diver Enclosure Pay (working without vertical escape):

Distance Traveled In the Enclosure	Hourly Enclosure Pay
5-50ft.	$0.50/hr. up to $4.00 maximum per day
50-100ft.	$1.13/hr. up to $9.00 maximum per day
100-150ft.	$2.13/hr. up to $17.00 maximum per day
150-200ft.	$4.63/hr. up to $37.00 maximum per day
200-300ft.	$4.63/hr. up to $37.00 maximum per day, plus $0.40 per foot traveled in enclosure.
300-450ft.	$4.63/hr. up to $37.00 maximum per day, plus $0.80 per foot traveled in enclosure.
450-600ft.	$4.63/hr. up to $37.00 maximum per day, plus $1.60 per foot traveled in enclosure.

DREDGER

Zone A (Base Rate)

Leverman (Hydraulic & Clamshell)	**45.96**	**14.35**
Assistant Engineer (Watch Engineer, Mechanic Machinist)	**42.80**	**14.35**
Tenderman (Boatman Attending Dredge Plant) Fireman	**41.31**	**14.35**
Fill Equipment Operator	**40.14**	**14.35**
Assistant Mate	**37.44**	**14.35**

TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE

DREDGER (continued)

Zone Differential for Dredgers
(Add to Zone A Base Rate)

Zone B	**3.00** per hour
Zone C	**6.00** per hour

Zone mileage based on road miles:

Zone A: Center of jobsite to no more than 30 miles from the city hall of Portland.
Zone B: More than 30 miles but not more than 60 miles.
Zone C: Over 60 miles.

DRYWALL, LATHER, ACOUSTICAL CARPENTER & CEILING INSTALLER

Zone 1 (Base Rate)

1. DRYWALL INSTALLER	**35.96**	**15.38**
2. LATHER, ACOUSTICAL CARPENTER & CEILING INSTALLER	**35.96**	**15.38**

Zone Differential for Drywall, Lather, Acoustical Carpenter & Ceiling Installer
(Add to Zone 1 Base Rate)

Zone mileage based on road miles:

Zone 2	31-40 miles	**.85** per hour
Zone 3	41-50 miles	**1.25** per hour
Zone 4	51-60 miles	**1.70** per hour
Zone 5	61-70 miles	**2.00** per hour
Zone 6	71-100 miles	**3.00** per hour
Zone 7	101 or more	**5.00** per hour

The correct transportation allowance shall be based on road mileage from the City Hall of the local union having jurisdiction of the job or other transportation reference cities herein listed.

Reference Cities for Drywall, Lather, Acoustical Carpenter & Ceiling Installer

Albany	Coquille	Medford	Roseburg
Astoria	Eugene	Newport	Salem
Baker	Grants Pass	North Bend	Seaside
Bandon	Hermiston	Pendleton	The Dalles
Bend	Klamath Falls	Portland	Tillamook
Brookings	Kelso-Longview	Reedsport	Vancouver

ELECTRICIAN

Area 1

Electrician	**28.60**	**13.48**
Cable Splicer	**31.53**	**13.66**

Reference Counties Area 1

Malheur

Area 2

Electrician	**40.30**	**18.89**
Cable Splicer	**42.32**	**18.95**

Reference Counties Area 2

Baker	Grant	Umatilla	Wallowa
Gilliam	Morrow	Union	Wheeler

Add 50% of the base rate when workers are required to work under the following conditions:

1. Under compressed air with atmospheric pressure exceeding normal pressure by at least 10%.

2. From trusses, swing scaffolds, bosun's chairs, open platforms, unguarded scaffolds, open ladders, frames, tanks, stacks, silos and towers where the workman is subject to a direct fall of (a) more than 60 feet or (b) into turbulent water under bridges, powerhouses or spillway faces of dams.

Area 3

Electrician	**35.80**	**16.62**

Reference Counties Area 3

Coos	Douglas (a)	Lincoln
Curry	Lane (a)	

(a) Those portions of Lane and Douglas lying **west** of a line running North and South from the NE corner of Coos County to the SE corner of Lincoln County.

TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE

ELECTRICIAN (continued)

Shift Differential

1st Shift "day"	Between the hours of 8:00am and 4:30pm	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 1:00am	8 hours pay for 8 hours work plus 17% for all hours worked
3rd Shift "Graveyard"	Between the hours of 12:30am and 9:00am	8 hours pay for 8 hours work plus 31% for all hours worked.

When workers are required to work under compressed air or where gas masks are required, or to work from trusses, all scaffolds including mobile elevated platforms, any temporary structure, bosun's chair or on frames, stacks, towers, tanks, within 15' of the leading edges of any building at a distance of:

50 – 75 feet to the ground	Add 1 ½ x the base rate
75+ feet to the ground	Add 2 x the base rate

High Time is not required to be paid on any permanent structure with permanent adequate safeguards (handrails, mid-rails, and toe guards). Any vehicle equipped with outriggers are exempted from this section.

Area 4

Electrician	**38.70**	**18.85**
Cable Splicer	**42.57**	**18.97**
Lighting Maintenance/ Material Handlers	**18.49**	**9.80**

Reference Counties Area 4

Benton	Jefferson	Marion
Crook	Lane (b)	Polk
Deschutes	Linn	Yamhill (c)

(b) That portion of Lane County lying **east** of a line running North and South from the NE corner of Coos County to the SE corner of Lincoln County.

(c) South half

ELECTRICIAN (continued)

Shift Differential

1st Shift "day"	Between the hours of 8:00am and 4:30pm	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 1:00am	8 hours pay for 8 hours work plus 17% for all hours worked
3rd Shift "Graveyard"	Between the hours of 12:30am and 9:00am	8 hours pay for 8 hours work plus 31.4% for all hours worked.

Area 5

Electrician	**40.20**	**22.30**
Electrical Welder	**44.22**	**22.42**
Material Handler/ Lighting Maintenance	**22.91**	**15.14**

Reference Counties Area 5

Clackamas	Hood River	Tillamook	Yamhill (d)
Clatsop	Multnomah	Wasco	
Columbia	Sherman	Washington	

(d) North Half

Shift Differential

1st Shift "day"	Between the hours of 8:00am and 4:30pm	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 1:00am	8 hours pay for 8 hours work plus 17.3% for all hours worked
3rd Shift "Graveyard"	Between the hours of 12:30am and 9:00am	8 hours pay for 8 hours work plus 31.4% for all hours worked.

TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE

ELECTRICIAN (continued)

Zone Pay for Area 5 **Electrician and Electrical Welder**
(Add to Basic Hourly Rate)

Zone mileage based on air miles:

Zone 1	31-50 miles	**1.50** per hour
Zone 2	51-70 miles	**3.50** per hour
Zone 3	71-90 miles	**5.50** per hour
Zone 4	Beyond 90	**9.00** per hour

There shall be a 30-mile free zone from downtown Portland City Hall and a similar 15-mile free zone around the following cities:

Astoria	Seaside	Tillamook
Hood River	The Dalles	

Further, the free zone at the Oregon coast shall extend along Hwy 101 west to the ocean Hwy 101 east 10 miles if not already covered by the above 15-mile free zone.

Area 6

Electrician	**30.44**	**15.70**
Cable Splicer	**30.44**	**15.70**
Lighting Maintenance and Material Handlers	**16.22**	**8.74**

Reference Counties Area 6

Douglas (e)	Jackson	Klamath
Harney	Josephine	Lake

(e) That portion of Douglas County lying **east** of a line running North and South from the NE corner of Coos County to the SE corner of Lincoln County.

Shift Differential

1st Shift "day"	Between the hours of 8:00am and 4:30pm	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 1:00am	8 hours pay for 8 hours work plus 7.5% for all hours worked
3rd Shift "Graveyard"	Between the hours of 12:30am and 9:00am	8 hours pay for 8 hours work plus 15% for all hours worked.

ELECTRICIAN (continued)

When workers are required to work under compressed air or to work from trusses, scaffolds, swinging scaffolds, bosun's chair or on building frames, stacks or towers at a distance of 50 to 90 feet from the ground or supporting structures shall be paid 1-1/2 times the base rate of pay.

ELEVATOR CONSTRUCTOR, INSTALLER AND MECHANIC

Area 1

Mechanic **50.82** **36.20**

Reference Counties Area 1

Baker Umatilla Union Wallowa

Area 2

Mechanic **51.03** **37.37**

Reference Counties Area 2

All remaining Counties

GLAZIER **34.65** **19.00**

(Add $1.00 to base rate if safety belt is required by State safety regulations)

(Add $4.00 to base rate for work done from a non-motorized single-man bosun chair)

HAZARDOUS MATERIALS HANDLER

23.03 **12.21**

HIGHWAY/PARKING STRIPER

34.37 **11.38**

Shift Differential

(Add $1.50 to base rate for shifts that start between 3:00pm and 4:00am)

TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE	TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE

IRONWORKER

Zone 1 (Base Rate): **36.71** **24.16**

Zone Differential for Ironworker
(Add to Basic Hourly Rate)

Zone 2 **3.75/**hr. or $30.00 maximum per day
Zone 3 **6.88**/hr. or $55.00 maximum per day
Zone 4 **9.38/**hr. or $75.00 maximum per day

Zone 1: Projects located within 45 miles of city hall in the reference cities listed below.
Zone 2: More than 45 miles, but less than 60 miles.
Zone 3: More than 60 miles, but less than 100 miles.
Zone 4: More than 100 miles.

Note: Zone pay for Ironworkers shall be determined using AAA road mileage computed from the city hall of the reference cities listed below **or** the residence of the employee, whichever is nearer to the project.

Reference Cities

Medford Portland

LABORER

Zone A (Base Rate):

Group 1 **27.72** **13.82**
Group 2 **28.77** **13.82**
Group 3 **23.96** **13.82**

Note: A Hazardous Waste Removal Differential must be added to the base rate if work is performed inside the boundary of a Federally Designated Hazardous Waste Site. A Group 1 base rate is used for General Laborer on such a site. For further information on this, call the Prevailing Wage Rate Coordinator at (971) 673-0839.

Zone Differential for Laborers
(Add to Zone A Base Rate)

Zone B **.85** per hour
Zone C **1.25** per hour
Zone D **2.00** per hour
Zone E **3.00** per hour
Zone F **5.00** per hour

Zone A: Projects located within 30 miles of city hall in the reference cities listed.
Zone B: More than 30 miles but less than 40 miles.
Zone C: More than 40 miles but less than 50 miles.
Zone D: More than 50 miles but less than 80 miles.

LABORER (continued)

Zone E: More than 80 miles but less than 100 miles.
Zone F: More than 100 miles.

Reference Cities for Laborer

Albany	Burns	Hermiston	Roseburg
Astoria	Coos Bay	Klamath Falls	Salem
Baker City	Eugene	Medford	The Dalles
Bend	Grants Pass	Portland	

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time, best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

LIMITED ENERGY ELECTRICIAN

Area 1 **20.00** **8.85**

Reference Counties Area 1

Malheur

Area 2 **31.50** **18.35**

Reference Counties Area 2

Baker	Grant	Umatilla	Wallowa
Gilliam	Morrow	Union	Wheeler

Area 3 **27.15** **14.81**

Reference Counties Area 3

Coos	Douglas (a)	Lincoln
Curry	Lane (a)	

(a) Those portions of Lane and Douglas lying **west** of a line running North and South from the NE corner of Coos County to the SE corner of Lincoln County.

TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE

LIMITED ENERGY ELECTRICIAN (continued)

Area 4	**28.88**	**14.37**

Reference Counties Area 4

Benton	Jefferson	Marion
Crook	Lane (b)	Polk
Deschutes	Linn	Yamhill (c)

(b) That portion of Lane County lying **east** of a line running North and South from the NE corner of Coos County to the SE corner of Lincoln County.

(c) South half

Area 5	**31.50**	**18.35**

Reference Counties Area 5

Clackamas	Hood River	Tillamook	Yamhill (d)
Clatsop	Multnomah	Wasco	
Columbia	Sherman	Washington	

(d) North Half

Area 6	**24.65**	**12.13**

Reference Counties Area 6

Douglas (e)	Jackson	Klamath
Harney	Josephine	Lake

(e) That portion of Douglas County lying **east** of a line running North and South from the NE corner of Coos County to the SE corner of Lincoln County.

LINE CONSTRUCTOR

Area 1

Group 1	**55.15**	**16.95**
Group 2	**49.24**	**16.71**
Group 3	**29.44**	**11.51**
Group 4	**42.35**	**13.24**
Group 5	**36.93**	**12.48**
Group 6	**32.09**	**12.28**
Group 7	**17.14**	**9.06**

Reference Counties Area 1

All counties except Malheur County

LINE CONSTRUCTOR (continued)

Area 2

Cable Splicer	**48.72**	**15.32**
Journeyman Lineman	**44.12**	**14.89**
Line Equip. Operator	**36.69**	**14.08**
Groundman	**26.05**	**11.83**

Reference County Area 2

Malheur County

MARBLE SETTER	**35.79**	**20.10**

(This trade is tended by "Tile, Terrazzo, & Marble Finishers")

PAINTER & DRYWALL TAPER

COMMERCIAL PAINTING	**22.52**	**10.38**
INDUSTRIAL PAINTING	**23.72**	**10.38**
BRIDGE PAINTING	**27.77**	**10.38**

(Add $0.75 to base rate for work over 60 ft. high on swing stage, mechanical climber, spider or bucket truck for all wage classifications)

(Add $0.60 to base rate for sandblasting, spray painting and working in confined spaces)

DRYWALL TAPER

Zone A (Base Rate)

34.48 **13.94**

Zone Differential for Drywall Taper
(Add to Zone A Base Rate)

Zone B	**.85** per hour
Zone C	**1.25** per hour
Zone D	**1.70** per hour
Zone E	**2.00** per hour
Zone F	**3.00** per hour
Zone G	**5.00** per hour

PAINTER & DRYWALL TAPER (continued)

Reference Cities and Dispatch Points for Drywall Taper

Astoria	Burns	Medford	The Dalles
Bend	Longview	Pendleton	

Local #10
11105 NE Sandy Blvd.
Portland, OR 97220

Local #24
2659 Commercial St. SE
Salem, OR 97302

Local #1277
541 Willamette, Suite 105
Eugene, OR 97402

Zone A: Projects located within 30 miles of the respective city hall of the reference cities and dispatch points listed.
Zone B: More than 30 miles, but less than 40 miles.
Zone C: More than 40 miles, but less than 50 miles.
Zone D: More than 50 miles, but less than 60 miles.
Zone E: More than 60 miles, but less than 70 miles.
Zone F: More than 70 miles, but less than 100 miles.
Zone G: More than 100 miles.

PLASTERER AND STUCCO MASON

(This trade is tended by "Tenders to Plasterers")

Zone A (Base Rate)

Plasterer	**28.12**	**18.48**
Swinging Scaffold	**29.12**	**18.48**
Nozzleman	**30.12**	**18.48**

Zone Differential for Plasterer and Stucco Mason
(Add to Zone A Base Rate)

Zone B	**.85** per hour
Zone C	**1.25** per hour
Zone D	**1.70** per hour
Zone E	**2.00** per hour
Zone F	**3.00** per hour
Zone G	**5.00** per hour
Zone H	**10.50** per hour for 8 hours

Zone A: Projects located within 30 miles of the respective city hall of the reference cities listed below.
Zone B: More than 30 miles, but less than 40 miles.
Zone C: More than 40 miles, but less than 50 miles.
Zone D: More than 50 miles, but less than 60 miles.
Zone E: More than 60 miles, but less than 70 miles.
Zone F: More than 70 miles, but less than 100 miles.
Zone G: More than 100 miles, but less than 300 miles.
Zone H: More than 300 miles.

PLASTERER AND STUCCO MASON (continued)

Reference Cities for Plasterer & Stucco Mason

Bend	Medford	Salem
Eugene	Portland	

PLUMBER/PIPEFITTER/STEAMFITTER

Area 1	**28.00**	**14.32**

Reference Counties Area 1

Baker	Harney (a)	Malheur

(a) Except that portion which lies North and West of a North-South line drawn from the town of John Day to a point five miles east of the town of Burns and three miles South of Burns thence on an airline through the town of Wagontire West to the county line.

(Add $2.21 to base rate if it is possible for worker to fall 30 ft. or more, or if required to wear a fresh-air mask or similar equipment for 2 hours or more)

Zone Differential for Area 1
Plumbers/Pipefitters/Steamfitters
(Add to Base Rate)

Zone 1	**2.50** per hour
Zone 2	**3.50** per hour
Zone 3	**5.00** per hour

Zone mileage based on road miles:
Zone 1: Forty (40) to fifty five (55) miles from City Hall in Boise, Idaho.
Zone 2: Fifty five (55) to one hundred (100) miles from City Hall in Boise, Idaho.
Zone 3: Over one hundred (100) miles from City Hall in Boise, Idaho.

There shall be a maximum of ten (10) hours of zone pay per workday.

Area 2	**49.24**	**29.09**

Reference Counties Area 2

Grant	Umatilla	Wallowa
Morrow	Union	

TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE	TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE

PLUMBER/PIPEFITTER/STEAMFITTER (continued)

Zone Differential for Area 2
(Add to Base Rate)

Zone 2 **10.62/**hr. not to exceed $80.00 day.

Zone mileage based on road miles:

Zone 2: Eighty (80) miles or more from City Hall in Pasco, Washington.

(Add $1.00 to base rate if it is possible for worker to fall 35 ft. or more, or if required to wear a fresh-air mask or similar equipment for 1 hour minimum increments)

Area 3	**42.83**	**27.02**

Reference Counties Area 3

Benton	Deschutes	Klamath	Polk
Clackamas	Douglas	Lake	Sherman
Clatsop	Gilliam	Lane	Tillamook
Columbia	Hood River	Lincoln	Wasco
Coos	Jackson	Linn	Washington
Crook	Jefferson	Marion	Wheeler
Curry	Josephine	Multnomah	Yamhill

POWER EQUIPMENT OPERATOR

Zone 1 (Base Rate)

Group 1	**39.90**	**14.10**
Group 1A	**41.90**	**14.10**
Group 1B	**43.89**	**14.10**
Group 2	**37.99**	**14.10**
Group 3	**36.84**	**14.10**
Group 4	**35.76**	**14.10**
Group 5	**34.52**	**14.10**
Group 6	**31.30**	**14.10**

(Group 4 Tunnel Boring Machine Mechanic add $10.00/hour hyperbaric pay)

Note: A Hazardous Waste Removal Differential must be added to the base rate if work is performed inside the boundary of a Federally Designated Waste Site. For information on this differential, call the Prevailing Wage Rate Coordinator at (971) 673-0839.

(Add $0.40 to the base rate for any and all work performed underground, including operating, servicing and repairing of equipment)

(Add $0.50 to the base rate per hour for any employee who works suspended by a rope or cable)

POWER EQUIPMENT OPERATOR (continued)

(Add $0.50 to the base rate for employees who do "pioneer" work (break open a cut, build road, etc.) more than one hundred fifty (150) feet above grade elevation)

Shift Differential

Two-Shift Operations:

On a two shift operation, when the second shift starts after 4:30 p.m., second-shift workers shall be paid the base hourly wage rate plus 5% for all hours worked.

When the second shift starts at 8:00 p.m. or later, the second-shift workers shall be paid at the base hourly wage rate plus 10% for all hours worked.

Three-Shift Operations:

On a three-shift operation, the base hourly wage rate plus five percent (5%) shall be paid to all second-shift workers for all hours worked, and the base hourly wage rate plus ten percent (10%) shall be paid to all third shift workers for all hours worked.

Zone Pay Differential
(Add to Zone 1 Base Rate)

Zone 2	**3.00** per hour
Zone 3	**6.00** per hour

For projects in the following metropolitan counties:

Clackamas	Marion	Washington
Columbia	Multnomah	Yamhill

See map on page 51 for Zone 1 of this classification

(A) All jobs or projects located in Multnomah, Clackamas and Marion counties, West of the western boundary of Mt. Hood National Forest and West of Mile Post 30 on Interstate 84 and West of Mile Post 30 on State Hwy 26 and West of Mile Post 30 on Hwy 22 and all jobs located in Yamhill County, Washington County and Columbia County shall receive Zone 1 pay for all classifications.

(B) All jobs or projects located in the area outside the *identified boundary* above, but less than 50 miles from the Portland City Hall shall receive Zone 2 pay for all classifications.

(C) All jobs or projects located more than 50 miles from the Portland City Hall, but outside the identified border above, shall receive Zone 3 pay for all classifications.

TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE

POWER EQUIPMENT OPERATOR (continued)

Reference cities for projects in all remaining counties:

Albany	Coos Bay	Grants Pass	Medford
Bend	Eugene	Klamath Falls	Roseburg

(A) All jobs or projects located within 30 miles of the respective city hall of the above mentioned cities shall receive Zone 1 pay for all classifications.

(B) All jobs or projects located more than 30 miles and less than 50 miles from the respective city hall of the above mentioned cities shall receive Zone 2 for all classifications.

(C) All jobs or projects located more than 50 miles from the respective city hall of the above mentioned cities shall receive Zone 3 pay for all classifications.

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time-best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

ROOFER

Area 1

Roofer	**28.53**	**17.42**
Handling coal tar pitch	**31.38**	**17.42**
Remove fiberglass insulation	**31.38**	**17.42**

Reference Counties Area 1

Baker	Gilliam	Multnomah	Washington
Clackamas	Grant	Sherman	Wheeler
Clatsop	Hood River	Tillamook	
Columbia	Jefferson	Wasco	

Area 2

Roofer	**25.55**	**14.49**
Handling coal tar pitch	**27.55**	**14.49**
Remove fiberglass insulation	**27.05**	**14.49**

ROOFER (continued)

Reference Counties Area 2

Benton	Douglas	Lake	Marion
Coos	Harney	Lane	Polk
Crook	Jackson	Lincoln	Yamhill
Curry	Josephine	Linn	
Deschutes	Klamath	Malheur	

Area 4

Roofers	**26.11**	**11.73**

Reference Counties Area 4

Umatilla Union Wallowa

(Add $2.00 to basic hourly rate for employees working with irritable bituminous materials)

(Add $2.00 to basic hourly rate for employees removing fiberglass insulation)

Area 5

Roofers	**25.92**	**11.78**

Reference County for Area 5

Morrow

(Add $3.00 to base rate for employees working with irritable and pitch bituminous materials)

SHEET METAL WORKER

Area 1	**38.11**	**19.82**

Reference Counties Area 1

Benton	Grant	Multnomah	Washington
Clackamas	Hood River	Polk	Wheeler
Clatsop	Lincoln	Sherman	Yamhill
Columbia	Linn	Tillamook	
Gilliam	Marion	Wasco	

(Add $1.00 to base rate for work performed on any swinging platform, swinging chair or swinging ladder)

(Add $1.00 to base rate for work where a worker is exposed to resins, chemicals or acid)

TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE

SHEET METAL WORKER (continued)

Area 2 **24.41** **16.74**

Reference Counties Area 2

Baker Malheur

(Add $1.75 to base rate for work performed in an area where epoxy resins or other injurious chemicals are being applied)

Area 3 **34.00** **21.49**

Reference Counties Area 3

Morrow Umatilla Union Wallowa

(Add $1.00 to base rate for work where it is necessary to wear a chemically activated type face mask)

Area 4 **31.57** **17.90**

Reference Counties Area 4

Douglas Lane

(Add $1.00 to base rate for work performed on any swinging platform, swinging chair or swinging ladder)

(Add $1.00 to base rate for work where a worker is exposed to resins, chemicals or acid)

Area 5 **31.73** **18.69**

Reference Counties Area 5

Coos

(Add $1.00 to base rate for work performed on any swinging platform, swinging chair or swinging ladder)

(Add $1.00 to base rate for work where a worker is exposed to resins, chemicals or acid)

Area 6 **26.86** **17.02**

Reference Counties Area 6

Curry	Jackson	Klamath
Harney	Josephine	Lake

(Add $1.00 to base rate for work performed on any swinging platform, swinging chair or swinging ladder)

SHEET METAL WORKER (continued)

(Add $1.00 to base rate for work where a worker is exposed to resins, chemicals or acid)

Area 7 **29.45** **16.65**

Reference Counties Area 7

Crook Deschutes Jefferson

(Add $1.00 to base rate for work performed on any swinging platform, swinging chair or swinging ladder)

(Add $1.00 to base rate for work where a worker is exposed to resins, chemicals or acid)

SOFT FLOOR LAYER **26.91** **15.84**

SPRINKLER FITTER

Area 1 **36.06** **21.30**

Reference Counties Area 1

Benton	Deschutes	Klamath	Polk
Clackamas	Douglas	Lake	Sherman
Clatsop	Harney	Lane	Tillamook
Columbia	Hood River	Lincoln	Wasco
Coos	Jackson	Linn	Washington
Crook	Jefferson	Marion	Wheeler
Curry	Josephine	Multnomah	Yamhill

Area 2 **31.75** **21.20**

Reference Counties Area 2

Baker	Grant	Morrow	Union
Gilliam	Malheur	Umatilla	Wallowa

TENDERS TO MASON TRADES (Brick and Stonemason, Mortar Mixer, Hod Carrier)

29.70 **13.85**

(Add $0.50 to base rate for Refractory work)

TENDER TO PLASTERER AND STUCCO MASON

Zone A (Base Rate) **29.72** **14.04**

TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE	TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE

TENDER TO PLASTERER AND STUCCO MASON
(continued)

Zone Differential
(Add to Zone A Base Rate)

Zone B	**.85** per hour
Zone C	**1.25** per hour
Zone D	**1.70** per hour
Zone E	**2.00** per hour
Zone F	**3.00** per hour
Zone G	**5.00** per hour

Zone A: Projects located within 30 miles of city hall in the reference cities listed.
Zone B: More than 30 miles but less than 40 miles.
Zone C: More than 40 miles but less than 50 miles.
Zone D: More than 50 miles but less than 60 miles.
Zone E: More than 60 miles but less than 70 miles.
Zone F: More than 70 miles but less than 100 miles.
Zone G: More than 100 miles.

Reference Cities

Astoria	Coos Bay	Medford	Roseburg
Bend	Eugene	Pendleton	Salem
Corvallis	Klamath Falls	Portland	The Dalles

(Add $0.50 to base rate for Refractory work)

TESTING AND BALANCING (TAB) TECHNICIAN

Air-Handling Equipment, Ductwork

See SHEET METAL WORKER

Water Distribution Systems

See PLUMBER/PIPEFITTER/STEAMFITTER

TILESETTER/TERRAZZO WORKER: Hard Tilesetter

30.55 18.37

(This trade is tended by "Tile, Terrazzo, & Marble Finisher")

(Add $1.00 to base rate when working with a safety belt)

(Add $1.00 to base rate if work involves epoxy, furnane, alkor or acetylene black grouting)

TILE, TERRAZZO, AND MARBLE FINISHER

1. TILE, TERRAZZO FINISHER
23.13 13.56

(Add $1.00 to base rate when working with a safety belt)

(Add $1.00 to base rate if work involves epoxy, furnane, alkor or acetylene black grouting)

2. BRICK AND MARBLE FINISHER
23.13 13.69

(Add $1.00 to base rate for Refractory work)

TRUCK DRIVER

Zone A (Base Rate):

Group 1	**27.60**	**14.37**
Group 2	**27.72**	**14.37**
Group 3	**27.85**	**14.37**
Group 4	**28.12**	**14.37**
Group 5	**28.34**	**14.37**
Group 6	**28.51**	**14.37**
Group 7	**28.71**	**14.37**

Zone differential for Truck Drivers
(Add to Zone A Base Rate)

Zone B	**.65** per hour
Zone C	**1.15** per hour
Zone D	**1.70** per hour
Zone E	**2.75** per hour

Zone A: Projects within 30 miles of the cities listed.
Zone B: More than 30 miles but less than 40 miles.
Zone C: More than 40 miles but less than 50 miles.
Zone D: More than 50 miles but less than 80 miles.
Zone E: More than 80 miles.

Reference Cities

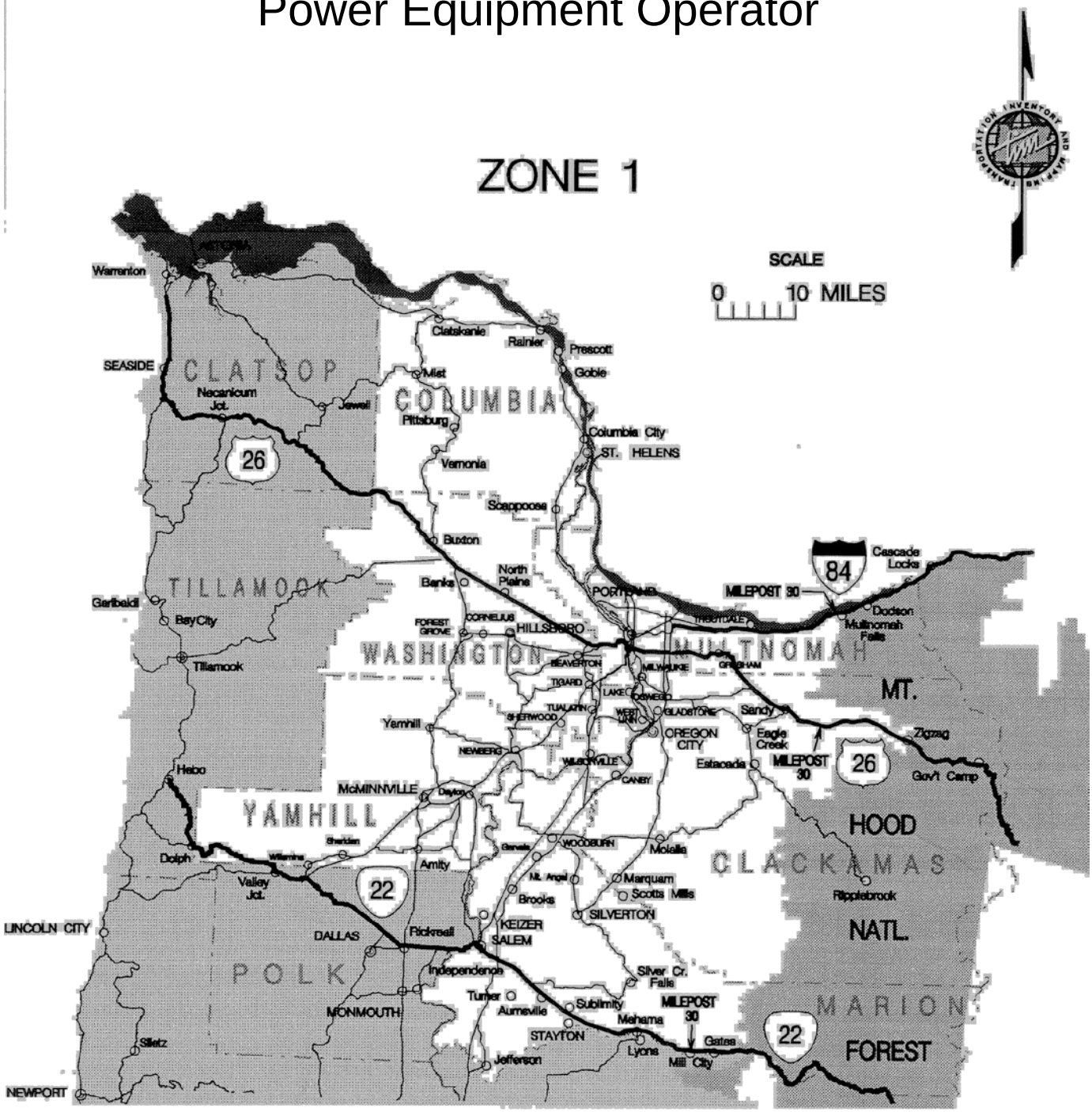
Albany	Eugene	Madras	Reedsport
Astoria	Goldendale	Medford	Roseburg
Baker	Grants Pass	McMinnville	Salem
Bend	Hermiston	Newport	The Dalles
Bingen	Hood River	Ontario	Tillamook
Brookings	Klamath Falls	Oregon City	Vancouver
Burns	LaGrande	Pendleton	
Coos Bay	Lakeview	Portland	
Corvallis	Longview	Port Orford	

TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE	TRADE	HOURLY BASE RATE	HOURLY FRINGE RATE

TRUCK DRIVER (continued)

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time-best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Power Equipment Operator



LIST OF CONTRACTORS INELIGIBLE
TO RECEIVE PUBLIC WORKS CONTRACTS
PUBLICATION DATE: JANUARY 1, 2017

To: All Oregon Contracting Agencies

Pursuant to ORS 279C.860, contractors on this list are ineligible to receive public works contracts subject to the Prevailing Wage Rate Law. These contractors and subcontractors, as well as any firm, corporation, partnership or association in which the contractor or subcontractor has a financial interest are ineligible to receive public works contracts until removed from this list.

If you have questions regarding the list or for the most current information regarding persons ineligible to receive prevailing wage contracts, please contact the Prevailing Wage Rate Coordinator in Portland at (971) 673-0839.

	CONTRACTOR NAME	DATE PLACED	REMOVAL DATE
1.	**A D Traffic Control Services, LLC** 309 S. McLoughlin Blvd. Oregon City, OR 97045	August 24, 2015	August 23, 2018
2.	**Affordable Safe and Professional Flagging, LLC** 305 NE 6th Street Grants Pass, OR 97526	September 17, 2012	September 16, 2017
3.	**ASAP Flagging & Traffic Control, Inc.** 11681 Sumner Street, Suite A Portland, OR 97220	September 17, 2012	September 16, 2017
4.	**Beaver Flagging** 2239 Dakota Street Eugene, OR 97404	November 25, 2009	November 24, 2019
5.	**Christy C. Beaver** 2570 River Road Eugene, OR 97404	November 25, 2009	November 24, 2019
6.	**Kimberly Bell-Eddy** 8535 Woodard Ave SE Salem, OR 97317	January 12, 2016	January 11, 2023
7.	**BSD OR WA. LLC** 2951 NW Division St., Ste110 Gresham, OR 97030	February 11, 2016	February 10, 2019
8.	**Bill Butler** 4355 SE 10th Drive Gresham, OR 97080	January 22, 2016	January 21, 2019
9.	**Cameron Creations** **Steven Cameron** **Nancy Cameron** PO Box 2 Lowell, OR 97452	May 25, 2000	Not to be Removed
10.	**Diane Marie Cina** 20630 Boulderfield Avenue Bend, OR 97701	March 7, 2014	March 6, 2017
11.	**Timothy Covington** 1000 NE 122nd Street, Suite B-13 Portland, OR 97230	September 17, 2012	September 16, 2017

LIST OF CONTRACTORS INELIGIBLE
TO RECEIVE PUBLIC WORKS CONTRACTS
PUBLICATION DATE: JANUARY 1, 2017

	CONTRACTOR NAME	DATE PLACED	REMOVAL DATE
12.	**Kelly Cunningham** 4355 SE 120th Drive Gresham, OR 97080	January 22, 2016	January 21, 2019
13.	**Randall D. David** 35491 Laura Lane SE Albany, OR 97321	January 15, 2016	January 14, 2019
14.	**Demolition Contractors, Inc.** PO Box 4010 19650 SW Teton Ave Tualatin, OR 97062	February 15, 2016	February 15, 2018
15.	**Amanda Dawn Denton Olsen-Smith** PO Box 1058 Willamina, OR 97080	February 11, 2016	February 10, 2019
16.	**Diamond Concrete, Inc.** PO Box 1627 Lake Oswego, OR 97035	April 4, 2014	April 3, 2017
17.	**DNB Painting, Inc.** 35491 Laura Lane SE Albany, OR 97321	January 15, 2016	January 14, 2019
18.	**Robert Donily** 19650 SW Teton Ave Tualatin, OR 97062	February 15, 2016	February 15, 2018
19.	**Elite Contract Flooring, LLC** 15192 SE Bradford Road Clackamas, OR 97015	March 25, 2014	March 24, 2017
20.	**Rocky Evans** 3333 NW Elm Avenue Redmond, OR 97756	April 10, 2014	April 9, 2017
21.	**Final Touch NW Inc.** PO Box 169 2245 Crestview Drive West Linn, OR 97068	January 8, 2015	January 7, 2018
22.	**GNC Construction Services, LLC** 309 S. McLoughlin Blvd. Oregon City, OR 97045	July 21, 2015	July 20, 2018
23.	**H. & L. Corporation** 13711 NE Laurin Rd. Vancouver, WA 98662	January 30, 2015	January 29, 2018
24.	**Hard Rock Concrete, Inc.** 3333 NW Elm Avenue Redmond, OR 97756	April 10, 2014	April 9, 2017

LIST OF CONTRACTORS INELIGIBLE
TO RECEIVE PUBLIC WORKS CONTRACTS
PUBLICATION DATE: JANUARY 1, 2017

	CONTRACTOR NAME	DATE PLACED	REMOVAL DATE
25.	**High Mountain Plumbing Company** 20630 Boulderfield Avenue Bend, OR 97701	March 7, 2014	March 6, 2017
26.	**K & O Contracting, LLC** 5050 SW 198th Avenue Aloha, OR 97007	April 11, 2014	April10, 2017
27.	**Kim Bell Flagging, Inc.** 8535 Woodard Ave SE Salem, OR 97317	January 12, 2016	January 11, 2023
28.	**KO Construction, LLC** 10736 SE Hwy 212 Clackamas, OR 97015	April 11, 2014	April 10, 2017
29.	**Peter G. Lupachev** **aka Peter Lupachov** 4536 SE Stark Street Portland, OR 97239	November 2, 2015	November 1, 2018
30.	**Mountain View Flagging, Inc.** 1122 NE 122nd Ave Portland, OR 97230	September 26, 2016	September 25, 2019
31.	**Sang In Nam** **dba Cornerstone Janitorial Services** 130 NE Danbury Ave Hillsboro, OR 97124	September 20, 2016	Not to be Removed
32.	**Noland Enterprises, Inc.** 601 NW McDonald Road Prineville, OR 97754	June 6, 2016	June 5, 2019
33.	**Debbie Noland** 601 NW McDonald Road Prineville, OR 97754	June 6, 2016	June 5, 2019
34.	**James Noland** 601 NW McDonald Road Prineville, OR 97754	June 6, 2016	June 5, 2019
35.	**Eric James O'Malley** PO Box 1627 Lake Oswego, OR 97035 9301 SW Sagert St. Apt 127 Tualatin, OR 97062	April 4, 2014	April 3, 2017
36.	**A.J. Olsen-Smith** **aka Alex James Olsen-Smith** **aka Alex J. Olsen** PO Box 1058 Willamina, OR 97080	February 11, 2016	February 10, 2019

LIST OF CONTRACTORS INELIGIBLE
TO RECEIVE PUBLIC WORKS CONTRACTS
PUBLICATION DATE: JANUARY 1, 2017

	CONTRACTOR NAME	DATE PLACED	REMOVAL DATE
37.	**Orcanco Commercial Construction, Inc.** 4355 SE 10th Drive Gresham, OR 97080	January 22, 2016	January 21,2019
38.	**Peter Construction, Inc.** **dba Peters Construction, Inc.** 4522 SW Water Ave., Suite 110 Portland, OR 97239	November 2,2015	November 1, 2018
39.	**Phoenix Construction Group, Inc.** 309 S. McLoughlin Blvd. Oregon City, OR 97045	August 24, 2015	August 23, 2018
40.	**Portland Flagging, LLC dba** **A D Traffic Control Services** 309 S. McLoughlin Blvd. Oregon City, OR 97045	August 24, 2015	August 23, 2018
41.	**Portland Safety Equipment, LLC** 309 S. McLoughlin Blvd. Oregon City, OR 97045	August 24, 2015	August 23, 2018
42.	**Bernadine Raiford** 424 NE Shaver Street Portland, OR 97212	September 26, 2016	September 25, 2019
43.	**Marco Antonio Rojas** 8855 SE 172nd Avenue Happy Valley, OR 97086	April 11, 2014	April 10, 2017
44.	**Mauricio Rojas-Osornio** 9006 SE Augustine Court Happy Valley, OR 97086	April 11, 2014	April 10, 2017
45.	**Colleen Runyon** 13711 NE Laurin Rd. Vancouver, WA 98662	January 30, 2015	January 29, 2018
46.	**Edward Runyon** 13711 NE Laurin Rd. Vancouver, WA 98662	January 30, 2015	January 29, 2018
47.	**Avian Samuel** PO Box 169 2245 Crestview Drive West Linn, OR 97068	January 8, 2015	January 7, 2018
48.	**Terrence Samuel** PO Box 169 PO Box 249 Wilsonville, OR 97070 2245 Crestview Drive West Linn, OR 97068	January 21, 2015	January 20, 2018

LIST OF CONTRACTORS INELIGIBLE
TO RECEIVE PUBLIC WORKS CONTRACTS
PUBLICATION DATE: JANUARY 1, 2017

	CONTRACTOR NAME	DATE PLACED	REMOVAL DATE
49.	**SBG Construction Services LLC** 309 S. McLoughlin Blvd. Oregon City, OR 97045	August 24, 2015	August 23, 2018
50.	**Kenya Smith** 309 S. McLoughlin Blvd. Oregon City, OR 97045	July 21, 2015	July 20, 2018
51.	**Alan Tatom** 168 Clearwater Avenue NE Salem, OR 97301	July 10, 2015	July 9, 2025
52.	**Tri-Star Flagging, LLC** 309 S. McLoughlin Blvd. Oregon City, OR 97045	August 24, 2015	August 23, 2018
53.	**Phillip Walker** 580 Market Street NE Salem, OR 97301	July 10, 2015	July 9, 2025
54.	**Willamette Plumbing and Mechanical, LLC** 1311 Doaks Ferry Road NW 1485 West Meadows Salem, OR 97304	February 3, 2014	February 2, 2017
55.	**Evan Williams** 309 S. McLoughlin Blvd. Oregon City, OR 97045	February 29, 2016	February 28, 2019
56.	**WWJD Traffic Control, Inc.** 168 Clearwater Avenue NE Salem, OR 97301	July 10, 2015	July 9, 2025

BRAD AVAKIAN, COMMISSIONER
OREGON BUREAU OF LABOR AND INDUSTRIES

PREVAILING WAGE RATE FORMS

WH-38	**Certified Payroll Form**
WH-39	**Public Works Fee Information Form**
WH-40	**Public Works Fee Adjustment Form**
WH-81	**Notice of Public Works**
WH-118	**Planned Public Improvement Summary**
WH-119	**Capital Improvement Cost Comparison Estimate**

BUREAU OF LABOR AND INDUSTRIES, PREVAILING WAGE RATE UNIT

INSTRUCTIONS FOR COMPLETING THE PREVAILING WAGE RATE PAYROLL/CERTIFIED STATEMENT FORM (WH-38)

The Payroll/Certified Statement form (WH-38) may be used by contractors for reporting their payroll as required by ORS 279C.845 on public works projects subject to the Prevailing Wage Rate (PWR) Law. Although this form has not been officially approved by the U.S. Department of Labor (US DOL), it is designed to meet the requirements of the federal Davis-Bacon Act. For projects associated with the U.S. Department of Housing and Urban Development (HUD), contact the public agency (owner) associated with the project for assistance with payroll reporting.

Contractors are not required to use the WH-38 form in reporting their payroll; however, the contractor must provide all of the information contained in the form, including the certified statement on page two. The certified statement must be signed by the contractor, certifying the accuracy of the information reported on the payroll, including representations pertaining to the provision of fringe benefits to employees by third parties, and must be submitted with each weekly payroll report. Detailed instructions concerning the preparation of the form follow:

Complete the top third of the form. Be sure to enter the date the contract was first advertised for bid. If you are not sure of this date, contact the public agency (owner) associated with the project. The "Payroll No." is a US DOL requirement and represents the number of weeks the contractor performed work on the project.

Column 1 – NAME AND ADDRESS: The employee's full name must be shown on each payroll submitted. The employee's address must also be shown on the first payroll submitted. The address need not be shown on subsequent payrolls submitted unless the address changes. The US DOL requires an employee identification number for each individual employee, on each payroll submitted. This number may be, but does not have to be, the last four digits of the employee's social security number.

Column 2 – CLASSIFICATION: For assistance in determining the correct classification, use the Bureau of Labor and Industries' (BOLI's) publication "Definitions of Covered Occupations for Public Works Contracts in Oregon." On the WH-38, list the classification that is most descriptive of the work actually performed by the employee. Give the group number for those classifications that include such information. Indicate which workers are apprentices, if any, and give their current percentage, classification, and group number when applicable. If an employee works in more than one classification, use the highest rate for all hours worked, or use separate line entries to show hours worked and hourly rates for each classification.

Column 3 – DAY AND DATE: Enter the day of the week (M, T, W, Th, F, S, and Sn) in the top row of boxes, and the corresponding date below.

HOURS WORKED EACH DAY: Enter the total number of straight time hours worked in the row marked "ST." Generally, hours worked over 8 in a day or work performed on Saturdays, Sundays, and legal holidays should be entered as overtime ("OT") hours worked. Contractors who have adopted and followed a written work schedule of four consecutive ten-hour days (Monday through Thursday or Tuesday through Friday) may enter hours worked over 10 in a day as overtime hours. For more information on overtime requirements, see the Contractor Responsibilities section of BOLI's publication, "*Prevailing Wage Rate Laws*."

Check the correct work schedule box to indicate the employee's weekly work schedule: 5/8 or 4/10. Enter the employee's regular hourly schedule for the week being reported next to the "Reg. Hrly. Schd:_____to_____." For example: 7:00 a.m. to 4:30 p.m.

Column 4 – TOTAL HOURS: Enter separately the total number of straight time and overtime hours worked by the employee (in each classification, if applicable) on the PWR project during the week. The total number of straight time hours worked should be entered in the lower box ("ST"); the total number of overtime hours worked should be entered in the top box ("OT").

Column 5 – HOURLY BASE RATE: Enter the hourly base rate (plus zone pay, if any) and the hourly overtime rate (plus zone pay, if any) paid to the employee in the appropriate straight time and overtime boxes. (Payment of not less than one and one half times the base rate of pay, including zone pay but not including fringe benefits, is required to be paid for overtime hours pursuant to ORS 279C.540). Generally, use the appropriate prevailing wage rates in effect at the time the contract was first advertised for bid by the public agency. If this date is not known, or if the project was not advertised for bid, contact the public agency (owner) associated with the project for assistance with applicable rates.

Column 6 – HOURLY FRINGE BENEFIT AMOUNT PAID AS WAGES TO THE EMPLOYEE: Enter hourly fringe benefit amounts paid directly to the employee as wages. (For overtime hours worked, it is not necessary to pay time and one half for the fringe benefit portion of the prevailing wage rate.)

Column 7 – GROSS AMOUNT EARNED: Enter the gross amount earned for work on the PWR project during the week. If part of the employee's wages for the pay period were earned on projects other than the project described on the WH-38, or if the employee is paid less often than on a weekly basis, enter in column 7 first the gross amount earned on the PWR project for the week, then the total gross amount earned for the pay period. For example: $567.84 / $1,267.27.

Column 8 – ITEMIZED DEDUCTIONS, FICA, FED, STATE, ETC.: Enter deductions withheld from wages for the pay period. All deductions must be in accordance with the provisions of ORS 652.610 (and as defined in Regulations, Part 3 (29 CFR Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. Stat. 967, 76 Stat. 357; 40 U.S.C 276c) on projects subject to Davis-Bacon Act). For projects subject to the Davis-Bacon Act, itemize the deductions.

Column 9 – NET WAGES PAID: Enter the total amount of net wages actually paid to the employee for the pay period. This figure can be calculated by subtracting the total deductions reported in Column 8 from the gross amount of wages for the pay period reported in the bottom portion of Column 7.

Column 10 – HOURLY FRINGE BENEFITS PAID TO BENEFITS PARTY, PLAN, FUND OR PROGRAM: Enter the hourly amount of fringe benefits paid to each individually approved party, plan, fund, or program, for each employee. List these amounts separately on the lines provided. Any contractor who is making payments to approved parties, plans, funds or programs in amounts less than the required hourly fringe benefit is obligated to pay the difference directly to the employee as wages in lieu of fringe benefits, and to show that amount in Column 6 of this form. For information on how to calculate hourly fringe benefit credits, see Appendix A in the BOLI's publication, "*Prevailing Wage Rate Laws*."

Column 11 – NAME OF BENEFIT PARTY, PLAN, FUND OR PROGRAM: Enter the name of the party, plan, fund, or program that corresponds to the amount paid as an hourly fringe benefit in Column 10.

CALCULATION CHECK

In order to determine whether the wages and fringe benefits paid are sufficient to meet prevailing wage rate requirements, the following check may be performed:

1. For each classification listed in column 2, compute the sum of:
   a) the hourly base rate of pay shown in Column 5,
   b) the hourly fringe benefit amount paid as wages to employee shown in Column 6, and
   c) the hourly fringe benefits paid to benefit party, plan, fund or program shown in Column 10.

2. This sum must equal or exceed the total of the hourly base rate (including zone pay) and the hourly fringe benefit rate for that classification as listed in the appropriate issue of BOLI's publication, *Prevailing Wage Rates for Public Works Contracts in Oregon*.

IF YOU HAVE QUESTIONS REGARDING COMPLETION OF THIS FORM, CONTACT THE PREVAILING WAGE RATE UNIT OF THE BUREAU OF LABOR AND INDUSTRIES AT (971) 673-0838.

NOTE: PAYROLL/CERTIFIED STATEMENTS ARE ONLY REQUIRED TO BE SUBMITTED TO THE PUBLIC AGENCY ASSOCIATED WITH THE PROJECT.

CERTIFIED PAYROLL AND OTHER FORMS ARE AVAILABLE ON OUR WEBSITE: WWW.OREGON.GOV/BOLI

BUREAU OF LABOR AND INDUSTRIES
WAGE AND HOUR DIVISION

PAYROLL/CERTIFIED STATEMENT FORM WH-38
FOR USE IN COMPLYING WITH ORS 279C.845*

PRIME CONTRACTOR ☐ SUBCONTRACTOR ☐ PAYROLL NO._____ FINAL PAYROLL ☐

Business Name (DBA): Phone: ( ) CCB Registration Number:

Project Name: Project Number: Type of Work:

Street Address: Project Location:

Mailing Address: Project County:

Date Pay Period Began: Date Pay Period Ended:

THIS SECTION FOR PRIME CONTRACTORS ONLY

Public Contracting Agency Name:
Phone: ( )
Date Contract Specifications First Advertised for Bid:
Contract Amount:

THIS SECTION FOR SUBCONTRACTORS ONLY

Subcontract Amount:
Prime Contractor Business Name (DBA):
Prime Contractor Phone: ( )
Prime Contractor's CCB Registration Number:
Date You Began Work on the Project:

(1)	(2)		(3) DAY AND DATE	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
NAME , ADDRESS AND EMPLOYEE'S IDENTIFICATION NUMBER	CLASSIFICATION (INCLUDE GROUP # AND APPRENTICESHIP STEP IF APPLICABLE)		HOURS WORKED EACH DAY	TOTAL HOURS	HOURLY BASE RATE	HOURLY FRINGE BENEFIT AMOUNTS PAID AS WAGES TO EMPLOYEE	GROSS AMOUNT EARNED (see directions)	ITEMIZED DEDUCTIONS FICA, FED, STATE, ETC.	NET WAGES PAID	HOURLY FRINGE BENEFITS PAID TO BENEFIT PARTY, PLAN, FUND, OR PROGRAM	NAME OF BENEFIT PARTY, PLAN, FUND, OR PROGRAM
		OT									
		ST									
		Schedule: 5/8 ☐ 4/10 ☐; Reg. Hrly. Schd: _____to_____.									
		OT									
		ST									
		Schedule: 5/8 ☐ 4/10 ☐; Reg. Hrly. Schd: _____to_____.									
		OT									
		ST									
		Schedule: 5/8 ☐ 4/10 ☐; Reg. Hrly. Schd: _____to_____.									
		OT									
		ST									
		Schedule: 5/8 ☐ 4/10 ☐; Reg. Hrly. Schd: _____to_____.									
		OT									
		ST									
		Schedule: 5/8 ☐ 4/10 ☐; Reg. Hrly. Schd: _____to_____.									

*Although this form has not been officially approved by the U.S. Department of Labor, it is designed to meet the requirements of both the state PWR law and the federal Davis-Bacon Act.

THIS FORM CONTINUED ON REVERSE

CERTIFIED STATEMENT

Date: _____

I, _____, _____
(NAME OF SIGNATORY PARTY) (TITLE)
do hereby state:
(1) That I pay or supervise the payment of the persons employed by:

_____
(CONTRACTOR, SUBCONTRACTOR OR SURETY)
on the _____; that during the payroll period
(BUILDING OR WORK)
commencing on the _____ day of _____, _____, and ending the _____ day
(MONTH) (YEAR)
of _____, _____, all persons employed on said project have been paid the
(MONTH) (YEAR)
full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said _____
(CONTRACTOR, SUBCONTRACTOR OR SURETY)
from the full weekly wages earned by any person, and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as specified in ORS 652.610, and as defined in Regulations, Part 3 (29 CFR Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. 276c), and described below:

_____

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for workers contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each worker conform with work performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a state apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a state, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

I HAVE READ THIS CERTIFIED STATEMENT, KNOW THE CONTENTS THEREOF AND IT IS TRUE TO MY KNOWLEDGE:

_____
(NAME AND TITLE)

_____
(SIGNATURE AND DATE)

In addition to completing sections (1) - (3), if your project is subject to the federal Davis-Bacon Act requirements, complete the following section as well:

(4) That:
(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS OR PROGRAMS

☐ - In addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in Section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ - Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in Section 4(c) below.

(c) EXCEPTIONS:

EXCEPTION (CRAFT) EXPLANATION

REMARKS:

NAME AND TITLE SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.

FILE THIS FORM WITH THE PUBLIC AGENCY ASSOCIATED WITH THE PROJECT
NOTE TO CONTRACTORS: YOU MUST ATTACH COPIES OF THIS FORM TO EACH OF YOUR PAYROLL SUBMISSIONS ON THIS PROJECT.
INSTRUCTIONS AND ADDITIONAL FORMS ARE AVAILABLE ON OUR WEBSITE: WWW.OREGON.GOV/BOLI.

CONTRACT FEE SECTION
PREVAILING WAGE RATE UNIT
BUREAU OF LABOR AND INDUSTRIES
800 N.E. OREGON ST., #1045
PORTLAND, OR 97232-2180
PHONE: (971) 673-0852
FAX: (971) 673-0769

For Office Use Only:

Project DB #:_____

PUBLIC WORKS FEE INFORMATION FORM

For use by public agencies that have contracted with a contractor on a public works project regulated by ORS 279C.800 to 279C.870, in compliance with ORS 279C.825. Also for use by public agencies that are a party to a public works project pursuant to ORS 279C.800(6)(a)(B), (C) (D) or (E).

PUBLIC AGENCIES: Please complete and mail this form to BOLI at the above address, along with the public works fee of one-tenth of one percent of the contract price (contract amount x .001), payable to BOLI. **The minimum fee is $250.00; the maximum fee is $7,500.00.** Without the following completed information, the bureau may be unable to properly credit you for payment received.

PUBLIC AGENCY: _____ **AGENCY #:** _____

AGENCY MAILING ADDRESS: _____

CITY, STATE, ZIP: _____

AGENCY CONTACT PERSON: _____ **PHONE: ( )** _____

PROJECT MANAGER NAME: _____ **PHONE: ( )** _____

PROJECT NAME: _____

CONTRACT NAME (if part of larger project): _____

PROJECT LOCATION: _____

PROJECT NO: _____ **DATE CONTRACT FIRST ADVERTISED:** _____

DATE CONTRACT AWARDED: _____ **CONTRACTOR CCB#:** _____

CONTRACTOR BUSINESS NAME (DBA): _____

CONTRACTOR ADDRESS: _____

CITY, STATE ZIP _____

CONTRACT AMOUNT: $_____ **FEE AMOUNT DUE/PAID: $**_____
If less than $50K, is it part of a larger project? ☐yes ☐no **Contract amount x .001 = fee due**

(Please duplicate this form for future use.)

CONTRACT FEE SECTION
PREVAILING WAGE RATE UNIT
BUREAU OF LABOR AND INDUSTRIES
800 N.E. OREGON ST., #1045
PORTLAND, OR 97232-2180
PHONE: (971) 673-0852
FAX: (971) 673-0769

For Office Use Only:

Project DB #:_____

PUBLIC WORKS FEE ADJUSTMENT FORM

THIS FORM TO BE USED FOR RECONCILIATION OF FEES UPON COMPLETION OF PUBLIC WORKS PROJECTS

(As required by ORS 279C.825 and OAR 839-025-0210)

PUBLIC AGENCIES: Complete and mail this form to BOLI at the above address after completion of the public work project and not less than 30 days after the final progress payment is made to the contractor. Public agencies are required to determine the final contract price, including all change orders or other adjustments to the original contract price, and to calculate the adjusted prevailing wage rate fee based on the revised contract price. Documentation must be included to support the final contract price. Documentation of the final contract price may consist of change orders or other contract documents substantiating the amount of the contract. The prevailing wage rate fee of one-tenth of one percent (.001) shall be applied to the final contract price, with credit taken for fees already submitted. The public agency must submit any additional fee payable to BOLI, or submit any request for refund, with this adjustment form. **THE MINIMUM FEE IS $250.00; THE MAXIMUM FEE IS $7,500.00. NO ADDITIONAL FEE IS REQUIRED TO BE PAID, AND REFUNDS WILL NOT BE MADE, IF THE BALANCE DUE OR THE REFUND DUE IS LESS THAN $100.00.**

PUBLIC AGENCY: _____ **AGENCY #:** _____

AGENCY CONTACT PERSON: _____ **PHONE :( )** _____

MAILING ADDRESS: _____

PROJECT NAME: _____

CONTRACT NAME (if part of larger project): _____

PROJECT NUMBER: _____ **PROJECT LOCATION:** _____

CONTRACTOR/BUSINESS NAME (DBA): _____

CONTRACTOR CCB#: _____ **DATE AWARDED:** _____

FINAL CONTRACT/PROJECT AMOUNT: _____ **FINAL FEE DUE:** _____
(Include all change orders and adjustments to the contract price) **(Final Contract amount X .001)**

ORIGINAL CONTRACT AMOUNT: _____ **INITIAL FEE PAID:** _____
(Original Contract amount X .001)

TOTAL ADJUSTMENT: _____ **BALANCE DUE*:** _____
or
REFUND DUE*: _____
***Final contract fee less initial fee paid**

Sample Calculation:			
Final Contract Amount:	**$ 400,000.00**	**Final Fee Due:**	**$ 400.00**
Original Contract Amount:	**- 300,000.00**	**Initial Fee Paid:**	**- 300.00**
Total Adjustment:	**$ 100,000.00**	**Additional Amount Due:**	**$ 100.00**

(Please duplicate this form for future use)

BUREAU OF LABOR AND INDUSTRIES
NOTICE OF PUBLIC WORKS

(For use by public agencies in complying with ORS 279C.835)

For Office Use Only:

Project DB #:_____

NOTE: ORS 279C.835 requires that public contracting agencies include with this form a copy of the disclosure of first-tier subcontractors submitted pursuant to ORS 279C.370.

PUBLIC AGENCY INFORMATION

Agency Name: _____

Agency Division:_____ Agency # (if known):_____

Address:_____

City, State, Zip:_____

Email Address: _____

Agency Representative: _____ Phone: _____

SECTION A: To be completed when a public agency awards a contract to a contractor for a public works project, including CM/GC projects. (See reverse for public works projects in which no public agency awards a contract to a contractor.)

CONTRACT INFORMATION:

Project Name: _____

Contract Name (if part of larger project): _____

Project #: _____ Contract #:_____

Project Manager Name:_____ Phone: _____ Fax:_____

Project Location (Street(s), City): _____ Project County: _____

Contract Amount: $_____ If under $50,000, is this contract part of a larger project? YES ☐ NO ☐

If yes, total project amount: $_____

Will project use federal funds that require compliance with the Davis-Bacon Act? YES ☐ NO ☐

Date Contract Specifications First Advertised for Bid (if not advertised, date of RFP or first contact with contractor): _____

OR If CM/GC Contract, Date Contract Became a Public Works Contract (see OAR 839-025-0020(6)): _____

Date Contract Awarded: _____ Date Work Expected to Begin: _____ Date Work Expected to be Complete: _____

PRIME CONTRACTOR INFORMATION:

Name: _____

Address: _____

City, State Zip:_____ Phone:_____

Construction Contractors Board Registration #: _____

Name of Bonding Company: _____

Address: _____

Agent Name: _____ Phone:_____

Payment Bond #: _____

☐ Copy of first-tier subcontractors attached (**see NOTE above**).

Signature of agency representative completing form: _____

Printed Name: _____ Phone: _____ Date:_____

Email Address:_____

THIS FORM WILL BE RETURNED TO THE PUBLIC AGENCY FOR CORRECTION AND RESUBMITTAL IF INCOMPLETE.

Complete this page for public works projects in which NO PUBLIC AGENCY AWARDS A CONTRACT TO A CONTRACTOR. Complete the CONTRACT INFORMATION *AND* SECTION B, C, D or E, whichever applies to the project.

CONTRACT INFORMATION:

Name of Project Owner: _____ Phone: _____

Project Name: _____ Project #: _____

Project Location (Street(s), City): _____ Project County: _____

Total Project Cost: $_____ Amount of Public Funds Provided for the project: $_____

Name(s) of Public Agency(ies) Providing Public Funds: _____

Will project use federal funds that require compliance with the Davis-Bacon Act? YES ☐ NO ☐

Date Work Expected to Begin: _____ Date Work Expected to be Complete: _____

SECTION B: **To be completed when a project is a public works pursuant to ORS 279C.800(6)(a)(B)** (a project for the construction, reconstruction, major renovation or painting of a road, highway, building, structure or improvement of any type **that uses $750,000 or more of funds of a public agency**).

Date the public agency or agencies committed to the provision of funds for the project: _____

SECTION C: **To be completed when a project is a public works pursuant to ORS 279C.800(6)(a)(C)** (a project for the construction of a privately owned road, highway, building, structure or improvement of any type **that uses funds of a private entity and in which 25 percent or more of the square footage of the completed project will be occupied or used by a public agency**).

Total square footage of privately owned road, highway, building, structure or improvement: _____

Percent of total square footage of the completed project that will be occupied or used by a public agency: _____

Date the public agency or agencies entered into an agreement to occupy or use the completed project: _____

SECTION D: **To be completed when a project is a public works pursuant to ORS 279C.800(6)(a)(D)** (a project that includes the construction or installation of a **device, structure or mechanism that uses solar radiation** on public property, regardless of project cost or whether the project uses funds of a public agency).

Date the public agency entered into an agreement for the project: _____

SECTION E: **To be completed when a project is a public works pursuant to ORS 279C.800(6)(a)(E)** (a project for the construction, reconstruction, major renovation or painting of a road, highway, building, structure, or improvement of any type that occurs, with or without using funds of a public agency, **on real property that the Oregon University System or an institution in the Oregon University System owns**).

Date the public agency entered into an agreement for the project: _____

Signature of agency representative completing form: _____

Printed Name: _____ Phone: _____ Date: _____

Email Address: _____

THIS FORM WILL BE RETURNED TO THE PUBLIC AGENCY FOR CORRECTION AND RESUBMITTAL IF INCOMPLETE.

RETURN THIS COMPLETED FORM TO:

Prevailing Wage Rate Unit • Bureau of Labor and Industries • 800 NE Oregon Street, #1045 • Portland, OR 97232-2180

Telephone (971) 673-0852 • FAX (971) 673-0769 • pwremail@boli.state.or.us

PLANNED PUBLIC IMPROVEMENT SUMMARY

FISCAL YEAR: _____ - _____ _____ **PAGE** _____ **OF** _____

(Name of State or Local Government Agency)

Project Number	Project Name	Project Type	Project Location	Estimated Project Cost	Agency or Contract Work

ORS 279C.305 requires that not less than 30 days prior to adoption of its budget for the subsequent budget period, each public agency shall prepare and file with the Commissioner of the Bureau of Labor and Industries a list of every public improvement known to the agency that the agency plans to fund in the budget period, identifying each improvement by name and estimating the total on-site construction costs. The list shall also contain a statement as to whether the agency intends to perform the construction by a private contractor. If the agency intends to perform construction work using the agency's own equipment and personnel on a project estimated to cost more than $125,000, the agency must also show that its decision conforms to the state's policy that public agencies make every effort to construct public improvements at the least cost to the public agency. Public agencies are required to keep and preserve a full, true and accurate account of the costs of performing the work, including all engineering and administrative expenses, and the cost, including investment costs, of any equipment used.

This form (WH-118) may be used to list planned public improvements. Form WH-119 (Capital Improvement Project Cost Comparison Estimate) may be used to report the agency's least cost analysis.

Completed forms should be mailed to:

Prevailing Wage Rate Unit
Wage and Hour Division, #1045
Bureau of Labor and Industries
800 N.E. Oregon St.
Portland, OR 97232-2180

CAPITAL IMPROVEMENT PROJECT COST COMPARISON ESTIMATE

_____
(Name of State or Local Government Agency)

DEPARTMENT: _____ **PROJECT NAME:** _____

PROPOSED YEAR: _____ **FUND:** _____

PROJECT DESCRIPTION: _____ **PROJECT NUMBER:** _____

Rough Quantity Estimates	Units	Work Class Description	Agency Force Estimate		Agency Contract Estimate	
			Unit Cost	Total Cost	Unit Cost	Total Cost
				$		$

ESTIMATED CONSTRUCTION PERIOD: _____

The above-named agency has determined that this project can be performed at the least cost by: ☐ **the Agency** ☐ **Contractor** (check one)

_____
(Signature of Agency Official)

ORS 279C.305 requires that not less than 30 days prior to adoption of its budget for the subsequent budget period, each public agency shall prepare and file with the Commissioner of the Bureau of Labor and Industries a list of every public improvement known to the agency that the agency plans to fund in the budget period, identifying each improvement by name and estimating the total on-site constructions costs. The list shall also contain a statement as to whether the agency intends to perform the construction by a private contractor. If the agency intends to perform construction work using the agency's own equipment and personnel on a project estimated to cost more than $125,000, the agency must also show that its decision conforms to the state's policy that public agencies make every effort to construct public improvements at the least cost to the public agency. Public agencies are required to keep and preserve a full, true and accurate account of the costs of performing the work, including all engineering and administrative expenses, and the cost, including investment costs, of any equipment used.

Form WH-118 (Planned Public Improvement Summary) may be used to list planned public improvements. This form (WH-119) may be used to report the agency's least cost analysis.

Completed forms should be mailed to:

Prevailing Wage Rate Unit
Wage and Hour Division, #1045
Bureau of Labor and Industries
800 N.E. Oregon St.
Portland, OR 97232-2180

The 2016 edition of the *Prevailing Wage Rate Laws* handbook are now available. One complimentary hard copy of each Prevailing Wage Rate (PWR) publication is available upon request by emailing BOLI at pwremail@boli.state.or.us or calling (971) 673-0838. Additional copies are available at cost, plus postage.

In addition to providing this and other PWR publications, the Bureau of Labor and Industries' PWR Unit regularly offers free, informational seminars for both public agencies and contractors. The current schedule is available online at http://www.oregon.gov/boli/WHD/PWR/docs/pwrsched.pdf.

Prior to responding below, please consider that all PWR-related information is available online at http://www.oregon.gov/BOLI/WHD/PWR/Pages/index.aspx. If you are interested in receiving the handbook and/or being included on our mailing lists for future seminar notifications, please complete the form below and return it to the bureau's PWR Unit. You may mail this form to the address on the opposite side of the form, or fax it to (971) 673-2372.

☐ Please send me the 2016 edition of the *Prevailing Wage Rate Laws* handbook.

☐ Please add me to the mailing list to receive information about BOLI PWR seminars.

☐ Please add me to the e-mailing list to receive information about BOLI PWR seminars.

_____

AGENCY OR CONTRACTOR BUSINESS NAME and PHONE NUMBER (Required)

_____

AGENCY OR CONTRACTOR BUSINESS E-MAIL ADDRESS (Please print clearly)

_____

MAILING ADDRESS

_____

CITY, STATE, ZIP

_____

NAME OF REPRESENTATIVE and PHONE NUMBER if different from above.

Apprentices and Trainees:
Apprentices and trainees may be employed on public works. To qualify as an apprentice or trainee, the worker must be registered in a bonafide apprenticeship or training program of the U.S. Department of Labor, Bureau of Apprenticeship and Training (BAT) or with any State Apprenticeship and Training Agency recognized by BAT. The apprentice or trainee is to receive all fringe benefits and a percentage of the journeyman's wage rate; the appropriate percentage shall be determined by the apprenticeship or training committee. All other workers must receive rates published.

Zone Pay:
In certain trades, the basic hourly rate of pay progressively increases based upon the distance between the job site and a designated landmark; this is commonly referred to as zone pay. To determine the hourly wage, find the correct zone based of the number of road miles the job site is from the closest city (based either on distance from city hall or from geographical center of the city, depending on the trade) and add the amount for that zone to the basic hourly wage upon which overtime is computed.

Bid Specifications:
The specifications for every public works contract must include the current prevailing wage rates in effect at the time the specifications are first advertised. A statement incorporating the existing rates by reference will not satisfy this requirement (ORS 279.352).

Fringe Benefits:
Payments for fringe benefits are in addition to the basic hourly rate. Fringe benefits means the amount for:

a) medical or hospital care; pensions on retirement or death; compensation for injuries or illness resulting from an occupational activity, or insurance to provide any of the foregoing;
b) unemployment benefits, life insurance, disability and sickness insurance or accident insurance
c) vacation and holiday pay;
d) defraying costs of apprenticeship or other similar programs; and
e) other such bona fide benefits.

NOTE: For the purpose of prevailing wage rates, fringe benefits do not include any benefits which may be required by federal, state or local law (e.g. Worker's Compensation, Unemployment Insurance, etc.).

Fringe benefits may be paid to the worker in cash or to a third party administering a fringe benefit program. When an hourly rate excess of the required base prevailing rate is paid, the amount by which the rate is exceeded may be credited toward payment of fringe benefits.

Where the determination of fringe benefits includes a percentage, the percentage refers to the basic hourly rate as determined by the Commissioner of the Bureau of Labor and Industries.

Overtime:
Workers employed on a public works job for more than eight hours in a day or 40 hours in a week must be paid overtime for each additional hour so worked (ORS 279.334). Overtime is calculated at no less than one and one-half times the basic hourly rate as determined by the Commissioner of Labor (not including fringe benefits which are paid at the straight rate for every hour worked). Work performed on Saturday, Sunday, or legal holidays must also be compensated at time and one-half. In the computation of overtime, travel pay need not be included but zone pay differentials do. Legal holidays include the following: 1) New Year's Day on January 1; 2) Memorial Day on the last Monday in May; 3) Independence Day on July 4; 4) Labor Day on the first Monday in September; 5) Thanksgiving Day on the fourth Thursday in November; 6) Christmas Day on December 25.
NOTE: Contractors who are signatory to a collective bargaining agreement may be subject to different overtime requirements.

Certification of Payroll:
The law requires every contractor and subcontractor to file certain information on wages paid to each worker employed on a public works contract. This statement must completely and accurately reflect payroll records for the work week immediately preceding the submission. A contractor or subcontractor must complete and

submit the certified statement contained on Form WH-38 as well as the information required on the weekly payroll side of the form.

The schedule for submitting payroll information is as follows: once before the first payment and once before the final payment is made to the contractor by the public contracting agency; in addition, for projects exceeding 90 days, filed with both the public contracting agency and the Wage and Hour Division, Bureau of Labor and Industries, 1400 SW Fifth Avenue, Portland, Oregon 97201. The payroll information must be kept by the contractor and/or subcontractor for three years.

END OF SECTION

PROJECT DESCRIPTION

In general, the project comprises a 30,980 square foot new building for the Marion County Sheriff's Office.

CONTRACT

In event work described herein is awarded, successful Bidder and Owner shall execute the following Contract:

Marion County standard construction contract.

WORK FURNISHED AND INSTALLED BY OWNER

Concurrently with Work of this Contract:

Telephone equipment installation
Low-Voltage cable installation and termination
Camera systems
Watchguard Antenna system
Furniture installation, unless otherwise noted
Appliance installation
Patio pavers and partial height wall per drawings

PRODUCTS FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR, IF ANY

Delivery:

By Owner.

Unloading:

By Owner.

Owner's Duties:

Arrange for and deliver necessary shop drawings.
Deliver product to site in accordance with approved construction schedule.
Inspect deliveries jointly with Contractor.
Submit claims for transportation damage.
Arrange for replacement of damaged, defective, missing, or otherwise unacceptable Items.
Arrange for manufacturer's required warranties, bond, service, and inspections.

Contractor's Duties:

Designate required delivery date for each Owner-furnished product.
Review any shop drawings, samples, and product data, and notify Architect about any anticipated discrepancies or problems.
Promptly inspect delivered products, and report any damage, defective items, or missing items.
Handle at site, including uncrating and storing.
Protect products against damage and discoloration.
Install, connect, adjust, and where scheduled, finish products.
Clean, repair and touch-up, or replace when directed, products including those of other sections which have been soiled, discolored, or damaged by this work.

OWNER'S PROJECT REPRESENTATIVE

The Owner's representative during the project will be:

Eric Eckfield, Project Manager
Day CPM Services
12745 SW Beaverdam Road, Ste. 120
Beavertion, Oregon 97005
Phone: (503) 729-4545

Allow access by the Project Representative to the project at all times.
Coordinate scheduling, personnel access, and equipment access to the building with the Project Representative.
Architect will provide contract administration services throughout project construction. All communications to the Owner shall be through the Owner's Project Representative.

WORK SEQUENCE

Work sequence shall be the responsibility of the contractor. Coordinate with Owner prior to start of construction.

WORK HOURS

Contractor shall schedule work during regular business hours, 7:00 a.m. to 6:00 p.m., Monday through Friday.

Disruptive work that creates excessive noise, traffic, or odors shall be scheduled after hours or on Saturday or Sunday. Before hours, after hours, or weekend work shall be prearranged and scheduled with the Owner's Project Representative.

Contractor may be asked to cease daytime work and to reschedule if it is found to interfere with the Owner's operations.

CONTRACTOR USE OF PREMISES

See Site Plan on Drawings for access to building area. Do not use other areas around building without approval from Owner's Project Representative.

Contractor to provide site plan showing staging, storage, trailer locations, contractor parking, etc. for review by Owner's Project Representative.

Except as noted on Drawings, do not use Owner's parking lot, driveways, and walks without prior approval from Owner.

GRADE LINES AND LEVELS

Contractor shall verify all setbacks, grades, and levels; and stay within the limits thereof.

PROTECTION OF PUBLIC

Construction site is to be isolated from the public by temporary chain link fencing.

Provide barriers around equipment located on the ground.

Provide warning signs where necessary to alert pedestrians and vehicle operators to potential hazards.

PROTECTION OF PROPERTY

Protect existing building, building contents, trees, shrubs, planting beds, pavement and other exterior areas from damage.

Protect building occupants, pedestrians, building, and building contents from damage due to work of this project.

Replace damaged property, where directed, at no additional cost to Owner.

Owner shall deduct the value of any damage from amount owed Contractor, or at Owner's option, Contractor may pay for repair or replacement directly.

PROTECTING EXISTING UTILITIES

Drawings indicate approximate location of any known, concealed utility lines. Before starting work, Contractor shall determine exact location of any of these lines that could be damaged by contract work.

Contractor shall assume that other, unknown utility lines do exist, and Contractor shall proceed with caution when working in areas that could conceal unknown utilities. If such utility lines are encountered, immediately request disposition instructions from Architect.

If utility lines are damaged; remove, repair or replace lines as directed. Additional compensation and/or extensions of time, if any, caused by removing, repairing, or replacing lines will be determined in accordance with the General Conditions.

PROJECT COORDINATION

General Contractor is responsible for overall coordination of trades. Mechanical and electrical contractors are responsible for coordinating with each other and making provisions in their work for the other's trade.

CODES

All work shall be in compliance with current state and local codes. General Contractor shall make available to all Sub-contractors, all reports and requirements issued by the building permit or subsequent inspections by the building officials.

PERMITS AND FEES

The Owner will pay the plan review fee, general building permit fee and systems development charges. The Contractor shall pay all other permit and use fees including, but not limited to: Specialty contractor fees and permit costs; public works fees and permits; plumbing, mechanical, electrical and related permits and fees; business license fees; permits and fees for work in public rights-of-way, temporary work, street closures, and utility taps. The Contractor shall be responsible for violations of law for any cause in

connection with the completion of the work. The Contractor shall be responsible for obstruction or damage to streets, sidewalks, utilities and other public or private improvements done in connection with completion of the work. Conform to applicable state, city and local codes and ordinances.

UNACCEPTABLE EXISTING CONDITIONS

Exposed to View:

Repair or replace as part of this work.

No additional payment by Owner will be made.

Concealed:

Repair or replace where necessary.

Upon notification from Contractor, Owner will issue change order authorizing Contractor to perform this work and contract sum will be adjusted accordingly.

END OF SECTION

SECTION INCLUDES
Submission procedures.
Documentation of changes to contract sum/price and contract time.

REQUIREMENTS
Alternates quoted on Bid Form will be reviewed and accepted or rejected at Owner's option. Accepted alternates will be identified in the Owner-Contractor Agreement. Coordinate related work and modify surrounding work to integrate the work of each alternate.

ALTERNATE BIDS
Alternate No. 1 – Patio Roof Cover, Columns, and Footings.
Base Bid Item: Provide footing for patio partial height wall. Exterior lap siding finish shall extend full height of wall to parapet.
Alternate Item: Provide finished roof structure with columns, footings, and associated work as shown on drawings.

Alternate No. 2 – Paving at Sheriff Parking Area.
Base Bid Item: Provide base rock and fine grading, adjust catch basins as required to prevent ponding of water.
Alternate Item: Provide asphalt paving and striping as indicated on drawings.

Alternate No. 3 – Patrol Vehicle Carport, Columns, and Footings.
Base Bid Item: Work not included in base bid.
Alternate Item: Provide finished roof structure with columns, footings and associated work as shown on drawings.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Contractor's requirements in the selection of products, manufacturers and procedures for consideration of proposal substitutions.

RELATED DOCUMENTS

"Marion County General Conditions for Public Improvement Contracts"

QUALIFICATIONS

Only approved substitutions may be used on contract work.

Each request for substitution approval shall include:

- Identity of product for which substitution is requested; include Specification page number.
- Identity of substitution; include product description, drawings, photographs, performance and test data, and any other information necessary for evaluation.
- Quality comparison of proposed substitution with specified product.
- Changes required in other work because of substitution.
- Effect on construction Progress Schedule.
- Cost comparison of proposed substitution with specified product.
- Any required license fees or royalties.
- Availability of maintenance service.
- Source of replacement materials.

SUBSTITUTIONS DURING BID PERIOD

No request for substitution approval will be considered unless written request in triplicate has been submitted on standard form bound herein, and has been received by Architect by 5:00 PM at least 10 calendar days prior to bid opening day.

Request submitted without self-addressed and stamped envelope will not be individually acknowledged.

Architect will issue Addenda prior to bid opening listing all approved substitutions.

SUBSTITUTIONS AFTER CONTRACT AWARD

Refer to "Marion County General Conditions for Public Improvement Contracts" for additional information on substitutions after contract award.

END OF SECTION

SUBSTITUTION REQUEST

TO:

PROJECT:

SPECIFIED ITEM:

Section **Page** **Paragraph** **Description**

PROPOSED SUBSTITUTION:

Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of request including identification of applicable data portions.

Attached data also includes description of changes to Contract Documents and proposed substitution requires for proper installation.

Undersigned certifies following items, unless modified by attachments, are correct:

1. Proposed substitution does not affect dimensions shown on drawings.
2. Undersigned pays for changes to building design, including engineering design, detailing, and
3. construction costs caused by proposed substitution.
4. Proposed substitution has no adverse effect on other trades, construction schedule, or specified warranty requirements.
5. Maintenance and service parts available locally or readily obtainable for proposed substitution.

Undersigned further certifies function, appearance, and quality of proposed substitution are equivalent or superior to specified item.

Undersigned agrees, if this page is reproduced, terms and conditions for substitutions found in Bidding Documents apply to this proposed substitution.

Submitted by:

Name (Printed or typed)	General Contractor (if after award of Contract)
Signature	For use by A/E ☐ Approved ☐ Approved as noted ☐ Not Approved ☐ Received too late
Firm Name	
Address	
City, State, Zip	By
Date	Date
Tel: Fax:	Remarks

July 1999

The Construction Specifications Institute
Northwest Region

Advancement of Construction Technology

_____
Owner (if after award of Contract)
Date _____

SECTION INCLUDES
Pre-bid meeting, pre-construction meeting, pre-installation conferences, progress meetings, and Requests for Information.

PRE-BID MEETING
Attendees:
Owner, Architect, Bidders, Sub-bidders, and Suppliers.
A written list of attendees will be prepared (sign-in sheet).
Agenda:
Introduction of parties involved, review of scope of project, overview of project requirements, review of project schedule, review of project budget, and questions from Bidders.
A walk-through of the existing building and project site will be conducted.
Architect will record meeting minutes and distribute minutes and copy of sign-in sheet to Owner and Bidders. Copies will be sent to other attendees upon request.

PRE-CONSTRUCTION MEETING
Meeting Requirements:
Owner, Architect, Contractor schedule date and time for a Preconstruction Site Meeting as soon as possible after Contractor receives signed contract or Notice to Proceed.
Attendees:
Contractor, Subcontractors, Suppliers, and Consultants deemed necessary by Architect and Contractor.
Agenda:
Schedule Progress Meetings.
Discuss lines of communication and methods on how to reduce possible miscommunications between parties involved. Reach conclusions and abide by them. Maintain communication and cooperation.
Discuss waste management plan and indoor air quality management plan.
Discuss hazardous materials.
Review list of subcontractors and suppliers.
Discuss Construction Progress Schedule and agree on date of publication.
Discuss critical scheduling requirements.
Discuss Contractor requirements.
Discuss Design-Build requirements if applicable.
Discuss procedures for Contractor's RFIs. Requirements as follows:
- Contact Architect for items apparently requiring immediate attention.
- If Contractor requires additional information, clarification, unforeseen conditions are encountered or suggestions for betterment of project, document apparent item, provide a due date and indicate whether additional time/cost or savings are involved and submit RFI on form at end of this Section. Prepare each RFI for a single subject matter.
- Record each RFI in a Log, identifying each RFI by number, subject, date submitted, date of response and disposition.
- Contractor may prepare RFI by copying or scanning form at end of this Section. Number each RFI numerically and record in log. Architect answers RFIs in a timely manner by written response on submitted RFI. If Change Order is indicated change order request prepared and forwarded to Contractor.
- Design Clarification/Verification Request (DCVR) or other forms are unacceptable.

Review procedures for processing shop drawings, product data, samples, field decisions, and change orders.
Review procedures for maintaining project record documents, security, deliveries, safety, housekeeping, and first aid.
Discuss procedures of work forces and working relations with Owner's staff and others.
Review use of site for parking, staging, temporary buildings and construction activities.
Schedule future meeting dates and times.

PRE-INSTALLATION CONFERENCES
Meeting Requirements:
Conduct Pre-installation Conference before each activity that requires coordination with other construction activities.
See each Specification Sections to verify if a pre-installation conference is required.
Attendees:

Architect, Contractor, Subcontractor(s) involved, manufacturer's representative if required by manufacturer and/or specifications. Code enforcement personnel if required by local codes.

Agenda:

Review progress of other activities and preparations for activity under consideration, including time schedules, manufacturer's preparation and installation recommendations, safety requirements, weather limitations, substrate acceptability, compatibility problems, and inspection and testing requirements. Contractor conducts and records significant discussions, agreements and disagreements of each conference. It is recommended that this meeting be held before or after Progress Meeting. Number and record meetings sequentially. Distribute meeting record to concerned parties including Architect and Owner within 72 hours after meeting.

PROGRESS MEETINGS

Meeting Requirements:

Contractor conducts Progress Meetings at weekly intervals.
Contractor prepares agenda and provides meeting minutes.
Weekly meetings, or as scheduled, conducted at jobsite.

Attendees:

Owner, Architect, Contractor, Consultants and Subcontractors deemed necessary by Architect and Contractor.

Agenda:

Review construction progress schedule.
Review last Meeting Minutes for accuracy. Correct items if needed.
Discuss old business and new business agenda items.
Review RFI log, ASI log, change order requests, and submittal log for current status.
Contractor distributes written minutes of each meeting to concerned parties, as determined, within 72 hours.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Submit shop drawings, product data, and samples required by Contract Documents.

RELATED DOCUMENTS

"Marion County General Conditions for Public Improvement Contracts".

DEFINITIONS

Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

Action Submittals: Written and graphic information and physical samples that require the Architect's responsive action. Action submittals are those submittals indicated in individual specification sections as action submittals.

Informational Submittals: Written and graphic information and physical samples that do not require the Design Professional's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual specification sections as informational submittals.

SPECIAL REQUIREMENTS

General:

Shop Drawings and Product Data shall be forwarded as electronic submittals in the form of PDF files. Electronic files may be forwarded by e-mail, or by interactive website services such as an FTP site, Smartsheet, or BlueBeam, established by the Contractor or the Contractors Project Information Management (PIM) software.

The electronic submittal process is not intended for color samples, color charts, or physical material samples.

Commissioning Authority will review submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with the Architect's review and approval.

Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

Submittal Schedule:

Designate in Construction Schedule, or in separate coordinated schedule, submission dates and dates that reviewed Shop Drawings, Product Data and Samples will be needed.

Once the submittal schedule has been developed by the Contractor, the Owner's Project Representative will identify those submittals that will require Marion County review.

Shop Drawings:

Identify Shop Drawing details by reference to drawing sheet, detail, schedule, or room number shown on contract drawings.

If shop drawings are not submitted as three-dimensional, provide detailed two-dimensional drawings.

Paper Copies: Sheet Size 8 1/2 X 11 inch, or folded to that size to facilitate filing.

Product Data:

Clearly mark each copy to identify pertinent products.

Show performance characteristics and capacities.

Show dimensions and required clearance.

Show wiring and piping diagrams, and controls.

Manufacturer's standard schematic drawings and diagrams:

- Modify to delete information not applicable to work.
- Supplement standard information to provide information specifically applicable to work.

Samples:

Size and quantity: See respective specification sections.

Show full range of color, texture, and pattern.

Deliver to Architect's office, unless otherwise specified.

Costs:
Cost of the project interactive website services shall be included in the Contractor's bid.
If using an FTP website or PIM software, Contractor shall provide training for Owner's representatives, Architect, and Architect's consultants, regarding use of website or PIM software.
Internet Service and Equipment Requirements:
- Email address and Internet access at Contractor's main office.
- Adobe Acrobat (www.adobe.com), Bluebeam PDF Revu (www.bluebeam.com), or other similar PDF review software for applying electronic stamps and comments. As an option, the project's interactive website provider shall provide free of charge to any party requesting it, a free downloadable PDF review software from their website.

CONTRACTOR'S RESPONSIBILITIES
Review Shop Drawings, Product Data, and Samples prior to submission.
Determine and verify:
- Field measurements.
- Field construction criteria.
- Catalog numbers and similar data.
- Conformance with specifications.

Comply with Contract Documents.
Coordinate each submittal with requirements of work.
Notify Architect in writing, at submission time, of any deviations in submittals from Contract Document requirements.
Contractor is responsible for providing submittals in one fully complete and vetted package. Failure to comply will cause the submittal to be returned to the Contractor for correction for proper submittal.
Perform no work or fabrication requiring submittal until Architect approves submittal.

SUBMISSION REQUIREMENTS
Make submittals promptly in accordance with approved Progress Schedule, and in such sequence as to cause no work delay.
Shop Drawings:
Submittal shall contain:
- Project title and names of Contractor, Supplier, and Manufacturer.
- Project identification complete with specification section number.
- Field measurements, clearly identified as such.
- Relation to critical features and adjacent work.
- Applicable standards, such as ASTM or Federal Specifications numbers.
- Identification of deviations from Contract Documents.
- Identification of resubmittal revisions.
- At least 6 X 8 inch space on each page for Contractor's and Architect's stamps.
- Contractor's stamp, signed and certifying that products, field measurements, field construction criteria, and information submitted has been reviewed and accepted by him as accurate and conforming with Contract Documents.

Product Data:
Submittal shall contain:
- Project title and names of Contractor, Supplier, and Manufacturer.
- Project identification complete with specification section number.
- Applicable standards, such as ASTM or Federal Specifications numbers.
- Identification of deviations from Contract Documents.
- Identification of resubmittal revisions.
- At least 6 X 8 inch space on the first page for Contractor's and Architect's stamps.

Contractor's stamp, signed and certifying that products and information submitted has been reviewed and accepted by him as accurate and conforming with Contract Documents.
Samples:
Submit number stated in respective specification section.
Submittal shall contain:
- Project title and names of Contractor, Supplier, and Manufacturer.
- Project identification complete with specification section number.
- Field measurements, clearly identified as such.
- Relation to critical features and adjacent work.

Applicable standards, such as ASTM or Federal Specifications numbers.
Identification of deviations from Contract Documents.
Identification of resubmittal revisions.
At least 6 X 8 inch space on each page for Contractor's and Architect's stamps.
Contractor's stamp, signed and certifying that products, field measurements, field construction criteria, and information submitted has been reviewed and accepted by him as accurate and conforming with Contract Documents.

RESUBMISSION REQUIREMENTS
Make any corrections or changes in submittals required by Architect and resubmit until approved.
Contractor to be allowed a single original submittal review and a follow up submittal for corrections.
Beyond the two reviews, the Contractor may be penalized to pay for the Architect and Owner review time.
Shop Drawings and Product Data:
Revise initial drawings or data, and resubmit as specified for initial submittal.
Identify any changes made other than those requested by Architect.
Samples:
Submit new samples as required for initial submittal.

ARCHITECT'S RESPONSIBILITIES
Review submittals with reasonable promptness.
Affix signature, and indicate approval or requirements for resubmittal.
Return submittals to Contractor for distribution, or resubmission.

REQUIRED SUBMITTALS
Refer to individual sections in this Project Manual.

DEFERRED SUBMITTALS
As required in other specification sections, submit to the Authority Having Jurisdiction (AHJ) shop drawings and design professional’s engineering calculations as required by the AHJ for those products required to be bidder designed based on performance criteria noted.
Submit the number of paper copies required by the AHJ. Upon receiving approval by the AHJ, make submittal to the Architect for his review and approval. Obtain Architect’s approval before fabricating work.

SUBMITTAL ADMINISTRATIVE REQUIREMENTS
Architect's Digital Data Files: Electronic copies of CAD Drawings of the Contract Drawings may be provided by Architect for Contractor's use in preparing submittals, subject to execution of an AIA E201 – 2007 Digital Data Protocol Exhibit and the Architect’s Digital File Disclaimer/Waiver Form.

END OF SECTION

REFERENCED SPECIFICATIONS AND STANDARDS

For products or workmanship specified by Referenced Specification or Standard, comply with requirements of the Specification or Standard, except when more rigid requirements are specified or are required by governing codes.

Except where a specific date is specified, the date of Referenced Specification or Standard is that in effect as of the date of Owner-Contractor Agreement.

Obtain a copy of all Referenced Specifications and Standards, and maintain at jobsite during the specific work until Substantial Completion of the Project.

Wherever referenced Standard Specifications or Standards issued by manufacturers or other similar organizations contain provisions which conflict with the Contract Documents the Contract Documents shall govern.

REFERENCED REGULATORY AGENCIES

ADAAG	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities Office on the Americans with Disabilities Act Civil Rights Division U.S. Department of Justice Washington, D.C. 20530 www.access-board.gov
AASHTO	American Association of State Highway and Transportation Officials 444 North Capital Street, NW Washington, D.C 20001 www.aashto.org
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018 www.ansi.org
ASHRAE	American Society of Heating, Refrigeration and Air-Conditioning Engineers 1791 Tullie Circle NE Atlanta, GA 30329 www.ashrae.org
ASCE	American Society of Civil Engineers 1801 Alexander Bell Drive Reston, VA 20191 www.asce.org
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103 www.astm.org
CS	Commercial Standards of the Commodities Division of the Department of Commerce Washington, D.C. 20006 www.doc.gov
EPA	Environmental Protection Agency Ariel Rios Building 1200 Pennsylvania Avenue, N.W. Washington, DC 20460 www.epa.gov
Fed. Spec.	Federal Specifications of the United States General Services Administration Specifications and Consumer Information Distribution Section (WF SIS)

	Washington Navy Yard, Building 197 Washington, D. C. 20407 www.apps.fss.gsa.gov/pub/fedspecs/iindex.cfm
FMG	FM Global [formerly Factory Mutual (FM)] 1301 Atwood Avenue P.O. Box 7500 Johnston, RI 02919 www.fmglobal.com
IBC	International Building Code Published by International Code Council (see ICC below)
ICBO	International Conference of Building Officials 5360 Workman Mill Road Whittier, CA 90601-2298
ICC	International Code Council 5203 Leesburg Pike, Suite 708 Falls Church, VA 22041-3401 www.intlcode.org
IMC	International Mechanical Code Published by International Code Council (see ICC above)
LEED	Leadership in Energy and Environmental Design U.S. Green Building Council 1015 18th Street NW, Suite 805 Washington, D.C. 20036 www.usgbc.org
NEC	National Electric Code published by the National Fire Protection Association (See NFPA below)
NFPA	National Fire Protection Association International Battery March Park Quincy, MA 02269 www.nfpa.org
OSHA	Occupational and Safety Health Administration U.S. Department of Labor Occupational Safety & Health Administration 200 Constitution Avenue Washington, D.C. 20210 www.osha.gov
OSSC	2014 Oregon Structural Specialty Code (based on the 2012 International Building Code) Building Codes Division 1535 Edgewater Street NW Salem, OR 97310 www.oregonbcd.org
PS	Product Standards of the Commodities Division of the Department of Commerce Washington, D. C. www.doc.gov

SMACNA	Sheet Metal & Air Conditioning Contractors National Association 4201 Lafayette Center Drive Chantilly, Virginia 20151-1219 www.smacna.org
UFAS	Uniform Federal Accessibility Standards United States Architectural and Transportation Barriers Compliance Board 1111 Eighteenth Street NW, Suite 501 Washington, D.C. 20036-3894 www.access-board.gov
UL	Underwriter's Laboratories 333 Pfingston Road Northbrook, Illinois 60062 www.ul.com
USGBC	U.S. Green Building Council 1015 18th Street NW, Suite 805 Washington, D.C. 20036 www.usgbc.org

TRADE ASSOCIATION REFERENCES

See specific Specification Sections.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Inspection and testing laboratory qualifications, duties, and responsibilities. Contractor's quality control requirements. Contractor's and Owner's responsibilities.

COSTS

Paid by Owner:

For Testing Laboratory Services specified in this section.

For special inspections of concrete, masonry and welding specified in building code.

Paid by Contractor

For inspection and testing required by laws, ordinances, regulations, and orders of Public Authorities, but not specified in this section.

For re-inspections and retesting required because of defective work of ill-timed notices.

QUALIFICATIONS OF LABORATORY

Independent laboratory acceptable to Architect and Building Official.

Meet "Recommended Requirements for Independent Laboratory Qualification," latest edition, published by American Council of Independent Laboratories, 1050 17th Street NW, Suite 1000, Washington, D.C. 20038, (202) 887-5872.

Meet ASTM E-329 latest edition, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as used in Construction."

LABORATORY'S DUTIES

Provide qualified personnel for specified inspections, sampling, and testing.

Ascertain and certify compliance with contract documents.

Promptly submit written inspection and test reports to Owner's Representative, Building Official, Contractor, and Architect.

Include the following on test reports:

- Date issued.
- Project title and locations.
- Testing laboratory name and address.
- Inspector's name.
- Date of inspection or sampling.
- Record of temperature and weather.
- Date of test.
- Identification of product tested.
- Test location in project.
- Type of inspection or test.
- Observations regarding compliance with contract documents.
- Laboratory is not authorized to:
- Release, revoke, alter, or enlarge on contract document requirements.
- Approve or accept any portion of work.
- Perform any duties for Contractor.

CONTRACTOR'S RESPONSIBILITIES

Cooperate with laboratory personnel, provide access to work and to manufacturer's operations.

Provide to laboratory, representative samples of materials to be tested, in required quantities.

Furnish casual labor and facilities:

- Provide access to work to be tested.
- To obtain and handle test samples at site.
- To facilitate inspections and tests.
- For laboratory's exclusive use for storage and curing of test samples until removed to laboratory.

Notify laboratory at least 24 hours in advance of operations to allow for personnel assignments and test scheduling.

Repair test holes to match original conditions.

LIABILITY

Laboratory service is provided for Owner's self-assurance and in no way relieves Contractor's

responsibility to comply with Contract Documents.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

SLAB MOISTURE
Testing Standard: ASTM F 1869-98 standard test method for measuring vapor emission rate at interior concrete slabs on grade requiring floor covering using anhydrous calcium chloride.
Testing Procedure: Sinak Dome Test vapor emission measuring system; Sinak Corporation, 861 Sixth Avenue, Suite 411, San Diego, CA 92101, phone 800-523-3147.

SLAB PH LEVEL
Method: ASTM F 710 "Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
Provide tests at area for each new flooring type.

EARTHWORK DENSITY
Method: ASTM D 698.
Provide tests for each 800 tons of gravel and 1 per 2,000 sq. ft. subgrade for each layer of fill and backfill, for pavement beds in cuts if any, and to any other earthwork construction which will support finished surfaces or structures.

ASPHALT PAVING
Conduct the following tests:

- Compacted base-rock field density.
- Placement tests per 300 tons of asphalt to determine asphalt-cement content, gradation of aggregate, voids, temperature, and Marshall stability of mix.
- Finish product core sample to check compaction and voids.

CAST-IN-PLACE CONCRETE
Test Concrete Slump as follows:
Follow ASTM C-143 and C-172.
Prepare tests from same batch as that employed in preparing strength test specimens, unless otherwise directed.
If measured slump falls outside specified limits retest immediately from another portion of same load. In event of second failure concrete shall be considered as failing specification requirements.
Test Concrete Compressive Strength as follows:
Follow ASTM C-31, C-39, and C-172.
Prepare not less than 4 test cylinders for each 100 cubic yards or less for each strength of concrete cast in any one day.
Break 2 cylinders at 7 days of age, and unless otherwise directed break remainder at 28 days.
If any one set of two cylinders does not develop full design strength at 28 days of age, cores may be called for. All coring costs paid by Contractor.
If tests indicate concrete has failed to meet specifications, replace substandard material when directed by Architect.
Test Concrete Air Content as Follows:
Follow ASTM C-231.
Test each cylinder containing air entrainment.

MASONRY
Mortar:
Prepare in accordance with UBC Standard 24-22, four 2 inch diameter by 4 inch long cylinders for each 2000 sq. ft. of wall. Break two at 7 days of age, and unless otherwise directed, break remainder at 28 days.

STRUCTURAL STEEL
Inspection of fabrication shop and jobsite as follows:

Qualification of high-strength bolt and welding procedure and personnel.
Inspection of specification conformance of fabricated structural steel member and assemblies.
Inspection of shop welding in accordance with AWS Building Code, Section 6 and as follows:
    Visual inspection in accordance with article 605.
    Visual inspection of surface preparation prior to shop painting to evaluate cleanness in accordance with SSPC Pictorial Standards.
    Measure dry film paint thickness in accordance with ASTM D-1005.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Temporary utilities and miscellaneous temporary facilities required during construction.

JOB CONDITIONS

Establish and initiate use of each temporary facility at time first reasonably required for proper performance of the work. Terminate use and removal of temporary facilities at earliest reasonable time when no longer needed.

Comply with governing codes and regulations.

Pay required fees and easement assessments.

Enforce safe and sanitary practices.

Maintain clean facilities.

Prevent interference with Owner's normal use of his own facilities.

Prevent wasteful utility uses.

Should Owner occupy part of facility, Owner will pay his proportional utility cost.

PART 2 - PRODUCTS

MATERIALS AND EQUIPMENT

Materials and equipment may be new or used, but must be suitable and adequate in capacity for required usage.

PART 3 - EXECUTION

PROJECT SIGN

3/4 inch waterproof plywood, 4 x 8 feet size, framed with suitable moldings.

Provide immediately after contract is signed, in accordance with Architect's design.

Paint two coats prepared paint, color selected.

Employ professional sign supplier approved by Architect to letter names of:

- Project
- Owner
- Architect
- Consulting Engineers
- General Contractor

Secure signboard to nominal 4 x 4 inch wood posts set 4 feet into ground.

Place no other signs or advertisements on premises.

FIELD OFFICE

General:

Provide substantial weathertight office building on premises where directed.

Office building to be of sufficient size to serve the construction project needs, including space for weekly progress meetings.

Provide heat, electric light, and janitor service.

Provide internet and phone access, service provided by Contractor.

At Contractor's option, portable buildings suitable for office use may be used.

Do not use field office for storage buildings or personnel housing.

Required Furnishings:

- 1 plan table large enough to hold open set of contract drawings.
- 1 plan rack large enough to store contract drawings, including record drawings.
- 1 shelf large enough to store project manuals and other similar documents.
- 1 standard lockable, legal size, metal filing cabinet to store shop drawings and other project correspondence.
- One waste basket.

TELEPHONE

Provide non-coin operated system as follows:

- One direct-line instrument in field office building.
- One direct-line facsimile (FAX) machine in field office building.

Subcontractors shall provide and pay for any separate additional instruments that they may require.
Allow those connected with work to use, provided they pay for toll calls.
Install when work is started, maintain until full completion, pay all charges.
Provide wall-mounted directory at each instrument listing name and business phone number of at least the following:

- Each Contractor and Subcontractor
- Architect
- Architect's Consulting Engineers
- Testing laboratories
- Physicians
- Hospitals
- Ambulance
- Local Fire Department

Do not use Owner's existing telephone system.

ENVIRONMENTAL PROTECTION

General:

Establish procedures among subcontractors to prevent environmental harm (air pollution, water pollution, soil erosion, excessive noise, excessive odors and similar problems).
Comply with environmental regulations.
Complete construction operations by methods that minimize pollution and contamination.

Noise:

Avoid construction operations that produce harmful noise levels. Restrict use of noisy equipment and operations to hours that will have minimum effect on workers and neighboring buildings.

Dust Control:

Provide dust-tight enclosures and/or sprinkle with water where necessary to control dust.
Do not use enough water to cause flooding, icing, or contaminated runoff.
Protect existing return air duct systems against demolition dust by providing filter media across duct openings. Replace dirty media with clean when necessary to protect systems.

Water Run-off Control:

Provide erosion control measures as required by Construction Documents. Provide additional measures if necessary to control erosion.
If high water table is encountered during construction, and water removal is necessary from excavations, lower water table by means of pumping, trenching below water table or other acceptable means to ensure drainage, proper soil compaction and placement of materials.
Dispose of excess water.
Where practical, direct excess water to storm water drainage system. Pre-treat water if necessary.
Conform to anti-pollution laws and regulations.

TEMPORARY WATER

Mechanical contractor shall provide and maintain water for the following purposes:

- Service standpipe equipped with sufficient 3/4 inch hydrants that any work Center can be reached with 100 ft. extension hose. Each Contractor shall provide his own extension hoses.
- Drinking water dispensed in single-service containers or sanitary fountains.
- Maintain cool as practicable, clean and fresh.

Maintain adequate volume.
Protect against freezing.
Water, in quantities judged reasonable by Architect, will be furnished without charge by Owner.
Ascertain where water service is available, provide required connections, and extend system to work area.

TEMPORARY TOILET FACILITIES

General Contractor shall provide at the rate of one fixture for each 40 workers.
Type: Comply with Building Code.
For enclosures accommodating more than one person, provide privacy screens for each toilet fixture.
If both men and women are working, provide separate facilities for each sex.
Maintain sufficient light and ventilation.
Maintain each toilet with toilet tissue on suitable dispenser.
Remove temporary toilets and use building fixtures as soon as feasible.

Disinfect premises after removal and restore to specified condition.
Do not use Owner's existing facilities.

TEMPORARY ENCLOSURES
Provide sufficient enclosure to prevent infiltration of rainwater, wind and other elements, and prevent undue heat loss from within enclosed area.

TEMPORARY BARRICADES
Provide all necessary to protect public against injury and protect project against damage and unauthorized intrusion.

TEMPORARY FIRE PROTECTION
Provide and maintain necessary facilities and equipment to safeguard project against fire damage.

TEMPORARY FENCING
Provide as needed to secure work area, 6 ft. high galvanized steel chain-link fencing.

TEMPORARY ELECTRICITY
Power:
Electrical Contractor shall provide and maintain structurally and electrically sound temporary power distribution system as follows:

- Sufficient 20 amp load centers that any work area can be reached with 100 foot extension cord.
- Each Contractor shall provide his own grounded, UL approved extension cords.
- Load centers shall include:
  - Weatherproof distribution boxes.
  - Circuit breakers for each outlet.
  - Equipment grounding continuity for entire system.
  - Power at proper voltage for:
    - Temporary field offices.
    - Temporary storage and construction buildings.
    - Temporary lighting and power.
    - Temporary heating and ventilating.
    - Pumping.
    - Testing and checking equipment.
    - Owner's facilities continuous operation during electrical services change over.

General Contractor and Subcontractors shall provide their own power and distribution system for field welders and any other special power beyond that specified herein.
Lighting:
Provide and maintain temporary lighting as follows:

- 30 ft. candles measured 3 feet above floor in spaces during work. Energize permanent lighting fixtures prior to painting, except where fixtures are mounted on walls or ceilings to be painted. Maintain from 14 minutes prior to until 15 minutes past scheduled work hours. Maintain 5 ft candles measured 3 feet above floor as necessary to prevent damage or injury. Maintain when authorized Personnel are present. Provide light control switches at area entrances, or successive areas, so personnel access to project can be through lighted areas.

Wiring:
Prevent conflict with General Construction.
Maintain cords clear of walkways and other heavy traffic areas.
Power Source:
Contractor to utilize a temporary connection on the Owner’s power system. Power use will be tracked monthly and the Contractor will pay the power costs over the duration of the project.
Ascertain where electrical service is available, provide required connections, and extend system to work area.

TEMPORARY EXTERIOR ENCLOSURES
Provide temporary weather-tight closure of exterior openings to accommodate acceptable working conditions and protection of products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification Sections, and to prevent entry of unauthorized persons.

Provide access doors with self-closing hardware.
Provide temporary roofing as required.
After work is started, Contractor shall provide a watertight roof enclosure at the end of each day's work.

TEMPORARY HEATING AND VENTILATING

Provide temporary heat and ventilation throughout enclosed construction areas to:

- Facilitate work progress.
- Protect work and products against dampness and cold.
- Prevent moisture condensation on surfaces.
- Provide suitable ambient temperatures and humidity levels for installation and curing of products.
- Provide adequate ventilation to meet health regulations for safe working environment.

Mechanical Contractor shall expedite work so permanent facilities will be structurally, mechanically, and electrically sound throughout and ready to provide "temporary" service as soon as possible.
Operate no permanent heating, ventilating, or air conditioning equipment without Mechanical Engineer's authorization that equipment is properly installed, has clean air filters, and is otherwise properly prepared. Replace temporary air filters with new units and restore system to like-new condition immediately prior to turning project over to Owner.
Temporary portable heaters, as may be required, shall be provided by General Contractor.
Continue temporary heating and ventilation until Owner occupies or finally accepts project, which ever the sooner.
Maintain ventilated areas in clean condition to avoid undue circulation of dust and air-borne particles.
Minimum temperatures to be maintained:

- Generally, 24 hours a day: 40^{o} minimum.
- Temperatures required for work of various trades: See technical specific specification sections.

Fuel costs for temporary heating shall be paid by General Contractor.

TEMPORARY VERTICAL TRANSPORTATION

General Contractor shall provide and pay costs for temporary stairs, ramps, personnel hoists, chutes, etc., required for execution of work of all trades. Subcontractors shall provide their own material hoists and scaffolds.

VEHICLE PARKING AND MATERIAL STORAGE

Coordinate with Owner's Representative.
Do not use existing paved streets or paved parking lots.

TEMPORARY EQUIPMENT

Thermometer:

Maintain one 10 inch minimum size outdoor thermometer. Mount at convenient location not in direct sunlight.
Temperature Range: Minus 20^{o}F to plus 110^{o}F.

FACILITIES REMOVAL

Remove temporary facilities, at project completion, or sooner, if directed.
Repair damage, if any, resulting from temporary facilities.

END OF SECTION

PART 1 - GENERAL

SCOPE

This section includes all work necessary to provide temporary traffic control to minimize obstruction and inconvenience to the public and to protect pedestrian and vehicular traffic.
Temporary traffic control shall include, but not be limited to:
Furnishing, installing, maintaining and removing all required traffic control devices.
Providing flaggers, barricades, lights, signs as shown on the Drawings or specified herein, or as requested by the Owner.
Provide pilot cars as required.
Contractor shall provide temporary traffic control measures outside the contract limits when the Contractor's work activities affect traffic outside the contract limits.
All work under this section to conform with all Federal, State and local regulations and requirements.

DEFINITIONS

MUTCD:
Manual on Uniform Traffic Control Devices.
Oregon supplement to the Manual on Uniform Traffic Control Devices.
Oregon Temporary traffic Control Handbook, 2006 (Traffic Control on State Highways for Short Term Work Zones), ODOT.

SUBMITTALS

Traffic Control

The Contractor shall submit a copy of traffic control plan(s) and/or staging plans for approval by the Owner's Representative and City of Salem for reference and review. The traffic control plan shall include:
Location and types of traffic control measures proposed.
Proposed order and duration of traffic control measures.

PART 2 - PRODUCTS

UNIFORM TRAFFIC CONTROL DEVICES

Use new or like-new equipment for all temporary items under this Section unless otherwise specified.
All barricades, signs, lights, flags and other traffic control devices shall conform to the current edition of the MUTCD unless otherwise specified.

Signs

Use standard size and shape conforming to the current edition of the MUTCD unless otherwise specified or ordered. Double-face signs will not be allowed except for flagger "STOP/SLOW" sign paddles.

Type

Unless otherwise specified or shown on the plans, use signs composed of orange reflectorized sheeting background with nonreflectorized black legend on one of the following materials.

Sheet aluminum.

3/4-inch medium or high-density overlay plywood.
Where there is interference from extraneous light sources which limits the effectiveness of the reflectorized surface, or as required by the Owner's Representative, illuminated signs shall be used.

Flaggers

Flaggers shall be equipped with a minimum of the following:
Clothing to cover the complete body except head, neck, and arms below the point of the shoulders.
An OSHA approved hard hat.
An orange, fluorescent red-orange, or fluorescent yellow-orange vest. For night-time conditions, the vest shall be reflective.
Highly visible, reflective "STOP/SLOW" sign paddles conforming to the MUTCD.
Portable, self-contained two-way radio with a range suitable for the project.
Illuminated stand area of high visibility at night.

PART 3 - EXECUTION

GENERAL

Contractor shall adequately warn the public at all times of existing conditions on all streets affected by work operations.

Provide approved access to private properties at all times, except during owner approved stages of construction.

The Contractor shall notify affected residents, businesses and emergency services in writing during business hours 48 hours in advance of parking removal, and/or street, driveway, and alley detour or closures. Failure to provide proper, timely notification will be grounds to deny the commencement of the work.

Emergency traffic such as police, fire, and disaster units shall be provided access to the work area at all times.

Provide open trenches and excavations with adequate barricades of an approved type. At night mark all open work and obstructions by lights. Install and maintain all necessary signs, lights, flares, barricades, railings, runways, stairs, bridges, and facilities for the protection of the public.

Contractor shall conform to all applicable local, State and Federal regulations relating to temporary traffic control and protection of the public.

TRAFFIC CONTROL WITHIN CONTRACT LIMITS

Contractor shall provide temporary traffic control as required by MUTCD, as well as applicable local and Federal regulations.

When vehicular parking is a hazard to through traffic or to the work, furnish and place NO PARKING signs on any street which is impacted by the work.

Flagging stations shall be staffed continuously during those hours requiring flaggers or until the Owner's Representative determines flagging is no longer required.

DETOURS

Contractor shall submit detour plans to the Owner's Representative, and City of Salem if required, a minimum of seven (7) days (or longer where required) prior to commencement of the work necessitating the detour, and obtain approval from all regulating authorities prior to detour construction. Any detour plans or provisions shown on the construction drawings shall be considered to be minimum requirements, and do not preclude the applicable regulatory agency from requiring additional or modified measures.

Contractor shall construct and maintain approved temporary detours to provide adequate passage of public traffic.

Contractor shall assume responsibility for detours within the limits of the project such as side street crossings, temporary bridges over freshly placed concrete, or utilization of one or more lanes of the construction area for maintenance of traffic.

Upon failure to immediately provide, maintain, or remove suitable detours or detour bridges when ordered to do so by Owner's Representative, Owner may without notice to Contractor or Surety, provide, maintain, or remove the detour and deduct costs thereof from any payments due or coming due to Contractor.

When detours are not available, confine operations to a width which provides for safe passage of traffic.

ONE-WAY PILOTED TRAFFIC

If, in the judgement of the Engineer, one-way piloted traffic is necessary, provide at least two flaggers to control traffic, one flagger being stationed at each end of the roadway being limited to restricted use and furnish a pilot car and driver to lead traffic. Pilot cars shall be identified with appropriate sign information mounted on the rear of the vehicle. At the end of each day leave work in such condition that it can be traveled without damage to the work and without danger to the public.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Requirements for temporary protection of trees, plants and groundcovers to remain during construction, and prevention of damage above and below grade, including temporary fencing.

REFERENCES

ISA: International Society of Arboriculture, P.O. Box 3129, Champaign, Illinois 61826; (217) 355-9411.
ASCA: American Society of Consulting Arborists, 9707 Key West Avenue, Suite 100, Rockville, MD 20850; (301) 947-0483.

DEFINITIONS

Drip Line: Outer perimeter of branches of any tree or plant.
Tree Protection Zone: Five feet beyond the tree drip line.
Ground Cover: Includes, but is not limited to, shrubs and grass.

QUALITY ASSURANCE

Contractor's Condition Inspection:

Include written report and color prints from digital photo files recording the condition of the site prior to commencing construction.
Notify the Architect and Owner of all issues related to tree protection as they arise. Comply with Arborist's recommendations for tree protection and continued tree health when work occurs within the root zones of trees scheduled to remain.

PROJECT CONDITIONS

Performance Requirements:

Prevent damage to trees and plants including soil, roots, bark, trunks, limbs, branches, and foliage due to construction activities including, but not limited to, the following:

- Soil contamination, erosion and compaction.
- Excessive wetting, ponding of stormwater, and construction run-off.
- Alteration of grade and stockpiling of soil, debris, and materials.
- Unauthorized cutting, breaking, skinning, and bruising of trees and plants.

Project Conditions:

Install protection during initial mobilization at the site and maintain until Substantial Completion.

Driving and Parking:

Not permitted within drip line of trees, plants and sensitive natural areas or lawn without Architect's written permission.

Storage of Material and Debris:

Not permitted within drip line of trees and plants.
Where Architect permits construction traffic, parking or materials storage on prepared lawn and planting areas, provide planks, plywood and similar protection; prevent rutting and compaction of soil.

COORDINATION

Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

FENCING

Contractor's choice.
Chain Link Fencing: 11 gauge galvanized chain link, six-feet tall, and 1.5 inch inside diameter galvanized steel line posts and 2.5 inch inside diameter corner posts, provide lockable gates as necessary.
Open Web Plastic Barrier Fence: 48-inches tall, safety orange: Amoco HiVu Barrier Fence, or approved, with rigid metal, plastic or wood posts, minimum 6-foot length and adequate strength to support fencing and resist wind and moderate live loads.

PART 3 - EXECUTION

PROTECTION

General:

Except where indicated to be removed, protect existing trees against damage.
Provide necessary fencing and barricades. Erect prior to work, and unless otherwise instructed, remove after work completion.
Prohibit earth stockpiling, material storage, and vehicle parking and traffic within drip line of trees.
Prohibit dumping of refuse, chemicals, and other materials, and puddling or running water which may injure plant growth including root systems.
Prohibit foot and vehicle traffic which may compact soil over root systems.
Prohibit unnecessary cutting, breaking, and skinning of branches and roots.
Prohibit skinning and bruising of bark.
Prohibit fires, high heat, and smoke adjacent to trees.
Verification of Existing Conditions:
Inspect trees, plants and groundcovers, and document existing conditions with digital photographs prior to installation of protective fencing and again after site clearing has been completed. Provide digital photographs to Architect for review within 24 hours of taking photos.
Value of existing trees on site shall be determined by Owner's Certified Arborist prior to beginning of construction.
Tree Protection Zones:
Establish Tree Protection Zone at drip line of trees designated to remain.
At perimeter of Tree Protection Zones install tree protection fencing 5 feet beyond tree dripline unless otherwise directed by Architect to prevent compaction of soil over roots.
Prevent entry into protected areas except as authorized in writing by the Owner's landscape maintenance personnel.
Water irrigated trees and plants as necessary to maintain existing condition throughout Contract period until Substantial Completion (do not provide supplemental water to existing oak trees).
Excavating and Trenching within Driplines:
Excavation and trenching permitted in Tree Protection Zones only where indicated on Drawings and at other approved locations.
Excavate within drip-line of trees only where necessary and then only parallel to roots whenever possible.
Tunnel under or around roots by hand digging or boring.
Minimize damage to root systems.
Use narrow tine spading forks and comb soil to expose roots. Relocate roots back into backfill areas wherever possible. If large main roots are encountered, expose beyond excavation limits as required to bend and relocate without breaking.
Do not cut main lateral roots and tap roots over 1-inch in diameter, cut smaller roots which interfere with installation of new work.
Do not allow exposed roots to be scarred nor to dry out. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in moist condition and temporarily support and protect from damage until permanently relocated and covered with backfill.

PRUNING
Review conditions with Architect prior to pruning or cutting roots, branches and foliage, and proceed as directed
Perform pruning and cutting with sharp instruments intended for the purpose; do not break nor chop.
Where roots have been cut or lost, engage an ISA Certified Arborist to prune corresponding tree branches where directed by Architect.

GRADING AND FILLING AROUND TREES
General:
Maintain existing grade within drip line of trees unless otherwise shown on Drawings.
Lower Grades:
Carefully hand excavate within drip line to new finish grade.
Raising Grades:
Where existing grade is 6 inches or less below finish grade shown, use existing topsoil fill materials. Carefully place in single layer, do not compact. Hand grade to required finish elevations.
Where existing grade is more than 6 inches below finish grade shown, follow Architect's instructions.

REPAIR AND REPLACEMENT OF TREES
General:
Repair or replace all damaged turf, shrubs, and trees under the direction of the Architect.

Make repairs promptly after damage occurs to prevent progressive deterioration.
Engage an ISA Certified Arborist to perform tree repair work.
Replace trees and plants damaged by construction operations where the Architect determines restoration to normal growth pattern is not possible. Plant and maintain as directed.
Unless otherwise approved, provide new trees of same size and species as those removed.
Where damaged trees can not readily be repaired or replaced, pay Owner, as liquidated damages, $25.00 per each square inch of trunk area measured 4 ft. above adjacent ground.
Trees up to 13-inch caliper:
Same size as damaged tree; species selected by Architect.
Trees over 13-inch caliper:
Compensate Owner as determined by Owner's Certified Arborist.
Plants:
Same size, quality, and quantity as damaged; species selected by Architect.
Where compaction of soil due to construction activity, including compaction of soil due to elevated water content, exceeds the critically limiting bulk density for the soil type in question, the Contractor shall provide measures as directed to reduce soil bulk density to acceptable levels to support normal plant growth.

CLEANING
All construction debris shall be removed from shrub beds and landscape areas.
Remove debris from project site upon work completion or sooner, if directed, including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

General requirements for transportation, handling, storage and protection of materials and equipment.
Contractor's options in selection of products, manufacturers and procedures.

PERFORMANCE REQUIREMENTS

Materials and Equipment incorporated into work shall:

- Conform to applicable specifications and standards.
- Comply with size, make, type, and quantity specified, unless otherwise approved in writing.

Manufactured and Fabricated Products:

- Manufactured like parts of duplicate units to standard sizes and gauges, to be interchangeable.
- Two or more items of same kind shall be identical, and by same manufacturer.
- Products shall be suitable for service conditions.
- Equipment shall comply with capacity, sizes, and dimensions shown or specified, unless otherwise approved in writing.

Do not use Materials or Equipment for any purpose other than that for which designed or specified.

CONTRACTOR'S OPTIONS

For products specified only by referenced standard, select any product meeting standard.
For products specified by naming several products, select any one complying with specifications.
For products specified by naming one or more products and "or accepted substitute," select any one specified product or submit request for substitution as required below.

INAPPROPRIATE PRODUCTS AND METHODS

If Contractor believes that any specified product, method, or system is inappropriate for use he shall, if possible, so notify Architect at least 5 working days prior to bid opening, and if not possible such notice shall be given before performing work in question.
If notice of objection is not received within the specified time limits, it will be assumed by the Owner that Contractor agrees that specified products, methods, and systems are not inappropriate for use on this project.

SALVAGE MATERIAL

All salvageable material will remain the property of the Owner, unless otherwise noted or released for the disposal by the Contractor.

NUMBER OF PRODUCTS REQUIRED

Wherever in Specifications a product is referred to in singular number, such reference shall include as many such products as are shown on Drawings or are required to complete the work.

PRODUCTS LIST

Before Contractor's first request for payment, submit to Architect complete list of major products proposed for use; include proprietary product names, Manufacturer's name, and installing Subcontractor's name.

MANUFACTURER'S INSTRUCTIONS

Perform work in accord with Manufacturer's instructions.
Do not omit preparatory or installation procedures required by Manufacturer, unless specifically modified or exempted by Contract Documents.
When Contract Documents require work to comply with Manufacturer's instructions, obtain and distribute such instructions to parties performing work including two copies to Architect. Maintain one set at job site during installation and until acceptance.
Handle, install, connect, clean, condition, and adjust products in strict accord with such instructions and in conformance with specified requirements.
Should job conditions or specified requirements conflict with Manufacturer's instructions, consult Architect for further instructions.
Do not proceed with work without clear instructions.

TRANSPORTATION AND HANDLING

Arrange product deliveries in accord with construction progress schedule; coordinate to avoid conflict with

work and site conditions.
Deliver products undamaged, in Manufacturer's original containers or packaging, and with legible identifying labels intact.
Immediately upon delivery, inspect shipments to assure that products are properly protected and undamaged.

STORAGE AND PROTECTION
Follow Manufacturer's instructions.
Maintain product identity labels legible and intact.
Store products subject to weather-damage in weathertight enclosures.
Maintain storage room temperature and humidity within ranges required by Manufacturer's instructions.
Maintain reasonable protection against product theft and vandalism.
Exterior Storage:
Store fabricated products above ground, on blocking or skids; prevent product damage and discoloration.
Cover products subject to deterioration with impervious sheet coverings; provide adequate ventilation to prevent condensation.
Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter.
Storage of Materials Off-site:
Not allowed unless previously approved by Marion County.
Inspection of Stored Products:
Arrange storage to permit easy access for inspection.
Make periodic inspections of stored products to assure that products are maintained as specified and are free from damage, discoloration, and deterioration.
Protection after Installation:
Provide substantial coverings as necessary to protect installed products against damage and discoloration. Remove covering when no longer needed.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Provide Field Engineering required for project, including the following:

- Layout survey work required for execution of project.
- Civil, structural, and other engineering necessary to execute Contractor's construction methods.

SUBMITTALS

Submit Engineer's names and addresses to Architect.

When requested, submit documentation to verify engineering accuracy to Architect.

Submit certificate signed by Surveyor certifying whether or not work layout conforms to Contract Documents.

QUALITY ASSURANCE

Engineer's Qualifications:

Land Surveyor: Oregon State Registered Land Surveyor.

Engineers: State-licensed in specific engineering to be performed.

Records:

Maintain complete and accurate log of control for survey work as it progresses.

PART 2 - PRODUCTS

EQUIPMENT

Maintain at project site the following:

- Complete transit or laser level
- Leveling rod
- Plumb bob
- 6 ft. and 10 ft. straight edges
- 100 ft. long measuring tape

PART 3 - EXECUTION

SURVEY REFERENCE POINTS

Existing Points: See Drawings.

Locate existing points prior to starting site work, and preserve during construction.

Make no changes to existing points without Architect's approval.

Notify Architect when any point is lost or destroyed, or requires relocation.

Employ Registered Surveyor to replace any lost, destroyed, or relocated points.

PROJECT LAYOUT

Establish at least two permanent bench marks on the site referenced to existing control points.

Record bench mark locations, with horizontal and vertical dimensions, on Project Record Drawings.

Using surveying instruments establish lines and levels for the following:

- Site improvements.
- Stakes for grading, fill, and topsoil placement.
- Utility slopes and invert elevations.
- Batter boards for structures.
- Building wall and column locations, floor elevations, and similar elements.

Periodically verify layout accuracy.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Procedures and limitations for cutting, removing, replacing or refinishing products or materials after initial installation of such products or materials.

EXTENT OF WORK

Perform all cutting, fitting, and patching, including attendant excavation and backfill, required to complete work or to:

- Make work fit properly together.
- Uncover work for installation of ill-timed work.
- Remove and replace defective work and work not conforming to Contract Documents.
- Remove samples of installed work for testing.
- Provide penetrations through non-structural surfaces for mechanical and electrical work.

SUBMITTALS

Submit written request for cutting approval to Architect well in advance of any cutting which affects:

- Work of Owner
- Structural value or integrity of any completed or existing work.
- Waterproof value or integrity of any weather-exposed or moisture-resistant work.
- Visual qualities of any sight-exposed work.

Request shall include:

- Project identification.
- Description of affected work.
- Necessity for cutting, alteration, or excavation.
- Effect on Owner's work.
- Effect on structural or weatherproof integrity on completed or existing work.
- Description of proposed work including:
  - Extent of cutting, patching, alteration, or excavation.
  - Trades who will execute work.
  - Products proposed for use.
  - Extent of required refinishing.
- Alternatives to cutting and patching.
- Cost proposal, when applicable.

Submit written notice to Architect designating date and time work will be performed.

PART 2 - PRODUCTS

MATERIALS

Products similar to those specified elsewhere in this Project Manual:

Follow those specifications.

Other Products:

Follow Architect's instructions.

PART 3 - EXECUTION

EXISTING CONDITIONS

Inspect existing conditions and identify work subject to damage or movement caused by proposed cutting and patching.

After uncovering work, inspect conditions affecting products installation or performance. Report unsatisfactory and questionable conditions to Architect in writing; do not proceed with work until Architect provides further instructions.

PREPARATION

Maintain adequate temporary support necessary to assure structural integrity of affected work.

Protect other portions of project work against damage and discoloration.

Protect work exposed by cutting against damage and discoloration.

PERFORMANCE

Provide proper surfaces for repairs.

Employ original installer or qualified contractor to perform cutting and patching for:

Weather-exposed or moisture-resistant surfaces.

Sight-exposed finished surfaces.

Restore cut or removed work with new products to provide work complete in accordance with Contract Documents.

Fit work air-tight to pipes, sleeves, ducts, conduits, and other surface penetrations.

Where patching occurs refinish entire surface to provide even finish to match adjacent work as follows:

Continuous Surfaces: Refinish to nearest intersection.

Assemblies: Refinish entire unit.

CUTTING STRUCTURAL FRAMING

Not permitted at any location, unless shown on Drawings or otherwise approved.

Exposed Members:

Not permitted, unless shown on Drawings or otherwise approved.

Concealed Framing Members:

Verify with Structural Engineer.

CLEANING AND REPAIRING

Including work of this section, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section. Remove debris from project site upon work completion or sooner, if directed.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Special procedures for waste recycling, material and equipment recycling, and requirements for indoor air quality prior to building occupancy.

REGULATORY AGENCY REQUIREMENTS

Comply with governing codes, regulations, ordinances, and anti-pollution requirements.
Comply with Environmental Protection Agency standards for indoor air quality as they apply to this project.
Comply with State Department of Environmental Quality standards.

COORDINATION

Coordinate with other trades affecting or affected by Work of this section.
Cooperate to maintain continuous operation of Owner's activities.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

WASTE RECYCLING

Recycle waste materials resulting from construction operations to the greatest extent possible unless otherwise specified herein.
Deliver recyclable waste materials, or arrange for transportation to, a construction materials waste recycling company or enterprise.
Provide designated on-site containers for disposal of recyclable and salvageable materials.
Instruct employees and subcontractors on proper sorting and disposal of recyclable materials.
Periodically remove recyclable materials from site.
Dispose of at Contractor's expense at appropriate recycling centers.
Maintain recycling area clean and clearly marked in order to avoid contamination and co-mingling of materials.
Materials to be recycled include, but are not limited to, the following:

- Demolition lumber and wood waste
- Dimensional lumber waste
- Plywood, OSB and particle board
- Cardboard, paper and packaging
- Metals
- Paint
- Glass
- Plastics including foam plastic and film

AIR QUALITY

Minimize dust spread, both to the exterior of the building and within the building, to the greatest extend possible.
Protect existing return air duct systems against demolition dust by providing filter media across duct openings. Replace dirty media with clean when necessary to protect systems.

CLEANING AND REPAIRING

Allow no debris to accumulate in buildings, or on grounds, streets, or walks.
Clean, repair and touch-up, or replace when directed, adjacent property and surfaces which have been soiled, discolored, or damaged by Work of this Section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Cleaning and trash removal during work progress, and at work completion.

REGULATORY AGENCY REQUIREMENTS
Comply with governing codes, regulations, ordinances, and anti-pollution requirements.

PART 2 – PRODUCTS

CLEANING MATERIALS
Use only those which will not create hazards to health or property and which will not damage surfaces.
Use only those recommended by Manufacturer of surface to be cleaned.
Use only on surfaces recommended by cleaning material manufacturer.

PART 3 – EXECUTION

GENERAL
Follow cleaning material and surface manufacturer's instructions.

DURING CONSTRUCTION
Periodically clean to maintain work, site and adjacent properties free from accumulations of waste, rubbish, and windblown debris, resulting from construction operations.
Provide on-site containers for collection of waste, debris, and rubbish.
Periodically remove waste material, debris, and rubbish and legally dispose of away from project site.

DUST CONTROL
Clean interior surfaces prior to painting, and continue cleaning as needed until painting is complete.
Schedule cleaning so that resultant dust and contaminants will not fall on wet or newly coated surfaces.

FINAL CLEANING
Remove waste, debris, and surplus material from project site.
Clean grounds as follows:
- Paved Surfaces: Remove stains, spills, and foreign substances and sweep clean.
- Other Surfaces: Rake clean.

In addition to debris removal and cleaning specified in other sections, clean exposed-to-view interior and exterior surfaces.
Employ skilled workers to perform final cleaning.
Remove any temporary protection and labels not required to remain.
Remove grease, mastic, adhesive, dust, dirt, stains, fingerprints, labels, and other foreign matter from sight-exposed interior and exterior surfaces.
Wash and shine glazing, including mirrors.
Polish glossy surfaces to clear shine.
Vacuum carpet and similar soft materials.
Clean equipment surfaces; remove excess lubricants.
Clean and sanitize food service equipment and plumbing fixtures.
Ventilating system, if used during construction:
- Permanent Filters: Clean
- Disposable Filters: Replace
- Clean Ducts, Blowers, and Coils: Clean

Clean light fixtures and lamps.
Remove waste, debris, and foreign matter from roofs and roof drainage system.
Maintain structure and components clean until substantial completion.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Contract condition requirements and specified administrative procedures in closing out work.

RELATED DOCUMENTS

"Marion County General Conditions for Public Improvement Contracts"

SUBSTANTIAL COMPLETION

When Contractor considers work substantially complete, as defined in General Conditions, he shall submit to the Architect:

- Written notice that work, or designated portion thereof, is substantially complete.
- List of items to be completed or corrected.

Architect will, as soon as possible thereafter, make inspection to determine completion status.

Should Architect determine that work is not substantially complete:

- Architect will promptly notify Contractor in writing, giving reasons therefore.
- Contractor shall remedy work deficiencies, and send second Notice of Substantial Completion to Architect.
- Architect will reinspect.

When Architect concurs that work is substantially complete, he will:

- Prepare Certificate of Substantial Completion using AIA Form G704, accompanied with Contractor's list of items to be completed or corrected.
- Submit Certificate to Owner and Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.

FINAL INSPECTION

When Contractor considers work complete, he shall submit written certification that:

- Contract Documents have been reviewed.
- Contractor has inspected work for compliance with Contract Documents.
- Work has been completed in accordance with Contract Documents.
- Equipment and Systems have been tested in presence of Owner's Representative and are operational.
- Work is complete and ready for final inspection.

Architect will inspect work to verify completion status as soon as possible after receipt of Contractor's certification.

Should Architect consider work incomplete or defective:

- Architect will promptly notify Contractor in writing, listing incomplete or defective work.
- Contractor shall immediately remedy deficiencies, and send second written certification to Architect that work is complete.
- Architect will reinspect work.

When Architect finds work acceptable under Contract Documents, he shall request Contractor to make closeout submittals.

REINSPECTION FEES

Should Architect be required to make more than two final inspections due to Contractor's failure to correct specified deficiencies:

- Owner will compensate Architect for such additional services.
- Owner will deduct Architect's compensation amount from Contractor's final payment as follows:
  - Architect's time at $150.00 per hour.
  - Architect's employees time at currently published hourly rates.
  - Others at 1.10 times the direct cost incurred.
  - Charges will be made for necessary travel time, auto expense computed at the Architect's currently published mileage rate, and all other expenses incurred in making inspections.

EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

Contractor shall submit the following:

- Contractor's Affidavit of Payments of Debts and Claims, AIA Document G706.
- Contractor's Affidavit of Release of Liens, AIA Document G706A including the following:
  - Consent of Contractor's Surety to Final Payment, AIA Document G707.

Contractor's Release of Waiver of Liens.
Separate releases or waivers of lien for Subcontractors, Suppliers, and others with lien rights against Owner's Property, together with list of those parties.

Duly sign and execute all submittals before delivery to Architect.

CONTRACTOR'S CLOSEOUT SUBMITTALS TO ARCHITECT

Extra Materials:

Verify and comply with each specification section for required extra stock of materials or product.
Certificate of domestic water disinfection.
Project Record Documents, see Section 01 78 39.
Owner's Operating and Maintenance Manual, see Section 01 78 83.

INSTRUCTION

Instruct Owner or Owner's personnel in operations of all systems and equipment in accordance with Section 01 78 83.

FINAL ADJUSTMENT OF ACCOUNTS

Submit final statement of accounting to Architect, including the following:

- Original contract sum.
- Additions and deductions resulting from:
  - Previous change orders.
  - Other adjustments.
  - Deductions for uncompleted work.
  - Deductions for reinspection payments.
- Total Contact Sum, as adjusted.
- Previous payments.
- Sum remaining due.

Architect will prepare and issue final Change Order, reflecting approved adjustments to Contract Sum not previously made by change orders.

FINAL APPLICATION FOR PAYMENT

Follow procedures specified in Supplementary Conditions, Section 00 7300.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Compile product data and related information appropriate for Owner's maintenance and operation of Products furnished under Contract.

Prepare as specified herein and in other specification sections.

Instruct Owner's personnel in maintenance of products and in operation of equipment and systems.

RELATED DOCUMENTS

"Marion County General Conditions for Public Improvement Contracts"

QUALITY ASSURANCE

Data preparation shall be done by personnel:

- Trained and experienced in maintenance and operation of described products.
- Completely familiar with requirements of this section.
- Sufficiently skilled as technical writer to communicate essential data.
- Sufficiently skilled as draftsman to competently prepare required drawings.

FORM OF SUBMITTALS

Printed Copies:

Prepare data in form of instructional manual for use by Owner's personnel.

Format:

- Size: 8 1/2 X 11 inches.
- Text: Manufacturer's printed data or neatly typed.
- Drawings:
  - Reinforce edges against tear-out.
  - Bind-in with text.
  - Fold larger drawings to match size of text pages.
- Provide fly-leaf for each separate product.
- Identify each fly-leaf with labeled tabs.
- Cover: Identify each volume with typed or printed title "Operating and Maintenance Instructions," and list:
  - Project title
  - Identity of general subject matter contained in manual.

Electronic Copy:

Prepare data in the form of PDF files. Electronic files may be separate for Divisions 1 thorugh14, Divisions 21 through 23 and Divisions 26 through 28.

Provide one copy to the Owner on flash drive.

PART 2 - PRODUCTS

BINDERS

Commercial quality, three-ring type with durable and cleanable plastic covers.

When multiple binders are used, correlate data into related consistent groupings.

MANUAL CONTENT, GENERAL

Neatly typewritten table of contents for each volume, arranged in systematic order.

List:

- Contractor, name of responsible principal, address, and telephone number.
- Each product including name, address, and telephone number of:
  - Subcontractor or installer
  - Recommended maintenance contractor
  - Local source for replacement parts
- Product name and other identifying symbols as set forth in Contract Documents.

Product Data:

- Include only those sheets which are pertinent to specific product.
- Annotate each sheet to:
  - Clearly identify product or part installed.
  - Clearly identify data applicable to installation.
  - Delete references to inapplicable data.

Drawings:
- Supplement product data with drawings where necessary to clearly illustrate:
  - Relations of component parts
  - Control and flow diagrams
- Do not use Project Record Documents as maintenance drawings.

Written Text:
- Provide where necessary to supplement Product Data and Drawings.
- Organize in consistent format under separate headings for different procedures.
- Provide logical sequence of instructions for each procedure.

Warranties, Bonds, and Maintenance Contracts:
- Provide copy of each.
- Including the following:
  - Proper procedures in event of failure.
  - Instances which might affect validity or Warranties, Bonds, or Contract.

MANUAL FOR ARCHITECTURAL MATERIALS AND FINISHES

Include the following Manufacturer's data:
- Catalog number, size, composition.
- Color and texture designations.
- Required reordering information.
- Recommended cleaning materials and methods.
- Cautions against detrimental cleaning materials and methods.
- Recommended cleaning and maintenance schedule.

Submit specified information as called for in each specification section.

MANUAL FOR WEATHER PROTECTION MATERIALS

Include the following Manufacturer's data:
- Applicable manufacturing standards.
- Instructions for inspection, maintenance, and repair.

Submit specified information as called for in each specification section.

MANUAL FOR MECHANICAL EQUIPMENT AND SYSTEMS

Include the following Manufacturer's data:
- Description of unit and component parts including:
  - Function, normal operating characteristics, and limiting conditions.
  - Performance curves, engineering data and tests.
  - Complete nomenclature and commercial number of replaceable parts. Operating procedures including:
  - Start-up, break-in, routine and normal operating instructions.
  - Regulation, control, stopping, shut-down, and emergency instructions.
  - Summer and winter operating instructions.
  - Special operating instructions.
- Maintenance procedures including:
  - Routine operations.
  - Trouble-shooting guide.
  - Disassembly, repair, and reassembly.
  - Alignment, adjusting, and checking.
  - Servicing and lubricating schedule, including recommended Lubricants.
- Manufacturer's printed operating and maintenance instructions.
- Control Systems operation sequences.
- Parts list, illustrations, assembly drawings, and diagrams necessary for maintenance, including:
  - Life expectancy of parts subject to wear.
  - Items recommended to be stocked as spare parts.
- As-installed control system diagrams.
- Color-code legend, if any.
- Valve Tag Number Chart, with location and function of each valve.
- Submit specified information for the following:
  - Mechanical Equipment specified in Division 23.

MANUAL FOR ELECTRICAL EQUIPMENT AND SYSTEMS
Include the following Manufacturer's data:
- Description of unit and component parts including:
  - Function, normal operating characteristics, and limiting conditions.
  - Performance curve, engineering data and tests.
  - Complete nomenclature and commercial number of replaceable parts.
- Panelboard circuit directories indicating:
  - Electrical service.
  - Controls.
  - Communications, if any.
  - As-installed wiring color-code legend, if any.
- Operating procedures, including:
  - Routine and normal operating instructions.
  - Sequences required.
  - Special operating instructions.
- Maintenance procedures, including:
  - Routine operations.
  - Trouble-shooting guide.
  - Disassembly, repair, and reassembly.
  - Adjustment and checking.
- Manufacturer's printed operating and maintenance instructions.
- Parts list, including current prices, and recommended spare parts to be maintained in storage.
- Submit specified information for the following:
- Electrical equipment specified in Divisions 23 and 26.

ADDITIONAL DATA
Prepare and include the following:
- Additional data when need become apparent during instruction of Owner's personnel.
- Additional data specified in other sections of Specifications to be included.

PART 3 - EXECUTION

SUBMITTAL SCHEDULE
Preliminary Draft:
Submit two copies of proposed format. Architect will review, and return one copy with comments.
Final Submittal:
Submit, in final form, one copy of complete data 15 days prior to final inspection.
Copy will be returned with comments.
Submit two paper copies and one electronic copy, in approved final form, within 10 days of final inspection.

INSTRUCTION OF OWNER'S PERSONNEL
Prior to final acceptance, instruct Owner's personnel in operation, adjustment, and maintenance of all products, equipment, and systems.
Operating and Maintenance Manual shall constitute basis of instruction.
Submit training materials and instruction schedule for Architect's review and acceptance at least 30 days prior to training session.
Training:
- Location: At project site.
- Review manual contents with Owner's personnel in detail to explain all aspects of operations and maintenance.

END OF SECTION

REQUIREMENTS INCLUDED
Compile specified warranties and bonds.
Compile specified service and maintenance contracts.
Review submittals to verify compliance with Contract Documents.

RELATED DOCUMENTS
"Marion County General Conditions for Public Improvement Contracts"

SUBMITTAL REQUIREMENTS
Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective Manufacturers, Suppliers, and Subcontractors.
Number of original signed copies required: Provide 1 for each volume of Owner's maintenance manual as specified in Section 01 78 83.
Table of Contents: Neatly typed in orderly sequence.
Provide complete information for each item:
- Product or work item.
- Firm, with name of principal. address and telephone number.
- Beginning date of warranty, bond, or service and maintenance contract.
- Duration of warranty, bond, or service and maintenance contract.
- Provide the following information for Owner's personnel:
  - Procedure in case of failure or malfunction.
  - Instances which affect warranty or bond validity.
- Contractor, name of responsible principal, address, and telephone number.

SUBMITTAL FORM
Punch sheets for standard 3-ring binder.
Size: 8 1/2 x 11 inches.
Fold larger sheets to fit into Binder.
Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS".
List:
- Title of project.
- Name of Contractor.

Electronic Copy:
Prepare data in the form of PDF files.
Provide one copy to owner on flash drive.

SUBMITTAL TIME
See Section 01 78 23.

SUBMITTAL LOCATION
Bind into Owner's maintenance manuals specified in Section 01 78 23.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Procedures for Record Documents to be used throughout the execution of the work and at final completion of the work.

RELATED DOCUMENTS

"Marion County General Conditions for Public Improvement Contracts"

SUBMITTAL

At Contract close-out deliver Record Documents to Architect for Owner.
Provide two paper copies and one electronic copy of all documents.
Accompany submittal with transmittal letter in duplicate, containing:

- Project title.
- Date.
- Contractor's name and address.
- Title and number of each Record Document.
- Signature of Contractor or his authorized representative.

PART 2 - PRODUCTS

REQUIRED DOCUMENTS

Maintain at project site for Owner one record copy of:

- Contract Drawings and Specifications.
- Addenda.
- Change Orders and other Contract Modifications.
- Field Orders and other written instructions.
- Approved Shop Drawings, Product Data, and Samples.
- Field Test Reports.

REQUIRED DRAWINGS

Maintain one black-line or blue-line print of Contract Drawings as "work set", marking as required to record all Contract changes.
Prior to submittal, transfer recorded information to reproducible tracing.
Contractor may retain "work-set" for his records.

PART 3 - EXECUTION

MAINTENANCE OF DOCUMENTS AND SAMPLES

Store in Contractor's field office apart from documents used for construction.
Provide files, shelving, and cabinets necessary to safely and securely store documents and samples.
Maintain documents clean, dry, legible, and in good order.
Do not use Record Documents for construction purposes.
Make documents available at all times for Architect's inspection.

RECORDING

Label each document "Project Record" in neat, large, printed letters.
Record information concurrently with construction progress.
Do not conceal any work until required information is recorded.
Drawings; legibly mark to record the following actual construction:

- Depths of foundation elements in relation to first floor elevation.
- Horizontal and vertical locations of underground utilities and Appurtenances, referenced to permanent surface improvements.
- Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
- Field changes of dimensions and details.
- Changes made by Change Order or Construction Change Directive.
- Details not shown on original Contract Drawings.

Specifications and Addenda: Legibly mark to record the following:

Manufacturer, trade name, catalog number, and supplier of each product actually installed.
Changes made by Change Order or Construction Change Directive.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Procedures for pre-functional and functional testing.

DEFINITIONS

Commissioning Plan:

A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

CxA:

Commissioning Authority.

SUMMARY

Commissioning is a comprehensive and systematic process to verify that the building systems perform as designed to meet the Owner's requirements. Commissioning during the construction and warranty phases is intended to achieve the following specific objectives:

1. Verify and document that equipment is installed and started per manufacturer's recommendations and the technical specifications requirements.
2. Verify and document that equipment and systems receive complete operational checkout by installing Contractors.
3. Verify and document equipment and system performance.

The commissioning process does not relieve the Contractor's responsibility to provide fully finished and fully functioning systems.

SYSTEMS COMMISSIONING ADMINISTRATOR QUALIFICATIONS

The Systems Commissioning Administrator (SCA) shall be employed by the Owner under a separate contract. The SCA is required to be a registered Professional Engineer or Architect licensed in the State of Oregon, with the following qualifications:

NEBB Certified for HVAC and plumbing systems commissioning with a minimum of ten (10) years of experience in the HVAC design and construction industry.

Successful completion of a minimum of five (5) other projects similar in size and complexity in which commissioning of the Building Systems have been performed.

The SCA shall not be affiliated with any contractors, subcontractor or equipment supplier on this project.

CONTRACTOR'S RESPONSIBILITIES

Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

1. Cooperate with the Owner in the scheduling of activities to be included in the commissioning plan.
2. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
3. Cooperate with the Owner for resolution of issues recorded in the Commissioning Issues Log.
4. Attend commissioning team meetings as requested by the Owner.
5. Integrate and coordinate commissioning process activities with construction schedule.
6. Review and use the Pre-Functional Checklists as specified in the technical specifications. In consideration to any approved "Substitution Requests" in accordance with 00 72 00 General Conditions and Section 01 33 00 Submittal Procedures, the Contractor shall be responsible for revising and completing the Pre-Functional Checklists and submit to the Owner for approval during the "Request for Substitution" process.
7. Complete the Pre-Functional Checklists as Work is completed and provide to the Owner.
8. Review and use the commissioning process and comply with the Pre-Functional Tests and Functional Test procedures and requirements as specified in the technical specifications. In consideration to any approved "Substitution Requests" in accordance with 00 72 00 General Conditions and Section 01 33 00 Submittal Procedures, the Contractor shall be responsible for revising and completing the Functional Performance Test procedures and requirements and submit to the Owner for approval during the "Request for Substitution" process.
9. Complete the commissioning process and Functional Performance Test procedures and requirements.

PROCEDURES FOR PRE-FUNCTIONAL TESTING

In conjunction with the Pre-Functional Checklists, adjustments and tests shall be made by Contractor as specified herein and as required by governing codes, regulations, manufacturer's recommendations and good construction requirements. Contractor shall adjust, calibrate, and test equipment and devices installed under these Specifications. Except as otherwise specified, Contractor shall furnish labor, materials, tools, and instruments required to perform the work.

In accordance with the Contract Documents, the Contractor shall render all services and do all work required to install each item of equipment, including auxiliaries, and wiring and in operating condition to the Owner's satisfaction. Individual systems and items of equipment shall be completed in a sequence that will permit systematic checkout and trial operation of each such component before it is incorporated in the initial operation. Contractor shall provide supervision and other workers required to make adjustments and correct deficiencies during initial equipment checking.

Certain calibration and test procedures may involve personnel or work being furnished by other contractors. Contractor shall arrange working crews and schedule so that calibration will be performed in one operation.

Work shall be performed as necessary to meet the Contract Document requirements and the approved construction schedule.

Personnel performing adjustments and tests shall be qualified and experienced. Adjustments and tests shall be performed as many times as is necessary to assure proper operation of equipment and systems and quality of materials and workmanship.

If tests reveal unsatisfactory materials or workmanship, such materials or installation shall be repaired or replaced by Contractor to satisfaction of the State and shall meet all Contract Document requirements.

Equipment and instrumentation furnished by Contractor (including gauges, switches, thermometers, and other devices which are part of major equipment assemblies furnished by Contractor) shall be assembled, tested, adjusted and calibrated as required for correct and reliable operation.

Contractor shall confirm the inspection and test procedures, identified in the Pre-functional Checklists, for systems in which the equipment is installed and submit to the State for approval. Inspection and test procedures information shall include but not be limited to the following:

1. Identification of material or article to be inspected or tested.
2. List of test equipment.
3. Detailed sequential instructions and test objective.
4. Measurement characteristics and required measuring equipment.
5. Acceptance and rejection criteria.
6. Allowable adjustment, repair or rework.
7. Requirements for data recording and reporting.

Pre-Functional tests and inspections shall be performed for all equipment, materials, and systems installed by Contractor, as specified herein and in accordance with equipment manufacturer's recommendations.

Pre-Functional tests shall be tests and checks required by these Specifications to verify correct assembly and installation of equipment and systems.

Contractor shall submit Pre-Functional test and inspection reports for each item of equipment or system which verifies and documents tests and inspections performed. When manufacturer's service representative has been involved, report shall include verification by that representative that the equipment or system is ready for operation.

PROCEDURES FOR FUNCTIONAL TESTING

In conjunction with the Functional Test procedures and requirements, the Contractor shall provide labor, equipment, and services to place systems and equipment into service.

The Owner will furnish operating personnel to observe Contractor's work during the Commissioning process. Contractor shall provide a minimum of two working days notice. Contractor shall provide other workers required to make adjustments and correct deficiencies during equipment commissioning and initial operation. It is anticipated that commissioning will be in progress continuously over extended periods of time. Workers required of Contractor shall be on site as required by the Owner.

Contractor shall furnish and apply oils, greases, refrigerants, fuels and other lubricants and materials required to place equipment in condition ready for operation. Contractor shall provide temporary gauging devices required during checkout and operation of equipment and systems. Contractor shall remedy any deficiencies and provide all labor, material, etc. to complete the Commissioning process in accordance with the Contract Documents and the approved construction schedule

After systems have been commissioned to satisfaction of the Owner, Architect/Engineer, Contractor, and equipment manufacturers, the systems will be considered commissioned and ready for operation.

END OF SECTION

PART 1 - GENERAL

SCOPE

This section includes furnishing of all labor, materials, equipment and services necessary for the completion of Construction Survey Work in accordance with the Contract Documents and as required to complete the work.

RESPONSIBILITY OF CONTRACTOR TO RETAIN SURVEYOR

The Contractor shall retain and pay for the services of a registered Land Surveyor (licensed in the State of Oregon) to locate and mark existing survey monuments of record (and replace disturbed survey monuments as required), as well as to establish construction control and perform construction surveys as required to establish the locations, lines and grades of curbs, grading, pipelines, structures, appurtenances and other improvements indicated on the drawings or specified.

The Contractor and the Contractor's surveyor shall be responsible for reviewing the drawings and verifying that the grade & invert elevations, stations and slopes listed on the drawings correspond (and match existing or new finish grades as applicable), as well as conforming with all requirements of this and related sections.

The Contractor and the Contractor's surveyor shall be responsible for reporting any discrepancies to the Owner's Representative far enough ahead of construction to allow Owner's Representative to review and make necessary adjustments without delaying the work.

The Contractor shall be responsible for layout of the work and transferring elevations from the construction control provided by the Surveyor as required to properly complete the construction of all improvements included in this project.

Responsibility of Contractor's Surveyor Regarding Existing Survey Monuments.

The Contractor's surveyor shall be responsible for determining the location of survey monuments to be located and marked for protection or replacement as specified herein.

Any failure by the Contractor's surveyor in fulfilling these responsibilities to locate, tie and/or mark existing survey monuments shall not entitle the Contractor to additional contract time or additional compensation.

MARKING & PROTECTION/REPLACEMENT OF PERMANENT SURVEY MONUMENTS

Prior to construction, the Contractor's Surveyor shall be responsible for researching, locating and marking all existing survey monuments of record (including but not limited to property and street monuments) and permanent elevation benchmarks. This shall include all which are located within or immediately adjacent to the project limits, which may be impacted by construction activities (whether or not the monuments are shown on the construction drawings).

Contractor shall not disturb permanent survey monuments, lot stakes, or elevation bench marks unless arrangements have been made to have his surveyor replace said survey markers after construction as noted herein. The Contractor's Surveyor shall be responsible for providing the County Surveyor with any required notice and/or maps as required under ORS 209.140-155. Contractor and Contractor's Surveyor shall bear the responsibility of replacing any survey monument disturbed by construction activities (whether removed with or without the consent or knowledge of the Owner's Representative).

If any survey monuments of record are removed, disturbed or destroyed during construction of the project, the Contractor shall retain the services of a registered Professional Land Surveyor licensed in the State of Oregon to reference and replace all such monuments in accordance with ORS 209.150. The Contractor shall be responsible paying all costs related to the replacement of disturbed survey monuments of record.

Each monument shall be replaced within a maximum of 90 days of its being removed, disturbed or destroyed as may be required by ORS 209.140-155. The surveyor shall notify the County Surveyor in writing of all such monuments replaced, and provide all documentation required by the County Surveyor, and pay any applicable recording fees. All monument replacement work shall be completed prior to final payment by the Owner. No separate or additional compensation will be provided for monument replacement work.

When a change is made in the finished elevation of the pavement of any roadway in which a permanent survey monument box is located, Contractor shall adjust the monument cover to the new grade at no expense to the Owner.

SUBMITTALS

Submittals shall be in accordance with the requirements of these Contract Documents and shall include the following submittals for Record.

Copies of construction survey cut sheets shall be provided to the Owner's Representative for reference during construction (faxed or emailed copies are acceptable). Receipt and/or review of these survey cut sheets by the Owner's Representative does not relieve the Contractor of his responsibility to review and confirm all elevations, grades, slopes, etc., and to notify the Owner's Representative of any discrepancies or conflicts.
Certification letter regarding the location and marking of existing survey monuments of record (and replacement of any disturbed monuments) as well as documentation regarding any required notice provided to the County Surveyor. A copy of survey documentation and/or maps submitted to the County Surveyor (pertaining to replacement or restoration of survey monuments, if any) shall be submitted with the certification letter.

PART 2 - PRODUCTS

SURVEY EQUIPMENT
The surveying equipment used for construction staking, layout of the work and transferring elevations from the construction stakes shall be able to operate within the tolerance limits set by the technical specifications. The Contractor and Contractor's Surveyor shall be responsible for verifying that the equipment is in proper working order and adjustment during all phases of the work. The Owner's Representative may at any time during the project require the Contractor's or Contractor's Surveyor's equipment to be checked for accuracy.

DIGITAL INFORMATION AVAILABLE FOR USE BY CONTRACTOR'S SURVEYOR
If requested by the Contractor's surveyor, the Engineer will make available the following digital survey & design data for use by the Contractor's surveyor.
ASCII point file of the topographic survey and control points.
XML file of the design to include surfaces, alignments, profiles, & pipe networks.
pdf plots of the current construction drawings.
No further digital data (including AutoCAD drawing files) will be provided to the Contractor or Contractor's surveyor.
The use of the electronic (digital) information transmitted herewith is intended for reference for this specific project, and is not to be used for other projects. The electronic media shall remain the property of the Engineer and is subject to its copyright. Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by Engineer, and Engineer makes no warranties, either express or implied, of merchantability and fitness for any particular purpose.
Any electronic files provided are not construction documents. Differences may exist between these electronic files and corresponding hardcopy construction documents. Construction shall be based on the stamped hard-copy design drawings produced by Westech Engineering, Inc. In the event that a conflict arises between the signed or sealed hard-copy construction documents prepared by Westech Engineering, and the electronic files, the signed or sealed hard-copy construction documents shall govern. Contractor is responsible for determining if any conflicts exist. Use of these electronic files does not relieve Contractor of Contractor's duty to fully comply with the contract documents including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate work with that of other contractors for the project. No revisions shall be made to the design without the express written consent of the Design Engineer whose stamp is on the hard-copy design drawings.
The electronic files are based on computer aided design (CAD) documents compatible with AutoCAD, based on Engineer's specific software configuration & settings. The Engineer makes no representations regarding the accuracy or completeness of the electronic files received by Contractor or Contractor's surveyor, or compatibility with any computer or software you may use. By such request of and use of electronic files, Contractor and Contractor's Surveyor explicitly acknowledge that he understands that any translation of CAD data from one computer system or environment to another (or conversion from software version to another) can and often does result in the loss of important data. This loss can include but may not be limited to: portions of text and dimensions; the existence, location or scale of symbols or other elements of graphics; the internal structure of the data including layers and data attributes; the style or weight of lines.
By such request of and use of electronic files, Contractor and Contractor's Surveyor further acknowledge that, while all digital CAD data appears to be extremely accurate, this apparent accuracy is an artifact of the techniques used to generate it and is in no way intended to imply actual accuracy. All users of this data take full responsibility for verifying (against the stamped hard-copy design drawings) the correctness of all measurements, areas, inventories, etc. digitally extracted from this data. For example, where shown

on the drawings, offset dimensions shall take precedence over the digitally scaled location of structures and utilities. Revisions to the design may be made subsequent to the transmission of this data. It is the responsibility of the Contractor to identify and make all required revisions or corrections to this data required by subsequent design revisions by Westech Engineering, Architect or Design Team.
Any use or reuse by Contractor or by others will be at Contractor's sole risk and without liability or legal exposure to Westech Engineering, Inc, Architect or Design Team. Contractor and Contractor's Surveyor agree to make no claim and hereby agree, to the fullest extent permitted by law, to indemnify, defend and hold harmless Westech Engineering, Inc. (including Westech's officers, directors, employees, agents, or sub consultants) against all damages, liabilities or costs, including reasonable attorneys' fees and defense costs arising out of or resulting from Contractor's use of these electronic files. In no event shall Westech Engineering, Inc. Architect or Design Team be liable for any loss of profit or any consequential damages as a result of use or reuse of these electronic files by Contractor or any party to whom Contractor provides these files.

PART 3 - EXECUTION

GENERAL

The Contractor shall be responsible for coordinating and providing sufficient advance notice to allow Contractor's Surveyor adequate opportunity to complete field surveying prior to construction.
The Contractor shall be responsible for layout of the Work shown on the drawings or as altered or modified by the Owner's Representative, and for transferring alignments, locations and elevations from the construction stakes set by the Surveyor. The Contractor shall use competent personnel and suitable equipment for the layout of the work required.
The Contractor's Surveyor shall establish baselines and benchmarks that in his judgment will enable the Contractor to proceed with the work. This will include establishing construction control, layout lines, and performing initial construction surveys to establish the lines, locations and grades of pipelines and/or roads, structures and appurtenances at appropriate intervals, on offset lines as determined by the Contractor.
Contractor's Surveyor shall provide survey cut sheets to the Contractor and the Owner's Representative.
Marked lathe shall be provided by the Contractor's Surveyor for all construction hubs (offset hubs or elevation hubs) set by the Surveyor.
Pavement and/or Curbs. Construction stakes for line and grade of pavement and/or curbs shall be set at a maximum of 50-foot intervals for curb grades of 0.5% or steeper and 25 feet intervals for curb grades less than 0.5% and at low and high points of vertical curves to assure conformance to plan line and grade.
Pipelines, Utilities or Associated Improvements, Construction stakes for line and grade of pipelines, utilities or associated improvements shall be set at a maximum of 50-foot intervals (or closer if required to assure conformance to plan line and grade), as well as at all horizontal angle points, grade changes, manholes, catch basins, inlets, valves, meters, vaults or other structures.
Buildings, Slabs, Etc. Construction stakes for use as horizontal & vertical points shall be set for all buildings, slabs, or other structures, sufficient to allow the contractor to establish stringlines or other means to accurately locate such improvements, as well as allowing the location of conduits, pipes, or other improvements installed prior to form installation to be accurately set.
The Contractor shall preserve and protect the construction stakes or markers set by the Surveyor until their purpose has been served. Any survey construction stakes or markers that are destroyed or disturbed by the Contractor beyond use, and that are essential to the project or prosecution of the work, shall be replaced by the Surveyor at the expense of the Contractor.

RIGHT-OF-WAY AND EASEMENT MARKING

When the Contractor performs construction within 10 feet of a right-of-way or easement line, the Surveyor shall place tall stakes properly identified at points of change in width or direction of the right-of-way or easement line and at points along the line so that at least two stakes can be seen distinctly from any point within the work area limits.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Permanent and temporary formwork and accessories for placing of structural and architectural cast-in-place concrete.

WORK INSTALLED BUT FURNISHED BY OTHERS
Build in as directed by those Contractors, without weakening or defacing formwork.

SUSTAINABILITY REQUIREMENTS
Comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA method 24):
Concrete Form Release Agents: 0g/L

DESIGN AND ENGINEERING
Formwork design and engineering, as well as construction are Contractor's responsibility.

DELIVERY, STORAGE, AND HANDLING
Protect against damage and discoloration.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

PLYWOOD FORMS
APA B-B Plyform grade plywood, Class 1.
Thickness: As required by concrete placement rate.
Provide at all vertical concrete work.

BOARD FORMS
Rough sawn 1x4 and 1x6 Douglas Fir
Thickness: Provide additional plywood backing as required by concrete placement rate.
Provide at all vertical concrete work at planters.

FORM TIES
For all Work:
Plastic cone type, Burke, Bowman, Richmond, Dayton, or approved, with standard breakback, and type recommended by manufacturer for conditions of installation.
Wire ties and wood spacers not permitted.

EMBEDDED ITEMS
Steel Reinforcement:
Refer to Section 03 20 00.
Anchor Bolts:
Furnished by steel fabricator.

FORM TREATMENT
For Plank Forms:
Clean water.
For Plywood Forms:
Coat with approved stainless form oil, using minimum quantity required for satisfactory form removal.

PART 3 - EXECUTION

PREPARATION
Conform to shapes, lines, and dimensions shown on Drawings.
Brace and tie together to insure that position and shape are maintained.
Make tight to prevent mortar leakage.

Arrange joints as indicated or directed.
Form for surface indentations, as shown on Drawings.
Provide access openings as required for cleaning and inspection of forms and embedded Items prior to placing concrete. Locate where not exposed to view.
Anchor as required to prevent upward or lateral formwork movement during concrete placement.

PLYWOOD FORMS
Prevent plywood end grain from forming concrete exposed to view.
Construct beam side forms for removal without disturbing bottom forms or shoring.

BRACING
Provide as required to meet load requirements.
Protect against undermining or settlement when placed on ground.
Anchor as required to prevent upward or lateral formwork movement during concrete placement.

OPENINGS AND CHASINGS
Provide openings and chasings of slabs and walls for mechanical and electrical work.
Sizes and locations as directed by mechanical and electrical trades.

CHAMFERS
Except at flush joints between adjacent materials, chamfer exposed external corners of concrete with 3/4 inch triangular wood strips placed in forms.

TREATMENT OF FORMS
Plank Forms:
Keep wet previous to placing concrete; wet thoroughly just before concrete placing.
Plywood Forms:
Apply coating to contact surfaces in accordance with manufacturer's directions.
When treating previously set forms, prevent coatings from covering reinforcing steel or existing concrete where bond is required.
Prohibit coatings from collecting in puddles.

EMBEDDED ITEM INSTALLATION
Steel Reinforcement:
Refer to Section 03 20 00.
Anchor Bolts:
Secure in accordance with approved setting drawings. Set with templates to assure accurate bolt positioning.

TOLERANCES
Variation of Building Lines:
1/4 inch in any bay or 20 ft. maximum.
Variation in Cross-Sectional Dimensions:
Minus 1/8 inch; plus 1/4 inch.
Variation in Surface Tolerance:
1/8 inch in any 10 ft. measured with 10 ft. straight-edge.
Deflection of Form Facing Material between Supports:
0.0025 x span, maximum.
Crossing Property Lines:
Regardless of tolerances specified above, no construction shall extend beyond the Legal Boundary of the Project.
Openings, Columns, Beams, and Slabs:
Accurately sized and located within 1/8 inch plus or minus.

ADJUSTMENTS
Reposition to true alignment prior to, during, and after concrete placement, if necessary.
During concrete placement, in areas where formwork develops weakness, settlement or distortion, stop placement and remove or strengthen formwork.

FORM CLEANING
Remove debris and foreign matter from formwork prior to concrete placement.
Remove loose rust and foreign matter from reusable hardware prior to installation into formwork.

FORM REMOVAL
Leave forms and shoring in place until concrete has attained sufficient strength to safely support own weight and imposed loads.
Remove forms at time and in manner to insure safety of structure, and without concrete surface damage.

FORM RE-USE
Withdraw projecting nails; clean concrete from contact surfaces. Replace with new material when necessary or when directed.
Re-use forms only when contact surfaces equal those specified for original use.

CLEANING AND REPAIRING
Remove formwork and debris from project site upon work completion or sooner, if directed.
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.

PROTECTION
Protect other work against damage and discoloration caused by work of this section

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Reinforcing steel and required supports for cast-in-place concrete and reinforced masonry.

REFERENCES
"2014 Oregon Structural Specialty Code (OSSC) based on the International Building Code (IBC) 2012 Edition", published by the International Code Council (ICC).
"Manual of Standard Practice for Detailing Reinforced Concrete Structures Standard 315" (ACI Manual 315), published by American Concrete Institute, Box 19150, Redford Station, Detroit, Mich. 48219.
"Manual of Standard Practice" (CRSI Manual), published by Concrete Reinforcing Steel Institute, 180 N. LaSalle Street; Chicago, Ill. 60601.

SUBMITTALS
Submit in accordance with Section 01 33 00.
Shop Drawings:
Follow ACI Manual 315.

PRODUCT DELIVERY, HANDLING AND STORAGE
Protect against damage, rust, mud, grease, and oil.
Tag each piece or bundle; indicate size, grade, and location.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

BARS
ASTM A 615, #3 and smaller: Grade 40; #4 and larger: Grade 60.

SMOOTH WIRE REINFORCING
ASTM A 615, Grade 60.

TIE WIRE
Black, annealed steel 16 GA. minimum; Fed. Spec.QQ-W-461.

ACCESSORIES
General:
Conform to CRSI "Manual of Standard Practice.
Include all devices necessary for proper reinforcement placement, spacing, supporting, and fastening.
Fabricate from concrete ceramics, metal or plastic. Galvanize metal accessories in contact with finished concrete surfaces.
Slab-on-grade Bar Supports:
Precast concrete spacer blocks at bars placed over vapor retarders; wire chairs permitted only where vapor retarders are not scheduled.

FABRICATION
Follow CRSI "Manual of Standard Practice."

TOLERANCES
Fabrication;
Sheared length: Plus or minus 1 inch.
Stirrup, Spiral, and Tie dimensions: 1/2 inch plus or minus.
All other bend dimensions: Plus or minus 1 inch.

PART 3 - EXECUTION

EXISTING CONDITIONS
Verify that surfaces to receive reinforcement are accurately sized and located, square, plumb, rigid,

secure, and otherwise accurately prepared.
Prior to starting work notify general contractor of defects requiring correction.

INSTALLATION
General:
Conform to Building Code and the following:
Bending:
Bend bars without heat.
Field bending partially embedded bars not permitted without Architect's approval.
Placing:
Secure against displacement.
Do not displace or damage vapor barrier.
Spacing:
Clear distance between parallel bars, including splices, unless otherwise permitted by Code, not less than:
- Nominal Bar diameter.
- 1-1/2 times maximum concrete aggregate size.
- 1 inch.

Splicing:
Do not weld or tackweld reinforcement splices.
Minimum Lap at Splices at Bar Reinforcement: 24 bar diameters.
Protective Concrete Covering:
At principal structural members cast directly against the ground, including footings: 3 inches minimum.
At principal structural members in direct contact with the ground after formwork removal: 2 inches minimum.
At walls not exposed directly to ground or weather: 3/4 inches minimum, or bar diameter, whichever the larger.
All other locations: 1-1/2 inches minimum, or bar diameter, whichever larger.

SPECIAL REINFORCEMENT, unless otherwise shown on Drawings
Masonry Reinforcement Bars:
At reinforced masonry walls cast bar dowels into concrete as required to develop continuity between masonry and concrete; space and size dowels as shown on Drawings.
Support vertical bars at top and at 192 bar diameter maximum intervals.
Splice bars at 30 bar diameter intervals.
At Corners and Intersections:
Splice horizontal wall reinforcing with corner bars; same size and spacing. Extend beyond corner or intersection 40 bar diameters, minimum.
At Openings:
Provide 1 each #5 bars around openings; extend 24 inches minimum beyond corners.
At Slab Re-entrant Corners:
Provide 1 each, 48 inch long, #4 bar diagonally across corner.

TOLERANCES
Placement:
Concrete cover: Plus or minus 1/4 inch.
Spacing between Bars: 1/4 inch.
Top Bars in Slabs and Beams:
- Members 8 inches deep or less: Plus or minus 1/4 inch.
- Members from 8 to 24 inches deep: Plus or minus 1/2 inch.
- Members more than 24 inches deep: Plus or minus 1 inch.

Stirrups and Transverse Bars: Space evenly within 2 inches of stated separation.
Bar relocation to avoid interference with other reinforcement, conduits, or embedded Items: 1 Bar diameter, unless otherwise approved by Architect.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

CLEANING AND REPAIRING

Prior to concrete placement, remove loose flaky rust, mud, oil, and other bond-reducing coatings; conform to IBC, Chapter 19.

Remove debris from project site upon work completion or sooner, if directed, including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Cast-in-place or in-situ concrete for structural building frame, slabs on fill or grade, and other concrete components associated with the construction.

RELATED SECTIONS

03 11 00 Concrete Forming
03 20 00 Concrete Reinforcement
32 16 00 Concrete Curbs and Sidewalks

SUBMITTALS

Submit in accordance with 01 33 00.

Shop Drawings:

For any location where layout and detailing has been provided in the Contract Documents, submit Shop Drawings indicating understanding for architect's approval.

Product Data:

Design Mixes: Submit for each type and class of concrete specified.

Include prior laboratory test data & compressive strength results in accordance with ACI 301 & ASTM standards.

Indicate amounts of mixing water to be withheld for later addition at Project site.

QUALITY ASSURANCE

Perform work in accordance with ACI 301.

Obtain materials from same source throughout the work.

Installer Qualifications:

A qualified installer with a minimum of 3 years of experience, who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician."

Manufacturer Qualifications:

A firm with a minimum of 3 years of experience in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94 M requirements for production facilities and equipment."

Pre-Installation Meeting:

Convene one week before starting work of this section to verify project requirements, coordinate with installers of other work, coordinate with mechanical requirements for hydronic floor heating, embedded items and penetrations required by other trades.

Establish condition and finish of concrete surfaces, including exposed form finish concrete.

Review construction joint layouts at walls and slabs.

Review control joint layouts at slabs.

SUSTAINABILITY REQUIREMENTS

Volatile Organic Compounds:

Comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA method 24):

Concrete Curing and Hardening Compounds: 60 g/L

Concrete Sealer: 10 g/L

PRODUCT DELIVERY, HANDLING, AND STORAGE

Protect against deterioration, foreign matter intrusion, contamination, and dampness.

Conform to ASTM C 94.

ENVIRONMENTAL REQUIREMENTS

Cold Weather:

Place no concrete on frozen subgrade.

Remove ice and snow from reinforcing, forms, and embedded items.

Raise temperature of all surfaces in contact with concrete above freezing prior to concrete placement.

Minimum concrete temperature during placement: 65^{o}F.

Minimum concrete temperature for 72 hours after placement: 55^{o}F.

Maximum air temperature drop during first 24 hours after protection removal: 55^{o}F.

Use of salts or chemical admixtures to prevent concrete freezing prohibited.
Do not permit temporary heaters to locally over-heat or over-dry concrete.
Assume responsibility, including costs, for testing suspected frozen concrete.
Remove and replace freeze-damaged concrete at contractor's expense.
Warm Weather:
When air temperature exceeds 90^{o}F and when wind exceeds 20 mph place concrete in accordance with the following requirement:
Maximum concrete temperature at time of placement 75^{o}F.
Mix concrete minimum possible time, and place as soon as possible thereafter.
Sprinkle forms, reinforcing, embedded items, and subgrade with cool water immediately prior to concrete placement.
Protect unstripped formwork and exposed concrete surfaces against excessive drying with water spray, or other approved method.
Assume responsibility, including costs, for testing suspected damaged concrete.
Remove and replace damaged concrete at contractor's expense.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

PORTLAND CEMENT
ASTM C 150, Type 1.
Use one brand only for exposed concrete.

AGGREGATE
Conform to ASTM C 33.
Maximum size: 3/4 inch, and not more than one-fifth of narrowest space between forms, one-third of slab depths, nor three-fourths of minimum clear space between reinforcing bars.
Maximum size for exposed aggregate: 3/4 inch.
Use same source for course and fine aggregate used in exposed concrete.
Minimum 60% of surface of course aggregate to have crushed faces.

ENTRAINED AIR
ASTM C 260, non-toxic after 30 days, not containing chloride.
Provide in exterior curbs, walks, and flatwork that are subject to freezing while wet.

WATER REDUCING ADMIXTURES (PLASTICIZER)
ASTM C 494, Type A.
Provide at all concrete slabs on grade.
May be used at Contractor's option.
Provide with dosages high enough to reduce water by minimum 10% from the same mix without admixture.

CALCIUM CHLORIDE
Not approved for use.

BONDING AGENT
Euclid “Flex-Con”, W.R. Meadows “Interlock 1059”, Sika “Sika Bond”, Tammsweld, Larsen “Weld-Crete”, Nox-Crete “Vinl-hesive”, Dayton Superior J-40, or accepted substitute.

EXPANSION JOINT FILLER
W.R.Meadows Fibre Expansion Joint #320-F, 1/2 inch thick, conforming to ASTM D 1751.
Depth as required to bring top to within 1/4 inch of surface of slab.

NON-SHRINK GROUT
Heavy-duty, high early strength, non-shrink, non-metallic, non-staining type, conforming to ASTM C 1107 and CRD-C621; Sonneborn “Sonogrout 14K”, Dayton Superior “1107 Advantage Grout”, “Tammsgrout Supreme", Sika “Sikagrout 121”, or accepted substitute.

Provide as Follows:
Under column base plates.
Elsewhere shown on Drawings.

STANDARD GROUT
Parts by volume:

Cement	1
Lime	1/4
Fine Aggregate	3
Pea Gravel, as graded below	1 1/2

Sieve Size	% Passing
3/8	95-100
#3	45-75
#4	10-20
#8	0-5

Water: Minimum amount to produce required compressive strength at 28 days, and to provide pouring consistency without aggregate segregation.
Provide around pipes, conduit and ducts passing through floors and walls, and elsewhere necessary to prevent air and sound passage through walls and floors.

FLOOR FILLER
Dowman "Fix-All", or accepted substitute.
Provide over concrete floor slabs which are too rough or uneven to provide satisfactory base for resilient covering or carpeting.

CURING AND HARDENING COMPOUNDS
Interior Flatwork to receive Finish Covering:
Clear, colorless, with fugitive dye, approved by covering contractor; meet or exceed ASTM C 309, Type 1.
Interior Flatwork without Finish Covering:
Water-based chemical hardener; Dayton Superior "Day-Chem Hardener J-15", Tamms "Hornolith," Euclid "Surfhard", Sonneborn "Lapidolith," Nox-crete "Harbeton," or accepted substitute.
Do not apply curing compound to surfaces scheduled to receive ceramic or stone tile. Wet cure only.
Exterior Flatwork:
Non-yellowing, resin cure, water-based, meet or exceed ASTM C 309, Type 1, Class A and B; Tamms "Horncure WB 100", Dayton Superior "Day-Chem Rez Cure J-11-W", BASF "Master Cure 100", W.R. Meadows "1100 Clear", Euclid "Kurex VOX", or accepted substitute.

OTHER INGREDIENTS
Conform to Building Code.

CONCRETE MIX DESIGN
General:
Conform to ACI Code 318-02 and 201 OSSC Section 1905.
Selection of concrete proportions shall be based on required average compressive strength of concrete f'cr stated in table below unless concrete production facility has 15 or more test records meeting the requirements of ACI-11 5.3.1.
Documentation that proposed concrete proportions will produce an average compressive strength equal to or greater than required average compressive strength f'cr shall consist of more than 30 but not less than 10 consecutive test records which encompass a period of time not less than 45 days. Such records shall represent materials and conditions similar to those expected. When an acceptable record of field test results is not available, concrete proportions may be established based on trial mixtures meeting the requirements of ACI-11 5.3.3.2.
Concrete Strength and Minimum Cement Content:

Location	f'c	Max w/c ratio	Min. cement (sacks/cu. yd.)
Slabs-on-grade, Curbs	3500 psi	0.44	5.5
Footings, all other	3000 psi	0.46	5.0

Note: One sack of cement equals 94 lbs.
Engineer may order cement content for any class of concrete to be increased over the quantity specified if determined that such increase is necessary to attain required strength. Increased quantities of cement

ordered to be furnished by contractor at no additional cost to owner.
Air Entrainment:
Footings: 2% to 4% of concrete volume.
Walls, Exterior Slabs: 4% to 6% of concrete volume.
Concrete Slump:
Minimum: 2 inches.
Slabs-on-grade, Curbs: Maximum 4 inches, 7 inches maximum with plasticizers..
Footings: 6 inches.
Verify that design mix test results reflect the slumps to be used and adequate slump is produced to properly transport and place the mix.

PART 3 - EXECUTION

EXISTING CONDITIONS
Verify that formwork, reinforcement, and embedded items are accurately and securely placed, clean, water and frost-free, and ready to receive concrete.
Verify that vapor retarder is not punctured or otherwise damaged. Repair all damage.
Remove water from vapor retarder with portable high-speed air blowers just prior to slab-on-grade pour.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

SURFACE PREPARATION
Remove foreign matter from surfaces and areas to receive concrete.
If vapor retarder is wet, blow water off with power blower.
Sprinkle subgrades and other porous surfaces with water to eliminate suction.
Install slab-on-grade screeds without penetrating vapor retarder.

PLACING
Convey and place by methods which will prevent material separation and loss.
Deposit continuously, or in layers that will not form seams or weakened planes; where seams or weakened planes are unavoidable provide construction joints as specified hereunder.
Do not convey pneumatically placed concrete through aluminum pipe.
Do not re-temper or use set concrete.
Maximum height of vertical drop without use of trunk, placement ports in sides of formwork, or other approved method is five (5) feet. When under-water concrete placement is approved, deposit fresh concrete into mass of previously placed concrete causing water to be displaced with minimum concrete surface disturbance.

COMPACTION
Employ mechanical high frequency vibrators to consolidate concrete around reinforcement, into corners and angles of forms, and to exclude rock pockets, air bubbles, and honey comb.
Hold vibrator in one spot no longer than 30 seconds; keep in constant motion, insert and withdraw at points approximately 18 inches on center.
Maintain vibrator in vertical position when penetrating concrete.
Transporting concrete with vibrator not permitted.
Maintain spare vibrator at jobsite during concrete placement.

CURING
Curing Period:
Not less than 7 days at 50^{o}F minimum.
Exterior Flatwork:
Treat with curing compound applied immediately after slabs are finished in accordance with manufacturer's directions.
Interior Flatwork:
Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
Avoid alternate wetting and drying and fluctuations of concrete temperature.

Curing compound prohibited at interior slabs-on-grade installed over vapor retarder.
Moist cure interior slabs-on-grade installed over vapor retarder only when weather conditions involve high temperatures, wind, or both. Moist cure for minimum 48 hours.
Cure concrete slabs scheduled to receive ceramic tile by keeping the surface continuously moist for minimum 48 hours. Do not use curing compounds.
Immediately prior to occupancy clean interior floors to remain exposed and treat with hardener.

CONSTRUCTION JOINTS IN FLATWORK
General:
Form to true, straight lines, with slabs flush at joints.
Locate under walls wherever possible.
Do not extend reinforcement through joints, unless otherwise shown on Drawings.
Spacing:
At Interior Flatwork:
    Maximum spacing, unless otherwise shown on Drawings:
    At uncovered Flatwork: 25 ft. apart, both ways.
    At covered Flatwork: 25 ft. apart, both ways.
At Exterior Flatwork:
    Maximum spacing, unless otherwise shown on Drawings:
    At Walks and Drives: 15 ft. apart, both ways.
    At Curbs: 30 ft. apart.
    Fill alternate joints and joints where flatwork abuts vertical construction with expansion joint filler.

CRACK CONTROL JOINTS IN FLATWORK
General:
Form to true, straight lines, with slabs flush at joints.
Saw-cut control joints in slab as soon as possible after finishing. Use saw blade with triangular arbor configuration similar to Soff-cut V-blades to reduce edge reveling and dislodging aggregate.
Spacing:
At Interior Flatwork:
    Maximum slab area without joints: 300 sq. ft.
    Maximum spacing, unless otherwise shown on Drawings:
    At uncovered Flatwork: 25 ft. apart, both ways.
    At covered Flatwork: 25 ft. apart, both ways.
At Exterior Flatwork:
    Maximum spacing, unless otherwise shown on Drawings:
    At Walks and Drives: 15 ft. apart, both ways.
    At Curbs: 15 ft. apart.

VOIDS AND GRAVEL POCKETS
Repair as directed wherever, in Architect's opinion, it is necessary.

CONCRETE SLAB FINISHES
General:
Screed all slabs, for whatever finish, to true levels or slopes.
Non-Slip Finish:
Screed and tamp to bring fine particles to surface.
Float with wood or carpet float to true surfaces.
Slightly roughen surfaces with hair broom before tooling edges.
Mark off slabs as shown or directed; round edges to 1/4 inch radius.
Provide at exterior driveways and walks unless otherwise indicated.
Troweling:
At interior slabs-on-grade installed over vapor retarder: Provide single finish troweling.
Do not absorb wet spots with Neat cement or mixture of cement and sand.
Wait until surfaces are dry enough for proper troweling.
Chemical dryers not permitted.
Trowel floors level to true slopes.
Provide at all concrete slabs unless otherwise noted.
Slopes to Drains:

True to line, evenly graded, 1/8 inch per foot unless otherwise shown on Drawings.

NON-SHRINK GROUT
Follow manufacturer's directions. Do not retemper set grout.
Saturate concrete contact surfaces prior to grouting; remove excess water.
Thoroughly compact grout free of air pockets. Do not vibrate.
Do not remove leveling shims, if any, until 48 hours after grout placement.
After shim removal fill voids with standard grout.
After grout which is exposed to final view has reached initial set, rake out exposed edges approximately one inch & point with mortar as follows: 1 part portland cement, 2 parts sand, & 1/2 part water by weight.
Cure with moisture for 24 hours minimum.

STANDARD GROUT
Saturate concrete contact surfaces prior to grouting. Remove excess water.
Thoroughly compact grout free of air pockets. Do not vibrate.
Cure with moisture for 24 hours minimum.
Do not retemper set grout.

FLOOR FILLER
Prime floor with asphalt emulsion prior to filler application.
Mix filler with asphalt emulsion as required to improve bond.

TOLERANCES
Troweled Surfaces: True within 1/8 inch per 10 ft.
Non-Slip Surfaces: True within 1/4 inch per 10 ft.
All Other Surfaces: True within 1/4 inch per 2 ft.

FIELD QUALITY CONTROL
Tests:
During the progress of the work, if lab-cured values shown for each concrete design strength and quality as determined by compression test cylinders and tests fail to attain the requirements specified, suspend all concrete work until new mixes are designed and reviewed as outlined.
Concrete that has been placed and does not meet specified requirements will be reviewed by the Architect and Contractor.
Any field testing such as core drilling required to verify in-place concrete strengths shall be at the Contractor's expense.
Correct or remove defective work in a manner approved by the Architect with no additional cost to the Owner.
Inspection:
Notify Architect at least 24 hours before intended concrete placement.
Place no concrete until formwork and reinforcement have been inspected.

DEFECTIVE WORK
Remove and replace, when directed by Architect, loose topping, surfaces which show excessive cracks, any slabs which do not drain properly, and other defective concrete. On surfaces scheduled to receive floor or wall coverings remove, by grinding if necessary, defects of magnitude to show through covering.
Remove honeycombed and other defective concrete down to sound concrete. If chipping is necessary, shape edges perpendicular to surface or slightly undercut.
Feathered edges not permitted.

CLEANING AND REPAIRING
Remove debris from project site upon work completion or sooner, if directed.
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.

PROTECTION
Protect work specified herein against damage and discoloration.
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Mortar materials, admixtures, and grout used in the installation of unit masonry.

REFERENCES
Mortar for Unit Masonry: ASTM C 270.
Grout for Reinforced and Non-reinforced Masonry: ASTM C 476.

SUBMITTALS
Provide in accordance with Section 01 33 00.
Design Data: Mortar and grout design mix formulas.

QUALITY ASSURANCE
If ready-mixed mortar is used, provide certificate from the mixing plant attesting that the delivered mortar conforms to the design mix specifications.

DELIVERY, STORAGE, AND HANDLING
Protect against damage, contamination, and discoloration.
Store unmixed materials off ground, and under protective cover.
Remove unacceptable materials from site immediately.

SUSTAINABILITY REQUIREMENTS
Volatile Organic Compounds:
Provide MSDS product information data showing that admixtures, cleaners and sealers meet environmental performance goals including low emitting, low volatile organic compound products (VOC).

ENVIRONMENTAL REQUIREMENTS
During Rainy Weather:
Work only under cover.
During Cold Weather:
Perform no work unless approved means for heating materials is provided, and masonry is protected against frost until mortar has set.
Do not use anti-freeze ingredients.
When Air Temperature is between 40^{o}F and 32^{o}F:
Heat mixing water to maintain mortar at 70^{o}F - 120^{o}F until used.
After work day: Cover materials and completed work with canvas or polyethylene film to protect work against freezing and wetting.
When Air Temperature is between 32^{o}F and 25^{o}F:
Heat mixing water and aggregate to maintain mortar at 40^{o}F - 120^{o}F until used.
When wind velocity exceeds 15 mph during work day: Protect work with windbreaker.
After work day: Cover materials and completed work with canvas or polyethylene film to protect work against freezing and wetting.
When Air Temperature is between 25^{o}F and 20^{o}F:
In addition to the above requirements, maintain mortar on mortar boards above 40^{o}F.
Maintain materials and completed work above freezing for at least 48 hours by using auxiliary heat and/or insulating blankets.
When Air Temperature is below 20^{o}F:
In addition to the above requirements, enclose materials and completed work, and maintain enclosed air temperature above 40^{o}F for at least 48 hours.
During Hot Weather:
Protect work against wind velocity exceeding 15 mph and against direct sun exposure when air temperature exceeds 90^{o}F in shade with less than 50% relative humidity.
When Work is not in progress, including shutdowns between each day's work:
Cover wall tops with non-staining, waterproof covering; extend covering 2 ft. minimum down both faces of wall and secure in place.
When work is resumed:
Remove any loose mortar from work surfaces, dampen surface if necessary and when directed.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

CEMENT
Portland cement in conformance with ASTM C 150, Type I, except Type III may be used in cold weather. Provide natural color or white cement as required to produce specified color. Use only 1 brand at exposed work.

MASONRY CEMENT
Do not use "masonry cement" in any location for entire project.

LIME
Hydrated type conforming to ASTM C 207, type S, special finishing hydrated lime, non-air entrained. Use only 1 brand at exposed work.

MORTAR AGGREGATE
Standard masonry type, clean, dry natural sand or manufactured sand conforming to ASTM C 144 or ASTM C 404, size #2, except for joints 1/4 inch and less use aggregate graded with 100% passing the No. 16 sieve.

GROUT AGGREGATE
Course: ASTM C 404, size #8 or size #89.
Fine: Sand, ASTM C 33 or ASTM C 404, size #1.

PREMIX MORTAR
ASTM C 387, using natural color or white cement as required to provide the specified color.

WATER
Clean, potable and free of deleterious material.

ADMIXTURES
Accelerator:
Sonneborn "Trimix," "Anti-Hydro," or accepted substitute.
Retardant:
Sonneborn "Sonotard," Sika "Plastiment," Protex, or accepted substitute.
Calcium Chloride and Anti-Freeze:
None permitted in any location for the entire project.

MORTAR COLORS
Pure inorganic natural clay or mineral oxide, manufactured by EnvironOxide Pigments, Solomon Colors, Davis Colors, or accepted substitute.
Harmless to mortar set and strength.
Stable at high temperature.
Sunlight and alkali-fast.

INTEGRAL WATER REPELLANT
Liquid polymeric admixture conforming to ASTM E 514 for water penetration resistance; W.R. Grace & Co. “Dry Block” mortar admixture.

MASONRY CLEANER
“Sure Klean” or approved specific product recommended by manufacturer for cleaning new and existing concrete masonry units.

MORTAR AND GROUT MIXES
General:
Assume responsibility for mix design and product performance.
Measure materials by volume; do not measure by shovel-load.

Mix proprietary products in accordance with manufacturer's directions.
Mix all other mortars in mechanical batcher for 3 to 5 minutes.
Use water necessary for desired workability and required compressive strength.
Do not use mortar or grout which has begun to set or if more than one hour has elapsed after initial mixing.
Admixtures:
Add accelerator and retardant to mortar where required by weather conditions.
Mortar:
Type "M", 2500 psi, for reinforced or below grade masonry, by volume:

Component	Proportion by Volume
Portland Cement	One (1)
Hydrated Lime	one quarter (1/4)
Masonry Aggregate	not less than two and one quarter (2-1/4) or more than three (3) times the sum of the volumes of Cement and Lime used.

Type "S", 1800 psi, for veneer systems, by volume:

Component	Proportion by Volume
Portland Cement	One (1)
Hydrated Lime	one quarter (1/4) to one half (1/2)
Masonry Aggregate	not less than two and one quarter (2-1/4) or more than three (3) times the sum of the volumes of Cement and Lime used.

Grout:
In accordance with ASTM C 476 and the following:
Course grout where specified:

Component	Proportion by Volume
Portland Cement	one (1)
Lime	zero (0) to one tenth (1/10)
Fine Aggregate (Sand)	two and one quarter (2-1/4) to three (3) times the sum of the volumes of cement and lime materials
Course Aggregate	one (1) to two (2) times the sum of the volumes of cement and lime materials.

Fine Grout where specified:

Component	Proportion by Volume
Portland Cement	one (1)
Lime	zero (0) to one tenth (1/10)
Fine Aggregate (sand)	two and one quarter (2-1/4) to three (3) times the sum of the volumes of cement and lime materials.

PART 3 - EXECUTION

EXAMINATION
Verify that mortar mixing equipment, surfaces, and tools are clean and free of contaminates. Do not proceed with mixing until conditions are acceptable.

INSTALLATION
Install mortar and grout in accordance with Section 04 20 00. Work grout into cores and cavities to eliminate voids. Do not displace reinforcing steel while placing grout.

ADDING ADMIXTURES
Color:
Add in proportions recommended by manufacturer, all exposed mortar.
Accelerator and Retardant:
Add in proportions recommended by manufacturer, to mixes where required by weather conditions.
Integral Water Repellant:
Agitate water repellant containers prior to use.
Add water repellant admixture to mix water prior to charging the mix. Reduce initial water used in mix as recommended by water repellant manufacturer.
Add to mortar mix in proportions and dosage rate as recommended by manufacturer for type of mortar used.

RE-TEMPERING

Retemper mortar only within one hour after initial mixing.

CLEANING AND REPAIRING

Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section. During the tooling of joints, enlarge any holes or voids completely fill with mortar. Point-up all joints at corners, openings and adjacent work to provide neat, uniform appearance.

Remove debris from project site upon work completion or sooner, if directed.

PROTECTION

Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Masonry units used as walls or partitions, load or non-loadbearing; single wythe, veneer, and cavity construction; including related accessories.

PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION
Anchor bolts, sheet metal flashing, hollow metal work.

SUBMITTALS
Submit in accordance with Section 01 33 00.
Samples:
Sample of colored and/or textured concrete masonry units.

SUSTAINABILITY REQUIREMENTS
Volatile Organic Compounds:
Provide MSDS product information data showing that concrete admixtures, water repellants & sealers meet environmental performance goals including low emitting, low volatile organic compound products (VOC).

ENVIRONMENTAL CONDITIONS
Comply with those described in Section 04 05 13.

MOCK-UPS
General:
Build sample mock-ups where directed.
Prepare mock-ups showing typical coursing, vertical and horizontal joints, and corner condition unless otherwise directed. Do no additional work until mock-up is reviewed and accepted.
Accepted mock-up represents minimum acceptable workmanship standards. Work of lesser quality is subject to rejection and replacement.
Mock-up 1:
8 ft. long X 6 ft. height, include a building corner and a portion of a window opening.
Accepted mock-up, in like new condition, may be used on project.
Coat completed mock-up with specified water repellant.

DELIVERY, STORAGE, AND HANDING
Protect against moisture, damage, and discoloration.
Store materials off ground.
Remove damaged or discolored materials from site immediately after detection.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.
Obtain exact sizes of, and accurately build around, any built-in items.

PART 2 - PRODUCTS

BRICK
Conform to ASTM C 216, type FBX, Grade SW.
Manufacturer: H.C. Muddox, or approved substitute
Sizes: Modular
Face Texture: Mission
Color: Tule Fog

CONCRETE BLOCK (CMU)
Type: Hollow core block conforming to ASTM C 90, Type 1, medium weight.
Compressive Strength: 1500 psi minimum, per individual unit average net area.
Aggregates: Conform to ASTM C 331.
Sizes: 4x8x16, 4x8x8 basic sizes at veneer units, 6x8x16, 6x8x8 at interior masonry walls and other sizes as detailed on Drawings.

Face Shell Thickness: 1" for nominal 4" & 6" wide units.
Required Special Shapes: Provide special shapes as detailed or required.
Face Texture and Color:
6" units: Standard units without flutes or color.
4" veneer units: Ground Face, Midnight color
Sill Block: Ground Face, Natural color

INTEGRAL WATER REPELLANT
Liquid polymeric admixture conforming to ASTM E 514 for water penetration resistance; W.R. Grace & Co. "Dry Block" concrete block admixture.

STEEL REINFORCING BARS
Furnish and install hereunder. Conform to requirements specified in Section 03 20 00, and herein.
Prefabricated welded wire reinforcement, truss design, hot-dipped galvanized finish; Dur-O-Wal Truss or accepted substitute.

THROUGH-WALL FLASHING
Where flashing is fully concealed in masonry:
Type: Copper with asphalt impregnated fabric backing both sides.
Size: 5 ounce.
Manufacturer: Afco Products, Inc., or accepted substitute.
Where flashing is partly concealed in masonry:
Type: Type 304 stainless steel conforming to ASTM A167.
Thickness: 0.179 inch minimum.
Solder: Cadmium and lead-free silver solder conform to ASTM B32.

ANCHORS AND TIES
Ties:
3/16 inch diameter ASTM A 82 steel wire protected and hot-dip galvanized coating.
Anchors:
16 gauge corrugated sheet steel straps or 3/8 inch diameter steel bars, bolts, or rods shown on Drawings or as required by conditions of use, and protected by hot-dip galvanized coating.
Fabrication:
Fabricate long enough to secure to structure and embed into masonry at least 2 inches.
Provide lateral masonry restraint while permitting free horizontal and vertical movement.

MORTAR DEFLECTION MATERIAL
Open mesh weave designed for suspension of mortar droppings in masonry cavities, 10" height, thickness as required for masonry cavity, made of recycled polyester or high density polyethylene; Mortar Net USA "Mortar Net" or accepted substitute.

CONTROL JOINTS
Molded Rubber, Dur-O-Wall "Rapid Control Joint", or accepted substitute.

PRE-FORMED WEEP HOLES
Type: Polypropylene, honeycomb design; Hohmann & Barnard, Inc. #QV – Quatro-Vent, or accepted substitute.
Size: 3/8" x 2 1/2" x 3 3/8"
Color: Gray.

MASONRY CLEANER
Sure Klean, FabriKleen Type L, or approved specific product recommended by manufacturer for cleaning new and existing concrete masonry units.

MASONRY WATER-REPELLENT SEALER
Refer to Section 07 19 16.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive masonry are accurately sized and located, solid, level, dry, clean, and otherwise properly prepared.
Prior to starting work notify General Contractor about defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
Do not wet concrete block.
Remove dirt, ice, loose rust, and scale from anchors, ties, and reinforcement prior to setting masonry.

TOLERANCES
Unless otherwise specified, construct masonry work true within 1/8 inch per 10 ft.
Accurately size masonry openings within 1/4 inch plus or minus.

INSTALLATION
General:
Do not install cracked, broken, or chipped masonry units.
Use masonry saws to cut and fit exposed units.
Lay plumb, true to line, and with level courses accurately spaced within allowable tolerances.
Do not furrow bed joints.
Stop off horizontal run by racking back in each course; toothing not permitted.
Adjust units to final position while mortar is soft and plastic.
If units are displaced after mortar has stiffened, remove, clean joints and units of Mortar, and relay with fresh mortar.
When joining fresh masonry to set or partially set masonry: Remove loose units and mortar.
Clean and lightly wet exposed surface of set masonry prior to laying fresh masonry.
Remove misplaced mortar and grout immediately.
Mortar Beds:
Fill joints with mortar, except:
- Control joints and weep holes.
- Joints in open-end hollow masonry units.
- Space between wythes of cavity walls.
- Space between masonry veneer and backing.

Take special care to keep above spaces clean and free from mortar droppings.
Where adjustment must be made after mortar has started to set, remove mortar and replace with fresh mortar.
Laying Concrete Block:
Lay units in running bond, unless otherwise noted on Drawings.
Units with exposed open cells not permitted.
Make joints uniform approximately 3/8 inches wide.
Compress all joints with round tool.
Where hollow cell units cannot be used, fill in with matching solid units.
Unit Masonry Control Joints:
Locate where indicated or directed, and install as follows:
Provide notched sash block adjacent to joints.
Build in rubber control joints.
Fill both control joint faces with caulking compound specified in Section 07900.

INTEGRAL WATER REPELLANT
Provide in concrete block mix as recommended by water repellant manufacturer.

ANCHORING
For Masonry Veneer on Frame Construction:
Provide one tie or anchor for no more than each 2 sq. ft. of wall area.
Maximum horizontal distance between ties and anchors: 24 inches.
For Metal Frames:
Build in anchors furnished by metal frame manufacturer.

REINFORCING
Reinforced Hollow Cell Units:
Reinforce as shown on Drawings.
Provide horizontal bond beams where indicated.
Grout reinforced cells full.

FLASHING INSTALLATION
Clean masonry surface smooth and free from projections which might puncture or otherwise damage flashing.
Place flashing on mortar bed and extend up wall minimum 6 inches above top of mortar deflection material. Fasten vertical leg to substrate and lap under wall underlayment.
Cover flashing with mortar.

WEEP HOLES
Provide in head joints in first course immediately above flashing and sills.
Leave head joint free and clean of mortar.
Maximum spacing: 32 inches o.c.
Keep weep holes and area above flashing free of mortar droppings.
Fill cavity behind weep holes with mortar deflection material to level position two courses above weep hole top.

SEALANT JOINTS
Provide 1/4 inch wide by 3/4 inch deep sealant openings around outside perimeters of exterior doors, windows, louvers, and other masonry openings, unless otherwise shown on Drawings.

GROUTING HOLLOW METAL FRAMES INSTALLED IN MASONRY WALLS
Fill heads and jambs with grouting mortar specified in Section 04 05 13.

POINTING
Upon completion point exposed work of this section.
Fill holes and cracks.
Remove loose mortar, cut out defective Work and repoint where directed.
Remove mortar fins from joint junctions.

FIELD QUALITY CONTROL
Field measurements:
Verify prior to starting work.
If field measurements differ slightly from Drawing dimensions modify Work as required for accurate fit. If measurements differ substantially notify Architect prior to fabrication.
Inspection:
Notify Architect, at least 24 hours before grout placement. Place no grout until reinforcement has been reviewed and accepted.

CLEANING AND REPAIRING
Remove mortar and stains from exposed masonry surfaces.
Unless otherwise approved, clean interior masonry before installing finish materials.
Delay cleaning until masonry is dry.
Prior to cleaning remove excess mortar by scraping using brass, nylon, or other non-ferrous devices only.
Mask or otherwise protect vegetation, metalwork, and other materials damageable by cleaning agents.
Prior to applying fluid cleaning agents saturate masonry with clean water.
Unless otherwise approved, do not use muriatic or other acid type cleaning solutions.
Remove cleaning agents from masonry following cleaning.
Follow manufacturer's instructions for applying and removing cleaning agents.
Leave masonry surfaces ready to receive dampproofing specified in Section 07150.
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION

Protect other work against damage and discoloration caused by work of this section.

Protect masonry against damage until mortar has set.

Protect sills, ledges, and offsets against mortar droppings.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Steel roof and floor decking, and accessories including framing for openings less than 18 inches.

REFERENCES
AISI: Specification for the design of cold-formed steel structural members.
ASTM A36: Structural steel.
ASTM A446: Steel sheet, zinc-coated by the hot-dip process, structural quality.
ASTM A525: Sheet steel, zinc coated, by the hot-dip process.
ASTM A611: Steel, cold-rolled sheet, carbon, structural.
AWS D1.1: Structural Welding code.
SDI: Design manual for composite decks, form decks, roof decks.
Design all light gauge, cold formed members in accordance with the latest edition of the "AISC Specification for the Design of Cold-Formed Structural Members."

SUBMITTALS
Submit in accordance with Section 01 33 00.
Shop Drawings:
Indicate decking plan, deck profile dimensions, supports, projections, openings and reinforcement, finishes, pertinent details, and accessories.

QUALITY ASSURANCE
Manufacturer: Regularly engaged in the fabrication of pre-engineered structures.
Materials: New, unused, and free from defect.

DELIVERY, STORAGE, AND HANDLING
Schedule delivery to coincide with erection schedule.
Store decking on wood sleepers with slope for positive drainage.
Protect against damage and discoloration.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

MATERIALS
Sheet Steel:
Cold formed sheet steel conforming to ASTM A 446 Grade B, structural quality, with G90 galvanized coating.
Bearing Angles and Plates:
Conform to ASTM A36.
Welding Materials:
Conform to AWS D1.1.
Cell Closures:
Closed cell foam rubber, 1 inch thick, profiled to deck.
Metal Closure Strips, Concrete stops, Cover Plates, and Related Accessories:
20 gage sheet steel, profiles and sizes as shown on Drawings.
Touch-up Primer:
Zinc Chromate.

STEEL ROOF DECKING
Steel Roof Decking:
Minimum 16 gage, 3 inch high, fluted profile to SDI, 36 inch wide sheets, single span, with lapped joints.

FABRICATION

General:

Fabricate metal decking in accordance with SDI Design Manual for Composite Decks, Form Decks, Roof Decks, to accommodate maximum working stress of 20,000 psi and maximum span deflection of 1/240.

PART 3 - EXECUTION

EXAMINATION

Verify that structure to receive steel roof decking is accurately sized and properly located.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION

Verify field dimensions prior to fabrication.
If minor differences exist between field measurements and drawing dimensions, modify work as required for accurate fit. Notify Architect about major differences prior to fabrication.

STEEL DECKING INSTALLATION

General:

Erect decking in accordance with SDI Design Manual for Composite Decks, Form Decks, Roof Decks.
Provide welding in accordance with AWS D1.1.
Provide minimum 1½ inch bearing at steel support members. Align and level on supports.
Provide minimum 4 inch bearing at masonry supports. Align and level on supports.
Attach Deck to supports as follows or as shown on drawings:

- Mechanically fasten male/female side laps at 12 inches on center maximum.
- Weld male/female side laps at 18 inches on center maximum.
- Fasten deck to steel supports at ends and intermediate supports with 1/2 inch fusing welds at 12 inches on center maximum.

Reinforce deck openings from 6 inches to 18 inches in size with 2 x 2 x ¼ inch steel angles. Place angles perpendicular to flutes; extend minimum two inches each side of opening and weld to deck.
Install 6 inch wide sheet steel cover plates where deck changes direction. Spot weld in place at 12 inches on center maximum.
Immediately after welding deck in place, touch-up welds, burned areas, and surface coating damage with specified primer.

Strip Closures:

Install sheet steel closures & angle flashings to close openings between deck and walls, columns, openings.

Foam Cell Closures:

Install cell foam closures in locations above walls and partitions.

TOLERANCES

1/8 inch from level and 1/8 inch from plumb.
Openings and sump pans: 1/4 inch from true position.

CLEANING AND REPAIRING

Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Leave surfaces ready for finish painting specified in Section 09 90 00.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION

Protect other work against damage and discoloration caused by work of this section.
Protect contacting dissimilar materials against electrolytic corrosion.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Light gage metal framing, fastening and accessories.

REFERENCES
Conform to the requirements of the Metal Stud Manufacturer's Association (MSMA) standard common section designations.
Conform to the American Iron & Steel Institute (AISI) "Specification for the Design of Cold-Formed Steel Structural Members".
American Welding Society (AWS): AWS D1.1 Structural Welding Code.

SUBMITTALS
Provide in accordance with Section 01 33 00.
Indicate component details and accessories or items required of other work for complete installation.
Detail stud and joist layout.
Provide calculations for loading and stresses of framing members sealed by an Oregon registered professional engineer.
Submit manufacturer's instructions for securing studs to tracks and for other framing connections.
Certificates:
Provide mill certificate indicating minimum chemical composition, yield strength, tensile strength, elongation and coating thickness.

DELIVERY, STORAGE, AND HANDLING
Deliver products to site with manufacturer's original labels intact and legible.
Provide legible label, stamp, or embossment indicating manufacturer's name, logo, or initials, ICBO evaluation service report number, material base metal thickness (uncoated) in thousandths of an inch, and yield strength.
Do not overload floor or roof system with stockpiled materials.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

STEEL FRAMING SECTIONS
Galvanized Steel:
Conform to ASTM A 446.
12 Gage: Grade D (f_y=50 ksi).
14 and 16 Gage: Grade A (f_y=33 ksi).
18 Gage and lighter: Grade A (f_y=33 ksi).
Metal Finish: Galvanized in accordance with ASTM A 525.
Carbon Steel:
Conform to ASTM A 570.
12 Gage: Grade 50 ksi.
14 and 16 Gage: Grade 50 ksi or Grade 33 ksi.
18 Gage and lighter: Grade 33 ksi.
Coating: Rust-inhibiting primer.
Metal thickness:
As noted on Drawings.
Member Sizes and Gages:
As noted on Drawings.
Track:
Galvanized steel, channel shape, same width as studs for tight fit, solid web, 18 gage unless otherwise shown on Drawings.

FASTENERS
Screws:
Self-tapping, self-drilling, length as required for installation, conforming to ASTM A 90, hot dip galvanized.

Conform to AISI Specification E4.
Welding:
Conform to AWS D1.1. and D1.3.
Electrodes: Level E60XX.
Weld sizes noted on Drawings.
Touch-up welds on galvanized steel with zinc primer.
Touch-up welds on carbon steel with rust-inhibiting primer.
Powder-Actuated Fasteners:
Low velocity type, 0.145 inch diameter, 1 1/8 inch length, conforming to ICBO ES 2388; Hilti DN series, or accepted substitute.

ACCESSORIES
Form of galvanized steel.
Provide all indicated or required for complete installation.

FABRICATION
Fabricate assemblies of sizes and profiles as shown on Drawings or as required, with joints fitted, secured, reinforced, and braced to suit design requirements.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive fold-formed steel framing are accurately located, plumb, square, true, secure, and otherwise properly prepared.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

INSTALLATION
General:
Follow manufacturer's directions.
Install plumb, level, true, and in accurate locations indicated.
Form corners and intersection with three studs.
Locate studs two inches from internal corners.
Frame for openings.
Handle and lift prefabricated panels so that no distortion is caused to any member of the assembly.
Install framing between members for attachment of mechanical and electrical items.
Tracks and Runners:
Align tracks square and parallel, located to layout.
Secure to supporting structure as shown on Drawings.
Secure butt ends of adjacent tracks to common structural member, butt-welded or spliced.
Studs:
Install studs plumb, aligned and securely fastened to flanges of upper and lower tracks at spacings noted on Drawings.
Connect studs to tracks using screws or welds as noted on Drawings.
Install jack studs below and above wall openings, and elsewhere to provide support for load-bearing walls. Securely attach to connecting members.
Provide lateral bracing conforming to AISI Specification Section D3.
Provide for structural movement where indicated on Drawings.
Install load-bearing studs in one-piece lengths. Splices in axially loaded studs not permitted.

CLEANING
Including work of other sections, clean, repair and touch-up, or replace when directed products which have been soiled, discolored, or damaged by work of this section.
Leave surface ready for finishing specified in other sections.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Shop fabricated metal items manufactured to conventional or standard details, galvanized or prime painted. Includes metal, stairs, railings, ladders, gratings and castings.

ALTERNATES
Refer to Section 01 23 00 for possible effect upon work of this section.

PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION
Anchor bolts and loose bearing plates.

REFERENCES
ASTM A 36: Structural Steel.
ASTM A 53: Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
ASTM A 307: Low-Carbon Steel Externally and Internally Threaded Fasteners.
ASTM A 325: High Strength Bolts for Structural Steel Joints.
ASTM A 500: Cold-formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
AWS D1.1: Structural Welding Code.
Follow AISC Specifications and Code of Standard Practice, except as modified by these Specifications. Code may be obtained from Institute.

SUBMITTALS
Provide in accordance with Section 01 33 00.
Shop Drawings:
Indicate shop and erection details, including cuts, copes, connections, holes, threaded fasteners, and welds.
Show critical dimensions, required clearances, construction details, installation methods including splices, attachments, and anchoring.
Indicate shop and field welds by ASW A2.0 welding symbols. Indicate net weld lengths.
Furnish anchor bolt templates, setting drawings and installation details.

QUALIFICATIONS
Structural Steel Fabricator:
Not less than 5 years experience in work of this type.
Structural Steel Erector:
Not less than 5 years experience in work of this type.
Welders:
Qualified for welds to be performed in accordance with AWS Article 5 within previous year.

DELIVERY, STORAGE, AND HANDLING
Deliver to jobsite in accordance with approved schedule and in proper erection sequence.
Include all required bolts, and other fastening devices.
Store structural steel members above ground on platforms, skids, or other approved supports.
Store other materials in weather-tight and dry locations.
Store packaged materials in original unbroken containers.
Protect against corrosion and damage.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

STEEL SHAPES, BARS, AND PLATES
Conform to ASTM A 36.

STRUCTURAL STEEL PIPE
Conform to ASTM A 53, Type S where exposed to view and Type E elsewhere, Grade A.

STRUCTURAL STEEL TUBING
ASTM A 500, Grade B, fy: 46 ksi.

STANDARD STRENGTH THREADED FASTENERS
Bolts and Nuts: Conform to ASTM A 307, Grade A.
Plain Washers: Conform to ANSI B 27.2.

ANCHOR BOLTS
Conform to ASTM A 307, Grade A.

CONCRETE EXPANSION ANCHORS
Hilti Kwik Bolt III, or accepted substitute.

FABRICATION
General:
Fabricate connections not specifically detailed on Drawings consistent with balance of design and strong enough to develop fully members involved.
Stress relieve welded assemblies by heat treatment.
Form to accurate sizes and shapes, with sharp lines and angles, and in accordance with AISC Minimum Fabrication Standards.
Punch and shear to leave clean surfaces.
Weld permanent connections; grind exposed welds smooth. Ease exposed edges to small uniform radius.
Provide holes and connections for work of other trades.
Cut abutting structural members to fit with full bearing contact.
Form elbows and bends to uniform radii, free from buckles and twists, with finished surfaces smooth.
Miter and cope member intersections within 2^{o}, fit to within 0.02 inches, and weld all around.
Where exposed to weather, form to exclude water; allow for expansion and contraction.
Do not use screws or bolts when they can be avoided; when used, countersink heads, draw up tight, and nick threads to prevent loosening.
Columns:
Fabricate columns of single piece, full length. Shop fabricate with base plates, column caps, and other members.
Bearing and Base Plates:
Provide bearing plates under footings, piers, walls, and where indicated on Drawings.
Plates attached or shipped loose at Contractor option.
Fall Arrest Tie Off Stanchions:
Fabricate to detail of steel pipe, size as shown on Drawings.
Close exposed pipe ends with 1/4 inch welded plate.
Form steel rod loop and weld to pipe as shown on Drawings.
Pipe Bollards:
Form of steel pipe, size as shown on Drawings.

FINISHING
Mill Mark Removal:
Allow no mill marks (stenciled, stamped, raised etc.) in exposed locations. Omit mill marks by cutting mill material to appropriate lengths where possible. Where not possible fill and/or grind to acceptable surface finish.
Cleaning:
Before treating metal fabrications, remove grease, oil, dirt, loose rust, loose mill scale, and any other bond-reducing materials.
Priming:
Do not prime galvanized steel, surfaces encased in concrete, surfaces to be welded, and contact surfaces to be connected with high strength friction type bolts.
Prime paint other surfaces with fabricator's standard rust inhibiting paint, medium dry film thickness: 1.0 mils.
Galvanizing:
Hot-dip process conforming to ASTM A123.
Provide galvanized finish at masonry lintels, pipe bollards, and tie-off stanchions.

TOLERANCES
Maximum deviation of individual members from dimensions shown on Drawings as follows:
Overall length of members with both ends finished for compact bearing: 1/32 inch.
Overall length of members without finished ends:
For members up to 30 ft. long: 1/16 inch.
For members over 30 ft. long: 1/8 inch.
Compressive member straightness: 1/1000 of axial length between lateral support points.
Twist, bends, kinks: Unacceptable.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive fabricated steel are accurately sized and located, sound, true, even, and otherwise properly prepared.
Prior to starting work notify General Contractor about defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
Verify field measurements prior to fabrication.
If field measurements differ slightly from Drawing dimensions modify work as required for accurate fit. If measurements differ substantially notify Architect prior to fabrication.
Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for their installation. Coordinate delivery of such items to project site.

BEARING AND BASE PLATE INSTALLATION
Set plates attached to members.
Align and level with leveling nuts.

STRUCTURAL STEEL ERECTION
Follow AISC Specifications specified above, except as modified herein.
Clean contacting bearing surfaces prior to assembling.
Accurately assemble to lines and elevations indicated.
Bring abutting surfaces of compression members into contact prior to fastening splices.
Prior to fastening align and adjust frame components within specified erection tolerances.
Splices permitted only where indicated.
Erection bolts used in welded construction may be tightened and left in place, or removed and holes plug-welded at Contractor's option.
Correcting fabrication errors by gas-cutting permitted only with Architect's approval.

NON-STRUCTURAL STEEL INSTALLATION
General:
Follow approved Shop Drawings.
Install to true lines, plumb and level, and as detailed or required for rigidity and permanence.
Pipe Bollards:
Install plumb and true.
Set in concrete footing as shown on Drawings.
Fall Arrest Tie Off Stanchions:
Install plumb and true; weld stanchion to roof beam.
Masonry Lintels and Shelf Angles:
Furnish to masonry contractor for installation.

STRUCTURAL STEEL ERECTION TOLERANCES
Maximum deviation of individual members from plumb, level, or true alignment: 1/8 inch per story.
Column centerline displacement of exterior columns not more than 1 inch inward nor 2 inches away from building line at any point.

FIELD INSPECTION
Do not remove staging or platforms before field connections are inspected or tested.

Do no welding until surface to be welded and filler metal to be used have been inspected and approved.
Refer to Section 01 45 00 for inspection and testing details.

TOUCH-UP PAINTING

Touch up field connections and damaged shop treatment areas as erection proceeds.
Immediately prior to final covering remove rust and retreat any structural steel members showing evidence of rust through shop treatment over approximately 25% or more of total shop treatment areas.

CLEANING AND REPAIRING

Remove loose rust, heavy mill scale, oil, dirt, and other bond-reducing foreign substances from members scheduled to receive finish painting.
Including work of other Sections, clean, repair and touch-up, or replace when directed products which have been soiled, discolored, or damaged by work of this section.

PROTECTION

Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Prefabricated ship ladders.

REFFERENCES
AA – Aluminum Association.
ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
OSHA 1910.27 – Fixed Ladders

SHOP DRAWINGS
Submit in accordance with Section 01 33 00.
Product Data: Manufacturer's data sheets on each product.
Shop Drawings: Detail fabrication and erection of each ladder indicated. Include plans, elevations, sections, and details of metal fabrications and their connections.
Provide templates for anchors and bolts specified for installation under other Sections.
Provide reaction loads for each hanger and bracket.
Qualification Data: Refer to Quality Assurance provisions for submittal requirements evidencing experience, certifications and resources.

QUALITY ASSURANCE
Manufacturer Qualifications: A firm experienced in producing aluminum metal ladders similar to those indicated for this Project. Professional engineering competent in design and structural analysis to fabricate ladders in compliance with industry standards and local codes.
Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing ladders to attain designed operational and structural performance.
Product Qualification: Product design shall comply with OSHA 1910.27 minimum standards for ladders.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

MANUFACTURER'S WARRANTY
Manufacturer has responsibility for an extended Corrective Period for work of this Section for a period of 5 years commencing on the shipment date of the product against all the conditions indicated below, and when notified in writing from Owner, manufacturer shall promptly and without inconvenience and cost to Owner correct said deficiencies.
Deterioration of material and surface performance below minimum OSHA standards as certified by independent third party testing laboratory. Ordinary wear and tear, unusual abuse or neglect excepted.
Within the warranty period, the manufacturer shall, at its option, repair, replace, or refund the purchase price of defective ladder.
Manufacturer shall be notified immediately of defective products, and be given a reasonable opportunity to inspect the goods prior to return. Manufacturer will not assume responsibility, or compensation, for unauthorized repairs or labor. Manufacturer makes no other warranty, expressed or implied, to the merchantability, fitness for a particular purpose, design, sale, installation, or use, of the ladder; and shall not be liable for incidental or consequential damages, losses of or expenses, resulting from the use of ladder products.

PART 2 - PRODUCTS

SHIP LADDER
Prefabricated Ship Ladder for roof access: Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.
Components: Manufacturer's standard rails, rungs, treads, handrails. returns, platforms and safety devices.

Materials: Aluminum; ASTM B221/B221M, alloy 6063-T52.
Components:
Channel Side Rails not less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide. Rungs not less than 1-1/4 inches (32mm) high, 4-1/8 inch (105 mm) deep and 2 feet (610 mm) wide; tread spacing shall be 1 foot (305 mm) on center. Handrails shall be aluminum pipe, not less than 1-1/2 inches (38 mm) in diameter with hemispheric end caps.
Incline: 65 degrees.
Finish: Natural aluminum.
Manufacturer & Model: Alaco “H1000-65”; O’Keeffe’s Inc. “523”; or accepted substitute.

PART 3 - EXECUTION

EXISTING CONDITIONS
Do not proceed until surfaces to receive accessories are level, true, smooth, clean, dry and prepared in accordance with approved Shop Drawings.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

PAINTING
Protect contacting dissimilar metals against galvanic corrosion with asphaltic compound 7 1/2 dry mil thickness minimum, applied to each contacting face.
Prime galvanized steel against oxidation.

INSTALLATION
Accurately secure accessories plumb, level, true to line, without warp or rack and in accordance with Manufacturer's instructions and reviewed Shop Drawings.

ADJUSTMENTS
Adjust moving parts to operate satisfactorily at time of final project acceptance, and during warranty period.

PRODUCT CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Leave surfaces ready for finishing specified in Section 09 90 00.
remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.
Protect contacting dissimilar materials against electrolytic corrosion.
Avoid overloading roof with stored materials.

END OF SECTION

PART 1 -GENERAL

SECTION INCLUDES
Treatment of wood products to increase their durability against decay or retard burning characteristics.

PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION
Deliver to General Contractor sufficient preservative solution for field-cut treatments.

REFERENCES
Pressure Treatments specified hereunder refer to quality mark designations of American Wood Protection Association, P.O. Box 361784, Birmingham, Alabama 35236-1784, and hereinafter referred to as AWPB. Specifications may be obtained from Association.

SUBMITTALS
Certification:
Indicate moisture content of treated wood, chemical used, and retention obtained.

DELIVERY, STORAGE, AND HANDLING
Protect against damage, moisture, and discoloration.

EXTRA MATERIAL
Deliver to General Contractor sufficient brush treatment material for field-cut treatments.

COORDINATION
Protect other work against damage or discoloration caused by work of this section.

PART 2 - PRODUCTS

PRESERVATIVE TREATMENT
Provide AWPA, Standard P5, Use Standard UC4A, Copper Azole – Type B (CA-B) treatment using CA-B dissolved in a solution of ethanolamine in water for wood preservative in the following locations:
In contact with masonry, concrete, roofing, and elsewhere shown on drawings.
Minimum Retention:
- Above Ground: 0.10 pcf CA-B.
- Ground or Fresh Water Contact: 0.21 pcf CA-B.
- Structural Posts and Poles (Sawn or Round): 0.31 pcf CA-B.

Preservative-treated lumber with chromated copper arsenate (CCA) treatments is not permitted.

BRUSH TREATMENT MATERIAL
Material: Recommended by preservative treatment manufacturer for application to field cut treated lumber.
Treat any field cuts to pressure-treated wood.

FIRE RETARDANT TREATMENT
Treatment Chemical: Free of halogens, sulfates, and ammonium phosphate; Lonza “Dricon FR” or accepted substitute.
Manufacturing Standard: AWPA C-20 for lumber and C-27 for plywood.
Surface Burning Characteristics: Maximum smoke developed 450; flame spread 25 when tested per ASTM E-84, NFPA 255 or UL 723.
Wood Moisture Content: Kiln dry after treatment to maximum moisture content of 19% for lumber and 15% for plywood.

PART 3 - EXECUTION

EXAMINATION
Verify that material to receive treatment does not exceed moisture content specified for similar untreated wood.
Prior to starting work notify General Contractor of conditions requiring correction.
Do not start work until conditions are satisfactory.

APPLICATION - PRESERVATIVE TREATED WOOD

General:

Follow referenced specifications.

Incise members prior to treatment.

Field Cuts and Brush Treatment:

Apply 2 liberal coats of brush treatment material to field cut surfaces.

INSTALLATION – FIRE RETARDANT TREATED WOOD

Do not rip or mill fire retardant treated wood. Only end cuts, drilling holes and joining cuts are permitted unless the material carries a UL approved milling treatment classification.

Install fire retardant treated wood with hot-dipped galvanized fasteners and hardware.

Do not use staples for fastening plywood. Galvanized nails permitted only.

Provide at all structural wood, blocking, backing, bracing and other wood located in concealed spaces.

PROTECTION

Protect other work against damage or discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Construction of wood framework using lumber, plywood, and other sheathing materials. Miscellaneous blocking and curbing, concealed wood framing and furring. Includes rough hardware to join members and anchor framework.

ALTERNATES

Refer to Section 01 23 00 for possible effect upon work of this section.

QUALITY ASSURANCE

Framing Lumber:

Grade mark and trademark of association listed below and having jurisdiction must appear on each piece of material.

On members scheduled to receive transparent finish do not place grade mark stamp where exposed to view. In lieu thereof stamp where concealed, or submit Certificate of Inspection.

WWPA: Western Wood Products Assn., 522 SW Fifth Avenue, Portland, OR 97204-2122.

APA: American Plywood Assn., 1119 A Street; Tacoma, WA 98401.

DELIVERY, STORAGE, AND HANDLING

Protect against moisture, damage, and discoloration.

Do not store wood materials in wet or damp areas, or in contact with ground.

Avoid overloading floor and roof framing with stored materials.

COORDINATION

Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

FRAMING LUMBER

Material:

Douglas fir, surfaced 4 sides to standard nominal dimensions except where rough sawn stock or special shapes are indicated.

Grade:

Comply with current WWPA Standard Grading Rules as follows:

Load-Bearing Studs, Roof and Floor Joists: No. 2 and better.

Beams, Ledgers and Columns: No. 1, free of heart center.

Other Framing Lumber: Standard and better.

Furring, Bracing and Blocking: Utility grade.

Maximum moisture content when delivered to project:

All wood materials: 19%.

PLYWOOD

US Product Standard 1-07, exterior type where exposed to moisture.

Each piece shall bear APA Grade mark.

Unless otherwise specified use Group 1 Douglas Fir; Grade "A" for exposed surfaces, "C" or better elsewhere.

PLYWOOD ROOF SHEATHING

Grade: APA C-D, with exterior glue, Exposure 1.

Thickness: 3/4 inch

Span Rating: 40/20

Sheet Size: 48 x 96 inch size unless otherwise indicated.

Surface Finish: Unsanded.

Edges: Tongue and groove.

PLYWOOD WALL SHEATHING

Grade: APA C-D with exterior glue, Exposure 1.

Thickness: 1/2 inch

Span Rating: 24/0
Sheet Size: 48 X 96 inch size, unless otherwise indicated.
Surface Finish: Unsanded.
Edges: Square.

SILL SEALER
Manufacturer: Protecto Wrap, Dow, Owens Corning, Knauf.
Material: Polyethylene foam or fiberglass at contractor option
Thickness: Manufacturer's standard.
Extent of Work: Install between wood plate and concrete/masonry foundation in width sized to match wood plate.

FASTENERS
Bolts: Fed. Spec. FF-B-575.
Nuts: Fed. Spec. FF-N-836.
Expansion Shields: Fed. Spec. FF-S-325.
Lag Screws and Lag Bolts: Fed. Spec. FF-B-561.
Wood Screws: Fed. Spec. FF-S-111.
Nails and Staples: Fed. Spec FF-N-105B.
Provide washers under bolt heads, lag heads, and nuts.
Provide all necessary for installation of work specified herein.
Hot-dip galvanize steel fasteners exposed to moisture.

FRAMING CONNECTORS
Zinc coated steel, code-approved, manufactured by Silver, Simpson, Timber Engineering Company, or accepted substitute.
Selected manufacturer to be used throughout entire project.
If specific type is not shown on Drawings, use type recommended by manufacturer for conditions of installation.
Connector model numbers shown on Drawings are taken from Simpson catalog.

WOOD FURRING
Square edge stock, thickness, size and spacing as required.

WOOD BUCKS
Nominal 2-inch stock, full width of wall or partition, unless otherwise indicated.
Let heads and sills 1/2 inch into jambs; spike securely.

WOOD BLOCKING
Provide 2 inch nominal framing lumber behind cabinets, roofing, sheetmetal, doors, windows, finish hardware including door stops, toilet room accessories, mirrors, miscellaneous specialties, building equipment, drapery track, and mechanical and electrical work. Verify exact location.

WOOD CANT STRIPS
Sizes shown, triangular shape, unless otherwise indicated.
Provide at built-up roofing perimeters, roof intersections with vertical surfaces, and elsewhere indicated.

ROOF INSULATION STOPS
Wood, thickness of insulation. Provide at insulated roof edges and around insulated roof openings.

ATTACHMENTS FOR WOOD ENGAGING MASONRY OR CONCRETE
Approved type metal plugs or inserts, spaced as directed.
Wood embedded in masonry or concrete not permitted unless shown on Drawings, then must be kiln dried and pressure-preservative treated as specified in Section 06070.

ADHESIVE
Glue conforming with APA Spec. AFG-01.
Approved manufacturers: Evans, Franklin, Georgia-Pacific, Glidden-Durkee, 3M, Weldwood, Willhold, Weyerhaeuser.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive work specified herein are rigid, secure, accurately sized and located, and otherwise properly prepared.
Prior to starting work notify General Contractor of surfaces requiring correction.
Do not start work until conditions are satisfactory.

VERIFICATION OF CONDITIONS
Where necessary verify field measurements prior to fabrication.
If field measurements differ slightly from drawing dimensions, modify work as required for accurate fit. If measurements differ substantially, notify Architect prior to fabrication.

INSTALLATION - GENERAL
Install proprietary products in accordance with manufacturer's directions.
Use additional fasteners to those specified herein where necessary to insure rigidity and permanence.
Provide washers under nuts and heads when making bolted or lag screwed connections.
Drive nails perpendicular to grain in lieu of toe-nailing, where feasible.
Machine nailing or stapling with written approval only.
Provide for installation and support of plumbing, heating, ventilating, and electrical work.
Accurately, located, cut, fit, and install work secure rigid, to true lines, plumb, and level, unless otherwise indicated.

FRAMING CONNECTORS
Provide where indicated; secure with fasteners noted on drawings or as recommended by manufacturer if none are noted.

WALL PLATES
Provide single plates at floors and bottoms of openings, double plates face-nailed together at ceilings and tops of openings. Provide headers over openings.
Splice single plates. Stagger ends of double plates at least 4 ft. Splice plates abutting at corners. Locate plate splices directly over studs.

JOISTS AND BEAMS
Set with crown side up; lap and spike together over bearings.
Minimum Bearing: 1 1/2 inches.
Boring and Notching: Comply with requirements of Section 01 60 00.

PLYWOOD ROOF SHEATHING
Install continuous over 2 or more supports, end joints on supports, and staggered, face grain perpendicular to supports.
Space adjacent panels 1/16 inch minimum.
Fasten sheathing to framing as follows:
- Nails: 10d common wire nails spaced 6 inches on center at panel edges and 12 inches on center at intermediate supports.

PLYWOOD WALL SHEATHING
Install continuous over 2 or more supports, end joints on supports.
Space adjacent panels 1/16 inch minimum.
Fasteners:
- Nails: 8d common wire nails spaced 6 inches on center at panel edges and 12 inches on center at intermediate supports, unless noted otherwise.

WOOD FURRING
Secure with fasteners spaced not more than 2 ft. apart.

WOOD CANT STRIPS
Securely attach to roof deck, straight, plumb, and true.

Where roof edges have deflected, provide shim strips to level position.

CLEANING AND REPAIRING

Including work of other sections, clean, repair and touch-up or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Leave surfaces ready for finishing specified in other sections.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION

Protect other work against damage or discoloration caused by work of this section.

NAILING SCHEDULE

Unless otherwise shown on drawings or in this specification, nailing shall be in accordance with the Building Code.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Columns, beams, joists, and other structural units fabricated from wood members and materials. Includes rough hardware to join members and anchor framework.

ALTERNATES

Refer to Section 01 23 00 for possible effect upon work of this section.

QUALITY ASSURANCE

Grade mark and trademark of association listed below and having jurisdiction must appear on each piece of material.

On members scheduled to receive transparent finish do not place grade mark stamp where exposed to view. In lieu thereof stamp where concealed, or submit Certificate of Inspection.

NES: National Evaluation Service, Inc., 5203 Leesburg Pike, Suite 600, Falls Church, VA 22041-3401.

DELIVERY, STORAGE, AND HANDLING

Protect against moisture, damage, and discoloration.

Do not store wood materials in wet or damp areas, or in contact with ground.

Avoid overloading floor and roof framing with stored materials.

COORDINATION

Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

LAMINATED VENEER LUMBER

Manufacturer and Product: Red-Built “Red-Lam LVL”, or accepted substitute.

Manufacturing Standard: Conform to National Evaluation Service, Inc. manufacturing standard NER-481.

Wood Veneers: Ultrasonically graded, manufacturer’s standard species, 1/10 to 1/8 inch thick,

Adhesives: Waterproof, conforming to ASTM D 2559.

Fabrication: Manufacture in full continuous lengths with all grain parallel to member length, free of finger joints, scarfs, or mechanical connectors.

Tolerances:

- Finished Length: ±1/8”.
- Depth: ±1/16”.
- Width: ±1/16”.

Grade Stamp: Stamp units with mark indicating product type, and grade, NER or CCMC report number, manufacturer’s name, plant number, and testing agency’s logo.

PARALLEL STRAND LUMBER

Manufacturer and Product: iLevel Trus-Joist “Parallam PSL”, or accepted substitute.

Manufacturing Standard: Conform to ICC Evaluation Service ESR 1387.

Wood Material: Wood strands oriented with member length, pressed to lay-up pattern, manufacturer’s standard species.

Moisture Content: 12% maximum at production.

Adhesives: Waterproof, conforming to ASTM D 2559.

Fabrication: Manufacture in full continuous lengths with all grain parallel to member length, free of finger joints, scarfs, or mechanical connectors.

Tolerances:

- Finished Length: ±1/4”.
- Depth: ±1/16”.
- Width: ±1/16”.

Grade Stamp: Stamp units with mark indicating product type, and grade, ICC-ES evaluation report number, manufacturer’s name, plant number, and inspection agency’s logo.

LAMINATED STRAND LUMBER

Manufacturer and Product: iLevel Trus-Joist “TimberStrand LSL”, or accepted substitute.

Parallel Strand Lumber:
Manufacturer and Product: iLevel Trus-Joist "Parallam PSL", or accepted substitute.
Manufacturing Standard: Conform to ICC Evaluation Service ESR 1387.
Wood Material: Wood strands oriented with member length, pressed to lay-up pattern, manufacturer's standard species.
Moisture Content: 12% maximum at production.
Adhesives: Waterproof, conforming to ASTM D 2559.
Fabrication: Manufacture in full continuous lengths with all grain parallel to member length, free of finger joints, scarfs, or mechanical connectors.
Tolerances:
Finished Length: ±1/4".
Depth: ±1/16".
Width: ±1/16".
Grade Stamp: Stamp units with mark indicating product type, and grade, ICC-ES evaluation report number, manufacturer's name, plant number, and inspection agency's logo.

FRAMING CONNECTORS
Zinc coated steel, code-approved, manufactured by Simpson, or accepted substitute.
Selected manufacturer to be used throughout entire project.
If specific type is not shown on Drawings, use type recommended by manufacturer for conditions of installation.
Connector model numbers shown on Drawings are taken from Simpson catalog.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive work specified herein are rigid, secure, accurately sized and located, and otherwise properly prepared.
Prior to starting work notify General Contractor of surfaces requiring correction.
Do not start work until conditions are satisfactory.

VERIFICATION OF CONDITIONS
Where necessary verify field measurements prior to fabrication.
If field measurements differ slightly from drawing dimensions, modify work as required for accurate fit. If measurements differ substantially, notify Architect prior to fabrication.

INSTALLATION
Install in accordance with manufacturer's directions.
Accurately, located, cut, fit, and install work secure rigid, to true lines, plumb, and level, unless otherwise indicated.
Do not cut holes or notches in members unless previously approved by manufacturer.
Install fasteners perpendicular to glue lines.
Do not allow temporary construction loads beyond design limits.

FRAMING CONNECTORS
Provide where indicated; secure with fasteners noted on drawings or as recommended by manufacturer if none are noted.

CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Leave surfaces ready for finishing specified in other sections.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Protect units from weather.
Protect other work against damage or discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Fabrication of wood members and combination of wood and metal elements into structural units.

DESIGN REQUIREMENTS
Trusses shall be designed by structural engineer licensed to practice in Oregon, based upon the load requirements shown on Drawings and Code.

SUBMITTALS
Submit in accordance with Section 01 33 00.
Shop Drawings:
Indicate shop and erection details, including cuts, copes, connections, holes, bracing, bridging and other supports.
Show critical dimensions, required clearances, construction details, installation methods including splices, attachments, and anchoring.
Illustrate erection procedures, and sequence.
Furnish installation drawings and details.

DELIVERY, STORAGE, AND HANDLING
Protect against moisture and damage.
Do not store wood materials in wet or damp areas, or in contact with ground.
Avoid overloading floor and roof framing with stored materials.
Store pre-engineered trusses and joists in vertical position.
COORDINATION
Coordinate with other trades regarding work of this section.

PART 2 - PRODUCTS

PLYWOOD WEB TYPE PRE-ENGINEERED JOISTS
Factory manufactured with structural grade plywood or oriented strand board web and machine stress rated wood or laminated wood chords. RedBuilt, Boise, or accepted substitutes.
Design joists to fit dimensions indicated on drawings.
All engineering for joists, bracing, bridging and fasteners by truss manufacturer.

FRAMING CONNECTORS
Zinc coated steel, code-approved, manufactured by Simpson, Silver, Timber Engineering Company, or accepted substitute.
If specific type is not shown on drawings, use type recommended by manufacturer for conditions of installation.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive work specified herein are rigid, secure, accurately sized and located, and otherwise properly prepared.
Prior to starting work notify General Contractor of surfaces requiring correction.
Do not start work until conditions are satisfactory.

FIELD MEASUREMENTS
Where necessary verify field measurements prior to fabrication.
If field measurements differ slightly from drawing dimensions, modify work required for accurate fit. If measurements differ substantially, notify Architect prior to fabrication.

INSTALLATION - GENERAL
Install proprietary products in accordance with manufacturer's directions.
Provide necessary bridging, bearing plates, anchoring clips, and bracing required to resist temporary and permanent vertical and lateral loads as defined in Building Code and herein.
Use additional fasteners to those specified herein where necessary to insure rigidity and permanence.

Provide washers under nuts and heads when making bolted or lag screwed connections.
Secure to supports with framing anchors.
Tighten loose connectors.
Do not cut or remove chord or web members.

INSTALLATION - JOISTS
Erect and install according to joist manufacturer's installation drawings.
Accurately locate and install joists plumb, secure, and rigid with adjacent chord members in true alignment.
Temporary construction loads beyond design limits are not permitted.
Install all erection bracing as required by manufacturer.

FRAMING CONNECTORS
Provide where indicated; secure with fasteners recommended by manufacturer.

ERECTION TOLERANCES
Install trusses top and bottom chords true within 1/8 inch per 12 ft.

PRODUCT CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Protect units until covered.
Protect other work against damage or discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Fabrication of wood members and combination of wood and metal elements into structural units.

DESIGN REQUIREMENTS
Conform to HUD guide #4950.2 "Design Criteria for Trussed Rafters."
Specification can be obtained from U.S. Dept. of Housing and Urban Development.
Trusses shall be designed by a structural engineer licensed to practice in the State of Oregon.
See Structural Drawings for load requirements.

SUBMITTALS
Submit in accordance with Section 01 33 00.
Shop Drawings:
Indicate shop and erection details, including cuts, copes, connections, holes, bracing, bridging and other supports.
Show critical dimensions, required clearances, construction details, installation methods including splices, attachments, and anchoring.
Illustrate erection procedures, and sequence.
Furnish installation drawings and details.
Certificates:
Prior to installation submit to Architect certification by fabricator that trusses will sustain design loads.

DELIVERY, STORAGE, AND HANDLING
Protect against moisture and damage.
Do not store wood materials in wet or damp areas, or in contact with ground.
Avoid overloading floor and roof framing with stored materials.
Store pre-engineered trusses in vertical position.

COORDINATION
Coordinate with other trades regarding work of this section.

PART 2 - PRODUCTS

CHORD AND WEB MEMBERS
Species: Fabricator's choice.
Grade: Machine stress-rated for axial forces encountered.
Minimum Nominal Thickness: 2 inches.
Surface Finish: Smooth.
Maximum Moisture Content: 19%

CONNECTOR PLATES
Metal Type:
20 gauge, grade A, galvanized sheet steel conforming to ASTM A 466, G-90 coating designation, ICBO accepted substitute.
Fabricate with uniformly formed and spaced plugs, teeth, or prongs for transferring stresses to adjacent members.
Plywood Type:
Conform to US Product Standard 1-95, Group 1 Douglas Fir; APA C-D grade.

FABRICATION
Custom design and accurately fabricate trusses to support design loads and satisfy requirements of building design
Locate web-connector at truss bearing points.
Build-in required camber.
Provide sufficient metal or glued plywood connector plates to resist design stresses.

FABRICATION TOLERANCES
Connector Locations: Within 1/4 inch of approved shop drawings position.

Length: Within 1/16 inch per 20 ft. of specified length.
End Cuts: True within 1/16 inch per ft. of depth or width.

FRAMING CONNECTORS
Zinc coated steel, code-approved, manufactured by Simpson, Timber Engineering Company, or accepted substitute.
If specific type is not shown on drawings, use type recommended by manufacturer for conditions of installation.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive work specified herein are rigid, secure, accurately sized and located, and otherwise properly prepared.
Prior to starting work notify General Contractor of surfaces requiring correction.
Do not start work until conditions are satisfactory.

FIELD MEASUREMENTS
Where necessary verify field measurements prior to fabrication.
If field measurements differ slightly from drawing dimensions, modify work required for accurate fit. If measurements differ substantially, notify Architect prior to fabrication.

ERECTION
Follow manufacturer's directions and approved shop drawings.
Hoist trusses with slings attached to designated lifting points.
Prohibit excessive out-of-plane bending.
Accurately locate and install trusses plumb, secure, and rigid with adjacent chord members in true alignment.
Provide necessary bridging, bearing plates, anchoring clips, and bracing required to resist temporary and permanent vertical and lateral loads as defined in Building Code and herein.
Secure to supports with framing anchors.
Tighten loose connectors.
Do not cut or remove chord or web members.

FRAMING CONNECTORS
Provide where indicated; secure with fasteners recommended by manufacturer.

ERECTION TOLERANCES
Install trusses top and bottom chords true within 1/8 inch per 12 ft.

PRODUCT CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Protect units until covered.
Protect other work against damage or discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Fabrication of wood members into glued, laminated structural units.

REFERENCED SPECIFICATIONS
Comply with American Institute of Timber Construction, AITC-117.

SUBMITTALS
Submit in accordance with Section 01 33 00.
Shop Drawings:
Include locations, dimensions, camber amounts, and complete fabrication and installation details.
Certificate:
Deliver to Architect report of approved, independent testing lab, or AITC Certificate of Conformance with Attachments 1 and 2, stating that glued laminated units conform to these Specifications.

DELIVERY, STORAGE, AND HANDLING
Protect against moisture, damage, and discoloration.
Do not store wood materials in wet or damp areas, or in contact with ground.

COORDINATION
Coordinate with other trades regarding work of this section.

PART 2 - PRODUCTS

WOOD
Species: Douglas fir, all laminations.
Grading: Visually graded.

DESIGN STRESS VALUES
Meet requirements of ANSI/AITC A 190.1, and provide allowable design values as follows:
- Combination symbol: 24F-V3
- Bending (Fb): 2400 psi
- Horizontal Shear (Fv): 165 psi
- Compression Perpendicular to Grain ($Fc_{\perp}$): 385 psi.
- Compression parallel to Grain (Fc): 1600 psi.
- Modulus of elasticity (E): 1.7×10^6 psi.

ADHESIVES
Follow referenced Specifications. Meet requirements for wet use type.

APPEARANCE
Grade: Industrial
Surface Texture: Plane or sand smooth at fabricator's option.

FABRICATION
Follow referenced specifications.
In any members subject to bending and spanning continuously over more than 2 supports, provide tension laminations complying with AITC requirements in both top and bottom laminations as necessitated by flexural configuration of member.

SHOP TREATMENT
Follow AITC 111 standards unless otherwise noted.
Treat unit ends with end sealer as soon as practicable after trimming.
Paint surfaces closely adjacent to masonry or concrete with aluminum paint.

PART 3 - EXECUTION

EXAMINATION

Verify that surfaces to receive work specified herein are rigid, secure, accurately sized and located, and otherwise properly prepared.

Prior to starting work notify General Contractor of surfaces requiring correction.

Do not start work until conditions are satisfactory.

FIELD MEASUREMENTS

Verify prior to fabrication.

If field measurements differ slightly from drawing dimensions, modify work as required for accurate fit. If measurements differ substantially, notify Architect prior to fabrication.

PROTECTIVE WRAPPING

Individually wrap all units with water-resistant paper prior to shipping. Do not remove wrapping until units are in place and protected from moisture exposure.

INSTALLATION

Accurately locate with camber side up.

Secure with no less bearing support than shown on Drawings and approved Shop Drawings.

Install proprietary products in accordance with manufacturer's directions.

Use additional fasteners to those specified herein where necessary to insure rigidity and permanence.

Provide washers under nuts and heads when making bolted or lag screwed connections.

Accurately, locate, cut, fit, and install work secure, rigid, to true lines, plumb, and level, unless otherwise indicated.

FRAMING CONNECTORS

Provide where indicated; secure with fasteners as noted on drawings or as recommended by connector manufacturer if none shown.

PRODUCT CLEANING AND REPAIRING

Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.

Leave surfaces ready for finishing specified in other sections,.

Remove debris from project site upon work completion or sooner, if directed.

PROTECTION

Protect glued laminated units until covered.

Protect other work against damage or discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Fabrication and incorporation of site-built and site-finished wood moldings, trim and paneling.

SUBMITTALS

Product Data:

Provide product data for composite wood and agrifiber products including manufacturer's product data verifying that these products contain no urea-formaldehyde resins.

Submit manufacturer's product data listing volatile organic compound (VOC) content of adhesives and sealants.

Include manufacturer's descriptive literature for specialty items.

Identify each item as to location, material grade, workmanship grade, construction, finishes, and hardware.

Shop Drawings:

Show profiles, joint details, and other pertinent items.

Show connections to adjacent work and complete assembly.

QUALITY STANDARDS

General:

Unless otherwise modified herein, materials and workmanship quality grades shall be determined by the Associations listed below.

Standards may be obtained from Association.

Plywood, Fir Lumber, and Workmanship:

Quality Standards of American Woodwork Institute, herein-after referred to as AWI, 5055 South Chesterfield Road; Arlington, VA 22206.

Fabricator Qualifications:

Company specializing in fabricating products specified in this section with a minimum of five years of documented experience.

DELIVERY, STORAGE, AND HANDLING

Do not deliver products to jobsite until notified by General Contractor that project is conditioned and prepared to handle and store products without damage or discoloration.

Protect against damage and discoloration.

PROJECT CONDITIONS

Illumination:

Perform no work with less than 30 ft. candles of light measured 3 ft. above floor.

Temperature:

Maintain 50^{o}F minimum in interior spaces where finish carpentry materials are located.

PART 2 - PRODUCTS

MOISTURE CONTENT IN LUMBER

12% maximum.

FIBER-CEMENT SIDING (FIELD PAINTED)

Type:

Non-asbestos fiber-cement siding complying with ASTM C1186 Grade II, Type A, non-combustible when tested in accordance with ASTM test method E136.

Lap Siding:

Thickness: 5/16 inch.

Width: 7 1/4" wide, 6" exposure

Texture: Smooth.

Manufacturer and Model: James Hardie Building Products Co. "Hardiplank", or accepted substitute.

Soffit Panel:

Thickness: 5/16 inch.

Width: Manufacturer's standard .

Texture: Smooth.
Finish: Primed.
Manufacturer and Model: James Hardie Building Products Co. “HardiSoffit”, or accepted substitute.

FIBER-CEMENT SIDING (PREFINISHED)
Type:
Non-asbestos fiber-cement siding complying with ASTM C1186 Grade II, Type A, non-combustible when tested in accordance with ASTM test method E136.
Lap Siding:
Thickness: 5/16 inch.
Width: 7 1/4” wide, 6” exposure
Texture: Select Cedarmill.
Color: to be determined from standard line.
Manufacturer and Model: Woodtone “RusticSeries” or accepted substitute.

EXTERIOR TRIM
Species: SPF, Pre-primed, Kiln-dried.
Grain: Mixed
AWI Grade: A
Surface Texture: Combed.
Minimum Lengths: Opening Trim: 1 piece, single length.
Standing Trim: No less than full story height.
Running Trim: Joints no closer than 16 ft. apart.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive finish carpentry are straight, plumb, true, solid, rigid, and otherwise properly prepared.
Prior to starting work, notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

FIELD MEASUREMENTS
Verify prior to fabrication.
If field measurements differ slightly from drawing dimensions, modify work as required for accurate fit. If measurements differ substantially, notify Architect prior to fabricating work.

INSTALLATION, GENERAL
Miter corners.
Accurately scribe filler strips, and trim strips to adjacent surface irregularities.
Ease sharp external corners prior to finishing.

FIBER-CEMENT SIDING INSTALLATION
Lap Siding:
Install according to manufacturer’s directions.
Install ¼ inch thick starter strip at bottom course.
Apply siding units horizontally with 1 ¼ inch laps at the top.
Install first course overlapping starter strip.
Align vertical joints between units over framing members.
Blind nail with minimum 2 inch length hot-dipped galvanized or No. 8 X 1 ¼” screws.
Space fasteners 1 inch from top of unit.
Space fasteners minimum 3/8 inch and maximum ½ inch from unit end.
Drive fasteners tight, fit against trim with maximum 1/16 inch gap. Do not over-drive fasteners.
Maximum end gap 1/16 inch. Caulk joints with Urethane sealant.

TRIM INSTALLATION
Fit carefully at joints and against other members; all joints on bearings, secure with hot-dip galvanized casing nails of proper size. Bevel-cut and glue end joints.

Set exposed nails using flathead punch 1/16 inch below wood surface.

PAINTING AND FINISHING included in this section:
Before installing, finish concealed ends of exterior trim.

PRODUCT CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Leave surfaces ready for finishing.
Remove debris from site upon work completion or sooner, if directed.

PROTECTION
Protect other surfaces against damage or discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Shop fabricated institutional casework including base, full-height, and wall-mounted cabinets, countertops, wardrobes, and other similar units.

SYSTEM DESCRIPTION

Casework modules of reveal overlay design with continuous countertops.
Exposed cabinet exterior finished with high-pressure plastic laminate.
Exposed cabinet interior overlaid with low-pressure plastic laminate.
Edges of case bodies, doors, drawers, and shelves finished with color coordinated protective edge.
Hardware of institutional type and quality.

SUBMITTALS

Submit in accordance with Section 01 33 00.

Product Data:

Include manufacturer's descriptive literature for specialty items.
Identify each item as to location, material grade, workmanship grade, construction, finishes, and hardware.
Provide manufacturer’s product data for composite wood and agrifiber products (including but not limited to particleboard, wheatboard, strawboard, agriboard products, engineered wood components, solid-core wood doors, OSB, MDF, and plywood products) verifying that these products contain no urea-formaldehyde resins.
Provide product data for field-applied paints and coatings which have a potential impact on indoor air, including manufacturer’s MSDS sheets or other Product Data listing VOC content.
Provide product data for adhesives and sealants which have a potential impact on indoor air, including manufacturer’s MSDS sheets or other Product Data listing VOC content. Provide manufacturers’ documentation verifying all adhesives used to apply laminates, whether shop-applied or field-applied, contain no urea-formaldehyde.

Shop Drawings:

Show profiles, joint details, and other pertinent items.
Show connections to adjacent work, and complete assembly, whether or not manufacturer furnishes materials.

EMISSIONS STANDARDS

Conform to the following minimum standards for adhesive emissions:

Adhesive Type	VOC Limits	Standard
Adhesive Primer for Plastic:	550 g/L	SCAQMD Rule #1168
Contact Adhesive:	80 g/L	SCAQMD Rule #1168
Special Purpose Contact Adhesive:	250 g/L	SCAQMD Rule #1168
Wood Adhesive:	140 g/L	SCAQMD Rule #1168
Top & Trim Adhesive:	250 g/L	SCAQMD Rule #1168

Aerosol Adhesives: Green Seal Standard for Commercial Adhesive GS-36 requirements.
Submit manufacturer’s product data listing volatile organic compound (VOC) content of products specified herein.
Provide manufacturer’s documentation verifying that adhesives and sealants contain no urea-formaldehyde.

QUALITY STANDARDS

Except as herein modified, material and workmanship grades shall be determined by Quality Standards of Architectural Woodwork Institute, current edition, published by Architectural Woodwork Institute, 5055 S. Chesterfield Road; Arlington, VA 22206. Institute hereinafter referred to as "AWI".

DELIVERY, STORAGE, AND HANDLING

Do not deliver products to job site until notified by General Contractor that project is conditioned and prepared to handle and store products without damage or discoloration.
Protect against damage and discoloration.

PROJECT CONDITIONS
Illumination:
Perform no work with less than 30 ft. candles of light measured 3 ft. above floor.
Temperature:
Maintain 50°F minimum in interior spaces where casework and shelving are located and installed.

COORDINATION
Coordinate with other trades regarding work of this section.

PART 2 - PRODUCTS

MANUFACTURER
Institutional Line by Lemons Millwork, Salem Wood Products, Kriegsco, Westmark, Anderson Woodworks, Precision Cabinets, Ashlund Glass & Millwork, Fixturelogic Cabinets, Inc., Ritter Cabinet Mfg., Pacific Cabinets, Inc., Specialty Cabinets, D&B Interiors.

LUMBER
Concealed: Casework Contractor's choice.
Exposed (if any): Douglas fir, hemlock or poplar, AWI Custom grade, vertical grain.

PLYWOOD
Type:
Douglas fir, US Product Standard PS 1-07, exterior type where exposed to moisture or around sinks.
Face:
Rotary cut veneer, AWI Custom Grade.

PARTICLE BOARD
Plain Particle Board:
Conform to ANSI 208.1, Grade M2, 47 pcf minimum density, no urea formaldehyde emissions; Roseburg Forest Products “SkyBlend” or accepted substitute.
Prefinished Particle Board:
Type: Thermoset decorative laminate panels, cabinet grade (LPDL).
Cladding Material: Thermally-fused melamine.
Substrate: Particle board as specified above.
Manufacturer: Roseburg Forest Products Co. “SkyBlend”, or accepted substitute.
Edge Treatment: PVC Edge band, match color of panel finish.
Finish as follows:
- Shelving: Color finish both sides and all edges.
- Dividers: Color finish only on visible faces and edges.
- Cabinet Bottoms: Color finish on exposed side only.

Color: White.

PLASTIC LAMINATE (HPDL)
Manufacturing Standard: Conform to NEMA Standard LD-3.
Exposed Surfaces: NEMA GP28, 0.030 inch thickness.
Post-Forming Grade: 0.042 inch material thickness for coved countertops and other forming.
Manufacturer, Color and Pattern: Selected by Architect. See finish schedule A-701
Primer, Sealer and Adhesive: Water-resistant type made or recommended by plastic laminate manufacturer.

PVC EDGE BANDING
Impact resistant, machine applied with hot melt adhesive.
Standard 3mm thick at doors and drawer fronts and vertical case ends, 0.030 inch thick at bottoms, shelves, and sub-tops.
Color: Selected by Architect

HARDWARE
Hinges: Rockford Process Control 854 five knuckle series,
Pulls: 3/8 inch wire type, 4" long.
Magnetic Catches: EPCO 1000LS, or accepted substitute.
Casework Locks: National Cabinet Lock #8053 at doors, #8060 at drawers.
Drawer Guides: Roller type, full extension, epoxy coated; Knape & Vogt No. 332 nickel plated steel brackets, 5mm diameter, or accepted substitute.
All Other Hardware: Manufacturer's standard.

FABRICATION
General:
Conform to AWI 400B standards for laminate clad cabinets, Premium Grade.
Construction: Overlay reveal, unless indicated otherwise.
Surfaces: Laminated plastic.
All Shelves adjustable unless otherwise shown.
Verify dimension of sinks and other items to be built into cases and counters.
Assemble at factory where feasible.
Use concealed fastenings wherever possible.
Use screws and bolts in addition to adhesive where required for strength and rigidity.
Install finish hardware specified herein at factory.
Materials, unless specifically noted otherwise:
Bases: Exterior grade 3/4 inch plywood.
Countertops: 3/4 inch plywood with 0.050 plastic laminate, backed with 0.020 balancing sheet.
Exposed materials: HPDL clad particle board.
Semi-exposed materials: LPDL clad particle board.
Concealed materials: Softwood.
Casework Bottoms, Ends, and Vertical Standards: 3/4 inch thick plywood.
Back and Side Splash: 3/4 inch particle board with 0.050 plastic laminate.
Shelving:
3/4 inch plywood.
Swinging Doors: 3/4 inch thick plywood.
Casework Backs:
    Concealed Base Cabinets: 1/4 inch prefinished hardboard.
    Exposed Backs: 3/4 inch plywood.
    Upper Wall Cabinets: 3/4 inch thick plywood.
Drawers:
Front: 3/4 inch prefinished plywood.
Sides: 1/2 inch thick prefinished plywood.
Backs: 1/2 inch thick prefinished plywood.
Bottoms: 1/2 inch prefinished plywood.
Drawer Stops: Integral side type. Do not use drawer front as stop.
Edge Banding: Provide at exposed plywood and particle board edges in accordance with AWI Standards and as specified herein.
Adjustable Shelf Hardware:
Provide bracket holes at 32 mm centers to within 6 inches of top and bottom of space where adjustable shelves are shown.
At Sink Cabinets:
Hold shelves 3/4 inch back from rear face of door to provide space for ventilation.
Solid Surface Countertop:
Shop fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with manufacturer's printed instructions and technical bulletins.
Form joints between components using manufacturer's standard joint adhesive with inconspicuous lines.
Provide factory cutouts for plumbing fittings and bath accessories. Rout and finish component edges with clean, sharp returns. Rout cutouts, radii and contours to template, smooth edges. Repair or reject defective and inaccurate work.

PART 3 - EXECUTION

EXAMINATION

Verify that surfaces to receive casework and shelving are straight, plumb, true, solid, rigid, and otherwise properly prepared.

Prior to starting work, notify General Contractor of defects requiring correction.

Do not start work until conditions are satisfactory.

FIELD MEASUREMENTS

Verify prior to fabricating casework and shelving.

If field measurements differ slightly from drawing dimensions modify Work as required for accurate fit. If measurements differ substantially, notify Architect prior to fabricating work.

INSTALLATION

Casework to be installed factory-trained personnel.

Bases secured to floor and cases secured to each other and tight to adjacent walls.

Countertops fastened to cases and secure tight to walls.

Provide continuous bases under in-line base casework, unless otherwise indicated.

Secure casework in place plumb, square, true, level, and without distortion; level where necessary with concealed shims. Provide sealant at intersection of differing materials.

INSTALLATION – COUNTERTOP

Install plumb, level and rigid, scribed to adjacent finishes. Install with largest size pieces available.

Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work, exposed joints/seams not permitted.

Reinforce field joints as recommended by manufacturer.

Cut and finish component edges with clean, sharp returns.

Rout radii and contours to template.

Anchor securely to base cabinets or other supports.

Align adjacent countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop.

Carefully dress joints smooth, remove surface scratches and clean entire surface. Install countertops with no more than 1/8-inch sag, bow or other variation from a straight line.

ADJUSTMENTS

Adjust moving parts to operate satisfactorily at time of final project acceptance and during warranty period.

CLEANING AND REPAIRING

Including Work of other Sections, clean, repair, and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this Section.

Remove debris from project site upon work completion or sooner, if directed.

PROTECTION

Protect other surfaces against damage or discoloration caused by Work of this Section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Non-structural composite mineral and plastic resin slabs.

SUBMITTALS

Provide in accordance with Section 01 33 00.

Product data:

Submit manufacturer's specifications and installation instructions for each type of product indicated.

Shop drawings:

Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.

Show full-size details, edge details, thermoforming requirements, attachments, etc.

Show locations and sizes of furring, blocking, including concealed blocking and reinforcement specified in other Sections.

Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacle and other items installed in solid surface.

Samples:

For each type of product indicated submit minimum 6-inch by 6-inch sample in specified gloss.

Cut sample and seam together for representation of inconspicuous seam.

Indicate full range of color and pattern variation.

Approved samples will be retained as a standard for work.

Sustainability Requirements:

Product data: Indicate product description, fabrication information and compliance with specified performance requirements.

Submittals:

- Certify percentages of post-consumer and pre-consumer recycled content.
- Submit manufacturer's product data for installation adhesives, including printed statement of VOC content and material safety data sheets.
- Product data indicating that materials are regionally manufactured and within 500 miles of the project site.

Product certificates:

For each type of product, signed by product manufacturer.

Fabricator/installer qualifications: Provide copy of certification number.

Manufacturer certificates: Signed by manufacturers certifying that they comply with requirements.

Maintenance data:

Submit manufacturer's care and maintenance data, including repair and cleaning instructions.

Include in project closeout documents.

QUALITY ASSURANCE

Qualifications - General:

Work of this Section shall be provide by a shop that employs skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance.

Fabricator/installer qualifications:

Work of this section shall be by a certified fabricator/installer, certified in writing by the manufacturer.

Applicable standards:

Standards of the following, as referenced herein:

American National Standards Institute (ANSI)

American Society for Testing and Materials (ASTM)

National Electrical Manufacturers Association (NEMA)

NSF International

Mock-up:

Prior to fabrication of architectural millwork, erect sample unit to further verify selections made under sample submittals and to demonstrate the quality of materials and execution.

Build the mock-up to comply with the contract documents and install in a location as directed by the Architect.

Notify the Architect one week in advance of the date of when the mock-up will be delivered.
Should mock-up not be approved, re-fabricate and reinstall until approval is secured.
Remove rejected units from project site.
After approval, the mock-up may become a part of the project.
Approved mock-up shall serve as a standard for judging quality of all completed units of work.

DELIVERY, STORAGE, AND HANDLING
Protect against damage and discoloration.

ENVIRONMENTAL REQUIREMENTS
Illumination:
Perform no work with less than 30 ft. candles of light measured 3 ft. above floor.
Temperature:
Maintain 65^{o}F minimum in interior spaces where solid surfacing fabrications materials are located and installed.
Humidity:
35% minimum, 80% maximum.

WARRANTY
Provide manufacturer's standard 10 year warranty against defects in materials.
Warranty shall provide material and labor to remove and replace defective materials.

COORDINATION
Coordinate with other trades regarding work of this section.

PART 2 - PRODUCTS

SOLID QUARTZ SURFACING (SS-1)
Type: Engineered composite stone slab, composed of quartz minerals and rock bound with resin, pigments and fillers.
Thickness: 3/4 inch unless otherwise shown on Drawings.
Edge treatment: As shown on Drawings.
Finish: Uniform, polished.
Manufacturer: Cambria
Color and Pattern: Templeton, Desert Collection

SOLID QUARTZ SURFACING (SS-2)
Type: Engineered composite stone slab, composed of quartz minerals and rock bound with resin, pigments and fillers.
Thickness: 3/4 inch unless otherwise shown on Drawings.
Edge treatment: As shown on Drawings.
Finish: Uniform, polished.
Manufacturer: Caesarstone
Color and Pattern: 4330 Ginger

ACCESSORIES
Document Tray: Brushed stainless steel, 12" x 12" x 2", Non-ricochet Level 2 Bullet Resistant; CR Laurence BRT312, or accepted substitute.
Trash Grommet: Brushed stainless steel, 8 5/8" overall diameter, 2" deep with 5/16" flange; Doug Mockett & Company, Inc. #TM2B, or accepted substitute.
Joint adhesive: Manufacturer's standard one or two-part adhesive to create inconspicuous, nonporous joints.
Sealant: Manufacturer's standard mildew-resistant, FDA-compliant, UL-listed silicone sealant in colors matching components.

FABRICATION:
Solid Quartz Surfacing :

Shop fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with manufacturer's printed instructions and technical bulletins.
Form joints between components using manufacturer's standard joint adhesive with inconspicuous lines.
Provide factory cutouts for plumbing fittings and bath accessories.
Rout and finish component edges with clean, sharp returns.
Rout cutouts, radii and contours to template, smooth edges. Repair or reject defective and inaccurate work.

PART 3 - EXECUTION

EXAMINATION

Verify that surfaces to receive solid surfacing are dry, clean, smooth, sound, well-fastened, free from conditions that would damage surfacing or impair adhesive-bond, and otherwise properly prepared.
Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.
Prior to starting work notify general contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

INSTALLATION

General:

Install in accordance with manufacturer's instructions and approved Shop Drawings.
Install plumb, level and rigid, scribed to adjacent finishes.

Solid Quartz Surfacing :

Install with largest size pieces available.
Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work, exposed joints/seams not permitted.
Reinforce field joints as recommended by manufacturer.
Cut and finish component edges with clean, sharp returns.
Rout radii and contours to template.
Anchor securely to base cabinets or other supports.
Align adjacent countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop.
Carefully dress joints smooth, remove surface scratches and clean entire surface. Install countertops with no more than 1/8-inch sag, bow or other variation from a straight line.

Applied Backsplashes and Sidesplashes:

Adhere applied backsplashes and sidesplashes as recommended by manufacturer.
Seal joints using manufacturer’s standard color-matched silicone sealant.

CLEANING AND REPAIRING

Promptly remove any excess adhesive or sealant.
Remove any stains or markings from surfaces.
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Remove debris from project site upon work completion, or sooner, if directed.

PROTECTION

Protect other materials against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Wallcoverings of prefinished panels over solid substrate for light, medium and heavy duty usage.

QUALITY ASSURANCE
Qualifications:
Workmen must have at least 2 years prior experience performing work of type specified herein, and be approved by covering manufacturer.
Regulatory Requirements:
Maximum ASTM E 84 Flame Spread Rating: Class C.
Maximum ASTM E 84 Smoke Developed Rating: 450.

DELIVERY, STORAGE, AND HANDLING
Store in clean and dry storage area.
Protect against damage and discoloration.
Protect from sunlight exposure.
Lay panels flat. Do not stand panels on edge.

ENVIRONMENTAL REQUIREMENTS
Install wall covering only when air temperature and humidity conditions approximate those that will exist when building is occupied.
Acclimate panels to installation environment minimum 24 hours prior to installation.
Do not install covering on surfaces which are colder than 65^{o}F.
Do not install covering under less than 30 ft. candles of light measured 3 ft. above floor.
Notify General Contractor, if necessary, to provide additional light.

WARRANTY
Manufacturer's Warranty:
Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
Installer's Warranty Period:
One (1) year commencing on Date of Substantial Completion.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

FIBERGLASS REINFORCED PANELS
Panel Type: Prefinished fiberglass reinforced plastic with embossed finish surface.
Material: Random chopped fiberglass reinforcement, modified polyester copolymer resin mix with inorganic fillers and pigments.
Panel Size: 48" X 96", or as required for installation.
Nominal Thickness: 0.09".
Color: Light Gray P-151 Pebble Surface.
Manufacturer and Pattern: Marlite, Kemlite "Glasbord-P", or accepted substitute.

ACCESSORIES
Moldings: Manufacturer's standard one-piece extruded plastic, color to match panel color.
Fasteners: Insulating nylon drive rivets, length as required for installation, color to match panels color.
Adhesive: Waterproof type recommended by panel manufacturer.
Sealant: Silicone type as specific in Section 07 92 00, color to match panel color.

PART 3 - EXECUTION

EXAMINATION

Verify that surfaces to receive wall and ceiling covering are true, sound, clean, dry and dust-free, free from conditions that would damage covering or impair adhesive bond, and otherwise properly prepared.
Prior to starting work notify General Contractor about defects requiring correction,
Do not start work until conditions are satisfactory.

PREPARATION

Before applying covering remove any finish hardware, electric cover plates, mechanical grilles and registers, etc. which would interfere with covering application.
Carefully store removed items and replace following covering application.

SURFACE PREPARATION

Follow manufacturer's directions.

INSTALLATION

Follow manufacturer's directions.
Take special care to insure complete adhesion at joints, edges, and corners.
Provide minimum 1/4" gap at ceiling joint and 1/8" gap between adjacent panels.
Pre-drill fastener holes oversized 1/8" to allow for panel expansion and contraction.
Apply adhesive to entire panel surface.
Set panels prior to "skinning" of adhesive.
Press panels firmly to substrate and install fasteners.
Provide single row of fasteners at top and bottom of panel as recommended by panel manufacturer for adhesive installation.
Install panels with moldings between adjacent panels, at wall corners, and exposed panel edges.
Apply sealant to molding channel prior to installing on panel. Apply sealant to opposite molding channel prior to installing adjacent panel.
Allow for specified gap between adjacent panels when installing moldings.
Remove excess sealant.

CLEANING AND REPAIRING

Remove adhesive and sealant from surfaces during application.
Replace defective and improperly applied material.
Leave surfaces clean and defect-free at time of final acceptance.
Remove debris from project site upon work completion or sooner, if directed.
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.

PROTECTION

Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Membranes or coatings applied to walls, slabs, decks, or other surfaces subject to intermittent water immersion.

SUBMITTALS
Submit in accordance with Section 01 33 00.
Product Data:
Manufacturer's literature, specifications, and application instructions.

QUALITY ASSURANCE
Applicator Qualifications:
Acceptable to dampproofing manufacturer and Architect.
Mock Up:
Prior to starting work, apply dampproofing to approximately 100 SF of substrate material matching actual job conditions.
Verify that dampproofing will repel moisture from surface without surface stains.

DELIVERY, STORAGE, AND HANDLING
Deliver materials in original sealed containers, clearly marked with manufacturer's name, brand name, and material type.
Unless otherwise authorized by dampproofing manufacturer, maintain storage room temperature between 50^{o}F and 85^{o}F.
Do not remove labels or open containers until Architect reviews and accepts.

ENVIRONMENTAL REQUIREMENTS
Do not apply dampproofing when ambient air or substrate surface temperature is less than 50^{o}F or more than 100^{o}F, or when such temperature is anticipated within 24 hours after dampproofing application.
Do not apply dampproofing during inclement weather, or until substrate materials dry from effects of such weather.
During interior applications provide sufficient mechanical or natural ventilation to maintain healthy and pleasant work spaces for workmen of all trades.

WARRANTY
Waterproofing is subject to 2-year Warranty in accordance with Supplementary Conditions, Section 00 73 00.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

BELOW GRADE DAMPPROOFING
For Exterior Concrete Walls:
Brush-applied, solvent-free, cement-based coating; Harris Specialty Chemicals, Inc. Thoro “Thoroseal” Foundation Coating with Thoro “Acryl 60” water-based acrylic modifier.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive dampproofing are clean, dry, solid, free of wax and efflorescence, and otherwise properly prepared.
Verify that caulking and sealing are completed prior to starting dampproofing.
Prior to starting work notify General Contractor of Work requiring completion or defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
Remove loose particles.
Follow manufacturer's instructions.
Mask off adjacent surfaces not to receive dampproofing.

APPLICATION
Below-Grade Dampproofing:
Clean and mix with potable water to a heavy pancake batter consistency according to manufacturer’s directions.
Allow mixture to sit for 10 minutes, then remix.
Dampen surfaces to be treated prior to application.
Do not retemper or thin dampproofing mixture.
Apply at manufacturer’s recommended rate.

FIELD QUALITY CONTROL
Tests:
After dampproofing has dried, spray-coat surfaces with water.
Re-coat surface that shows water-absorption and retest.
Protective Cover:
Protect treated surfaces from direct heat or sunlight until dampproofing has dried.

CLEANING
Remove over-spray as soon as possible.
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Remove debris from project site upon Work completion or sooner, if directed.

PROTECTION
Protect other materials, including glass, aluminum, lawns, and vegetation against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Protective coating for above grade exterior brick, CMU, concrete, or masonry surface with the application of clear, penetrating water repellant.

SUBMITTALS

Submit in accordance with Section 01 33 00.

Product Data:

Submit manufacturer's data including MSDS for each protective coating.

QUALITY ASSURANCE

Qualifications:

Applicator must have a minimum of three (3) years experience in applying products of this nature and must be approved by manufacturer.

Regulatory Requirements:

Products shall comply with State and local regulations concerning AIM (Architectural, Industrial and Maintenance) coatings regarding Volatile Organic Content (VOC).

The use of 1,1,1 trichloroethane shall not be allowed.

Pre-installation Conference:

Owner’s representative, Architect, General Contractor, Mason, and Coating Applicator shall meet prior to installation of coating to review specifications, conditions, pre application testing, coverage rates, and final warranty compliance.

DELIVERY, STORAGE, AND HANDLING

Do not deliver until application is ready to start.

Deliver in original unbroken containers, with manufacturer's labels thereon.

Do not remove labels or open packages until Architect reviews and accepts.

Protect against damage and discoloration.

ENVIRONMENTAL REQUIREMENTS

Perform no work under less than 30 foot-candles measured 3 ft. above floor.

Protective coating should not be applied to surfaces, which have been wet or rained on during any of the 24 preceding hours, or rain is expected with two hours following application.

Temperature must be minimum 20^0F and rising.

On new construction or where repairs have been undertaken, surfaces should be allowed to cure in accordance with manufacturer’s requirements.

Perform no work when air and surface conditions are not in conformance with manufacturer's specified limits.

WARRANTY

Manufacturer shall stand behind installed system for period of 10 years from Date of Substantial Completion against all the conditions indicated below. When notified in writing from Owner, Manufacturer shall promptly and without inconvenience and cost to Owner correct said deficiencies.

Loss of water repellency:

Brick Masonry: 1.0 ml/20 minutes or greater (80 mph wind driven rain equivalent).

Concrete Masonry: 1.0 ml/20 minutes or greater (60 mph wind driven rain equivalent).

COORDINATION

Coordinate with other Trades affecting or affected by Work of this Section.

PART 2 - PRODUCTS

MANUFACTUER

Evonik Degussa Corporation, www.protectosil.com. Bob Sallee, 800-370-7821

MATERIALS

Clay Fired Brick Masonry Units:

Protective coating must be a minimum 40% solids active content by weight, isobutyltrimethoxy silane in a denatured ethyl alcohol solution, with the following tested qualities:
Water Absorption: ASTM C67, 98% reduction.
Vapor Transmission: ASTM D 1653, minimum 100%.
Penetration: Average 3/32 to 1/4 inches.
Freeze Thaw: ASTM C672.
Accelerated Weathering: ASTM G23, 2000 hours arc weatherometer with max. 5% loss.
Water Permeance of Masonry: ASTM E514, minimum 95% improvement.
Product Name: Protectosil Chem-Trete BSM 40 VOC.
Concrete Masonry Units:
Protective coating must be a minimum 40% solids active content by weight, isobutyltrialkoxy silane in a denatured ethyl alcohol solution, with the following tested qualities:
Water Penetration: ASTM C140 - 24 hour soak, minimum 99% effective.
Vapor Transmission: ASTM D1653 – 97% breathable.
Penetration: Average 1/4 inches.
Freeze Thaw: ASTM C672.
Accelerated Weathering: ASTM G23, 2000 hours arc weatherometer with max. 3% loss.
Water Permeance of Masonry: ASTM E514, minimum 100% improvement.
Product Name: Protectosil Chem-Trete PB VOC.

PART 3 - EXECUTION

EXAMINATION
Verify that masonry is sound and to standards established by Specifications.
Surface must be clean, dry, and free from efflorescence, oils, paints, and other contaminants. On new construction or where repairs have been made, surfaces shall be allowed to cure for minimum 28 days.

PREPARATION
All glass, metal, and other materials not specified to receive protective coating must be masked or protected in accordance with manufacturer's instructions.
Caulking of control joints should be done before coating application.
All masonry must be covered and protected from rainfall or runoff at all times during construction!
Surface Preparation:
Verify masonry joints found to be unsound, hollow, or otherwise defective, have been raked out to a depth of 1/2 inch and pointed with mortar.
Verify cracks that exceed 1/64 inch wide have been filled with pointing mortar.
All repointing must be completed and allowed to cure.
Remove dirt, dust and materials that will interfere with the proper and effective application of the penetrating sealer. It is the responsibility of the Contractor to prepare the surfaces of the concrete as recommended by the Water Repellent Manufacturer.
Sealants, patching materials, and expansion joints shall have been installed.

APPLICATION
Apply protective coating in accordance with the Manufacturer's instructions.
Protective coating shall be applied by means of a hand held, manual pump, low-pressure sprayer (Hudson, Chapin, Burke) or similar device. DO NOT use airless paint spraying equipment.
Spray a light mist or fog coat over masonry to be coated to break the surface tension of the substrate.
Apply coating in a uniform flood coat allowing approximately a six (6) inch rundown from the point of contact. Coverage rate for brick walls shall be 100- 125 square feet/gallon, unless noted otherwise in pre-installation conference.
Coverage rate for CMU walls shall be 80- 125 square feet/gallon, unless noted otherwise in pre-installation conference.
If it is determined that a second coat is required, wait at least 12 - 24 hours for the first coat to cure.

CLEANING AND REPAIRING

Remove debris from project site upon Work completion or sooner, if directed.

Including Work of other Sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by Work of this Section.

The final detail cleaning shall be accomplished after the Owners representative, Architect, and Contractor(s) have made an inspection of the coated masonry to determine areas that will need a final cleaning. Areas that require final cleaning shall be cleaned during months of July and August, unless otherwise agreed upon.

PROTECTION

Protect Work specified herein, and Work of other Trades, against damage and discoloration caused by Work of this Section. Provide necessary coverings and barricades to protect completed Work.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Thermal insulation organic or inorganic applied to walls, roofs, perimeter of foundations, and other heated spaces.

DELIVERY, STORAGE, AND HANDLING
Deliver to project site in manufacturer's original unopened packages.
Label package wrappers with brand name, insulation type, and thermal rating.
Store materials off ground.
Protect against moisture and damage.
Do not use damaged or damp insulation.

ENVIRONMENTAL REQUIREMENTS
Do not install insulation when surfaces to receive insulation are wet.

SUSTAINABILITY REQUIREMENTS
Product Data:
Provide manufacturer's product data verifying that fiberglass batt insulation contains no urea-formaldehyde.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

FLEXIBLE BATTS
Manufacturer:
Knauf "EcoBatt", Certainteed Sustainable Insulation, Owens Corning "EcoTouch", or accepted substitute.
Material:
Glass wool blankets, full-length, single-piece where practicable, conforming to ASTM C 665, Type I, Class A for unfaced batts.
Facings:
None, separate vapor retarder film as specified in Section 07 25 00.
Extent of Work:
Provide blanket insulation as follows: At exterior of all heated spaces in thickness and locations as shown on Drawings.

RIGID BOARD TYPE AT WALL APPLICATIONS
Insulating Material: 2 pcf density glass-reinforced polyisocyanurate foam plastic.
Nominal thickness: 1 inch.
Facing Material: 1 mil thick aluminum foil.
Panel Size: Provide minimum joints practicable.
Minimum Aged Thermal Resistance Value: R-6.0.
Manufacturer: Rmax "Thermasheath-3", Celotex "Thermax Sheathing", or accepted substitute.
Accessories:
Fasteners: Manufacturer's recommended polymer or other corrosion protective coated steel screw fasteners with plastic washers for anchoring sheathing to wall framing. Fastener length and size based on wall sheathing thickness.
Insulation Flashing Tape: Manufacturer's recommended peel-and-stick board joint tape for sealing joints, seams and veneer tie penetrations through the insulation layer.
Wall Opening Flashing: Manufacturer's recommended flashing for sealing window and door wall openings.
Penetration Filler: Manufacturer's recommended polyurethane foam for sealing penetrations of insulated sheathing.

WIRE
Noncorrosive steel, 18 ga. minimum.

ADHESIVE
Manufactured or recommended by insulation manufacturer.

MECHANICAL FASTENERS
Type recommended by insulation manufacturer.
Long enough to penetrate substrate 1/2 inch, minimum.

PART 3 - EXECUTION

EXAMINATION
Verify that work of preceding trades is completed.
Verify that surfaces and spaces to receive insulation are accurately sized, located, dry, protected against inclement weather, clean, and otherwise properly prepared.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
Remove, or protect against projections which may damage insulation or prevent proper installation.
Remove bond-reducing coatings, and roughen surfaces, to receive insulation by adhesion as necessary for bond.
Prime surfaces to receive insulation by adhesion.

INSULATION INSTALLATION - GENERAL
Follow manufacturer's directions.
Fit insulation snugly between framing without forcing.
Permit no gaps for air passage.
Carefully cut and fit insulation around pipes, conduits, and other obstructions.
Where pipes, conduit, and other obstructions are located in space to receive insulation, place insulation between cold-in-winter surface and obstruction, compressing insulation where necessary.
Unless indicated otherwise, do not compress insulation more than 10%.

INSTALLATION - FLEXIBLE BATTS
Install insulation with vapor retarder facing to the warm-in-winter side of assembly.
Use full-length, single-piece batts where practicable.
Provide additional wire support as necessary to prevent insulation displacement or sagging.

INSTALLATION - RIGID BOARD TYPE
Bring edges into moderate contact without deforming.
Install true to line; stagger vertical joints.
Cut to fit neatly at corners and around projections through insulation.
Maintain insulation integrity.

INSPECTION
Notify Architect at least 24 hours prior to completing insulation work for inspection.

CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Maintain the following minimum clearances between insulation and recessing lighting fixtures, metal chimneys, metal gas vents and similar high temperature equipment unless equipment is U.L. labeled for zero-clearance:
Side: 3 inches.
Top: 24 inches.
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Elastic sheet vapor retarders for all exterior thermal insulation and air barrier installed as part of the exterior envelope construction.

SUBMITTALS
Submit in accordance with Section 01 33 00.
Product Data:
Manufacturer's data and details to include installation instructions.
Samples:
Two 8 1/2" x 11" samples of vapor retarder material.

QUALITY ASSURANCE
Subcontract the vapor retarder work of this section to the installer of associated work so there will be undivided responsibility for the related items of work.

PROJECT CONDITIONS
Proceed with vapor retarder work only after substrate work has been completed.
The contractor shall examine the substrate and the conditions under which the vapor retarder work is to be performed. Do not proceed with the work until satisfactory conditions have been corrected.
Environmental Requirements:
Proceed with vapor retarder work only when weather conditions will permit the materials to be applied in accordance with manufacturer's recommendations.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

VAPOR RETARDERS
Sheet Barrier Below Grade:
Polyolefin geomembrane sheet, 15 mils thickness, maximum permeance = 0.01 perms as tested in accordance with ASTM E1745 Section 7.1 (7.1.1-7.1.5); Stego Industries "Stego Wrap", Fortifiber "Moistop Ultra 15", Raven Industries "Vapor Block 15", or accepted substitute.
Sheet Barrier Above Grade:
Translucent polyethylene film, 6 mil thickness, maximum permeance = 1.0.
Provide at all interior warm side wall locations.
Sheet Barrier Exposed in Attic Spaces:
Fire resistant type, foil-skrim-kraft facing composition, maximum flame spread rating 25, 0.02 perm rating.

FLEXIBLE FLASHING MEMBRANE
Membrane:
Self-adhering, rubberized SBS asphalt compound integrally laminated to cross-laminated polyethylene film, 40 mils thickness, 0.05 perms maximum vapor permeance; Henry Company "Blueskin SA", or accepted substitute.
Provide at window sills and other opening sills as detailed on Drawings.
Primer:
Quick-drying rubber based adhesive primer; Henry Company "Blueskin Adhesive", or accepted substitute.
Provide over substrate where Flexible air/vapor barrier membrane is applied.

WEATHER-RESISTIVE BARRIER (WRB)
Material: Self-adhered, vapor-permeable, water-resistive, air infiltration and moisture barrier with split-back poly-release film.
Fire Characteristics: Flame Spread Class A, tested in accordance with ASTM E 84.
Manufacturer and Model: Blueskin VP160 or accepted substitute.
Flexible Flashing: Adhesive-backed flexible membrane; Henry "Blueskin SA" specified above. Provide at door, window and other openings as detailed on Drawings.
Sealant: Moisture cured, medium modulus polymer modified sealing compound compatible with WRB

and substrate; Henry "HE925 BES", or accepted substitute.
Adhesive: As recommended by WRB manufacturer.
Seam Tape: Adhesive-backed tape recommended by WRB manufacturer.
Through-Wall Flashing: Henry Blueskin TWF or accepted substitute.

ADHESIVE PRIMER
Low VOC, quick setting rubber based adhesive primer for primary self-adhering weather resistive barrier membrane and SBS modified bitumen membranes at all temperatures; Henry Company "Blueskin® LVC Adhesive" or accepted substitute.

ACCESSORIES
Vapor Retarder Tape:
Sheet Barrier Below Grade: Polyethylene Tape as recommended by vapor retarder manufacturer.
Sheet Barrier Above Grade: Adhesive-backed polyethylene by Monsanto Plastics & Resins Co. or adhesive-backed polypropylene sheathing tape No. 8086 by 3M Contractor Products, or accepted substitute.
Sheet Barrier Exposed in Attic Spaces: Adhesive-backed, mylar-faced aluminum foil, 1-1/2 inches wide, 0.00 perm rating; Alumiseal Zero Perm.
Sealant:
Vapor Barrier Sealant: Elastic, polyurethane base, flexible sealant used to seal vapor retarder materials together or to other substrates as recommended by vapor retarder manufacturer.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive work specified herein are rigid, secure, accurately sized and located, and otherwise properly prepared.
Prior to starting work notify General Contractor of surfaces requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
Clean substrate of projections and substances detrimental to the work; comply with recommendations of the vapor retarder manufacturer.
Remove ice, snow, grease, dust or other foreign material that may prevent bonding to substrate.
Install cant strips, flashings and similar accessory items as shown, and as recommended by vapor retarder manufacturer. Prime substrate where recommended by the manufacturer.

INSTALLATION - VAPOR RETARDERS
Exterior Walls:
Locate over exterior wall insulation continuously from floor to underside of roof/attic insulation on the warm-in-winter side of wall.
Sequence of insulation and vapor retarder installation: Protect insulation at all times against migration of moisture vapor.
Immediately protect insulation with vapor retarder after insulation installation.
Apply sheets full height in one piece. Lap edges minimum 6"; seal with specified sealant or vapor retarder tape. Make all laps over framing members.
To avoid water vapor migration prior to installation of finish wall material, seal all edges and joints with specified sealant.
Carefully cut retarder around framing members, conduits, and other penetrations; seal edges by lapping a separate piece of vapor retarder material.
Concrete Floor Slabs:
Install underslab vapor retarder over smooth surface substrate, and without puncture under the entire area of floor slab or any accessory concrete on grade construction in accordance with manufacturer's instructions and ASTM E 1643.
Install with the longest dimension parallel with the direction of the concrete pour.
Lap edges minimum 6 inches and seal with vapor retarder tape.
Tape all seams with vapor retarder tape.
Seal all penetrations, including pipes and conduit per manufacturer's instructions. Install vapor retarder boots around all penetrations and seal with vapor retarder tape.

Do not penetrate vapor retarder with screed pins, stakes or other items. No penetration of the vapor retarder is allowed except for reinforcing steel and permanent utilities.
Sand or other granular fill prohibited above vapor retarder.
Coordinate sequence of installation, treatment of penetrations, and sealing of edges identical with that of exterior walls above.
Repair damaged areas, if any, by cutting patches of vapor retarder, overlapping damaged area 6 inches and taping all four sides with vapor retarder tape.
Penetrations:
Carefully seal all penetrations of vapor retarder by lapping additional piece of Vapor Retarder minimum 6" around all penetration edges. Carefully cut center "cut out" to fit the penetration. Seal all edges with specified sealant to ensure continuous vapor retarder performance.

INSTALLATION – ADHESIVE PRIMER
Apply adhesive primer according to manufacturer's recommendations where appropriate surface adhesion cannot be achieved.
Prime substrate with specified primer at a rate of 200-250 sq. ft. per gallon.
Apply adhesive primer on surface of WRB where subsequent WRB membrane will overlap such as selvage edge and end laps

INSTALLATION - FLEXIBLE FLASHING MEMBRANE
Install sill flashing stop.
Install flexible flashing membrane over window sill. Lap up vertical leg of flashing stop, down vertically below opening minimum 6 inches and up opening jambs minimum 6 inches. See detail on Drawings.
Fold side flaps of air infiltration retarder into opening, lapping over flexible flashing and staple in place.
Install window sill flashing and window.
Install 12 inch wide flexible flashing strips over window jamb flanges and air infiltration retarder. Adhere to window flange and air infiltration retarder.
Install window head flashing.
Install 12 inch wide flexible flashing strip over window head flashing and under air infiltration retarder, lapping side strips. Adhere to window head flashing and substrate. See detail on Drawings

INSTALLATION – WEATHER-RESISTIVE BARRIER (WRB)
Install in a consecutive weatherboard method starting at bottom of wall and working up. Maintain minimum 2" side laps and 3" end laps.
Cut to manageable lengths, position membrane for alignment, remove protective poly-film and firmly apply pressure to assure adhesion.
Eliminate fishmouths, wrinkles and gaps.
Roll entire membrane surface (including seams) with a counter top or "J-roller" using minimum 5 lbs. pressure to ensure full contact and adhesion.
Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, duct work, electrical and other apparatus extending through the WRB and around perimeter edge of membrane terminations at window and door frames with sealant recommended by WRB manufacturer.
Install WRB at rough openings and transitions according to manufacturer's installation instructions and details.
Flash window and door openings according to manufacturer's installation instructions and details shown on Drawings.
Use pre-cut rolls of flexible flashing membrane for sill pan flashings per manufacturer's published window flashing guidelines.
Prime substrate before installation of flexible flashing membrane.
Mechanically fastened insulation clips, brick ties and other through penetrations through the membrane into solid backing and seal with sealant recommended by WRB manufacturer.
Inside and Outside Corners:
Seal inside and outside corners of sheathing boards with a strip of self-adhering vapor permeable membrane extending a minimum of 3 inches on either side of the corner detail.
At inside corners, pre-treat the corner with a continuous ½ inch bead of sealant.
Align and position self-adhering transition membrane, remove protective film and press firmly into place.
Ensure minimum 2 inches overlap at all side laps and minimum 3 inches overlap at all end laps of membrane.
Roll all laps and membrane with a counter top roller to ensure seal.

Transition Areas:
Tie-in to structural beams, columns, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials with self-adhering water resistive air barrier transition membrane.
Align and position self-adhering transition membrane, remove protective film and press firmly into place.
Provide minimum 3 inch lap to all substrates.
Ensure minimum 2 inches overlap at all side laps and minimum 3 inches overlap at all end laps of membrane.
Roll all laps and membrane with a counter top roller to ensure seal.
Openings:
Install Flexible Flashing Membrane at opening sill as described above.
Pre-treat inside corners with a bead of termination sealant..
Wrap jamb of rough openings with self-adhering water resistive barrier transition membrane.
Extend self-adhering water resistive air barrier membrane into rough window openings sufficient to provide a connection to interior vapor retarder.
Align and position self-adhering transition membrane, remove protective film and press firmly into place.
Ensure minimum 2 inches overlap at all side laps and minimum 3 inches overlap at all end laps of membrane.
Roll all laps and membrane with a counter top roller to ensure seal.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Preformed metal siding, soffit panels, and accessories.

REFERENCES
General Requirements for Aluminum-Zinc Coated Sheet: ASTM A 792.

SUBMITTALS
Provide in accordance with Section 01 33 00.
Manufacturer's Data:
Submit copies of specifications, installation instructions, and standard detail drawings for preformed panels. Include current manufacturer's product literature and design guide substantiating that materials and finishes comply with specifications.
Samples:
Submit full range of manufacturer's standard colors for color selection.
After color selection, submit (2) 12 inch long by full width samples for verification of pattern, texture and color.
Shop Drawings:
Submit shop drawings showing details of forming, jointing, gaskets, supports, anchorages, trim, flashing, and accessories. Show manufacturer's approved layout of entire work.

QUALITY ASSURANCE
Manufacturer's Experience: Minimum 10 years in architectural roofing manufacturing, and minimum 10 years use for specified panels. Provide examples of past experience on similar projects, materials, and exposure.
Installer's Experience: Authorized by panel manufacturer. Installation supervisor trained by panel manufacturer in proper installation of specified products.

DELIVERY, STORAGE AND HANDLING
Keep roofing products dry prior to installation.
Avoid condensation by storing all sheets in a dry location.
Do not allow sheets to come in contact with materials which might cause staining. Provide manufacturer's approved spreader to adequately support long length panels during all handling operations. Refer to manufacturer's literature for support requirements.
Protect all system components from damage while in transit.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

WARRANTY
Panels:
Prior to completion of the project submit panel manufacturers 20 year warranty against structural defects or corrosion.
Finish:
Provide panel manufacturers 20 year warranty on the Kynar Fluorocarbon for durability and color fade.
Installer:
Provide subcontractor/installers 1 year guarantee on workmanship and leaks.

PART 2 - PRODUCTS

METAL SOFFITS
Material: Prefinished steel conforming to ASTM A 446, Grade C, minimum yield strength 40,000 psi, 24 gauge thickness. Solid or perforated per drawings.
Type: Linear flat panel in 12 inch wide modules, without intermediate stiffening ribs or flutes; Taylor Metals, "SmoothWall"; AEP Span, "Prestige-12" or accepted substitute.
Finish: Silicone-modified polyester finish coat applied over a 0.2 mil. baked-on epoxy base primer to a

total film thickness of 1.0 mil.
Color: To be selected by Architect from Manufacturer's standard line.

FLASHINGS
Material: Same type and finish as the panel, but may be tempered differently to facilitate forming.
Minimum thickness: Same as siding panel.
Finish: DuraTech® 5000 (Polyvinylidine Fluoride), full 70% Kynar® 500/Hylar 5000®

PART 3 - EXECUTION

EXAMINATION
Examine substrate and conditions under which metal panel and accessories work is to be preformed. Do not proceed with installation of any work specified herein until all supporting surfaces are complete, clean, true and prepared per manufacturer's instructions for application of materials.

PREPARATION
Verify count and alignment of panels to meet layout requirements. Repair any breaks or interruptions of isolating material before commencing panel installation.

INSTALLATION
Remove any strippable protective coatings on the metal panels after installation. Coatings may be partially removed to facilitate installation.
Where panels are in contact with wood or other absorptive materials subject to wetting, or treated with preservative, provide underlayment or manufacturer's approved elastomeric sheet adhesive or mechanically attached.
No perforations permitted in panels by fasteners except flashing, closures, or trim as shown on details.
Install penetrations for plumbing, ventilators and any other equipment or structures that are supported by the panels in accordance with manufacturer's direction. Allow for thermal movement of panels.
Engage anchor clip as recommended by manufacturer before positioning hook rib of adjacent panel.
Use manufacturer's pan end tool to turn up the upper end of all panels to be square cut.
Provide channel closure as recommended by the manufacturer, at all panels cut at an angle.
Flashings:
Install linear flashings with approved slip joints between sections. Use three part joint with backing plate behind gap and anchor clip to hold joint tight. Provide approved sealant between pieces. Do not use lap joints without prior approval of architect.

CLEANING
As panels are installed, sweep clean and apply touch-up paint where required. Do not allow debris to accumulate on panels.
Apply touch-up paint to flashings and accessories.
Clean away excess sealants.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Elastomeric, single ply roof membrane including flashings, insulation, and other items integral with roofing.

ROOFING SYSTEM DESIGN

Provide membrane roofing system identical to systems that have been successfully tested by a qualified testing and inspection agency to resist uplift pressure calculated according to ASCE/SEI 7, meeting the following minimum loads:

Corner Uplift Pressure: 75 lbs./sq. ft.
Perimeter Uplift Pressure: 120 lbs./sq. ft.
Field-of-Roof Uplift Pressure: 180 lbs./sq. ft.

SUBMITTALS

Provide in accordance with Section 01 33 00.

Manufacturer's Data:

Two copies installation specifications.
Two copies of materials list proposed for use.

Shop Drawings:

Include dimensioned roof plan with fastening pattern, and roofing manufacturer’s standard details that are representative of those that will be encountered during installation.

Samples:

Two each 8½" x 11" samples of membrane, factory weld, T-shaped lap, walkway pad, termination bar, fascia bar with cover, each fastener type to be used for installing membrane, insulation/recover board and flashing.

Installer Certificates:

Signed by roofing system manufacturer certifying that installer is approved, authorized, or licensed by manufacturer to install roofing system.

Manufacturer Certificates:

Signed by roofing manufacturer certifying that the roofing system complies with requirements specified herein.

ASTM D4434 Certification:

Supply test results from qualified testing agency that states that the roofing product meets the requirements for Type IV PVC sheet roofing as defined in ASTM D4434.

Maintenance Data:

Outlining leak reporting procedure, maintenance requirements, and emergency repair procedures.

Sustainability Requirements:

Provide product data listing the Solar Reflective Index (SRI) for roofing material.
Provide manufacturer’s product data listing blowing agents and statement that rigid polystyrene and polyurethane foam insulation was manufactured with no hydrochlorofluorocarbon (HCFC) blowing agents.
Submit manufacturer’s data listing roofing membrane “Energy-Star” rating.

Samples:

Two each 8-1/2" x 11" samples of membrane and flashing

QUALITY ASSURANCE

Qualifications:

Applicator/installer certified and authorized by membrane manufacturer.

Source Limitations:

Obtain components for membrane roofing system from roofing membrane manufacturer with no deviations from the roofing membrane manufacturer’s installation directions and approved shop drawings without prior written approval of the manufacturer.

Fire Ratings:

Exterior Fire Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

Pre-installation Conference:
Conform to the requirements of Section 01 31 19.
Prior to roofing, Contractor shall arrange meeting to clarify any questions about Specifications, details, and application requirements.
Representatives of the following shall attend:
- Architect
- General Contractor
- Roofing Contractor
- General Sheetmetal Contractor
- Roofing Manufacturer
- Roof-mounted Mechanical Equipment Contractor

DELIVERY, STORAGE, AND HANDLING
Deliver material in original packages with manufacturer's legible labels thereon.
Do not remove labels or open packages until Architect inspects.
Store roof insulation off ground; store roll goods on end.
Protect against damage, moisture, and extreme temperatures.
Do not stack insulation higher than 8 feet.
Do not overload building with stored materials.

WARRANTY
Manufacturer's Warranty:
Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, substrate board, roofing accessories, roof pavers, and other components of membrane roofing system.
Warranty Period: 20 years from date of Substantial Completion.
Roofing Installer's Project Warranty:
Prior to final project acceptance submit roofing Installer's warranty, on warranty form at the end of this section, signed by Installer, covering the Work of this Section, including all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:
Warranty Period: Three years from date of Substantial Completion.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

ROOFING MEMBRANE
Material: Single-ply, fabric reinforced poly-vinyl chloride (PVC), "Energy-Star" rated, conforming to ASTM D4434, Type III.
Minimum Thickness: 80 mils.
Color: White
- Minimum Initial Reflectance: 0.83.
- Initial Emissivity: 0.90
- Solar Reflectance Index (SRI): >104

System: Fully Adheared.
Flashings: Minimum 80 mils, reinforced PVC sheet and prefabricated penetration flashings, matching color.
Minimum Fire Resistive Classification: Class A.
Minimum Wind Uplift Classification: Factory Mutual Class 1-60.
Accessories: Manufacturer's standard pre-formed internal and external corners, pipe boots, curb flashing, termination bars, sealant, membrane laminated metal, and other products necessary for complete installation.
Manufacturer: Carlisle SynTec, Inc., Johns Manville, Sika "Sarnafil", or accepted substitute.

ROOF INSULATION
Type: Polyisocyanurate rigid foam board with inorganic polymer coated glass mat facing sheet both sides.
Manufacturing Standard: ASTM C 1289, Type II, Class I, Grade 3.
Thickness:
Maximum Board Thickness: 2.0 inches.
Minimum Total Insulation Thickness: 6.0 inches minimum (3-layers) unless otherwise shown on Drawings.
Sheet Size: 4 ft. X 8 ft. maximum.
Minimum Thermal Resistance Value: Aged in accordance with RIC/TIMA to R-Value of 6.25/inch.
Density: Minimum, 2.0 pcf.
Manufacturer: Carlisle “SecurShield HP”, CertainTeed “Flintboard ISO Cold”, Johns-Manville "ENRGY 3 AGF", R Max "Ultra-Max", Atlas “AC Foam III”, or accepted substitute.
Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

VAPOR RETARDER
Vinyl sheet, minimum 0.0023 inch thickness, maximum 1.0 perm rating.
Provide on top of decking under roof insulation.

INSULATION ACCESSORIES
Bead-Applied Insulation Adhesive:
Insulation manufacturer's recommended bead-applied, low-rise, one- or multi-component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.
Overlay Board:
ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch thick; Georgia-Pacific “Dens Deck Prime”, USG “Securock”, or accepted substitute.

OTHER MATERIALS
Manufactured or recommended by roofing manufacturer for conditions of use.

ROOF WALKWAY
Factory-formed nonporous, heavy-duty slip-resistant, surface-textured walkway pads or rolls, approximately 3/16 inch thick, acceptable to membrane roofing system manufacturer.

PART 3 - EXECUTION

EXAMINATION
Do not proceed until work which penetrates roof deck has been completed.
Do not proceed until surfaces to receive insulation are smooth, sound, clean, dry, and free of defects.
Prior to starting work notify General Contractor about defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions.
Remove sharp projections.
Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
Verify materials at each work area comply with roof systems schedule contained within the Drawings.

VAPOR RETARDER UNDER ROOF INSULATION
Install vapor retarder as recommended by manufacturer.
Apply vapor retarder to deck utilizing adhesive as recommended by vapor retarder manufacturer.
Lap joints 6 inches minimum and seal with vapor retarder tape.

Lap edges onto parapet wall minimum 6 inches and seal with insulation adhesive and vapor retarder tape.
Install pre-formed boots over penetrations through vapor retarder. Seal joints with adhesive and apply vapor retarder tape.
Seal around all other penetrations through vapor retarder.
Seal openings in electrical boxes.
Apply vapor retarder tape to all seams, joints, tears, and punctures, if any.

INSULATION INSTALLATION
Apply in dry condition and in accordance with Manufacturer's specifications, for Factory Mutual FM Global 1-60 wind uplift resistance.
Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
Install tapered insulation under area of roofing to conform to slopes indicated.
Install insulation under area of roofing to achieve required thickness. Install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
Secure insulation to roof deck with mechanical fasteners or other Factory Mutual approved method in order to meet Factory Mutual loss prevention rating of FM-I60.
Provide tapered, fiber, edge strip at exposed insulation edges, if any.
Do not damage insulation edges during installation.

OVERLAY/COVER BOARD INSTALLATION
Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
Comply with membrane roofing system and insulation manufacturer's written instructions for installing overlay board.
Trim surface of overlay board where necessary at roof drains so completed surface is flush and does not restrict flow of water.
Install overlay board with long joints in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards.
Cut and fit overlay board within 1/4 inch of nailers, projections, and penetrations.
Set overlay board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

MEMBRANE INSTALLATION
Comply with manufacturer's specification and as emphasized herein.
Apply in homogenous, 1-piece, loosely laid membrane.
Place sheets in final position without stretching.
Allow sheets to relax 30 minutes minimum before making splices.
Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
Overlap sheets in accordance with manufacturer's specifications.
Weld and seal seams during same day as sheet application.
Flash pipes, conduits, ducts, and other penetrations through membrane in accordance with manufacturer's recommended procedures.
Provide mechanically attached system.
Seams:
Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
Verify field strength of seams a minimum of twice daily and repair seam sample areas.
Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

BASE FLASHING INSTALLATION

Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars

ROOF WALKWAY

Install per layout shown on Drawings. Install walkway products in locations indicated. Heat weld to substrate or adhere to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

FIELD QUALITY CONTROL

Inspection:

Notify Architect and roofing manufacturer at least 48 hours before starting work.

Final Roof Inspection:

Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
Notify Architect and roofing manufacturer at least 24 hours after work is substantially complete.
Any deficiencies identified during the inspection will be corrected and made ready for Installed Re-inspection within five (5) working days at no additional cost to Owner.
Upon receipt of required materials, certifying inspection and acceptance of the installation by the manufacturer, the warranty shall be duly executed and issued to the Owner.
Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

Re-inspection:

Before expiration of three-year warranty, inspect work and make necessary repairs at no additional cost to Owner.

CLEANING AND REPAIRING

Including work of other sections, clean, repair and touch-up, or replace when directed products which have been soiled, discolored, or damaged by work of this section.
Remove insulation waste from project site daily.
Remove all other debris from project site at work completion or sooner, when directed.
Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

PROTECTION OF UNFINISHED WORK

Before stopping work for day, protect insulation.
Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing the nature and extend in a written report, with copies to the Owner and Architect.

PROTECTION OF OTHER MATERIALS

Protect against damage and discoloration caused by work of this section.
Prevent debris from entering and clogging roof drains and scuppers.

ROOFING INSTALLER'S WARRANTY

Provide the following form with project close-out documents:

A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
   1. Owner: <Insert name of Owner>.
   2. Address: <Insert address>.
   3. Building Name/Type: <Insert information>.
   4. Address: <Insert address>.
   5. Area of Work: <Insert information>.
   6. Acceptance Date: <Insert date>.
   7. Warranty Period: <Insert time>.
   8. Expiration Date: <Insert date>.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:
   1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
      a. Lightning;
      b. Peak gust wind speed exceeding 95 mph;
      c. Fire;
      d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
      e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
      f. Vapor condensation on bottom of roofing; and
      g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
   2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
   3. Roofing Installer is responsible for damage to work covered by this Warranty for consequential damages to building or building contents resulting from leaks or faults or defects of work.
   4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer or other Manufacturer-approved Contractor to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
   5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
   6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
   7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully

available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <Insert day> day of <Insert month>, <Insert year>.

1. Authorized Signature: <Insert signature>.
2. Name: <Insert name>.
3. Title: <Insert title>.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Shop or field formed sheet metal products with waterproof joints; accessories and trim such as gutters, downspouts, copings, and metal or flexible flashings for roof or wall construction.

SUBMITTALS
Provide in accordance with Section 01 33 00.
Samples:
Submit two samples of pre-finished sheet metal in each color selected.
Shop Drawings:
Submit shop drawings showing profiles, dimensions, location and arrangement of joints, supports, types and locations of fasteners and other anchorage, sealant and accessories. Show details of weatherproofing at edges, terminations and penetrations.

SUSTAINABILITY REQUIREMENTS:
Provide manufacturer's product data listing recycled content.
Provide documentation of recycled content and value of recycled content as described in Section 01 81 13.

REFERENCES
Architectural Sheet Metal Manual, published by the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), current edition.

DELIVERY, STORAGE, AND HANDLING
Protect against damage and discoloration.
Store off ground.

WARRANTY
Warrant work weathertight for 3 years, subject to General Condition terms.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

SHEET METAL
Pre-finished Sheet Steel:
Material: Sheet steel, 24 gauge thickness, unless otherwise shown on Drawings.
Exterior Finish: Baked on corrosion resistant primer and baked on Polyvinylidene Fluoride (PVDF) finish coat which includes 70% Kynar 500/Hylar 5000 resins.
Color: Match siding panels metallic "Champagne SRI-46".
Location: Where exposed and elsewhere shown on Drawings.
Aluminum Sheet:
Material: Alloy 5005-H32, conforming to ASTM B209/B209M, .050" minimum thickness unless otherwise shown on Drawings.
Finish: Anodized conforming to NAAMM AA-M21C22A41, Class 1, Architectural, 0.7 mils thick, dark bronze anodized aluminum color to match storefront windows.
Location: Exposed locations adjacent to aluminum windows, doors, louvers and other openings shown on Drawings.
Galvanized Sheet Steel:
Conform to ASTM A 525, coating designation: G-90; lock forming quality conforming to ASTM A 527.
Location: At locations not specified above or where shown on Drawings.

NAILS
Flat head, wire, barbed, slating type, conforming to Fed. Spec. FF-N-105B, type 11, style 23.
Galvanized steel, 1 inch long, 12 gauge minimum.

SCREWS
Pan head, self-tapping, sheet metal type; conforming to Fed. Spec. FF-S-107; #7 by one inch long minimum, cadmium plated.

RIVETS
1/8 inch minimum diameter, length as recommended by rivet manufacturer for materials to be joined; cadmium plated.

EXPANSION ANCHORS
Type recommended by manufacturer for conditions of use.
1/4 inch diameter by 1 inch long, minimum.

SOLDER
ASTM B 32; 50% Tin and 50% Lead.

FLUX
Rosin, cut muriatic acid, or commercial preparation for material to be soldered.

SEALANT
Silicone type conforming to Fed. Spec. TT-S-001543; Dow, GE, or accepted substitute.

ASPHALT PLASTIC CEMENT
Fed. Spec. SS-C-153, Type 1.

PRIMER COATING AND UNDERCOATINGS
Galvanized iron primer as specified in Section 09 90 00.

ASPHALTIC COATING COMPOUND
Fed. Spec. TT-C-494, Type 11.

SLIP SHEET
Rosin-sized smooth building paper; 4 lbs. per 100 sq. ft. minimum.

FABRICATION
General:
Form to details shown on Drawings or described herein. For work not described or detailed in the Drawings or Specifications, refer to SMACNA “Architectural Sheet Metal Manual”.
Form to shapes and dimensions shown with planes and lines in true alignment.
Unless otherwise shown on Drawings or specified fabricate with longest practicable lengths.
Hem exposed edges.
Angle bottom edge of vertical surfaces to form drip.
Cleats:
Same material and thickness as sheet metal.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive sheet metal are smooth, clean, and otherwise properly prepared.
Verify that reglets and nailers to receive sheet metal are properly placed.
Prior to starting work notify General Contractor of defects that require correction.
Do not start work until conditions are satisfactory.
PREPARATION
Before fabricating sheet metal, verify shapes and dimensions of surfaces to be covered.
If field measurements differ slightly from Drawing dimensions modify work as required for accurate fit. If measurements differ substantially notify Architect prior to fabrication.

INSTALLATION, GENERAL
Install work watertight, without waves, warps, buckles, tool marks, fastening stresses, distortion, or defects which impair strength or mar appearance.

Install planes and lines to true alignment.
Allow for sheet metal expansion and contraction.

SEAM INSTALLATION
Common Lock Seams:
3/4 inch finish width; 4-ply loose-locked.
Flat Lock Seams:
5/8 inch finish width; 4-ply flat-locked, malleted tight; sweat full with solder.
Drive Lock Seams:
Fold back abutting edges and cover joint with 1 1/8 inch wide loose drive cap.
Single Corner Seams:
3/4 inch finish width, 3-ply loose locked.
Double Corner Seams:
5/8 inch finish width; 4-ply loose locked.
Lap Seams:
3 inch finish width.
Solder-Lap Seams:
1 inch finish width; sweat full with solder.
Cover Plate Seams:
Space abutting sheets 1/2 inch; cover joint with 4 inch wide cover and back-up plates set in sealant.
Match plates to flashing profile.
Secure plates to substrate with screw installed through open space between flashing sheets.
S-Lock Seams:
Form 1 1/4 inch wide "S" shaped seam on one edge of flashing sheet for concealed fastening.

CLEAT INSTALLATION
Space 2 feet on center, unless continuous cleats or other spacings are specified hereunder.
Secure spaced cleats to substrate with 2 fasteners.
Secure continuous cleats to substrate with fasteners spaced at 12 inch maximum centers.
Cover fastener heads with cleat tabs.

SOLDERING
Clean and flux metals prior to soldering.
Sweat solder completely through seam widths.

SEALANT INSTALLATION
Apply 1/4 inch diameter bead, centered in full length of joint.

ASPHALT PLASTIC CEMENT INSTALLATION
Trowel apply 1/8 inch thick.

PAINTING
Apply primer coat to exposed sheet metal surfaces specified in Section 09 90 00 to receive finish paint; l 1/2 mil dry film thickness.
Protect galvanized steel against oxidation by back-painting with undercoating, 1 1/2 mil dry film thickness.
Protect contacting dissimilar metals against corrosion with asphaltic coating compound, 7 1/2 mil dry film thickness, applied to each contacting face.

COUNTER FLASHINGS
Form of 26 gage galvanized steel.
Overlap base flashing 4 inches minimum.
Install bottom edge spring-tight against base flashing, or at Contractor's option secure bottom edge with 1 inch wide clips spaced no greater than 24 inch on center. Attach clips to substrate with concealed fasteners. Reinforce clips by double-bending back over bottom edge of counter flashing 3/4 inch.
Lap-seam vertical joints, and apply sealant.
Miter, lap-seam, and close corner joints with solder.
Provide where roof intersects vertical surfaces and elsewhere shown on Drawings.

COPINGS
General:
Form of 26 gage pre-finished steel.
Fabricate with standing seams spaced 10 ft. apart, approximately.
Miter and join corners with standing seams.
At Parapet Walls:
Lock exterior edges over continuous cleats secured to substrate.
Lock interior edges to substrate with spaced cleats.
Slope top toward roof.
At Roof Edges:
Lock exterior edges over continuous cleats secured to substrate.
Install roof flange spring-tight against roofing, or at Contractor's option secure with 1 inch wide clips spaced 24 inches apart maximum. Attach clips to substrate with concealed fasteners. Reinforce clips by double-bending back over bottom edge of roof flange 3/4 inch.

CUSTOM FORMED METAL
At Windows, Doors, Louvers and Other Openings: Form to detail of anodized aluminum sheet. Color and finish to match adjacent frames.
Elsewhere: Form to detail of pre-finished steel where exposed to view or galvanized steel where concealed.

DOWNSPOUTS
Form of 24 gage pre-finished steel.
Fabricate longitudinal joints with double corner seams.
Telescope upper into lower sections 1 1/2 inches minimum, rivet and seal.
At open downspout ends provide elbow bends away from building.
Attach to wall with 1 1/4 inch wide straps matching downspout material, and 1 gauge heavier.
Locate straps at downspout tops, bottoms, horizontal joints, and at 10 ft. maximum centers.
Secure straps as required.
Except where otherwise shown on Drawings, install downspouts plumb; modify straps if necessary.
Extend downspouts 3 inches minimum into storm drain hub and close opening with Portland cement grout. Trowel top surface of grout and slope away from downspout.

ROOF PENETRATIONS (if any)
General:
Form of 26 gage galvanized steel.
Base Flashing:
Extend flange onto roof 8 inches minimum in all directions away from penetration, and upward around penetration to position at least 2 inches above roof flood line.
At sheet metal roofing fold upper and side edges back flange 1/2 inch.
Solder-lap joints.
Furnish to roofer for installation.
Counter Flashing:
Overlap base flashing at least 1 inch with storm collar sloped away from penetration.
Secure to penetration with solder.

EQUIPMENT SUPPORT FLASHING
Form of 18 gage galvanized steel.
Fully cap support.
Over lap base flashing 4 inches.
Solder-lap joints.
Provide sealant around penetrations, if any.

MISCELLANEOUS FLASHING
Provide flashing around doors, windows, louvers, and other openings in exterior walls where indicated or required to maintain building watertight.

CLEANING AND REPAIRING
As work progresses, neutralize excess flux with 5% to 10% washing soda solution, and thoroughly rinse.

Including work of other sections, clean, repair and touch-up, or replace when directed products which have been soiled, discolored, or damaged by work of this section.
Leave surfaces ready for finish painting specified in Section 09 90 00.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Prefabricated roof hatches, with hardware and counter flashings.

DESIGN CRITERIA
Positive Live Load: 25 psf, minimum.
Negative Live Load: 20 psf, minimum.
Perpendicular Wind Load: 30 psf, minimum.
Thermal Expansion: Resistant to stress from 200^{o}F temperature shift.

SHOP DRAWINGS
Submit in accordance with Section 01 33 00.
Show complete assembly including curb, joints, gaskets, drainage, insulation, accessories, anchorage details, and other pertinent items.
Include installation instructions.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

WARRANTY
Work of this section is subject to two-year weatherproof warranty called for in Supplementary Conditions, Section 00 73 00.

PART 2 - PRODUCTS

ROOF HATCHES
Type: Service Stair Access type with single leaf.
Curb: Prime-coated galvanized steel
Cover and Lining Material: Galvanized steel, White finish.
Size: 36 X 96 inch. See Drawings for locations.
Manufacturers: Babcock-Davis “BRHPW36X96S1T”, Bilco, Milcor, Dur-Red, or acceptable substitute
Provide complete with watertight, insulated curb and cover; shock-absorbing, spring-loaded cover and inside closing handle.
Provide 42” high (from roofing surface), curb mounted, Roof Hatch Safety Railing with self-closing gate at access end.

PAINT
Galvanized Iron Primer:
Type specified in Section 09 90 00.
Asphalt Compound:
Fed. Spec. TT-C-494, Type II.

SEALANT
Silicone type, as specified in Section 07 92 00.
Provide where necessary to produce weatherproof installation.

PART 3 - EXECUTION

EXISTING CONDITIONS
Do not proceed until surfaces to receive accessories are level, true, smooth, clean, dry and prepared in accordance with approved Shop Drawings.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

PAINTING
Protect contacting dissimilar metals against galvanic corrosion with asphaltic compound 7 1/2 dry mil

thickness minimum, applied to each contacting face.
Prime galvanized steel against oxidation.

INSTALLATION

Accurately secure accessories plumb, level, true to line, without warp or rack and in accordance with Manufacturer's instructions and reviewed Shop Drawings.

ADJUSTMENTS

Adjust moving parts to operate satisfactorily at time of final project acceptance, and during warranty period.

PRODUCT CLEANING AND REPAIRING

Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Leave surfaces ready for finishing specified in Section 09 90 00.
remove debris from project site upon work completion or sooner, if directed.

PROTECTION

Protect other work against damage and discoloration caused by work of this section.
Protect contacting dissimilar materials against electrolytic corrosion.
Avoid overloading roof with stored materials.

END OF SECTION

PART I - GENERAL

SECTION INCLUDES

Firestop systems necessary to fill holes or gaps in fire rated building components in order to maintain the fire resistance integrity of the building.

REFERENCES

ASTM E 84 Surface Burning Characteristics of Building Materials.
ASTM 814 Fire Tests of Through Penetration Firestops.
UL 1479 Fire Tests of Through Penetration Firestops.
NFPA 101 Life Safety Code.
NFPA 70 National Electric Code.
UL Fire Resistance Directory, Vol. II.
ULC S115M
International Building Code (IBC)

SUBMITTALS

Submit in accordance with Section 01 33 00.
Product Data:
Manufacturer's literature, specifications, and application instructions.

QUALITY ASSURANCE

Qualifications:
Installation performed by a firm with expertise in firestopping or similar materials.
Installer licensed or otherwise approved by the firestopping material manufacturer.
Perform work in accordance with manufacturers written installation specification and recommendations.
Pre-installation Conference:
Prior to installation, Contractor shall schedule a meeting to establish procedures to maintain efficient, coordinated working conditions between installer and other trades.

DELIVERY, STORAGE, AND HANDLING

Deliver materials to the project in manufacturer's unopened packages or containers, fully identified as to trade name, type and other identifying data. Packaging shall bear the UL. label and mixing and installation instructions as applicable.
Store materials in a clean, dry location, protected from the weather. Damaged packages found unsuitable for use shall be removed from the project.

PROJECT CONDITIONS

Do not proceed with installation of firestopping when temperature or humidity conditions exceed the manufacturer's recommendations.
Provide adequate ventilation to allow proper curing of firestopping and conform to all safety requirements.

SEQUENCING AND SCHEDULING

Schedule installation of firestopping after installation of penetrating item and prior to concealment.
The Building Team shall cooperate in the coordination and scheduling of firestopping work throughout the construction sequence to avoid delays in job progress.
Coordinate firestop work as necessary with the work of other trades. Firestop installation shall precede gypsum board finishing.

PART 2 - PRODUCTS

MATERIALS

Firestop Material:
CAFCO TPS Through Penetration System firestop products by Isolatek International, or accepted substitute.
Testing:
Conform to ASTM E 814 or UL 1479, Standard Method of Fire Tests of Through Penetration Firestops.

Fire Rating:
Minimum “F” rating, one (1) hour but not less than the fire resistance rating of the floor or wall construction being penetrated.
Provide “T” rating, when required by code authority, based on the temperature rise of the penetrating item.
Comply with interior finish flame spread and smoke developed requirements for the areas of installation.
Material Characteristics:
Water resistant, insoluble in water when cured, free of asbestos and hazardous ingredients.
Compatible with all materials used in the construction. Do not use solvent based materials, not subject to shrinkage, cracking, or pull back from contact surface upon drying.
Flammability: No fire hazard in storage, installation, during curing, or while in service.
Installations subject to movement or vibration: Seal with material designed to perform under these conditions.
Installations subject to frequent changes of penetrating item(s): Seal with materials designed to be refitted without damage to the system.
Water:
Potable.

PART 3 - EXECUTION

PREPARATION
Verify penetrations are sized in accordance with drawings and specifications and are suitable to receive firestopping material.
Verify that all surfaces to receive firestopping are free of oil, grease, loose mill scale, dirt, or other materials which would impair satisfactory fitting or bonding or, which may affect the fire resistance rating.
Cleaning of surfaces shall be the responsibility of the General Contractor.
Provide masking or drop cloths to prevent damage to adjacent areas.
Disconnect power to exposed cable in the work area. Inspect cable jacketing and report damage to the General Contractor before proceeding.

INSTALLATION
Install all materials per system requirements in accordance with manufacturer's written installation specification and recommendations.
Do not begin firestopping application until certification has been received by the General Contractor that areas requiring firestopping have been inspected by the installer and are acceptable to receive firestopping.
Notify Contractor of all unsuitable surfaces.
Do not proceed with firestopping installation until unsatisfactory conditions have been corrected.
Do not install firestopping prior to the completion of construction, with the exception of finish work.
Maintain proper temperature and ventilation specified in manufacture's installation instructions.
Protect materials subject to traffic from damage.
Install firestop materials prior to shelf life expiration.

CLEANING AND REPAIRING
Including work of other sections, clean, repair, and touch-up, or replace when directed products which have been damaged by work of this section.
Repair damaged firestopping.

FIELD QUALITY CONTROL
Inspection:
Do not cover firestop systems until they have been properly inspected and accepted by the authorities having jurisdiction.

PROTECTION
Protect other work against damage or discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Elastomeric and non-elastomeric sealants, caulking compounds, compression seals, joint fillers and related accessories.

DELIVERY, STORAGE, AND HANDLING

Protect against damage.

Store products in original, tightly sealed containers, original labels thereon.

Do not exceed sealant shelf life.

SUBMITTALS

Submit in accordance with Section 01 33 00.

Manufacturer's Data:

Provide Manufacturer's installation instructions for each product used.

Provide Manufacturer's Literature and Data for primers and each type of sealant including compatibility when different sealants in contact with each other.

Sustainability Requirements:

Submit manufacturer's product data listing volatile organic compound (VOC) content of products specified herein.

Provide manufacturer's documentation verifying that sealants contain no urea-formaldehyde.

Samples:

Provide cured samples of exposed sealants for each color where required to match adjacent material.

ENVIRONMENTAL REQUIREMENTS

Perform no work when weather exceeds manufacturer's specified limits.

EMISSIONS STANDARDS

Conform to the following minimum standards for sealant emissions:

Sealant Type	VOC Limits	Standard
Architectural Sealants:	250 g/L	SCAQMD Rule #1168
Other Sealants:	420 g/L	SCAQMD Rule #1168

QUALITY ASSURANCE

Installer Qualifications:

Experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

Source Limitations:

Obtain each type of joint sealant through one source from a single manufacturer.

Sealant Testing:

Product Testing: Obtain test results from a qualified testing agency based on testing current sealant formulations within a 12-month period.

Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021.

Test elastomeric joint sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C920 for adhesion and cohesion under cyclic movement, adhesion-in peel, and indentation hardness.

Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.

Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates in accordance with sealant manufacturer's recommendations:

- Locate test joints as directed by Architect.
- Conduct field tests for each application indicated below:
  - Each type of elastomeric sealant and joint substrate indicated.
  - Each type of non-elastomeric sealant and joint substrate indicated.
- Notify Architect seven days in advance of dates and times when test joints will be installed

Arrange for tests to take place with joint sealant manufacturer's technical representative present.

Mockups:

Before installing joint sealants, apply elastomeric sealants as follows to verify selections made under

sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution:
Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this section.

ENVIRONMENTAL REQUIREMENTS
Perform no work when weather exceeds manufacturer's specified limits.

WARRANTY
Caulking and sealing subject to 2 year weatherproof warranty called for in Supplementary Conditions, Section 00 73 00.
Prior to final project acceptance submit in accordance with Section 01 78 23, 2 copies of the Warranty for inclusion in Owner's Maintenance Manual:

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

SILICONE SEALANT
GE, Dow, Bostik 1250, with mildew inhibitor, conforming to Fed. Spec. TT-S-001543.
Select proper type in accordance with manufacturer's recommendations.

URETHANE SEALANT
Vertical Joints:
Non-sag, one component type; Pecora "Dynatrol I", BASF "MasterSeal NP 1", Bostik Chem-Caulk 915.
Horizontal Joints:
Self-leveling, one component type; Pecora "Urexpan NR-201", BASF "MasterSeal SL 1", Bostik Chem-Cail 955-SL.

FOAM AIR-INFILTRATION SEALANT
Grace Polycel One.

SEALANT COLORS
Urethane Sealant: Approximate color of adjacent surfaces, unless otherwise directed.
Silicone Sealant: Approximate color of adjacent surfaces, or clear if color not available.
Foam Sealant: Contractor's choice.

PRIMER AND SURFACE CONDITIONER
Made or recommended by manufacturer of compound or sealant.

BACKER ROD
Closed-cell polyethylene gasketing rod, Dow "Ethaform," or accepted substitute.
Diameter: 1/4 greater than width of joint where to be installed.

PART 3 - EXECUTION

EXAMINATION
Inspect joints to be sealed and verify that joints are clean, dry, and free from dust, oil, grease, rust, lacquer, laitance, loose mortar, or other bond-reducing matter.
Allow concrete surfaces to dry at least 4 weeks before sealing.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
General:
Remove dust, dirt and other foreign matter from joints to be sealed by brushing and air-blowing.
Priming:
Prime unpainted surfaces to receive sealant.
Apply with bristle brush. Do not flood surfaces.

BACKER INSTALLATION
Install backer rod behind sealant in accordance with manufacturer's directions.
Provide in as long continuous lengths as practicable.
Stretch taut and force into joints to uniform depth, approximately 1/2 Joint width but not to exceed 1/2 inch.
Replace any punctured backer rod.

FOAM SEALANT INSTALLATION
Follow sealant manufacturer's directions.
Inject sealant continuously until opening is filled.
If opening is not filled within sealant snap time or maximum of 3 minutes, stop application for at least 15 minutes before resuming work.
Trim cured foam flush with adjacent surface.

OTHER SEALANT INSTALLATION
Apply sealant in accordance with manufacturer's directions using gun-type dispenser.
Size gun nozzle to fit joint.
Seal joints before applying final paint coat.
Fill joints and voids solid; superficial pointing with skin bead not acceptable.
Install flush with adjacent surfaces.
Tool joints smooth within 10 minutes after installation.
Remove masking materials, if any, immediately after sealant installation.

APPLICATION
Caulk exterior and interior joints around window frames, door frames, and louver frames and other openings in exterior walls with urethane sealant.
Caulk spaces around utility penetrations through walls and floors with foam penetrant sealant.
Where subject to air infiltration, caulk spaces between wall framing members and windows, doors, and other openings in exterior walls with foam air-infiltration sealant.
Caulk space beneath exterior wall base plates with foam air infiltration sealant.
Caulk with silicone sealant where shown on Drawings.

CLEANING AND REPAIRING
Remove excess material as work progresses and leave surfaces neat, smooth, and clean.
Remove debris from project site upon work completion or sooner, if directed.
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Shop fabricated metal doors, insulated or non-insulated, stock or custom sizes. Shop fabricated and assembled or field assembled steel frames of standard profiles and measurements.

REFERENCES

Except as modified herein, conform to requirements of "Recommended Specifications Standard Steel Doors and Frames," S.D.I. 100 (ANSI 250.8-2003), published by Steel Door Institute, 30200 Detroit Road, Westlake, Ohio 44145; 440-899-0010.

Conform to requirements of ANSI 250.4-2001, Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcings; and ANSI 250.10-1998, Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames. Specifications may be obtained from Institute.

SUBMITTALS

Provide in accordance with Section 01 33 00.

Shop Drawings:

Show elevations, principal construction features, and dimensions of each door type and frame type, cut-outs, reinforcement, joints, welds, finish, anchoring and other pertinent details.

Locate and detail field splice joints for frames too large to ship in one piece.

Indicate instructions for making field splices.

Manufacturer's published details may be substituted for standard stock items, provided required information is included.

Certificates:

Furnish letter from manufacturer stating that the work delivered to project conforms to these Specifications.

Label on each unit, as defined in this section, may be substituted, at Contractor's option.

REGULATORY REQUIREMENTS

Fabricate doors and frames where scheduled to be fire-restrictive in accordance with Underwriters Laboratories requirements. Affix UL Acceptance Label on each piece.

QUALITY ASSURANCE

Manufacturer’s Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

DELIVERY, STORAGE, AND HANDLING

Protect against damage and discoloration.

Remove door wrappings upon jobsite delivery.

Store doors and frames upright in protected dry area, at least one inch above ground or floor, and with at least 1/4 inch between individual pieces.

Brace bottom ends of frame jambs against displacement.

COORDINATION

Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

MATERIALS

General:

Steel, carbon, cold-rolled, commercial quality: ASTM A 366.

Steel sheet, zinc coated (galvanized) by the hot dip process, general requirements: ASTM A 525.

Steel, carbon, hot-rolled sheet and strip, commercial quality: ASTM A 569.

Sheet steel, cold-rolled, electrolytic zinc coated: ASTM A 591.

Supports and Anchors:

Fabricate of not less than 18 gage galvanized sheet steel.

Inserts, Bolts, and Fasteners:

General: Comply with ASTM A 153, class C or D as applicable.

Items built into exterior walls: Galvanized.
Elsewhere: Manufacturer's standard units.
Glass and Glazing:
Provide glass and glazing materials which comply ANSI Z97.1 and with Section 08 80 00.

STANDARD STEEL DOORS
Type: Level II, Model 1, heavy duty 1-3/4 inch.
Style: Style F unless otherwise shown on Drawings, full flush hollow steel construction.
Construction: 18 gage.
Core: Solid foam core.

STANDARD STEEL FRAMES
Gauge Construction:
Exterior Frames: 16 gage, unless otherwise noted on Drawings.
Interior Frames: Less than 40 inches wide: 18 gage.
Frame Type:
Construction: Full welded.
Frame Face: Standard 2" width.
Frame Depth:
    Interior: Finished wall thickness + 1 inch unless otherwise shown on Drawings.
    Exterior: 8 inches, unless otherwise shown on Drawings.

BULLET RESISTANT STEEL FRAMES
Construction: 16 gage steel lined with UL Listed bullet resistant composite; UL 752, Level 2, NIJ 0108.01 Bullet Resistant Standards, and ASTM F1233.
Frame Type:
Construction: Full welded.
Frame Face: Standard 2" width.
Frame Depth: Finished wall thickness + 1 inch unless otherwise shown on Drawings.

ANCHORS
General:
Follow referenced specifications.
To Stud Walls:
Full frame width and depth, welded to frame.
Minimum quantity:
    Frames up to 7'-6" high: 3 per jamb.
    Frames 7'-6" to 8'-0" high: 4 per jamb.
    Frames higher than 8'-0": 4 anchors plus 1 additional for each 2 ft. or fraction thereof over 8'0".
To Masonry Walls:
0.156" diameter galvanized steel wire loop or type required to meet fire rating.
Minimum Quantity:
    Frames up to 7'-6" high: 3 per jamb.
    Frames 7'-6" to 8'-0" high: 4 per jamb.
    Frames higher than 8'-0": 4 anchors plus 1 additional for each 2 ft. or fraction thereof over 8'0".

FABRICATION
General:
Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle.
Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site.
Fill surface depressions with metallic paste filler and grind to smooth finish.
Touch up areas where galvanized coating has been removed.
Fabricate with 26 gage minimum dust cover boxes at hardware mortises and where mortar or other materials might obstruct hardware operation.
Fabricate with the following clearances:
    Between doors and frames: 1/8 inch.
    Between door sills and thresholds: 1/4 inch.

Between door sills and floor: 5/8 inch.
Between meeting edges of pairs of doors: 1/8 inch.

Shop Finish:
Dress surface irregularities to smooth surface.
Chemically treat and clean exposed surfaces.
Manufacturer's standard, bonderized, and one coat baked-on rust inhibiting prime paint.

Doors:
Mechanically interlock longitudinal seams of honeycomb core type doors and panels. Leave seams invisible, or weld, fill and grind smooth.
Fabricate exterior doors with flush tops.
Provide astragals for double doors where removable center mullions are not provided. Provide in accordance with UL requirements for labeled doors and panels.

Frames:
Accurately form and cut mitered corners of welded type frames. Weld on inside surfaces. Grind welded joints to smooth uniform finish.
Accurately cope and securely weld butt joints of mullions and transoms of glazed lights. Grind welded joints to smooth uniform finish.
Reinforce frames wider than four feet with 12 gage formed steel channels welded in place, flush with top of frames.
At metal stud partitions, for exterior and interior doors as noted on Drawings: backplaster frames with rich, metal adhering, fast setting gypsum plaster.

Hardware reinforcement:
Make standard provision for hardware listed in Section 08 71 00, in accordance with ANSI/SDI 250.6-2003 “Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames”.
Reinforce for hardware listed in Hardware Schedule, Section 08 71 00.
Provide standard reinforcement for door closers whether or not closers are listed in Hardware Schedule, Section 08 71 00.

PART 3 - EXECUTION

EXAMINATION
Verify that openings to receive hollow steel doors and frames are accurately sized and located, square, plumb, and otherwise properly prepared.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
Verify field dimensions prior to fabrication.
If minor differences exist between field measurements and drawing dimensions, modify work as required for accurate fit. Notify Architect about major differences prior to fabrication.

INSTALLATION
Follow referenced specifications and manufacturer's instructions.
Secure anchors to adjacent construction.
At metal stud partitions, for exterior and interior doors as noted on Drawings: backplaster frames with rich, metal adhering, fast setting gypsum plaster.
Accurately position work. Set doors flush with frame face.
Set doors plumb to hold any desired position.
Install glazed light frames with welded glass stops on security side.
Coordinate installation of glass and glazing in doors.

ADJUSTING
Adjust moving parts to operate satisfactorily at time of final project acceptance and during warranty period.

CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Leave surfaces ready for finish painting specified in Section 09 90 00.

Remove debris from project site upon work completion or sooner, if directed.

PROTECTION

Protect other work against damage and discoloration caused by work of this section.
Protect contacting dissimilar materials against electrolytic corrosion.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Hollow and solid core wood doors, solid wood stiles and rails and/or plastic laminate face veneer.

REFERENCES
For Hardwood Veneer Faced Doors: National Woodwork Manufacturer's Association Industry Standards I.S.1-97.
Standard may be obtained from association at 400 W. Madison Street, Chicago, Ill. 60606.
For Softwood Doors: Fir and Hemlock Door Association, Industry Standard FHDA 5-75.
Standard may be obtained from Association at 1500 Yeon Building, Portland, Oregon 97204.

OPTIONS
Prefitting doors to frames and preparing for finish hardware specified in Section 08 71 00 may, at Contractor's option, be performed at mill.
Flush panel doors with openings therein, may, at Contractor's option, be fabricated with stile and rail cores.

SUBMITTALS
Submit in accordance with Section 01 33 00.
Shop Drawings:
Show elevations, principal construction features and dimensions of each door type.
Samples:
Submit two samples of door veneer, 12 x 12 inch size, illustrating wood grain, stain color, and sheen.

REGULATORY REQUIREMENTS
Fire Resistance Rating Certification Agency: Underwriter's Laboratories, Inc.

QUALITY ASSURANCE
Manufacturer’s Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

DELIVERY, STORAGE, AND HANDLING
Do not deliver to jobsite until notified by General Contractor that project is conditioned and prepared to handle and store products without damage or discoloration.
Protect against damage and discoloration.
Store flat on level, dry surface and in well ventilated space.
Cover for protection, but allow air circulation.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

CORE
Interior Flush Solid Core Doors:
Particle board type with 1 1/8 inch minimum width stiles.
Bullet resistant doors:
UL Listed bullet resistant composite; UL 752, Level 2, NIJ 0108.01 Bullet Resistant Standards, and ASTM F1233.

FACE
At doors to be stained and varnished:
Plain sliced white birch.
Veneer Grade: HPVA Grade AA.
Construction Grade: AWI Premium Grade.
Book matched veneers. Carefully match veneers for color.

EDGE BAND
At wood veneer faced doors:
1/2 inch thick, minimum.
Species: Manufacturer's standard hardwood, matched for color.

ADHESIVE
Commercial Standards CS-171, Type I.

FACTORY FINISH
Finishing Standards: Conform to WDMA G-17 Finish System Description or AWI Division 1500-S-4 – Finish System Standards.
Type: Water-based stain with ultra-violet (UV) cured polyurethane complying with EPA Title 5 guidelines for Volatile Organic Compound (VOC) emissions limitations. Meet or exceed performance standards of TR-6 catalyzed polyurethane.
Stain Color: Selected by Architect.

FABRICATION
Conform to referenced standards "Premium" grade.
Prepare doors in accordance with "Standard Procedures and Recommendations for Factory Machining," published by National Woodwork Manufacturer's Association.
At paired doors match face veneers on adjacent door sides and identify matching faces.
Install glass, if any, in fire-rated doors with manufacturer's standard steel stops.
Install glass, if any, in other doors with manufacturer's standard wood stops.
Tolerances:
Thickness: 1/16 inch plus or minus.
Size: 1/8 inch plus or minus; 1/32 inch for prefit doors.
Squareness: 1/4 inch maximum difference between opposite diagonal measurements.
Warp: 1/4 inch maximum space measured from horizontal, vertical, or diagonal straight edge to point of maximum bow, cup or twist.

PART 3 - EXECUTION

EXAMINATION
Verify that door frames are correct type, accurately located and sized, square, plumb, true, and otherwise properly prepared.
Prior to starting work notify General Contractor about defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION OF DOORS FOR HANGING
Seal job-cut surfaces with 2 coats waterproof sealer compatible with door finish specified in Section 09 90 00.
Undercut doors as required for floor covering clearance.
Fit doors for width by planing; for height by sawing. Fit fire-rated doors for width by planing from lock side only; for height by sawing bottom only.

INSTALLATION
Position doors flush with frame face.
Set plumb so door will hold any desired position.
Install with the following clearances:
- Between doors and frames: 1/8 inch.
- Between door sills and thresholds: 1/4 inch.
- Between meeting edges of pairs of doors: 1/8 inch.

ADJUSTMENTS
Adjust moving parts to operate satisfactorily at time of final project acceptance and during warranty period.

CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed, products which

have been soiled, discolored, or damaged by work of this section.
Leave surfaces ready for finishing specified in Section 09 90 00.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Protect other surfaces against damage or discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Special doors operating in various methods and for various uses including hardware and controls.

SUBMITTALS
Provide in accordance with Section 01 33 00.
Shop Drawings:
Show elevations, principal construction features, and dimensions of each door type and frame type, cut-outs, reinforcement, joints, welds, finish, anchoring and other pertinent details.
Locate and detail field splice joints for frames too large to ship in one piece.
Indicate instructions for making field splices.
Manufacturer's published details may be substituted for standard stock items, provided required information is included.

REGULATORY REQUIREMENTS
Fabricate doors, where scheduled to be fire-resistive, in accordance with Underwriters Laboratories requirements. Affix U.L. Acceptance Label on each piece.

DELIVERY, STORAGE, AND HANDLING
Protect against damage and discoloration.

ENVIRONMENTAL REQUIREMENTS
Protect contacting dissimilar materials against electrolytic corrosion.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

WALL ACCESS DOORS
Type: Flush, side hinged, size as shown on Drawings.
Manufacturer: J.L. Industries, Milcor Inc., Larsen's, or accepted substitute.
Material: 14 gauge door, 16 gauge frame, prime coated steel.
Finish: Manufacturer’s standard primer. Paint panel doors and frames to match color of adjacent material.
Size: As required for installation. Minimum size for access to plumbing valves 12” X 12”.
Provide appropriate U.L. fire-resistance rating where doors are located in fire walls.
Hardware: Concealed type hinges.
Number Required: Allow in Bid for all access doors, if any, indicated on Drawings or required under Divisions 21 and 23.
Exact number will be determined by Architect as Work progresses.
Contract sum will be adjusted in accordance with General Conditions.
Locks: Cylinder lock, keyed to existing access door locks. Furnish with two keys per lock.

PART 3 - EXECUTION

EXISTING CONDITIONS
Verify that openings to receive doors are square, plumb, and accurately sized and located. Prior to starting work notify General Contractor of defects requiring corrections.
Do not start work until conditions are satisfactory.

INSTALLATION
Install access doors and hardware in accordance with manufacturer's directions and approved shop drawings.
Accurately locate and anchor members plumb, square, true, rigid, secure, and with proper clearances.

ADJUSTMENTS
Adjust moving parts to operate satisfactorily at time of project final acceptance and during warranty

period.

PRODUCT CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed products which have been soiled, discolored, or damaged by work of this section.
Leave surfaces ready for painting specified in Section 09 90 00.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Entrance, transom and sidelight systems fabricated of formed or extruded metals and all glass systems.

SUBMITTALS

Provide in accordance with Section 01 33 00.

Shop Drawings:

Show elevations, principal construction features, and dimensions of each door type and frame type, cut-outs, reinforcement, joints, welds, finish, anchoring and other pertinent details.

Samples:

Submit finish color samples.

Submit frame sections, mullion section, corner section, glass, and anchor samples upon request.

Submit two samples 24 x 24 inches in size illustrating finished aluminum surface, glazing, infill panels, glazing materials.

LABORATORY TESTING AND PERFORMANCE REQUIREMENTS

Performance Requirements:

Provision for Thermal Movements: Design storefront framing systems to provide for thermal movement of all component materials resulting from expected surface temperatures range without causing buckling, stresses on glass, failure of joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or other detrimental effects. Operating windows and doors shall function normally over temperature range.

Test Procedures and Performance:

Air Infiltration Test:

Test unit in accordance with ASTM E 283 at a static air pressure difference of 6.24 psf (299 Pa).

Maximum air infiltration.06 cfm/SF (.30 l/s•m²) of unit.

Water Resistance Test:

Test unit in accordance with ASTM E 331.

No uncontrolled water leakage at a static test pressure of 10.0 psf (479 Pa).

Uniform Load Deflection Test:

Test in accordance with ASTM E 330.

Maximum deflection under design load L/175 of the clear span.

Uniform Load Structural Test:

Test in accordance with ASTM E 330 at a pressure 1.5 times the design wind pressure in 1.05.B.3.b with no glass breakage, permanent damage to fasteners, storefront parts, or any other damage that would cause the storefront to be defective.

Condensation Resistance Test (CRF):

Test unit in accordance with AAMA 1503.1.

Minimum condensation Resistance Factor (CRF) 66 (frame) and 69 (glass) when glazed with 1" (25 mm) insulated – 1/4" (6 mm) clear low emissivity, 1/2" (12 mm) air, 1/4" (6 mm) clear glass.

Thermal Transmittance Test (Conductive U-Value):

Test in accordance with AAMA 1503.1.

Maximum conductive thermal transmittance (U-Value) 0.44 BTU/hr•ft²•°F (2.49 W/m²•K) when glazed with 1" (25 mm) insulated – 1/4" (6 mm) clear low emissivity, 1/2" (12 mm) air, 1/4" (6 mm) clear glass.

Thermal Transmittance Test (Conductive U-Value):

Test in accordance with NFRC-102.

Maximum conductive thermal transmittance (U-Value) 0.41 BTU/hr•ft²•°F (2.32 W/m²•K) when glazed with 1" (25 mm) insulated – 1/4" (6 mm) clear low emissivity, 1/2" (12 mm) air, 1/4" (6 mm) clear glass.

Project Wind Loads:

Design wind pressure, both positive and negative as required by Building Code, calculated from ANSI A58.1, or as determined by boundary layer wind tunnel testing.

Use 20.0 psf (958 Pa) as minimum.

Provide test reports from AAMA accredited laboratories certifying performance.

Thermal Performance:

Comply with Energy Code.

Maximum Assembly U-value:

Entrance Doors: 0.80.
Elsewhere: 0.45.
Maximum Assembly Solar Heat Gain Coefficient: 0.40.
Air Leakage:
Entrance Doors: 1.0 cubic feet per minute per square foot of door area when tested in accordance with ASTM E 283.
Elsewhere: Maximum 0.3 cubic feet per minute per square foot of fenestration area when tested in accordance with ASTM E 283.

QUALITY ASSURANCE
Source Limitations for Aluminum-Framed Systems:
Obtain from single source from single manufacturer.
Manufacturer Qualifications:
Company specializing in manufacturing aluminum glazing systems with minimum five (5) years of documented experience.
Installer Qualifications:
Company specializing in installation of aluminum glazing systems and approved by glazing system manufacturer.
Pre-Installation Meeting:
Convene one week before starting work of this section to verify project requirements, coordinate with installers of other work.
Representatives of the following shall attend:
Owner's Project Representative
Architect
Mechanical Engineer/Systems Engineer
General Contractor
Storefront Installer
Manufacturer's Representatives
Representatives of other trades requiring coordination with Storefront installation.

DELIVERY, STORAGE, AND HANDLING
Protect against damage and discoloration.
Store doors and frames upright in protected dry area, at least one inch above ground or floor, and with at least 1/4 inch between individual pieces.
Brace bottom ends of frame jambs against displacement.
Provide removable protective coating on exposed metalwork adjacent to plaster, gypsum board, or sprayed gypsum work. Maintain until project completion.

ENVIRONMENTAL REQUIREMENTS
Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

WARRANTY
Total Storefront System:
Assume full responsibility and warrant for one year the satisfactory performance of the total storefront installation including insulated glazing units, anchorage and setting system, sealing, flashing, etc., as it relates to air, water, and structural adequacy as called for in the specifications and approved shop drawings. Correct any deficiencies due to such elements not meeting the specifications by the responsible contractor at their expense during the warranty period.
Material and Workmanship:
Per AAMA standard 601, provide written guarantee against defects in material and workmanship. Warranty period shall be for 3 years from the date of final shipment.
Glass:
Provide written warranty for insulated glass units that they will be free from obstruction of vision as a result of dust or film formation on the internal glass surfaces caused by failure of the hermetic seal due to defects in material and workmanship. Warranty period shall be for 10 (ten) years.

PART 2 - PRODUCTS

MATERIALS

Aluminum:

Structural shapes, blocking, bracing, and other concealed members: 6061-T6.

Exposed Extrusions: 6063-T6.

Casting: 214-T6.

Sheetmetal: 5005-H32.

Special Finishes: Modify alloys and tempers specified above as necessary for proper application of special finishes specified hereunder.

Finish (unless modified hereunder):

Concealed Work: Mill Finish.

All other Work: AA-M12C22A31, clear anodized.

Glass:

Refer to Section 08 80 00.

STEEL REINFORCEMENT

Conform to ASTM A 36.

FASTENERS

Type recommended by manufacturer for conditions of use.

Galvanically compatible with materials to be fastened.

CORROSION INSULATING COMPOUND

Asphaltic Coating Compound: Fed. Spec. TT-C-494, Type II.

FRAMES

Material: Extruded aluminum.

Size and Profile: 2 inches x 4½ inches, flush front glazing at exterior windows, center glazing at interior windows.

Wall Thickness: .125 inch.

Manufacturers: Kawneer, EFCO, Oldcastle, or approved substitute.

Model:

- Exterior insulated glazing: Kawneer “Trifab VG 451T - Front”
- Interior insulated glazing: Kawneer “Trifab VG 451T - Center”
- Interor non-insulated glazing: Kawneer “Trifab VG 450 - Center”

SWING DOORS

Material: Extruded aluminum.

Rail Dimensions:

- Top and Side Rails: 5 inches width.
- Bottom Rail: 10 inches height.

Manufacturer: Kawneer “Wide Stile 500”, or approved substitute.

FINISH HARDWARE

Provide the following Hardware by door manufacturer or supplier:

- Hinges: Oil-impregnated bearing, five knuckle full mortise type butt hinges, stainless steel.
- Number of hinges required:
  - 7 ft. height doors: 4.
- Push/Pull Set: 1" diameter rod, Kawneer "CO9" pull, "CP-II" push bar. Provide where no lever set or exit device is specified in Hardware Schedule on Section 08 71 00.
- Closer: Surface type conforming to ANSI A156.4, Grade 2. Comply with ADAAG 4.13.10 AND 4.13.11 for maximum allowable sweep time and opening force.
- Threshold: Manufacturer's standard extruded aluminum type, mill finish.
- Weatherstripping: Manufacturer's standard flexible, non-porous polymeric strip. Provide for heads, jambs and sills of exterior doors. Sill weatherstrip adjustable for wear.
- Locking Mechanism: Adams Rite MS-1850 Deadlock with Exit Indicator. Provide where no lever set or exit device is specified in Hardware Schedule on Section 08 71 00.

GLASS STOPS
Square stops and non-stretch, high shore vinyl glazing beads reinforced with 60 pound test fiberglass cord core against both glass faces.

FABRICATION
General:
Provide concealed steel stiffeners where indicated or required to resist wind or other applied loads.
Fabricate connections as required for strength and rigidity using concealed mechanical fastenings wherever possible. Where not possible, welding may be used.
Cut horizontal members between verticals.
Match exposed welds with adjacent material, free of porosity, cracks and blow-holes.
Select materials carefully for matching color and texture after finishing.
Fabricate flat surfaces smooth and true, free from waves, buckles, and seams.
Fabricate edges, corners, and angles clean, sharp, and square; joints precision fitted.
Allow for expansion and contraction.
Make exterior work permanently weathertight.
Clearances:
Fabricate with the following clearances:
- Between Doors and Frames: 1/8 inch.
- Between Door Sills and Thresholds: 1/4 inch.
- Between meeting edges of pairs of Doors: 1/8 inch.

Tolerances:
Member Alignment: True within 1/8 inch per 12 feet.
Openings: Accurately sized and located within 1/4 inch.
Squareness: 1/8 inch maximum difference between opposite diagonal measurements.

PART 3 - EXECUTION

EXAMINATION
Verify that openings to receive work of this section are plumb, rigid, accurately sized and located, and otherwise properly prepared.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
Verify prior to fabrication.
If field measurements differ slightly from drawing dimensions modify work as required for accurate fit. If measurements differ substantially notify Architect prior to fabrication.

INSTALLATION
Follow manufacturer's directions and approved shop drawings.
Install plumb, square, true, rigid, secure, weathertight, and without glass-to-metal contact between panels and frames.

PAINTING
Coat contacting dissimilar materials with corrosion insulating paint, 7 1/2 mil dry film thickness, minimum, applied to each contacting face.
Touch-up any unfinished metal exposed by cutting. Match adjacent color.

CLEANING AND REPAIRING
Remove protective coatings.
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Final glass cleaning specified in Supplementary Conditions.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Protect other work against damage or discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Automatic sliding type doors of aluminum construction complete with glass and glazing, hardware, weatherstripping, sensors and controls.

REFERENCES
Comply with ANSI A 156.10, Power Operated Pedestrian Door Standard.

SHOP DRAWINGS
Submit product data and shop drawings in accordance with Section 01 33 00.
Indicate pertinent dimensioning, general construction, component connections and locations, anchorage methods and locations, and installation details.

DELIVERY, STORAGE, AND HANDLING
Do not deliver to jobsite until notified by General Contractor that project is conditioned and prepared to handle and store products without damage or discoloration.
Protect against damage and discoloration.
Store on level, dry surface and in well ventilated space.
Cover for protection, but allow air circulation.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART - 2 PRODUCTS

MATERIALS
Doors and Frames:
Extrusions: Aluminum, 6063-T5 alloy and temper, minimum 1/8 inch thickness.
Fasteners: Aluminum, stainless steel, or plated steel in accordance with ASTM A164.
Anchors: Aluminum or steel. Isolate steel from aluminum.
Finish (unless modified hereunder):
Concealed Work: Mill Finish.
All other Work: AA-M12C22A44, dark bronze anodized color
Glass:
Type: Specified in Section 08 80 00.
Total Thickness: 1 inch.
Glazing Materials:
Glazing Gaskets: Vinyl extrusions.
Other Materials: Manufacturer's standard type to suit location and applications.

AUTOMATIC SLIDING DOOR UNITS
Manufacturer and Model:
Horton 2003T Series, Type 110T, O-X-SX, or accepted substitute.
Track:
Nylon covered with anti-derailing device full length of door travel, replaceable without removing operator.
Doors:
Horizontal sliding type, extruded aluminum construction, complete with operable and locking hardware, and bottom guides. Narrow stile, 10” bottom rail, 6 ½ inch muntin w/ exit device on SX panel.
Frames: 1 ¾ inches x 4 ½ inches
Hardware:
Caster: Manufacturer's standard ball bearing type
Lock: Power fail secure, operator autolock.
Exit Device: Flush mounted, Adams Rite 8600 on SX panel
Threshold: ½ inch high X 7 inches wide saddle.
Cylinder: none.
Pull: none.

Detectors: Optic X-zone sensor for 2-way traffic. Photo beams at 24 inches AFF and 48 inches AFF
Operator:
Motor: Linear drive.
Time Delay: Adjustable from 1 to 28 seconds.
Adjustments: Opening speed, closing speed, back check, latch check, and reverser fully adjustable.
Manual Operation: Power fail secure, operator autolock.
Switching: On-off switch located at inside of header to function as hold-open when in "off" position.
Safety Reverse: Reverse when 15 lbs exerted to prevent door closing.
Coordinate function with access control system.

FABRICATION
Supported sliding units on base tracks.
Sliding panels not removable when in locked position.

PART - 3 EXECUTION

EXAMINATION
Verify that openings to receive automatic sliding doors are accurately located and sized, square, plumb, true, and otherwise properly prepared.
Prior to starting work notify General Contractor about defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
Verify field dimensions prior to fabrication.
If minor differences exist between field measurements and drawing dimensions, modify work as required for accurate fit. Notify Architect about major differences prior to fabrication.

INSTALLATION
Follow referenced specifications and manufacturer's instructions.
Secure anchors to adjacent construction.
Set frames true with adjacent construction.
Accurately position work.
Install plumb, level and true to line, rigidly secured to adjacent construction.
Install doors, frames, operators and hardware in accordance with approved shop drawings and manufacturer's recommendations.

ADJUSTING
Adjust moving parts to operate satisfactorily at time of final project acceptance and during warranty period.

CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Operating hardware and accessories for doors and windows not specifically supplied as part of the manufactured item. Door hardware includes, but is not necessarily limited to mechanical door hardware, electromechanical door hardware, power supplies, back-ups and surge protection, automatic operators, and cylinders specified for doors in other sections.

CODES AND REFERENCES

Comply with the version year adopted by the Authority Having Jurisdiction.
ANSI A117.1 - Accessible and Usable Buildings and Facilities.
ICC/IBC - International Building Code.
NFPA 80 - Fire Doors and Windows.
NFPA 101 - Life Safety Code.
NFPA 105 - Installation of Smoke Door Assemblies.
UL/ULC and CSA C22.2 – Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
State Building Codes, Local Amendments.
Standards: All hardware specified herein shall comply with the following industry standards:
ANSI/BHMA Certified Product Standards - A156 Series
UL10C – Positive Pressure Fire Tests of Door Assemblies
Conform to Building Code requirements if more restrictive than those specified herein.
Notify Architect of difference prior to starting work.

SUBMITTALS

Provide in accordance with Section 01 33 00.
Product Data:
Submit three (3) copies of manufacturer's data for each item of finish hardware.
Submit manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
Hardware Schedule:
Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, and procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
Content: Include the following information:
- Type, style, function, size, label, hand, and finish of each door hardware item.
- Manufacturer of each item.
- Fastenings and other pertinent information.
- Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
- Explanation of abbreviations, symbols, and codes contained in schedule.
- Mounting locations for door hardware.
- Door and frame sizes and materials.

Submittal Sequence: Submit three (3) copies of the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
Submit a keying schedule in accordance with the Owner's representative.
Shop Drawings:
Show details of electrified access control hardware indicating the following:
- Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system

electrified hardware. Differentiate between manufacturer-installed and field-installed wiring.
Include the following:
Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
Complete (risers, point-to-point) access control system block wiring diagrams.
Electrical Coordination: Coordinate with related Division 26 Electrical Sections the voltages and wiring details required at electrically controlled and operated hardware openings.

Keying Schedule:

Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.

Operating and Maintenance Manuals:

Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required by Section 01 78 23. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.

Warranties and Maintenance:

Special warranties and maintenance agreements specified in this Section.

QUALITY ASSURANCE

Hardware Supplier shall employ person qualified for membership in American Society of Hardware Consultants, who shall be available for consultation with Architect and Contractor during course of work.
Prior to final project acceptance supplier's representative shall make one field inspection and notify Architect if hardware installation complies with manufacturer’s instructions.
Prior to final project acceptance supplier's representative shall instruct Owner how to properly adjust and maintain hardware.

Manufacturers Qualifications:

Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

Installer Qualifications:

Approved by supplier.
Installers, trained by the primary product manufacturers, with a minimum 3 years documented experience installing both standard and electrified builders hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

Door Hardware Supplier Qualifications:

Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor in good standing by the manufacturers of the primary materials with a warehousing facility in Project's vicinity.
Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
Scheduling Responsibility: Preparation of door hardware and keying schedules.

Source Limitations:

Obtain each type and variety of Door Hardware specified in this Section from a single source, qualified supplier unless otherwise indicated.
Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

Regulatory Requirements:

Comply with NFPA 70, NFPA 80, NFPA 101 and ANSI A117.1 requirements and guidelines as directed in the model building code including, but not limited to, the following:
NFPA 70 "National Electrical Code", including electrical components, devices, and accessories listed and

labeled as defined in Article 100 by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1 as follows:
- Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
- Door Closers: Comply with the following maximum opening-force requirements indicated:
- Interior Hinged Doors: 5 lbf applied perpendicular to door.
- Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
- Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.

NFPA 101: Comply with the following for means of egress doors:
- Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
- Thresholds: Not more than 1/2 inch high
- Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252 (neutral pressure at 40" above sill) or UL-10C.
- Test Pressure: Positive pressure labeling.
- Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

Keying Conference:
Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
- Function of building, purpose of each area and degree of security required.
- Plans for existing and future key system expansion.
- Requirements for key control storage and software.
- Installation of permanent keys, cylinder cores and software.
- Address and requirements for delivery of keys.

Pre-Submittal Conference:
Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
Review sequence of operation narratives for each unique access controlled opening.
Review and finalize construction schedule and verify availability of materials.
Review the required inspecting, testing, commissioning, and demonstration procedures
At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

DELIVERY, STORAGE, AND HANDLING
Deliver to General Contractor for installation in original, unopened containers with legible labels intact.
Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".
Include complete set of specialized hardware maintenance and removal tools for Owner's use. Store where directed by Owner.

Protect against theft, damage, and discoloration.

COORDINATION

Coordinate with other trades affecting or affected by work of this section.

Templates:

Furnish hardware templates for fabricators of doors, frames and other work to be factory prepared for hardware. Check shop drawings of such other work to confirm that adequate provisions will be made for installation of hardware.

Door Hardware and Electrical Connections:

Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

Door and Frame Preparation:

Related Division 08 Sections (Steel, Aluminum and Wood) doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

WARRANTY

General Warranty:

Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

Warranty Period:

Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

Structural failures including excessive deflection, cracking, or breakage.

Faulty operation of the hardware.

Deterioration of metals, metal finishes, and other materials beyond normal weathering.

Electrical component defects and failures within the systems operation.

Standard Warranty Period:

One year from date of Substantial Completion, unless otherwise indicated.

Special Warranty Periods:

Ten years for mortise locks and latches.

Five years for exit hardware.

Twenty five years for manual surface door closers.

Two years for electromechanical door hardware.

MAINTENANCE SERVICE

Maintenance Tools and Instructions:

Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

Continuing Service:

Beginning at Substantial Completion, and running concurrent with the specified warranty period, provide continuous (6) months full maintenance including repair and replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door opening operation. Provide parts and supplies as used in the manufacture and installation of original

PART 2 - PRODUCTS

SCHEDULED DOOR HARDWARE

General:

Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

Designations:

Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware

type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

Substitutions:

Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

MATERIALS

Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than the following:

Mortise Locks: 57%

Exit Devices: 54%

Door Closers: 51%

BUTT HINGES

Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.

Type: Mortise.

Sizes: Provide the following, unless otherwise scheduled, with hinge widths sized for door thickness and clearances required:

- Widths up to 3'-0": 4-1/2" standard or heavy weight as specified.
- Sizes from 3'-1" to 4'-0": 5" standard or heavy weight as specified.
- Size Hinges to clear any projecting trim or other obstructions where necessary to obtain maximum possible door opening.

Quantity: Provide the following hinge quantity, unless otherwise scheduled:

- Two Hinges: For doors with heights up to 60 inches.
- Three Hinges: For doors with heights 61 to 90 inches.
- Four Hinges: For doors with heights 91 to 120 inches.
- For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

- Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
- Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:

- Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:
  - Out-swinging exterior doors.
  - Out-swinging access controlled doors.
  - Out-swinging lockable doors.

Provide non-rising loose pins at all other doors unless otherwise scheduled.

Acceptable Manufacturers:

- Hager Companies (HA).
- McKinney Products (MK).

POWER TRANSFER DEVICES

Electrified Quick Connect Transfer Hinges:

Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

Acceptable Manufacturers:

- McKinney Products (MK) - QC (# wires) Option.

Electric Door Hardware Cords:

Provide electric transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number of concealed wires to accommodate

electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
Acceptable Manufacturers:
McKinney Products (MK) – QC-C Series.
Provide one each of the following tools as part of the base bid contract:
McKinney Products (MK) - Electrical Connecting Kit: QC-R001.
McKinney Products (MK) - Connector Hand Tool: QC-R003.

MECHANICAL LOCKS AND LATCHING DEVICES
Mortise Locksets: Grade 1 (Heavy Duty), ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified mortise locksets furnished in the functions as specified in the Hardware Sets.
Locksets to be manufactured with a corrosion resistant, stamped 12 gauge minimum formed steel case and be field-reversible for handing without disassembly of the lock body.
Lockset trim (including knobs, levers, escutcheons, roses) to be the product of a single manufacturer.
Furnish with standard 2 3/4" backset, 3/4" throw anti-friction stainless steel latchbolt, and a full 1" throw stainless steel bolt for deadbolt functions.
Manufacturer: Sargent Manufacturing (SA) – 8200 Series, no substitutions (facility standard).
Lock Trim Design: As specified in Hardware Sets.

LOCK AND LATCH STRIKES
Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
Standards: Comply with the following:
Strikes for Mortise Locks and Latches: BHMA A156.13.
Strikes for Bored Locks and Latches: BHMA A156.2.
Strikes for Auxiliary Deadlocks: BHMA A156.5.
Dustproof Strikes: BHMA A156.16.

PUSH PLATES AND PULL BARS
ANS/BHMA A156.6 certified door pushes and pulls of type and design specified below or in the Hardware Sets.
Coordinate and provide proper width and height as required where conflicting hardware dictates.
Push/Pull Plates:
Thickness: Minimum .050 inch thick.
Size: As indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
Door Pull and Push Bar: Design, size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
Acceptable Manufacturers:
Rockwood Manufacturing (RO).
Trimco (TC).

CYLINDERS AND KEYING
General:
Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
Source Limitations:
Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
Cylinders
Original manufacturer cylinders complying with the following:

Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
Bored-Lock Type: Cylinders with tailpieces to suit locks.
Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
Keyway: Manufacturer's Standard.

High Security Cylinders:

High security cylinder conforming to UL437, including both pick and drill resistance.
Pick resistance incorporates two or more independent locking mechanisms including a pin tumbler device with six top pin chambers, mushroom-shaped driver pins, and coded sidebar locking mechanism operated independently from the six top pin tumbler device.
Drill resistance incorporates cylinder housing with fixed case-hardened inserts protecting the pin tumbler shear line, cylinder plugs with case-hardened inserts protecting both the pin tumbler shear line and the side bar, mushroom-shaped stainless steel driver pins, and stainless steel sidepins.
Factory key cylinders.
Acceptable Manufacturers: Medeco (MC) – M3 Series.

Keying System:

Each type of lock and cylinders to be keyed by Owner's locksmith.
Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
Incorporate decisions made in keying conference, and as follows:
Master Key System: Cylinders are operated by a change key and a master key.
Grand Master Key System: Cylinders are operated by a change key, a master key, and a grand master key.
Great-Grand Master Key System: Cylinders are operated by a change key, a master key, a grand master key, and a great-grand master key.
Existing System: Master key or grand master key locks to Owner's existing system.
Keyed Alike: Key all cylinders to same change key.

Key Quantity:

Provide the following minimum number of keys:
Top Master Key: One (1)
Change Keys per Cylinder: Two (2)
Master Keys (per Master Key Group): Two (2)
Grand Master Keys (per Grand Master Key Group): Two (2)
Construction Keys (where required): Ten (10)
Construction Control Keys (where required): Two (2)
Permanent Control Keys (where required): Two (2)

Construction Keying:

Provide construction master keyed cylinders or temporary keyed construction cores where specified.
Provide construction master keys in quantity as required by project Contractor. Replace construction cores with permanent cores.
Furnish permanent cores for installation as directed under specified "Keying Conference".

Key Registration List:

Provide keying transcript list to Owner's representative.

Key Control Software:

Provide one network version of "Key Wizard" branded key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into "Key Wizard" software.

CONVENTIONAL EXIT DEVICES

General:

All exit devices specified herein shall meet or exceed the following criteria:
At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for

installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is not acceptable except in any case where the door light extends behind the device as in a full glass configuration.
Flush End Caps: Provide heavy weight impact resistant flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty trim with cold forged escutcheons, beveled edges, and four threaded studs for thru-bolts.
Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets. Provided free-wheeling type trim where indicated.
Where function of exit device requires a cylinder, provide an interchangeable core type keyed cylinder (Rim or Mortise) as specified in Hardware Sets.
Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
Rail Sizing: Provide exit device rails factory sized for proper door width application.
Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

Conventional Push Rail Exit Devices (Heavy Duty):
Conform to ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets.
Mounting rails to be formed from smooth stainless steel, brass or bronze architectural materials no less than 0.072" thick, with push rails a minimum of 0.062" thickness.
Painted or aluminum metal rails are not acceptable.
Exit device latch to be investment cast stainless steel, pullman type, with deadlock feature.
Acceptable Manufacturers: Sargent Manufacturing (SA) - 80 Series, no substitutions (facility standard).

ELECTROMECHANICAL EXIT DEVICES
Electrified Conventional Push Rail Devices (Heavy Duty):
Subject to same compliance standards and requirements as mechanical exit devices, electrified devices to be of type and design as specified below.
Acceptable Manufacturers: Sargent Manufacturing (SA) - 80 Series, no substitutions (facility standard).
Electrified Options:
As indicated in hardware sets, provide electrified exit device options including: electric latch retraction (shall be motorized type that fully retracts the touchpad/push bar), electric dogging, outside door trim control, exit alarm, delayed egress, latchbolt monitoring, lock/unlock status monitoring, touchbar monitoring and request-to-exit signaling.
Unless otherwise indicated, provide electrified exit devices standard as fail secure.

DOOR CLOSERS
General:
Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size.
Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
Unless specified elsewhere, do not restrict door swing.
Fasteners: Concealed.
Standards:
Closers to comply with UL-10C and UBC 7-2 for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
Cycle Testing:
Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
Size of Units:
Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors

required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
Closer Arms:
Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
Where closers are indicated to have mechanical dead-stop, provide heavy duty arms and brackets with an integral positive stop.
Where closers are indicated to have mechanical hold open, provide heavy duty units with an additional built-in mechanical holder assembly designed to hold open against normal wind and traffic conditions. Holder to be manually selectable to on-off position.
Where closers are indicated to have a cushion-type stop, provide heavy duty arms and brackets with spring stop mechanism to cushion door when opened to maximum degree.
Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
Provide drop plates or other accessories as required for proper mounting.
Closer Accessories:
Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates, and through-bolt or security type fasteners as specified in the door Hardware Sets.
Door Closers, Surface Mounted (Heavy Duty):
Conform to ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force.
Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.
Provide non-handed units standard.
Acceptable Manufacturers: Sargent Manufacturing (SA) - 351 Series, no substitution, (facility standard).

DOOR PROTECTIVE TRIM:
Metal Protection Plates:
ANSI/BHMA A156.6 certified metal protection plates (kick, armor, or mop), beveled on four edges (B4E), fabricated from the following:
- Stainless Steel: 300 series, 050-inch thick, with countersunk screw holes (CSK).
- Brass or Bronze: 050-inch thick, with countersunk screw holes (CSK).
- Laminate Plastic or Acrylic: 1/8-inch thick, with countersunk screw holes (CSK).

Door protective trim units to be of type and design as specified below or in the Hardware Sets.
Size: Not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side.
Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
Fasteners:
Provide manufacturer's designated fastener type as specified in the Hardware Sets.
Acceptable Manufacturers:
Rockwood Manufacturing (RO).
Trimco (TC).

DOOR STOPS AND HOLDERS
Door Stops and Bumpers:
ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers.
Provide wall bumpers with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets.
Do not mount floor stops where they will impede traffic.
Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
Acceptable Manufacturers:
- Rockwood Manufacturing (RO).
- Trimco (TC).

DOOR SILENCERS
At Metal Frames: Glynn Johnson #64, or accepted substitute.
At Wood Frames: Glynn Johnson #65, or accepted substitute.
Three silencers for single doors, 4 for pairs of doors.

ARCHITECTURAL SEALS

General:

Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets.

Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated.

At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

Sound-Rated Gasketing:

Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.

Replaceable Seal Strips:

Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

Acceptable Manufacturers: Pemko Manufacturing (PE).

Threshold:

Extruded aluminum, maximum 1/2 inch height, mill finish unless otherwise scheduled.

ELECTRONIC ACCESSORIES

Wireless Card Readers:

Card readers to support HID 125 kHz proximity technology or 13.56 MHz contactless smart cards as specified in the hardware sets.

Card readers to meet the following minimum design and performance specifications:

- Reader to wirelessly operate on one 3V CR2 lithium battery.
- Reader to be suitable for outdoor use.
- Contactless smart card versions to be compatible with the following technologies: iCLASS, iCLASS Seos, iCLASS SE, ISO1443B UID, Mifare, Mifare Plus, Desfire SE, Desfire EV1, NFC
- Reader to come pre-paired with an Aperio hub and communicate with the hub via IEEE802.14.4 (2.4 GHz) wireless technology.
- Aperio hub to communicate with the access control panel using industry standard Wiegand protocol interface.
- Reader to have green LED status indicator.
- Reader type and model to meet the design and mounting applications needs of each entry point as indicated on the drawings.
- Acceptable Manufacturers: Securitron (SU) – R100 Series.

Integrated Wiegand Digital Keypads:

Digital keypad designed for high volume use controlling entry of electrified locking devices.

Fully weather proof, vandal resistant with wall type gang box or mullion mounting applications.

Keypad provides Wiegand output for integration into access control system.

Provide DKC Digital Controllers to complete the installation of the keypads.

Acceptable Manufacturers: Securitron (SU) – DK-37/DK-38 Series.

Touchless Switches:

FCC certified microwave sensing switch used for REX or activation of various access control devices in place of a traditional wired switch.

Unit to have an adjustable sensing zone from 4” to 24”.

At exterior locations furnish foam gaskets and weather covers.

Provide single gang or double gang unit as specified in the hardware sets

Acceptable Manufacturers: Securitron (SU) - WSS Series.

Power Supplies:

Provide Nationally Recognized Testing Laboratory Listed 12VDC or 24VDC (field selectable) filtered and regulated power supplies.

Include battery backup option with integral battery charging capability in addition to operating the DC load in event of line voltage failure.

Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

Acceptable Manufacturers: Securitron (SU) - BPS Series.

CABINET LOCKS

Manufacturer: Sargent, Schlage, Yale, or accepted substitute.

Cylinder: 6-pin.

Material: Brass body, bronze cam.

FASTENERS
Provide required screws, bolts, and other fasteners.
Match hardware material and finish.
Use phillips head type where exposed to view.

KEYS
Material: Nickel-silver, or approved.
Keying Instructions: Masterkey and otherwise key locks as directed by Owner.
Number of keys required: Furnish 2 keys for each lock unless otherwise instructed.

FABRICATION
Make hardware for prefitted doors and frames to template. Send templates, together with hardware schedule, to door and frame manufacturer not later than two weeks after hardware schedule approval.
Lock and latch components shall be manufactured by only one manufacturer, and carry that manufacturer's warranty.
Fabricate joints with smooth, hair-line seams.
Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

FINISHES
Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
Finish unless otherwise scheduled: BHMA No. 626 (US26D) satin chrome except:
Door Closers: Spray painted to match hardware color.
Thresholds: As listed.
Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive finish hardware are properly prepared, including necessary backing.
Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
Wood Doors: Comply with ANSI/DHI A115-W series.
Provide solid blocking for all wall stops.
Fasteners: Use fastening devices as needed to securely anchor all hardware per manufacturer's templates. Self tapping sheet metal screws are not acceptable. Closers on wood doors shall be through bolted.

INSTALLATION
General:
Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
Accurately locate, fit, and install square, plumb, and secure in accordance with manufacturer's directions and templates.

Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
After fitting mortised hardware to surfaces to be painted remove and store hardware in original package until painting completion, then permanently install.
Mounting Heights:
Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
Retrofitting:
Install door hardware to comply with manufacturer's published templates and written instructions.
Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections.
Do not install surface-mounted items until finishes have been completed on substrates involved.
Thresholds:
Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
Storage:
Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

FIELD QUALITY CONTROL
Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

ADJUSTING
Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit.
Replace units that cannot be adjusted to operate as intended.
Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
Adjust moving parts to operate satisfactorily at time of final project acceptance and during warranty period.

CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Remove debris from project site upon work completion or sooner, if directed.
Clean operating items as necessary to restore proper finish and provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

DEMONSTRATION
Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finishes.

PROTECTION
Protect other surfaces against damage and discoloration caused by work of this section.

HARDWARE SCHEDULE
The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule.

Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process.
Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

Manufacturer's Abbreviations:

MK - McKinney	SA - Sargent	RO – Rockwood
PE - Pemko	MC – Medeco	00 - Other
RF - Rixson	NO - Norton	
AD - Adams Rite	SU - Securitron	

Set: 1.0

6 Hinge (heavy weight)	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
2 Power Transfer Hinge (heavy weight)	ETH 420W4545	626	CA
1 Removable Mullion	L980S w/ 980C1	PC	SA
1 Exit Device (exit only)	LC 55 8810 LHR	US32D	SA
1 Exit Device	LC 55 56-8804-ETL RHR	US32D	SA
1 Cylinder	10W0200 1 3/8", coord owners stand	US26D	MC
1 Drop Plate	351D	EN	SA
1 Door Closer	351 P10	EN	SA
1 Powered Door Operator	See section 08 71 13		
2 ElectroLynx Harness, door	QC-C1500		MK
2 ElectroLynx Harness, jamb up	QC-C1500P		MK
1 Exit Device Power Supply	per manufacture's recommendation		SA
2 Door Position Switch	1076-G		GE

Notes:
Latch retraction, locked and unlocked on schedule via EAC system.
Notes: Presenting valid credentials retracts exit device latches and enables outside wall activation switch, depressing opens door.
Wall mounted Card Reader by security integrator.
Free egress allowed at all times.
REX switch (55) included in exit device bars.
Gasketing by aluminum door and frame supplier.

Set: 2.0

1 Drop Plate	351D	EN	SA
1 Door Closer	351 P10	EN	SA
1 Powered Door Operator	See section 08 71 13		

All other hardware by aluminum door and frame supplier.

Set: 3.0

1 ElectroLynx Harness	QC-C1500P	MK	087100
1 ElectroLynx Harness	QC-C300P	MK	087100
1 Battery Backup	B-24-5	SU	087100
1 Power Supply	BPS-24-10	SU	087100

Notes:
Coordinate with Automatic Entrance door supplier.
Presenting valid credentials retracts exit device latches and enables outside wall activation switch, depressing opens door.
Wall mounted Card Reader by security integrator.
Internal RX switch in exit device bar.
Egress allowed at all times.
One power supply to operate all doors.

Set: 4.0

3	Hinge (heavy weight)	T4A3786 4-1/2" x 4-1/2"	US26D	MK	087100
1	Push Plate	70F	US32D	RO	087100
1	Pull Plate	107x70C	US32D	RO	087100
2	Door Switch	501		NO	087100
1	Door Operator	6010	689	NO	087100
1	Kickplate	K1050 10" x 2" LTDW 4BE	US32D	RO	087100
1	Wall Stop	403	US26D	RO	087100
1	Gasketing	S773D		PE	087100

Set: 5.0

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1	Passage Latchset	8215 LNJ	US26D	SA	087100
1	Wall Stop	403	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 6.0

2	Hinge (heavy weight)	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK	087100
1	Hinge (heavy weight)	T4A3386 NRP QC12 4-1/2" x 4-1/2"	US32D	MK	087100
1	Electric trim exit device	55 8876 ETL LC	US32D	SA	087400
1	Cylinder	10W0200 verify length, coordinate w/owners standard			
			US26D	MC	087100
1	Door Closer	351 P10	EN	SA	087100
1	Kick Plate	K1050 10" x 2" LTDW 4BE	US32D	RO	087100
1	Gasketing	S773D		PE	087100
1	Wall Stop	403	US26D	RO	087100
1	ElectroLynx Harness	QC-C700P		MK	087100
1	ElectroLynx Harness	QC-C1500P		MK	087400

Notes:
Door lever locked or unlocked on schedule or by remote access via EAC system.
Presenting valid credentials enabled for passage mode toggles lever unlocked for schedule or until toggled again.
When locked presentation of valid momentarily unlocks lever for access.
Free egress allowed at all times.
REX, DPS, Card Reader, “55” is internal RX switch
Wall mounted Card Reader by security integrator.

Set: 7.0

2	Hinge (heavy weight)	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK	087100
1	Hinge (heavy weight)	T4A3386 NRP QC12 4-1/2" x 4-1/2"	US32D	MK	087100
1	Electric trim exit device	55 8876 ETL LC	US32D	SA	087400
1	Cylinder	10W0200 verify length, coordinate w/owners standard	US26D	MC	087100
1	Door Closer	351 P10	EN	SA	087100
1	Kick Plate	K1050 10" x 2" LTDW 4BE	US32D	RO	087100
1	Threshold	271A		PE	087100
1	Gasketing	S773D		PE	087100
1	Door Bottom	420APKL		PE	087100
1	Wall Stop	403	US26D	RO	087100
1	ElectroLynx Harness	QC-C700P		MK	087100
1	ElectroLynx Harness	QC-C1500P		MK	087400

Notes:
Door lever locked or unlocked on schedule or by remote access via EAC system.
Presenting valid credentials enabled for passage mode toggles lever unlocked for schedule or until toggled again.
When locked presentation of valid momentarily unlocks lever for access.
Free egress allowed at all times.
REX, DPS, Card Reader, “55” is internal RX switch
Wall mounted Card Reader by security integrator.

Set: 8.0

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1	Passage Latchset	8215 LNJ	US26D	SA	087100
1	Door Closer	351 P10	EN	SA	087100
1	Kick Plate	K1050 10" x 2" LTDW 4BE	US32D	RO	087100
1	Wall Stop	403	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 9.0

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1	Office Lock, thumb turn	8205 LNJ LC	US26D	SA	087100
1	Cylinder	10W0200 verify, coord w/owner	26D	MC	
1	Wall Stop	403	US26D	RO	087100
1	Gasketing	S773D		PE	087100

Set: 10.0

3	Hinge (heavy weight)	T4A3786 4-1/2" x 4-1/2"	US26D	MK	087100
1	Push Plate	70F	US32D	RO	087100
1	Pull Plate	107x70C	US32D	RO	087100
1	Door Closer	351 P10	EN	SA	087100
1	Kickplate	K1050 10" x 2" LTDW 4BE	US32D	RO	087100
1	Wall Stop	403	US26D	RO	087100
1	Gasketing	S773D		PE	087100

Set: 11.0

3 Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Exit Device	LP 8613 ETJ LC	US32D	SA	087100
1 Cylinder	10W0200 verify, coord w/owner	26D	MC	
1 Door Closer	351 P10	EN	SA	087100
1 Kickplate	K1050 10" x 2" LTDW 4BE	US32D	RO	087100
1 Wall Stop	403	US26D	RO	087100
1 Gasketing	S773D		PE	087100

Set: 12.0

3 Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Privacy Set	49 8265 LNJ	US26D	SA	087100
1 Wall Stop	403	US26D	RO	087100
1 Gasketing	S773D		PE	087100

Set: 13.0

3 Hinge (heavy weight)	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK	087100
1 Storeroom Lock	8204 LNL LC	US26D	SA	087100
1 Cylinder	10W0200 verify length, coordinate w/owners standard	26D	MC	
1 Door Closer	351 P10	EN	SA	087100
3 Silencer	608		RO	087100
1 Wall Stop	403	US26D	RO	087100
1 Kick Plate	K1050 10" x 2" LTDW 4BE	US32D	RO	087100

Set: 14.0

6 Hinge (heavy weight)	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
2 Power Transfer Hinge (heavy weight)	ETH 420W4545	626	CA
1 Removable Mullion	L980S w/ 980C1	PC	SA
1 Exit Device (exit only)	LC 55 8810 LHR	US32D	SA
1 Exit Device	LC 55 56-8804-ETL RHR	US32D	SA
1 Cylinder	10W0200 1 3/8", coord owners stand	US26D	MC
2 Drop Plate	351D	EN	SA
2 Door Closer	351 P10	EN	SA
2 ElectroLynx Harness, door	QC-C1500		MK
2 ElectroLynx Harness, jamb up	QC-C1500P		MK
1 Exit Device Power Supply	per manufacture's recommendation		SA
2 Door Position Switch	1076-G		GE

Notes:
Latch retraction, locked and unlocked on schedule via EAC system.
Notes: Presenting valid credentials retracts exit device latches and enables outside wall activation switch, depressing opens door.
Wall mounted Card Reader by security integrator.
Free egress allowed at all times.
REX switch (55) included in exit device bars.
Gasketing by aluminum door and frame supplier.

Set: 15.0

2	Hinge (heavy weight)	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK	087100
1	Hinge (heavy weight)	T4A3386 NRP QC12 4-1/2" x 4-1/2"	US32D	MK	087100
1	Electric trim exit device	55 8876 ETL LC	US32D	SA	087400
1	Cylinder	10W0200 verify length, coordinate w/owners standard			
			US26D	MC	087100
1	Drop Plate	351D	EN	SA	
1	Door Closer	351 P10	EN	SA	087100
1	Wall Stop	403	US26D	RO	087100
1	ElectroLynx Harness	QC-C700P		MK	087100
1	ElectroLynx Harness	QC-C1500P		MK	087400

Notes:
All other hardware by aluminum door and frame supplier.
Door lever locked or unlocked on schedule or by remote access via EAC system.
Presenting valid credentials enabled for passage mode toggles lever unlocked for schedule or until toggled again.
When locked presentation of valid momentarily unlocks lever for access.
Free egress allowed at all times.
REX, DPS, Card Reader, “55” is internal RX switch
Wall mounted Card Reader by security integrator.

Set: 16.0

All hardware by aluminum door and frame supplier.

Set: 17.0

4	Hinge (heavy weight)	T4A3386 x NRP 4-1/2" x 4-1/2"	US32D	MK	087100
1	Exit Device	8804 LC	US32D	SA	087100
1	Cylinder	10W0200 verify length, coordinate w/owners standard			
			26D	MC	
1	Door Closer	351 CPS	EN	SA	087100
1	Threshold	271A		PE	087100
1	Rain Guard	346C		PE	087100
1	Sweep	315CN		PE	087100
1	Gasketing	S773D		PE	087100

Notes: DPS by security contractor.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Automatic operating equipment, hardware, and accessories to operate entrance doors of the swing or horizontal sliding type not specifically supplied as part of a proprietary door or entrance assembly.

SUBMITTALS
Provide in accordance with Section 01 33 00.
Shop Drawings:
Submit showing layout, profiles, product components including anchorage, accessories, finish and glazing details.
Product Data:
Submit three (3) copies of manufacturer's data for each item of automatic operating equipment.
Templates:
Furnish hardware templates for fabricators of doors, frames and other work to be factory prepared for equipment hardware. Upon request, check shop drawings of other work so that adequate provisions will be made for installation of hardware.

INSTALLER'S QUALIFICATIONS
Factory trained, experienced to perform work of this section and approved by supplier.

SOURCE LIMITATIONS
Obtain automatic door operators through one source from a single manufacturer.

REGULATORY REQUIREMENTS
Conform to Building Code requirements if more restrictive than those specified herein.
Notify Architect of difference prior to starting work.
Conform to ADAAG requirements for accessibility.

DELIVERY, STORAGE, AND HANDLING
Deliver in original, unopened containers with legible labels intact.
Include complete set of specialized hardware maintenance and removal tools, if any, for Owner's use. Store tools where directed by Owner.
Protect against theft, damage, and discoloration.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

DOOR OPERATORS
Manufacturer and Model: Horton "HD-Swing 4100 LE", or accepted substitute.
Regulatory Standard: Conform to ANSI A156.19.
Type: Extra heavy duty, surface mounted.
System Operation: Dual operation modes; push button automatic operation mode and manual "Push-N-Go" mode.
Electrical Requirements: 120V, 60 Hz, 1-phase, 10 amps for doors with operated pairs and 5 amps for single doors.
Adjustment: Door open time adjustable and opening angle adjustable 80° to 135°.
Fasteners: Concealed.
Warranty: Manufacturer's standard 1 year warranty.

ACTIVATING DEVICES
Type: Hard-wired, conforming to ANSI Safety Standard A117.1.
Push Plate: 4½" square stainless steel, wall mounted. Engrave plates with international symbol of accessibility and "Press To Open".

MATERIAL AND FINISHES
Extruded Aluminum: 1/8" thickness, ASTM B221, 6063-T5 alloy and temper, anodized.

Finish: Architectural Class 2 clear anodized, AA-M12C22A31.

FASTENERS
Provide required screws, bolts, and other fasteners.
Match hardware material and finish.
Use phillips head type where exposed to view.

FABRICATION
Components shall be manufactured by only one manufacturer, and carry that manufacturer's warranty.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive automatic door equipment are properly prepared, including necessary backing.
Prior to staring work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
Provide solid backing automatic door equipment mounting.
Fasteners: Use fastening devices as needed to securely anchor all equipment per manufacturer's templates.

INSTALLATION
Accurately locate, fit, and install square, plumb, and secure in accordance with manufacturer's directions and templates.
Separate aluminum materials and other corrodible surfaces from sources of corrosion or electrolytic action according to AAMA 101.
Install header and framing members in a bed of sealant or with joint filler gaskets. Coordinate installation with wall flashings and other components of construction.

ADJUSTING
Adjust moving parts to operate satisfactorily at time of final project acceptance and during warranty period.

CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Remove temporary coverings and protection of adjacent work areas.
Remove debris from project site upon work completion or sooner if directed.
Clean product surfaces and lubricate operating equipment for optimum condition and safety.

DEMONSTRATION
Instruct Owner's personnel in proper adjustment and maintenance of equipment and equipment finishes.

PROTECTION
Protect other surfaces against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Shop or site installed glass or plastic, and glazing methods.

REFERENCES
Glass Association of North America (GANA) formerly Flat Glass Marketing Association (FGMA): Glazing Manual.
IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
American National Standards Institute (ANSI): ANSI Z97.1.
Safe Glass Standard: CPSC 16 CFR 1201.
Federal Specifications:
DD-G-451D: Glass, Plate, Sheet Figured (Flat, for Glazing, Mirrors, and other uses).
DD-G-1403B: Glass, Plate (Float), Sheet, Figured, and Spandrel (Heat Strengthened and Fully Tempered).
DD-M-00411b & Am-1: Mirrors, Glass.

PERFORMANCE REQUIREMENTS
Watertight and airtight installation or each piece of glass is required unless otherwise shown. Each installation must withstand normal temperature changes, wind loading, and impact loading (for operating doors) without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.
Comply with Building Code requirements for maximum allowable air infiltration.

SUBMITTALS
Submit in accordance with Section 01 33 00.
Product Data:
Provide structural, physical and environmental characteristics, size limitations, and special handling or installation requirements.
Provide data on glazing sealant. Identify colors available.
Samples:
Submit two samples, 12 X 12 inches in size, illustrating glass unit color and design.
Certificates:
Submit sealed glass unit manufacturer's certificate indicating units meet or exceed specified requirements.
Qualification Data:
For glazing fabricators.
Preconstruction adhesion and compatibility test report.
Sample Warranties.

ENVIRONMENTAL REQUIREMENTS
Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40° F (4.4° C).
Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

DELIVERY, STORAGE, AND HANDLING
Schedule glass delivery to coincide with glazing schedules.
Original labels, showing manufacturer, quality, and thickness required for each piece of glass except where label must be removed for glass-cutting.
Deliver other glazing materials in original containers, manufacturer's original legible labels thereon.
Protect against damage and discoloration.

WARRANTY
Manufacturer's Special Warranty for Coated Glass Products:
Manufacturer's standard form, made out to Owner and signed by coated glass manufacturer agreeing to replace coated glass units that deteriorate within specified warranty period.
Warranty Period: Ten (10) years from date of substantial completion. Glass manufacturer shall warrant that any glass that is not edge deleted will not develop loss of adhesion with insulating glass or structural glazing sealants for a period of ten (10) years.
Manufacturer's Special Warranty on Insulating Glass:
Manufacturer's standard form, made out to Owner and signed by insulating glass manufacturer agreeing to replace insulating glass units that deteriorate within the specified warranty period.
Warranty period: Ten (10) years from date of Substantial Completion.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.
Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

PART 2 - PRODUCTS

MANUFACTURERS
Provide coated glass units that are the products of one of the following coated glass manufacturers:
- Guardian Industries, Inc.
- PPG Industries, Inc.
- Viracon.

FABRICATORS
Provide insulating glass units fabricated by firm certified by coated glass manufacturer.

SOURCE LIMITATIONS
Provide coated glass through a single source from a single coated glass manufacturer.
Provide insulating glass units fabricated by a single firm.

PRODUCT REQUIREMENTS
In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
- Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
- Products: Subject to compliance with requirements, provide one of the products specified.
- Product: Subject to compliance with requirements, provide product specified.
- Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
- Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
- Basis-of-Design Product: The design for each glazing product is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

GLASS PRODUCTS
Glazing Publications:
Comply with published recommendations of glass product manufacturers and organizations listed in REFERENCES article above.
Safety Glazing Labeling:
Permanently mark glazing with certification label of the SGCC.
Insulating-Glass Certification Program:
Permanently marked with appropriate certification label of IGCC.
Thickness:
Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

Minimum Glass Thickness for Exterior Lites:
6 mm. Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed requirements.
Strength:
Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

ANNEALED FLOAT GLASS
Clear Float Glass: Manufacturing Standard: ASTM C1036 Type I, Class 1, Quality: q3 - Glazing Select.
Ultraclear Float Glass: ASTM C1036 Type I, Class 1, Quality: q3 - Glazing Select, and with visible light transmission of not less than 91 percent and solar heat gain coefficient of not less than 0.87.

FULLY TEMPERED FLOAT GLASS
Manufacturing Standard: ASTM C 1048, Type I, Class 1 (clear), Quality q3, Kind FT.
Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
Roll Wave Maximum Distortion Tolerance: .003 inch target with .005 inch maximum peak to valley measurement.
Bow and Warp Maximum Tolerance: 50 percent of the maximum allowed in ASTM C 1048

HEAT-STRENGTHENED FLOAT GLASS
Manufacturing Standard: ASTM C 1048, Type I, Class 1 (clear), Quality q3, Kind HS.
Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
Roll Wave Maximum Distortion Tolerance: .003 inch target with .005 inch maximum peak to valley measurement.
Bow and Warp Maximum Tolerance: 50 percent of the maximum allowed in ASTM C 1048

INSULATING GLASS
Manufacturing Standard: ASTM E 2190.
Type: Hermetically sealed units with dehydrated air space, dual sealant, and argon gas fill.
Coatings: Comply with ASTM C1376.
Glass Layers: 2
Interspace Thickness: 1/2 inch.
Edge Sealant Material: Primary Seal: Polyisobutylene (PIB); Secondary Seal: Silicone.
Spacer Material: Aluminum.
Edge Deletion: Delete low E prior to fabrication of insulating units according to coated glass manufacturer's instructions

INSULATING GLASS UNIT TYPES
General:
Type: Low-E-coated, clear (low-iron) insulating safety glass.
Overall Unit Thickness: 1 inch.
Minimum Thickness of Each Glass Lite: 6 mm.
Low-E Coating: Sputtered on second surface.
Interspace Content: Argon.
Winter Nighttime U-Factor: 0.28 maximum.
Visible Light Transmittance: 64 percent minimum.
Solar Heat Gain Coefficient: 0.27 maximum.
Glass Type:
Outdoor Lite: ¼" Solarban 70XL
Indoor Lite: ¼" clear annealed float glass, tempered where required by code or as noted on drawings.

MIRROR GLASS
Type: Type I, Class 1, Quality q2.
Thickness: 3/16 inch thick for sizes less than 10 square feet and ¼ inch thick for sizes 10 square feet and larger.
Silvering: Silver coating with electrolytic copper plating conforming to Fed Spec. DD-M-411.
Coating Protection: Two coats clear varnish applied over copper backing and edges.
Bottom Channel:
"J" channel, extruded aluminum with clear anodized finish.
Manufacturer: U.S. Aluminum, model MM250.

BULLET RESISTANT GLAZING
Type: Glass clad polycarbonate, UL 752 Level 2, complyling with NIJ Standard 0108.01.
Thickness: Per manufacturer's requirements to comply with security level.
Manufacturer: Total Security Solutions "LTI-BR2", Consolidated Armor Products, or accepted substitute.
Voice Transmission: Provide manufacturer's standard electronic talk thru device.
Bottom Chanel: U-Channel specifically designed for securing transparencies tightly in place.
Secure unit in hollow metal frame with standard glazing gaskets and stops.

GLAZING SEALANTS
Type: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.
Manufacturer: Dow Corning Corporation; 799, GE Advanced Materials-Silicones; UltraGlaze SSG4000 or UltraGlaze SSG4000AC, Tremco Incorporated; Proglaze SSG or Tremsil 600.
Applications: General applications in glazing installation including perimeter; use non-staining formula at absorbent perimeter applications.

GLAZING GASKETS
Type: As specified below and recommended by manufacturer for conditions of use.
For Wood and Hollow Steel Work: Butyl tape.
For Aluminum Sections: Silicone conforming to ASTMC1115 or EPDM conforming to ASTM C864, extruded bead compatible with the silicone sealant or other recommended by Section manufacturer.
For Insulating Glass: Type compatible with edge sealant and recommended by insulating glass fabricator.

SETTING BLOCKS
Material: Neoprene rubber with 70-90 Shore "A" durometer hardness, and compatible with glazing compound and sealant.
Size: Fabricate wider than glass unit thickness and long enough to support glass without excessive pressure on glass edge.

PART 3 - EXECUTION

EXAMINATION
Verify that openings to be glazed are accurately sized and located, and free of fasteners and other projections which will interfere with glazing.
Verify that glazing surfaces are free of moisture, dirt, grease, oil or other deleterious substances.
Verify that steel or wood glazing rabbets and any contacting dissimilar materials are painted.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
Verify opening dimensions prior to fabrication; allow for glass-edge clearances.
If field measurements differ slightly from drawing dimensions modify work as required for accurate fit. If measurements differ substantially notify Architect prior to fabrication.
Prior to starting work, clean, dry, and remove protective coatings from glass and surfaces to be glazed.

INSTALLATION, GENERAL
Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing

publications.
Allow for glass expansion and contraction.
Do not impact glass against framing.
Install setting blocks placed at sill quarter points unless identified other by submitted stamped structural calculations.
Install glass larger than 5 square feet with setting blocks placed at sill quarter points unless identified other by submitted stamped structural calculations.
Install glass surface waves running horizontal.
Shift glass with suction cups; do not use pry bar.
Clean inside faces of double glazed openings before setting glass in place.

INSULATING GLASS INSTALLATION
Remove identity labels immediately after installation; save for Architect's review.
Follow glazing specification for sealed insulating glass units, SIGMA No. 70-7-1.

MIRROR INSTALLATION
Install mirrors plumb, level, after finish painting is completed, and with open ventilation space behind.
Install with bottom "J" channel secured to wall framing with concealed fittings and tamperproof mountings and mastic adhesive elsewhere.
Provide mastic in coverage as recommended by manufacturer.

CLEANING AND REPAIRING
Remove excess glazing compound from glass and surrounding work.
Final glass cleaning specified in Section 01 74 23.
Remove debris from project site upon work completion or sooner, if directed.
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.

PROTECTION
Protect materials of other trades against damage or discoloration caused by work of this section.
Protect installed glazing against breakage and staining.
Cure glazing sealants in compliance with manufacturer's instructions and recommendations to obtain high early bond strength and surface durability.
Protect exterior glass from breakage immediately upon installation, by attachment of crossed streamers held away from glass.
Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in other ways during the construction period, including pieces damaged through natural causes, accidents, and vandalism.

GLAZING SCHEDULE
See Window Schedule on Drawings.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Light gage metal framing, acoustical treatment, gypsum board with paper or vinyl facings, and finishing of board joints.

REFERENCES

Conform to Recommended Specifications for the Application and Finishing of Gypsum Board, GA-216-1989, and "Recommended Specification: Levels of Gypsum Board Finish" as modified and supplemented herein.

Recommended material and methods are mandatory; those proposed by Contractor as equal or equivalent must be accepted by Architect.

Referenced Specifications may be obtained from Gypsum Association, 810 1st Street NE, Suite 510, Washington D.C. 20002; 310 277-8686.

PERFORMANCE REQUIREMENTS

Maximum ceiling deflection: 1/360 of span.

Maximum deviation from true plane: 1/8 inch per 10 ft. and 1/16 inch in any running foot.

REGULATORY REQUIREMENTS

Where fire-rated ceilings are noted, construct to obtain specified rating as listed and rated by Underwriter's Laboratories (UL).

QUALITY ASSURANCE

Surface Texture Mock-Up:

Before starting surface texture work on gypsum board walls, submit texture sample for review and acceptance.

DELIVERY, STORAGE, AND HANDLING

Deliver products to site with manufacturer's original labels intact and legible.

Identify fire-rated materials with testing agency label.

Protect gypsum materials against damage and discoloration and metal materials against rust.

Do not stack gypsum board with long lengths overhanging shorter lengths.

Do not overload floor system with stockpiled materials.

Indicate adhesive "open time" on adhesive container label.

ENVIRONMENTAL CONDITIONS

Maintain between 55^{o}F and 75^{o}F for 24 hours before and during work, and for at least 24 hours after materials have dried.

Maintain at least 30 ft. candles of illumination measured 3 ft. above floor in work spaces during joint treatment.

Maintain sufficient ventilation for proper joint treatment drying.

COORDINATION

Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

STEEL STUDS

Material: Steel conforming to ASTM C 645.

Metal Finish: Galvanized in accordance with ASTM A 591.

Metal thickness:

- Adjacent to door jamb: 20 gage.
- 6” and wider studs: 20 gage.
- Elsewhere: 25 gage.

Accessories: Provide as required for complete installation.

DEFLECTION TRACK

Material: Steel conforming to ASTM C 645.

Metal Finish: Galvanized in accordance with ASTM A 591.
Type: Slotted deep leg.
Metal thickness: 25 gage minimum.

RESILIENT CHANNELS (RC-1 CHANNEL)
Material: Steel conforming to ASTM A 653/653M, yield strength 33 ksi.
Metal Finish: G-40 hot-dipped galvanized coating.
Type: 1/2"x2 5/8" profile.
Metal thickness: 25 gage minimum.

FRAMING CHANNELS
Hot or cold rolled, galvanized steel conforming to MLA specification 12.
Type and size as required to support loads.

FURRING CHANNELS
Roll-formed, hot-dipped galvanized steel, hat-shaped.

SHEET METAL BACKING
Provide 22 gauge sheet metal backing behind toilet room accessories, mirrors, marker boards, tack boards, TV monitors, miscellaneous specialties, building equipment, drapery track, and mechanical and electrical work. Verify exact location.

HANGER WIRE
9 ga. minimum galvanized steel wire; Fed. Spec. QQ-W-461.

TIE WIRE
Galvanized steel wire, Fed. Spec. QQ-W-461.

ATTACHING DEVICES
Hot-dipped galvanized steel wire or sheetmetal devices designed for attaching furring members to supports or each other.

GYPSUM BOARD
Manufacturing Standard: ASTM C 1396.
Edges: Tapered
Type and Thickness:
- Interior stud walls and furred ceilings: Standard board, Type X, 5/8" thick.
- Interior ceilings: Gypsum ceiling board, ½" thick.
- Restrooms and "Wet" Walls without ceramic tile finish: Water-resistant board, Type X, 5/8" thick.

TILE BACKER BOARD
General: Non-combustible, inorganic, dimensionally stable panels designed to be a water resistant backer for ceramic tile on finished walls.
Applicable Standards:
Humidified Deflection: ASTM C 473, dry cup method.
Thickness: 5/8 inch
Manufacturer: Georgia Pacific "Dens-Shield Fireguard", or accepted substitute.

SURE-BOARD SHEAR PANEL & SECURITY GYPSUM BOARD
Material and Manufacturing Standard: 22 ga. galvanized sheet steel per ASTM A 653 CS laminated to gypsum board products listed herein, per manufacturer's approval.
Model: Series 200 for steel framing.
Thickness: Per gypsum board products listed herein.

BULLET RESISTANT PANELS
Manufacturing Standard: Conform to UL 752, Level 2.
Thickness: 3/8 inch.
Manufacturer: Total Security Solutions "BB-1", or accepted substitute.

FASTENERS
Screws:
Self-tapping, self-drilling, bugle head, ASTM C 626, Type S.
Length: 1 5/8 inches
Do not use nails.

METAL TRIM
Casing Bead:
US Gypsum No. 200-A, 200-B, or as noted in drawings, or accepted substitute.
Corner Bead:
US Gypsum No. 101, or accepted substitute.
Reveal Molding:
Extruded aluminum, Gordon 300 Series, Fry “Z” molding, or accepted substitute.

JOINT TAPE
ASTM C 475, perforated.

JOINT COMPOUND
ASTM C 475.

GYPSUM BOARD PRIMER-SURFACER
USG, "Tuff Hide," or accepted substitute.
Provide at all gypsum board surfaces prior to finish texture.

FINISH TEXTURE
USG, "Spray Texture," or accepted substitute.
Provide at gypsum board surfaces scheduled to receive paint finish.

ACOUSTIC SEALANT
Pecora BA 98, Tremco, Miracle 21, US Gypsum, or accepted substitute.
Provide at toilet room perimeter walls and at walls where acoustic insulation is noted on drawings.

ACOUSTIC INSULATION
Paperless, semi-rigid, spun mineral fiber mat, NOT fiberglass, minimum 2 inches thick, minimum 2.5 pcf density per ASTM C612, conforming to Federal Spec. Type 1 HH-I-521F, ASTM E136, ASTM E1050, and ASTM E90. Thermafiber SAFB (Sound Attenuation Fire Blankets), Roxul AFB.

ACOUSTIC SEALANT
Pecora BA 98, Tremco, Miracle 21, US Gypsum, or accepted substitute.
Provide at toilet room perimeter walls and at walls where acoustic insulation is noted on drawings.

WATER RESISTANT SEALANT
Silicone with mildew inhibitor conforming to Fed. Spec. TT-S-001543; GE, Dow, or accepted substitute.
Clear translucent color.

OTHER MATERIALS
Made or recommended by gypsum board manufacturer.
Provide all indicated or required for complete installation.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive gypsum board are accurately located, plumb, square, true, secure, and otherwise properly prepared.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

STEEL STUD INSTALLATION
General:

Follow manufacturer's directions.
Install plumb, level, true, and in accurate locations indicated.
Isolate stud partitions from structure to prevent transfer of loads or movement into partitions.
Where stud partitions stop at or slightly above ceiling, brace partition to structure as required to stabilize partition.
Form corners and intersection with three studs.
Locate studs two inches from internal corners.
Frame for openings.
Provide partition-height stud adjacent to door frame jambs and secure to jambs.
Provide additional partition-height stud approximately 2 inches from each jamb-stud.
Provide reinforcing and blocking as required behind wall-mounted door stops, and to support wall-hung loads such as cabinets, railings, toilet room accessories, building equipment, etc. Verify exact locations.
Deflection Track:
Provide at all full height stud walls attached to overhead roof or floor framing.
Attach track to overhead structure.
Cut studs 1" to 1 1/2" short.
Install studs plumb.
Install screws through slot into stud snug-tight, approximately centered in length of slot to allow upward and downward track movement.
Do not attach gypsum board to track. Cut gypsum board approximately 1 inch short of full height.
Attach gypsum board to studs only.

SUSPENDED CEILING INSTALLATION
General:
Provide runner channels no more than 6 inches from walls and other ceiling interruptions.
Where mechanical and electrical equipment interfere with regular spacing of hangers provide additional hangers and channels, and make necessary adjustments in ceiling construction.
Hangers shall not be attached to or passed through ducts.
Provide framing around recessed light fixtures, expansion joints, and other ceiling openings.
Wire Tying:
Use double-strand 16 gage wire.
Splicing: Double wrap tie.
Horizontal stiffeners to channel brackets: Figure-eight tie.
Framing members perpendicular to each other: Saddle tie.

GYPSUM BOARD INSTALLATION
Install board horizontally, and extend to within 1/4 inch of floor.
Loosely butt joints.
Place tapered edges together, except at angles.
Do not place butt ends against tapered edges.
Where possible apply boards without butt joints. Where butt joints are necessary, locate as far from ceiling centers as possible and stagger.
Support board ends and edges on framing members.
Maintain 3/8 inch minimum distance between fastener and board edge.
Dimple board surface 1/32 inch with fastener; do not fracture face paper.
Secure to framing as follows:
- Wood Wall Framing: Screw at 8 inches on center along board perimeter and at 12 inches on center at intermediate supports.
- Wood Ceiling Framing: Screw at 8 inches on center along each support.
- Metal Wall Framing: Screw at 8 inches on center along board perimeter and 12 inches on center at intermediate supports.
- Metal Ceiling Framing: Screw at 8 inches on center along each support.

Provide gypsum board hood over top of any recessed lighting fixtures which penetrate fire-rated gypsum drywall ceilings. Maintain ceiling fire-resistance rating.
At stud walls constructed with deflection track, do not attach gypsum board to deflection track. Attach gypsum board to studs only. Allow for structure deflection without loading gypsum board panels.

TILE BACKER BOARD INSTALLATION
Install at wall areas scheduled to receive tile.
Pre cut panels to required sizes and secure to framing in accordance with manufacturer's instructions.
Tape and seal joints as directed by manufacturer for tile system to be used.

JOINT, CORNER, AND EDGE TREATMENT
Application and finishing standard: ASTM C 840.
Fill joints and fastener holes in accordance with referenced standards.
Conform to GA 216, Level 4, finish.
Except at attic draft stops, fill joints and fastener holes in accordance with referenced specifications.
Reinforce inside corners in accordance with manufacturer's directions.
Protect external corners and exposed edges with metal trim.
Provide control joints, unless otherwise shown on drawings, where and if framing changes direction, and at 30 ft. maximum spacings.

SEALANT INSTALLATION
Acoustic Sealant:
Provide sealant around electrical boxes, pipes, etc., located in or passing through sound walls.
Prior to installing gypsum board, provide acoustic sealant around sound wall perimeters in angle between wall, floor and ceiling; press board into sealant forming bond between framing member face and back side of board.
Provide in joints between sound wall perimeters and other adjacent materials.
Permit no voids for sound passage.
Water Resistant Sealant:
Provide at raw edges and around cutouts in water-resistant gypsum board.

ACOUSTIC INSULATION INSTALLATION
Install blankets in stud cavities. Friction fit securely between studs. Butt ends of blankets closely together and fill all voids. When installing in multiple layers, stagger joints. When installing in one thick layer, cut blankets vertically about 1 inch deep on a centerline between studs before gypsum board panel is installed.

SURFACE TEXTURE
Spray apply to produce light orange peel finish.
Application:
Apply after joints are taped and dry.
Follow manufacturer's directions.

REPAIRS
General:
After installation and before finishing, correct surface damage and defects.
Leave surfaces clean, smooth, and ready for finishing specified in Section 09 90 00.
Ridging:
Sand ridges smooth without cutting joint tape.
Fill concave areas on both sides of ridge with compound and finish flush and smooth.
Cracks:
Fill with compound and finish flush and smooth.

CLEANING
Including work of other sections, clean, repair and touch-up, or replace when directed products which have been soiled, discolored, or damaged by work of this section.
Leave surface ready for finishing specified in other sections.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Manufactured surfacing units of impervious materials; glazed, unglazed, abrasive, or textured.

REFERENCES
Conform to the following American National Standards Institute Specifications as Architect judges them applicable, and as supplemented and modified herein. Referenced Specifications may be obtained from Institute at 1430 Broadway; New York, NY 10018.
Ceramic Tile Installed with Portland Cement Mortar: ANSI A108.1
Ceramic Tile Installed with Water-Resistant Organic Adhesives: ANSI A108.4
Ceramic Tile Installed with Dry-Set Portland Cement Mortar: ANSI A108.5
Ceramic Tile Installed with Chemical Resistant, Water Cleanable Tile Setting Epoxy: ANSI A108.6
Installation of Grout in Tile Work: ANSI A108.10
Dry-Set Portland Cement Mortar: ANSI A118.1
Chemical Resistant, Water Cleanable Tile Setting Epoxy: ANSI A118.3
Latex-Portland Cement Mortar: ANSI A118.4
Ceramic Tile Grouts: ANSI A118.6
Organic Adhesives for Installation of Ceramic Tile: ANSI A136.1
Recommended Standard Specifications for Ceramic Tile: ANSI A137.1
Conform to Tile Council of North America, Inc. (TCNA) grade standards and installation recommendations as published in the 2008 TCA "Handbook for Ceramic Tile Installation" as Architect judges them applicable. Specifications may be obtained from Council at 100 Clemson Research Blvd., Anderson, SC 29625; 864-646-8453, Fax: 864-646-2821

SUBMITTALS
Provide in accordance with Section 01 33 00.
Data:
Submit product data specifications and instructions for using adhesives and grouts.
Samples:
Submit samples of each type of ceramic tile to be used at least 10 days prior to starting work. For each tile type, mount tile and apply grout and sealer on one plywood panel, minimum 36 x 36 inches in size illustrating pattern, color variations, grout joint size variations, and sealer.
Maintenance Data:
Submit maintenance data in accordance with Section 01 78 23.
Include cleaning methods, cleaning solutions recommended, stain removal methods, and polishes and waxes recommended.

QUALITY ASSURANCE:
Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
Manufacturer Qualifications:
Company specializing in manufacturing the types of products specified in this section, with minimum 5 (five) years of documented experience.
Installer Qualifications:
Company specializing in performing tile installation, with minimum 5 (five) years of documented experience.
Pre-Installation Meeting:
Convene one week before starting work of this section."

DELIVERY, STORAGE, AND HANDLING
Protect against damage, discoloration, and contamination.
Deliver in manufacturer's original, unopened containers with legible labels intact.
Attach grade label to each container in accordance with TCA 137.1.

ENVIRONMENTAL REQUIREMENTS
Refer to Section 01500 for temporary enclosures, heat and illumination.
Set and grout tile when ambient temperature is at least 50^{o}F and rising.
Perform work under at least 30 ft. candles illumination measured 3 ft. above floor.

Notify General Contractor, if necessary, to provide additional light.

EXTRA STOCK
Provide one unopened case of each color and type of tile.
Store where directed.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

CERAMIC TILE
General:
Manufacturing Standard: ANSI 137.1.
Grade: Standard Grade; no seconds accepted.
Manufacturer: Dal-Tile, Design and Direct Source, or accepted substitute.
Color and Pattern: See Finish Schedule Sheet A-701 for products

SPECIAL TILE SHAPES
Provide as shown on Drawings or required for complete installation.
Size so that joints align with field pattern.

CERAMIC TILE TRIM
Furnish size, color and shade to match ceramic tile.
Observe following requirements:
- Walls: Internal corners square or round, external corners bullnose.
- Wainscot Walls: Bullnose cap on wainscot except provide flat tile where ceramic mosaic wall surface is flush with plaster wall above.
- Floors: Cove base.
- Curbs: Bullnose and cove.
- Jambs: Bullnose where tile work projects from jamb.

METAL TRIM
Material: Satin anodized or stainless steel extruded aluminum.
See Finish Schedule on Drawings for products

TILE BACKER BOARD
Specified under Section 09 29 00.

CRACK ISOLATION MATERIAL
Chlorinated polyethylene sheet with non-woven fabric laminated to both sides; Schluter Systems "KERDI", or accepted substitute.

PROTECTIVE SEALER
Type made or recommended by tile manufacturer.
Provide at tile and other surfaces, if any, which are subject to damage by grout.

GROUT
ANSI A118.6 and Tile Council of America, Commercial Portland Cement Grout.
Color: To be selected by Architect.

COLOR PIGMENT
Pure mineral oxides manufactured by J. Lee Smith, 3M Company, G.K. Williams, or accepted substitute.

SEALANT
Silicone, Dow #784, GE 1700, or accepted substitute with mildew inhibitor; conforming to Fed. Spec. TT-S-001543.
Provide around any plumbing fixture fittings and toilet accessories passing through or recessed into tile.

PART 3 - EXECUTION

EXAMINATION

Examine surfaces to receive tile and start no work until defects that will adversely affect tile work have been corrected.

Variations of surface to be tiled shall fall within maximum variations shown below:

	Walls	Floors
Portland Cement Mortar	1/4" in 8'	1/4" in 10"
Dry-Set Mortar	1/8" in 8'	1/8" in 10'
Epoxy	1/8" in 8'	1/8" in 10'
Organic Adhesive	1/8" in 8'	1/18" in 3'

Report all unacceptable surfaces to Architect and do not tile such surfaces until they are leveled enough to meet above requirements.

Surfaces to be tiled must be free of curing membranes, oil, grease, wax, and dust.

Do not start until work of other trades, which goes through or in the space behind tile, has been completed, and any unacceptable conditions are corrected.

EXTENT OF WORK

Where tile base or walls are scheduled, provide around entire perimeter of room or space, including free-standing columns and pilasters, if any.

Tile not required where concealed under or behind permanently built-in cabinets or equipment.

TILE LAYOUT

Determine locations of all movement joints before starting tile work.

Determine locations of all porcelain accessories before starting tile work.

Lay out all tile work so as to minimize cuts less than one-half tile in size.

Locate tile cuts in both walls and floors so as to be least conspicuous.

Lay out tile wainscots to next full tile beyond dimensions shown.

Align all wall joints to give straight uniform grout lines, plumb and level.

Align all floor joints to give straight uniform grout lines, parallel with walls.

Center tile joints over slab control joints. Fill with sealant specified in Section 07 92 00.

If tile joints cannot be centered over slab control joints, cut units to allow tile joint to center over slab joint or saw-cut tile over slab joint.

Contractor’s option: Provide crack isolation joint material specified herein.

Make joints between tile sheets same width as joints within sheets so extent of each sheet is not apparent in finished work.

For heights dimensioned on Drawings, maintain full courses to produce height nearest to this dimension without cutting tile.

TILE SETTING METHODS

Refer to Tile Council of America (TCA) "Handbook for Ceramic Tile Installation".

Ceramic Tile on Concrete Floors: ANSI A108.1B, TCA Method F113.

Ceramic Tile on Walls: ANSI A108.1B, TCA Method W247.

CRACK ISOLATION MATERIAL INSTALLATION

Install according to manufacturer’s recommendations.

Install sheet in minimum 24 inch widths and extending minimum two tiles beyond substrate joint or crack.

Provide sealant joints at locations recommended by crack isolation material manufacturer.

Use sealant specified in section 07900.

EXPANSION JOINTS

Provide expansion joints at ceiling/wall intersections, internal wall corners and elsewhere shown on Drawings.

Extend vertical joints from floor to ceiling.

Form joints by raking out mortar 1/4 inch wide through setting bed.

Clean joint before installing backing rod and sealant.

GROUTING

Follow ANSI Standard A108.10 and grout manufacturer's recommendations for grouting procedures and precautions.

Remove all grout haze, observing both tile and grout manufacturers recommendations as to use of acid and chemical cleaners.

Rinse tile work thoroughly with clean water before and after chemical cleaners.

Polish surface of tile work with soft cloth.

PROTECTIVE SEALER

Follow manufacturer's directions.

Apply evenly to fully protect tile.

CLEANING AND REPAIRING

Including work of other sections, clean, repair, and touch-up, or replace when directed products which have been soiled, discolored, or damaged by work of this section.

Remove excess sealant within 20 to 30 minutes after installation using denatured alcohol on cheesecloth pad.

Remove debris from project site upon work completion or sooner, if directed.

PROTECTION

Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Commonly used acoustical ceiling systems, consisting of suspension system, grid, and acoustic tiles or boards.

REFERENCES
Acoustic Systems:
Type of acoustic materials, types of mounting, noise reduction coefficients, and methods of installation, hereinafter specified, refer to "Ceiling Systems Handbook," published by Ceilings and Interior Systems Construction Association (CISCA), 405 Illinois Avenue, Unit 2B, St. Charles, IL 60174; 630-584-1919.
Suspension Systems:
Suspension systems, hereinafter specified, refer to "Metal Suspension Systems for Acoustical Tile & Lay-in Panel Ceilings," ASTM C 635, and to "Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustic Tile and Lay-in Panels," ASTM C 636.

PERFORMANCE REQUIREMENTS
Suspension system components fully loaded; maximum deflection: 1/360 of span in accordance with ASTM C 635.
Finish surfaces level and true within 1/8 inch per 12 feet.
Fire Resistance Classification: ASTM E 119.
Flame Spread Classification: ASTM E 84.

SUBMITTALS
Product Data:
Submit manufacturer's specifications and installation instructions for acoustical materials, suspension system and accessory products required to provide a complete system.
Samples:
Submit samples of each acoustical material specified including representative grid and metal items. Samples shall show full range of texture and color to be expected in completed work.

QUALITY ASSURANCE
Mock-up:
Complete ceiling installation in one room where directed.
Notify Architect when installation is ready for review.
After acceptance, mock-up in like-new condition may be used for project work.

DELIVERY, STORAGE, AND HANDLING
Deliver in original, unopened, protective packages with manufacturer's labels indicating brand name, pattern, size, thickness, and fire rating legible and intact.
Protect against damage and discoloration.
Store cartons open at each end to stabilize moisture content and temperature.

ENVIRONMENTAL REQUIREMENTS
Delay installation of acoustic units until work spaces are dry.
Maintain 65% - 75% humidity in work spaces 24 hours before, during, and 24 hours after installation.
Maintain uniform 55^{o}F - 70^{o}F temperature in work spaces 24 hours before, during, and after installation.

EXTRA MATERIALS
Submit one extra case of each type of acoustic tile in unopened protective package. Store in Owner-approved location.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

ACOUSTIC TILE
Manufacturer: Armstrong, Celotex, US Gypsum, or accepted substitute.
Finish: Factory applied paint. White.
Noise Reduction Coefficient on specified mounting: Per manufacturer's testing data.
Basis-of-design: Armstrong
ACT-1:
Type: Fissured mineral fiber tile, angled tegular edge.
Model and Size: Cortega Second Look II, #2767 - 24"x48"x3/4"
ACT-2:
Type: Fissured mineral fiber tile, square lay-in edge.
Model and Size: Cortega, #769 - 24"x48"x5/8"

METAL SUSPENSION SYSTEM
Type: Steel, heavy duty rating, exposed grid T-bar system.
Manufacturers: Donn, Armstrong, Chicago Metallic, or accepted substitute.
Size: 15/16 inch
Finish: Manufacturer's standard enamel.
Color: Match Acoustic Tile.
Follow layout shown on Drawings.

STRUTS
ICBO listed, adjustable, heavy duty galvanized tubing with spring steel clip at upper end and bulb clip at bottom end; Donn, Roblin, or accepted substitute.

FASTENERS AND ACCESSORIES
General:
Type and sizes recommended by suspension system manufacturer.
Seismic Accessories:
Beam End Retaining Clip: Armstrong BERC or accepted substitute.

METAL EDGE TRIM
Hemmed angle molding, corrosion-resistant steel, bonderized and enameled to match color of adjacent metal suspension system.
Size: 7/8 inch

ACOUSTIC INSULATION
Paperless, semi-rigid, spun mineral fiber mat, 2 inches thick, standard density, conforming to Federal Spec. HH-I-521F, Type I, ASTM C 665 and ASTM E 84. Thermafiber Sound Attenuation Blankets, Roxul AFB, or accepted substitute.

PART 3 – EXECUTION

EXAMINATION
Verify that surfaces to receive directly-attached acoustical units are even, regular, true, level within 1/8 inch per 12 ft. dry and free from oil, or other bond-reducing substances.
Verify that surfaces provided by other trades are clean, dry, dust-free, smooth, level, within 1/8 inch in 12 ft. and otherwise properly prepared to receive acoustic treatment.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

FIELD MEASUREMENTS
Verify prior to fabrication.
If field measurements differ slightly from drawing dimensions, modify work as required for accurate fit. If measurements differ substantially notify Architect prior to fabrication.

INSTALLATION
General:
Follow standard specifications, manufacturer's directions and layout drawings, except as modified hereunder.

Metal Suspension System:
Where mechanical and electrical work interferes with regular spacing of hangers provide additional hangers and channels and make necessary adjustments in ceiling construction.
Do not attach or pass hangers through mechanical or electrical ductwork.
Provide framing around recessed light fixtures and other openings.
Maximum vertical hanger splay: 5 inches per 4 ft.
Acoustical Units:
Install units in level plane, in straight line courses, and with solid bearing on support members.
Minimum border unit width: 1/2 unit dimension, unless otherwise shown on Drawings.
Install pattern grain, if any, in one direction.
Seal joints around pipes, ducts, and other penetrations with sealant specified in Section 07900.
Where tile abuts vertical surfaces trim joints with metal edge trim. Attach trim to vertical surface with mechanical fasteners.
Acoustic Insulation:
Provide between framing members butting joints tight with no voids.
Provide above ceilings at all interview rooms, conference rooms and multipurpose rooms.

CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed products which have been soiled, discolored, or damaged by work of this section.
Remove debris from project site upon work completion, or sooner, if directed.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Sheet vinyl, resilient tile, and linoleum flooring. Preparation of substrate surfaces. Resilient bases and accessories.

SUBMITTALS

Provide in accordance with Section 01 33 00.

Lay-out diagram:

Provide to scale layout diagram showing all seam locations and direction of materials

Samples:

Four full size samples of specified floor tile.

One 3 X 6 inch sample of specified sheet vinyl flooring and resilient tile.

One 12 inch long sample of each edge strip.

Maintenance Instructions:

In accordance with Section 01 33 00, submit manufacturer's recommended maintenance products and methods to General Contractor, for inclusion on Owner's maintenance manual.

QUALITY ASSURANCE

General:

Standards: Meet requirements of Resilient Floor Covering Institute.

Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

Manufacturer Qualifications:

Company specializing in manufacturing the types of products specified in this section, with minimum 5 (five) years of documented experience.

Installer Qualifications:

Company specializing in performing tile installation, with minimum 5 (five) years of documented experience.

Pre-Installation Meeting:

Convene one week before starting work of this section.

Mock-up:

Install at project site a mock-up of resilient flooring materials as listed below, minimum floor area size 9 sq. ft., encompassing all design elements, including heat welded seams, self-coving, and a corner. Use specified products, manufacturers and installation methods. Obtain acceptance of Owner and Architect of finish, color, texture, pattern and workmanship standards prior to proceeding with final installation.

Mock-ups required:

Sheet Vinyl

Luxury Vinyl Tile

DELIVERY, STORAGE AND HANDLING

Deliver in unopened packages, manufacturer's original labels thereon.

Matching coverings shall bear manufacturer's run number.

Do not remove labels or open packages until Architect inspects.

Protect against damage and discoloration.

Store in dry place.

Maintain storage place temperature above 70^{o}F for immediate 48 hours prior to and during storage.

ENVIRONMENTAL REQUIREMENTS

Work Space Air and Surface Temperatures:

Not less than 70^{o}F 48 hours before, during, and 48 hours after laying.

Not lower than 55^{o}F thereafter.

Work Space Ventilation:

When using offensive odor adhesive provide sufficient ventilation to maintain healthy and pleasant environment for all trades.

Work Space Illumination:

Do not work under less than 30 foot candles measured 3 ft. above floor.

EXTRA STOCK
Provide one unopened case of each color and type of tile.
Store where directed.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

SHEET VINYL
Manufacturing Standard: ASTM F 1303, Type I, Class B backing, Grade 1.
Manufacturer and type: Lonseal, Loneco or accepted substitute.
Thickness: .080" gage.
Color: 7233 Lavender (topseal)

SHEET VINYL COVE BASE
Sheet Vinyl: Same as floor.
Height: 6 inches.
Cove Stick: Flexco, no. 95, Armstrong, Burke, Roppe, or approved substitute.
Cove Cap: Flexco, no. 197R, Armstrong, Burke, Roppe, or approved substitute.

LUXURY VINYL TILE
Manufacturing Standard: ASTM F-1700 Class III, Type B
Manufacturer and type: Interface, Level Set
Size: 25cmx1m (9.845 in x39.38 in)
Thickness: 4.5mm
Color: A00207 Washed Wheat

RUBBER BASE
Manufacturer: Armstrong, Flexco, Burke, Roppe, or accepted substitute.
Height: 4 inches or 6 inches as scheduled on Drawings.
Type: Coved.
Provide with factory formed external corners, mitered internal corners and factory-formed end stops.
Color: Black Brown 523

EDGING STRIPS
One inch wide, 1/8 inch thick, rubber base with beveled top.
Provide at exposed resilient flooring edges, if any.

PRIMER, SEALER, CRACK FILLER, AND ADHESIVE
Water-resistant type, made or approved by covering manufacturer.

CLEANER
Neutral type approved by covering manufacturer.

FLOOR POLISH
Non-slip, non-yellowing type approved by floor covering manufacturer.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive work specified herein are solid, dry, clean, level, and otherwise properly prepared.
Verify that walls to receive base extend to within 1/4 inch of floor.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
Fill concrete slab cracks less than 1/16 inch wide and depressions less than 1/8 inch deep with crack

filler. Notify General Contractor to correct wider cracks and deeper depressions.
Provide 1 coat of primer on sanded wood and other surfaces recommended by manufacturer.

AREAS TO BE COVERED

In Spaces Scheduled to have Floor Covering:

Also cover closet and alcove floors opening off spaces, if any, with same material.

Where Base is scheduled:

Provide around perimeter of room or space, unless otherwise indicated elsewhere.
Include casework, free-standing columns, pilasters and other projections, if any.

Miscellaneous:

Covering not required under permanently built-in casework and equipment, unless otherwise indicated elsewhere.

INSTALLATION

General:

Follow manufacturer's instructions and applicable sections of referenced specifications.

Luxury Vinyl Tile:

At least 24 hours before installing, remove tile from shipping cartons and back-stack.
Install tile in "ashlar pattern".
Develop layout and Install tiles so that no tile is smaller than 5 or 6 inches.
Install floor tiles in strict compliance with manufacturer’s printed instructions.
Extend tile flooring into toed space, door reveals, into closets, and similar openings.

Sheet Vinyl Flooring:

Install with adhesive over entire floor area to be covered.
Install with all seams to be heat welded. Prepare heat-welded seams with special routing tool supplied for this purpose and heat weld with vinyl welding rod in seams. Use methods and sequence of work in conformance with written instructions of the flooring manufacturer. Finish all seams flush and free from voids, recesses, and raised areas. Provide integral flash cove wall base, 6 inches high, where shown on the drawings, including cove fillet support strip and top edge cap trim. Construct flash cove base in accordance with the flooring manufacturer's instructions. Heat-weld seams as specified for those on the floor.
Install with self-coved base where shown on Drawings, 6 inches high.

Rubber Base:

Areas to receive base shall be clean, fully enclosed, weather-tight, and maintained at a uniform temperature of at least 65°F for 24 hours before, during, and after the installation is completed. The wall base and adhesives shall be conditioned in the same manner.
The wall surface shall be clean, dry and free of all foreign material, such as dust, paint, grease, oils, solvents, sealers, and old adhesive residue which may interfere with proper adhesion.
All coiled wall base shall be unrolled and allowed to lay flat for a period of at least 24 hours at 65°F prior to installation.
Wall base shall be rolled, with a J-hand roller, after installation, to ensure proper bonding.

Edging Strips:

Provide wherever covering edges are exposed.

PATCHING

General:

Where alterations occur, and where indicated, patch existing covering to remain; match existing material, pattern, and color.
Join new covering neatly with existing covering in as good condition as found.

At Floor Tile:

Patch with full size tile only, unless otherwise approved.
Remove existing, less than full size tile, where required to install new full size tile.

Base:

Patch existing base with 4 ft. minimum length pieces.

CLEANING, REPAIRING, AND FINISHING

After covering and base have set sufficiently, wash with cleaner.
After rinsing and drying apply one coat of floor polish to covering. Machine-buff to smooth, dull gloss; hand-buff inaccessible areas.

Leave surfaces smooth and defect-free.
Remove debris from project site upon work completion or sooner, if directed.
Including work of other sections, clean, repair and touch-up, or replace when directed products which have been soiled, discolored, or damaged by work of this section.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.
Rope off work areas and/or provide necessary coverings to protect work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Low pile carpet materials including cushions, if any, and accessories.

INSTALLER QUALIFICATIONS
To be eligible to perform work specified herein Contractor must be acceptable to carpet Manufacturer and have successfully completed 2 similar projects.

REGULATORY REQUIREMENTS
Comply with Department of Commerce Flammability Standard DOC FF 1-70.
Corridor and exit way carpet shall comply with National Bureau of Standards Radiant Panel Test 75-950.

SUBMITTALS
Certifications:
Provide in accordance with Section 01 33 00.
Product Data:
Submit manufacturer's product data listing volatile organic compound (VOC) content of products specified herein.
Provide manufacturer's documentation verifying that adhesives and sealants contain no urea-formaldehyde.
Lay-out diagram:
Provide to scale layout diagram showing all seam locations and direction of materials
Samples:
Four full size samples of specified floor tile.
One 3 X 6 inch sample of specified sheet vinyl flooring and resilient tile.
One 12 inch long sample of each edge strip.
Maintenance Instructions:
In accordance with Section 01 33 00, submit manufacturer's recommended maintenance products and methods to General Contractor, for inclusion on Owner's maintenance manual.

QUALITY ASSURANCE
General:
Standards: Meet requirements of Resilient Floor Covering Institute.
Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
Testing: Owner will employ services of an independent testing laboratory for testing moisture content in concrete slabs in accordance with Section 01 45 00.
Installer Qualifications:
Company specializing in performing tile installation, with minimum 5 (five) years of documented experience.
Pre-Installation Meeting:
Convene one week before starting work of this section.
Mock-up:
Install at project site a mock-up of resilient flooring materials as listed below, minimum floor area size 9 sq. ft., encompassing all design elements, including heat welded seams, self-coving, and a corner. Use specified products, manufacturers and installation methods. Obtain acceptance of Owner and Architect of finish, color, texture, pattern and workmanship standards prior to proceeding with final installation.

MAINTENANCE MATERIALS
Leave with Owner excess pieces of usable carpet over 2 sq. ft., but not more than the equivalent of two cases.
Store where directed by Owner.

MAINTENANCE INSTRUCTIONS
Submit to General Contractor in accordance with Section 01 78 23 for inclusion in Owner's maintenance manual 1 copy of Manufacturer's recommendations for care, cleaning, and maintenance of installed carpet.
After installation thoroughly instruct Owner in care, cleaning, and maintenance of installed carpet.

PRODUCT DELIVERY

Deliver in original unbroken mill-wrapping, Manufacturer's register number labels thereon.
Do not deliver until installation is ready to start.
Do not remove labels or open packages until Architect reviews and accepts.

PRODUCT STORAGE AND HANDLING
Protect against damage and discoloration.
Do not store carpet rolls on end.
Store between 40°F and 100°F and must be conditioned to between 60°F and 90°F, or applicable service conditions prior to and during installation.

WORK SPACE ILLUMINATION
Perform no work under less than 30 ft. candles measured 3 ft. above floor.

MINIMUM AIR AND SURFACE TEMPERATURE
Perform no work when conditions exceed manufacturer's specified limits; 60°F minimum.

EXTRA STOCK
Provide two unopened cases of each color and type of tile.
Store where directed.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

WARRANTY
Correct defects in materials or workmanship which appear during Warranty Period by repairing and/or replacing and/or re-stretching, if necessary, at no additional cost to Owner. Warrant for 5 years that carpet will maintain specified limits of static electricity generation. 10 year wear warranty against edge ravel and de-lamination.

PART 2 - PRODUCTS

CARPET TILE 1
Extent of work as noted on Drawings.
Manufacturer: Shaw
Model: Collide 5T051 Still
Color: 48505
Minimum construction requirements:
- Construction: Multi-Level Pattern Loop
- Gauge: 1/12
- Density: 5635
- Pile Height: 0.115 in
- Surface Yarn: Eco Solution q® nylon
- Dye Method: 87% Solution dyed /13% yarn dyed
- Primary Backing: synthetic
- Secondary Backing: ecoworx® tile
- Width: 18”x36”.

Static Electricity Control Fiber: Manufacturer's standard type blended with carpet fiber. Maximum Electrostatic Charge: 3.5 kilovolts at 20% relative humidity at 70°F.
Flame Spread Rating: ASTM E 648, Class 1.
Smoke Density Rating: Less than 450 per ASTM E 662.

CARPET TILE 2
Extent of work as noted on Drawings.
Manufacturer: Shaw
Model: Collide 5T049 Ignite
Color: 48505
Minimum construction requirements:

Construction: Multi-Level Pattern Loop
Gauge: 1/12
Density: 6171
Pile Height: 0.105 in
Surface Yarn: Eco Solution q® nylon
Dye Method: 87% Solution dyed /13% yarn dyed
Primary Backing: synthetic
Secondary Backing: ecoworx® tile
Width: 18”x36”.

Static Electricity Control Fiber: Manufacturer's standard type blended with carpet fiber. Maximum Electrostatic Charge: 3.5 kilovolts at 20% relative humidity at 70^{o}F.
Flame Spread Rating: ASTM E 648, Class 1.
Smoke Density Rating: Less than 450 per ASTM E 662.

WALK-OFF MAT 1
Extent of work as noted on Drawings.
Manufacturer: Mannington
Model: Ruffian II
Color: Ebony Earth 1506
Minimum construction requirements:
Construction: Tip-sheared Loop
Gauge: 5/32
Pile Density: 8,825 oz/sq. yd.
Face Fiber: Type 6,6 Nylon
Backing: 100% Synthetic
Dye Method: Solution Dyed

WALK-OFF MAT 2
Extent of work as noted on Drawings.
Manufacturer: van Gelder, Inc, or approved substitute.
Model: Frontrunner LP
Color: Black
Minimum construction requirements:
Construction: Open grid, flexible PVC
Thickness: 3/8 inch
Provide joining strips at material seams.

CUSHION
Not required.

EDGE STRIP
One inch wide, thickness to match carpet height, with beveled top.
Provide at exposed carpet edges, if any.
Color selected by Architect.

ADHESIVE AND FLOOR FILLER
Non-flammable type recommended by carpet Manufacturer.
Adhesive for Carpet Tiles: Non-flammable type with anti-microbial protection, VOC content meeting requirements if CRI Green Label Indoor Air Quality Program; “Commercialon Premium Modular Adhesive”, or accepted substitute.

CONCRETE SEALER
Type recommended by carpet Manufacturer.

SEAM CEMENT
Non-flammable type recommended by carpet Manufacturer.

PART 3 - EXECUTION

EXAMINATION

Verify that subfloor is clean, dry, level, and solid, with no projections or holes that will damage carpet system; that work spaces have specified illumination, humidity, and temperature; and that surfaces are otherwise properly prepared.

Prior to starting work notify General Contractor of defects requiring correction.

Do not start work until conditions are satisfactory.

PREPARATION

Fill cracks less than 1/16 inch wide and depressions less than 1/8 inch deep with filler.

Notify General Contractor to correct wider cracks and deeper depressions.

EDGE STRIP INSTALLATION

Follow Manufacturer's directions.

Provide edge stripping at exposed carpet edges.

Where carpet terminates at door openings, center edge strip under door.

ADHESIVE APPLICATION

Follow Manufacturer's directions.

Apply uniformly.

Apply only to area that can be covered by carpet within adhesive working-time.

Promptly remove spillages.

CARPET TILE INSTALLATION

Follow Manufacturer's directions.

Provide trowel applied, full spread adhesive.

Slide tiles in from side so they are together but not too tight or compressed.

Install tiles in a vertical ashlar pattern.

Roll tiles only after 24 hours to re-adhere any tiles that may be lifting.

CLEANING AND REPAIRING

After all trades have completed with work, vacuum clean carpet.

Remove debris from project site upon work completion or sooner, if directed.

Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.

PROTECTION

Protect work specified herein, and work of other trades, against damage and discoloration caused by work of this section.

Provide necessary coverings and barricades to protect completed work.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Acoustical sound absorbing units.

PERFORMANCE REQUIREMENTS
Finish surfaces level and true within 1/8 inch per 12 feet.
Fire Resistance Classification: ASTM E 119.
Flame Spread Classification: ASTM E 84.

SUBMITTALS
Product Data:
Submit manufacturer's specifications and installation instructions for acoustical materials and accessory products required to provide a complete system.
Samples:
Submit samples of each acoustical material specified including representative accessory items. Samples shall show full range of texture and color to be expected in completed work.

DELIVERY, STORAGE, AND HANDLING
Deliver in original, unopened, protective packages with manufacturer's labels indicating brand name, pattern, size, thickness, and fire rating legible and intact.
Protect against damage and discoloration.
Store cartons open at each end to stabilize moisture content and temperature.

ENVIRONMENTAL REQUIREMENTS
Delay installation of acoustic units until work spaces are dry.
Maintain 65% - 75% humidity in work spaces 24 hours before, during, and 24 hours after installation.
Maintain uniform 55^{o}F - 70^{o}F temperature in work spaces 24 hours before, during, and after installation.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

ACOUSTIC WALL PANELS (ACP-1)
Type: Fabric-covered rigid fiberglass, minimum 7 lb./cu. ft. minimum density.
Thickness: 1 inch minimum.
Edge Detail: Square edge at three sides, mitered edge at bottom side. Provide mitered edge where panel meets door frame.
Attachment: Manufacturer’s standard concealed metal wall brackets.
Fabric Covering: Guillford FR701, Style 2100. Color: Pearl 481
Minimum Noise Reduction Coefficient (NRC): 0.80 when tested in conformance to ASTM C 423.
Manufacturer and Model: Conwed “Respond”, Lamvin “Sonic Series”, Armstrong “Soundsoak”, Decoustics, GTS, or accepted substitute.

FASTENERS AND ACCESSORIES
Type and sizes recommended by suspension system manufacturer.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces provided by other trades are clean, dry, dust-free, smooth, level, within 1/8 inch in 12 ft. and otherwise properly prepared to receive acoustic treatment.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

FIELD MEASUREMENTS
Verify prior to fabrication.
If field measurements differ slightly from drawing dimensions, modify work as required for accurate fit. If

measurements differ substantially notify Architect prior to fabrication.

ACOUSTIC WALL PANEL INSTALLATION

Factory-install panel brackets to back of panel with adhesive or mechanical fasteners.
Install wall brackets to wall construction with mechanical fasters as recommended by panel manufacturer.
Install units in plumb and level, in straight line courses, and with solid bearing on support brackets.

CLEANING AND REPAIRING

Including work of other sections, clean, repair and touch-up, or replace when directed products which have been soiled, discolored, or damaged by work of this section.
Remove debris from project site upon work completion, or sooner, if directed.

PROTECTION

Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Exterior and interior painting with transparent or opaque finishes. Includes stains, varnishes, lacquers, fillers, and preparation of surfaces.

SUBMITTALS

Provide in accordance with Section 01 33 00.

Product List:

Before ordering, submit complete and detailed list of materials proposed for use.
Obtain Architect's acceptance before ordering.
Provide product data for field-applied interior paints and coatings which have a potential impact on indoor air quality, including manufacturer's MSDS sheets or other Product Data listing VOC content as noted below.
Provide product data for exterior field-applied paints and coatings, which have a potential impact on ambient air quality, including manufacturer's MSDS sheets or other manufacturer's Product Data listing VOC content as noted below.

Color Samples:

One Sample of each required finish, color, and sheen. Sample size 8 1/2 X 11 inches, minimum.
Use suitable substrate for each sample, such as stiff paper for paint and specified wood for stains.
Obtain Architect's acceptance before proceeding with work.

QUALITY ASSURANCE

Each product container shall bear manufacturer's legible label indicating the following:

- Manufacturer's Name
- Type of Material
- Manufacturer's Product Number
- Manufacturer's Batch Number
- Color
- Instructions for reducing, where applicable.

DELIVERY, STORAGE, AND HANDLING

Deliver in original, unopened containers.
Do not open containers or remove labels until Architect inspects.
Store in suitable location where directed by General Contractor.
Protect against contamination by foreign matter.
Remove unacceptable materials from project site.

ENVIRONMENTAL REQUIREMENTS

Follow manufacturer's directions.
Minimum ambient air and surface temperature for 24 hours prior to and during application and until film is dry hard thereafter: 40^{o}F.
Do not work where dust or insects are present.
Do not work where inclement weather may damage surface.
Do not work with less than 30 foot candles of available light measured 3 ft. above floor.

EMISSIONS STANDARDS

Conform to the following minimum standards for coating emissions:

Coating Type	VOC Limits	Standard
Architectural Flat Paints – Interior	50 g/L	Green Seal GS-11
Architectural Non-Flat Paints - Interior	150 g/L	Green Seal GS-11
Primer or Undercoat	150 g/L	Green Seal GS-11
Anti-Corrosive Coating	250 g/L	Green Seal GS-11
Clear Wood Finishes - General	350	SCAQMD Rule 1113
Clear Wood Finishes – Varnish	350	SCAQMD Rule 1113
Clear Wood Finishes – Sanding Sealer	275	SCAQMD Rule 1113
Clear Wood Finishes – Lacquer	550	SCAQMD Rule 1113
Clear Wood Finishes – Pigmented Lacquer	550	SCAQMD Rule 1113
Stains – Interior	250	SCAQMD Rule 1113

EXTRA STOCK
Leave, in previously unopened original containers, one gallon of each top coat.
Label for positive identification.
Store on project premises where directed.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

GENERAL
Products for each general purpose shall be of same manufacturer.
Do not use products of different manufacturers over one another, except for shop prime coats specified in other sections of these Specifications.

MATERIALS
Select from the following Approved Products Table unless otherwise specified herein.
All listed products will not necessarily be employed on this project. Consult painting schedule for required materials.
Product numbers are given to establish desired quality and do not indicate color.

COLORS
As selected by Architect.
Color Quantity: As noted on drawings.

MIXING AND TINTING
Deliver paints and enamels ready-mixed to jobsite.
Job-mix and job-tint only when acceptable to Architect.
Mix only in clean, rust-resistant containers.
Use tinting colors recommended by manufacturer for specific type of surface.
Factory-add fungicidal agent to all exterior coatings and to interior coatings applied in any high humidity spaces.

PART 3 - EXECUTION

EXAMINATION
Examine surfaces to receive coating for conditions that will adversely affect execution, permanence, and Work quality.
Verify that General Contractor has removed door hardware.
Prior to starting work notify General Contractor about defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
Protection:
Cover or otherwise protect work of other trades, including walls and floors of paint storage and mixing rooms.
Remove finish hardware, accessories, plates, lighting fixtures, and similar items. Obtain Architect's approval for protection in lieu of removal.
Post signs and install barricades as required to protect work of this section against damage or discoloration.
Take extraordinary care to prevent fire. Open cans of paint and varnish only when needed.
Keep rubbing cloths and oily rags submersed in water.
Surface Preparation:
General: Remove any loose material, dirt, or dust.
Concrete: Remove excess form oil and curing compound.
Where necessary for coatings-adhesion, etch concrete with muriatic-acid solution; rinse thoroughly.
Masonry: Remove efflorescence and other bond-reducing substances.
Galvanized Metal: Thoroughly clean with surface conditioner in accordance with manufacturer's

instructions.
Etch metal with metal conditioner or in accordance with Steel Structures Painting Council Specification 7.
Non-Galvanized Steel: Remove any rust and scale.
Wood Doors: Lightly hand block-sand faces and edges with 180 grit sandpaper to remove any raised grain.
Fill any Voids. At natural finish, color filler to match wood.
Other Wood: Clean soiled surfaces with alcohol or approved.
Except at rough-sawn surfaces, hand block-sand with 180 grit sandpaper to remove any raised grain.
At opaque coating seal knots, pitch, and resinous sapwood before prime coat application.
Fill voids, cracks, and other defects. At natural finish, color filler to match wood.
Remove gloss by washing and sanding; touch-up bare spots with proper type primer.

COATING APPLICATION

General:

Follow manufacturer's directions.
Do not apply initial coating until moisture content of surface to be finished is within limitations recommended by paint manufacturer. Test with moisture meter.
Apply coating with suitable brushes, rollers, or spraying equipment as recommended by coating manufacturer.
Do not exceed coating manufacturer's application rate.
Follow coating manufacturer's recommended drying time between succeeding coats.
Apply finish coats smooth, free of brush marks, streaks, laps, coating pile-up, and skips.
Keep brushes, rollers, and spraying equipment clean, dry, free from contaminates, and suitable for finish required.
At rough or resawn wood, back-brush any spray-applied stain.
Leave moldings and ornaments clean and true to detail without excessive coating build-up in corners and depressions.
Where paint abuts other materials or colors, cut paint edges clean and sharp and with no overlap.
Finish door tops, bottoms and edges as specified below: Remove doors from frames, if necessary.

Painted Work:

Flat Metalwork except Doors: Apply paint with brush, roller or airless spray equipment.
Doors: Apply paint with roller or airless spray equipment only, do not apply with brush.
Face runs not permitted.

Stained and Natural Work:

Adjust finishes where necessary to obtain similar appearance between different adjacent materials.

FIELD QUALITY CONTROL

For each required color scheme, request Architect to inspect first finished room, space, or item for color, texture, and workmanship.
Dry paint film thicknesses will be measured upon painting completion using Tooke Paint Inspection Gage IV, a precision instrument designed for measuring and evaluating paint coatings. Re-coat any Work measuring less than specified thickness.

FIELD SAMPLE

Before proceeding with painting, apply where directed at least 30 sq. ft. of each specified coating on actual wall and ceiling surfaces, and at least one sample door, door frame, and cabinet. Simulate building's design lighting during Architect's review.
Accepted sample represents minimum standards for subsequent work.
Accept samples in like-new condition may be used in contract work.
Touch-up test surfaces, which will measure approximately 1 sq. inch per Test.

CLEANING

Remove spills, splatters, and stains from all surfaces including other work and those in paint storage and mixing rooms.
Unless otherwise approved, refinish entire wall or surface where portion of finish has been damaged or is otherwise unacceptable.
Remove debris from project site upon work completion or sooner, if directed.
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.

PAINTING SCHEDULE

General:

Prime coats specified below may be omitted where factory-applied shop coats are specified in other Sections.

Prime coats specified may be omitted from existing finished surfaces, provided existing coating is sound.

Number of coats hereunder specified is minimum. Finished work shall be even, uniform color, and free from cloudy and mottled surfaces. Apply additional coats where necessary for any deep tone colors.

Minimum coating thicknesses specified below include prime coat and finishing coats combined.

Surfaces not coated, unless otherwise shown on Drawings:

Items having complete factory finish.

Rubber.

Non-ferrous metal.

Elastomeric sealants.

Tempered hardboard.

Acoustic tile.

Glass.

Flooring.

Fire-resistance rating labels and instructional labels.

Portions of buildings where no alterations occur, except as noted on Finish Schedule on Drawings.

Exterior Ferrous Metal:

Paint System – 4: Latex Enamel

One coat ferrous metal primer, 2.5 mils.
Two coats semi-gloss latex enamel, 2.6 mils.
Total minimum dry thickness: 5.1 mils.

Exterior Non-ferrous Metal:

Paint System – 5: Latex Enamel

Two coats self-priming semi-gloss latex enamel, 2.6 mils.
Total minimum dry thickness: 2.6 mils.

Exterior Woodwork and Cement-Fiber:

Paint System 8: Latex Enamel.

One coat exterior water base primer, 1.4 mils.
Two coats satin exterior latex enamel, 2.6 mils.
Total minimum dry thickness: 4.0 mils.

Exterior Soffits:

Paint System – 10: Latex Enamel

One coat water base primer, 1.4 mils.
Two coats exterior flat latex enamel, 2.6 mils.
Total minimum dry thickness: 4.0 mils.

Exterior Integral Color Concrete Block:

Specified in Section 07 19 10

Interior Gypsum Board Walls:

Paint System - 15: Latex Enamel

One coat wallboard primer, 1.0 mils.
Two coats eggshell gloss latex enamel, 1.5 mils.
Total minimum dry thickness: 4.0 mils.

Interior Gypsum Board Ceilings:

Paint System - 14: Latex Enamel

One coat wallboard primer, 1.0 mils.
Two coats eggshell gloss latex enamel, 1.5 mils.
Total minimum dry thickness: 4.0 mils.

Interior Gypsum Board in Shower Areas and as noted on drawings:

Paint System - 16: Epoxy Enamel

One coat water base primer, 1.6 mils.
Two coats eggshell gloss water-based catalyzed epoxy enamel, 6.0 mils.
Total minimum dry thickness: 7.6 mils.

Interior Ferrous and Non-ferrous Metal:

Paint System – 18: Latex Enamel

One coat metal primer, 2.5 mils.
Two coats semi-gloss latex enamel, 2.6 mils.

Total minimum dry thickness: 5.1 mils.

Interior Concrete Block:

Paint System - 19: Latex Enamel

One coat masonry primer sealer, 3.0 mils.

Two coats semi-gloss latex enamel, 2.6 mils.

Total minimum dry thickness: 5.6 mils.

Interior Woodwork:

Paint System - 20: Stain and Clear Coating

One coat clear prestain

One coat penetrating water-base stain.

One coat sanding sealer

Two coats satin gloss urethane coating.

Exposed Mechanical and Electrical Work except in Mechanical or Electrical Equipment Rooms:

Paint System -25: Exterior metal work including that on roof:

Prepare and paint as specified for other exterior metal of same kind.

Paint System - 26: Interior metal work:

Prepare and paint as specified for other interior metal of same kind.

Paint System - 27: Electrical conduit, panel boards, and service boxes:

Prepare and paint as specified for other interior metal of same kind.

Traffic Control Markings:

Paint System - 28: Traffic paint:

One coat white traffic paint.

Paint parking stall lines 4 inches wide, and any other pavement markings shown on Drawings. Apply straight, true, and with sharp edges.

END OF SECTION

APPROVED PRODUCTS TABLE

Manufacturers ►| Products ▼|	Benjamin Moore	ICI	Kelly Moore	Miller	PPG	Rodda Cloverdale	Sherwin Williams	Other
Concrete Block Filler – water base	285	4000	521	6015	6-7	501901	B25W25	
Masonry Primer Sealer – water base	066	1010	247	6040	4-808	505901	A24W300	
Wood Primer Sealer – water base	023	2010	255	2840	17-921	501601	B42W41	
Wood Primer Sealer – solvent base	176	1220	220	240	6-9	701501	Y24W20	
Galvanized Iron Primer – water base	P04	2000	1725	6023	17-921	501601	B66W1	
Galvanized Iron Primer – solvent base		4120	1712	484	6-209	71007	B50WZ30	
Ferrous Metal Primer – water base	P04	4020	1725	5000	90-709	508901	B66W1	
Ferrous Metal Primer – solvent base	P06	4120	1711	484	6-208	708225	B50WZ1	
Heavy-bodied Stain – water base	N089	2600	1240	PRO-VT	77-400	511001	A15W10	Olympic, Cabot,
Heavy-bodied Stain – solvent base	080	2700	1720	3900	77-700	714401	A14WZ1011	Olympic, Cabot, Cuprinol
Exterior Semi-Transparent Stain – solvent base	328	2710		5800	77-1600	714104	DeckScapes	Olympic, Cabot, Cuprinol
Exterior Satin Enamel – water base	184	2412	1245	7100	6-2000	521101	A82	
Exterior Semi-gloss Enamel – water base	170	2416	1250	7200	6-900	542001	A8	
Exterior Semi-gloss Enamel – solvent base	P24	2516	1275	6750		745001	B55	
Elastomeric Coating – water base	054	2260	1128	8800	4-110	511301	A5	
Epoxy Enamel Semi-gloss – water base	P43-86	4406	7100	4200		70503	B70/B60V25	
Enamel Undercoat – water base	253	1020	975	2840	17-955	502001	B28W200	
Enamel Undercoat – solvent base	C245	1120	985	81	17-956	703401	B49WZ2	
Wallboard Primer – water base	253	1030	971	6020	6-2	507801	B28W200	
Interior Eggshell Enamel – water base	274	1412	1040	3880	6-411	523101	B20W251	
Interior Satin Enamel – water base	277	1414	1010	4480	6-3500	533001	A87	
Interior Semi-gloss Enamel – water base	276	4206	1050	4580	6-500	542001	B31W251	
Interior Semi-gloss Enamel – solvent base	C271	1516	1630	6750	7-844	745001	B34WZ	
Dry Fall – water base	153	1280	480	624	6-715	513801	B42W1	
Clear Pre-stain – solvent base	236	1918			Benite	706006		Minwax, Zinsser Seal Coat
Clear Sanding Sealer – solvent base				1206	Seal Coat	705100	B26V3	Varathane
Interior Stain – solvent base	C234	1600		700	77-560	716006	A49	Varathane
Urethane Varnish Gloss – solvent base	C428	1908		1283		755100	A66	Minwax Polycrylic, Varathane
Urethane Varnish Satin – solvent base	D435	1901		1281		725100	A66	Minwax Polycrylic, Varathane
Traffic Paint – White	19201	4800	1450-100	8001	11-3	7341	B29W1	
Traffic Paint – Yellow	19210		1450-131	8013	11-4	7342	B29Y2	

PART 1 - GENERAL

SECTION INCLUDES
Writing and marker board surfaces manufactured of various materials; mounting surfaces including framing systems and accessories.

SUBMITTALS
Provide in accordance with Section 01 33 00.
Shop Drawings:
Show dimensions, full size sections, metal thickness, construction details, required clearance, anchor location, and installation details.
Manufacturer's Instructions:
One copy of manufacturer's cleaning and maintenance instruction for inclusion in Owner's Maintenance Manual.
Install one permanent Chalkboard Maintenance Instructions Plate where directed in each room where boards are installed. Plate shall include instructions for proper board care.

DELIVERY, STORAGE, AND HANDLING
Deliver in protective containers with manufacturer's original, legible label intact.
Store in clean, dry area.
Protect against damage and discoloration.
Store rolled material on end, and sheet material flat.
Provide support necessary to retain original shape.
Maintain storage area temperature above 55^{o}F.

ENVIRONMENTAL REQUIREMENTS
Maintain installation area temperature greater than 55^{o}F for 24 hours prior to, during, and continuously after installation.
When using offensive smelling adhesives provide adequate ventilation to maintain healthy and pleasant working environment for workmen of all trades.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

OWNER-PROVIDED PRODUCTS
The owner will provide the following to the Contractor for installation:
Dry Marker Boards: surface mount.
Tackboards: surface mount.

BACKING FOR BOARDS
Provide all necessary.
Sheet metal backing as described in section 09 29 00.
Accessories are located on Drawings for Contractor's convenience.
Verify location, type, and quantity with Owner prior to proceeding with work.

SCREWS
Phillips head type, match adjoining surface; size recommended by manufacturer.

PART 3 - EXECUTION

EXAMINATION
Do not proceed with work until surfaces to receive boards are smooth, true, clean, sound, dry, backing is in place, and otherwise properly prepared.
Prior to starting work notify General Contractor of defects requiring correction.

Do not start work until conditions are satisfactory.
Verify prior to fabrication.
If field measurements differ slightly from drawing dimensions modify work as required for accurate fit. If measurements differ substantially notify Architect prior to fabrication.

PREPARATION
Remove substrate surface imperfections that will interfere with board installation or mar board appearance.
Roughen smooth surfaces before applying adhesive.
Prime substrate surfaces prior to applying adhesive when recommended by manufacturer.

INSTALLATION
General:
Follow manufacturer's directions.
Keep perimeter lines straight, plumb, level, and true to wall plane.
Install boards without horizontal joints, unless otherwise shown on Drawings.
Install boards without vertical joints if possible; where joints are mandatory space no closer than 8 feet on center unless otherwise approved or shown on Drawings.
Fabricate board joints straight and balance symmetrically, unless otherwise shown on Drawings.
Fit butt joints tight and in same plane on both side of joints.

CLEANING AND REPAIRING
Remove debris from project site upon work completion or sooner, if directed.
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.
Provide temporary protective cover. Remove at substantial completion.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Directories, directional items, letters, signs, and plaques of various materials used in establishing identity or communication.

SUBMITTALS
Provide in accordance with Section 01 33 00.
Shop Drawings:
Prior to starting work submit the following for review and acceptance:
- Layout templates
- Color samples
- One completed sign
- Jobsite layout and mounting of each sign type.

DELIVERY, STORAGE, AND HANDLING
Protect against damage and discoloration.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

PLASTIC SIGNS
General:
Type: Injection-molded plastic, exposed edges beveled, single faced.
Thickness: 1/8 inch minimum.
Colors: White lettering on black background.
Size: Match existing.
Extent of Work: Provide signs next to each new interior door in Door Schedule.
Permanent Room Signs:
Type Style: Match existing, 1/32" raised pattern with Grade 2 Braille.
Location: Restrooms.
Room Signs:
Type Style: Optima bold, 1/32" raised pattern. Provide room names and numbers as directed by owner.
Location: All other locations.

PART 3 - EXECUTION

EXAMINATION
Verify that backing and surfaces to receive signs are complete, clean, dry, secure, and otherwise properly prepared.
Prior to starting work notify General Contractor about defects requiring corrections.
Do not start work until conditions are satisfactory.

FIELD MEASUREMENTS
Verify prior to fabrication.
If field measurements differ slightly from Drawing dimensions modify work as required for accurate fit. If measurements differ substantially notify Architect prior to fabrication.

INSTALLATION
Install plumb, level, square, true, and secure.
Attach to wall at latch side of doors unless otherwise noted on Drawings.

Install with double-stick adhesive tape.
Mount signs at maximum 60 inches above floor to centerline of sign. All signs mounted at uniform height.

CLEANING AND REPAIRING
Remove debris from project site upon work completion of sooner, if directed.

Including work of other sections, clean, repair and touch-up, or replace when directed products which have been soiled, discolored, or damaged by work of this section.

PROTECTION

Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Shop fabricated enclosures, dividers and screens for toilets including accessories.

SUBMITTALS
Shop Drawings:
Show layouts, dimensions, colors, methods of anchoring and reinforcing, core construction, other pertinent details; submit in accordance with Section 01 33 00.
Furnish bolt hole locations templates.

DELIVERY, STORAGE, AND HANDLING
Protect against damage and discoloration.
Deliver in manufacturer's original unopened and undamaged packages.
Clearly label packages with manufacturer, brand name, contents, color, stock number, and order number.

EXTRA STOCK
Provide Owner with extra stock of screws and bolts, and tamperproof tools used to change fasteners.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

SOLID PLASTIC TOILET COMPARTMENTS AND SCREENS
Material and Finishes:
Stiles and Doors: 3/4” thick solid color reinforced composite plastic resin with integral color.
Partitions: 1/2” thick solid color reinforced composite plastic resin with integral color.
Urinal Screen Posts: 1¼” square Type 304, 18 gage stainless steel tubing.
Color: Selected by Architect from manufacturer’s standard line.
Fittings: Manufacturer's standard heavy-duty, stainless steel.
Minimum Recycled Content: 25%
Compartments:
Type: Floor supported, overhead braced type with anti-grip rails, flush partitions, doors and pilasters.
Manufacturer and Model: Bobrick 1090 Sierra Series.
Color: SC04 – Forest Green.
Dimensions:
Refer to Drawings.
Maintain 32 inch minimum clear dimension at outswinging doors serving compartments for handicapped users.
Screens:
Include wall supported urinal screens with full-length floor-to-ceiling support posts.
Flush type to match compartments.

HARDWARE
For Each Door:
One pair self lubricating gravity type hinges that will hold door partially open when compartment is unoccupied. Out-swing doors shall close tight.
One slide bar latch with combination stop and latch keeper.
One pull on outswinging doors complying with ADAAG requirements.
Fasteners:
Corrosion-resistant finished to match fittings.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive compartments are straight, plumb, square, secure, accurately sized and

located, and otherwise properly prepared.
Prior to starting work notify general contractor of defects requiring correction.
Do not start work until conditions are satisfactory.
Verification of Conditions:
Verify prior to fabrication.
If field measurements differ slightly from Drawing dimensions, modify work as required for accurate fit. If measurements differ substantially notify Architect prior to fabrication.

COMPARTMENT AND SCREEN INSTALLATION
Install rigid, straight, parallel, plumb, and level in accordance with Manufacturer's directions and approved Shop Drawings.
Install with the following maximum uniform clearances:
- Pilaster and Wall: 3/8 to 1/2 inch.
- Panel and Wall: 3/8 to 1/2 inch.
- Pilaster and Panel: 1/2 inch.
- Pilaster and Door: 3/16 inch.

Align closed doors with adjacent panel tops and bottoms.

HARDWARE INSTALLATION
Follow manufacturer's directions.
Provide no less than 2 wall brackets; locate near panel top and bottom.
Conceal evidence of field drilling, cutting, and fitting.

ADJUSTMENTS
Adjust moving parts to operate satisfactorily at time of final project acceptance and during warrant period.

PRODUCT CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Folding, stacking type manually or electrically operated partitions with ceiling track and hardware.

WORKMEN'S QUALIFICATIONS
Factory-trained and approved Manufacturer.

SUBMITTALS
Submit in accordance with Section 01 33 00.
Shop Drawings:
Show locations, openings sizes, stacking space, construction details, anchorage, clearance, head and jamb details, hardware, facing pattern and color, and installation methods.
Certificates:
Submit for each partition type one copy of the following independent laboratory test results signed by laboratory official:
Sound Transmission Class: ASTM E-90 using 14 X 9 ft. minimum test opening.
Operate partitions 10 times minimum prior to test.
Operation and Maintenance Instructions:
In accordance with Section 01 78 23, submit one copy of adjusting and maintenance instructions to Contractor for inclusion in Owner's maintenance manual.

ALLOWABLE TOLERANCE
Install tracks level within 1/4 inch per 10 ft. non-accumulating.

PRODUCT DELIVERY, STORAGE, AND HANDLING
Protect against damage and discoloration.
Deliver in Manufacturer's original, unopened, undamaged packages with labels legible and intact.
Identify Manufacturer, brand name, model size, finish, and location.

SYSTEM MODIFICATIONS
Verify installation conditions, and include in Bid Proposal sufficient funds to modify building, if necessary, to accommodate partition system design.
No additional payment to Contractor for work of this type will be made.

WARRANTY
Provide manufacturer’s written warranty agreeing to repair or replace any components with manufacturing defects within a warranty period of two years.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

PAIRED PANEL OPERABLE PARTITIONS
General:
Type: Paired flat panels hinged together in pairs, manually operated, top supported with operable floor seals.
Manufacturer and Model: Modernfold “Acoustiseal” #932. Or approved substitute.
Acoustic Performance: STC 50 per ASTM E 90-75, field test, 40 NIC per ASTM E 336-76.
Jamb Closure: Expandable panel with flexible seal.
Panels:
Facing Material: Full height markerboard work surface, white color, enamel on steel, bonded panel face.
Horizontal Trim: Without exposed fasteners.
Vertical Trim: None required.
Construction: Manufacturer's standard 18 gauge steel frame and panels, 3 inches thickness.
Hinges for Closure Panels, Pass Doors, and Pocket Doors: Full leaf butt hinges, attached directly to panel

frame with welded hinge anchor plates. Lifetime warranty on hinges.
Sound Seals:
Vertical: Interlocking tongue and groove sound seals between panels, continuous contact vinyl bulb top seal, manually operated bottom seals with self contained handle.
Horizontal Bottom Seal: Modernfold IA2 bottom seal. Automatic operable seals providing nominal 2-inch operating clearance with operating range of +1/2-inch to –1-1/2-inch. Automatic drop as panels are positioned, without tools or cranks.
Suspension System:
Suspension Track: Minimum 11-gage, 0.12-inch roll-formed steel track, with adjustable steel hanger brackets.
Hanger Rods: Pair 3/8-inch diameter threaded rods.
Exposed Track Soffit: Steel, integral to track, and pre-painted off-white.
Carriers: Manufacturer's standard type all-steel trolley with steel-tired ball bearing wheels per panel sized for loads, and designed for ease of operation, maintenance, and adjustments.
Hardware:
Manufacturer's recommended pulls and latches.
Hardware Colors:
Hinge: Taupe
Trim: Dark Bronze
Other: Manufacturer's standard.

PART 3 - EXECUTION

EXISTING CONDITIONS
Verify that openings to receive partitions are square, plumb, accurately sized and located, and with level floor.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

FIELD MEASUREMENTS
Confirm field dimensions prior to fabricating partitions.
If field measurements differ slightly from Drawing dimensions modify work as required for accurate fit. If measurements differ substantially notify Architect prior to fabrication.

INSTALLATION
Follow Manufacturer's directions,
Level tracks and secure to support headers.
Maintain 3/4 inch clearance between partition bottom and floor.

ADJUSTMENTS
Adjust moving parts to operate satisfactory at time of final project acceptance, and during Warranty Period.

CLEANING AND REPAIRING
Remove debris from project site upon work completion or sooner, if directed.
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Prefabricated items for use in conjunction with toilets and baths.

DELIVERY, STORAGE, AND HANDLING
Protect against damage and discoloration.
Do not remove protective covers until final project clean-up.
Deliver keys to Architect.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

GRAB BARS
Material: Satin finish stainless steel.
Mounting: 1 1/2 inch clearance between bar and wall; mount as shown on Drawings.
Manufacturer: Bobrick B-5806, or accepted substitute.
Provide in toilet compartments intended for handicapped users as shown on the Drawings.

HOOKS
Type: Single robe hook, concealed mounting.
Material: Satin finish stainless steel.
Mounting: Unless otherwise shown on Drawings, mount 6 ft. above floor.
Manufacturer: Bobrick B-6707, or accepted substitute.

BABY CHANGING STATION
Type: Wall mounted, horizontal, fold-down, ADA compliant.
Construction: Blow-molded high density polyethylene with Microban antimicrobial additive, continuous steel hinge, 11 gage steel mounting plates and mounting hardware, pneumatic cylinder controlled opening and closing, with built-in dispenser for sanitary liners.
Accessories: Nylon safety straps and bag hooks, safety messages in six languages and Braille.
Manufacturing and Safety Standards: Conform to ASTM F 2285-04, ANSI S117.1 and ANSI Z535.4.
Manufacturer and Model: Koala Kare Products KB100-00, cream color, with sanitary liner dispenser KB134-PLLD.

HANDICAP LAVATORY INSULATION KIT
Type: Molded closed-cell vinyl with nylon fasteners.
Color: White.
Manufacturer: Truebo Inc. “Handi-Lav-Guard”, McGuire “Pro-Wrap; Brocar, Inc.
Accessories: “Trap Wrap”, or accepted substitute. Provide all necessary for complete installation.
Provide at P-Traps, hot water, and cold water piping under lavatories.

OWNER-PROVIDED PRODUCTS
The owner will provide the following Toilet Accessories to the Contractor for installation:
- Toilet seat cover dispensers: Surface mount.
- Soap dispensers: Surface mount.
- Paper towel dispensers: Surface mount hands-free type.
- Toilet paper dispensers: Surface mount double roll type.
- Trash receptacles: Surface mount.
- Sanitary napkin receptacle: Surface mount.

BLOCKING AND BACKING
Provide all necessary.
Accessories are located on Drawings for Contractor's convenience.
Verify location, type, and quantity with Owner prior to proceeding with work.

FABRICATION
Fabricate units with welded corners, one piece seamless exposed flanges, and without open miters.
Except at coin boxes, key locked units alike.

PART 3 - EXECUTION

EXAMINATION
General:
Do not proceed until surfaces to receive accessories are smooth, clean, dry, square, sound, accurately sized and located, and otherwise properly prepared.
Prior to starting work notify General Contractor of defects requiring correction.
Verification of Conditions:
Verify type of wall construction prior to ordering. Provide all required fasteners, clamps, adapters, etc., necessary for conditions encountered.

INSTALLATION
Install accessories in accordance with manufacturer's directions where indicated, or directed.
Mount plumb, level, true, and secure with non-corrosive Fasteners.

ADJUSTMENTS
Adjust moving parts to operate satisfactorily at time of final project acceptance and during warranty period.

CLEANING AND REPAIRING
Remove debris from project site upon work completion or sooner, if directed.
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Shop fabricated, field installed metal lockers, related components and accessories.

WORK BY OTHERS
Locker padlocks furnished and installed by Owner.

SUBMITTALS
Submit in accordance with Section 01 33 00.
Shop Drawings:
Show dimensions, details of construction, joining of equipment to adjacent construction, color, and other pertinent items.

PRODUCT DELIVERY, STORAGE, AND HANDLING
Deliver in Manufacturer's protective container with legible identifying label intact.
Store flat and above ground.
Protect against moisture, damage, and discoloration.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

EQUIPMENT SIZE
Dimensions of lockers listed are nominal, are for each unit, and are exclusive of legs or base.

STANDARD STEEL LOCKERS
Location:
Men's and Women's Locker Rooms.
Manufacturer:
Spacesaver "Freestyle", Tiffin "Airflow Wardrobe", may be substituted without additional approval.
Type:
Personal Storage Lockers with built-in external access drawers specifically designed for law enforcement personnel.
Size:
Upper Section: 24 inches wide X 24 inches deep X 66 inches high
Lower Drawer Section: 24 inches wide X 36 inches deep (24" deep at ADA units) X 18 inches high
Total height: 84 inches.
Metal Thickness:
Doors: Two layers of 18 gage.
Frame, Tops, Backs, Sides and Shelves: 18 gage.
Bottom: 22 gage.
Bottom Shelf and Base: 22 gage, galvanized.
Finish:
Synthetic baked-on enamel, color as selected by Architect.
Fabrication:
Frame: Welded lap joint with double metal thickness at lock.
Doors: Single door, with louvers, equipped with stainless steel door handle assembly, 180º door swing.
Body: All welded construction.
Bottom Shelf and Base: Galvanized.
Bench Drawer: All welded construction, pull out drawer with flush mounted pull-out handle, 200lbs capacity each drawer slides, boot tray and ventilated body-armor upper rack.
Provide ventilation louvers at drawer face and door face, and internally for air flow thru top of each unit.
Provide mounting holes for units to be ganged together as shown on drawings
Provide leveling feet at bottom of drawer unit.

Provide end panels with no exposed fasteners where side panel is visible.
Bench Seat: 1-1/2 inches thick kiln-dried maple, bull nosed leading edge, (2) coats catalyzed varnish finsh.

HARDWARE
Hinges: Manufacturer's standard full length.
Locking Device: Hasp for pad lock, integral interlock system with lower drawer.
Handles: Stainless steel.
Provide with Manufacturer's standard hardware and accessories, unless modified herein.
Provide ADA accessible hardware on minimum of 5% of lockers.

NUMBER PLATES
Provide non-corrosive number plate on each locker.
Schedule of numbers furnished by Owner.

ACCESSORIES
Provide the following accessories:
- Upper shelf with integral hanger bracket. Upper shelf to stop ½ inch short of back of locker to allow for ventilation.
- Lockable box shelf
- Modular shelf, one per locker
- Document holder
- Double hook at bottom of shelf
- Door mounted hooks, one set

PART 3 - EXECUTION

EXISTING CONDITIONS
Verify that surfaces to receive work of this section are solid, true, square, plumb, accurately sized and located, and otherwise properly prepared.
Prior to starting work notify General Contractor of defects requiring corrections.
Do not start work until conditions are satisfactory.

INSTALLATION
Assemble lockers and benches plumb and true; fasten securely together and to adjacent construction.

ADJUSTMENTS
Adjust moving parts to operate satisfactorily at time of final project acceptance and during warranty period.

PRODUCT CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Collection of small specialty items not found in independent sections.

SUBMITTALS
Submit in accordance with Section 01 33 00.
Shop Drawings:
Show layout, dimensions, details of construction, methods of joining to other work, required clearances, finishes, accessories, and other pertinent items.
Manufacturer's printed data or samples may be substituted, provided required information is included.
Approved samples in like-new condition may be used on contract work.

DELIVERY, STORAGE, AND HANDLING
Protect against damage and discoloration.
Deliver in manufacturer's original, unopened, protective wrapping with original, legible label intact.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

FIRE EXTINGUISHER CABINETS (FEC)
Type: Recessed, anodized aluminum, trimmed.
Door: Clear acrylic plastic convex bubble.
Cylinder Lock: Cylindrical lock.
Brackets: Provide with manufacturer's standard brackets to support extinguisher.
Painting: Paint cabinet interior with black enamel.
Manufacturer and Type: J. L. Industries Clear VU accepted substitute.

FIRE EXTINGUISHERS (FE)
Type: OSHA Approved, red, multi-purpose dry chemical.
Rating: UL rated 3A-40B:C, 5 lb capacity.
Fill and service extinguishers prior to substantial completion of project.
Install in fire extinguisher cabinets where cabinets are shown on Drawings.

COAT RODS
Material: Polished chrome, heavy wall steel tubing.
Size: 1 5/16 inch outside diameter.
Manufacturer: KV #770, or accepted substitute.
Mounting: Mount 5 feet above finish floor and equip with flanges specified below.
Provide where indicated.

COAT ROD FLANGES
Type: Fixed, polished chrome.
Size: For use with 1 5/16 inch diameter tubing specified above.
Manufacturer: KV #764 or accepted substitute.

CORNER GUARDS
Size: 1½" X 1½" wings or 1½" X wall width, 48 inches length.
Material: 16 gage, type 304 stainless steel.
Mounting: Cement-on type.
Manufacturer: IPC Door and Wall "181124C-304" Protection, Wilkinson, or accepted substitute.

JANITOR'S MOP HANDLE HOLDERS
Material: Type 30 Stainless steel.
Size: 24 inches long with 3 holders.
Manufacturer: Bobrick B-223 X 24, or accepted substitute.
Quantity Required: 1

BICYCLE RACK
Type: Staple or Hoop style.
Material: 2" outside diameter galvanized steel pipe.
Manufacturer and Model: Radius Pipe Bending Hoop Style, Creative Pipe, Inc. Inverted U, Huntco HP Series, or accepted substitute.

SHOP PAINTING
Factory-apply one coat rust-preventative metal primer to ferrous metal surfaces after fabrication, but before installation, unless hereunder specified otherwise.
Substitute complete factory-finish where so specified herein.

BLOCKING AND BACKING
Provide where necessary.
Specialties are shown on Drawings for Contractor's convenience; verify location, type and extent of Work before installing blocking and backing.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive specialties are properly prepared, sized, and located.
Prior to starting work notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

INSTALLATION
General:
Follow manufacturer's instructions and approved shop drawings.
Secure plumb, level, square, straight, and true as applicable.
Fire Extinguishers:
Mount in cabinet as approved by building official.
Bike Rack:
Set level and plumb.
Fasten mounting flange to concrete slab with expansion bolts as recommended by rack manufacturer.

ADJUSTMENTS
Adjust moving parts to operate satisfactorily at time of final project acceptance and during warranty period.

CLEANING AND REPAIRING
Remove debris from project site upon work completion or sooner, if directed.
Including work of other sections, clean, repair and touch-up, or replace when directed products which have been soiled, discolored, or damaged by work of this section.
Leave installation clean and defect-free.

PROTECTION
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Furnishing and installing window blinds and hardware.

SUBMITTALS
Submit in accordance with Section 01 33 00.
Product Data:
For each product specified.
Shop Drawings:
Show mounting details with appropriate fasteners for specific project substrates.

PRODUCT DELIVERY, STORAGE, AND HANDLING
Deliver in Manufacturer's protective container with legible identifying labels intact.
Store flat and above ground.
Protect against moisture, damage, and discoloration.

COORDINATION
Coordinate with other Trades affecting or affected by Work of this Section.

PART 2 - PRODUCTS

WINDOW BLINDS
Type: Horizontal, spring tempered, bounce back, solid aluminum slats window covering with valance free exposed headrail.
Manufacturer: SWF Contract, Hunter-Douglas.
Model: SWF Contract, Bali Classics; Hunter-Douglas, CE81.
Slats: Nominally 1" wide, .008" thickness with minimum 90% recycled content.
Mounting and Controls: Inside frame where possible. Tilt left/Lift right. Provide longer extensions at all glazing 7'-0" AFF, such as transoms above doors, verify in field.
Included Options: Heavy duty cord, cordlock, cradles.
Color: Selected by Architect from manufacturer's standard.
Extent of Work: Provide at all Window Types A, B, and D.

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces to receive work of this section are solid, true, square, plumb, accurately sized and located, and otherwise properly prepared.
Prior to starting work notify General Contractor of defects requiring corrections.
Do not start work until conditions are satisfactory.

ADJUSTMENTS
Adjust moving parts to operate satisfactorily at time of final project acceptance and during warranty period.

PRODUCT CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Protect other Work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Pipe, fittings, sleeves, escutcheons, seals, and connections for sprinkler systems.

RELATED REQUIREMENTS

Section 07 8400 - Firestopping.

Section 09 9123 - Interior Painting: Preparation and painting of interior fire protection piping systems.

REFERENCE STANDARDS

ASME A112.18.1 - Plumbing Supply Fittings; 2012.

ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Welding, Brazing, and Fusing Qualifications; 2015.

ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250; 2010.

ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2016.

ASME B16.4 - Gray Iron Threaded Fittings: Classes 125 and 250; 2011.

ASME B16.5 - Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard; 2013.

ASME B16.9 - Factory-Made Wrought Buttwelding Fittings; 2012.

ASME B16.11 - Forged Fittings, Socket-welding and Threaded; 2011.

ASME B16.25 - Buttwelding Ends; 2012.

ASME B36.10M - Welded and Seamless Wrought Steel Pipe; 2004.

ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999 (Reapproved 2014).

ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

ASTM A135/A135M - Standard Specification for Electric-Resistance-Welded Steel Pipe; 2009 (Reapproved 2014).

ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2016.

ASTM A536 - Standard Specification for Ductile Iron Castings; 1984 (Reapproved 2014).

ASTM A795/A795M - Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use; 2013.

AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; 2010.

AWWA C606 - Grooved and Shouldered Joints; 2015.

NFPA 13 - Standard for the Installation of Sprinkler Systems; 2016.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide manufacturers catalogue information. Indicate valve data and ratings.

PART 2 PRODUCTS

FIRE PROTECTION SYSTEMS

Sprinkler Systems: Conform to NFPA 13.

Welding Materials and Procedures: Conform to ASME BPVC-IX.

BURIED PIPING

Steel Pipe: ASTM A53/A53M Schedule 40, ASTM A135/A135M Schedule 10, ASTM A795/A795M Standard Weight, or ASME B36.10M Schedule 40, black, with AWWA C105/A21.5 polyethylene jacket, or double layer, half-lapped polyethylene tape.

Steel Fittings: ASME B16.9, wrought steel, buttwelded, ASME B16.25, buttweld ends, ASTM A234/A234M, wrought carbon steel or alloy steel, ASME B16.5, steel flanges and fittings, or ASME B16.11, forged steel socket welded and threaded; with double layer, half-lapped polyethylene tape.

ABOVE GROUND PIPING

Steel Pipe: _____, black.

Steel Fittings: _____.

Cast Iron Fittings: ASME B16.1, flanges and flanged fittings and ASME B16.4, threaded fittings.

Malleable Iron Fittings: ASME B16.3, threaded fittings and ASTM A47/A47M.

Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.

Mechanical Formed Fittings: Carbon steel housing with integral pipe stop and O-ring pocked and O-ring, uniformly compressed into permanent mechanical engagement onto pipe.

PIPE SLEEVES

Vertical Piping:

Sleeve Length: 1 inch (25 mm) above finished floor.

Provide sealant for watertight joint.

Blocked Out Floor Openings: Provide 1-1/2 inch (40 mm) angle set in silicon adhesive around opening.

Drilled Penetrations: Provide 1-1/2 inch (40 mm) angle ring or square set in silicone adhesive around penetration.

MANUFACTURED SLEEVE-SEAL SYSTEMS

Manufacturers:

Advance Products & Systems, Inc; _____: www.apsonline.com.

The Metraflex Company; _____: www.metraflex.com/#sle.

Modular/Mechanical Seal:

Synthetic rubber interlocking links continuously fill annular space between pipe and wall/casing opening.

Provide watertight seal between pipe and wall/casing opening.

Elastomer element size and material in accordance with manufacturer's recommendations.

Glass reinforced plastic pressure end plates.

ESCUTCHEONS

Manufacturers:

Fire Protection Products, Inc; _____: www.fppi.com.com.

Tyco Fire Protection Products; _____: www.tyco-fire.com.

Viking Group Inc; _____: www.vikinggroupinc.com.

Material:

Metals and Finish: Comply with ASME A112.18.1.

Construction:

One-piece for mounting on chrome-plated tubing, pipe, or _____ and one-piece, split-pattern, or _____ type elsewhere.

Internal spring tension devices or setscrews to maintain a fixed position against a surface.

PIPE HANGERS AND SUPPORTS

Hangers for Pipe Sizes 1/2 to 1-1/2 inch (15 to 40 mm): Malleable iron, adjustable swivel, split ring.

Hangers for Pipe Sizes 2 inches (50 mm) and Over: Carbon steel, adjustable, clevis.

Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

Wall Support for Pipe Sizes to 3 inches (80 mm): Cast iron hook.

Wall Support for Pipe Sizes 4 inches (100 mm) and Over: Welded steel bracket and wrought steel clamp.

Vertical Support: Steel riser clamp.

MECHANICAL COUPLINGS

Manufacturers:

- Tyco Fire Protection Products; Grinnell G-Fire Figure 705 Grooved Flexible Couplings: www.tyco-fire.com.
- Victaulic Company; FireLock Style 009H: www.victaulic.com.

Rigid Mechanical Couplings for Grooved Joints:

- Dimensions and Testing: Comply with AWWA C606.
- Minimum Working Pressure: 300 psig (2065 kPa).
- Housing Material: Fabricate of ductile iron conforming to ASTM A536.
- Housing Coating: Factory applied orange enamel or _____.
- Gasket Material: EPDM suitable for operating temperature range from minus 30 degrees F (minus 34 degrees C) to 230 degrees F (110 degrees C).
- Bolts and Nuts: Hot dipped galvanized or zinc electroplated steel.

PART 3 EXECUTION

INSTALLATION

Install sprinkler system and service main piping, hangers, and supports in accordance with NFPA 13.

Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.

Install piping to conserve building space, to not interfere with use of space and other work.

Group piping whenever practical at common elevations.

Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

Pipe Hangers and Supports:

- Install hangers to provide minimum 1/2 inch (15 mm) space between finished covering and adjacent work.
- Place hangers within 12 inches (300 mm) of each horizontal elbow.
- Use hangers with 1-1/2 inch (40 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
- Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
- Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.

Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

Provide sleeves when penetrating footings, floors, walls, partitions, and _____. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.

103 Manufactured Sleeve-Seal Systems:

104 Install manufactured sleeve-seal systems in sleeves located in grade slabs and exterior concrete walls at piping entrances into building.

105 Provide sealing elements of the size, quantity, and type required for the piping and sleeve inner diameter or penetration diameter.

106 Locate piping in center of sleeve or penetration.

107 Install field assembled sleeve-seal system components in annular space between sleeve and piping.

108 Tighten bolting for a water-tight seal.

109 Install in accordance with manufacturer's recommendations.

110 Escutcheons:

111 Install and firmly attach escutcheons at piping penetrations into finished spaces.

112 Provide escutcheons on both sides of partitions separating finished areas through which piping passes.

113 Use chrome plated escutcheons in occupied spaces and to conceal openings in construction.

114 When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

115 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Two-piece ball valves with indicators.

Bronze butterfly valves with indicators.

Iron butterfly valves with indicators.

Check valves.

Bronze OS&Y gate valves.

Iron OS&Y gate valves.

NRS gate valves.

Indicator posts.

Trim and drain valves.

RELATED REQUIREMENTS

Section 21 0500 - Common Work Results for Fire Suppression: Pipe and fittings.

Section 21 0553 - Identification for Fire Suppression Piping and Equipment.

Section 21 1300 - Fire-Suppression Sprinkler Systems.

REFERENCE STANDARDS

FM (AG) - FM Approval Guide; current edition.

NFPA 13 - Standard for the Installation of Sprinkler Systems; 2016.

NFPA 13R - Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies; 2016.

UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.

QUALITY ASSURANCE

Manufacturer Qualifications:

- Obtain valves for each valve type from single manufacturer.
- Company must specialize in manufacturing products specified in this section, with not less than three years of documented experience.

Where listed products are specified, provide products listed, classified, and labeled by FM (AG), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for the purpose indicated.

PART 2 PRODUCTS

GENERAL REQUIREMENTS

Comply with NFPA 13, NFPA 13R, and ____ for valves.

Valve Pressure Ratings: Not less than minimum pressure rating indicated or higher as required.

Valve Sizes: Same as upstream piping unless otherwise indicated.

TWO-PIECE BALL VALVES WITH INDICATORS

Description:

- Minimum Pressure Rating: 175 psig (1200 kPa).
- Body Design: Two piece.
- Body Material: Forged brass or bronze.
- Port Size: Full or standard.

Seat: PTFE.
Stem: Bronze or stainless steel.
Ball: Chrome-plated brass.
Actuator: Worm gear or traveling nut.

BRONZE BUTTERFLY VALVES WITH INDICATORS

Minimum Pressure Rating: 175 psig (1200 kPa).
Body Material: Bronze.
Seat: EPDM.
Stem: Bronze or stainless steel.
Disc: Bronze with EPDM coating.
Actuator: Worm gear or traveling nut.
Supervisory Switch: Internal or external.

IRON BUTTERFLY VALVES WITH INDICATORS

Minimum Pressure Rating: 175 psig (1200 kPa).
Body Material: Cast or ductile iron with nylon, EPDM, epoxy, polyamide, or _____ coating.
Seat: EPDM.
Stem: Stainless steel.
Disc: Ductile iron, nickel plated.
Actuator: Worm gear or traveling nut.
Supervisory Switch: Internal or external.
Body Design: Grooved-end connections.

CHECK VALVES

Minimum Pressure Rating: 175 psig (1200 kPa).
Type: Center guided check valve.
Body Material: Cast iron, ductile iron.
Center guided check with elastomeric seal.
Hinge Spring: Stainless steel.
End Connections: Flanged, grooved, or threaded.

BRONZE OS&Y GATE VALVES

Minimum Pressure Rating: 175 psig (1200 kPa).
Body and Bonnet Material: Bronze or brass.
Wedge: One-piece bronze or brass.
Wedge Seat: Bronze.
Stem: Bronze or brass.
Packing: Non-asbestos PTFE.
Supervisory Switch: External.
End Connections: Threaded.

IRON OS&Y GATE VALVES

Minimum Pressure Rating: 175 psig (1200 kPa).
Body and Bonnet Material: Cast or ductile iron.
Wedge: Cast or ductile iron, or bronze with elastomeric coating.
Wedge Seat: Cast or ductile iron, or bronze with elastomeric coating.

Stem: Brass or bronze.
Packing: Non-asbestos PTFE.
Supervisory Switch: External.
End Connections: Flanged.

NRS GATE VALVES

Minimum Pressure Rating: 175 psig (1200 kPa).
Body and Bonnet Material: Cast or ductile iron.
Wedge: Cast or ductile iron with elastomeric coating.
Stem: Brass or bronze.
Packing: Non-asbestos PTFE.
Supervisory Switch: External.
End Connections: Flanged.

INDICATOR POSTS

Type: Underground.
Base Barrel Material: Cast or ductile iron.
Cap: Cast or ductile iron.
Operation: Wrench.

TRIM AND DRAIN VALVES

Ball Valves:
    Description:
        Pressure Rating: 175 psig (1200 kPa).
        Body Design: Two piece.
        Body Material: Forged brass or bronze.
        Port Size: Full or standard.
        Seat: PTFE.
        Stem: Bronze or stainless steel.
        Ball: Chrome-plated brass.
        Actuator: Hand-lever.

PART 3 EXECUTION

EXAMINATION

Confirm valve interior to be free of foreign matter and corrosion.
Remove packing materials.
Examine guides and seats by operating valves from the fully open position to the fully closed position.
Examine valve threads and mating pipe for form and cleanliness.

INSTALLATION

Comply with specific valve installation requirements and application in the following Sections:
Install listed fire protection shutoff valves supervised-open, located to control sources of water supply except from fire department connections.
Valves in horizontal piping installed with stem at or above the pipe center.
Position valves to allow full stem movement.

121 Install valve tags. Comply with Section 21 0553 requirements for valve tags, schedules, and signs on surfaces concealing valves; and the appropriate NFPA standard applying to the piping system in which valves are installed.

122 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Nameplates.

Tags.

Stencils.

Pipe markers.

Ceiling tacks.

RELATED REQUIREMENTS

Section 09 9123 - Interior Painting: Stencil paint.

REFERENCE STANDARDS

ASME A13.1 - Scheme for the Identification of Piping Systems; The American Society of Mechanical Engineers; 2007 (ANSI/ASME A13.1).

ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2013.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide manufacturers catalog literature for each product required.

Manufacturer's Installation Instructions: Indicate special procedures, and installation instructions.

PART 2 PRODUCTS

IDENTIFICATION APPLICATIONS

Automatic Controls: Tags.

Control Panels: Nameplates.

Instrumentation: Tags.

Major Control Components: Nameplates.

Piping: Tags.

Pumps: Nameplates.

Relays: Tags.

Small-sized Equipment: Tags.

NAMEPLATES

Description: Laminated three-layer plastic with engraved letters.

TAGS

Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch (40 mm) diameter.

Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch (40 mm) diameter with smooth edges.

STENCILS

Stencils: With clean cut symbols and letters of following size:

- 3/4 to 1-1/4 inch (20-30 mm) Outside Diameter of Insulation or Pipe: 8 inch (200 mm) long color field, 1/2 inch (15 mm) high letters.
- 1-1/2 to 2 inch (40-50 mm) Outside Diameter of Insulation or Pipe: 8 inch (200 mm) long color field, 3/4 inch (20 mm) high letters.
- 2-1/2 to 6 inch (65-150 mm) Outside Diameter of Insulation or Pipe: 12 inch (300 mm) long color field, 1-1/4 inch (30 mm) high letters.
- 8 to 10 inch (200-250 mm) Outside Diameter of Insulation or Pipe: 24 inch (600 mm) long color field, 2-1/2 inch (65 mm) high letters.

PIPE MARKERS

Color: Conform to ASME A13.1.

Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches (150 mm) wide by 4 mil (0.10 mm) thick, manufactured for direct burial service.

CEILING TACKS

Description: Steel with 3/4 inch (20 mm) diameter color coded head.

PART 3 EXECUTION

INSTALLATION

Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

Install tags with corrosion resistant chain.

Apply stencil painting in accordance with Section 09 9123.

Install plastic pipe markers in accordance with manufacturer's instructions.

Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

Install underground plastic pipe markers 6 to 8 inches (150 to 200 mm) below finished grade, directly above buried pipe.

Use tags on piping 3/4 inch (20 mm) diameter and smaller.

- Identify service, flow direction, and pressure.
- Install in clear view and align with axis of piping.
- Locate identification not to exceed 20 feet (6 m) on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

Locate ceiling tacks to locate valves above T-bar type panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT
22 0513

PART 1 GENERAL

SECTION INCLUDES

General construction and requirements.

Applications.

Single phase electric motors.

RELATED REQUIREMENTS

Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

Section 26 2913 - Enclosed Controllers.

REFERENCE STANDARDS

NEMA MG 1 - Motors and Generators; 2016.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

SUBMITTALS

See Section 01 3000 - Administrative Requirements for submittal procedures.

Product Data: Provide wiring diagrams with electrical characteristics and connection requirements.

PART 2 PRODUCTS

GENERAL CONSTRUCTION AND REQUIREMENTS

Construction:

- Open drip-proof type except where specifically noted otherwise.
- Design for continuous operation in 104 degrees F (40 degrees C) environment.
- Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.

Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.

Wiring Terminations:

- Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.
- For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

APPLICATIONS

Exception: Motors less than 250 watts, for intermittent service may be the equipment manufacturer's standard and need not conform to these specifications.

PART 3 EXECUTION

INSTALLATION

Install in accordance with manufacturer's instructions.

Install securely on firm foundation. Mount ball bearing motors with shaft in any position.

Check line voltage and phase and ensure agreement with nameplate.

END OF SECTION

EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING
22 0516

PART 1 GENERAL

SECTION INCLUDES

Pipe loops, offsets, and swing joints.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data:

Flexible Pipe Connectors: Indicate maximum temperature and pressure rating, face-to-face length, live length, hose wall thickness, hose convolutions per foot (meter) and per assembly, fundamental frequency of assembly, braid structure, and total number of wires in braid.

Expansion Joints: Indicate maximum temperature and pressure rating, and maximum expansion compensation.

PART 2 PRODUCTS

EXPANSION LOOPS - HOSE AND BRAID

Manufacturers:

The Metraflex Company; Metraloop: www.metraflex.com/#sle.

Substitutions: See Section 01 6000 - Product Requirements.

Provide flexible loops with two flexible sections of hose and braid, two 90 degree elbows, and 180 degree return with support bracket and air release or drain plug.

Provide flexible loops capable of movement in the x, y, and z planes. Flexible loops to impart no thrust loads to the building structure.

Flexible Connectors: Flanged, braided type with wetted components of stainless steel, sized to match piping.

Maximum Allowable Working Pressure: 150 psig (1030 kPa) at 120 degrees F (49 degrees C).

Accommodate the Following:

Axial Deflection in Compression and Expansion: _____ inch (_____ mm).

Lateral Movement: _____ inch (_____ mm).

Angular Rotation: 15 degrees.

Force developed by 1.5 times specified maximum allowable operating pressure.

End Connections: Same as specified for pipe jointing.

Provide necessary accessories including, but not limited to, swivel joints.

PART 3 EXECUTION

INSTALLATION

Install in accordance with manufacturer's instructions.

Provide support and equipment required to control expansion and contraction of piping. Provide loops, pipe offsets, and swing joints, or expansion joints where required.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Pressure gages and pressure gage taps.

Thermometers and thermometer wells.

Static pressure gages.

RELATED REQUIREMENTS

Section 23 0923 - Direct-Digital Control System for HVAC.

Section 23 2113 - Hydronic Piping.

REFERENCE STANDARDS

ASME B40.100 - Pressure Gauges and Gauge Attachments; 2013.

ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2014.

ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2014.

UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Current Edition, Including All Revisions.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.

Project Record Documents: Record actual locations of components and instrumentation.

Operation and Maintenance Data: _____.

Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

See Section 01 6000 - Product Requirements. for additional provisions.

FIELD CONDITIONS

Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports and test plugs.

PART 2 PRODUCTS

PRESSURE GAGES

Manufacturers:

Dwyer Instruments, Inc: www.dwyer-inst.com.

Moeller Instrument Company, Inc: www.moellerinstrument.com.

Omega Engineering, Inc: www.omega.com.

Pressure Gages: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.

Case: Steel with brass bourdon tube.

Size: 4-1/2 inch (115 mm) diameter.

Mid-Scale Accuracy: One percent.

Scale: Psi and kPa.

PRESSURE GAGE TAPPINGS

Gage Cock: Tee or lever handle, brass for maximum 150 psi (1034 kPa).

STEM TYPE THERMOMETERS

Manufacturers:

Dwyer Instruments, Inc: www.dwyer-inst.com.

Omega Engineering, Inc: www.omega.com.

Weksler Glass Thermometer Corp: www.wekslerglass.com.

Substitutions: See Section 01 6000 - Product Requirements.

Thermometers - Fixed Mounting: Red- or blue-appearing non-toxic liquid in glass; ASTM E1; lens front tube, cast aluminum case with enamel finish.

- Size: 9 inch (225 mm) scale.
- Window: Clear Lexan.
- Accuracy: 2 percent, per ASTM E77.
- Calibration: Degrees F.

THERMOMETER SUPPORTS

Socket: Brass separable sockets for thermometer stems with or without extensions as required, and with cap and chain.

TEST PLUGS

Test Plug: 1/4 inch (6 mm) or 1/2 inch (13 mm) brass fitting and cap for receiving 1/8 inch (3 mm) outside diameter pressure or temperature probe with neoprene core for temperatures up to 200 degrees F (93 degrees C).

STATIC PRESSURE GAGES

Manufacturers:

- Dwyer Instruments, Inc: www.dwyer-inst.com.
- Omega Engineering, Inc: www.omega.com.
- Weksler Glass Thermometer Corp: www.wekslerglass.com.

3-1/2 inch (90 mm) diameter dial in metal case, diaphragm actuated, black figures on white background, front recalibration adjustment, 2 percent of full scale accuracy.

Inclined manometer, red liquid on white background with black figures, front recalibration adjustment, 3 percent of full scale accuracy.

Accessories: Static pressure tips with compression fittings for bulkhead mounting, 1/4 inch (6 mm) diameter tubing.

PART 3 EXECUTION

INSTALLATION

Install in accordance with manufacturer's instructions.

Provide one pressure gage per pump, installing taps before strainers and on suction and discharge of pump. Pipe to gage.

Install pressure gages with pulsation dampers. Provide gage cock to isolate each gage. Extend nipples and siphons to allow clearance from insulation.

Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inch (60 mm) for installation of thermometer sockets. Ensure sockets allow clearance from insulation.

Provide instruments with scale ranges selected according to service with largest appropriate scale.

Install gages and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.

Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate to zero.

Locate test plugs adjacent thermometers and thermometer sockets.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Applications.

General requirements.

Ball valves.

Check valves.

Globe valves.

RELATED REQUIREMENTS

Section 07 8400 - Firestopping.

Section 22 0548 - Vibration and Seismic Controls for Plumbing Piping and Equipment.

Section 22 0553 - Identification for Plumbing Piping and Equipment.

Section 22 0716 - Plumbing Equipment Insulation.

Section 22 0719 - Plumbing Piping Insulation.

Section 22 1005 - Plumbing Piping.

ABBREVIATIONS AND ACRONYMS

CWP: Cold working pressure.

EPDM: Ethylene propylene copolymer rubber.

NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

NRS: Non-rising stem.

RS: Rising stem.

SWP: Steam working pressure.

TFE: Tetrafluoroethylene.

REFERENCE STANDARDS

API STD 594 - Check Valves: Flanged, Lug Wafer, and Butt-Welding; 2007 (Errata 2010).

ASME B1.20.1 - Pipe Threads, General Purpose (Inch); 2013.

ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.

ASME B31.9 - Building Services Piping; 2014.

ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings; 2015.

MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves; 2013.

MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010.

NSF 61 - Drinking Water System Components - Health Effects; 2016.

NSF 372 - Drinking Water System Components - Lead Content; 2016.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.

Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.

QUALITY ASSURANCE

Manufacturer:

Obtain valves for each valve type from single manufacturer.

DELIVERY, STORAGE, AND HANDLING

Prepare valves for shipping as follows:
- Minimize exposure of operable surfaces by setting plug and ball valves to open position.
- Protect valve parts exposed to piped medium against rust and corrosion.
- Protect valve piping connections such as grooves, weld ends, threads, and flange faces.
- Adjust globe, gate, and angle valves to the closed position to avoid clattering.
- Secure check valves in either the closed position or open position.
- Adjust butterfly valves to closed or partially closed position.

Use the following precautions during storage:
- Maintain valve end protection and protect flanges and specialties from dirt.
  - Provide temporary inlet and outlet caps.
  - Maintain caps in place until installation.
- Store valves in shipping containers and maintain in place until installation.
  - Store valves indoors in dry environment.

PART 2 PRODUCTS

APPLICATIONS

Provide the following valves for the applications if not indicated on Drawings:
- Shutoff: Ball, butterfly, _____.
- Throttling: Provide globe.
- Swing Check (Pump Outlet):
  - 2 NPS (50 DN) and Smaller: Bronze swing check valves with bronze disc.

GENERAL REQUIREMENTS

Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.

Valve Sizes: Match upstream piping unless otherwise indicated.

Valve Actuator Types:
- Hand Lever: Quarter-turn valves 6 NPS (150 DN) and smaller except plug valves.

Valves in Insulated Piping: With 2 NPS (50 DN) stem extensions and the following features:
- Ball Valves: Extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
- Memory Stops: Fully adjustable after insulation is installed.

Valve-End Connections:
- Threaded End Valves: ASME B1.20.1.
- Solder Joint Connections: ASME B16.18.

General ASME Compliance:
- Building Services Piping Valves: ASME B31.9.

Valve Materials for Potable Water: NSF 61 and NSF 372.

Source Limitations: Obtain each valve type from a single manufacturer.

BRASS BALL VALVES

One-Piece, Reduced-Port with Brass Trim:
- Comply with MSS SP-110.
- Body: Forged brass.
- Ends: Threaded.
- Seats: PTFE or ____.
- Stem: Brass.
- Ball: Chrome-plated brass.

Two Piece, Full Port with Brass Trim:
- Comply with MSS SP-110.

SWP Rating: 150 psig (1035 kPa).
CWP Rating: 600 psig (4140 kPa).
Body: Forged brass.
Ends: Threaded.
Seats: PTFE.

BRONZE SWING CHECK VALVES

Class 125: CWP Rating: 200 psig (1380 kPa).
Comply with MSS SP-80, Type 3.
Design: Horizontal flow.
Body: Bronze, ASTM B62.
Ends: Threaded as indicated.
Disc: Bronze.

BRONZE GLOBE VALVES

Class 125: CWP Rating: 200 psig: (1380 kPa).
Comply with MSS SP-80, Type 1.
Body: ASTM B62, bronze with integral seat and screw-in bonnet.
Ends: Threaded joint.
Stem: Bronze.
Disc: PTFE.
Packing: Asbestos free.
Handwheel: Malleable Iron.

PART 3 EXECUTION

EXAMINATION

Discard all packing materials and verify that valve interior, including threads and flanges are completely clean without signs of damage or degradation that could result in leakage.

Verify valve parts to be fully operational in all positions from closed to fully open.

Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.

Should valve is determined to be defective, replace with new valve.

INSTALLATION

Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.

Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.

Install check valves where necessary to maintain direction of flow as follows:
Swing Check: Install horizontal maintaining hinge pin level.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Equipment support bases.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data:

Provide manufacturer's product literature documenting compliance with PART 2 PRODUCTS.

Include seismic rating documentation for each isolator and restraint component accounting for horizontal, vertical, and combined loads.

QUALITY ASSURANCE

Perform design and installation in accordance with applicable codes.

Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and registered and licensed in the State in which the Project is located.

Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

PART 2 PRODUCTS

MANUFACTURERS

Kinetics Noise Control, Inc; _____: www.kineticsnoise.com.

Mason Industries; _____: www.mason-ind.com.

Vibration Eliminator Company, Inc; _____: www.veco-nyc.com.

PERFORMANCE REQUIREMENTS

General:

All vibration isolators, base frames and inertia bases to conform to all uniform deflection and stability requirements under all operating loads.

EQUIPMENT SUPPORT BASES

Structural Bases:

Construction: Engineered, structural steel frames with welded brackets for side mounting of the isolators.

Frames: Square, rectangular or T-shaped.

Design: Sufficiently rigid to prevent misalignment or undue stress on machine, and to transmit design loads to isolators and snubbers.

PART 3 EXECUTION

INSTALLATION - GENERAL

Install in accordance with manufacturer's instructions.

Bases:

Set steel bases for one inch (25 mm) clearance between housekeeping pad and base.

Adjust equipment level.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Nameplates.

Tags.

Pipe markers.

Ceiling tacks.

RELATED REQUIREMENTS

Section 09 9123 - Interior Painting: Identification painting.

REFERENCE STANDARDS

ASME A13.1 - Scheme for the Identification of Piping Systems; 2015.

ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2016.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.

Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

Product Data: Provide manufacturers catalog literature for each product required.

Manufacturer's Installation Instructions: Indicate special procedures, and installation.

Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS

IDENTIFICATION APPLICATIONS

Piping: Tags.

Pumps: Nameplates.

Small-sized Equipment: Tags.

Valves: Tags and ceiling tacks where located above lay-in ceiling.

NAMEPLATES

Manufacturers:
- Brimar Industries, Inc.: www.pipemarker.com.
- Kolbi Pipe Marker Co.: www.kolbipipemarkers.com.
- Seton Identification Products: www.seton.com.

Description: Laminated three-layer plastic with engraved letters.
- Letter Color: White.
- Letter Height: 1/4 inch (6 mm).
- Background Color: Black.
- Plastic: Conform to ASTM D709.

TAGS

Manufacturers:
- Advanced Graphic Engraving: www.advancedgraphicengraving.com.
- Brady Corporation: www.bradycorp.com.
- Brimar Industries, Inc.: www.pipemarker.com.

Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch (40 mm) diameter.

Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

PIPE MARKERS

Manufacturers:
- Brady Corporation: www.bradycorp.com.
- Brimar Industries, Inc: www.pipemarker.com.
- Kolbi Pipe Marker Co: www.kolbipipemarkers.com.
- MIFAB, Inc: www.mifab.com.

Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

Color code as follows:
- Potable, Cooling, Boiler, Feed, Other Water: Green with white letters.
- Fire Quenching Fluids: Red with white letters.

CEILING TACKS

Description: Steel with 3/4 inch (20 mm) diameter color coded head.

Color code as follows:
- Plumbing Valves: Green.

PART 3 EXECUTION

PREPARATION

Degrease and clean surfaces to receive adhesive for identification materials.

Prepare surfaces in accordance with Section 09 9123 for stencil painting.

INSTALLATION

Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

Install tags with corrosion resistant chain.

Install plastic pipe markers in accordance with manufacturer's instructions.

Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

Use tags on piping 3/4 inch (20 mm) diameter and smaller.
- Identify service, flow direction, and pressure.
- Install in clear view and align with axis of piping.
- Locate identification not to exceed 20 feet (6 m) on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

Install ductwork with plastic nameplates. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Piping insulation.

Jackets and accessories.

RELATED REQUIREMENTS

Section 07 8400 - Firestopping.

Section 09 9113 - Exterior Painting: Painting insulation jacket.

Section 09 9123 - Interior Painting: Painting insulation jacket.

Section 22 1005 - Plumbing Piping: Placement of hangers and hanger inserts.

Section 23 2113 - Hydronic Piping: Placement of hangers and hanger inserts.

REFERENCE STANDARDS

ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2013.

ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2013).

ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2013).

ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2015.

ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2013).

ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.

UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

QUALITY ASSURANCE

Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

DELIVERY, STORAGE, AND HANDLING

Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

FIELD CONDITIONS

Maintain ambient conditions required by manufacturers of each product.

Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

REGULATORY REQUIREMENTS

Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

GLASS FIBER

Manufacturers:
- CertainTeed Corporation: www.certainteed.com.
- Johns Manville Corporation: www.jm.com.
- Knauf Insulation: www.knaufusa.com.
- Substitutions: See Section 01 6000 - Product Requirements.

Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
- 'K' ('Ksi') Value: ASTM C177, 0.24 at 75 degrees F (0.035 at 24 degrees C).
- Maximum Service Temperature: 850 degrees F (454 degrees C).
- Maximum Moisture Absorption: 0.2 percent by volume.

Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches (0.029 ng/Pa s m).

Tie Wire: 0.048 inch (1.22 mm) stainless steel with twisted ends on maximum 12 inch (300 mm) centers.

Vapor Barrier Lap Adhesive: Compatible with insulation.

Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

Fibrous Glass Fabric:
- Cloth: Untreated; 9 oz/sq yd (305 g/sq m) weight.
- Blanket: 1.0 lb/cu ft (16 kg/cu m) density.
- Weave: 5 by 5.

Indoor Vapor Barrier Finish:
- Cloth: Untreated; 9 oz/sq yd (305 g/sq m) weight.
- Vinyl emulsion type acrylic, compatible with insulation, black color.

Insulating Cement: ASTM C449.

JACKETS

PVC Plastic.
- Manufacturers:
  - Johns Manville Corporation; _____: www.jm.com.
  - Substitutions: See Section 01 6000 - Product Requirements.
- Jacket: One piece molded type fitting covers and sheet material, off-white color.
  - Minimum Service Temperature: 0 degrees F (Minus 18 degrees C).
  - Maximum Service Temperature: 150 degrees F (66 degrees C).
  - Moisture Vapor Permeability: 0.002 perm inch (0.0029 ng/Pa s m), maximum, when tested in accordance with ASTM E96/E96M.
  - Thickness: 10 mil (0.25 mm).
  - Connections: Brush on welding adhesive.

PART 3 EXECUTION

EXAMINATION

Verify that piping has been tested before applying insulation materials.

Verify that surfaces are clean and dry, with foreign material removed.

INSTALLATION

Install in accordance with manufacturer's instructions.

Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.

Exposed Piping: Locate insulation and cover seams in least visible locations.

Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.

Glass fiber insulated pipes conveying fluids below ambient temperature:

Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.

Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

For hot piping conveying fluids 140 degrees F (60 degrees C) or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

Glass fiber insulated pipes conveying fluids above ambient temperature:

Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.

Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

Inserts and Shields:

Application: Piping 1-1/2 inches (40 mm) diameter or larger.

Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.

Insert Location: Between support shield and piping and under the finish jacket.

Insert Configuration: Minimum 6 inches (150 mm) long, of same thickness and contour as adjoining insulation; may be factory fabricated.

Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07 8400.

Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet (3 meters) above finished floor): Finish with PVC jacket and fitting covers.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Pipe, pipe fittings, specialties, and connections for piping systems.
- Sanitary sewer.
- Domestic water.
- Storm water.
- Flanges, unions, and couplings.
- Pipe hangers and supports.
- Manufactured sleeve-seal systems.
- Valves.
- Flow controls.
- Check.
- Relief valves.
- Strainers.

RELATED REQUIREMENTS

Section 22 0516 - Expansion Fittings and Loops for Plumbing Piping.

Section 22 0548 - Vibration and Seismic Controls for Plumbing Piping and Equipment.

Section 22 0553 - Identification for Plumbing Piping and Equipment.

Section 22 0719 - Plumbing Piping Insulation.

Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

Section 31 2316 - Excavation.

Section 31 2316.13 - Trenching.

Section 33 1300 - Disinfecting of Water Utility Distribution.

REFERENCE STANDARDS

ANSI Z21.22 - American National Standard for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems; 1999, and addenda A&B (R2004).

ANSI Z223.1 - National Fuel Gas Code; 2015.

ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250; The American Society of Mechanical Engineers; 2010.

ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; The American Society of Mechanical Engineers; 2011.

ASME B16.4 - Gray Iron Threaded Fittings: Classes 125 and 250; The American Society of Mechanical Engineers; 2011.

ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers; 2012 (ANSI B16.18).

ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; The American Society of Mechanical Engineers; 2013.

ASME B31.1 - Power Piping; The American Society of Mechanical Engineers; 2014 (ANSI/ASME B31.1).

ASME B31.9 - Building Services Piping; The American Society of Mechanical Engineers; 2014 (ANSI/ASME B31.9).

ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999 (Reapproved 2014).

ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2016.

ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2015.

ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).

ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes; 2015a.

ASTM B43 - Standard Specification for Seamless Red Brass Pipe, Standard Sizes; 2014.

ASTM B68/B68M - Standard Specification for Seamless Copper Tube, Bright Annealed; 2011.

ASTM B75/B75M - Standard Specification for Seamless Copper Tube; 2011.

ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2010.

ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2014.

ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings; 2004 (Reapproved 2011).

ASTM D2661 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings; 2014.

ASTM D2680 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping; 2001 (Reapproved 2014).

ASTM F628 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe with a Cellular Core; 2012.

ASTM F876 - Standard Specification for Crosslinked Polyethylene (PEX) Tubing; 2013a.

ASTM F877 - Standard Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems; 2011.

11

AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; American Water Works Association; 2010 (ANSI/AWWA C105/A21.5).

AWWA C651 - Disinfecting Water Mains; American Water Works Association; 2005 (ANSI/AWWA C651).

MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2009.

MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2010.

NSF 61 - Drinking Water System Components - Health Effects; 2014 (Errata 2015).

NSF 372 - Drinking Water System Components - Lead Content; 2011.

PPI TR-4 - PPI Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB), and Minimum Required Strength (MRS) Ratings For Thermoplastic Piping Materials or Pipe; Plastics Pipe Institute; 2013.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

Project Record Documents: Record actual locations of valves.

Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

See Section 01 6000 - Product Requirements, for additional provisions.

Valve Repacking Kits: One for each type and size of valve.

QUALITY ASSURANCE

Perform work in accordance with applicable codes.

Valves: Manufacturer's name and pressure rating marked on valve body.

DELIVERY, STORAGE, AND HANDLING

Accept valves on site in shipping containers with labeling in place. Inspect for damage.

Provide temporary protective coating on cast iron and steel valves.

Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

GENERAL REQUIREMENTS

Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

SANITARY SEWER PIPING, BURIED WITHIN 5 FEET (1500 mm) OF BUILDING

ABS Pipe: ASTM F628.
- Fittings: ABS.
- Joints: Solvent welded with ASTM D2235 cement.

DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET (1500 mm) OF BUILDING

Copper Pipe: ASTM B42, hard drawn.
- Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.

DOMESTIC WATER PIPING, ABOVE GRADE

Cross-Linked Polyethylene (PEX) Pipe: ASTM F876 or ASTM F877.
- Manufacturers:
  - Uponor, Inc: www.uponorengineering.com/sle.
  - Viega LLC: www.viega.com.
  - Zurn Industries, LLC: www.zurn.com.
- PPI TR-4 Pressure Design Basis:
  - 100 psig (689 kPa) at maximum 180 degrees F (82 degrees C).
- Fittings: Brass and engineered polymer (EP) ASTM F1960.
- Joints: Mechanical compression fittings.
- Joints: ASTM F1960 cold-expansion fittings.

STORM WATER PIPING, BURIED WITHIN 5 FEET (1500 mm) OF BUILDING

ABS Pipe: ASTM D2680.
- Fittings: ABS.
- Joints: Solvent welded with ASTM D2235 cement.

STORM WATER PIPING, ABOVE GRADE

Cast Iron Pipe: ASTM A74 extra heavy weight.
- Fittings: Cast iron.
- Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.

ABS Pipe: ASTM D2680.
- Fittings: ABS.
- Joints: Solvent welded with ASTM D2235 cement.

NATURAL GAS PIPING, BURIED WITHIN 5 FEET (1500 mm) OF BUILDING

Steel Pipe: ASTM A53/A53M Schedule 40 black.
- Fittings: ASTM A234/A234M, wrought steel welding type.

Joints: ASME B31.1, welded.
Jacket: AWWA C105/A21.5 polyethylene jacket or double layer, half-lapped 10 mil (0.25 mm) polyethylene tape.

NATURAL GAS PIPING, ABOVE GRADE

Steel Pipe: ASTM A53/A53M Schedule 40 black.
Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
Joints: Threaded or welded to ASME B31.1.

FLANGES, UNIONS, AND COUPLINGS

Unions for Pipe Sizes 3 Inches (80 mm) and Under:
Copper tube and pipe: Class 150 bronze unions with soldered joints.

PIPE HANGERS AND SUPPORTS

Provide hangers and supports that comply with MSS SP-58.
If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
Trapeze Hangers: Welded steel channel frames attached to structure.
Vertical Pipe Support: Steel riser clamp.

Plumbing Piping - Drain, Waste, and Vent:
Hangers for Pipe Sizes 1/2 Inch (15 mm) to 1-1/2 Inches (40 mm): Malleable iron, adjustable swivel, split ring.
Hangers for Pipe Sizes 2 Inches (50 mm) and Over: Carbon steel, adjustable, clevis.

Plumbing Piping - Water:
Hangers for Pipe Sizes 1/2 Inch (15 mm) to 1-1/2 Inches (40 mm): Malleable iron, adjustable swivel, split ring.
Hangers for Cold Pipe Sizes 2 Inches (50 mm) and Over: Carbon steel, adjustable, clevis.
Hangers for Hot Pipe Sizes 2 Inches (50 mm) to 4 Inches (100 mm): Carbon steel, adjustable, clevis.

BALL VALVES

Manufacturers:
Grinnell Products, a Tyco Business: www.grinnell.com.
Nibco, Inc: www.nibco.com.
Uponor, Inc: www.uponorengineering.com/sle.

Construction, 4 Inches (100 mm) and Smaller: MSS SP-110, Class 150, 400 psi (2760 kPa) CWP, bronze or ductile iron body, 304 stainless steel or chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, threaded or grooved ends with union.

PIPING SPECIALTIES

Flow Controls:
Construction: Class 125, Brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet, blowdown/backflush drain.
Calibration: Control flow within 5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, maximum minimum pressure 3.5 psi (24 kPa).

PART 3 EXECUTION

PREPARATION

Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

Remove scale and dirt, on inside and outside, before assembly.

Prepare piping connections to equipment with flanges or unions.

147 INSTALLATION

148 Install in accordance with manufacturer's instructions.

149 Provide non-conducting dielectric connections wherever jointing dissimilar metals.

150 Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

151 Install piping to maintain headroom, conserve space, and not interfere with use of space.

152 Group piping whenever practical at common elevations.

153 Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 22 0516.

154 Install vent piping penetrating roofed areas to maintain integrity of roof assembly; refer to Section _____.

155 Pipe Hangers and Supports:

156 Install in accordance with ASME B31.9.

157 Support horizontal piping as scheduled.

158 Install hangers to provide minimum 1/2 inch (15 mm) space between finished covering and adjacent work.

159 Place hangers within 12 inches (300 mm) of each horizontal elbow.

160 Use hangers with 1-1/2 inch (40 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

161 Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

162 Provide copper plated hangers and supports for copper piping.

163 APPLICATION

164 Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

165 Install globe valves for throttling, bypass, or manual flow control services.

166 Provide flow controls in water recirculating systems where indicated.

167 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

168 Disinfect water distribution system in accordance with Section 33 1300.

169 Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

170 Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.

171 Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

172 Maintain disinfectant in system for 24 hours.

173 If final disinfectant residual tests less than 25 mg/L, repeat treatment.

174 Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

175 Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

176 SERVICE CONNECTIONS

177 Provide new sanitary sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

178 Provide new water service complete with approved reduced pressure backflow preventer and water meter with by-pass valves, pressure reducing valve, and sand strainer.

179 Provide sleeve in wall for service main and support at wall with reinforced concrete bridge. Calk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.

180 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

- Drains.
- Cleanouts.
- Hose bibbs.
- Hydrants.
- Backflow preventers.
- Double check valve assemblies.
- Water hammer arrestors.
- Mixing valves.

RELATED REQUIREMENTS

- Section 22 1005 - Plumbing Piping.
- Section 22 3000 - Plumbing Equipment.
- Section 22 4000 - Plumbing Fixtures.
- Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

REFERENCE STANDARDS

- ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- ASME A112.6.3 - Floor and Trench Drains; 2001 (R2007).
- ASSE 1019 - Performance Requirements for Wall Hydrant with Backflow Protection and Freeze Resistance; 2011.
- NSF 61 - Drinking Water System Components - Health Effects; 2016.
- NSF 372 - Drinking Water System Components - Lead Content; 2016.
- PDI-WH 201 - Water Hammer Arresters; 2010.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.

Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.

Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.

Operation Data: Indicate frequency of treatment required for interceptors.

Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

Project Record Documents: Record actual locations of equipment, cleanouts, backflow preventers, water hammer arrestors.

Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

See Section 01 6000 - Product Requirements, for additional provisions.

Extra Loose Keys for Outside Hose Bibbs: One.

QUALITY ASSURANCE

Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

DELIVERY, STORAGE, AND HANDLING

Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

GENERAL REQUIREMENTS

Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

DRAINS

Manufacturers:
- Jay R. Smith Manufacturing Company: www.jayrsmith.com.
- Josam Company: www.josam.com.
- Zurn Industries, LLC: www.zurn.com.
- Substitutions: See Section 01 6000 - Product Requirements.

CLEANOUTS

Manufacturers:
- Jay R. Smith Manufacturing Company: www.jayrsmith.com.
- Josam Company: www.josam.com.
- Zurn Industries, LLC: www.zurn.com.
- Substitutions: See Section 01 6000 - Product Requirements.

Cleanouts at Exterior Surfaced Areas (CO-1):
- Round cast nickel bronze access frame and non-skid cover.

HOSE BIBBS

Manufacturers:
- Jay R. Smith Manufacturing Company: www.jayrsmith.com.
- Watts Regulator Company: www.wattsregulator.com.
- Zurn Industries, LLC: www.zurn.com.
- Substitutions: See Section 01 6000 - Product Requirements.

HYDRANTS

Manufacturers:
- Arrowhead Brass & Plumbing, LLC: www.arrowheadbrass.com.
- Jay R. Smith Manufacturing Company: www.jayrsmith.com.
- Zurn Industries, LLC: www.zurn.com.
- Substitutions: See Section 01 6000 - Product Requirements.

Wall Hydrants:
- ASSE 1019; freeze resistant, self-draining type with chrome plated wall plate hose thread spout, handwheel, and integral vacuum breaker.

DOUBLE CHECK VALVE ASSEMBLIES

Manufacturers:
- Conbraco Industries, Inc; _____: www.apollovalves.com.
- Watts Regulator Company, a part of Watts Water Technologies; _____: www.wattsregulator.com.
- Zurn Industries, LLC; _____: www.zurn.com.

WATER HAMMER ARRESTORS

Manufacturers:
- Jay R. Smith Manufacturing Company: www.jayrsmith.com.
- Watts Regulator Company, a part of Watts Water Technologies: www.wattsregulator.com.
- Zurn Industries, LLC: www.zurn.com.
- Substitutions: See Section 01 6000 - Product Requirements.

Water Hammer Arrestors:
- Stainless steel construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range minus 100 to 300 degrees F (minus 73 to 149 degrees C) and maximum 250 psi (1700 kPa) working pressure.

MIXING VALVES

Thermostatic Mixing Valves:
- Manufacturers:
  - ESBE: www.esbe.se/en.
  - Honeywell International Inc: yourhome.honeywell.com.
  - Leonard Valve Company: www.leonardvalve.com.
  - Substitutions: See Section 01 6000 - Product Requirements.
- Valve: Chrome plated cast brass body, stainless steel or copper alloy bellows, integral temperature adjustment.
- Accessories:
  - Volume control shut-off valve on outlet.
  - Stem thermometer on outlet.
  - Strainer stop checks on inlets.
- Cabinet: 16 gage, 0.0598 inch (1.52 mm) prime coated steel, for recessed mounting with keyed lock.

PART 3 EXECUTION

INSTALLATION

Install in accordance with manufacturer's instructions.

Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.

Encase exterior cleanouts in concrete flush with grade.

Install floor cleanouts at elevation to accommodate finished floor.

Install approved portable water protection devices on plumbing lines where contamination of domestic water may occur; on boiler feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibbs.

Pipe relief from backflow preventer to nearest drain.

Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatory sinks or washing machine outlets.

Install air chambers on hot and cold water supply piping to each fixture or group of fixtures (each washroom). Fabricate same size as supply pipe or 3/4 inch (20 mm) minimum, and minimum 18 inches (450 mm) long.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Water Heaters:
- Commercial gas fired.

Diaphragm-type compression tanks.

In-line circulator pumps.

RELATED REQUIREMENTS

Section 22 0548 - Vibration and Seismic Controls for Plumbing Piping and Equipment.

Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

REFERENCE STANDARDS

ANSI Z21.10.1 - Gas Water Heaters - Volume I - Storage Water Heaters with Input Ratings of 75,000 Btu per Hour or Less; 2014.

ANSI Z21.10.3 - Gas-Fired Water Heaters - Volume III - Storage Water Heaters with Input Ratings Above 75,000 Btu per Hour, Circulating and Instantaneous; 2016.

ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels; 2015.

CSA P.3 - Testing Method for Measuring Energy Consumption and Determining Efficiencies of Gas-Fired Storage Water Heaters; 2004 (Reaffirmed 2015).

ICC (IPC) - International Plumbing Code; 2015.

NEMA MG 1 - Motors and Generators; 2016.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittals procedures.

Product Data:
- Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.
- Indicate pump type, capacity, power requirements.
- Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.
- Provide electrical characteristics and connection requirements.

Shop Drawings:
- Indicate dimensions of tanks, tank lining methods, anchors, attachments, lifting points, tappings, and drains.

Project Record Documents: Record actual locations of components.

Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.

Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

Project Record Documents: Record actual locations of components.

Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
- See Section 01 6000 - Product Requirements, for additional provisions.

QUALITY ASSURANCE

Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

Certifications:

Gas Water Heaters: Certified by CSA International to ANSI Z21.10.1, as applicable, in addition to requirements specified elsewhere.

Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

Identification: Provide pumps with manufacturer's name, model number, and rating/capacity identified by permanently attached label.

Performance: Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, operate within 25 percent of midpoint of published maximum efficiency curve.

DELIVERY, STORAGE, AND HANDLING

Provide temporary inlet and outlet caps. Maintain caps in place until installation.

WARRANTY

See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

Provide five year manufacturer warranty for domestic water heaters.

PART 2 PRODUCTS

WATER HEATERS

Manufacturers:

- A.O. Smith Water Products Co: www.hotwater.com.
- Bock Water Heaters, Inc: www.bockwaterheaters.com.
- Rheem Manufacturing Company: www.rheem.com.

Commercial Gas Fired:

- Type: Automatic, natural gas-fired, vertical storage.
- Performance: as scheduled
- Tank: Glass lined welded steel ASME labeled; multiple flue passages, 4 inch (100 mm) diameter inspection port, thermally insulated with minimum 2 inches (50 mm) glass fiber, encased in corrosion-resistant steel jacket; baked-on enamel finish; floor shield and legs.
- Accessories:
  - Water Connections: Brass.
  - Dip Tube: Brass.
  - Drain valve.
  - Anode: Magnesium.
  - Temperature and Pressure Relief Valve: ASME labeled.
- Certified For The Following Applications:
  - Automatic storage water heater.
- Controls: Automatic water thermostat with temperature range adjustable from 120 to 180 degrees F (49 to 82 degrees C), automatic reset high temperature limiting thermostat factory set at 195 degrees F (90 degrees C), gas pressure regulator, multi-ribbon or tubular burner, 100 percent safety shut-off pilot and thermocouple, flue baffle and draft hood.

DIAPHRAGM-TYPE COMPRESSION TANKS

Manufacturers:

- Amtrol Inc: www.amtrol.com.
- Bell & Gossett, a xylem brand: www.bellgossett.com.
- Taco, Inc: www.taco-hvac.com.

Construction: Welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; supplied with National Board Form U-1, rated for working pressure of 125 psig (860 kPa), with flexible EPDM diaphragm sealed into tank, and steel legs or saddles.

Accessories: Pressure gage and air-charging fitting, tank drain; precharge to 12 psig (80 kPa).

PART 3 EXECUTION

INSTALLATION

Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions of certification, if any.

Coordinate with plumbing piping and related fuel piping, gas venting, and electrical work to achieve operating system.

Domestic Water Storage Tanks:

Provide steel pipe support, independent of building structural framing members.

Clean and flush prior to delivery to site. Seal until pipe connections are made.

Pumps:

Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Water closets.

Urinals.

Lavatories.

Sinks.

Service sinks.

Electric water coolers.

Showers.

RELATED REQUIREMENTS

Section 22 1005 - Plumbing Piping.

Section 22 1006 - Plumbing Piping Specialties.

Section 22 3000 - Plumbing Equipment.

REFERENCE STANDARDS

NSF 61 - Drinking Water System Components - Health Effects; 2016.

NSF 372 - Drinking Water System Components - Lead Content; 2016.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

Manufacturer's Instructions: Indicate installation methods and procedures.

Maintenance Data: Include fixture trim exploded view and replacement parts lists.

Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

See Section 01 6000 - Product Requirements, for additional provisions.

REGULATORY REQUIREMENTS

Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

WARRANTY

See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

Provide five year manufacturer warranty for electric water cooler.

PART 2 PRODUCTS

GENERAL

Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

Provide plumbing fixtures per the plumbing fixture schedule, and basis of design, or approved alternate.

PART 3 EXECUTION

EXAMINATION

Verify that walls and floor finishes are prepared and ready for installation of fixtures.

Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

PREPARATION

Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

INSTALLATION

Install each fixture with trap, easily removable for servicing and cleaning.

Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

Install components level and plumb.

Install and secure fixtures in place with wall carriers and bolts.

INTERFACE WITH WORK OF OTHER SECTIONS

Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

ADJUSTING

Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

CLEANING

Clean plumbing fixtures and equipment.

PROTECTION

Protect installed products from damage due to subsequent construction operations.

Repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT
23 0513

PART 1 GENERAL

SECTION INCLUDES

General construction and requirements.

Applications.

Single phase electric motors.

Three phase electric motors.

RELATED REQUIREMENTS

Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

Section 26 2913 - Enclosed Controllers.

REFERENCE STANDARDS

NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2014.

NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

SUBMITTALS

See Section 01 3000 - Administrative Requirements for submittal procedures.

Product Data: Provide wiring diagrams with electrical characteristics and connection requirements.

Test Reports: Indicate test results verifying nominal efficiency and power factor for three phase motors larger than 1/2 horsepower.

Manufacturer's Installation Instructions: Indicate setting, mechanical connections, lubrication, and wiring instructions.

Operation Data: Include instructions for safe operating procedures.

Maintenance Data: Include assembly drawings, bearing data including replacement sizes, and lubrication instructions.

QUALITY ASSURANCE

Conform to NFPA 70.

Provide certificate of compliance from Authority Having Jurisdiction indicating approval of high efficiency motors.

Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

DELIVERY, STORAGE, AND HANDLING

Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

PART 2 PRODUCTS

GENERAL CONSTRUCTION AND REQUIREMENTS

Construction:

- Open drip-proof type except where specifically noted otherwise.
- Design for continuous operation in 104 degrees F (40 degrees C) environment.
- Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.

Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.

Wiring Terminations:

Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.

For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

APPLICATIONS

Exception: Motors less than 250 watts, for intermittent service may be the equipment manufacturer's standard and need not conform to these specifications.

Motors located in exterior locations: Totally enclosed type.

PART 3 EXECUTION

INSTALLATION

Install in accordance with manufacturer's instructions.

Install securely on firm foundation. Mount ball bearing motors with shaft in any position.

Check line voltage and phase and ensure agreement with nameplate.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Flexible pipe connectors.

Expansion joints and compensators.

Pipe loops, offsets, and swing joints.

RELATED REQUIREMENTS

Section 23 2113 - Hydronic Piping.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data:

- Flexible Pipe Connectors: Indicate maximum temperature and pressure rating, face-to-face length, live length, hose wall thickness, hose convolutions per foot (meter) and per assembly, fundamental frequency of assembly, braid structure, and total number of wires in braid.
- Expansion Joints: Indicate maximum temperature and pressure rating, and maximum expansion compensation.

Samples: Submit two low pressure compensators 3/4 inch (20 mm) in size.

Design Data: Indicate selection calculations.

Manufacturer's Instructions: Indicate manufacturer's installation instructions, special procedures, and external controls.

Maintenance Data: Include adjustment instructions.

Project Record Documents: Record installed locations of flexible pipe connectors, expansion joints, anchors, and guides.

Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

- See Section 01 6000 - Product Requirements, for additional provisions.
- Extra Packing for Packed Expansion Joints: One set for each joint.

PART 2 PRODUCTS

FLEXIBLE PIPE CONNECTORS - STEEL PIPING

Manufacturers:

- Mercer Rubber Company: www.mercer-rubber.com.
- The Metraflex Company: www.metraflex.com/#sle.

Inner Hose: Bronze.

Exterior Sleeve: Single braided, stainless steel.

Pressure Rating: 125 psi and 450 degrees F (862 kPa and 232 degrees C).

Joint: Flanged.

Size: Use pipe sized units.

Maximum offset: 3/4 inch (20 mm) on each side of installed center line.

FLEXIBLE PIPE CONNECTORS - COPPER PIPING

Manufacturer:

- Mercer Rubber Company: www.mercer-rubber.com.
- The Metraflex Company: www.metraflex.com/#sle.

Inner Hose: Bronze.

Exterior Sleeve: Braided bronze.

Pressure Rating: 125 psi and 450 degrees F (862 kPa and 232 degrees C).

Joint: Flanged.

Size: Use pipe sized units.

Maximum offset: 3/4 inch (20 mm) on each side of installed center line.

Application: Copper piping.

EXPANSION LOOPS - HOSE AND BRAID

Manufacturers:
- The Metraflex Company; Metraloop: www.metraflex.com/#sle.
- Substitutions: See Section 01 6000 - Product Requirements.

Provide flexible loops with two flexible sections of hose and braid, two 90 degree elbows, and 180 degree return with support bracket and air release or drain plug.

Provide flexible loops capable of movement in the x, y, and z planes. Flexible loops to impart no thrust loads to the building structure.

Flexible Connectors: Flanged, braided type with wetted components of stainless steel, sized to match piping.
- Maximum Allowable Working Pressure: 150 psig (1030 kPa) at 120 degrees F (49 degrees C).
- Accommodate the Following:
  - Axial Deflection in Compression and Expansion: _____ inch (_____ mm).
  - Lateral Movement: _____ inch (_____ mm).
  - Angular Rotation: 15 degrees.
  - Force developed by 1.5 times specified maximum allowable operating pressure.
- End Connections: Same as specified for pipe jointing.
- Provide necessary accessories including, but not limited to, swivel joints.

PART 3 EXECUTION

INSTALLATION

Install in accordance with manufacturer's instructions.

Install in accordance with EJMA (Expansion Joint Manufacturers Association) Standards.

Install flexible pipe connectors on pipes connected to vibration isolated equipment. Provide line size flexible connectors.

Install flexible connectors at right angles to displacement. Install one end immediately adjacent to isolated equipment and anchor other end. Install in horizontal plane unless indicated otherwise.

Provide support and equipment required to control expansion and contraction of piping. Provide loops, pipe offsets, and swing joints, or expansion joints where required.

Substitute grooved piping for vibration isolated equipment instead of flexible connectors. Grooved piping need not be anchored.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Pressure gages and pressure gage taps.

Thermometers and thermometer wells.

Static pressure gages.

RELATED REQUIREMENTS

Section 23 0923 - Direct-Digital Control System for HVAC.

Section 23 2113 - Hydronic Piping.

REFERENCE STANDARDS

ASME B40.100 - Pressure Gauges and Gauge Attachments; 2013.

ASME MFC-3M - Measurement of Fluid Flow in Pipes Using Orifice, Nozzle and Venturi; 2007.

ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2014.

ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2014.

UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Current Edition, Including All Revisions.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.

Project Record Documents: Record actual locations of components and instrumentation.

Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

- See Section 01 6000 - Product Requirements, for additional provisions.
- Extra Gage Oil for Inclined Manometers: One bottle.

FIELD CONDITIONS

Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports and test plugs.

PART 2 PRODUCTS

PRESSURE GAGES

Manufacturers:

- Dwyer Instruments, Inc: www.dwyer-inst.com.
- Moeller Instrument Company, Inc: www.moellerinstrument.com.
- Omega Engineering, Inc: www.omega.com.

Pressure Gages: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.

- Case: Steel with brass bourdon tube.
- Size: 4-1/2 inch (115 mm) diameter.
- Mid-Scale Accuracy: One percent.
- Scale: Psi and KPa.

PRESSURE GAGE TAPPINGS

Gage Cock: Tee or lever handle, brass for maximum 150 psi (1034 kPa).

STEM TYPE THERMOMETERS

Manufacturers:

- Dwyer Instruments, Inc: www.dwyer-inst.com.
- Omega Engineering, Inc: www.omega.com.
- Weksler Glass Thermometer Corp: www.wekslerglass.com.

Thermometers - Fixed Mounting: Red- or blue-appearing non-toxic liquid in glass; ASTM E1; lens front tube, cast aluminum case with enamel finish.
- Size: 9 inch (225 mm) scale.
- Window: Clear Lexan.
- Accuracy: 2 percent, per ASTM E77.
- Calibration: Degrees F.

THERMOMETER SUPPORTS

Socket: Brass separable sockets for thermometer stems with or without extensions as required, and with cap and chain.

TEST PLUGS

Test Plug: 1/4 inch (6 mm) or 1/2 inch (13 mm) brass fitting and cap for receiving 1/8 inch (3 mm) outside diameter pressure or temperature probe with neoprene core for temperatures up to 200 degrees F (93 degrees C).

STATIC PRESSURE GAGES

Manufacturers:
- Dwyer Instruments, Inc: www.dwyer-inst.com.
- Omega Engineering, Inc: www.omega.com.
- Veris Industries: www.veris.com.
- Substitutions: See Section 01 6000 - Product Requirements.

3-1/2 inch (90 mm) diameter dial in metal case, diaphragm actuated, black figures on white background, front recalibration adjustment, 2 percent of full scale accuracy.

Inclined manometer, red liquid on white background with black figures, front recalibration adjustment, 3 percent of full scale accuracy.

Accessories: Static pressure tips with compression fittings for bulkhead mounting, 1/4 inch (6 mm) diameter tubing.

PART 3 EXECUTION

INSTALLATION

Install in accordance with manufacturer's instructions.

Provide one pressure gage per pump, installing taps before strainers and on suction and discharge of pump. Pipe to gage.

Install pressure gages with pulsation dampers. Provide gage cock to isolate each gauge. Provide siphon on gages in steam systems. Extend nipples and siphons to allow clearance from insulation.

Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inch (60 mm) for installation of thermometer sockets. Ensure sockets allow clearance from insulation.

Install thermometer sockets adjacent to controls system thermostat, transmitter, or sensor sockets. Refer to Section 23 0943. Where thermometers are provided on local panels, duct or pipe mounted thermometers are not required.

Coil and conceal excess capillary on remote element instruments.

Provide instruments with scale ranges selected according to service with largest appropriate scale.

Install gages and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.

Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate to zero.

Locate test plugs adjacent thermometers and thermometer sockets.

END OF SECTION

SECTION 23 0523
GENERAL-DUTY VALVES FOR HVAC PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Applications.
B. General requirements.
C. Angle valves.
D. Globe valves.
E. Ball valves.
F. Butterfly valves.
G. Check valves.
H. Gate valves.

1.02 RELATED REQUIREMENTS

A. Section 07 8400 - Firestopping.
B. Section 08 3100 - Access Doors and Panels.
C. Section 23 0548 - Vibration and Seismic Controls for HVAC Piping and Equipment.
D. Section 23 0553 - Identification for HVAC Piping and Equipment.
E. Section 23 0716 - HVAC Equipment Insulation.
F. Section 23 0719 - HVAC Piping Insulation.
G. Section 23 2113 - Hydronic Piping.

1.03 ABBREVIATIONS AND ACRONYMS

A. CWP: Cold working pressure.
B. EPDM: Ethylene propylene copolymer rubber.
C. NRS: Nonrising stem.
D. RS: Rising stem.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.

1.05 QUALITY ASSURANCE

A. Manufacturer:
   1. Obtain valves for each valve type from single manufacturer.
   2. Company must specialize in manufacturing products specified in this section, with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:
   1. Minimize exposure of operable surfaces by setting plug and ball valves to open position.
   2. Protect valve parts exposed to piped medium against rust and corrosion.
   3. Protect valve piping connections such as grooves, weld ends, threads, and flange faces.
   4. Adjust globe, gate, and angle valves to the closed position to avoid clattering.

5. Secure check valves in either the closed position or open position.
6. Adjust butterfly valves to closed or partially closed position.

B. Use the following precautions during storage:
1. Maintain valve end protection and protect flanges and specialties from dirt.
a. Provide temporary inlet and outlet caps.
b. Maintain caps in place until installation.
2. Store valves in shipping containers and maintain in place until installation.
a. Store valves indoors in dry environment.
b. Store valves off the ground in watertight enclosures when indoor storage is not an option.

PART 2 PRODUCTS

2.01 APPLICATIONS

A. Provide the following valves for the applications if not indicated on Drawings:
1. Throttling (Hydronic): Globe.
2. Isolation (Shutoff): Butterfly, Gate, and Ball.
3. Swing Check (Pump Outlet):
a. 2-1/2 NPS (65 DN) and Larger: Iron with lever and spring or center-guided metal.

B. Heating Hot Water Valves:
1. 2 NPS (50 DN) and Smaller, Brass and Bronze Valves:
a. Threaded ends.
b. Angle: Bronze disc, Class 125.
c. Ball: Full port, one piece, brass trim.
d. Swing Check: Bronze disc, Class 125.
e. Gate: NRS, Class 125.
f. Globe: Bronze disc, Class 125.
2. 2-1/2 NPS (65 DN) and Larger, Iron Valves:
a. 2-1/2 NPS (65 DN) to 4 NPS (100 DN): Threaded ends.
b. Ball: 2-1/2 NPS (65 DN) to 10 NPS (250 DN), Class 150.
c. Swing Check: 2-1/2 NPS (65 DN) to 12 NPS (300 DN), lever and spring closure control, Class 125.
d. Gate: NRS, Class 125.
e. Globe: 2-1/2 NPS (65 DN) to 12 NPS (300 DN), Class 125.

2.02 GENERAL REQUIREMENTS

A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.

B. Valve Sizes: Match upstream piping unless otherwise indicated.

C. Valve Actuator Types:
1. Handwheel: Valves other than quarter-turn types.
2. Hand Lever: Quarter-turn valves 6 NPS (150 DN) and smaller.

D. Valves in Insulated Piping: Provide 2 NPS (50 DN) stem extensions and the following features:
1. Gate Valves: Rising stem.
2. Ball Valves: Extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
3. Butterfly Valves: Extended neck.
4. Memory Stops: Fully adjustable after insulation is installed.

E. Valve-End Connections:
1. Threaded End Valves: ASME B1.20.1.
2. Flanges on Iron Valves: ASME B16.1 for flanges on iron valves.
3. Solder Joint Connections: ASME B16.18.

F. General ASME Compliance:

1. Building Services Piping Valves: ASME B31.9.

G. Bronze Valves:
1. Fabricate from dezincification resistant material.
2. Copper alloys containing more than 15 percent zinc are not permitted.

2.03 BRONZE ANGLE VALVES

A. Class 125: CWP Rating: 200 psig: (1380 kPa), and Class 150: CWP Rating: 300 psig: (2070 kPa).
1. Comply with MSS SP-80, Type 1.
2. Body: Bronze; ASTM B62, with integral seat and screw in bonnet.
3. Ends: Threaded.
4. Stem: Bronze.
5. Disc: Bronze, PTFE, or TFE.
6. Packing: Asbestos free.
7. Handwheel: Bronze or aluminum.

2.04 BRONZE GLOBE VALVES

A. Class 125: CWP Rating: 200 psig: (1380 kPa).
1. Comply with MSS SP-80, Type 1.
2. Body: Bronze; ASTM B62, with integral seat and screw in bonnet.
3. Ends: Threaded or solder joint.
4. Stem and Disc: Bronze.
5. Packing: Asbestos free.
a. Handwheel: Malleable iron.

2.05 IRON GLOBE VALVES

A. Class 125: CWP Rating: 200 psig: (1380 kPa), and Class 250: CWP Rating: 500 psig: (3450 kPa).
1. Comply with MSS SP-85, Type I.
2. Body: Gray iron; ASTM A126, with bolted bonnet.
3. Ends: Flanged.
4. Trim: Bronze.
5. Packing and Gasket: Asbestos free.
6. Operator: Handwheel or chainwheel.

2.06 BRASS BALL VALVES

A. One Piece, Reduced Port with Brass Trim:
1. Comply with MSS SP-110.
2. CWP Rating: 400 psig (2760 kPa).
3. Body: Forged brass.
4. Ends: Threaded.
5. Seats: PTFE, TFE, or ____.
6. Stem: Brass.
7. Ball: Chrome-plated brass.

B. Two Piece, Full Port, Regular Port, and _____ with Stainless Steel Trim:
1. Comply with MSS SP-110.
2. SWP Rating: 150 psig (1035 kPa).
3. CWP Rating: 600 psig (4140 kPa).
4. Body: Forged brass.
5. Ends: Threaded.
6. Seats: PTFE, TFE, PTFE or TFE, or ____.
7. Ball: Chrome-plated brass.

2.07 IRON BALL VALVES

A. Split Body, Full Port:

1. Comply with MSS SP-72.
2. CWP Rating: 200 psig (1380 kPa).
3. Body: ASTM A126, gray iron.
4. Ends: Flanged.
5. Seats: PTFE.
6. Stem: Stainless steel.
7. Ball: Stainless steel.

2.08 BRONZE SWING CHECK VALVES

A. Class 125: CWP Rating: 200 psig (1380 kPa).
   1. Comply with MSS SP-80, Type 3.
   2. Body Design: Horizontal flow.
   3. Body Material: Bronze, ASTM B62.
   4. Ends: Threaded.
   5. Disc: Bronze.

2.09 IRON SWING CHECK VALVES WITH CLOSURE CONTROL

A. Class 125:
   1. Comply with MSS SP-71, Type I.
   2. Body Design: Clear or full waterway.
   3. Body Material: ASTM A126, gray iron with bolted bonnet.
   4. Ends: Flanged.
   5. Trim: Bronze.
   6. Gasket: Asbestos free.
   7. Closer Control: Factory installed, exterior lever, and spring or weight.

2.10 BRONZE GATE VALVES

A. Non-Rising Stem (NRS) or Rising Stem (RS):
   1. Comply with MSS SP-80, Type I.
   2. Body Material: Bronze with integral seat and union-ring bonnet.
   3. Ends: Threaded or solder joint.
   4. Stem: Bronze.
   5. Disc: Solid wedge; bronze.
   6. Packing: Asbestos free.
   7. Handwheel: Malleable iron, bronze, or aluminum.

2.11 IRON GATE VALVES

A. NRS:
   1. Comply with MSS SP-70, Type I.
   2. Body Material: Gray iron with bolted bonnet.
   3. Ends: Flanged.
   4. Trim: Bronze.
   5. Disc: Solid wedge.
   6. Packing and Gasket: Asbestos free.

PART 3 EXECUTION

3.01 EXAMINATION

A. Discard all packing materials and verify that valve interior, including threads and flanges are completely clean without signs of damage or degradation that could result in leakage.

B. Verify valve parts to be fully operational in all positions from closed to fully open.

C. Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.

D. Should valve is determined to be defective, replace with new valve.

3.02 INSTALLATION

A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.

B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.

C. Install check valves where necessary to maintain direction of flow as follows:
   1. Swing Check: Install horizontal maintaining hinge pin level.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

- Equipment support bases.
- Vibration isolators.
- Seismic snubber assemblies.
- Seismic restraints for suspended components and equipment.
- Roof curbs.

RELATED REQUIREMENTS

- Section 03 3000 - Cast-in-Place Concrete.

REFERENCE STANDARDS

- ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; 2011.
- FEMA 412 - Installing Seismic Restraints for Mechanical Equipment; 2002.
- FEMA 413 - Installing Seismic Restraints for Electrical Equipment; 2004.
- FEMA 414 - Installing Seismic Restraints for Duct and Pipe; 2004.
- FEMA E-74 - Reducing the Risks of Nonstructural Earthquake Damage: A Practical Guide; 2011.
- SMACNA (SRM) - Seismic Duct Restraint Manual Guidelines for Mechanical Systems; Sheet Metal and Air Conditioning Contractors' National Association; 2008.

SUBMITTALS

- See Section 01 3000 - Administrative Requirements, for submittal procedures.
- Product Data:
  - Provide manufacturer's product literature documenting compliance with PART 2 PRODUCTS.
  - Include seismic rating documentation for each isolator and restraint component accounting for horizontal, vertical, and combined loads.
- Shop Drawings:
  - Provide schedule of vibration isolator type with location and load on each.
  - Fully dimensioned fabrication drawings and installation details for vibration isolation bases, member sizes, attachments to isolators, and supported equipment.
  - Include auxiliary motor slide bases and rails, base weights, inertia bases, concrete weights, equipment static loads, support points, vibration isolators, and detailed layout of isolator location and orientation with static and dynamic load on each isolator.
  - Include selections from prescriptive design tables that indicate compliance with the applicable building code and the vibration isolator manufacturer's requirements.
  - Clearly indicate the load and capacity assumptions selected. Include copies of any calculations.
  - Include the seal of the Professional Structural Engineer registered in the State of Oregon in which the Project is located, on the drawings and calculations which at a minimum include the following:
    - Seismic Restraint Details: Detailed drawings of seismic restraints and snubbers including anchorage details that indicate quantity, diameter, and depth of penetration, edge distance, and spacing of anchors.
    - Equipment Seismic Qualification Certification: Certification by the manufacturer or responsible party that each piece of equipment provided will withstand seismic force levels as specified in the applicable building code for seismic controls.
      - Basis for Certification: Indicate whether the withstand certification is based on actual testing of assembled components, on calculations, or on historic data.

Indicate equipment to be sufficiently durable to resist design forces and or remain functional after the seismic event.

Dimensioned outline drawings of equipment identifying center of gravity, locations, and provisions for mounting and anchorage.

Detailed description of the equipment anchorage devices on which the certifications are based.

QUALITY ASSURANCE

Perform design and installation in accordance with applicable codes.

Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and registered and licensed in the State in which the Project is located.

Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

PART 2 PRODUCTS

MANUFACTURERS

Kinetics Noise Control, Inc: www.kineticsnoise.com.

Mason Industries: www.mason-ind.com.

Vibration Eliminator Company, Inc: www.veco-nyc.com.

PERFORMANCE REQUIREMENTS

General:

All vibration isolators, base frames and inertia bases to conform to all uniform deflection and stability requirements under all operating loads.

Steel springs to function without undue stress or overloading.

EQUIPMENT SUPPORT BASES

Structural Bases:

Construction: Engineered, structural steel frames with welded brackets for side mounting of the isolators.

Frames: Square, rectangular or T-shaped.

Design: Sufficiently rigid to prevent misalignment or undue stress on machine, and to transmit design loads to isolators and snubbers.

VIBRATION ISOLATORS

Seismic Type:

Coil Springs Consisting of Single Elements:

Housing: Manufactured from cast iron material.

Ductile Material: Designed and rated for seismic applications.

Spring: Restrained by housing without significant degradation of vibration isolation capabilities during normal equipment operating conditions.

Resilient Snubbing Grommet System: Incorporated and designed with clearances of no more than 0.25 inch (6 mm) in any direction preventing direct metal-to-metal contact between supported member and fixed restraint housing.

Resilient Pad: Located in series with spring.

Coil Springs: Color coded elements to have a lateral stiffness greater than 0.8 times the rated vertical stiffness with 50 percent overload capacity.

Finish: Suitable for the application.

All Directional Elastomeric:

Material: Molded from oil, ozone, and oxidant resistant compounds.

Operating Parameters: Designed to operate within the isolator strain limits providing maximum performance and service life.

Attachment Method: Encapsulated load transfer plate bolted to equipment and base plate with anchor hole bolted to supporting structure.

- Rating: Cast iron and aluminum housings rated for seismic restraint applications.
- Minimum Operating Static Deflections: Deflections indicated in project documents are not to exceed published load capacities.

SEISMIC SNUBBER ASSEMBLIES

Comply with:
- FEMA 412.
- FEMA 413.
- FEMA 414.
- FEMA E-74.
- SMACNA (SRM).

SEISMIC RESTRAINTS FOR SUSPENDED COMPONENTS AND EQUIPMENT

Comply with:
- ASHRAE (HVACA) Handbook - HVAC Applications.
- FEMA 412.
- FEMA 413.
- FEMA 414.
- FEMA E-74.
- SMACNA (SRM).

Cable Restraints:
- Wire Rope: Steel wire strand cables sized to resist seismic loads in all lateral directions.
- Protective Thimbles: Eliminates potential for dynamic cable wear and strand breakage.
- Size: Based on the lesser of cable capacity or anchor load taking into account bracket geometry.
- Connections:
  - Use overlapping wire rope U clips, cable clamping bolts, swaged sleeves or seismically rated tool-less wedge insert lock connectors.
  - Internally brace clevis hanger bracket cross bolt to prevent deformation.
- Vertical Suspension Rods: Attach required bracing of sufficient strength to prevent rod buckling from vertical compression forces utilizing series of attachment clips.

Rigid Restraints:
- Structural Element: Sized to resist seismic loads in all lateral directions and carry both compressive and tensile loading.
- Size: Based on the lesser of cable capacity or anchor load taking into account bracket geometry.
- Connections: Internally brace clevis hanger bracket cross bolt to prevent deformation.
- Static Support System: Anchorage capable of carrying additional tension loads generated by the vertical component of the rigid brace compression which is additive to any static load requirements on the system.
- Vertical Suspension Rods: Attached required bracing of sufficient strength to prevent rod buckling from vertical compression forces utilizing series of attachment clips.

ROOF CURBS

Vibration Isolation Curbs:
- Seismic Curb:
  - Location: Between structure and rooftop equipment.
  - Construction: Steel.
  - Integral vibration isolation to conform to requirements of this section.
  - Snubbers consist of minimum 0.25 inch (6 mm) thick resilient pads to avoid metal-to-metal contact without compromising vibration isolating capabilities.
  - Weather exposed components consist of corrosion resistant materials.

PART 3 EXECUTION

INSTALLATION - GENERAL

Install in accordance with manufacturer's instructions.

On closed spring isolators, adjust so side stabilizers are clear under normal operating conditions.

Prior to making piping connections to equipment with operating weights substantially different from installed weights, block up equipment with temporary shims to final height. When full load is applied, adjust isolators to load to allow shim removal.

INSTALLATION - SEISMIC

Comply with:

- ASHRAE (HVACA) Handbook - HVAC Applications.
- FEMA 412.
- FEMA 413.
- FEMA 414.
- FEMA E-74.
- SMACNA (SRM).

Seismic Snubbers:

- Provide on all isolated equipment, piping and ductwork.
- Provide minimum of four seismic snubbers located close to isolators.
- Snub equipment designated for post-disaster use to 0.05 inch (1.5 mm) maximum clearance.
- Snub all other equipment between 0.15 inch (4 mm) and 0.25 inch (7 mm) clearance.

Floor and Base-Mounted Equipment, Vibration Isolated Equipment and associated Vibration and Seismic Controls for Connections:

- Install equipment anchorage items designed to resist seismic design force in any direction.
- Install vibration and seismic controls designed to include base and isolator requirements.
- Provide flexible connections between equipment and interconnected piping.
- Provide isolators and restraints designed for amplified code forces per ASCE 7 and with demonstrated ability to resist required forces including gravity, operational and seismic forces.
- Where equipment is not designed to be point loaded, provide base capable of transferring gravity and seismic demands from equipment to isolator base plate anchorage.
- Where concrete floor thickness is less than required for expansion anchor installation, install through bolt in lieu of expansion anchor.
- Where timber/wood floor or other substrate is inadequate for installation of lag bolts, screws or other mechanical fasteners, install supplemental framing or blocking to transfer loads to structural elements.

Suspended Mechanical Equipment:

- Provide supports and bracing to resist seismic design force in any direction.
- Provide flexible connections between equipment and interconnected piping.
- Brace equipment hung from spring mounts using cable or other bracing that will not transmit vibration to the structure.
- Use of proprietary restraint systems with a certificate of compliance, verified and listed by an accredited inspection body is acceptable (pending shop drawing approval), as an alternative to project specific seismic bracing design.

Piping:

- Provide seismic bracing in accordance ASCE 7.
- Provide supports, braces, and anchors to resist gravity and seismic design forces.
- Provide flexible connections between floor mounted equipment and suspended piping; between unbraced piping and restrained suspended items; as required for thermal movement; at building separations and seismic joints; and wherever relative differential movements could damage pipe in an earthquake.

Ductwork:

Provide seismic bracing for ducts with cross sectional area greater than 6 sq ft (0.56 sq m) (independent of duct contents).

Provide supports, braces, and anchors to resist gravity and seismic design forces.

Independently support in-line devices weighing more than 20 pounds (9.07 kg).

Independently support and brace all in-line devices weighing more than 75 pounds (34 kg).

Provide unbraced piping attached to braced in-line equipment with adequate flexibility to accommodate differential displacements.

Positively attach dampers, louvers, diffusers and similar appurtenances to ductwork with mechanical fasteners.

Install duct supports designed to resist not less than 150 percent of the duct weight.

FIELD QUALITY CONTROL

See Section 01 4000 - Quality Requirements, for additional requirements.

Inspect isolated equipment after installation and submit report. Include static deflections.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Nameplates.

Tags.

Adhesive-backed duct markers.

Pipe markers.

Ceiling tacks.

RELATED REQUIREMENTS

Section 09 9123 - Interior Painting: Identification painting.

REFERENCE STANDARDS

ASME A13.1 - Scheme for the Identification of Piping Systems; The American Society of Mechanical Engineers; 2007 (ANSI/ASME A13.1).

ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2013.

SUBMITTALS

See Section 01 3000 - Administrative Requirements for submittal procedures.

Product Data: Provide manufacturers catalog literature for each product required.

PART 2 PRODUCTS

IDENTIFICATION APPLICATIONS

Air Handling Units: Nameplates.

Air Terminal Units: Tags.

Automatic Controls: Tags. Key to control schematic.

Control Panels: Nameplates.

Dampers: Ceiling tacks, where located above lay-in ceiling.

Ductwork: Nameplates.

Piping: Tags.

Pumps: Nameplates.

Small-sized Equipment: Tags.

Thermostats: Nameplates.

Valves: Tags and ceiling tacks where located above lay-in ceiling.

NAMEPLATES

Manufacturers:

- Advanced Graphic Engraving, LLC; _____: www.advancedgraphicengraving.com.
- Brimar Industries, Inc; _____: www.pipemarker.com.
- Kolbi Pipe Marker Co; _____: www.kolbipipemarkers.com.
- Seton Identification Products, a Tricor Direct Company; _____: www.seton.com.

Letter Color: White.

Letter Height: 1/4 inch (6 mm).

Background Color: Black.

Plastic: Conform to ASTM D709.

TAGS

Manufacturers:

- Advanced Graphic Engraving; _____: www.advancedgraphicengraving.com.
- Brady Corporation; _____: www.bradycorp.com.

Brimar Industries, Inc; _____: www.pipemarker.com.
Kolbi Pipe Marker Co; _____: www.kolbipipemarkers.com.
Seton Identification Products, a Tricor Company; _____: www.seton.com.
_____.

Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch (40 mm) diameter.

Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch (40 mm) diameter with smooth edges.

ADHESIVE-BACKED DUCT MARKERS

Manufacturers:
Brimar Industries, Inc; _____: www.pipemarker.com.

Material: High gloss acrylic adhesive-backed vinyl film 0.0032 inch (0.76 mm); printed with UV and chemical resistant inks.

Style: Individual Label.

Color: Yellow/Black.

PIPE MARKERS

Manufacturers:
Brady Corporation; _____: www.bradycorp.com.
Brimar Industries, Inc; _____: www.pipemarker.com.
Kolbi Pipe Marker Co; _____: www.kolbipipemarkers.com.
MIFAB, Inc; _____: www.mifab.com.
Seton Identification Products, a Tricor Company; _____: www.seton.com.

Color: Conform to ASME A13.1.

Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

CEILING TACKS

Manufacturers:
Craftmark; _____: www.craftmarkid.com.

Description: Steel with 3/4 inch (20 mm) diameter color coded head.

Color code as follows:
HVAC Equipment: Yellow.

PART 3 EXECUTION

PREPARATION

Degrease and clean surfaces to receive adhesive for identification materials.

Prepare surfaces in accordance with Section 09 9123 for stencil painting.

INSTALLATION

Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

Install tags with corrosion resistant chain.

Install plastic pipe markers in accordance with manufacturer's instructions.

Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

Use tags on piping 3/4 inch (20 mm) diameter and smaller.

81 Identify service, flow direction, and pressure.

82 Install in clear view and align with axis of piping.

83 Locate identification not to exceed 20 feet (6 m) on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

84 Install ductwork with plastic nameplates. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

85 Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

86 END OF SECTION

TESTING, ADJUSTING, AND BALANCING FOR HVAC
23 0593

PART 1 GENERAL

SECTION INCLUDES

- Testing, adjustment, and balancing of air systems.
- Testing, adjustment, and balancing of hydronic systems.
- Measurement of final operating condition of HVAC systems.

RELATED REQUIREMENTS

- Section 01 2100 - Allowances: Inspection and testing allowances.
- Section 01 4000 - Quality Requirements: Employment of testing agency and payment for services.
- Section 01 9113 - General Commissioning Requirements: Commissioning requirements that apply to all types of work.

REFERENCE STANDARDS

- AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.
- ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008.
- NEBB (TAB) - Procedural Standards for Testing Adjusting and Balancing of Environmental Systems; 2015, Eighth Edition.
- SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2002.

SUBMITTALS

- See Section 01 3000 - Administrative Requirements, for submittal procedures.
- Installer Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.
- TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
    - Include at least the following in the plan:
        - List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
        - Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
        - Discussion of what notations and markings will be made on the duct and piping drawings during the process.
        - Final test report forms to be used.
        - Detailed step-by-step procedures for TAB work for each system and issue, including:
            - Terminal flow calibration (for each terminal type).
            - Diffuser proportioning.
            - Branch/submain proportioning.
            - Total flow calculations.
            - Rechecking.
            - Diversity issues.
        - Procedures for formal deficiency reports, including scope, frequency and distribution.
- Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
    - Revise TAB plan to reflect actual procedures and submit as part of final report.
    - Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
    - Include actual instrument list, with manufacturer name, serial number, and date of calibration.

Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.

Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

GENERAL REQUIREMENTS

Perform total system balance in accordance with one of the following:

AABC (NSTSB), AABC National Standards for Total System Balance.

ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.

NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.

SMACNA (TAB).

Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

TAB Agency Qualifications:

Company specializing in the testing, adjusting, and balancing of systems specified in this section.

Having minimum of three years documented experience.

Certified by one of the following:

AABC, Associated Air Balance Council: www.aabc.com; upon completion submit AABC National Performance Guaranty.

NEBB, National Environmental Balancing Bureau: www.nebb.org.

TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org.

TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

EXAMINATION

Verify that systems are complete and operable before commencing work. Ensure the following conditions:

Systems are started and operating in a safe and normal condition.

Temperature control systems are installed complete and operable.

Proper thermal overload protection is in place for electrical equipment.

Final filters are clean and in place. If required, install temporary media in addition to final filters.

Duct systems are clean of debris.

Fans are rotating correctly.

Fire and volume dampers are in place and open.

Air coil fins are cleaned and combed.

Access doors are closed and duct end caps are in place.

Air outlets are installed and connected.

Duct system leakage is minimized.

Hydronic systems are flushed, filled, and vented.

Pumps are rotating correctly.

Proper strainer baskets are clean and in place.

Service and balance valves are open.

Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

Beginning of work means acceptance of existing conditions.

PREPARATION

Hold a pre-balancing meeting at least one week prior to starting TAB work.

Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect to facilitate spot checks during testing.

ADJUSTMENT TOLERANCES

Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

Hydronic Systems: Adjust to within plus or minus 10 percent of design.

RECORDING AND ADJUSTING

Field Logs: Maintain written logs including:
- Running log of events and issues.
- Discrepancies, deficient or uncompleted work by others.
- Contract interpretation requests.
- Lists of completed tests.

Ensure recorded data represents actual measured or observed conditions.

Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

AIR SYSTEM PROCEDURE

Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

Measure air quantities at air inlets and outlets.

Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.

Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches (12.5 Pa) positive static pressure near the building entries.

Check multi-zone units for motorized damper leakage. Adjust air quantities with mixing dampers set first for cooling, then heating, then modulating.

For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.

WATER SYSTEM PROCEDURE

Adjust water systems to provide required or design quantities.

Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gages to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.

Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.

Effect system balance with automatic control valves fully open to heat transfer elements.

Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.

Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.

SCOPE

Test, adjust, and balance the following:

- Sprinkler Air Compressor.
- Plumbing Pumps.
- HVAC Pumps.
- Water Tube Boilers.
- Air Cooled Refrigerant Condensers.
- Terminal Heat Transfer Units.
- Air Handling Units.
- Fans.
- Air Terminal Units.
- Air Inlets and Outlets.

MINIMUM DATA TO BE REPORTED

Electric Motors:

- Manufacturer.
- Model/Frame.
- HP/BHP.
- Phase, voltage, amperage; nameplate, actual, no load.
- RPM.
- Service factor.
- Starter size, rating, heater elements.
- Sheave Make/Size/Bore.

V-Belt Drives:

- Identification/location.
- Required driven RPM.
- Driven sheave, diameter and RPM.
- Belt, size and quantity.
- Motor sheave diameter and RPM.
- Center to center distance, maximum, minimum, and actual.

Pumps:

- Identification/number.
- Manufacturer.

- Size/model.
- Impeller.
- Service.
- Design flow rate, pressure drop, BHP.
- Actual flow rate, pressure drop, BHP.
- Discharge pressure.
- Suction pressure.
- Total operating head pressure.
- Shut off, discharge and suction pressures.
- Shut off, total head pressure.

Combustion Equipment:

- Boiler manufacturer.
- Model number.
- Serial number.
- Heat input.
- Percent combustion efficiency.
- Heat output.

Air Cooled Condensers:

- Identification/number.
- Location.
- Manufacturer.
- Model number.
- Serial number.

Cooling Coils:

- Identification/number.
- Location.
- Service.
- Manufacturer.
- Air flow, design and actual.
- Entering air DB temperature, design and actual.
- Entering air WB temperature, design and actual.
- Leaving air DB temperature, design and actual.
- Leaving air WB temperature, design and actual.
- Water flow, design and actual.
- Water pressure drop, design and actual.
- Entering water temperature, design and actual.
- Leaving water temperature, design and actual.
- Saturated suction temperature, design and actual.
- Air pressure drop, design and actual.

Heating Coils:

- Identification/number.
- Location.
- Service.
- Manufacturer.
- Air flow, design and actual.
- Water flow, design and actual.
- Water pressure drop, design and actual.
- Entering water temperature, design and actual.
- Leaving water temperature, design and actual.
- Entering air temperature, design and actual.
- Leaving air temperature, design and actual.
- Air pressure drop, design and actual.

Return Air/Outside Air:
- Identification/location.
- Design air flow.
- Actual air flow.
- Design return air flow.
- Actual return air flow.
- Design outside air flow.
- Actual outside air flow.
- Return air temperature.
- Outside air temperature.
- Required mixed air temperature.
- Actual mixed air temperature.
- Design outside/return air ratio.
- Actual outside/return air ratio.

Exhaust Fans:
- Location.
- Manufacturer.
- Model number.
- Serial number.
- Air flow, specified and actual.
- Total static pressure (total external), specified and actual.
- Inlet pressure.
- Discharge pressure.
- Sheave Make/Size/Bore.
- Number of Belts/Make/Size.
- Fan RPM.

Duct Traverses:
- System zone/branch.
- Duct size.
- Area.
- Design velocity.
- Design air flow.
- Test velocity.
- Test air flow.
- Duct static pressure.
- Air temperature.
- Air correction factor.

Terminal Unit Data:
- Manufacturer.
- Type, constant, variable, single, dual duct.
- Identification/number.
- Location.
- Model number.
- Size.
- Minimum static pressure.
- Minimum design air flow.
- Maximum design air flow.
- Maximum actual air flow.
- Inlet static pressure.

Air Distribution Tests:
- Air terminal number.
- Room number/location.

Terminal type.
Terminal size.
Area factor.
Design velocity.
Design air flow.
Test (final) velocity.
Test (final) air flow.
Percent of design air flow.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Duct insulation.

Duct Liner.

RELATED REQUIREMENTS

Section 23 0553 - Identification for HVAC Piping and Equipment.

Section 23 3100 - HVAC Ducts and Casings: Glass fiber ducts.

REFERENCE STANDARDS

ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2015.

ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.

ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation; 2014.

ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2012.

ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.

ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.

UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

PART 2 PRODUCTS

REGULATORY REQUIREMENTS

Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

GLASS FIBER, FLEXIBLE

Manufacturer:

- Knauf Insulation; _____: www.knaufinsulation.com.
- Johns Manville; _____: www.jm.com.
- Owens Corning Corporation; _____: www.ocbuildingspec.com.

Insulation: ASTM C553; flexible, noncombustible blanket.

- 'K' ('Ksi') value: 0.36 at 75 degrees F (0.052 at 24 degrees C), when tested in accordance with ASTM C518.
- Maximum Service Temperature: 1200 degrees F (649 degrees C).
- Maximum Water Vapor Absorption: 5.0 percent by weight.

Vapor Barrier Jacket:

- Kraft paper with glass fiber yarn and bonded to aluminized film.
- Moisture Vapor Permeability: 0.02 perm inch (0.029 ng/Pa s m), when tested in accordance with ASTM E96/E96M.
- Secure with pressure sensitive tape.

DUCT LINER

Manufacturers:

- Knauf Insulation; _____: www.knaufinsulation.com.
- Johns Manville; _____: www.jm.com.
- Owens Corning Corporation; QuietR Rotary Duct Insulation; _____: www.ocbuildingspec.com/sle.

Insulation: Non-corrosive, incombustible glass fiber complying with ASTM C1071; flexible blanket, rigid board, and preformed round liner board; impregnated surface and edges coated with poly vinyl acetate polymer, acrylic polymer, or black composite.
- Fungal Resistance: No growth when tested according to ASTM G21.
- Apparent Thermal Conductivity: Maximum of 0.31 at 75 degrees F (0.045 at 24 degrees C).
- Service Temperature: Up to 250 degrees F (121 degrees C).
- Rated Velocity on Coated Air Side for Air Erosion: 5,000 fpm (25.4 m/s), minimum.
- Minimum Noise Reduction Coefficients:
  - 1 inch (25 mm) Thickness: 0.45.

Adhesive: Waterproof, fire-retardant type, ASTM C916.

Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

PART 3 EXECUTION

EXAMINATION

Verify that ducts have been tested before applying insulation materials.

Verify that surfaces are clean, foreign material removed, and dry.

INSTALLATION

Install in accordance with manufacturer's instructions.

Insulated ducts conveying air below ambient temperature:
- Provide insulation with vapor barrier jackets.
- Finish with tape and vapor barrier jacket.
- Continue insulation through walls, sleeves, hangers, and other duct penetrations.
- Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

Insulated ducts conveying air above ambient temperature:
- Provide with or without standard vapor barrier jacket.
- Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Equipment insulation.

Covering.

RELATED REQUIREMENTS

Section 23 2113 - Hydronic Piping: Placement of hangers and hanger inserts.

Section 23 2114 - Hydronic Specialties.

REFERENCE STANDARDS

ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2014.

ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide product description, thermal characteristics, list of materials and thickness for equipment scheduled.

QUALITY ASSURANCE

Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with not less than three years of documented experience.

DELIVERY, STORAGE, AND HANDLING

Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

FIELD CONDITIONS

Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

REGULATORY REQUIREMENTS

Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

FLEXIBLE ELASTOMERIC CELLULAR INSULATION

Manufacturer:

- Aeroflex USA, Inc; _____: www.aeroflexusa.com.
- Armacell LLC; _____: www.armacell.us.
- K-Flex USA LLC; _____: www.kflexusa.com.

Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 3, in sheet form.

- Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
- Maximum Service Temperature: 220 degrees F (104 degrees C).
- Connection: Waterproof vapor barrier adhesive.

PART 3 EXECUTION

INSTALLATION

Install in accordance with manufacturer's instructions.

SCHEDULE

Heating Systems:

Air Separators:

Expansion Tanks:

END OF SECTION

1 PART 1 GENERAL

2 SECTION INCLUDES

3 Thermostats.

4 Control valves.

5 Automatic dampers.

6 Damper operators.

7 Miscellaneous accessories.

8 RELATED REQUIREMENTS

9 Section 23 0923 - Direct-Digital Control System for HVAC.

10 Section 23 2113 - Hydronic Piping: Installation of control valves, flow switches, temperature sensor sockets, gauge taps.

11 Section 23 2114 - Hydronic Specialties.

12 Section 23 3300 - Air Duct Accessories: Installation of automatic dampers.

13 Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

14 Section 26 2726 - Wiring Devices: Elevation of exposed components.

15 REFERENCE STANDARDS

16 AMCA 500-D - Laboratory Methods for Testing Dampers for Rating; Air Movement and Control Association International, Inc.; 2012.

17 NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 2014.

18 NEMA DC 3 - Residential Controls - Electrical Wall-Mounted Room Thermostats; National Electrical Manufacturers Association; 2013.

19 NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilation Systems; National Fire Protection Association; 2015.

20 ADMINISTRATIVE REQUIREMENTS

21 Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

22 SUBMITTALS

23 See Section 01 3000 - Administrative Requirements, for submittal procedures.

24 Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.

25 Shop Drawings: Indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences. Submit schedule of valves indicating size, flow, and pressure drop for each valve. For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.

26 Operation and Maintenance Data: Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.

27 Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors. Accurately record actual location of control components, including panels, thermostats, and sensors.

28 Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner s name and registered with manufacturer.

29 QUALITY ASSURANCE

30 Designer Qualifications: Design system under direct supervision of a Professional Engineer experienced in design of this work and licensed at the State in which the Project is located.

Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

WARRANTY

See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

MANUFACTURERS

Automated Logic by Climatec.

EQUIPMENT - GENERAL

Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

CONTROL VALVES

Globe Pattern:

- Up to 2 inches (50 mm): Bronze body, bronze trim, rising stem, renewable composition disc, screwed ends with backseating capacity repackable under pressure.
- Over 2 inches (50 mm): Iron body, bronze trim, rising stem, plug-type disc, flanged ends, renewable seat and disc.
- Hydronic Systems:
  - Rate for service pressure of 125 psig at 250 degrees F (860 kPa at 121 degrees C).
  - Replaceable plugs and seats of stainless steel.
  - Size for 3 psig (20 kPa) maximum pressure drop at design flow rate.
  - Two way valves shall have equal percentage characteristics, three way valves linear characteristics. Size two way valve operators to close valves against pump shut off head.

Electronic Operators:

- Valves shall spring return to normal position as indicated on freeze, fire, or temperature protection.
- Select operator for full shut off at maximum pump differential pressure.

DAMPERS

Performance: Test in accordance with AMCA 500-D.

Frames: Galvanized steel, welded or riveted with corner reinforcement, minimum 12 gage, 0.1046 inch (2.66 mm).

Blades: Galvanized steel, maximum blade size 8 inches (200 mm) wide, 48 inches (1200 mm) long, minimum 22 gage, 0.0299 inch (0.76 mm), attached to minimum 1/2 inch (13 mm) shafts with set screws.

Blade Seals: Synthetic elastomeric inflatable mechanically attached, field replaceable.

Jamb Seals: Spring stainless steel.

Shaft Bearings: Oil impregnated sintered bronze.

Linkage Bearings: Oil impregnated sintered bronze.

Leakage: Less than one percent based on approach velocity of 2000 ft/min (10 m/sec) and 4 inches wg (1.0 kPa).

Maximum Pressure Differential: 6 inches wg (1.5 kPa).

Temperature Limits: -40 to 200 degrees F (-40 to 93 degrees C).

DAMPER OPERATORS

General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for two position control and for fail safe operation.

INPUT/OUTPUT SENSORS

Temperature Sensors:

Use thermistor or RTD type temperature sensing elements with characteristics resistant to moisture, vibration, and other conditions consistent with the application without affecting accuracy and life expectancy.

Construct RTD of nickel or platinum with base resistance of 1000 ohms at 70 degrees F (26 degrees C).

100 ohm platinum RTD is acceptable if used with project DDC controllers.

Temperature sensing device must be compatible with project DDC controllers.

THERMOSTATS

Electric Room Thermostats:

Type: NEMA DC 3, 24 volts, with setback/setup temperature control.

Service: Cooling and heating.

Covers: Locking with set point adjustment, with thermometer.

PART 3 EXECUTION

EXAMINATION

Verify existing conditions before starting work.

Verify that systems are ready to receive work.

Beginning of installation means installer accepts existing conditions.

Sequence work to ensure installation of components is complementary to installation of similar components in other systems.

Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

Ensure installation of components is complementary to installation of similar components.

Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

INSTALLATION

Install in accordance with manufacturer's instructions.

Check and verify location of thermostats with plans and room details before installation. Locate 60 inches (1500 mm) above floor. Align with lighting switches. Refer to Section 26 2726.

Mount outdoor reset thermostats and outdoor sensors indoors, with sensing elements outdoors with sun shield.

Provide separable sockets for liquids and flanges for air bulb elements.

Provide thermostats in aspirating boxes in front entrances.

Provide guards on thermostats in entrances and public areas.

Provide conduit and electrical wiring in accordance with Section 26 2717. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

System description.

Controllers.

Power supplies and line filtering.

System software.

Controller software.

HVAC control programs.

RELATED REQUIREMENTS

Section 23 0913 - Instrumentation and Control Devices for HVAC.

Section 23 0993 - Sequence of Operations for HVAC Controls.

Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

REFERENCE STANDARDS

ANSI/CEA 709.1.D - Control Network Protocol Specification; 2014.

ASHRAE Std 135 - BACnet - A Data Communication Protocol for Building Automation and Control Networks; 2012, Including All Addenda.

MIL-STD-810 - Environmental Engineering Considerations and Laboratory Tests; Revision G, 2014.

ASHRAE Std 147 - Reducing the Release of Halogenated Refrigerants From Refrigerating and Air-Conditioning Equipment and Systems; 2002.

NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

SUBMITTALS

See Section 01 3000 - Administrative Requirements for submittal procedures.

Product Data: Provide data for each system component and software module.

Shop Drawings:

- Indicate trunk cable schematic showing programmable control unit locations, and trunk data conductors.
- Indicate system graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations. Provide demonstration diskette containing graphics.
- Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
- Indicate description and sequence of operation of operating, user, and application software.

Manufacturer's Instructions: Indicate manufacturer's installation instructions for all manufactured components.

Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.

- Revise shop drawings to reflect actual installation and operating sequences.
- Include submittals data in final "Record Documents" form.

Operation and Maintenance Data:

- Include interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.
- Include keyboard illustrations and step-by-step procedures indexed for each operator function.

Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.

Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner s name and registered with manufacturer.

Maintenance Materials:

See Section 01 6000 - Product Requirements, for additional provisions.

QUALITY ASSURANCE

Designer Qualifications: Perform design of system software under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

Installer Qualifications: Company specializing in performing work of the type specified and with minimum three years of documented experience.

Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for purpose specified and indicated.

WARRANTY

See Section 01 7800 - Closeout Submittals for additional warranty requirements.

Provide five year manufacturer's warranty for field programmable micro-processor based units.

PART 2 PRODUCTS

MANUFACTURERS

Automated Logic by Climatec.

CONTROLLERS

BUILDING CONTROLLERS

General:

Manage global strategies by one or more, independent, standalone, microprocessor based controllers.

Provide sufficient memory to support controller's operating system, database, and programming requirements.

Share data between networked controllers.

Controller operating system manages input and output communication signals allowing distributed controllers to share real and virtual object information and allowing for central monitoring and alarms.

Utilize real-time clock for scheduling.

Continuously check processor status and memory circuits for abnormal operation.

Controller to assume predetermined failure mode and generate alarm notification upon detection of abnormal operation.

Communication with other network devices to be based on assigned protocol.

Communication:

Controller to reside on a BACnet network using ISO 8802-3 (ETHERNET) Data Link/Physical layer protocol.

Perform routing when connected to a network of custom application and application specific controllers.

Provide service communication port for connection to a portable operator's terminal or hand held device with compatible protocol.

Anticipated Environmental Ambient Conditions:

Outdoors and/or in Wet Ambient Conditions:

Mount within waterproof enclosures.

Rated for operation at 40 to 150 degrees F (4 to 65 degrees C).

Conditioned Space:

Mount within dustproof enclosures.
Rated for operation at 32 to 120 degrees F (0 to 50 degrees C).
Provisions for Serviceability:
Diagnostic LEDs for power, communication, and processor.
Make all wiring connections to field removable, modular terminal strips, or to a termination card connected by a ribbon cable.
Memory: In the event of a power loss, maintain all BIOS and programming information for a minimum of 72 hours.
Power and Noise Immunity:
Maintain operation at 90 to 110 percent of nominal voltage rating.
Perform orderly shutdown below 80 percent of nominal voltage.
Operation protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W. at 3 feet (1 m).

INPUT/OUTPUT INTERFACE
Hardwired inputs and outputs tie into the DDC system through building, custom application, or application specific controllers.
All Input/Output Points:
Protect controller from damage resulting from any point short-circuiting or grounding and from voltage up to 24 volts of any duration.
Provide universal type for building and custom application controllers where input or output is software designated as either binary or analog type with appropriate properties.
Binary Inputs:
Allow monitoring of On/Off signals from remote devices.
Provide wetting current of 12 mA minimum, compatible with commonly available control devices and protected against the effects of contact bounce and noise.
Sense dry contact closure with power provided only by the controller.
Pulse Accumulation Input Objects: Conform to all requirements of binary input objects and accept up to 10 pulses per second.
Analog Inputs:
Allow for monitoring of low voltage 0 to 10 VDC, 4 to 20 mA current, or resistance signals (thermistor, RTD).
Compatible with and field configurable to commonly available sensing devices.
Binary Outputs:
Used for On/Off operation or a pulsed low-voltage signal for pulse width modulation control.
Outputs provided with three position (On/Off/Auto) override switches.
Status lights for building and custom application controllers to be selectable for normally open or normally closed operation.
Analog Outputs:
Monitoring signal provides a 0 to 10 VDC or a 4 to 20 mA output signal for end device control.
Provide status lights and two position (AUTO/MANUAL) switch for building and custom application controllers with manually adjustable potentiometer for manual override on building and custom application controllers.
Drift to not exceed 0.4 percent of range per year.
Tri State Outputs:
Coordinate two binary outputs to control three point, floating type, electronic actuators without feedback.
Limit the use of three point, floating devices to the following zone and terminal unit control applications:
Control algorithms run the zone actuator to one end of its stroke once every 24 hours for verification of operator tracking.
System Object Capacity:

System size to be expandable to twice the number of input output objects required by providing additional controllers, including associated devices and wiring.

Hardware additions or software revisions for the installed operator interfaces are not to be required for future, system expansions.

POWER SUPPLIES AND LINE FILTERING

Power Supplies:

Provide UL listed control transformers with Class 2 current limiting type or over-current protection in both primary and secondary circuits for Class 2 service as required by the NEC.

Limit connected loads to 80 percent of rated capacity.

Match DC power supply to current output and voltage requirements.

Unit to be full wave rectifier type with output ripple of 5.0 mV maximum peak to peak.

Regulation to be 1 percent combined line and load with 100 microsecond response time for 50 percent load changes.

Provide over-voltage and over-current protection to withstand a 150 percent current overload for 3 seconds minimum without trip-out or failure.

Operational Ambient Conditions: 32 to 120 degrees F (0 to 50 degrees C).

EM/RF meets FCC Class B and VDE 0871 for Class B and MIL-STD 810 for shock and vibration.

Line voltage units UL recognized and CSA approved.

Power Line Filtering:

Provide external or internal transient voltage and surge suppression component for all workstations and controllers.

Minimum surge protection attributes:

Dielectric strength of 1000 volts minimum.

Response time of 10 nanoseconds or less.

Transverse mode noise attenuation of 65 dB or greater.

Common mode noise attenuation of 150 dB or greater at 40 to 100 Hz.

LOCAL AREA NETWORK (LAN)

Provide communication between control units over local area network (LAN).

LAN Capacity: Not less than 60 stations or nodes.

Break in Communication Path: Alarm and automatically initiate LAN reconfiguration.

LAN Data Speed: Minimum 19.2 Kb.

Communication Techniques: Allow interface into network by multiple operation stations and by auto-answer/auto-dial modems. Support communication over telephone lines utilizing modems.

Transmission Median: Fiber optic or single pair of solid 24 gage twisted, shielded copper cable.

Network Support: Time for global point to be received by any station, shall be less than 3 seconds. Provide automatic reconfiguration if any station is added or lost. If transmission cable is cut, reconfigure two sections with no disruption to system's operation, without operator intervention.

SYSTEM SOFTWARE

Operating System:

Concurrent, multi-tasking capability.

Common Software Applications Supported: Microsoft Excel.

Acceptable Operating Systems: _____.

System Graphics:

Allow up to 10 graphic screens, simultaneously displayed for comparison and monitoring of system status.

Animation displayed by shifting image files based on object status.

Provide method for operator with password to perform the following:

Move between, change size, and change location of graphic displays.

- Modify on-line.
- Add, delete, or change dynamic objects consisting of:
  - Analog and binary values.
  - Dynamic text.
  - Static text.
  - Animation files.
- Custom Graphics Generation Package:
  - Create, modify, and save graphic files and visio format graphics in PCX formats.
  - HTML graphics to support web browser compatible formats.
  - Capture or convert graphics from AutoCAD.
- Standard HVAC Graphics Library:
  - HVAC Equipment:
  - Ancillary Equipment:

Workstation System Applications:

- Automatic System Database Save and Restore Functions:
  - Current database copy of each Building Controller is automatically stored on hard disk.
  - Automatic update occurs upon change in any system panel.
  - In the event of database loss in any system panel, the first workstation to detect the loss automatically restores the database for that panel unless disabled by the operator.
- Manual System Database Save and Restore Functions by Operator with Password Clearance:
  - Save database from any system panel.
  - Clear a panel database.
  - Initiate a download of a specified database to any system panel.
- Software provided allows system configuration and future changes or additions by operators under proper password protection.
- On-line Help:
  - Context-sensitive system assists operator in operation and editing.
  - Available for all applications.
  - Relevant screen data provided for particular screen display.
  - Additional help available via hypertext.
- Security:
  - Operator log-on requires user name and password to view, edit, add, or delete data.
  - System security selectable for each operator.
  - System supervisor sets passwords and security levels for all other operators.
  - Operator passwords to restrict functions accessible to viewing and/or changing system applications, editor, and object.
  - Automatic, operator log-off results from keyboard or mouse inactivity during user-adjustable, time period.
  - All system security data stored in encrypted format.
- System Diagnostics:
  - Operations Automatically Monitored:
    - Workstations.
    - Printers.
    - Modems.
    - Network connections.
    - Building management panels.
    - Controllers.
  - Device failure is annunciated to the operator.
- Alarm Processing:
  - All system objects are configurable to "alarm in" and "alarm out" of normal state.
  - Configurable Objects:
    - Alarm limits.
    - Alarm limit differentials.

- States.
- Reactions for each object.

Alarm Messages:

- Descriptor: English language.
- Recognizable Features:
  - Source.
  - Location.
  - Nature.

Configurable Alarm Reactions by Workstation and Time of Day:

- Logging.
- Printing.
- Starting programs.
- Displaying messages.
- Dialing out to remote locations.
- Paging.
- Providing audible annunciation.
- Displaying specific system graphics.

Custom Trend Logs:

- Definable for any data object in the system including interval, start time, and stop time.
- Trend Data:
  - Sampled and stored on the building controller panel.
  - Archivable on hard disk.
  - Retrievable for use in reports, spreadsheets and standard database programs.
  - Archival on LAN accessible storage media including hard disk, tape, Raid array drive, and virtual cloud environment.
  - Protected and encrypted format to prevent manipulation, or editing of historical data and event logs.

Alarm and Event Log:

- View all system alarms and change of states from any system location.
- Events listed chronologically.
- Operator with proper security acknowledges and clears alarms.
- Alarms not cleared by operator are archived to the workstation hard disk.

Object, Property Status and Control:

- Provide a method to view, edit if applicable, the status of any object and property in the system.
- Status Available by the Following Methods:
  - Menu.
  - Graphics.
  - Custom Programs.

Reports and Logs:

- Reporting Package:
  - Allows operator to select, modify, or create reports.
  - Definable as to data content, format, interval, and date.
  - Archivable to hard disk.
- Real-time logs available by type or status such as alarm, lockout, normal, etc.
- Stored on hard disk and readily accessible by standard software applications, including spreadsheets and word processing.
- Set to be printed on operator command or specific time(s).

Reports:

- Standard:
  - Objects with current values.
  - Current alarms not locked out.
  - Disabled and overridden objects, points and SNVTs.
  - Objects in manual or automatic alarm lockout.

- Objects in alarm lockout currently in alarm.
- Logs:
  - Alarm History.
  - System messages.
  - System events.
  - Trends.
- Custom:
  - Daily.
  - Weekly.
  - Monthly.
  - Annual.
  - Time and date stamped.
  - Title.
  - Facility name.
- Tenant Override:
  - Monthly report showing total, requested, after-hours HVAC and lighting services on a daily basis for each tenant.
  - Annual report showing override usage on a monthly basis.
- Electrical, Fuel, and Weather:
  - Electrical Meter(s):
    - Monthly showing daily electrical consumption and peak electrical demand with time and date stamp for each meter.
    - Annual summary showing monthly electrical consumption and peak demand with time and date stamp for each meter.
  - Fuel Meter(s):
    - Monthly showing daily natural gas consumption for each meter.
    - Annual summary showing monthly consumption for each meter.
  - Weather:
    - Monthly showing minimum, maximum, average outdoor air temperature and heating/cooling degree-days for the month.

Workstation Applications Editors:

- Provide editing software for each system application at PC workstation.
- Downloaded application is executed at controller panel.
- Full screen editor for each application allows operator to view and change:
  - Configuration.
  - Name.
  - Control parameters.
  - Set-points.
- Scheduling:
  - Monthly calendar indicates schedules, holidays, and exceptions.
  - Allows several related objects to be scheduled and copied to other objects or dates.
  - Start and stop times adjustable from master schedule.
- Custom Application Programming:
  - Create, modify, debug, edit, compile, and download custom application programming during operation and without disruption of all other system applications.
  - Programming Features:
    - English oriented language, based on BASIC, FORTRAN, C, or PASCAL syntax allowing for free form programming.
    - Alternative language graphically based using appropriate function blocks suitable for all required functions and amenable to customizing or compounding.
    - Insert, add, modify, and delete custom programming code that incorporates word processing features such as cut/paste and find/replace.
    - Allows the development of independently, executing, program modules designed to enable and disable other modules.

Debugging/simulation capability that displays intermediate values and/or results including syntax/execution error messages.

Support for conditional statements (IF/THEN/ELSE/ELSE-F) using compound Boolean (AND, OR, and NOT) and/or relations (EQUAL, LESS THAN, GREATER THAN, NOT EQUAL) comparisons.

Support for floating-point arithmetic utilizing plus, minus, divide, times, square root operators; including absolute value; minimum/maximum value from a list of values for mathematical functions.

Language consisting of resettable, predefined, variables representing time of day, day of the week, month of the year, date; and elapsed time in seconds, minutes, hours, and days where the variable values cab be used in IF/THEN comparisons, calculations, programming statement logic, etc.

Language having predefined variables representing status and results of the system software enables, disables, and changes the set points of the controller software.

CONTROLLER SOFTWARE

All applications reside and operate in the system controllers and editing of all applications occurs at the operator workstation.

System Security:

- User access secured via user passwords and user names.
- Passwords restrict user to the objects, applications, and system functions as assigned by the system manager.
- User Log On/Log Off attempts are recorded.
- Automatic Log Off occurs following the last keystroke after a user defined delay time.

Object or Object Group Scheduling:

- Weekly Schedules Based on Separate, Daily Schedules:
  - Include start, stop, optimal stop, and night economizer.
  - 10 events maximum per schedule.
  - Start/stop times adjustable for each group object.

Provide standard application for equipment coordination and grouping based on function and location to be used for scheduling and other applications.

Alarms:

- Binary object is set to alarm based on the operator specified state.
- Analog object to have high/low alarm limits.
- All alarming is capable of being automatically and manually disabled.
- Alarm Reporting:
  - Operator determines action to be taken for alarm event.
  - Alarms to be routed to appropriate workstation.
  - Reporting Options:

Maintenance Management: System monitors equipment status and generates maintenance messages based upon user-designated run-time limits.

Sequencing: Application software based upon specified sequences of operation in Section 23 0993.

PID Control Characteristics:

- Direct or reverse action.
- Anti-windup.
- Calculated, time-varying, analog value, positions an output or stages a series of outputs.
- User selectable controlled variable, set-point, and PED gains.

Staggered Start Application:

- Prevents all controlled equipment from simultaneously restarting after power outage.
- Order of equipment startup is user selectable.

Energy Calculations:
- Accumulated instantaneous power or flow rates are converted to energy use data.
- Algorithm calculates a rolling average and allows window of time to be user specified in minute intervals.
- Algorithm calculates a fixed window average with a digital input signal from a utility meter defining the start of the window period that in turn synchronizes the fixed-window average with that used by the power company.

Anti-Short Cycling:
- All binary output objects protected from short-cycling.
- Allows minimum on-time and off-time to be selected.

On-Off Control with Differential:
- Algorithm allows binary output to be cycled based on a controlled variable and set-point.
- Algorithm to be direct-acting or reverse-acting incorporating an adjustable differential.

Run-Time Totalization:
- Totalize run-times for all binary input objects.
- Provides operator with capability to assign high run-time alarm.

PART 3 EXECUTION

INSTALLERS

Installer List:
- Climatec.

EXAMINATION

Verify existing conditions before starting work.

Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

INSTALLATION

Install control units and other hardware in position on permanent walls where not subject to excessive vibration.

Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation. Refer to Section 23 0993.

Provide conduit and electrical wiring in accordance with Section 26 2717. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Pipe, pipe fittings, valves, and connections for natural gas piping systems.

RELATED REQUIREMENTS

Section 07 8400 - Firestopping.

Section 08 3100 - Access Doors and Panels.

Section 09 9113 - Exterior Painting.

Section 09 9123 - Interior Painting.

Section 22 0516 - Expansion Fittings and Loops for Plumbing Piping.

Section 22 0719 - Plumbing Piping Insulation.

Section 23 0516 - Expansion Fittings and Loops for HVAC Piping.

Section 23 0548 - Vibration and Seismic Controls for HVAC Piping and Equipment.

Section 23 0553 - Identification for HVAC Piping and Equipment.

Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

Section 31 2316 - Excavation.

Section 31 2316.13 - Trenching.

Section 33 5216 - Gas Hydrocarbon Piping.

REFERENCE STANDARDS

ANSI Z21.18/CSA 6.3 - Gas Appliance Pressure Regulators; 2007 (Reaffirmed 2012).

ANSI Z21.80/CSA 6.22 - Line Pressure Regulators; 2011 (Including Addendum 1).

ANSI Z223.1 - National Fuel Gas Code; 2015.

ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Welding, Brazing, and Fusing Qualifications; 2015.

ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2016.

ASME B31.1 - Power Piping; 2016.

ASME B31.9 - Building Services Piping; 2014.

ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999 (Reapproved 2014).

ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2016.

ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992 (Reapproved 2014).

AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; 2010.

AWWA C606 - Grooved and Shouldered Joints; 2015.

MSS SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends; 2011.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

Welder Certificate: Include welders certification of compliance with ASME BPVC-IX.

Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

Project Record Documents: Record actual locations of valves.

Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
See Section 01 6000 - Product Requirements, for additional provisions.

QUALITY ASSURANCE

Perform work in accordance with applicable codes.

Valves: Manufacturer's name and pressure rating marked on valve body.

Welding Materials and Procedures: Conform to ASME BPVC-IX and applicable state labor regulations.

Identify pipe with marking including size, ASTM material classification, and ASTM specification.

DELIVERY, STORAGE, AND HANDLING

Accept valves on site in shipping containers with labeling in place. Inspect for damage.

Provide temporary protective coating on cast iron and steel valves.

Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

FIELD CONDITIONS

Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

NATURAL GAS PIPING, BURIED WITHIN 5 FEET (1500 mm) OF BUILDING

Steel Pipe: ASTM A53/A53M, Schedule 40 black.
Fittings: ASTM A234/A234M, wrought steel welding type.
Joints: ANSI Z223.1, welded.
Jacket: AWWA C105/A21.5 polyethylene jacket or double layer, half-lapped 10 mil (0.25 mm) polyethylene tape.

NATURAL GAS PIPING, ABOVE GRADE

Steel Pipe: ASTM A53/A53M, Schedule 40 black.
Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
Joints: Threaded or welded to ASME B31.1.

FLANGES, UNIONS, AND COUPLINGS

Unions for Pipe Sizes 3 Inches (80 mm) and Under:
Ferrous pipe: Class 150 malleable iron threaded unions.

Flanges for Pipe Size Over 1 Inch (25 mm):
Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.

Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
Dimensions and Testing: In accordance with AWWA C606.
Housing Material: Provide ASTM A47/A47M malleable iron, ductile iron, or _____, galvanized.
Gasket Material: EPDM suitable for operating temperature range from minus 30 degrees F (minus 34 degrees C) to 230 degrees F (110 degrees C).
Gasket Material: Nitrile rubber suitable for operating temperature range from minus 20 degrees F to 180 degrees F (minus 29 degrees C to 82 degrees C).

- Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
- When pipe is field grooved, provide coupling manufacturer's grooving tools.

Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

PIPE HANGERS AND SUPPORTS

Provide hangers and supports that comply with MSS SP-58.

- If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
- Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
- Trapeze Hangers: Welded steel channel frames attached to structure.
- Vertical Pipe Support: Steel riser clamp.
- Floor Supports: Concrete pier or steel pedestal with floor flange; fixture attachment.
- Rooftop Supports for Low-Slope Roofs: Steel pedestals with bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified; and as follows:
  - Bases: High density polypropylene.
  - Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
  - Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
  - Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion resistant material.
  - Height: Provide minimum clearance of 6 inches (150 mm) under pipe to top of roofing.

Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:

PLUG VALVES

Construction 2-1/2 Inches (65 mm) and Larger: MSS SP-78, 175 psi (1200 kPa) CWP, cast iron body and plug, pressure lubricated, Teflon or Buna N packing, flanged or grooved ends. Provide lever operator with set screw.

LINE PRESSURE REGULATORS AND APPLIANCE REGULATORS INDICATORS

Manufacturers:

- Actaris Metering Systems (A brand of ITT Controls): www.actaris-metering-systems.com.
- Dungs Combustion Controls: www.dungs.com.
- Maxitrol Company: www.maxitrol.com.
- Substitutions: See Section 01 6000 - Product Requirements.

Compliance Requirements:

- Appliance Regulator: ANSI Z21.18/CSA 6.3.
- Line Pressure Regulator: ANSI Z21.80/CSA 6.22.

Materials in Contact With Gas:

- Housing: Aluminum, steel (free of non-ferrous metals).
- Seals and Diaphragms: NBR-based rubber.

Maximum Inlet Operating Pressure: 10 psi (68.9 kPa).

- Appliance Regulator: 10 psi (68.9 kPa).
- Line Pressure Regulator: 10 psi (68.9 kPa).

Maximum Body Pressure: 10 psi (1000 mbar).

Output Pressure Range: 1 inch wc (2.5 mbar) to 80 inch wc (200 mbar).

PART 3 EXECUTION

EXAMINATION

Verify that excavations are to required grade, dry, and not over-excavated.

113 PREPARATION

114 Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

115 Remove scale and dirt, on inside and outside, before assembly.

116 Prepare piping connections to equipment with flanges or unions.

117 INSTALLATION

118 Install in accordance with manufacturer's instructions.

119 Provide non-conducting dielectric connections wherever jointing dissimilar metals.

120 Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

121 Install piping to maintain headroom, conserve space, and not interfere with use of space.

122 Group piping whenever practical at common elevations.

123 Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 22 0516.

124 Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

125 Provide access where valves and fittings are not exposed.

126 Coordinate size and location of access doors with Section 08 3100.

127 Install vent piping penetrating roofed areas to maintain integrity of roof assembly; refer to Section _____.

128 Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

129 Provide support for utility meters in accordance with requirements of utility companies.

130 Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.

131 Install valves with stems upright or horizontal, not inverted.

132 Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.

133 Sleeve pipes passing through partitions, walls and floors.

134 Pipe Hangers and Supports:

135 Install in accordance with ASME B31.9.

136 Support horizontal piping as scheduled.

137 Install hangers to provide minimum 1/2 inch (15 mm) space between finished covering and adjacent work.

138 Place hangers within 12 inches (300 mm) of each horizontal elbow.

139 Use hangers with 1-1/2 inch (40 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

140 Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

141 APPLICATION

142 Install unions downstream of valves and at equipment or apparatus connections.

143 Provide plug valves in natural gas systems for shut-off service.

144 SERVICE CONNECTIONS

145 Provide new gas service complete with gas meter and regulators in accordance with Section 33 5216. Gas service distribution piping to have initial minimum pressure of 2 psi (14 kPa). Provide regulators on each line serving gravity type appliances, sized in accordance with equipment.

146 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Hydronic system requirements.

Heating water piping, above grade.

Heating water and glycol piping, above grade.

Equipment drains and overflows.

Pipe hangers and supports.

Unions, flanges, mechanical couplings, and dielectric connections.

Valves:

- Ball valves.
- Butterfly valves.
- Check valves.

Flow controls.

RELATED REQUIREMENTS

Section 08 3100 - Access Doors and Panels.

Section 09 9123 - Interior Painting.

Section 22 0553 - Identification for Plumbing Piping and Equipment.

Section 22 0719 - Plumbing Piping Insulation.

Section 23 0516 - Expansion Fittings and Loops for HVAC Piping.

Section 23 0523 - General-Duty Valves for HVAC Piping.

Section 23 0548 - Vibration and Seismic Controls for HVAC Piping and Equipment.

Section 23 0553 - Identification for HVAC Piping and Equipment.

Section 23 0719 - HVAC Piping Insulation.

Section 23 2114 - Hydronic Specialties.

Section 23 2500 - HVAC Water Treatment: Pipe cleaning.

Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

REFERENCE STANDARDS

ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; The American Society of Mechanical Engineers; 2011.

ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers; 2012 (ANSI B16.18).

ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.

ASME B31.9 - Building Services Piping; 2014 (ANSI/ASME B31.9).

ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2013.

ASTM B32 - Standard Specification for Solder Metal; 2008.

ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.

ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2013.

ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992 (Reapproved 2014).

ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications; 2007 (Reapproved 2013).

11

AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2015.

AWWA C606 - Grooved and Shouldered Joints; 2015 (ANSI/AWWA C606).

MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2009.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data:

- Include data on pipe materials, pipe fittings, valves, and accessories.
- Provide manufacturers catalogue information.
- Indicate valve data and ratings.

Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

Project Record Documents: Record actual locations of valves.

Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

- See Section 01 6000 - Product Requirements, for additional provisions.

DELIVERY, STORAGE, AND HANDLING

Accept valves on site in shipping containers with labeling in place. Inspect for damage.

Provide temporary protective coating on cast iron and steel valves.

Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

HYDRONIC SYSTEM REQUIREMENTS

Comply with ASME B31.9 and applicable federal, state, and local regulations.

Piping: Provide piping, fittings, hangers and supports as required, as indicated, and as follows:

- Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
- Use non-conducting dielectric connections whenever jointing dissimilar metals.
- Grooved mechanical joints may be used in accessible locations only.
  - Accessible locations include those exposed on interior of building, in pipe chases, and in mechanical rooms, aboveground outdoors, and as approved by Architect.
  - Use rigid joints unless otherwise indicated.
- Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.

Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges, unions, or grooved couplings to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.

Valves: Provide valves where indicated:

- Provide drain valves where indicated, and if not indicated provide at least at main shut-off, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch (20 mm) gate valves with cap; pipe to nearest floor drain.
- For throttling, bypass, or manual flow control services, use globe, ball, or butterfly valves.
- For shut-off and to isolate parts of systems or vertical risers, use ball or butterfly valves.

74 HEATING WATER AND GLYCOL PIPING, ABOVE GRADE

Steel Pipe: ASTM A53/A53M, Schedule 40, black, using one of the following joint types:
- Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1/D1.1M welded.
- Threaded Joints: ASME B16.3, malleable iron fittings.

Copper Tube: ASTM B88 (ASTM B88M), Type K (A), drawn, using one of the following joint types:
- Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings.
  - Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
  - Braze: AWS A5.8M/A5.8 BCuP copper/silver alloy.
- Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.

83 EQUIPMENT DRAINS AND OVERFLOWS

Copper Tube: ASTM B88 (ASTM B88M), Type K (A), drawn; using one of the following joint types:
- Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings; ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.

86 PIPE HANGERS AND SUPPORTS

Provide hangers and supports that comply with MSS SP-58.
- If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
- Hangers for Pipe Sizes 1/2 to 1-1/2 Inch (13 to 38 mm): Malleable iron, adjustable swivel, split ring.
- Hangers for Hot Pipe Sizes 2 to 4 Inches (50 to 100 mm): Carbon steel, adjustable, clevis.
- Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
- Wall Support for Pipe Sizes to 3 Inches (76 mm): Cast iron hook.
- Wall Support for Pipe Sizes 4 Inches (100 mm) and Greater: Welded steel bracket and wrought steel clamp.
- Floor Support for Hot Pipe Sizes to 4 Inches (100 mm): Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
- Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

In grooved installations, use rigid couplings with offsetting angle-pattern bolt pads or with wedge shaped grooves in header piping to permit support and hanging in accordance with ASME B31.9.

98 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS

Unions for Pipe 2 Inches (50 mm) and Less:
- Ferrous Piping: 150 psig (1034 kPa) malleable iron, threaded.
- Copper Pipe: Bronze, soldered joints.

Flanges for Pipe 2 Inches (50 mm) and Greater:
- Ferrous Piping: 150 psig (1034 kPa) forged steel, slip-on.
- Copper Piping: Bronze.
- Gaskets: 1/16 inch (1.6 mm) thick preformed neoprene.

Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
- Dimensions and Testing: In accordance with AWWA C606.
- Mechanical Couplings: Comply with ASTM F1476.
- Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
- When pipe is field grooved, provide coupling manufacturer's grooving tools.

Dielectric Connections:

Waterways:
Water impervious insulation barrier capable of limiting galvanic current to 1 percent of short circuit current in a corresponding bimetallic joint.
Dry insulation barrier able to withstand 600 volt breakdown test.
Construct of galvanized steel with threaded end connections to match connecting piping.
Suitable for the required operating pressures and temperatures.

BALL VALVES

Manufacturers:
Grinnell Products, a Tyco Business: www.grinnell.com.
Victaulic Company: www.victaulic.com.
Substitutions: See Section 01 6000 - Product Requirements.

Up To and Including 2 Inches (50 mm):
Bronze one piece body, chrome plated brass ball, teflon seats and stuffing box ring, lever handle with balancing stops, solder ends with union.

Over 2 Inches (50 mm):
Ductile iron body, chrome plated stainless steel ball, teflon seat and stuffing box seals, lever handle, flanged ends, rated to 800 psi (5515 kPa).

BUTTERFLY VALVES

Manufacturers:
Grinnell Products, a Tyco Business: www.grinnell.com.
Victaulic Company: www.victaulic.com.
Substitutions: See Section 01 6000 - Product Requirements.

Body: Cast or ductile iron with resilient replaceable EPDM seat, wafer or lug ends, extended neck.

Disc: Construct of aluminum bronze, chrome plated ductile iron, stainless steel, ductile iron with EPDM encapsulation, or Buna-N encapsulation.

Stem: Stainless steel with stem offset from the centerline to provide full 360 degree circumferential setting.

Operator: 10 position lever handle.

SWING CHECK VALVES

Manufacturers:
Grinnell Products, a Tyco Business: www.grinnell.com.
Victaulic Company: www.victaulic.com.
Substitutions: See Section 01 6000 - Product Requirements.

Up To and Including 2 Inches (50 mm):
Bronze body, bronze trim, bronze rotating swing disc, with composition disc, solder ends.

Over 2 Inches (50 mm):
Iron body, bronze trim, stainless steel or bronze swing disc, renewable disc and seat, flanged ends.

FLOW CONTROLS

Manufacturers:
Griswold Controls: www.griswoldcontrols.com.
ITT Bell & Gossett: www.bellgossett.com.
Taco, Inc: www.taco-hvac.com.
Substitutions: See Section 01 6000 - Product Requirements.

Construction: Class 125, Brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet, blowdown/backflush drain.

151 Calibration: Control flow within 5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, maximum minimum pressure 3.5 psi (24 kPa).

152 PART 3 EXECUTION

153 PREPARATION

154 Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

155 Prepare pipe for grooved mechanical joints as required by coupling manufacturer.

156 Remove scale and dirt on inside and outside before assembly.

157 Prepare piping connections to equipment using jointing system specified.

158 Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

159 After completion, fill, clean, and treat systems. Refer to Section 23 2500 for additional requirements.

160 INSTALLATION

161 Install in accordance with manufacturer's instructions.

162 Route piping in orderly manner, parallel to building structure, and maintain gradient.

163 Install piping to conserve building space and to avoid interfere with use of space.

164 Group piping whenever practical at common elevations.

165 Sleeve pipe passing through partitions, walls and floors.

166 Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified _____.

167 Slope piping and arrange to drain at low points.

168 Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 23 0516.

169 Pipe Hangers and Supports:

170 Install in accordance with ASME B31.9, ASTM F708, or MSS SP-58.

171 Install hangers to provide minimum 1/2 inch (13 mm) space between finished covering and adjacent work.

172 Place hangers within 12 inches (300 mm) of each horizontal elbow.

173 Use hangers with 1-1/2 inch (38 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

174 Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.

175 Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

176 Provide copper plated hangers and supports for copper piping.

177 Prime coat exposed steel hangers and supports. Refer to Section 09 9123. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

178 Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 22 0719.

179 Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Section 08 3100.

180 Prepare unfinished pipe, fittings, supports, and accessories, ready for finish painting. Refer to Section 09 9123.

181 Install valves with stems upright or horizontal, not inverted.

182 SCHEDULES

183 Hanger Spacing for Copper Tubing.

1/2 inch (15 mm) and 3/4 inch (20 mm): Maximum span, 5 feet (1500 mm); minimum rod size, 1/4 inch (6 mm).
1 inch (25 mm): Maximum span, 6 feet (1800 mm); minimum rod size, 1/4 inch (6 mm).
1-1/2 inch (40 mm) and 2 inch (50 mm): Maximum span, 8 feet (2400 mm); minimum rod size, 3/8 inch (9 mm).
2-1/2 inch (65 mm): Maximum span, 9 feet (2700 mm); minimum rod size, 3/8 inch (9 mm).
3 inch (80 mm): Maximum span, 10 feet (3.0 m); minimum rod size, 3/8 inch (9 mm).
4 inch (100 mm): Maximum span, 12 feet (3.6 m); minimum rod size, 1/2 inch (13 mm).

Hanger Spacing for Steel Piping.
1/2 inch (15 mm), 3/4 inch (20 mm), and 1 inch (25 mm): Maximum span, 7 feet (2100 mm); minimum rod size, 1/4 inch (6 mm).
1-1/4 inches (32 mm): Maximum span, 8 feet (2400 mm); minimum rod size, 3/8 inch (9 mm).
1-1/2 inches (40 mm): Maximum span, 9 feet (2700 mm); minimum rod size, 3/8 inch (9 mm).
2 inches (50 mm): Maximum span, 10 feet (3.0 m); minimum rod size, 3/8 inch (9 mm).
2-1/2 inches (65 mm): Maximum span, 11 feet (3.4 m); minimum rod size, 3/8 inch (9 mm).
3 inches (80 mm): Maximum span, 12 feet (3.6 m); minimum rod size, 3/8 inch (9 mm).
4 inches (100 mm): Maximum span, 14 feet (4.3 m); minimum rod size, 1/2 inch (13 mm).

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

- Expansion tanks.
- Air vents.
- Air separators.
- Strainers.
- Suction diffusers.
- Pump connectors.
- Combination pump discharge valves.
- Pressure-temperature test plugs.
- Balancing valves.
- Relief valves.

RELATED REQUIREMENTS

- Section 23 2113 - Hydronic Piping.
- Section 23 2500 - HVAC Water Treatment: Pipe cleaning.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description and model.

Certificates: Inspection certificates for pressure vessels from authority having jurisdiction.

Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

Project Record Documents: Record actual locations of flow controls.

Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

DELIVERY, STORAGE, AND HANDLING

Accept valves on site in shipping containers with labeling in place. Inspect for damage.

Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

EXPANSION TANKS

Manufacturers:

- Amtrol Inc: www.amtrol.com.
- ITT Bell & Gossett: www.bellgossett.com.
- Taco, Inc: www.taco-hvac.com.
- Wessels..

Construction: Welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; supplied with National Board Form U-1, rated for working pressure of 125 psi (860 kPa), with flexible EPDM diaphragm or bladder sealed into tank, and steel support stand.

Accessories: Pressure gage and air-charging fitting, tank drain; precharge to 12 psi (80 kPa).

Automatic Cold Water Fill Assembly: Pressure reducing valve, reduced pressure double check back flow preventer, test cocks, strainer, vacuum breaker, and valved by-pass.

AIR VENTS

Manufacturers:
- Armstrong International, Inc: www.armstronginternational.com.
- ITT Bell & Gossett: www.bellgossett.com.
- Taco, Inc: www.taco-hvac.com.

Manual Type: Short vertical sections of 2 inch (50 mm) diameter pipe to form air chamber, with 1/8 inch (3 mm) brass needle valve at top of chamber.

Float Type:
- Brass or semi-steel body, copper, polypropylene, or solid non-metallic float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.

AIR SEPARATORS

In-line Air Separators:
- Manufacturers:
  - Armstrong International, Inc: www.armstronginternational.com.
  - ITT Bell & Gossett: www.bellgossett.com.
  - Taco, Inc: www.taco-hvac.com.
  - Rolairtrol..
  - Substitutions: See Section 01 6000 - Product Requirements.
- Cast iron for sizes 1-1/2 inch (40 mm) and smaller, or steel for sizes 2 inch (50 mm) and larger; tested and stamped in accordance with ASME BPVC-VIII-1; for 125 psi (860 kPa) operating pressure.

STRAINERS

Manufacturers:
- Armstrong International, Inc: www.armstronginternational.com.
- Flexicraft Industries: www.flexicraft.com.
- Grinnell Products, a Tyco Business: www.grinnell.com.
- Substitutions: See Section 01 6000 - Product Requirements.

Size 2 inch (50 mm) and Under:
- Screwed brass or iron body for 175 psi (1200 kPa) working pressure, Y pattern with 1/32 inch (0.8 mm) stainless steel perforated screen.

Size 2-1/2 inch (65 mm) to 4 inch (100 mm):
- Provide flanged iron body for 175 psi (1200 kPa) working pressure, Y pattern with 1/16 inch (1.6 mm) stainless steel perforated screen.

SUCTION DIFFUSERS

Manufacturers:
- Anvil International, Inc: www.anvilintl.com.
- Grinnell Products, a Tyco Business: www.grinnell.com.
- ITT Bell & Gossett: www.bellgossett.com.
- Substitutions: See Section 01 6000 - Product Requirements.

Fitting: Angle pattern, cast-iron body, threaded for 2 inch (50 mm) and smaller, flanged for 2-1/2 inch (65 mm) and larger, rated for 175 psi (1200 kPa) working pressure, with inlet vanes, cylinder strainer with 3/16 inch (5 mm) diameter openings, disposable 5/32 inch (4 mm) mesh strainer to fit over cylinder strainer, 20 mesh start up screen, and permanent magnet located in flow stream and removable for cleaning.

PUMP CONNECTORS

Manufacturers:
- The Metraflex Company; Vane Flex: www.metraflex.com/#sle.
- Substitutions: See Section 01 6000 - Product Requirements.

Flexible Connectors: Flanged, braided type with wetted components of stainless steel, sized to match piping.
Maximum Allowable Working Pressure: 150 psig (1030 kPa) at 120 degrees F (49 degrees C).
Accommodate the Following:
Axial Deflection in Compression and Expansion: _____ inch (_____ mm).
Lateral Movement: _____ inch (_____ mm).
Angular Rotation: 15 degrees.
Force developed by 1.5 times specified maximum allowable operating pressure.
End Connections: Same as specified for pipe jointing.
Provide pump connector with integral vanes to reduce turbulent flow.
Provide necessary accessories including, but not limited to, swivel joints.

COMBINATION PUMP DISCHARGE VALVES

Manufacturers:
Crane Co.: www.craneco.com.
Taco, Inc: www.taco-hvac.com.
Victaulic Company of America: www.victaulic.com.

Valves: Straight or angle pattern, flanged cast-iron valve body with bolt-on bonnet for 175 psi (1200 kPa) operating pressure, non-slam check valve with spring-loaded bronze disc and seat, stainless steel stem, and calibrated adjustment permitting flow regulation.

PRESSURE-TEMPERATURE TEST PLUGS

Manufacturers:
Ferguson Enterprises Inc: www.fnw.com.
Peterson Equipment Company Inc: www.petesplug.com.
Sisco Manufacturing Company Inc: www.siscomfg.com.
Substitutions: See Section 01 6000 - Product Requirements.

Construction: Brass body designed to receive temperature or pressure probe with removable protective cap, and Neoprene rated for minimum 200 degrees F (93 degrees C).

Application: Use extended length plugs to clear insulated piping.

BALANCING VALVES

Manufacturers:
Armstrong International, Inc: www.armstronginternational.com.
ITT Bell & Gossett: www.bellgossett.com.
Taco, Inc: www.taco-hvac.com.
Substitutions: See Section 01 6000 - Product Requirements.

Size 2 inch (50 mm) and Smaller:
Provide globe style with flow balancing, flow measurement, and shut-off capabilities, memory stops, minimum of two metering ports and NPT threaded, soldered, or _____ connections.
Metal construction materials consist of bronze or brass.
Non-metal construction materials consist of Teflon, EPDM, engineered resin, or _____.

Size 2.5 inch (64 mm) and Larger:
Provide ball or globe style with flow balancing, flow measurement, and shut-off capabilities, memory stops, minimum of two metering ports and flanged or grooved connections.
Valve body construction materials consist of carbon steel or ductile iron.
Internal components construction materials consist of brass or aluminum bronze.

RELIEF VALVES

Manufacturers:
Armstrong International, Inc: www.armstronginternational.com.

ITT Bell & Gossett: www.bellgossett.com.
Conbraco Industries: www.apollovalves.com.

Bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labelled.

PART 3 EXECUTION

INSTALLATION

Install specialties in accordance with manufacturer's instructions.

Provide manual air vents at system high points and as indicated.

For automatic air vents in ceiling spaces or other concealed locations, provide vent tubing to nearest drain.

Provide air separator on suction side of system circulation pump and connect to expansion tank.

Provide valved drain and hose connection on strainer blow down connection.

Provide combination pump discharge valve on discharge side of base mounted centrifugal pumps where indicated.

Support pump fittings with floor mounted pipe and flange supports.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Vertical in-line pumps.

RELATED REQUIREMENTS

Section 03 3000 - Cast-in-Place Concrete.

Section 23 0719 - HVAC Piping Insulation.

Section 23 2113 - Hydronic Piping.

Section 23 2114 - Hydronic Specialties.

REFERENCE STANDARDS

NEMA MG 1 - Motors and Generators; 2016.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

UL 778 - Standard for Motor-Operated Water Pumps; Current Edition, Including All Revisions.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.

PART 2 PRODUCTS

MANUFACTURERS

Armstrong Pumps Inc; _____: www.armstrongpumps.com.

Bell & Gossett, a Xylem Inc. brand; _____: www.bellgossett.com.

Taco.

HVAC PUMPS - GENERAL

Provide pumps that operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

Products Requiring Electrical Connection: Listed and classified by UL or testing agency acceptable to Authority Having Jurisdiction as suitable for the purpose specified and indicated.

VERTICAL IN-LINE PUMPS

Type: Vertical, single stage, close coupled, radially or horizontally split casing, for in-line mounting, for 175 psi (1200 kPa) working pressure.

Casing: Cast iron, with suction and discharge gage port, casing wear ring, seal flush connection, drain plug, flanged suction and discharge.

Impeller: Bronze, fully enclosed, keyed directly to motor shaft or extension.

Shaft: Carbon steel with stainless steel impeller cap screw or nut and bronze sleeve.

Seal: Mechanical seal, 225 degrees F (107 degrees C) maximum continuous operating temperature.

PART 3 EXECUTION

INSTALLATION

Install in accordance with manufacturer's instructions.

Provide access space around pumps for service. Provide no less than minimum space recommended by manufacturer.

34 Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings. For close-coupled or base-mounted pumps, provide supports under elbows on pump suction and discharge line sizes 4 inches (102 mm) and over.

35 Provide line sized shut-off valve and strainer on pump suction, and line sized soft seat check valve and balancing valve on pump discharge.

36 Install in-line base-mounted pumps on concrete housekeeping base, with anchor bolts, set and level, and grout in place. Refer to Section 03 3000.

37 Lubricate pumps before start-up.

38 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Materials.

Closed system treatment (water).

By-pass (pot) feeder.

RELATED REQUIREMENTS

Section 23 2113 - Hydronic Piping.

Section 23 2114 - Hydronic Specialties.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide chemical treatment materials, chemicals, and equipment including electrical characteristics and connection requirements.

Operation and Maintenance Data: Include data on chemical feed pumps, agitators, and other equipment including spare parts lists, procedures, and treatment programs. Include step by step instructions on test procedures including target concentrations.

QUALITY ASSURANCE

Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience. Company shall have local representatives with water analysis laboratories and full time service personnel.

REGULATORY REQUIREMENTS

Conform to applicable code for addition of non-potable chemicals to building mechanical systems and to public sewage systems.

PART 2 PRODUCTS

MATERIALS

Closed System Treatment (Water):

Manufacturers:

AmSolv-Amrep, Inc; _____: www.amsolv.com.

GE Water & Process Technologies; _____: www.gewater.com.

Nalco, an Ecolab Company; _____: www.nalco.com.

Sequestering agent to reduce deposits and adjust pH; polyphosphate.

Corrosion inhibitors; boron-nitrite, sodium nitrite and borax, sodium totyltriazole, low molecular weight polymers, phosphonates, sodium molybdate, or sulphites.

BY-PASS (POT) FEEDER

Manufacturers:

Griswold Controls; _____: www.griswoldcontrols.com.

J. L. Wingert Company; _____: www.jlwingert.com.

Neptune, a brand of the Dover Company; _____: www.neptune1.com.

2 quart (1.9 L) quick opening cap for working pressure of 175 psi (1200 kPa).

PART 3 EXECUTION

PREPARATION

Systems shall be operational, filled, started, and vented prior to cleaning. Use water meter to record capacity in each system.

Place terminal control valves in open position during cleaning.

Verify that electric power is available and of the correct characteristics.

CLEANING SEQUENCE

Concentration:

As recommended by manufacturer.

Hot Water Heating Systems:

Apply heat while circulating, slowly raising temperature to 160 degrees F (71 degrees C) and maintain for 12 hours minimum.

Remove heat and circulate to 100 degrees F (37.8 degrees C) or less; drain systems as quickly as possible and refill with clean water.

Circulate for 6 hours at design temperatures, then drain.

Refill with clean water and repeat until system cleaner is removed.

INSTALLATION

Install in accordance with manufacturer's instructions.

CLOSED SYSTEM TREATMENT

Provide one bypass feeder on each system. Install isolating and drain valves and necessary piping. Install around balancing valve downstream of circulating pumps unless indicated otherwise.

Introduce closed system treatment through bypass feeder when required or indicated by test.

Provide 3/4 inch (19 mm) water coupon rack around circulating pumps with space for 4 test specimens.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Metal ductwork.

Duct cleaning.

RELATED REQUIREMENTS

Section 23 0593 - Testing, Adjusting, and Balancing for HVAC.

Section 23 0713 - Duct Insulation: External insulation and duct liner.

Section 23 3300 - Air Duct Accessories.

Section 23 3600 - Air Terminal Units.

Section 23 3700 - Air Outlets and Inlets.

REFERENCE STANDARDS

ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; 2013.

ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association; 2015.

SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Rev. 2009).

SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; 2012, 2nd Edition.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide data for duct materials.

Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK).

Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

QUALITY ASSURANCE

Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.

PART 2 PRODUCTS

DUCT ASSEMBLIES

Regulatory Requirements: Construct ductwork to NFPA 90A standards.

Ducts: Galvanized steel, unless otherwise indicated.

Low Pressure Supply (System with Cooling Coils): 1 inch w.g. (250 Pa) pressure class, galvanized steel.

Medium and High Pressure Supply: 2 inch w.g. (___ Pa) pressure class, galvanized steel.

Return and Relief: 1 inch w.g. (250 Pa) pressure class, galvanized steel.

General Exhaust: 1 inch w.g. (250 Pa) pressure class, galvanized steel.

MATERIALS

Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.

DUCTWORK FABRICATION

Fabricate and support in accordance with SMACNA (DCS) and as indicated.

Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.

Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).

MANUFACTURED DUCTWORK AND FITTINGS

Flat Oval Ducts: Machine made from round spiral lockseam duct.
- Manufacture in accordance with SMACNA (DCS).
- Fittings: Manufacture at least two gages heavier metal than duct.
- Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

Double Wall Insulated Flat Oval Ducts: Machine made from round spiral lockseam duct.
- Manufacture in accordance with SMACNA (DCS).
- Fittings: Manufacture with solid inner wall.
- Inner wall: Perforated galvanized steel.
- Insulation:
  - Thickness: 1 inch (25 mm) fiberglass.

PART 3 EXECUTION

INSTALLATION

Provide Double Wall Flat Oval Insulated ducts for the first twenty (20) linear feet of run from packaged rooftop equipment on both supply and return ducts, regardless of whether round or square ducts are shown on plans. Flat oval ducts to be equivalent cross sectional area of ductwork shown on plans.

Install, support, and seal ducts in accordance with SMACNA (DCS).

During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.

Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

Use double nuts and lock washers on threaded rod supports.

Connect terminal units to supply ducts directly or with one foot (300 mm) maximum length of flexible duct. Do not use flexible duct to change direction.

CLEANING

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Air turning devices/extractors.

Backdraft dampers - metal.

Combination fire and smoke dampers.

Duct access doors.

Duct test holes.

Flexible duct connections.

Volume control dampers.

RELATED REQUIREMENTS

Section 07 8400 - Firestopping.

Section 22 0548 - Vibration and Seismic Controls for Plumbing Piping and Equipment.

Section 23 0548 - Vibration and Seismic Controls for HVAC Piping and Equipment.

Section 23 3100 - HVAC Ducts and Casings.

Section 23 3600 - Air Terminal Units: Pressure regulating damper assemblies.

Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

REFERENCE STANDARDS

NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association; 2015.

NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2014.

SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Rev. 2009).

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.

Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.

Manufacturer's Installation Instructions: Provide instructions for fire dampers.

Project Record Drawings: Record actual locations of access doors and test holes.

QUALITY ASSURANCE

Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

DELIVERY, STORAGE, AND HANDLING

Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

AIR TURNING DEVICES/EXTRACTORS

Manufacturers:

- Krueger: www.krueger-hvac.com.
- Ruskin Company: www.ruskin.com.
- Titus: www.titus-hvac.com.

Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

BACKDRAFT DAMPERS - METAL

Manufacturers:

Louvers & Dampers, Inc: www.louvers-dampers.com.
Nailor Industries Inc: www.nailor.com.
Ruskin Company: www.ruskin.com.

Gravity Backdraft Dampers, Size 18 by 18 inches (450 by 450 mm) or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.

Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch (150 mm) width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

DUCT ACCESS DOORS

Manufacturers:
Nailor Industries Inc: www.nailor.com.
Ruskin Company: www.ruskin.com.
SEMCO Incorporated: www.semcohvac.com.

Fabricate in accordance with SMACNA (DCS) and as indicated.

Access doors with sheet metal screw fasteners are not acceptable.

DUCT TEST HOLES

Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

FLEXIBLE DUCT CONNECTIONS

Fabricate in accordance with SMACNA (DCS) and as indicated.

Flexible Duct Connections: Fabric crimped into metal edging strip.
Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd (1.0 kg/sq m).
Net Fabric Width: Approximately 2 inches (50 mm) wide.
Metal: 3 inches (75 mm) wide, 24 gage, 0.0239 inch (0.61 mm) thick galvanized steel.

VOLUME CONTROL DAMPERS

Manufacturers:
Louvers & Dampers, Inc: www.louvers-dampers.com.
Nailor Industries Inc: www.nailor.com.
Ruskin Company: www.ruskin.com.
Substitutions: See Section 01 6000 - Product Requirements.

Single Blade Dampers: Fabricate for duct sizes up to 6 by 30 inch (150 by 760 mm).
Fabricate for duct sizes up to 6 by 30 inch (150 by 760 mm).
Blade: 24 gage, 0.0239 inch (0.61 mm), minimum.

Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch (200 by 1825 mm). Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
Blade: 18 gage, 0.0478 inch (1.21 mm), minimum.

End Bearings: Except in round ducts 12 inches (300 mm) and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.

Quadrants:
Provide locking, indicating quadrant regulators on single and multi-blade dampers.
On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
Where rod lengths exceed 30 inches (750 mm) provide regulator at both ends.

77 MISCELLANEOUS PRODUCTS

78 Internal Strut End Plugs: Combination end-mounting and sealing plugs for metal conduit used as internal reinforcement struts for metal ducts; plug crimped inside conduit with outside gasketed washer seal.

79 PART 3 EXECUTION

80 INSTALLATION

81 Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 23 3100 for duct construction and pressure class.

82 Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

83 Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide for cleaning kitchen exhaust ducts in accordance with NFPA 96. Provide minimum 8 by 8 inch (200 by 200 mm) size for hand access, size for shoulder access, and as indicated. Provide 4 by 4 inch (100 by 100 mm) for balancing dampers only. Review locations prior to fabrication.

84 Provide duct test holes where indicated and required for testing and balancing purposes.

85 At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.

86 At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.

87 Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.

88 Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

89 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Roof exhausters.

RELATED REQUIREMENTS

Section 23 0513 - Common Motor Requirements for HVAC Equipment.

Section 23 0548 - Vibration and Seismic Controls for HVAC Piping and Equipment.

Section 23 3300 - Air Duct Accessories: Backdraft dampers.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.

QUALITY ASSURANCE

Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

ROOF EXHAUSTERS

Manufacturers:

- Carnes, a division of Carnes Company Inc; _____: www.carnes.com/sle.
- Greenheck; _____: www.greenheck.com.
- PennBarry; _____: www.pennbarry.com.
- Loren Cook.

Fan Unit: V-belt or direct driven as indicated, with spun aluminum housing; resilient mounted motor; 1/2 inch (13 mm) mesh, 0.62 inch (1.6 mm) thick aluminum wire birdscreen; square base to suit roof curb with continuous curb gaskets.

Roof Curb: 12 inch (300 mm) high self-flashing of galvanized steel with continuously welded seams, built-in cant strips.

Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked, and line voltage motor drive, power open, spring return.

Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

PART 3 EXECUTION

INSTALLATION

Install in accordance with manufacturer's instructions.

Provide backdraft damper or low leakage motorized damper as indicated in equipment schedules and in accordance with energy code requirements.

Secure roof exhausters with cadmium plated steel lag screws to roof curb.

Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Single-duct terminal units.

Single-duct, variable-volume units.

RELATED REQUIREMENTS

Section 22 0513 - Common Motor Requirements for Plumbing Equipment.

Section 22 0548 - Vibration and Seismic Controls for Plumbing Piping and Equipment.

Section 23 0513 - Common Motor Requirements for HVAC Equipment.

Section 23 0548 - Vibration and Seismic Controls for HVAC Piping and Equipment.

Section 23 0923 - Direct-Digital Control System for HVAC.

Section 23 0993 - Sequence of Operations for HVAC Controls.

Section 23 2113 - Hydronic Piping: Connections to heating coils.

Section 23 2114 - Hydronic Specialties: Connections to heating coils.

Section 23 3100 - HVAC Ducts and Casings.

Section 23 3300 - Air Duct Accessories.

Section 23 3700 - Air Outlets and Inlets.

Section 23 8200 - Convection Heating and Cooling Units: Air coils.

REFERENCE STANDARDS

AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils; 2001 (R2011).

AHRI 880 (I-P) - Performance Rating of Air Terminals; 2011 with Addendum 1.

AHRI 885 - Procedure for Estimating Occupied Space Sound Levels in the Application of Air Terminals and Air Outlets; 2008 with Addendum 1.

ASHRAE Std 130 - Methods of Testing Air Terminal Units; 2008 (R2014).

ASTM A492 - Standard Specification for Stainless Steel Rope Wire; 1995 (Reapproved 2013).

ASTM A603 - Standard Specification for Zinc-Coated Steel Structural Wire Rope; 1998 (Reapproved 2014).

ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2012.

NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems; Sheet Metal and Air Conditioning Contractors' National Association; 2008.

SUBMITTALS

See Section 01 3000 - Administrative Requirements for submittal procedures.

Product Data: Provide data indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings that indicate air flow, static pressure, and NC designation. Include electrical characteristics and connection requirements.

Shop Drawings: Indicate configuration, general assembly, and materials used in fabrication, and electrical characteristics and connection requirements.

Include schedules listing discharge and radiated sound power level for each of second through sixth octave bands at inlet static pressures of 1 to 4 inch wg (250 to 1000 Pa).

Certificates: Certify that coils are tested and rated in accordance with AHRI 410.

Manufacturer's Installation Instructions: Indicate support and hanging details, installation instructions, recommendations, and service clearances required.

Project Record Documents: Record actual locations of units and locations of access doors required for access of valving.

Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts lists. Include directions for resetting constant-volume regulators.

Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

QUALITY ASSURANCE

Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

WARRANTY

See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

Provide five year manufacturer warranty for air terminal units.

PART 2 PRODUCTS

SINGLE-DUCT, VARIABLE-VOLUME UNITS

Manufacturers:
- Price Industries, Inc.: www.priceindustries.com.
- Nailor.
- Titus.

Acoustic Performance Requirements:
- Use attenuation values found in appendix E of AHRI 885.

General:
- Factory-assembled, AHRI 880 (I-P) rated and bearing the AHRI seal, air volume control terminal with damper assembly, flow sensor, externally mounted volume controller, duct collars, and all required features.
- Control box bearing identification, including but not necessarily limited to nominal cfm, maximum and minimum factory-set airflow limits, coil type and coil (right or left hand) connection, where applicable.

Unit Casing:
- Minimum 22 gage, 0.0299 inch (0.76 mm) galvanized steel.
  - Assembled with longitudinal lock seam construction.
  - Casing leakage to meet ASHRAE Std 130.
- Air Inlet Collar: Provide round, suitable for standard flexible duct sizes.
- Unit Discharge: Rectangular, with slip-and-drive connections.
- Acceptable Liners:
  - 1/2 inch (13 mm) thick, coated, fibrous-glass complying with ASTM C1071.
    - Secure with adhesive.
    - Coat edges exposed to airstream with NFPA 90A approved sealant.
    - Cover liner with non-porous foil.
  - Liner not to contain pentabrominated diphenyl ether (CAS #32534-81-9) or octabrominated diphenyl ether.

Damper Assembly:
- Heavy-gage, galvanized steel or extruded aluminum construction with solid steel, nickel-plated shaft pivoting on HDPE, self-lubricating bearings.
- Provide integral position indicator or alternative method for indicating damper position over full range of 90 degrees.
- Incorporate low leak damper blades for tight airflow shutoff.

Hot Water Heating Coil:
- Coil Casing: Minimum 22 gage, 0.0299 inch (0.76 mm) galvanized steel, factory-installed on terminal discharge with rectangular outlet, duct connection type.

- Access Door: Gasketed and insulated located on bottom, on top, and downstream of coils.
- Right or left coil inlets.
- Coil Fins: Aluminum or aluminum plated fins, mechanically-bonded to seamless copper tubes.
- Coil leak tested to minimum 350 psig (2413 kPa).
- Base performance data on tests run in accordance with AHRI 410 and units to bear AHRI 410 label.

Controls:

- DDC (Direct-Digital Controls):
  - Basis of Design: Titus
    - The unit level controller to include the following:
      - 24 VAC power terminal or RJ-12 Power connection.
      - T-Stat Port for thermostat connection.
      - Service Port for Price Linker diagnostic equipment.
      - Damper actuator.
      - Fan output connection.
      - LED indication for troubleshooting.
      - Three binary staged heating outputs.
      - Binary cooling output.
      - S.A.T. sensor input.
      - Contact closure input.
      - Four analog outputs.
    - Include a field-installed, factory-tested, direct-digital controller.
    - Bi-directional Damper Actuator: 24 volt, powered closed, spring return open.
    - Microprocessor-Based Controller: Air volume controller, pressure-independent with electronic airflow transducers, factory-calibrated maximum and minimum CFM's.
      - Occupied and unoccupied operating mode.
      - Remote reset of temperature or CFM set points.
      - Proportional, plus integral control of room temperature.
      - Monitoring and adjusting with portable terminal.
    - Room Sensor:
      - Compatible with temperature controls specified.
      - Wall-mounted, system powered, with temperature set-point adjustment including connection access for portable operator terminal.
    - See Section 23 0923.
  - Airflow Sensor: Differential pressure airflow device measuring total, static, and wake pressures.
    - Signal accuracy: Plus/minus five percent throughout terminal operating range.
  - Control Sequence:
    - Suitable for operation with duct pressures between 0.25 and 3.0 inch wg (60 and 750 Pa) inlet static pressure.
    - Include factory-mounted and piped, 5-micron filter; and adjustable, velocity-resetting, high-limit control with amplifying relay.
    - See Section 23 0993.

PART 3 EXECUTION

EXAMINATION

Verify that conditions are suitable for installation.

INSTALLATION

Install in accordance with manufacturer's instructions.

Install the inlets of air terminal units and air flow sensors a minimum of four duct diameters from elbows, transitions, and duct takeoffs.

116 Provide ceiling access doors or locate units above easily removable ceiling components.

117 Support units individually from structure with wire rope complying with ASTM A492 and ASTM A603 in accordance with SMACNA (SRM). See Section 23 0548.

118 Do not support from ductwork.

119 Connect to ductwork in accordance with Section 23 3100.

120 Install heating coils in accordance with Section 23 8200.

121 ADJUSTING

122 Reset volume with damper operator attached to assembly allowing flow range modulation from 100 percent of design flow to zero percent full flow. Set units with heating coils for minimum 50 percent full flow.

123 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Diffusers.

Registers/grilles.

RELATED REQUIREMENTS

Section 09 9123 - Interior Painting: Painting of ducts visible behind outlets and inlets.

REFERENCE STANDARDS

AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; Air Movement and Control Association International, Inc.; 2012.

ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Inlets; 2006 (R2011).

SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Rev. 2009).

SUBMITTALS

See Section 01 3000 - Administrative Requirements for submittal procedures.

Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

Project Record Documents: Record actual locations of air outlets and inlets.

QUALITY ASSURANCE

Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.

QUALITY ASSURANCE

PART 2 PRODUCTS

MANUFACTURERS

Carnes, a division of Carnes Company Inc; _____: www.carnes.com/sle.

Krueger: www.krueger-hvac.com.

Price Industries; _____: www.price-hvac.com.

Titus: www.titus-hvac.com.

Substitutions: See Section 01 6000 - Product Requirements.

RECTANGULAR CEILING DIFFUSERS

Type: Provide square and rectangular, multi-louvered diffuser to discharge air in four way pattern with sectorizing baffles where indicated.

Connections: Round.

Frame: Provide surface mount and inverted T-bar type. In plaster ceilings, provide plaster frame and ceiling frame.

Fabrication: Steel with baked enamel finish.

Color: As selected by Architect from manufacturer's standard range.

Accessories: Provide radial opposed blade, butterfly, combination splitter, and _____ volume control damper; removable core, equalizing grid, and gaskets for surface mounted diffusers with damper adjustable from diffuser face.

CEILING EGG CRATE EXHAUST AND RETURN GRILLES

Type: Egg crate style face consisting of 1/2 by 1/2 by 1/2 inch (13 by 13 by 13 mm) grid core.

Fabrication: Grid core consists of aluminum with mill aluminum finish.

Color: To be selected by Architect from manufacturer's standard range.

Frame: 1-1/4 inch (32 mm) margin with countersunk screw mounting.

Frame: Channel lay-in frame for suspended grid ceilings.

Accessories: Provide integral, gang & face operated opposed blade damper and prescored molded fiberglass back.

WALL SUPPLY REGISTERS/GRILLES

Type: Streamlined and individually adjustable blades, 3/4 inch (19 mm) minimum depth, 3/4 inch (19 mm) maximum spacing with spring or other device to set blades, vertical face, single deflection.

Frame: 1-1/4 inch (32 mm) margin with countersunk screw mounting and gasket.

Fabrication: Steel with 20 gage, 0.0359 inch (0.91 mm) minimum frames and 22 gage, 0.0299 inch (0.76 mm) minimum blades, steel and aluminum with 20 gage, 0.0359 inch (0.91 mm) minimum frame, or aluminum extrusions, with factory baked enamel finish.

Color: To be selected by Architect from manufacturer's standard range.

Damper: Integral, gang-operated opposed blade type with removable key operator, operable from face.

WALL SUPPLY REGISTERS/GRILLES

Type: Streamlined and individually adjustable curved blades to discharge air along face of grille with two-way deflection.

Frame: 1-1/4 inch (32 mm) margin with countersunk screw mounting and gasket.

Fabrication: Aluminum extrusions with factory clear lacquer finish.

Color: To be selected by Architect from manufacturer's standard range.

Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

PART 3 EXECUTION

INSTALLATION

Install in accordance with manufacturer's instructions.

Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

Install diffusers to ductwork with air tight connection.

Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09 9123.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Manufactured units.

Boiler construction.

Boiler trim.

Fuel burning system.

Factory installed controls.

RELATED REQUIREMENTS

Section 03 3000 - Cast-in-Place Concrete.

Section 23 0913 - Instrumentation and Control Devices for HVAC.

Section 23 2114 - Hydronic Specialties.

Section 23 2123 - Hydronic Pumps.

Section 23 2500 - HVAC Water Treatment.

Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

REFERENCE STANDARDS

AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI); current edition at www.ahrinet.org.

ANSI Z21.13 - American National Standard for Gas-Fired Low-Pressure Steam and Hot Water Boilers; 2014, with Errata.

ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; 2013, Including All Amendments and Errata.

ASHRAE Std 103 - Methods of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers; 2007, Including All Amendments.

ASME BPVC-IV - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers; 2015.

NBBI Manufacturer and Repair Directory - The National Board of Boiler and Pressure Vessel Inspectors (NBBI); current edition at www.nationalboard.org.

NFPA 54 - National Fuel Gas Code; 2015.

SCAQMD 1146.1 - South Coast Air Quality Management District Rule No.1146.1; current edition.

ADMINISTRATIVE REQUIREMENTS

Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittals procedures.

Product Data: Provide data indicating general assembly, components, controls, safety controls, and wiring diagrams with electrical characteristics and connection requirements, and service connections.

Manufacturer's Installation Instructions: Indicate assembly, support details, connection requirements, and include start up instructions.

Manufacturer's Factory Inspection Report: Submit boiler inspection prior to shipment.

Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, cleaning procedures, replacement parts list, and maintenance and repair data.

Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

QUALITY ASSURANCE

Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

DELIVERY, STORAGE, AND HANDLING

Protect boilers from damage by leaving factory inspection openings and shipping packaging in place until final installation.

WARRANTY

See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

Provide a five year warranty to include coverage for heat exchanger.

PART 2 PRODUCTS

MANUFACTURERS

Natural Gas, Propane, or Combination Natural Gas/Propane for Indoor Applications:

- KN Boilers
- LAARS Heating Systems Company: www.laars.com.
- Lochinvar LLC: www.lochinvar.com.
- The Fulton Companies: www.fulton.com.

MANUFACTURED UNITS

Factory assembled, factory fire-tested, self-contained, readily transported unit ready for automatic operation except for connection of water, fuel, electrical, and vent services.

Unit: Metal membrane wall, water or fire tube, condensing boiler on integral structural steel frame base with integral fuel burning system, firing controls, boiler trim, insulation, and removable jacket, suitable for indoor application.

Annual Fuel Utilization Efficiency (AFUE) in accordance with ASHRAE Std 103: 0.82.

BOILER CONSTRUCTION

Conform to the minimum requirements of ASME BPVC-IV and ANSI Z21.13 for construction of boilers.

Assembly to bear the ASME "H" stamp and comply with the efficiency requirements of the latest edition of ASHRAE Std 90.1 I-P.

Required Directory Listings:

- AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI); current edition at www.ahrinet.org.
- NBBI Manufacturer and Repair Directory - The National Board of Boiler and Pressure Vessel Inspectors (NBBI); current edition at www.nationalboard.org.

Heat Exchanger: Construct with materials that are impervious to corrosion where subject to contact with corrosive condensables.

Provide adequate tappings, observation ports, removable panels, and access doors for entry, cleaning, and inspection.

Insulate casing with insulation material, protected and covered by heavy-gage metal jacket.

Factory apply boiler base and other components, that are subject to corrosion, with durable, acrylic, powder coated, painted, or weather-proofed finish.

BOILER TRIM

ASME rated pressure relief valve.

Flow switch.

Electronic Low Water Cut-off: Complete with test light and manual reset button to automatically prevent firing operation whenever boiler water falls below safe level.

Temperature and pressure gage.

Pressure Switches:
- High gas pressure.
- Low gas pressure.
- Air pressure.

Manual reset high limit.

Boiler Pump (where required by boiler design):
- Primary pump, factory supplied and sized for field installation to ensure minimum, continuous circulation through boiler.
- Where pump is not provided by boiler manufacturer, provide pump in accordance with boiler manufacturer's recommendations.
- Pump time delay.

FUEL BURNING SYSTEM

Provide forced draft automatic burner or pulse combustion, integral to boiler, designed to burn natural gas, and maintain fuel-air ratios automatically.
- Blower Design: Statically and dynamically balanced to supply combustion air; direct connected to motor.
- Forced Draft Design: Mixes combustion air and gas to achieve 90 percent combustion efficiency.
- Pulse Combustion Design: Self-aspirating, not requiring blower for combustion.
- Combustion Air Filter: Protects fuel burning system from debris.

Gas Train: Plug valve, safety gas valve, gas-air ratio control valve, and pressure regulator controls air and gas mixture.

Emission of Oxides of Nitrogen Requirements: Comply with SCAQMD 1146.1 for natural gas fired system, as applicable.

Intakes: Combustion air intake capable of accepting free mechanical room air or direct outside air through a sealed intake pipe

FACTORY INSTALLED CONTROLS

Option for internal or external (0-10) VDC control.

Temperature Controls:
- Automatic reset type to control fuel burning system on-off and firing rate to maintain temperature.
- Manual reset type to control fuel burning system to prevent boiler water temperature from exceeding safe system water temperature.
- Low-fire start time delay relay.

Electronic PI setpoint/modulation control system.

Microprocessor-based, fuel/air mixing controls.

SOURCE QUALITY CONTROL

See Section 01 4000 - Quality Requirements, for additional requirements.

Provide factory tests to check construction, controls, and operation of unit.

Manufacturer to conduct boiler inspection prior to shipment; submit copy of inspection report to Architect.

Non-Conforming Work: See Section 01 4000.

PART 3 EXECUTION

INSTALLATION

Install in accordance with manufacturer's instructions.

Install boiler and provide connection of natural gas service in accordance with requirements of NFPA 54 and applicable codes.

Install boiler on concrete housekeeping base, sized minimum of 4 inches (100 mm) larger than boiler base in accordance with Section 03 3000.

Coordinate factory installed controls with Section 23 0913.

Coordinate provisions for water treatment in accordance with Section 23 2500.

Pipe relief valves to nearest floor drain.

Pipe cooled condensate produced by the combustion process from the boiler condensate connection and/or flue stack with suitable piping material to neutralizer prior to discharging into nearest floor drain.

Install primary boiler pump in accordance with Section 23 2123.

Provide piping connection and accessories in accordance with Section 23 2114.

Provide for connection to electrical service in accordance with Section 26 2717.

CLOSEOUT ACTIVITIES

See Section 01 7800 - Closeout Submittals, for closeout submittals.

See Section 01 7900 - Demonstration and Training, for additional requirements.

Demonstrate proper operation of equipment to Owner's designated representative.

Demonstration: Demonstrate operation of system to Owner's personnel.

Use operation and maintenance data as reference during demonstration.

Briefly describe function, operation, and maintenance of each component.

Training: Train Owner's personnel on operation and maintenance of system.

Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

Provide minimum of two hours of training.

Instructor: Manufacturer's training personnel.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Energy recovery units.

Casing.

Fans.

Total energy wheel.

Filters.

Dampers.

Vibration isolation.

Roof curbs.

Power and controls.

Accessories.

REFERENCE STANDARDS

AMCA 500-D - Laboratory Methods of Testing Dampers for Rating; 2012.

AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2012.

AHRI 1060 I-P - Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment; 2014.

ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2012, with 2015 amendments.

ASHRAE Std 84 - Method of Testing Air to Air Heat/Energy Exchangers; 2013.

ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Manufacturer's installation instruction, product data, and engineering calculations.

Shop Drawings: Show design and assembly of energy recovery unit and installation and connection details.

QUALITY ASSURANCE

Manufacturer Qualifications:

- Firm regularly engaged in manufacturing energy recovery units..
- Products in satisfactory use in similar service for not less than five years.

DELIVERY, STORAGE, AND HANDLING

Store in manufacturer's unopened packaging.

WARRANTY

See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

Warranty ventilator to be free from defects in material and workmanship and of all parts for period of 1-1/2 years from date of Substantial Completion.

Warranty energy recovery wheel to be free from defects in material and workmanship for 3 years under circumstances of normal use.

Warranty motor to be free from defects in material and workmanship for 7 years under circumstances of normal use.

PART 2 PRODUCTS

MANUFACTURERS

Energy Recovery Ventilators:
- Aaon.
- Substitutions: See Section 01 6000 - Product Requirements.

ENERGY RECOVERY UNITS

Energy Recovery Units: Dessicant wheel type; prefabricated packaged system designed by manufacturer.
- Access: Hinged and/or screwed access panels on front.
- Framing: Welded extruded aluminum tubular frame capable of supporting components and casings.
- Permanent name plate listing manufacturer mounted inside door near electrical panel.

CASING

Wall, Floor, and Roof Panels:
- Construction: 2 inch (50 mm) thick, double wall box construction, with formed edges of exterior wall overlapping formed edges of interior wall.
- Exterior Wall: Galvanized steel sheet.
  - 0.040 inch (1 mm) thick aluminum.
- Interior Wall: Galvanized sheet metal.
  - 22 gage, 0.0299 inch (0.76 mm) galvanized sheet metal.
- Insulation:
  - 1/2 inch (13 mm) insulated fiberglass.
  - Panel Cores: Mineral wool board.
  - Flame Spread Index (FSI): 25 or less, when tested in accordance with ASTM E84 or UL 723.
  - Smoke Developed Index (SDI): 50, maximum, when tested in accordance with ASTM E84 or UL 723.
- Roof Panel: Weatherproof.
- Coating: Polyurethane enamel.

Access Panels: Provide access to components through a large, tightly sealed and easily removable panel.

Doors:
- Construct doors of same construction and thickness as wall panels.
- Height: 80 inches (2032 mm).

Weather Hood: Provide on fresh air inlet and exhaust air outlet; removable for access.
- Fresh Air Weather Hood: Maintain a face velocity less than 340 feet/min (1.6 m/s).

FANS

Provide separate fans for exhaust and supply blowers.

Fans:

Housings: 12 gage, 0.1046 inch (2.66 mm) aluminized steel with plenums integral to general housing and constructed to Class 1 fan standards.

Motors:
- Motors: Open drip proof.
- Efficiency: High.
- Speed: Single.
- Control: Constant Speed.
- Fan Motor: UL listed and labeled.

Drives:
Fans: Belt driven.
Horsepower: 7.5 HP (5.2 kW).
Service Factor: 1.2.

TOTAL ENERGY WHEEL

Wheel: Transfer heat and humidity from one air stream to the other with minimum carryover of the exhaust air into the supply air stream.

Sensible Recovery Efficiency: _____.

Latent Recovery Efficiency: _____.

Wheel Effectiveness: Rated in accordance with ASHRAE Std 84 and AHRI 1060 I-P.

Flame Spread Index (FSI): 25 or less, when tested in accordance with ASTM E84 or UL 723.

Smoke Developed Index (SDI): 50 or less, when tested in accordance with ASTM E84 or UL 723.

Energy Recovery Wheel Media Face:
Conform to NFPA 90A.

Rotor:
Type: Non-segmented hygroscopic aluminum wheel.
Rotor Matrix: Corrosion resistant aluminum alloy composed of alternating corrugated and flat, continuously wound layers of uniform widths.

Desiccant:
Type: 3A.

Drive:
Drive: Tensioned drive with full perimeter link style belt.

FILTERS

Efficiency: ____ MERV.

Exhaust and Fresh Air Streams: MERV 7 filters constructed to meet ASHRAE Std 52.2.

Mount 1/2 inches (13 mm) thick permanent aluminum washable type filter in the outside air hood and in the return plenum air.

DAMPERS

Exhaust Back-Draft Damper: Factory installed, galvanized steel.
High performance, backdraft dampers suitable for application in HVAC systems with velocities to 3000 feet per minute (914 m/min).
Louvers, Dampers, and Shutters: AMCA 500-D and AMCA 500-L.
Damper Capacity: Demonstrate damper capacity to withstand HVAC system operating conditions.
Fabrication:
Frame: 20 gage, 0.0359 inch (0.91 mm), 3 inch (76 mm) roll formed galvanized steel channel with rear flange, prepunched mounting holes, and welded corner clips for maximum rigidity.
Blades:
Style: Single-piece, overlap frame.
Material: Roll formed 28 gage, 0.0149 inch (0.38 mm) galvanized steel.
Width: Maximum 6 inches (152 mm).

Return Air Damper:
Factory installed, adjustable volume control, opposed blade damper for regulating airflow, based on external static pressure.
Return Air Damper: Structural hat channels, reinforced at corners.
Roll-formed Frames: Structurally superior to 13 gage, 0.0897 inch (2.28 mm) U-channel frames.
Blades: Single skin, 16 gage, 0.0598 inch (1.52 mm).

Motorized Dampers: Provide motorized dampers at outside air inlet, exhaust air outlet, and supply air outlet.
Type: Motorized two position parallel blade damper with blade seals.
Motorized Damper: Roll-formed structural hat channels, reinforced at the corners,
Blades: Single skin, 16 gage, 0.0598 inch (1.52 mm).
Motorized Louvers:
Type: Motorized two position parallel blade louver with drainable blades, blade seals, and jamb seals
Adjustable louver:
Fabrication: Mullion style.
Frame:
Material: Extruded aluminum, Alloy 6063-T5.
Blades:
Style: Horizontal, adjustable, drainable.
Material: Formed aluminum, Alloy 6063-T5.

ROOF CURBS

Curbs: Provide full perimeter roof curb fabricated from 10 gage, 0.1345 inch (3.42 mm) aluminized steel.

Isolation Rails: Provide factory-installed, 12 gage, 0.1046 (2.66 mm) aluminized steel angles top and bottom, connected with flexible, outdoor rated membrane and factory-installed vibration isolation springs.

POWER AND CONTROLS

Motor Control Panels: UL listed.

Include necessary motor starters, fuses, transformers and overload protection according to NFPA 70.

Install wiring in accordance with NFPA 70.

ACCESSORIES

Airflow Monitor:
Include integral airflow monitoring station with ability to read both ventilation and exhaust airflow expressed in cu ft/min (L/s).
Rotation Detector:
Equip unit with rotation sensor.
Equip controller with outdoor air temperature sensor that stops energy recovery wheel during moderate temperature periods.
Allow the energy recovery wheel to be operated in stop mode during very low temperature periods to prevent freezing of wheel while still delivering outdoor air through the unit.
Freeze Protection Thermostat:

PART 3 EXECUTION

EXAMINATION

Verify that structure is ready for installation of unit, that openings in deck for ductwork, if required, are correctly sized and located, and that mechanical and electrical utilities supplying unit are of correct capacities and are accessible.

INSTALLATION

Provide openings for suitable ductwork connection.

Outdoor Installations:
Roof Panels:
Fasteners: Use concealed means of attachment.
Minimize penetrations through roof.
Provide weather tight seal at required penetrations.

Provide drip edge around roof perimeter.
Do not locate roof panel joints above doors.

SYSTEM STARTUP

Provide services of manufacturer's authorized representative to provide start up of unit.

CLEANING

Clean filters, air plenums, interior and exposed-to-view surfaces prior to Substantial Completion.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Air-source heat pumps.

Air cooled condensing units.

Indoor ductless fan & coil units.

Controls.

REFERENCE STANDARDS

AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2008, Including All Addenda.

AHRI 520 - Performance Rating of Positive Displacement Condensing Units; 2004.

ASHRAE Std 23.1 - Methods of Testing for Rating the Performance of Positive Displacement Refrigerant Compressors and Condensing Units that Operate at Subcritical Temperatures of the Refrigerant; 2010.

NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2015.

UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical; Current Edition, Including All Revisions.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

QUALITY ASSURANCE

Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

WARRANTY

See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

MANUFACTURERS

Carrier Corporation; _____: www.carrier.com.

Trane Inc; _____: www.trane.com.

LG.

SYSTEM DESIGN

Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units; UL listed.

Heating and Cooling: Air-source electric heat pump located in outdoor unit with evaporator; _____.

Provide refrigerant lines internal to units and between indoor and outdoor units, factory cleaned, dried, pressurized and sealed, with insulated suction line.

Performance Requirements: See Drawings for additional requirements.

INDOOR UNITS FOR DUCTLESS SYSTEMS

Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, evaporator coil, and controls; wired for single power connection with control transformer.

Location: High-wall.

Cabinet: Plastic.

Finish: White.

Fan: Line-flow fan direct driven by a single motor.

Filter return air with washable, antioxidant pre-filter and a pleated anti-allergy enzyme filter.

Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.

Construction and Ratings: In accordance with AHRI 210/240 and UL 207.

Manufacturer: System manufacturer.

Remote Actuators:

OUTDOOR UNITS

Outdoor Units: Self-contained, packaged, pre-wired unit consisting of cabinet, with compressor and condenser.

Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.

Refrigerant: R-410A.

Cabinet: Galvanized steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.

Construction and Ratings: In accordance with AHRI 210/240 with testing in accordance with ASHRAE Std 23.1 and UL 207.

Compressor: Hermetic, two speed 1800 and 3600 rpm, AHRI 520 resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high pressure control, motor overload protection, service valves and drier. Provide time delay control to prevent short cycling and rapid speed changes.

Air Cooled Condenser: Aluminum fin and copper tube coil, AHRI 520 with direct drive axial propeller fan resiliently mounted, galvanized fan guard.

Accessories: Filter drier, high pressure switch (manual reset), low pressure switch (automatic reset), service valves and gage ports, thermometer well (in liquid line).

Provide thermostatic expansion valves.

Operating Controls:

Control by room thermostat to maintain room temperature setting.

PART 3 EXECUTION

EXAMINATION

Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.

Verify that proper power supply is available and in correct location.

Verify that proper fuel supply is available for connection.

INSTALLATION

Install in accordance with NFPA 90A and NFPA 90B.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Single conductor building wire.

Metal-clad cable.

Wiring connectors.

Electrical tape.

Wire pulling lubricant.

REFERENCE STANDARDS

ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013.

ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011.

ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).

ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).

ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2010.

NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC); 2012.

NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2009.

NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.

UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.

UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.

UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.

UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.

UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
- Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
- Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

QUALITY ASSURANCE

Conform to requirements of NFPA 70.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

34 DELIVERY, STORAGE, AND HANDLING

35 Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

36 FIELD CONDITIONS

37 Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F (-10 degrees C), unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

38 PART 2 PRODUCTS

39 CONDUCTOR AND CABLE APPLICATIONS

40 Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

41 Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

42 Nonmetallic-sheathed cable is not permitted.

43 Metal-clad cable is permitted only as follows:

44 Where not otherwise restricted, may be used:

45 Where concealed above accessible ceilings for final connections from junction boxes to luminaires.

46 Maximum Length: 6 feet (1.8 m).

47 Where concealed in hollow stud walls, above accessible ceilings, and under raised floors for branch circuits up to 20 A.

48 Exception: Provide single conductor building wire in raceway for circuit homerun from first outlet to panelboard.

49 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

50 Provide products that comply with requirements of NFPA 70.

51 Provide products listed, classified, and labeled as suitable for the purpose intended.

52 Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

53 Comply with NEMA WC 70.

54 Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

55 Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

56 Conductors for Grounding and Bonding: Also comply with Section 26 0526.

57 Conductor Material:

58 Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.

59 Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.

60 Tinned Copper Conductors: Comply with ASTM B33.

61 Minimum Conductor Size:

62 Branch Circuits: 12 AWG.

63 Exceptions:

64 20 A, 120 V circuits longer than 75 feet (23 m): 10 AWG, for voltage drop.

65 20 A, 120 V circuits longer than 150 feet (46 m): 8 AWG, for voltage drop.

66 20 A, 277 V circuits longer than 150 feet (46 m): 10 AWG, for voltage drop.

67 _____.

Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

Conductor Color Coding:

- Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
- Color Coding Method: Integrally colored insulation.
- Color Code:
  - 480Y/277 V, 3 Phase, 4 Wire System:
    - Phase A: Brown.
    - Phase B: Orange.
    - Phase C: Yellow.
    - Neutral/Grounded: Gray.
  - 208Y/120 V, 3 Phase, 4 Wire System:
    - Phase A: Black.
    - Phase B: Red.
    - Phase C: Blue.
    - Neutral/Grounded: White.
  - Equipment Ground, All Systems: Green.
  - Isolated Ground, All Systems: Green with yellow stripe.
  - Travelers for 3-Way and 4-Way Switching: Pink.

SINGLE CONDUCTOR BUILDING WIRE

Manufacturers:

- Copper Building Wire:
  - Cerro Wire LLC: www.cerrowire.com.
  - Encore Wire Corporation: www.encorewire.com.
  - Southwire Company: www.southwire.com.

Description: Single conductor insulated wire.

Conductor Stranding:

- Feeders and Branch Circuits:
  - Size 10 AWG and Smaller: Solid or Stranded
  - Size 8 AWG and Larger: Stranded.

Insulation Voltage Rating: 600 V.

Insulation:

- Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.

METAL-CLAD CABLE

Manufacturers:

- AFC Cable Systems Inc: www.afcweb.com.
- Encore Wire Corporation: www.encorewire.com.
- Southwire Company: www.southwire.com.

Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.

Conductor Stranding:

- Size 10 AWG and Smaller: Solid.
- Size 8 AWG and Larger: Stranded.

Insulation Voltage Rating: 600 V.

Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.

Provide oversized neutral conductors where indicated or required.

Provide dedicated neutral conductor for each phase conductor where indicated or required.

Grounding: Full-size integral equipment grounding conductor.

114 Armor: Steel, interlocked tape.

115 WIRING CONNECTORS

116 Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

117 Connectors for Grounding and Bonding: Comply with Section 26 0526.

118 Wiring Connectors for Splices and Taps:

119 Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.

120 Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.

121 Wiring Connectors for Terminations:

122 Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.

123 Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.

124 Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.

125 Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.

126 Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.

127 Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.

128 Conductors for Control Circuits: Use crimped terminals for all connections.

129 Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

130 Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

131 Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F (105 degrees C) for standard applications and 302 degrees F (150 degrees C) for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.

132 Mechanical Connectors: Provide bolted type or set-screw type.

133 Compression Connectors: Provide circumferential type or hex type crimp configuration.

134 Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

135 WIRING ACCESSORIES

136 Electrical Tape:

137 Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F (105 degrees C).

138 Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).

139 Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

PART 3 EXECUTION

EXAMINATION

Verify that interior of building has been protected from weather.

Verify that work likely to damage wire and cable has been completed.

Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

Verify that field measurements are as shown on the drawings.

Verify that conditions are satisfactory for installation prior to starting work.

PREPARATION

Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

INSTALLATION

Circuiting Requirements:

- Unless dimensioned, circuit routing indicated is diagrammatic.
- When circuit destination is indicated and routing is not shown, determine exact routing required.
- Arrange circuiting to minimize splices.
- Include circuit lengths required to install connected devices within 10 ft (3.0 m) of location shown.
- Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
- Maintain separation of wiring for emergency systems in accordance with NFPA 70.
- Circuiting Adjustments: Unless otherwise indicated, when branch circuits are shown as separate, combining them together in a single raceway is permitted, under the following conditions:
  - Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
  - Increase size of conductors as required to account for ampacity derating.
  - Size raceways, boxes, etc. to accommodate conductors.
- Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

Install products in accordance with manufacturer's instructions.

Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.

Install metal-clad cable (Type MC) in accordance with NECA 120.

Installation in Raceway:

- Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
- Pull all conductors and cables together into raceway at same time.
- Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
- Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.

Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.

Terminate cables using suitable fittings.

Metal-Clad Cable (Type MC):

Use listed fittings.

Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.

Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.

Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

Make wiring connections using specified wiring connectors.

Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.

Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.

Do not remove conductor strands to facilitate insertion into connector.

Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.

Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.

Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.

Insulate ends of spare conductors using vinyl insulating electrical tape.

Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

FIELD QUALITY CONTROL

Inspect and test in accordance with NETA ATS, except Section 4.

Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.

Disconnect surge protective devices (SPDs) prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPDs connected.

Correct deficiencies and replace damaged or defective conductors and cables.

End of Section

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
26 0526

PART 1 GENERAL

SECTION INCLUDES

Grounding and bonding requirements.

Conductors for grounding and bonding.

Connectors for grounding and bonding.

Ground bars.

Ground rod electrodes.

Ground access wells.

REFERENCE STANDARDS

IEEE 81 - Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System; Institute of Electrical and Electronic Engineers; 2012.

NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; National Electrical Manufacturers Association; 2007.

NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; International Electrical Testing Association; 2013 (ANSI/NETA ATS).

NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Verify exact locations of underground metal water service pipe entrances to building.
- Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
- Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

Sequencing:

- Do not install ground rod electrodes until final backfill and compaction is complete.

SUBMITTALS

See Section 01 3000 - Administrative Requirements for submittals procedures.

Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

Field quality control test reports.

Project Record Documents: Record actual locations of grounding electrode system components and connections.

QUALITY ASSURANCE

Conform to requirements of NFPA 70.

Maintain at the project site a copy of each referenced document that prescribes execution requirements.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

DELIVERY, STORAGE, AND HANDLING

Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

GROUNDING AND BONDING REQUIREMENTS

Do not use products for applications other than as permitted by NFPA 70 and product listing.

Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

Grounding System Resistance:

- Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.

Grounding Electrode System:

- Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
  - Provide continuous grounding electrode conductors without splice or joint.
  - Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
- Metal Underground Water Pipe(s):
  - Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet (3.0 m) at an accessible location not more than 5 feet (1.5 m) from the point of entrance to the building.
  - Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
  - Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.
- Concrete-Encased Electrode:
  - Provide connection to concrete-encased electrode consisting of not less than 20 feet (6.0 m) of either steel reinforcing bars or bare copper conductor not smaller than 4 AWG embedded within concrete foundation or footing that is in direct contact with earth in accordance with NFPA 70.
- Ground Rod Electrode(s):
  - Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
  - Space electrodes not less than 10 feet (3.0 m) from each other and any other ground electrode.
  - Provide ground access well for first connected electrode.
- Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.
- Ground Bar: Provide ground bar, separate from service equipment enclosure, for common connection point of grounding electrode system bonding jumpers as permitted in NFPA 70. Connect grounding electrode conductor provided for service-supplied system grounding to this ground bar.
  - Ground Bar Size: 1/4 by 2 by 12 inches (6 by 50 by 300 mm) unless otherwise indicated or required.
  - Where ground bar location is not indicated, locate in accessible location as near as possible to service disconnect enclosure.
  - Ground Bar Mounting Height: 60 inches (1830 mm) above finished floor unless otherwise indicated.

- Service-Supplied System Grounding:
  - For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
  - For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.
- Separately Derived System Grounding:
  - Separately derived systems include, but are not limited to:
    - Transformers (except autotransformers such as buck-boost transformers).
    - Generators, when neutral is switched in the transfer switch.
  - Provide grounding electrode conductor to connect derived system grounded conductor to nearest effectively grounded metal building frame. Unless otherwise indicated, make connection at neutral (grounded) bus in source enclosure.
  - Provide bonding jumper to connect derived system grounded conductor to nearest metal building frame and nearest metal water piping in the area served by the derived system, where not already used as a grounding electrode for the derived system. Make connection at same location as grounding electrode conductor connection.
  - Provide system bonding jumper to connect system grounded conductor to equipment ground bus. Make connection at same location as grounding electrode conductor connection. Do not make any other connections between neutral (grounded) conductors and ground on load side of separately derived system disconnect.
  - Where the source and first disconnecting means are in separate enclosures, provide supply-side bonding jumper between source and first disconnecting means.
- Bonding and Equipment Grounding:
  - Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
  - Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
  - Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
  - Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
  - Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
  - Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
  - Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
    - Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
    - Metal gas piping.
  - Provide bonding for metal building frame.
- Communications Systems Grounding and Bonding:
  - Provide intersystem bonding termination at service equipment or metering equipment enclosure and at disconnecting means for any additional buildings or structures in accordance with NFPA 70.
  - Provide bonding jumper in raceway from intersystem bonding termination to each communications room or backboard and provide ground bar for termination.
    - Bonding Jumper Size: 6 AWG, unless otherwise indicated or required.
    - Raceway Size: 3/4 inch (21 mm) trade size unless otherwise indicated or required.

Ground Bar Size: 1/4 by 2 by 12 inches (6 by 50 by 300 mm) unless otherwise indicated or required.

GROUNDING AND BONDING COMPONENTS

General Requirements:

Provide products listed, classified, and labeled as suitable for the purpose intended.

Provide products listed and labeled as complying with UL 467 where applicable.

Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:

Use insulated copper conductors unless otherwise indicated.

Exceptions:

Use bare tinned copper conductors where installed underground in direct contact with earth.

Use bare tinned copper conductors where directly encased in concrete (not in raceway).

Factory Pre-fabricated Bonding Jumpers: Furnished with factory-installed ferrules; size braided cables to provide equivalent gage of specified conductors.

Connectors for Grounding and Bonding:

Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.

Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.

Unless otherwise indicated, use compression connectors or exothermic welded connections for accessible connections.

Exceptions:

Use exothermic welded connections for connections to metal building frame.

Ground Bars:

Description: Copper rectangular ground bars with mounting brackets and insulators.

Size: As indicated.

Holes for Connections: As indicated or as required for connections to be made.

Ground Rod Electrodes:

Comply with NEMA GR 1.

Material: Copper-bonded (copper-clad) steel.

Size: 3/4 inch (19 mm) diameter by 10 feet (3.0 m) length, unless otherwise indicated.

Ground Access Wells:

Description: Open bottom round or rectangular well with access cover for testing and inspection; suitable for the expected load at the installed location.

Size: As required to provide adequate access for testing and inspection, but not less than minimum size requirements specified.

Depth: As required to extend below frost line to prevent frost upheaval, but not less than 10 inches (250 mm).

Cover: Factory-identified by permanent means with word "GROUND".

PART 3 EXECUTION

EXAMINATION

Verify that work likely to damage grounding and bonding system components has been completed.

Verify that field measurements are as shown on the drawings.

Verify that conditions are satisfactory for installation prior to starting work.

INSTALLATION

Install products in accordance with manufacturer's instructions.

Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.

126 Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or provide ground plates.

127 Outdoor Installations: Unless otherwise indicated, install with top of rod 18 inches below finished grade.

128 Indoor Installations: Unless otherwise indicated, install with 4 inches (100 mm) of top of rod exposed.

129 Make grounding and bonding connections using specified connectors.

130 Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.

131 Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.

132 Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.

133 Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.

134 Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

135 Identify grounding and bonding system components in accordance with Section 26 0553.

136 FIELD QUALITY CONTROL

137 Inspect and test in accordance with NETA ATS except Section 4.

138 Perform inspections and tests listed in NETA ATS, Section 7.13.

139 Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.

140 Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

141 Submit detailed reports indicating inspection and testing results and corrective actions taken.

142 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

RELATED REQUIREMENTS

Section 03 3000 - Cast-in-Place Concrete: Concrete equipment pads.

REFERENCE STANDARDS

ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2015.

MFMA-4 - Metal Framing Standards Publication; 2004.

NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
- Coordinate the work with other trades to provide additional framing and materials required for installation.
- Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
- Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
- Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

Sequencing:

- Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 3000.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide manufacturer's standard catalog pages and data sheets for metal channel (strut) framing systems, non-penetrating rooftop supports, and post-installed concrete and masonry anchors.

Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.

QUALITY ASSURANCE

Comply with NFPA 70.

Comply with applicable building code.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

DELIVERY, STORAGE, AND HANDLING

Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

SUPPORT AND ATTACHMENT COMPONENTS

General Requirements:

Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.

Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.

Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 1.5. Include consideration for vibration, equipment operation, and shock loads where applicable.

Do not use products for applications other than as permitted by NFPA 70 and product listing.

Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.

Steel Components: Use corrosion resistant materials suitable for the environment where installed.

Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.

Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.

Zinc-Plated Steel: Electroplated in accordance with ASTM B633.

Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.

Conduit Straps: One-hole or two-hole type; steel or malleable iron.

Conduit Clamps: Bolted type unless otherwise indicated.

Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.

Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.

Comply with MFMA-4.

Channel (Strut) Used as Raceway (only where specifically indicated): Listed and labeled as complying with UL 5B.

Channel Material:

Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.

Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.

Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch (2.66 mm).

Minimum Channel Dimensions: 1-5/8 inch (41 mm) width by 13/16 inch (21 mm) height.

Manufacturers:

Cooper B-Line, a division of Eaton Corporation; _____: www.cooperindustries.com.

Thomas & Betts Corporation; _____: www.tnb.com.

Unistrut, a brand of Atkore International Inc; _____: www.unistrut.com.

Source Limitations: Furnish channels (struts) and associated fittings, accessories, and hardware produced by a single manufacturer.

Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.

Minimum Size, Unless Otherwise Indicated or Required:

Equipment Supports: 1/2 inch (13 mm) diameter.

Single Conduit up to 1 inch (27mm) trade size: 1/4 inch (6 mm) diameter.

Single Conduit larger than 1 inch (27mm) trade size: 3/8 inch (10 mm) diameter.

Trapeze Support for Multiple Conduits: 3/8 inch (10 mm) diameter.

Outlet Boxes: 1/4 inch (6 mm) diameter.

Luminaires: 1/4 inch (6 mm) diameter.

Non-Penetrating Rooftop Supports for Low-Slope Roofs: Steel pedestals with thermoplastic or rubber bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified.

- Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
- Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
- Mounting Height: Provide minimum clearance of 6 inches (150 mm) under supported component to top of roofing.
- Manufacturers:
  - Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com.
  - Erico International Corporation: www.erico.com.
  - PHP Systems/Design: www.phpsd.com.
  - Unistrut, a brand of Atkore International Inc: www.unistrut.com.

Anchors and Fasteners:

- Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
- Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
- Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
- Hollow Masonry: Use toggle bolts.
- Hollow Stud Walls: Use toggle bolts.
- Steel: Use beam clamps, machine bolts, or welded threaded studs.
- Sheet Metal: Use sheet metal screws.
- Plastic and lead anchors are not permitted.
- Powder-actuated fasteners are permitted only as follows:
  - Where approved by Architect.
  - Use only threaded studs; do not use pins.
- Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
  - Comply with MFMA-4.
  - Channel Material: Use galvanized steel.
  - Manufacturer: Same as manufacturer of metal channel (strut) framing system.
- Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.

PART 3 EXECUTION

EXAMINATION

Verify that field measurements are as shown on the drawings.

Verify that mounting surfaces are ready to receive support and attachment components.

Verify that conditions are satisfactory for installation prior to starting work.

INSTALLATION

Install products in accordance with manufacturer's instructions.

Install support and attachment components in a neat and workmanlike manner in accordance with NECA 1.

Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.

108 Unless specifically indicated or approved by Architect, do not provide support from roof deck.

109 Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

110 Equipment Support and Attachment:

111 Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.

112 Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.

113 Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.

114 Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

115 Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.

116 Secure fasteners according to manufacturer's recommended torque settings.

117 Remove temporary supports.

118 FIELD QUALITY CONTROL

119 Inspect support and attachment components for damage and defects.

120 Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

121 Correct deficiencies and replace damaged or defective support and attachment components.

122 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Galvanized steel rigid metal conduit (RMC).

Intermediate metal conduit (IMC).

Flexible metal conduit (FMC).

Liquidtight flexible metal conduit (LFMC).

Electrical metallic tubing (EMT).

Rigid polyvinyl chloride (PVC) conduit.

Conduit fittings.

RELATED REQUIREMENTS

Section 03 3000 - Cast-in-Place Concrete: Concrete encasement of conduits.

Section 07 8400 - Firestopping.

Section 26 0526 - Grounding and Bonding for Electrical Systems.

Section 26 0529 - Hangers and Supports for Electrical Systems.

Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

REFERENCE STANDARDS

ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2015.

ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2015.

ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit (EIMC); 2005.

NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.

NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2003.

NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.

NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2013.

NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2015.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.

UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.

UL 360 - Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.

UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.

UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.

UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
- Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
- Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.

Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.

Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

Sequencing:

Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

QUALITY ASSURANCE

Conform to requirements of NFPA 70.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

DELIVERY, STORAGE, AND HANDLING

Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

CONDUIT APPLICATIONS

Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

Underground:

Under Slab on Grade: Use galvanized steel rigid metal conduit or rigid PVC conduit.

Exterior, Direct-Buried: Use galvanized steel rigid metal conduit, intermediate metallic conduit (IMC), or rigid PVC conduit.

Exterior, Embedded Within Concrete: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or rigid PVC conduit.

Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.

Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.

Where steel conduit is installed in direct contact with earth where soil has a resistivity of less than 2000 ohm-centimeters or is characterized as severely corrosive based on soils report or local experience, use corrosion protection tape to provide supplementary corrosion protection.

Where steel conduit emerges from concrete into soil, use corrosion protection tape to provide supplementary corrosion protection for a minimum of 4 inches (100 mm) on either side of where conduit emerges or use PVC-coated galvanized steel rigid metal conduit.

Embedded Within Concrete:

Within Slab on Grade (within structural slabs only where approved by Structural Engineer): Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or rigid PVC conduit.

Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from concrete.

Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT).

Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).

Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).

Locations subject to physical damage include, but are not limited to:

Where exposed below 8 feet (2.4 m), except within electrical and communication rooms or closets.

Exposed, Exterior: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).

Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).

CONDUIT REQUIREMENTS

Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

Provide products listed, classified, and labeled as suitable for the purpose intended.

Minimum Conduit Size, Unless Otherwise Indicated:

Branch Circuits: 1/2 inch (16 mm) trade size.

Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.

Control Circuits: 1/2 inch (16 mm) trade size.

Flexible Connections to Luminaires: 3/8 inch (12 mm) trade size.

Underground, Interior: 3/4 inch (21 mm) trade size.

Underground, Exterior: 1 inch (27 mm) trade size.

Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

Fittings:

Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

Material: Use steel or malleable iron.

Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

INTERMEDIATE METAL CONDUIT (IMC)

Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.

Fittings:

Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

Material: Use steel or malleable iron.

Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

FLEXIBLE METAL CONDUIT (FMC)

Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.

Fittings:

Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

Material: Use steel or malleable iron.

101 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

102 Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

103 Fittings:

104 Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

105 Material: Use steel or malleable iron.

106 ELECTRICAL METALLIC TUBING (EMT)

107 Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

108 Fittings:

109 Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

110 Material: Use steel or malleable iron.

111 Connectors and Couplings: Use compression (gland) or set-screw type.

112 Do not use indenter type connectors and couplings.

113 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

114 Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.

115 Fittings:

116 Manufacturer: Same as manufacturer of conduit to be connected.

117 Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

118 PART 3 EXECUTION

119 EXAMINATION

120 Verify that field measurements are as shown on drawings.

121 Verify that mounting surfaces are ready to receive conduits.

122 Verify that conditions are satisfactory for installation prior to starting work.

123 INSTALLATION

124 Install products in accordance with manufacturer's instructions.

125 Install conduit in a neat and workmanlike manner in accordance with NECA 1.

126 Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

127 Install intermediate metal conduit (IMC) in accordance with NECA 101.

128 Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.

129 Install liquidtight flexible nonmetallic conduit (LFNC) in accordance with NECA 111.

130 Conduit Routing:

131 Unless dimensioned, conduit routing indicated is diagrammatic.

132 When conduit destination is indicated and routing is not shown, determine exact routing required.

133 Conceal all conduits unless specifically indicated to be exposed.

134 Conduits in the following areas may be exposed, unless otherwise indicated:

135 Electrical rooms.

136 Mechanical equipment rooms.

137 Unless otherwise approved, do not route conduits exposed:

138 Across floors.

139 Across roofs.

140 Across top of parapet walls.

- Across building exterior surfaces.

Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.

Arrange conduit to maintain adequate headroom, clearances, and access.

Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.

Arrange conduit to provide no more than 150 feet (46 m) between pull points.

Route conduits above water and drain piping where possible.

Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.

Maintain minimum clearance of 6 inches (150 mm) between conduits and piping for other systems.

Maintain minimum clearance of 12 inches (300 mm) between conduits and hot surfaces. This includes, but is not limited to:

- Heaters.
- Hot water piping.
- Flues.

Group parallel conduits in the same area together on a common rack.

Conduit Support:

Secure and support conduits in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.

Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.

Use conduit strap to support single surface-mounted conduit.

- Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.

Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.

Use conduit clamp to support single conduit from beam clamp or threaded rod.

Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.

Use non-penetrating rooftop supports to support conduits routed across rooftops (only where approved).

Use of spring steel conduit clips for support of conduits is permitted only as follows:

- Support of electrical metallic tubing (EMT) up to 1 inch (27 mm) trade size concealed above accessible ceilings and within hollow stud walls.

Use of wire for support of conduits is permitted only as follows:

- For suspending conduits supported by spring steel conduit clips (only where specifically indicated or permitted).

Connections and Terminations:

Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.

Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.

Use suitable adapters where required to transition from one type of conduit to another.

Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.

Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.

Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.

Secure joints and connections to provide maximum mechanical strength and electrical continuity.

Penetrations:

Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.

Make penetrations perpendicular to surfaces unless otherwise indicated.

Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.

Conceal bends for conduit risers emerging above ground.

Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.

Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.

Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.

Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

Underground Installation:

Minimum Cover, Unless Otherwise Indicated or Required:

Underground, Exterior: 24 inches (610 mm).

Under Slab on Grade: 12 inches (300 mm) to bottom of slab.

Provide underground warning tape in accordance with Section 26 0553 along entire conduit length for service entrance where not concrete-encased.

Embedment Within Structural Concrete Slabs (only where approved by Structural Engineer):

Include proposed conduit arrangement with submittals.

Maximum Conduit Size: 1 inch (27 mm) unless otherwise approved.

Secure conduits to prevent floating or movement during pouring of concrete.

Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide concrete in accordance with Section 03 3000 with minimum concrete cover of 3 inches (76 mm) on all sides unless otherwise indicated.

Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:

Where conduits cross structural joints intended for expansion, contraction, or deflection.

Where conduits are subject to earth movement by settlement or frost.

Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:

Where conduits pass from outdoors into conditioned interior spaces.

Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches (300 mm) at each end.

Provide grounding and bonding in accordance with Section 26 0526.

FIELD QUALITY CONTROL

Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

Correct deficiencies and replace damaged or defective conduits.

206 CLEANING

207 Clean interior of conduits to remove moisture and foreign matter.

208 PROTECTION

209 Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

210 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Outlet and device boxes up to 100 cubic inches (1,650 cu cm), including those used as junction and pull boxes.

Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches (1,650 cu cm).

Floor boxes.

Underground boxes/enclosures.

REFERENCE STANDARDS

NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.

NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.

NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.

NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

SCTE 77 - Specification for Underground Enclosure Integrity; 2013.

UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.

UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
- Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
- Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
- Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
- Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
- Coordinate the work with other trades to preserve insulation integrity.
- Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
- Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide manufacturer's standard catalog pages and data sheets for floor boxes and underground boxes/enclosures.

Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes, and underground boxes/enclosures.

Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
See Section 01 6000 - Product Requirements, for additional provisions.
Keys for Lockable Enclosures: Two of each different key.

QUALITY ASSURANCE

Conform to requirements of NFPA 70.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

DELIVERY, STORAGE, AND HANDLING

Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

BOXES

General Requirements:
Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
Provide products listed, classified, and labeled as suitable for the purpose intended.
Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
Provide grounding terminals within boxes where equipment grounding conductors terminate.

Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
Use sheet-steel boxes for dry locations unless otherwise indicated or required.
Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit or exposed intermediate metal conduit (IMC) is used.
Use suitable concrete type boxes where flush-mounted in concrete.
Use suitable masonry type boxes where flush-mounted in masonry walls.
Use raised covers suitable for the type of wall construction and device configuration where required.
Use shallow boxes where required by the type of wall construction.
Do not use "through-wall" boxes designed for access from both sides of wall.
Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes.
Minimum Box Size, Unless Otherwise Indicated:
Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
Communications Systems Outlets: 4 inch square by 2-1/8 inch (100 by 54 mm) trade size.
Wall Plates: Comply with Section 26 2726.

Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
NEMA 250 Environment Type, Unless Otherwise Indicated:

- Indoor Clean, Dry Locations: Type 1, painted steel.
- Outdoor Locations: Type 4X, stainless steel.
- Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
- Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
- Boxes 6 square feet (0.56 sq m) and Larger: Provide sectionalized screw-cover or hinged-cover enclosures.
- Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
- Provide lockable hinged covers, all locks keyed alike unless otherwise indicated.
- Back Panels: Painted steel, removable.
- Terminal Blocks: Provide voltage/current ratings and terminal quantity suitable for purpose indicated, with 25 percent spare terminal capacity.
- Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.
- Floor Boxes:
- Description: Floor boxes compatible with floor box service fittings provided in accordance with Section 26 2726; with partitions to separate multiple services; furnished with all components, adapters, and trims required for complete installation.
- Use cast iron floor boxes within slab on grade.
- Metallic Floor Boxes: Fully adjustable (with integral means for leveling adjustment prior to and after concrete pour).
- Manufacturer: Same as manufacturer of floor box service fittings.
- Underground Boxes/Enclosures:
- Description: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.
- Size: As indicated on drawings.
- Depth: As required to extend below frost line to prevent frost upheaval, but not less than 12 inches (300 mm).
- Provide logo on cover to indicate type of service.
- Applications:
- Sidewalks and Landscaped Areas Subject Only to Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum SCTE 77, Tier 8 load rating.
- Parking Lots, in Areas Subject Only To Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum SCTE 77, Tier 15 load rating.
- Do not use polymer concrete enclosures in areas subject to deliberate vehicular traffic.
- Polymer Concrete Underground Boxes/Enclosures: Comply with SCTE 77.
- Manufacturers:
- Hubbell Incorporated; Quazite Products: www.hubbellpowersystems.com.
- MacLean Highline: www.macleanhighline.com.
- Oldcastle Precast, Inc: www.oldcastleprecast.com.
- Combination fiberglass/polymer concrete boxes/enclosures are acceptable.
- Product(s):
- MacLean Highline PHA Series: Straight wall, all-polymer concrete splice box/pull box; available Tier 8, Tier 15, and Tier 22 load ratings.
- 11 by 18 by 12 inches nominal; Model PHA111812 (stackable).
- MacLean Highline CHA Series: Fiberglass/polymer concrete splice box/pull box; available Tier 8 and Tier 15 load ratings.
- 11 by 18 by 12 inches nominal; Model CHA111812.
- MacLean Highline CVA Series: Fiberglass/polymer concrete splice vault; available Tier 8, Tier 15, and Tier 22 load ratings.

PART 3 EXECUTION

EXAMINATION

- Verify that field measurements are as shown on drawings.
- Verify that mounting surfaces are ready to receive boxes.

109 Verify that conditions are satisfactory for installation prior to starting work.

110 INSTALLATION

111 Install products in accordance with manufacturer's instructions.

112 Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

113 Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

114 Provide separate boxes for emergency power and normal power systems.

115 Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.

116 Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.

117 Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.

118 Box Locations:

119 Locate boxes to be accessible. Provide access panels in accordance with Section 08 3100 as required where approved by the Architect.

120 Unless dimensioned, box locations indicated are approximate.

121 Locate boxes as required for devices installed under other sections or by others.

122 Switches, Receptacles, and Other Wiring Devices: Comply with Section 26 2726.

123 Locate boxes so that wall plates do not span different building finishes.

124 Locate boxes so that wall plates do not cross masonry joints.

125 Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.

126 Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches (150 mm) horizontal separation unless otherwise indicated.

127 Acoustic-Rated Walls: Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches (610 mm) horizontal separation.

128 Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.

129 Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches (610 mm) separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.

130 Do not install flush-mounted boxes with area larger than 16 square inches (0.0103 sq m) or such that the total aggregate area of openings exceeds 100 square inches (0.0645 sq m) for any 100 square feet (9.29 sq m) of wall area.

131 Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 0534.

132 Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:

133 Concealed above accessible suspended ceilings.

134 Within joists in areas with no ceiling.

135 Electrical rooms.

136 Mechanical equipment rooms.

137 Box Supports:

138 Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.

139 Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.

140 Install boxes plumb and level.

Flush-Mounted Boxes:

Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch (6 mm) or does not project beyond finished surface.

Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.

Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch (3 mm) at the edge of the box.

Install boxes as required to preserve insulation integrity.

Metallic Floor Boxes: Install box level at the proper elevation to be flush with finished floor.

Underground Boxes/Enclosures:

Install enclosure on gravel base, minimum 6 inches (150 mm) deep.

Install additional bracing inside enclosures in accordance with manufacturer's instructions to minimize box sidewall deflections during backfilling. Backfill with cover bolted in place.

Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

Close unused box openings.

Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

Provide grounding and bonding in accordance with Section 26 0526.

CLEANING

Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

PROTECTION

Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Electrical identification requirements.

Identification nameplates and labels.

Wire and cable markers.

Voltage markers.

Underground warning tape.

Warning signs and labels.

REFERENCE STANDARDS

ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2011.

ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011.

NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

NFPA 70E - Standard for Electrical Safety in the Workplace; National Fire Protection Association; 2015.

UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.

Sequencing:

- Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
- Do not install identification products until final surface finishes and painting are complete.

SUBMITTALS

Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

Shop Drawings: Provide schedule of items to be identified indicating proposed designations, materials, legends, and formats.

Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation and installation of product.

QUALITY ASSURANCE

Conform to requirements of NFPA 70.

FIELD CONDITIONS

Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

IDENTIFICATION REQUIREMENTS

Identification for Equipment:

- Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
  - Switchboards:
    - Identify ampere rating.
    - Identify voltage and phase.
    - Identify power source and circuit number. Include location when not within sight of equipment.

Use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.

Panelboards:

Identify ampere rating.

Identify voltage and phase.

Identify power source and circuit number. Include location when not within sight of equipment.

Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.

Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.

For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.

Transformers:

Identify kVA rating.

Identify voltage and phase for primary and secondary.

Identify power source and circuit number. Include location when not within sight of equipment.

Enclosed switches, circuit breakers, and motor controllers:

Identify voltage and phase.

Identify power source and circuit number. Include location when not within sight of equipment.

Identify load(s) served. Include location when not within sight of equipment.

Time Switches:

Identify load(s) served and associated circuits controlled. Include location.

Transfer Switches:

Identify voltage and phase.

Identify power source and circuit number for both normal power source and standby power source. Include location.

Identify load(s) served. Include location.

Identify short circuit current rating based on the specific overcurrent protective device type and settings protecting the transfer switch.

Electricity Meters:

Identify load(s) metered.

Service Equipment:

Use identification nameplate to identify each service disconnecting means.

Emergency System Equipment:

Use identification nameplate or voltage marker to identify emergency system equipment in accordance with NFPA 70.

Use identification nameplate at each piece of service equipment to identify type and location of on-site emergency power sources.

Use voltage marker to identify highest voltage present for each piece of electrical equipment.

Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.

Use identification label or handwritten text using indelible marker on inside of door at each fused switch to identify required NEMA fuse class and size.

Use identification label to identify overcurrent protective devices for branch circuits serving fire alarm circuits. Identify with text "FIRE ALARM CIRCUIT".

Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70, including but not limited to the following.

Service equipment.

Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter

socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.

Minimum Size: 3.5 by 5 inches (89 mm by 127 mm).

Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.

Service Equipment: Include the following information in accordance with NFPA 70.

Nominal system voltage.

Available fault current.

Clearing time of service overcurrent protective device(s).

Date label applied.

Identification for Conductors and Cables:

Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.

Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

Identification for Raceways:

Use voltage markers or color-coded bands to identify systems other than normal power system for accessible conduits at maximum intervals of 20 feet (6.1 m).

Color-Coded Bands: Use field-painting or vinyl color coding electrical tape to mark bands 3 inches (76 mm) wide.

Color Code:

Emergency Power System: Red.

Fire Alarm System: Red.

Field-Painting: Comply with Section 09 9123 and 09 9113.

Vinyl Color Coding Electrical Tape: Comply with Section 26 0519.

Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify circuits enclosed for accessible conduits at wall penetrations, at floor penetrations, at roof penetrations, and at equipment terminations when source is not within sight.

Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.

Use underground warning tape to identify underground raceways.

Identification for Boxes:

Use voltage markers to identify highest voltage present.

Use voltage markers or color coded boxes to identify systems other than normal power system.

Color-Coded Boxes: Field-painted in accordance with Section 09 9123 and 09 9113 per the same color code used for raceways.

Identification for Devices:

Wiring Device and Wallplate Finishes: Comply with Section 26 2726.

Factory Pre-Marked Wallplates: Comply with Section 26 2726.

Use identification label to identify fire alarm system devices.

Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.

Use identification label or engraved wallplate to identify load controlled for wall-mounted control devices controlling loads that are not visible from the control location and for multiple wall-mounted control devices installed at one location.

Use identification label to identify receptacles protected by upstream GFI protection, where permitted.

Identification for Luminaires:

107 IDENTIFICATION NAMEPLATES AND LABELS

Identification Nameplates:
- Materials:
  - Indoor Clean, Dry Locations: Use plastic nameplates.
  - Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
- Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
- Stainless Steel Nameplates: Minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
- Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
- Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch (25 mm) high; Four, located at corners for larger sizes.

Identification Labels:
- Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
- Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

Format for Equipment Identification:
- Minimum Size: 1 inch (25 mm) by 2.5 inches (64 mm).
- Legend:
  - System designation where applicable:
    - Emergency Power System: Identify with text "EMERGENCY".
    - Fire Alarm System: Identify with text "FIRE ALARM".
  - Equipment designation or other approved description.
- Text: All capitalized unless otherwise indicated.
- Minimum Text Height:
  - System Designation: 1 inch (25 mm).
  - Equipment Designation: 1/2 inch (13 mm).
- Color:
  - Normal Power System: White text on black background.
  - Emergency Power System: White text on red background.
  - Fire Alarm System: White text on red background.

Format for General Information and Operating Instructions:
- Minimum Size: 1 inch (25 mm) by 2.5 inches (64 mm).
- Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
- Text: All capitalized unless otherwise indicated.
- Minimum Text Height: 1/4 inch (6 mm).
- Color: Black text on white background unless otherwise indicated.
  - Exceptions:
    - Provide white text on red background for general information or operational instructions for emergency systems.
    - Provide white text on red background for general information or operational instructions for fire alarm systems.

Format for Caution and Warning Messages:
- Minimum Size: 2 inches (51 mm) by 4 inches (100 mm).
- Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
- Text: All capitalized unless otherwise indicated.
- Minimum Text Height: 1/2 inch (13 mm).
- Color: Black text on yellow background unless otherwise indicated.

Format for Receptacle Identification:
- Minimum Size: 3/8 inch (10 mm) by 1.5 inches (38 mm).
- Legend: Power source and circuit number or other designation indicated.
- Text: All capitalized unless otherwise indicated.
- Minimum Text Height: 3/16 inch (5 mm).
- Color: Black text on clear background.

Format for Control Device Identification:
- Minimum Size: 3/8 inch (10 mm) by 1.5 inches (38 mm).
- Legend: Load controlled or other designation indicated.
- Text: All capitalized unless otherwise indicated.
- Minimum Text Height: 3/16 inch (5 mm).
- Color: Black text on clear background.

Format for Fire Alarm Device Identification:
- Minimum Size: 3/8 inch (10 mm) by 1.5 inches (38 mm).
- Legend: Designation indicated and device zone or address.
- Text: All capitalized unless otherwise indicated.
- Minimum Text Height: 3/16 inch (5 mm).
- Color: Red text on white background.

WIRE AND CABLE MARKERS

Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

Legend: Power source and circuit number or other designation indicated.

Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

Minimum Text Height: 1/8 inch (3 mm).

Color: Black text on white background unless otherwise indicated.

VOLTAGE MARKERS

Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth, or vinyl snap-around type markers.

Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.

Minimum Size:
- Markers for Equipment: 1 1/8 by 4 1/2 inches (29 by 110 mm).
- Markers for Conduits: As recommended by manufacturer for conduit size to be identified.
- Markers for Pull Boxes: 1 1/8 by 4 1/2 inches (29 by 110 mm).
- Markers for Junction Boxes: 1/2 by 2 1/4 inches (13 by 57 mm).

Legend:
- Markers for Voltage Identification: Highest voltage present.
- Markers for System Identification:
  - Emergency Power System: Text "EMERGENCY".

Color: Black text on orange background unless otherwise indicated.

UNDERGROUND WARNING TAPE

Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.

Foil-backed Detectable Type Tape: 3 inches (76 mm) wide, with minimum thickness of 5 mil (0.1 mm), unless otherwise required for proper detection.

Legend: Type of service, continuously repeated over full length of tape.

Color:
Tape for Buried Power Lines: Black text on red background.

WARNING SIGNS AND LABELS

Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

Warning Signs:
Materials:
Minimum Size: 7 by 10 inches (178 by 254 mm) unless otherwise indicated.

Warning Labels:
Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.

PART 3 EXECUTION

PREPARATION

Clean surfaces to receive adhesive products according to manufacturer's instructions.

INSTALLATION

Install products in accordance with manufacturer's instructions.

Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
Surface-Mounted Equipment: Enclosure front.
Flush-Mounted Equipment: Inside of equipment door.
Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
Elevated Equipment: Legible from the floor or working platform.
Branch Devices: Adjacent to device.
Interior Components: Legible from the point of access.
Conduits: Legible from the floor.
Boxes: Outside face of cover.
Conductors and Cables: Legible from the point of access.
Devices: Outside face of cover.

Install identification products centered, level, and parallel with lines of item being identified.

Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

Install underground warning tape above buried lines with one tape per trench at 3 inches (75 mm) below finished grade.

Mark all handwritten text, where permitted, to be neat and legible.

FIELD QUALITY CONTROL

Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Short-circuit study.

Protective device coordination study.

Arc flash and shock risk assessment.

- Includes arc flash hazard warning labels.

Criteria for the selection and adjustment of equipment and associated protective devices not specified in this section, as determined by studies to be performed.

RELATED REQUIREMENTS

Section 26 0553 - Identification for Electrical Systems: Additional requirements for arc flash hazard warning labels.

REFERENCE STANDARDS

ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011.

IEEE 141 - IEEE Recommended Practice for Electrical Power Distribution for Industrial Plants; 1993 (Reaff 1999).

IEEE 242 - IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems; 2001, with Errata, 2003.

IEEE 399 - IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis; 1997.

IEEE 551 - IEEE Recommended Practice for Calculating Short-Circuit Currents in Industrial and Commercial Power Systems; 2006.

IEEE 1584 - IEEE Guide for Performing Arc Flash Hazard Calculations; 2002, including 1584a (2004) and 1584b (2011) amendments.

NEMA MG 1 - Motors and Generators; 2016.

NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

NFPA 70E - Standard for Electrical Safety in the Workplace; 2015.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Coordinate the work to provide equipment and associated protective devices complying with criteria for selection and adjustment, as determined by studies to be performed.
- Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

Sequencing:

- Submit study reports prior to or concurrent with product submittals.
- Do not order equipment until matching study reports and product submittals have both been evaluated by Architect.
- Verify naming convention for equipment identification prior to creation of final drawings, reports, and arc flash hazard warning labels (where applicable).

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Study reports, stamped or sealed and signed by study preparer.

Product Data: In addition to submittal requirements specified in other sections, include manufacturer's standard catalog pages and data sheets for equipment and protective devices indicating information relevant to studies.

Include characteristic time-current trip curves for protective devices.
Include impedance data for busway.
Include impedance data for engine generators.
Identify modifications made in accordance with studies that:
Can be made at no additional cost to Owner.
As submitted will involve a change to the contract sum.

Arc Flash Hazard Warning Label Samples: One of each type and legend specified.

Site-specific arc flash hazard warning labels.

Field quality control reports.

Project Record Documents: Revise studies as required to reflect as-built conditions.
Include hard copies with operation and maintenance data submittals.
Include computer software files used to prepare studies with file name(s) cross-referenced to specific pieces of equipment and systems.

POWER SYSTEM STUDIES

Scope of Studies:
Perform analysis of new electrical distribution system as indicated on drawings.
Except where study descriptions below indicate exclusions, analyze system at each bus from primary protective devices of utility source down to each piece of equipment involved, including parts of system affecting calculations being performed (e.g. fault current contribution from motors).
Include in analysis alternate sources and operating modes (including known future configurations) to determine worst case conditions.
Known Operating Modes:
Utility as source.
Generator as source.
Maintenance settings.

General Study Requirements:
Comply with NFPA 70.
Perform studies utilizing computer software complying with specified requirements; manual calculations are not permitted.

Data Collection:
Compile information on project-specific characteristics of actual installed equipment, protective devices, feeders, etc. as necessary to develop single-line diagram of electrical distribution system and associated input data for use in system modeling.
Utility Source Data: Include primary voltage, maximum and minimum three-phase and line-to-ground fault currents, impedance, X/R ratio, and primary protective device information.
Obtain up-to-date information from Utility Company.
Generators: Include manufacturer/model, kW and voltage ratings, and impedance.
Motors: Include manufacturer/model, type (e.g. induction, synchronous), horsepower rating, voltage rating, full load amps, and locked rotor current or NEMA MG 1 code letter designation.
Transformers: Include primary and secondary voltage ratings, kVA rating, winding configuration, percent impedance, and X/R ratio.
Protective Devices:
Circuit Breakers: Include manufacturer/model, type (e.g. thermal magnetic, electronic trip), frame size, trip rating, voltage rating, interrupting rating, available field-adjustable trip response settings, and features (e.g. zone selective interlocking).
Fuses: Include manufacturer/model, type/class (e.g. Class J), size/rating, and speed (e.g. time delay, fast acting).

- Protective Relays: Include manufacturer/model, type, settings, current/potential transformer ratio, and associated protective device.
- Conductors: Include feeder size, material (e.g. copper, aluminum), insulation type, voltage rating, number per phase, raceway type, and actual length.

Short-Circuit Study:

- Comply with IEEE 551 and applicable portions of IEEE 141, IEEE 242, and IEEE 399.
- For purposes of determining equipment short circuit current ratings, consider conditions that may result in maximum available fault current, including but not limited to:
  - Maximum utility fault currents.
  - Maximum motor contribution.
  - Known operating modes (e.g. utility as source, generator as source, utility/generator in parallel, bus tie breaker open/close positions).
- For each bus location, calculate the maximum available three-phase bolted symmetrical and asymmetrical fault currents. For grounded systems, also calculate the maximum available line-to-ground bolted fault currents.

Protective Device Coordination Study:

- Comply with applicable portions of IEEE 242 and IEEE 399.
- Analyze alternate scenarios considering known operating modes (e.g. utility as source, generator as source, utility/generator in parallel, bus tie breaker open/close positions).
- Analyze protective devices and associated settings for suitable margins between time-current curves to achieve full selective coordination while providing adequate protection for equipment and conductors.

Arc Flash and Shock Risk Assessment:

- Comply with NFPA 70E.
- Perform incident energy and arc flash boundary calculations in accordance with IEEE 1584 (as referenced in NFPA 70E Annex D), where applicable.
- Analyze alternate scenarios considering conditions that may result in maximum incident energy, including but not limited to:
  - Maximum and minimum utility fault currents.
  - Maximum and minimum motor contribution.
  - Known operating modes (e.g. utility as source, generator as source, utility/generator in parallel, bus tie breaker open/close positions).

Study Reports:

- General Requirements:
  - Identify date of study and study preparer.
  - Identify study methodology and software product(s) used.
  - Identify scope of studies, assumptions made, implications of possible alternate scenarios, and any exclusions from studies.
  - Identify base used for per unit values.
  - Include single-line diagram and associated input data used for studies; identify buses on single-line diagram as referenced in reports, and indicate bus voltage.
  - Include conclusions and recommendations.
- Short-Circuit Study:
  - For each scenario, identify at each bus location:
    - Calculated maximum available symmetrical and asymmetrical fault currents (both three-phase and line-to-ground where applicable).
    - Fault point X/R ratio.
    - Associated equipment short circuit current ratings.
  - Identify locations where the available fault current exceeds the equipment short circuit current rating, along with recommendations.
- Protective Device Coordination Study:
  - For each scenario, include time-current coordination curves plotted on log-log scale graphs.

For each graph include (where applicable):
Partial single-line diagram identifying the portion of the system illustrated.
Protective Devices: Time-current curves with applicable tolerance bands for each protective device in series back to the source, plotted up to the maximum available fault current at the associated bus.
Conductors: Damage curves.
Transformers: Inrush points and damage curves.
Generators: Full load current, overload curves, decrement curves, and short circuit withstand points.
Motors: Full load current, starting curves, and damage curves.
Capacitors: Full load current and damage curves.
For each protective device, identify fixed and adjustable characteristics with available ranges and recommended settings.
Circuit Breakers: Include long time pickup and delay, short time pickup and delay, and instantaneous pickup.
Include ground fault pickup and delay.
Include fuse ratings.
Protective Relays: Include current/potential transformer ratios, tap, time dial, and instantaneous pickup.
Identify cases where either full selective coordination or adequate protection is not achieved, along with recommendations.
Arc Flash and Shock Risk Assessment:
For each scenario, identify at each bus location:
Calculated incident energy and associated working distance.
Calculated arc flash boundary.
Bolted fault current.
Arcing fault current.
Clearing time.
Arc gap distance.
For purposes of producing arc flash hazard warning labels, summarize the maximum incident energy and associated data reflecting the worst case condition of all scenarios at each bus location.
Identify locations where the calculated maximum incident energy exceeds 40 calories per sq cm.

QUALITY ASSURANCE

Study Preparer Qualifications: Professional electrical engineer licensed in the State in which the Project is located and with minimum five years experience in the preparation of studies of similar type and complexity using specified computer software.
Study preparer may be employed by the manufacturer of the electrical distribution equipment.
Study preparer may be employed by field testing agency.
Computer Software for Study Preparation: Use the latest edition of commercially available software utilizing specified methodologies.
Acceptable Software Products:
EasyPower LLC: www.easypower.com.
ETAP/Operation Technology, Inc: www.etap.com.
SKM Systems Analysis, Inc: www.skm.com.

PART 2 PRODUCTS

ARC FLASH HAZARD WARNING LABELS

Provide warning labels complying with ANSI Z535.4 to identify arc flash hazards for each work location analyzed by the arc flash and shock risk assessment.
Materials: Comply with Section 26 0553.

Legend: Provide custom legend in accordance with NFPA 70E based on equipment-specific data as determined by arc flash and shock risk assessment.

Include the following information:

- Arc flash boundary.
- Available incident energy and corresponding working distance.
- Nominal system voltage.
- Limited approach boundary.
- Restricted approach boundary.
- Equipment identification.
- Date calculations were performed.

PART 3 EXECUTION

INSTALLATION

Install arc flash warning labels in accordance with Section 26 0553.

FIELD QUALITY CONTROL

See Section 01 4000 - Quality Requirements, for additional requirements.

Provide the services of field testing agency or equipment manufacturer's representative to perform inspection, testing, and adjusting.

Inspect and test in accordance with NETA ATS, except Section 4.

Adjust equipment and protective devices for compliance with studies and recommended settings.

Notify Architect of any conflicts with or deviations from studies. Obtain direction before proceeding.

Submit detailed reports indicating inspection and testing results, and final adjusted settings.

CLOSEOUT ACTIVITIES

Training: Include as part of the base bid training for Owner's personnel on electrical safety pertaining to arc flash and shock hazards.

Use site-specific arc flash and shock risk assessment report as training reference, supplemented with additional training materials as required.

Instructor: Representative of entity performing study.

Location: At project site.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Occupancy sensors.

Outdoor motion sensors.

Outdoor photo controls.

Daylighting controls.

RELATED REQUIREMENTS

Section 26 0537 - Boxes.

Section 26 2726 - Wiring Devices: Devices for manual control of lighting, including wall switches, wall dimmers, and fan speed controllers.

REFERENCE STANDARDS

NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.

NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

UL 773A - Nonindustrial Photoelectric Switches for Lighting Control; Current Edition, Including All Revisions.

UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Coordinate the placement of lighting control devices with millwork, furniture, equipment, etc. installed under other sections or by others.
- Coordinate the placement of wall switch occupancy sensors with actual installed door swings.
- Coordinate the placement of occupancy sensors with millwork, furniture, equipment or other potential obstructions to motion detection coverage installed under other sections or by others.
- Coordinate the placement of photo sensors for daylighting controls with windows, skylights, and luminaires to achieve optimum operation. Coordinate placement with ductwork, piping, equipment, or other potential obstructions to light level measurement installed under other sections or by others.
- Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

Sequencing:

- Do not install lighting control devices until final surface finishes and painting are complete.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.

- Occupancy Sensors: Include detailed motion detection coverage range diagrams.

Shop Drawings:

- Occupancy Sensors: Provide lighting plan indicating location, model number, and orientation of each occupancy sensor and associated system component.
- Daylighting Controls: Provide lighting plan indicating location, model number, and orientation of each photo sensor and associated system component.

Field Quality Control Reports.

Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

Operation and Maintenance Data: Include detailed information on device programming and setup.

Project Record Documents: Record actual installed locations and settings for lighting control devices.

QUALITY ASSURANCE

Conform to requirements of NFPA 70.

Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

DELIVERY, STORAGE, AND PROTECTION

Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

FIELD CONDITIONS

Maintain field conditions within manufacturer's required service conditions during and after installation.

WARRANTY

See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

Provide two year manufacturer warranty for all daylighting controls.

PART 2 PRODUCTS

LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS

Provide products listed, classified, and labeled as suitable for the purpose intended.

Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

OCCUPANCY SENSORS

Manufacturers:

- Hubbell Building Automation, Inc: www.hubbellautomation.com
- Sensor Switch Inc: www.sensorswitch.com.
- WattStopper: www.wattstopper.com.
- Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

All Occupancy Sensors:

- Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.
- Sensor Technology:
  - Passive Infrared (PIR) Occupancy Sensors: Designed to detect occupancy by sensing movement of thermal energy between zones.
  - Ultrasonic Occupancy Sensors: Designed to detect occupancy by sensing frequency shifts in emitted and reflected inaudible sound waves.
  - Passive Infrared/Ultrasonic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and ultrasonic technologies.
- Provide LED to visually indicate motion detection with separate color LEDs for each sensor type in dual technology units.

- Operation: Unless otherwise indicated, occupancy sensor to turn load on when occupant presence is detected and to turn load off when no occupant presence is detected during an adjustable turn-off delay time interval.
- Dual Technology Occupancy Sensors: Field configurable turn-on and hold-on activation with settings for activation by either or both sensing technologies.
- Passive Infrared Lens Field of View: Field customizable by addition of factory masking material, adjustment of integral blinders, or similar means to block motion detection in selected areas.
- Turn-Off Delay: Field adjustable, with time delay settings up to 30 minutes.
- Sensitivity: Field adjustable.
- Adaptive Technology: Field selectable; capable of self-adjusting sensitivity and time delay according to conditions.
- Compatibility (Non-Dimming Sensors): Suitable for controlling incandescent lighting, low-voltage lighting with electronic and magnetic transformers, fluorescent lighting with electronic and magnetic ballasts, and fractional motor loads, with no minimum load requirements.
- Load Rating for Line Voltage Occupancy Sensors: As required to control the load indicated on the drawings.
- Isolated Relay for Low Voltage Occupancy Sensors: SPDT dry contacts, ratings as required for interface with system indicated.

Wall Switch Occupancy Sensors:

All Wall Switch Occupancy Sensors:

- Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.
- Unless otherwise indicated or required to control the load indicated on the drawings, provide line voltage units with self-contained relay.
- Where indicated, provide two-circuit units for control of two separate lighting loads, with separate manual controls and separately programmable operation for each load.
- Operation: Field selectable to operate either as occupancy sensor (automatic on/off) or as vacancy sensor (manual-on/automatic off).
- Manual-Off Override Control: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.
- Finish: Match finishes specified for wiring devices in Section 26 2726, unless otherwise indicated.

Passive Infrared (PIR) Wall Switch Occupancy Sensors: Capable of detecting motion within an area of 900 square feet (83.6 sq m).

Ultrasonic Wall Switch Occupancy Sensors: Capable of detecting motion within an area of 400 square feet (37.2 sq m).

Passive Infrared/Ultrasonic Dual Technology Wall Switch Occupancy Sensors: Capable of detecting motion within an area of 900 square feet (83.6 sq m).

Ceiling Mounted Occupancy Sensors:

All Ceiling Mounted Occupancy Sensors:

- Description: Low profile occupancy sensors designed for ceiling installation.
- Unless otherwise indicated or required to control the load indicated on the drawings, provide low voltage units, for use with separate compatible accessory power packs.
- Provide field selectable setting for disabling LED motion detector visual indicator.
- Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.
- Finish: White unless otherwise indicated.

Passive Infrared (PIR) Ceiling Mounted Occupancy Sensors:

Standard Range Sensors: Capable of detecting motion within an area of 450 square feet (41.8 square meters) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.

Ultrasonic Ceiling Mounted Occupancy Sensors:

Standard Range Sensors: Capable of detecting motion within an area of 500 square feet (46.5 sq m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.

Passive Infrared/Ultrasonic Dual Technology Ceiling Mounted Occupancy Sensors:

Standard Range Sensors: Capable of detecting motion within an area of 450 square feet (41.8 sq m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.

Power Packs for Low Voltage Occupancy Sensors:

Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.

Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on the drawings.

Input Supply Voltage: Dual rated for 120/277 V ac.

Load Rating: As required to control the load indicated on the drawings.

OUTDOOR MOTION SENSORS

Manufacturers:

Hubbell Lighting, Inc: www.hubbelllighting.com.

Lithonia Lighting: www.lithonia.com.

WattStopper: www.wattstopper.com.

Substitutions: See Section 01 6000 - Product Requirements.

Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

Description: Factory-assembled wet location listed device suitable for wall or ceiling/eave mounting, with integral swivel for field adjustment of coverage, capable of detecting motion for automatic control of load indicated.

Sensor Technology: Passive Infrared (PIR) designed to detect occupancy by sensing movement of thermal energy between zones.

Operation: Unless otherwise indicated, motion sensor to turn load on when motion is detected and to turn load off when no motion is detected during an adjustable turn-off delay time interval.

Turn-Off Delay: Field adjustable, with time delay settings available up to 15 minutes.

Integral Photocell: For dusk to dawn operation.

Manual Override: Activated by switching power off to unit and then back on.

Load Rating: 1,000 W incandescent and fluorescent load at 120 V ac.

Coverage: Capable of detecting motion within a distance of 50 feet (15 m) at a mounting height of 8 feet (2.4 m), with a field of view of 270 degrees.

OUTDOOR PHOTO CONTROLS

DAYLIGHTING CONTROLS

Manufacturers:

Hubbell Building Automation, Inc: www.hubbellautomation.com

Lutron Electronics Company, Inc: www.lutron.com/sle.

Sensor Switch Inc: www.sensorswitch.com.

WattStopper: www.wattstopper.com.

Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

System Description: Control system consisting of photo sensors and compatible control modules and power packs, contactors, or relays as required for automatic control of load indicated according to available natural light; capable of integrating with occupancy sensors and manual override controls.

Daylighting Control Photo Sensors: Low voltage class 2 photo sensor units with output signal proportional to the measured light level and provision for zero or offset based signal.
- Sensor Type: Filtered silicon photo diode.
- Sensor Range:
  - Indoor Photo Sensors: 5 to 100 footcandles (53.8 to 1,080 lx).
  - Outdoor Photo Sensors: 5 to 250 footcandles (53.8 to 2690 lx).
  - Skylight Photo Sensors: 1,000 to 6,000 footcandles (10,760 to 64,580 lx).
- Finish: White unless otherwise indicated.

Dimming Photo Sensors: Photo sensor units with integral controller compatible with specified dimming ballasts, for direct continuous dimming of up to 50 ballasts.

Daylighting Control Switching Modules for Low Voltage Sensors: Low voltage class 2 control unit compatible with specified photo sensors, for switching of compatible power packs, contactors, or relays in response to changes in measured light levels according to selected settings.
- Operation: Unless otherwise indicated, load to be turned on when light level is below selected low set point and load to be turned off when light level is above selected high set point, with a no switching dead band between set points to prevent unwanted cycling.
- Input Delay: To prevent unwanted cycling due to intermittent light level fluctuations.
- Control Capability:
  - Single Zone Switching Modules: Capable of controlling one programmable channel.
  - Multi-Zone Switching Modules: Capable of controlling up to three separately programmable channels.

Daylighting Control Dimming Modules for Low Voltage Sensors: Low voltage class 2 control unit compatible with specified photo sensors and with specified dimming ballasts, for both continuous dimming of compatible dimming ballasts and switching of compatible power packs, contactors, or relays in response to changes in measured light levels according to selected settings.
- Operation: Unless otherwise indicated, specified load to be continuously brightened as not enough daylight becomes available and continuously dimmed as enough daylight becomes available.
- Control Capability: Capable of controlling up to three separately programmable channels, with up to 50 ballasts per channel.
- Dimming and Fade Rates: Adjustable from 5 to 60 seconds.
- Cut-Off Delay: Selectable and adjustable from 0 to 20 minutes.

Power Packs for Low Voltage Daylighting Control Modules:
- Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage daylighting control modules for switching of line voltage loads. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on the drawings.
- Input Supply Voltage: Dual rated for 120/277 V ac.
- Load Ratings: As required to control the load indicated on the drawings.

Accessories:
- Where indicated, provide compatible accessory wall switches for manual override control.
- Where indicated, provide compatible accessory wireless controls for manual override control.

PART 3 EXECUTION

EXAMINATION

Verify that field measurements are as shown on the drawings.

Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.

Verify that final surface finishes are complete, including painting.

Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.

Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.

Verify that conditions are satisfactory for installation prior to starting work.

PREPARATION

Provide extension rings to bring outlet boxes flush with finished surface.

Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

INSTALLATION

Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of lighting control devices provided under this section.

Mounting Heights: Unless otherwise indicated, as follows:

Wall Switch Occupancy Sensors: 48 inches (1.2 m) above finished floor.

Orient outlet boxes for vertical installation of lighting control devices unless otherwise indicated.

Locate wall switch occupancy sensors on strike side of door with edge of wall plate 3 inches (80 mm) from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.

Install lighting control devices in accordance with manufacturer's instructions.

Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

Install lighting control devices plumb and level, and held securely in place.

Where required and not furnished with lighting control device, provide wall plate in accordance with Section 26 2726.

Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

Occupancy Sensor Locations:

Location Adjustments: Locations indicated are diagrammatic and only intended to indicate which rooms or areas require devices. Provide quantity and locations as required for complete coverage of respective room or area based on manufacturer's recommendations for installed devices.

Locate ultrasonic and dual technology passive infrared/ultrasonic occupancy sensors a minimum of 4 feet (1.2 m) from air supply ducts or other sources of heavy air flow and as per manufacturer's recommendations, in order to minimize false triggers.

Outdoor Photo Control Locations:

Where possible, locate outdoor photo controls with photo sensor facing north. If north facing photo sensor is not possible, install with photo sensor facing east, west, or down.

Locate outdoor photo controls so that photo sensors do not face artificial light sources, including light sources controlled by the photo control itself.

Install outdoor photo controls so that connections are weatherproof. Do not install photo controls with conduit stem facing up in order to prevent infiltration of water into the photo control.

Daylighting Control Photo Sensor Locations:

Location Adjustments: Locations indicated are diagrammatic and only intended to indicate which rooms or areas require devices. Provide quantity and locations as required for proper

control of respective room or area based on manufacturer's recommendations for installed devices.

186 Unless otherwise indicated, locate photo sensors for closed loop systems to accurately measure the light level controlled at the designated task location, while minimizing the measured amount of direct light from natural or artificial sources such as windows or pendant luminaires.

187 Unless otherwise indicated, locate photo sensors for open loop systems to accurately measure the level of daylight coming into the space, while minimizing the measured amount of lighting from artificial sources.

188 Lamp Burn-In: Operate lamps at full output for minimum of 100 hours or prescribed period per manufacturer's recommendations prior to use with any dimming controls. Replace lamps that fail prematurely due to improper lamp burn-in.

189 Unless otherwise indicated, install power packs for lighting control devices above accessible ceiling or above access panel in inaccessible ceiling near the sensor location.

190 Where indicated, install separate compatible wall switches for manual control interface with lighting control devices or associated power packs.

191 Unless otherwise indicated, install switches on load side of power packs so that switch does not turn off power pack.

192 FIELD QUALITY CONTROL

193 Inspect each lighting control device for damage and defects.

194 Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area. Record test results in written report to be included with submittals.

195 Test outdoor photo controls to verify proper operation, including time delays where applicable.

196 Test daylighting controls to verify proper operation, including light level measurements and time delays where applicable. Record test results in written report to be included with submittals.

197 Correct wiring deficiencies and replace damaged or defective lighting control devices.

198 ADJUSTING

199 Adjust devices and wall plates to be flush and level.

200 Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Architect.

201 Adjust position of directional occupancy sensors and outdoor motion sensors to achieve optimal coverage as required.

202 Where indicated or as directed by Architect, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology occupancy sensor lenses to block undesired motion detection.

203 Adjust daylighting controls under optimum lighting conditions after all room finishes, furniture, and window treatments have been installed to achieve desired operation as indicated or as directed by Architect. Record settings in written report to be included with submittals. Readjust controls calibrated prior to installation of final room finishes, furniture, and window treatments that do not function properly as determined by Architect.

204 CLEANING

205 Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

206 COMMISSIONING

207 See Section 01 9113 - General Commissioning Requirements for commissioning requirements.

208 CLOSEOUT ACTIVITIES

209 Demonstration: Demonstrate proper operation of lighting control devices to Architect, and correct deficiencies or make adjustments as directed.

210 Training: Train Owner's personnel on operation, adjustment, programming, and maintenance of lighting control devices.

211 Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

212 Instructor: Qualified contractor familiar with the project and with sufficient knowledge of the installed lighting control devices.

213 Location: At project site.

214 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Electrical service requirements.

RELATED REQUIREMENTS

Section 26 0526 - Grounding and Bonding for Electrical Systems.

Section 26 0529 - Hangers and Supports for Electrical Systems.

Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

DEFINITIONS

Service Point: The point of connection between the facilities of the serving utility and the premises wiring as defined in NFPA 70, and as designated by the Utility Company.

REFERENCE STANDARDS

IEEE C2 - National Electrical Safety Code; 2012.

NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

ADMINISTRATIVE REQUIREMENTS

No later than two weeks following date of the Agreement, notify Utility Company of anticipated date of service.

Coordination:

- Verify the following with Utility Company representative:
  - Utility Company requirements, including division of responsibility.
  - Exact location and details of utility point of connection.
  - Utility easement requirements.
  - Utility Company charges associated with providing service.
- Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for electrical service and associated equipment.
- Coordinate arrangement of service entrance equipment with the dimensions and clearance requirements of the actual equipment to be installed.
- Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

Arrange for Utility Company to provide permanent electrical service. Prepare and submit documentation required by Utility Company.

Utility Company charges associated with providing permanent service to be paid by Contractor..

Preinstallation Meeting: Convene one week prior to commencing work of this section to review service requirements and details with Utility Company representative.

Scheduling:

- Arrange for inspections necessary to obtain Utility Company approval of installation.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide manufacturer's standard catalog pages and data sheets for each product. Include ratings, configurations, standard wiring diagrams, outline and support point dimensions, finishes, weights, service condition requirements, and installed features.

Shop Drawings: Include dimensioned plan views and sections indicating locations and arrangement of Utility Company and service entrance equipment, metering provisions, required clearances, and proposed service routing.

Project Record Documents: Record actual locations of equipment and installed service routing.

QUALITY ASSURANCE

Comply with the following:

- IEEE C2 (National Electrical Safety Code).
- NFPA 70 (National Electrical Code).
- The requirements of the Utility Company.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

DELIVERY, STORAGE, AND HANDLING

Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

Store products indoors in a clean, dry space having a uniform temperature to prevent condensation (including outdoor rated products which are not weatherproof until completely and properly installed). Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

Handle products carefully to avoid damage to internal components, enclosure, and finish.

PART 2 PRODUCTS

ELECTRICAL SERVICE REQUIREMENTS

Provide new electrical service consisting of all required conduits, conductors, equipment, metering provisions, supports, accessories, etc. as necessary for connection between Utility Company point of supply and service entrance equipment.

Electrical Service Characteristics: As indicated on drawings.

Division of Responsibility: Per Utility Company requirements.

Products Furnished by Contractor: Comply with Utility Company requirements.

PART 3 EXECUTION

EXAMINATION

Verify that field measurements are as shown on drawings.

Verify that ratings and configurations of service entrance equipment are consistent with the indicated requirements.

Verify that conditions are satisfactory for installation prior to starting work.

PREPARATION

INSTALLATION

Install products in accordance with manufacturer's instructions and Utility Company requirements.

Perform work in a neat and workmanlike manner in accordance with NECA 1.

Arrange equipment to provide minimum clearances and required maintenance access.

Provide required support and attachment components in accordance with Section 26 0529.

Provide grounding and bonding for service entrance equipment in accordance with Section 26 0526.

Identify service entrance equipment, including main service disconnect(s) in accordance with Section 26 0553.

PROTECTION

Protect installed equipment from subsequent construction operations.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

General purpose transformers.

RELATED REQUIREMENTS

Section 03 3000 - Cast-in-Place Concrete: Concrete equipment pads.

Section 26 0526 - Grounding and Bonding for Electrical Systems.

Section 26 0534 - Conduit: Flexible conduit connections.

Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

REFERENCE STANDARDS

10 CFR 431, Subpart K - Energy Efficiency Program for Certain Commercial and Industrial Equipment - Distribution Transformers; Current Edition.

IEEE C57.94 - IEEE Recommended Practice for Installation, Application, Operation, and Maintenance of Dry-Type Distribution and Power Transformers; 2015.

IEEE C57.96 - Guide for Loading Dry-Type Distribution and Power Transformers; 2013.

NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

NECA 409 - Standard for Installing and Maintaining Dry-Type Transformers; 2015.

NEMA ST 20 - Dry-Type Transformers for General Applications; 2014.

NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

UL 506 - Standard for Specialty Transformers; Current Edition, Including All Revisions.

UL 1561 - Standard for Dry-Type General Purpose and Power Transformers; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination: Coordinate the work with placement of support framing and anchors required for mounting of transformers.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Include voltage, kVA, impedance, tap configurations, insulation system class and rated temperature rise, efficiency, sound level, enclosure ratings, outline and support point dimensions, weight, required clearances, service condition requirements, and installed features.

Shop Drawings: Provide dimensioned plan and elevation views of transformers and adjacent equipment with all required clearances indicated.

Source Quality Control Test Reports: Include reports for tests designated in NEMA ST 20 as design and routine tests.

Field Quality Control Test Reports.

Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

Maintenance Data: Include recommended maintenance procedures and intervals.

Project Record Documents: Record actual locations of transformers.

QUALITY ASSURANCE

Conform to requirements of NFPA 70.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

DELIVERY, STORAGE, AND HANDLING

Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to transformer internal components, enclosure, and finish.

FIELD CONDITIONS

Ambient Temperature: Do not exceed the following maximum temperatures during and after installation of transformers.

Greater than 10 kVA: 104 degrees F (40 degrees C) maximum.

Less than 10 kVA: 77 degrees F (25 degrees C) maximum.

PART 2 PRODUCTS

MANUFACTURERS

Eaton Corporation: www.eaton.com.

General Electric Company: www.geindustrial.com.

Schneider Electric; Square D Products: www.schneider-electric.us.

Source Limitations: Furnish transformers produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

TRANSFORMERS - GENERAL REQUIREMENTS

Description: Factory-assembled, dry type transformers for 60 Hz operation designed and manufactured in accordance with NEMA ST 20 and listed, classified, and labeled as suitable for the purpose intended.

Unless noted otherwise, transformer ratings indicated are for continuous loading according to IEEE C57.96 under the following service conditions:

Altitude: Less than 3,300 feet (1,000 m).

Ambient Temperature:

Greater than 10 kVA: Not exceeding 104 degrees F (40 degrees C).

Less than 10 kVA: Not exceeding 77 degrees F (25 degrees C).

Core: High grade, non-aging silicon steel with high magnetic permeability and low hysteresis and eddy current losses. Keep magnetic flux densities substantially below saturation point, even at 10 percent primary overvoltage. Tightly clamp core laminations to prevent plate movement and maintain consistent pressure throughout core length.

Impregnate core and coil assembly with non-hydroscopic thermo-setting varnish to effectively seal out moisture and other contaminants.

Basic Impulse Level: 10 kV.

Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.

Isolate core and coil from enclosure using vibration-absorbing mounts.

Nameplate: Include transformer connection data, ratings, wiring diagrams, and overload capacity based on rated winding temperature rise.

GENERAL PURPOSE TRANSFORMERS

Description: Self-cooled, two winding transformers listed and labeled as complying with UL 506 or UL 1561; ratings as indicated on the drawings.

Primary Voltage: 480 volts delta, 3 phase.

Secondary Voltage: 208Y/120 volts, 3 phase.

Insulation System and Allowable Average Winding Temperature Rise:

Less than 15 kVA: Class 180 degrees C insulation system with 115 degrees C average winding temperature rise.

15 kVA and Larger: Class 220 degrees C insulation system with 150 degrees C average winding temperature rise.

Coil Conductors: Continuous aluminum windings with terminations brazed or welded.

Winding Taps:

Less than 3 kVA: None.

3 kVA through 15 kVA: Two 5 percent full capacity primary taps below rated voltage.

15 kVA through 300 kVA: Two 2.5 percent full capacity primary taps above and four 2.5 percent full capacity primary taps below rated voltage.

500 kVA and Larger: Two 2.5 percent full capacity primary taps above and two 2.5 percent full capacity primary taps below rated voltage.

Energy Efficiency: Comply with 10 CFR 431, Subpart K.

Sound Levels: Standard sound levels complying with NEMA ST 20.

Mounting Provisions:

Less than 15 kVA: Suitable for wall mounting.

15 kVA through 75 kVA: Suitable for wall, floor, or trapeze mounting.

Larger than 75 kVA: Suitable for floor mounting.

Transformer Enclosure: Comply with NEMA ST 20.

Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:

Indoor clean, dry locations: Type 2.

Outdoor locations: Type 3R.

Construction: Steel.

Less than 15 kVA: Totally enclosed, non-ventilated.

15 kVA and Larger: Ventilated.

Finish: Manufacturer's standard grey, suitable for outdoor installations.

Provide lifting eyes or brackets.

Accessories:

Lug Kits: Sized as required for termination of conductors as indicated on the drawings.

PART 3 EXECUTION

EXAMINATION

Verify that field measurements are as shown on the drawings.

Verify that suitable support frames and anchors are installed where required and that mounting surfaces are ready to receive transformers.

Perform pre-installation tests and inspections on transformers per manufacturer's instructions and as specified in NECA 409. Correct deficiencies prior to installation.

Verify that conditions are satisfactory for installation prior to starting work.

INSTALLATION

Perform work in a neat and workmanlike manner in accordance with NECA 1.

Install transformers in accordance with manufacturer's instructions.

Install transformers in accordance with NECA 409 and IEEE C57.94.

Use flexible conduit, under the provisions of Section 26 0534, 2 feet (600 mm) minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.

Arrange equipment to provide minimum clearances as specified on transformer nameplate and in accordance with manufacturer's instructions and NFPA 70.

Mount floor-mounted transformers on properly sized 3 inch (80 mm) high concrete pad constructed in accordance with Section 03 3000.

104 Mount floor-mounted transformers using vibration isolators suitable for isolating the transformer noise from the building structure.

105 Provide seismic restraints.

106 Provide grounding and bonding in accordance with Section 26 0526.

107 Remove shipping braces and adjust bolts that attach the core and coil mounting bracket to the enclosure according to manufacturer's recommendations in order to reduce audible noise transmission.

108 Where not factory-installed, install lugs sized as required for termination of conductors as shown on the drawings.

109 Identify transformers in accordance with Section 26 0553.

110 FIELD QUALITY CONTROL

111 See Section 01 4000 - Quality Requirements, for additional requirements.

112 Inspect and test in accordance with NETA ATS, except Section 4.

113 Perform inspections and tests listed in NETA ATS Sections 7.2.1.1 and 7.2.1.2. Tests and inspections listed as optional are not required.

114 167 kVA single phase, 500 kVA three phase and smaller:

115 Perform turns ratio tests at all tap positions.

116 ADJUSTING

117 Measure primary and secondary voltages and make appropriate tap adjustments.

118 Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

119 CLEANING

120 Clean dirt and debris from transformer components according to manufacturer's instructions.

121 Repair scratched or marred exterior surfaces to match original factory finish.

122 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Low-voltage (600 V and less) switchboards and associated accessories for service and distribution applications.

Overcurrent protective devices for switchboards.

RELATED REQUIREMENTS

Section 03 3000 - Cast-in-Place Concrete: Concrete equipment pads.

Section 26 0526 - Grounding and Bonding for Electrical Systems.

Section 26 0529 - Hangers and Supports for Electrical Systems.

Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

Section 26 2100 - Low-Voltage Electrical Service Entrance.

Section 26 4300 - Surge Protective Devices.

REFERENCE STANDARDS

FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; Revision E with Supplement 1, 2013.

IEEE C57.13 - IEEE Standard Requirements for Instrument Transformers; 2016.

NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

NECA 400 - Standard for Installing and Maintaining Switchboards; 2007.

NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

NEMA PB 2 - Deadfront Distribution Switchboards; 2011.

NEMA PB 2.1 - General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or Less; 2013.

NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

UL 891 - Switchboards; Current Edition, Including All Revisions.

UL 1053 - Ground-Fault Sensing and Relaying Equipment; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances required by NFPA 70.
- Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
- Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
- Coordinate with manufacturer to provide shipping splits suitable for the dimensional constraints of the installation.
- Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

Service Entrance Switchboards:

Coordinate with Utility Company to provide switchboards with suitable provisions for electrical service and utility metering, where applicable.

Coordinate with Owner to arrange for Utility Company required access to equipment for installation and maintenance.

Obtain Utility Company approval of switchboard prior to fabrication.

Arrange for inspections necessary to obtain Utility Company approval of installation.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide manufacturer's standard catalog pages and data sheets for switchboards, enclosures, overcurrent protective devices, and other installed components and accessories.

Include characteristic trip curves for each type and rating of overcurrent protective device upon request.

Shop Drawings: Indicate dimensions, voltage, bus ampacities, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

Include dimensioned plan and elevation views of switchboards and adjacent equipment with all required clearances indicated.

Include wiring diagrams showing all factory and field connections.

Include documentation demonstrating selective coordination upon request.

Service Entrance Switchboards: Include documentation of Utility Company approval of switchboard.

Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

Project Record Documents: Record actual installed locations of switchboards and final equipment settings.

Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

QUALITY ASSURANCE

Conform to requirements of NFPA 70.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

DELIVERY, STORAGE, AND HANDLING

Receive, inspect, handle, and store switchboards in accordance with manufacturer's instructions, NECA 400, and NEMA PB 2.1.

Store in a clean, dry space having a uniform temperature to prevent condensation (including outdoor switchboards, which are not weatherproof until completely and properly installed). Where necessary, provide temporary enclosure space heaters or temporary power for permanent factory-installed space heaters.

Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

FIELD CONDITIONS

Maintain field conditions within required service conditions during and after installation.

PART 2 PRODUCTS

MANUFACTURERS

Switchboards:

Eaton Corporation: www.eaton.com.

General Electric Company: www.geindustrial.com.
Schneider Electric; Square D Products: www.schneider-electric.us.

Source Limitations: Furnish switchboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

SWITCHBOARDS

Provide switchboards consisting of all required components, control power transformers, instrumentation and control wiring, accessories, etc. as necessary for a complete operating system.

Provide products listed, classified, and labeled as suitable for the purpose intended.

Description: Dead-front switchboard assemblies complying with NEMA PB 2, and listed and labeled as complying with UL 891; ratings, configurations and features as indicated on the drawings.

Front-Connected Switchboards:
- Main Device(s): Individually-mounted.
- Feeder Devices: Panel/group-mounted.
- Arrangement: Front accessible only (not rear accessible), rear aligned.
- Gutter Access: Bolted covers.

Service Entrance Switchboards:
- Listed and labeled as suitable for use as service equipment according to UL 869A.
- For solidly-grounded wye systems, provide factory-installed main bonding jumper between neutral and ground busses, and removable neutral disconnecting link for testing purposes.
- Comply with Utility Company requirements for electrical service.
- Utility Metering Provisions: Provide separate barriered compartment complying with Utility Company requirements where indicated or where required by Utility Company. Include hinged sealable door and provisions for Utility Company current transformers (CTs), potential transformers (PTs), or potential taps as required.

Service Conditions:
- Provide switchboards and associated components suitable for operation under the following service conditions without derating:
  - Altitude: Less than 6,600 feet (2,000 m).
  - Ambient Temperature:
    - Switchboards Containing Molded Case or Insulated Case Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).
- Provide switchboards and associated components suitable for operation at indicated ratings under the service conditions at the installed location.

Short Circuit Current Rating:
- Provide switchboards with listed short circuit current rating not less than the available fault current at the installed location as determined by short circuit study performed in accordance with Section 26 0573.

Selectivity: Where the requirement for selectivity is indicated, furnish products as required to achieve selective coordination.

Main Devices: Configure for top or bottom incoming feed as indicated or as required for the installation. Provide separate pull section and/or top-mounted pullbox as indicated or as required to facilitate installation of incoming feed.

Bussing: Sized in accordance with UL 891 temperature rise requirements.
- Through bus (horizontal cross bus) to be fully rated through full length of switchboard (non-tapered). Tapered bus is not permitted.
- Provide solidly bonded equipment ground bus through full length of switchboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- Phase and Neutral Bus Material: Aluminum or copper.

Ground Bus Material: Copper.

Conductor Terminations: Suitable for use with the conductors to be installed.
Line Conductor Terminations:
Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
Main and Neutral Lug Type: Compression.
Load Conductor Terminations:
Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
Lug Type:

Enclosures:
Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
Indoor Clean, Dry Locations: Type 1 or Type 2 (drip-proof).
Finish: Manufacturer's standard unless otherwise indicated.

Future Provisions:
Prepare designated spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

Surge Protective Devices: Where factory-installed, internally mounted surge protective devices are provided in accordance with Section 26 4300, list switchboards as a complete assembly including surge protective device.

Ground Fault Protection: Where ground-fault protection is indicated, provide system listed and labeled as complying with UL 1053.
Where overcurrent protective devices equipped with integral ground fault protection are used, provide separate neutral current sensor where applicable.

Arc Flash Energy-Reducing Maintenance Switching: For circuit breakers rated 1200 A or higher, provide a local accessory switch with status indicator light that permits selection of a maintenance mode with alternate electronic trip unit settings for reduced fault clearing time.

Owner Metering:
Provide microprocessor-based digital electrical metering system including all instrument transformers, wiring, and connections necessary for measurements specified.
Measured Parameters:
Voltage (Volts AC): Line-to-line, line-to-neutral for each phase.
Current (Amps): For each phase and neutral.
Frequency (Hz).
Real power (kW): For each phase, 3-phase total.
Reactive power (kVAR): For each phase, 3-phase total.
Apparent power (kVA): For each phase, 3-phase total.
Power factor.
Real energy (kWh).
Reactive energy (kVARh).
Apparent energy (kVAh).
Current demand.
Power demand: Real, reactive, and apparent.
Meter Accuracy: Plus/minus 1.0 percent.
Features:
Communications Capability: Utilize Modbus communications protocol. Provide all accessories necessary for proper interface.
Remote monitoring capability via PC.

Instrument Transformers:
Comply with IEEE C57.13.
Select suitable ratio, burden, and accuracy as required for connected devices.
Current Transformers: Connect secondaries to shorting terminal blocks.

Potential Transformers: Include primary and secondary fuses with disconnecting means.

OVERCURRENT PROTECTIVE DEVICES

Circuit Breakers:

Interrupting Capacity:

Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than specified minimum requirements.

Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.

Molded Case Circuit Breakers:

Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers; listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.

Provide thermal magnetic circuit breakers unless otherwise indicated.

Minimum Interrupting Capacity:

10,000 rms symmetrical amperes at 240 VAC or 208 VAC.

14,000 rms symmetrical amperes at 480 VAC.

Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.

Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 225 amperes and larger.

Insulated Case Circuit Breakers:

Description: Quick-make, quick-break, trip-free circuit breakers with two-step stored energy closing mechanism; standard 80 percent rated unless otherwise indicated; listed and labeled as complying with UL 489; ratings, configurations, and features as indicated on the drawings.

Operation:

Provide manually operated circuit breakers unless otherwise indicated.

Pad-Lock Provision: For preventing circuit breaker closing operation.

Construction:

Provide fixed-mount circuit breakers unless otherwise indicated.

Trip Units: Solid state, microprocessor-based, true rms sensing.

Provide the following field-adjustable trip response settings:

Long time pickup, adjustable by replacing interchangeable trip unit or by setting dial.

Long time delay.

Short time pickup and delay.

Instantaneous pickup.

Ground fault pickup and delay where ground fault protection is indicated.

SOURCE QUALITY CONTROL

Factory test switchboards according to NEMA PB 2, including the following production (routine) tests on each switchboard assembly or component:

Dielectric tests.

Mechanical operation tests.

Grounding of instrument transformer cases test.

Electrical operation and control wiring tests, including polarity and sequence tests.

Ground-fault sensing equipment test.

PART 3 EXECUTION

EXAMINATION

Verify that field measurements are as shown on the drawings.

174 Verify that the ratings and configurations of the switchboards and associated components are consistent with the indicated requirements.

175 Verify that mounting surfaces are ready to receive switchboards.

176 Verify that conditions are satisfactory for installation prior to starting work.

177 INSTALLATION

178 Install products in accordance with manufacturer's instructions.

179 Install switchboards in accordance with NECA 1 (general workmanship), NECA 400, and NEMA PB 2.1.

180 Arrange equipment to provide required clearances and maintenance access, including accommodations for any drawout devices.

181 Where switchboard is indicated to be mounted with inaccessible side against wall, provide minimum clearance of 1/2 inch (10 mm) between switchboard and wall.

182 Provide required support and attachment components in accordance with Section 26 0529.

183 Install switchboards plumb and level.

184 Unless otherwise indicated, mount switchboards on properly sized 4 inch (100 mm) high concrete pad constructed in accordance with Section 03 3000.

185 Provide grounding and bonding in accordance with Section 26 0526.

186 Install all field-installed devices, components, and accessories.

187 Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.

188 Set field-adjustable circuit breaker tripping function settings as determined by overcurrent protective device coordination study performed in accordance with Section 26 0573.

189 Set field-adjustable ground fault protection pickup and time delay settings as indicated.

190 Provide filler plates to cover unused spaces in switchboards.

191 FIELD QUALITY CONTROL

192 See Section 01 4000 - Quality Requirements, for additional requirements.

193 Disconnect surge protective devices (SPDs) prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPDs connected.

194 Before energizing switchboard, perform insulation resistance testing in accordance with NECA 400 and NEMA PB 2.1.

195 Inspect and test in accordance with NETA ATS, except Section 4.

196 Perform inspections and tests listed in NETA ATS, Section 7.1.

197 Molded Case and Insulated Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than 400A amperes. Tests listed as optional are not required.

198 Ground Fault Protection Systems: Test in accordance with manufacturer's instructions as required by NFPA 70.

199 Perform inspections and tests listed in NETA ATS, Section 7.14. The insulation-resistance test on control wiring listed as optional is not required.

200 Meters: Perform inspections and tests listed in NETA ATS, Section 7.11.2.

201 Instrument Transformers: Perform inspections and tests listed in NETA ATS, Section 7.10.

202 Correct deficiencies and replace damaged or defective switchboards or associated components.

203 ADJUSTING

204 Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

205 Adjust alignment of switchboard covers and doors.

206 CLEANING

207 Clean dirt and debris from switchboard enclosures and components according to manufacturer's instructions.

208 Repair scratched or marred surfaces to match original factory finish.

209 CLOSEOUT ACTIVITIES

210 Training: Train Owner's personnel on operation, adjustment, and maintenance of switchboard and associated devices.

211 Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

212 Instructor: Manufacturer's authorized representative.

213 Location: At project site.

214 PROTECTION

215 Protect installed switchboards from subsequent construction operations.

216 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Power distribution panelboards.

Lighting and appliance panelboards.

Overcurrent protective devices for panelboards.

RELATED REQUIREMENTS

Section 03 3000 - Cast-in-Place Concrete: Concrete equipment pads.

Section 26 0526 - Grounding and Bonding for Electrical Systems.

Section 26 0529 - Hangers and Supports for Electrical Systems.

Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

Section 26 0573 - Power System Studies: Additional criteria for the selection and adjustment of equipment and associated protective devices specified in this section.

REFERENCE STANDARDS

NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

NECA 407 - Standard for Installing and Maintaining Panelboards; 2015.

NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

NEMA PB 1 - Panelboards; 2011.

NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; 2013.

NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

UL 67 - Panelboards; Current Edition, Including All Revisions.

UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
- Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
- Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
- Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
- Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

Include characteristic trip curves for each type and rating of overcurrent protective device upon request.

Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

Include dimensioned plan and elevation views of panelboards and adjacent equipment with all required clearances indicated.

Field Quality Control Test Reports.

Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.

Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

QUALITY ASSURANCE

Conform to requirements of NFPA 70.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

DELIVERY, STORAGE, AND HANDLING

Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.

Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

FIELD CONDITIONS

Maintain ambient temperature within the following limits during and after installation of panelboards:

Panelboards Containing Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).

PART 2 PRODUCTS

MANUFACTURERS

Eaton Corporation: www.eaton.com.

General Electric Company: www.geindustrial.com.

Schneider Electric; Square D Products: www.schneider-electric.us.

Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

PANELBOARDS - GENERAL REQUIREMENTS

Provide products listed, classified, and labeled as suitable for the purpose intended.

Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:

Altitude: Less than 6,600 feet (2,000 m).

Ambient Temperature:

Panelboards Containing Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).

Short Circuit Current Rating:

Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as determined by short circuit study performed in accordance with Section 26 0573.

Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.

Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.

Bussing: Sized in accordance with UL 67 temperature rise requirements.

Provide fully rated neutral bus, with a suitable lug for each feeder or branch circuit requiring a neutral connection.

Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.

Conductor Terminations: Suitable for use with the conductors to be installed.

Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.

Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:

Indoor Clean, Dry Locations: Type 1.

Boxes: Galvanized steel unless otherwise indicated.

Provide wiring gutters sized to accommodate the conductors to be installed.

Increase gutter space as required where sub-feed lugs, feed-through lugs, gutter taps, or oversized lugs are provided.

Fronts:

Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.

Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.

Lockable Doors: All locks keyed alike unless otherwise indicated.

Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

Selectivity: Where the requirement for selectivity is indicated, furnish products as required to achieve selective coordination.

Multi-Section Panelboards: Provide enclosures of the same height, with feed-through lugs or sub-feed lugs and feeders as indicated or as required to interconnect sections.

Provide the following features and accessories where indicated or where required to complete installation:

Feed-through lugs.

Sub-feed lugs.

POWER DISTRIBUTION PANELBOARDS

Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

Conductor Terminations:

Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

Main and Neutral Lug Type: Compression.

Bussing:

Phase and Neutral Bus Material: Aluminum.

Ground Bus Material: Aluminum.

Circuit Breakers:

Provide bolt-on type or plug-in type secured with locking mechanical restraints.

Enclosures:
Provide surface-mounted enclosures unless otherwise indicated.
Fronts: Provide door-in-door trim with hinged cover for access to load terminals and wiring gutters, and separate lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
Provide clear plastic circuit directory holder mounted on inside of door.

LIGHTING AND APPLIANCE PANELBOARDS

Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

Conductor Terminations:
Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
Main and Neutral Lug Type: Mechanical.

Bussing:
Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
Phase and Neutral Bus Material: Aluminum.
Ground Bus Material: Aluminum.

Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.

Enclosures:
Provide surface-mounted or flush-mounted enclosures as indicated.
Provide clear plastic circuit directory holder mounted on inside of door.

OVERCURRENT PROTECTIVE DEVICES

Molded Case Circuit Breakers:
Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
Interrupting Capacity:
Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
Conductor Terminations:
Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 225 amperes and larger.
Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
Do not use tandem circuit breakers.
Do not use handle ties in lieu of multi-pole circuit breakers.
Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.

SOURCE QUALITY CONTROL

Factory test panelboards according to NEMA PB 1.

PART 3 EXECUTION

EXAMINATION

Verify that field measurements are as shown on the drawings.

Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.

Verify that mounting surfaces are ready to receive panelboards.

Verify that conditions are satisfactory for installation prior to starting work.

INSTALLATION

Install products in accordance with manufacturer's instructions.

Install panelboards securely, in a neat and workmanlike manner in accordance with NECA 1 (general workmanship), NECA 407 (panelboards), and NEMA PB 1.1.

Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

Provide required supports in accordance with Section 26 0529.

Install panelboards plumb.

Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.

Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches (2000 mm) above the floor or working platform.

Mount floor-mounted power distribution panelboards on properly sized 4 inch (100 mm) high concrete pad constructed in accordance with Section 03 3000.

Provide minimum of six spare 1 inch (27 mm) trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling and below floor.

Provide grounding and bonding in accordance with Section 26 0526.

Install all field-installed branch devices, components, and accessories.

Set field-adjustable circuit breaker tripping function settings as determined by overcurrent protective device coordination study performed according to Section 26 0573.

Provide filler plates to cover unused spaces in panelboards.

Provide circuit breaker lock-on devices to prevent unauthorized personnel from de-energizing essential loads where indicated. Also provide for the following:

- Emergency and night lighting circuits.
- Fire detection and alarm circuits.
- Communications equipment circuits.
- Intrusion detection and access control system circuits.
- Video surveillance system circuits.

Identify panelboards in accordance with Section 26 0553.

FIELD QUALITY CONTROL

See Section 01 4000 - Quality Requirements, for additional requirements.

Inspect and test in accordance with NETA ATS, except Section 4.

Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than _____ amperes. Tests listed as optional are not required.

Correct deficiencies and replace damaged or defective panelboards or associated components.

ADJUSTING

Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

Adjust alignment of panelboard fronts.

CLEANING

Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.

Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Electrical connections to equipment.

RELATED REQUIREMENTS

Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.

Section 26 0534 - Conduit.

Section 26 0537 - Boxes.

Section 26 2726 - Wiring Devices.

Section 26 2818 - Enclosed Switches.

REFERENCE STANDARDS

NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (R2015).

NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2016.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
- Determine connection locations and requirements.

Sequencing:

- Install rough-in of electrical connections before installation of equipment is required.
- Make electrical connections before required start-up of equipment.

SUBMITTALS

Product Data: Provide wiring device manufacturer’s catalog information showing dimensions, configurations, and construction.

Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

QUALITY ASSURANCE

Conform to requirements of NFPA 70.

Products: Listed, classified, and labeled as suitable for the purpose intended.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

MATERIALS

Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.

- Colors: Conform to NEMA WD 1.
- Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
- Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

Disconnect Switches: As specified in Section 26 2818 and in individual equipment sections.

Wiring Devices: As specified in Section 26 2726.

Flexible Conduit: As specified in Section 26 0534.

Wire and Cable: As specified in Section 26 0519.

Boxes: As specified in Section 26 0537.

PART 3 EXECUTION

EXAMINATION

Verify that equipment is ready for electrical connection, wiring, and energization.

ELECTRICAL CONNECTIONS

Make electrical connections in accordance with equipment manufacturer's instructions.

Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.

Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.

Provide receptacle outlet to accommodate connection with attachment plug.

Provide cord and cap where field-supplied attachment plug is required.

Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

Install terminal block jumpers to complete equipment wiring requirements.

Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

- Wall switches.
- Wall dimmers.
- Receptacles.
- Wall plates.
- Floor box service fittings.
- Access floor boxes.

REFERENCE STANDARDS

- FS W-C-596 - Connector, Electrical, Power, General Specification for; Federal Specification; Revision G, 2001.
- FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification); Federal Specification; Revision F, 1999.
- NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.
- NECA 130 - Standard for Installing and Maintaining Wiring Devices; National Electrical Contractors Association; 2010.
- NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association; 1999 (R 2010).
- NEMA WD 6 - Wiring Device -- Dimensional Specifications; National Electrical Manufacturers Association; 2012.
- NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.
- UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
- UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.
- UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.
- UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
- Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
- Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
- Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

Sequencing:

- Do not install wiring devices until final surface finishes and painting are complete.

SUBMITTALS

Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

- Wall Dimmers: Include derating information for ganged multiple devices.

Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

Operation and Maintenance Data:

Project Record Documents: Record actual installed locations of wiring devices.

QUALITY ASSURANCE

Conform to requirements of NFPA 70.

Products: Listed, classified, and labeled as suitable for the purpose intended.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

DELIVERY, STORAGE, AND PROTECTION

Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 PRODUCTS

WIRING DEVICE APPLICATIONS

Provide wiring devices suitable for intended use and with ratings adequate for load served.

For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.

Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.

Provide GFCI protection for receptacles installed within 6 feet (1.8 m) of sinks.

Provide GFCI protection for receptacles installed in kitchens.

Provide GFCI protection for receptacles serving electric drinking fountains.

For flush floor service fittings, use tile rings for installations in tile floors.

For flush floor service fittings, use carpet flanges for installations in carpeted floors.

WIRING DEVICE FINISHES

Provide wiring device finishes as described below unless otherwise indicated.

Wiring Devices Connected to Emergency Power: Red with red nylon wall plate.

Access Floor Boxes: Gray wiring devices with gray steel cover with insert to match floor covering.

WALL SWITCHES

Manufacturers:

- Hubbell Incorporated: www.hubbell-wiring.com.
- Leviton Manufacturing Company, Inc: www.leviton.com.
- Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us

Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.

- Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.

Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

Momentary Contact Wall Switches: Industrial specification grade, 20 A, 120/277 V with toggle type three position switch actuator and momentary contacts; single pole double throw, off with switch actuator in center position.

65 WALL DIMMERS

66 Manufacturers:
67 Leviton Manufacturing Company, Inc: www.leviton.com.
68 Lutron Electronics Company, Inc; Maestro Series: www.lutron.com/sle.
69 Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us

70 Wall Dimmers - General Requirements: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 1472; types and ratings suitable for load controlled as indicated on the drawings.

71 Power Rating, Unless Otherwise Indicated or Required to Control the Load Indicated on the Drawings:

72 Provide accessory wall switches to match dimmer appearance when installed adjacent to each other.

73 RECEPTACLES

74 Manufacturers:
75 Hubbell Incorporated: www.hubbell-wiring.com.
76 Leviton Manufacturing Company, Inc: www.leviton.com.
77 Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us
78 Source Limitations: Where wall controls are furnished as part of lighting control system, provide accessory matching receptacles and wallplates by the same manufacturer in locations indicated.

79 Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
80 Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
81 NEMA configurations specified are according to NEMA WD 6.

82 Convenience Receptacles:
83 Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.

84 GFCI Receptacles:
85 GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
86 Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
87 Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.

88 WALL PLATES

89 Manufacturers:
90 Hubbell Incorporated: www.hubbell-wiring.com.
91 Leviton Manufacturing Company, Inc: www.leviton.com.
92 Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us
93 Source Limitations: Where wall controls are furnished as part of lighting control system, provide accessory matching receptacles and wallplates by the same manufacturer in locations indicated.

94 Wall Plates: Comply with UL 514D.
95 Configuration: One piece cover as required for quantity and types of corresponding wiring devices.

Size: Standard.
Screws: Metal with slotted heads finished to match wall plate finish.

Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.

Weatherproof Covers for Wet or Damp Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.

FLOOR BOX SERVICE FITTINGS

Manufacturers:
Hubbell Incorporated: www.hubbell-wiring.com.
Thomas & Betts Corporation: www.tnb.com.
Wiremold, a brand of Legrand North America, Inc: www.legrand.us
Substitutions: See Section 01 6000 - Product Requirements.

Description: Service fittings compatible with floor boxes provided under Section 26 0537 with components, adapters, and trims required for complete installation.

Flush Floor Service Fittings:
Single Service Flush Convenience Receptacles:
Cover: Rectangular.
Configuration: One standard convenience duplex receptacle(s) with duplex flap opening(s).
Dual Service Flush Combination Outlets:
Cover: Rectangular.
Configuration:
Power: One standard convenience duplex receptacle(s) with duplex flap opening(s).
Communications: _____.
Voice and Data Jacks: Provided by others.
Accessories:
Tile Rings: Finish to match covers; configuration as required to accommodate specified covers.
Carpet Flanges: Finish to match covers; configuration as required to accommodate specified covers.

ACCESS FLOOR BOXES

Manufacturers - Access Floor Boxes:
Hubbell Incorporated: www.hubbell-wiring.com.
Thomas & Betts Corporation: www.tnb.com.
Wiremold, a brand of Legrand North America, Inc: www.legrand.us
Substitutions: See Section 01 6000 - Product Requirements.

Description: Metallic multi-service box suitable for mounting in access floor system specified in Section 09 6900.

Configuration:
Power: Two standard convenience duplex receptacle(s).
Communications: _____.
Voice and Data Jacks: Provided by others.

PART 3 EXECUTION

EXAMINATION

Verify that field measurements are as shown on the drawings.

Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

Verify that wall openings are neatly cut and will be completely covered by wall plates.

Verify that final surface finishes are complete, including painting.

Verify that floor boxes are adjusted properly.

Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

Verify that conditions are satisfactory for installation prior to starting work.

PREPARATION

Provide extension rings to bring outlet boxes flush with finished surface.

Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

INSTALLATION

Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of wiring devices provided under this section.

Mounting Heights: Unless otherwise indicated, as follows:

Wall Switches: 48 inches (1.2 m) above finished floor.

Wall Dimmers: 48 inches (1.2 m) above finished floor.

Receptacles: 18 inches (450 mm) above finished floor or 6 inches (150 mm) above counter.

Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.

Where multiple receptacles, wall switches, or wall dimmers are installed at the same location and at the same mounting height, gang devices together under a common wall plate.

Locate wall switches on strike side of door with edge of wall plate 3 inches (80 mm) from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.

Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.

Install wiring devices in accordance with manufacturer's instructions.

Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

Where required, connect wiring devices using pigtails not less than 6 inches (150 mm) long. Do not connect more than one conductor to wiring device terminals.

Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.

Install wiring devices plumb and level with mounting yoke held rigidly in place.

Install wall switches with OFF position down.

Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.

Do not share neutral conductor on branch circuits utilizing wall dimmers.

Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.

165 Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

166 Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

167 FIELD QUALITY CONTROL

168 Inspect each wiring device for damage and defects.

169 Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.

170 Test each receptacle to verify operation and proper polarity.

171 Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.

172 Correct wiring deficiencies and replace damaged or defective wiring devices.

173 ADJUSTING

174 Adjust devices and wall plates to be flush and level.

175 Adjust presets for wall dimmers according to manufacturer's instructions as directed by Architect.

176 CLEANING

177 Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

178 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Enclosed safety switches.

RELATED REQUIREMENTS

Section 26 0526 - Grounding and Bonding for Electrical Systems.

Section 26 0529 - Hangers and Supports for Electrical Systems.

Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

Section 26 0573 - Power System Studies: Additional criteria for the selection of equipment and associated protective devices specified in this section.

Section 26 2813 - Fuses.

REFERENCE STANDARDS

NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 2014.

NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); National Electrical Manufacturers Association; 2013.

NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; International Electrical Testing Association; 2013 (ANSI/NETA ATS).

NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
- Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
- Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
- Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

SUBMITTALS

Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

Shop Drawings: Indicate outline and support point dimensions, voltage and current ratings, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

Project Record Documents: Record actual locations of enclosed switches.

Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

30 QUALITY ASSURANCE

31 Conform to requirements of NFPA 70.

32 Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

33 DELIVERY, STORAGE, AND HANDLING

34 Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

35 Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

36 FIELD CONDITIONS

37 Maintain ambient temperature between -22 degrees F (-30 degrees C) and 104 degrees F (40 degrees C) during and after installation of enclosed switches.

38 PART 2 PRODUCTS

39 MANUFACTURERS

40 Eaton Corporation: www.eaton.com.

41 General Electric Company: www.geindustrial.com.

42 Schneider Electric; Square D Products: www.schneider-electric.us.

43 Source Limitations: Furnish enclosed switches and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

44 ENCLOSED SAFETY SWITCHES

45 Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.

46 Provide products listed, classified, and labeled as suitable for the purpose intended.

47 Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:

48 Altitude: Less than 6,600 feet (2,000 m).

49 Ambient Temperature: Between -22 degrees F (-30 degrees C) and 104 degrees F (40 degrees C).

50 Horsepower Rating: Suitable for connected load.

51 Voltage Rating: Suitable for circuit voltage.

52 Short Circuit Current Rating:

53 Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as determined by short circuit study performed in accordance with Section 26 0573.

54 Provide with switch blade contact position that is visible when the cover is open.

55 Fuse Clips for Fusible Switches: As required to accept fuses indicated.

56 Conductor Terminations: Suitable for use with the conductors to be installed.

57 Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.

58 Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.

59 Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:

60 Indoor Clean, Dry Locations: Type 1.

61 Outdoor Locations: Type 3R.

Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.

Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

Heavy Duty Switches:
Comply with NEMA KS 1.
Conductor Terminations:
Provide mechanical lugs unless otherwise indicated.
Lug Material: Copper, suitable for terminating copper conductors only.
Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

PART 3 EXECUTION

EXAMINATION

Verify that field measurements are as shown on the drawings.

Verify that the ratings of the enclosed switches are consistent with the indicated requirements.

Verify that mounting surfaces are ready to receive enclosed safety switches.

Verify that conditions are satisfactory for installation prior to starting work.

INSTALLATION

Install enclosed switches in accordance with manufacturer's instructions.

Install enclosed switches securely, in a neat and workmanlike manner in accordance with NECA 1.

Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

Provide required supports in accordance with Section 26 0529.

Install enclosed switches plumb.

Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches (2000 mm) above the floor or working platform.

Provide grounding and bonding in accordance with Section 26 0526.

Provide fuses complying with Section 26 2813 for fusible switches as indicated or as required by equipment manufacturer's recommendations.

Identify enclosed switches in accordance with Section 26 0553.

FIELD QUALITY CONTROL

Inspect and test in accordance with NETA ATS, except Section 4.

Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.

Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

ADJUSTING

Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

CLEANING

Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.

Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Packaged engine generator system and associated components and accessories:
- Engine and engine accessory equipment.
- Alternator (generator).
- Generator set control system.
- Generator set enclosure.

REFERENCE STANDARDS

ASTM D975 - Standard Specification for Diesel Fuel Oils; 2016.

NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

NECA/EGSA 404 - Standard for Installing Generator Sets; 2014.

NEMA MG 1 - Motors and Generators; 2016.

NFPA 30 - Flammable and Combustible Liquids Code; 2015.

NFPA 37 - Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines; 2015.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

NFPA 110 - Standard for Emergency and Standby Power Systems; 2016.

UL 142 - Steel Aboveground Tanks for Flammable and Combustible Liquids; Current Edition, Including All Revisions.

UL 1236 - Battery Chargers for Charging Engine-Starter Batteries; Current Edition, Including All Revisions.

UL 2200 - Stationary Engine Generator Assemblies; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:
- Coordinate compatibility of generator sets to be installed with work provided under other sections or by others.
  - Transfer Switches: See Section 26 3600.
- Coordinate the work with other trades to avoid placement of ductwork, piping, equipment or other potential obstructions within the spaces dedicated for engine generator system.
- Coordinate arrangement of equipment with the dimensions and clearance requirements of the actual equipment to be installed.
- Coordinate the work to provide electrical circuits suitable for the power requirements of the actual auxiliary equipment and accessories to be installed.
- Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide manufacturer's standard catalog pages and data sheets for each product, including ratings, configurations, dimensions, finishes, weights, service condition requirements, and installed features. Include alternator starting capabilities, engine fuel consumption rates, and cooling, combustion air, and exhaust requirements.
- Include generator set sound level test data.
- Include characteristic trip curves for overcurrent protective devices.
- Include alternator thermal damage curve.

Shop Drawings: Include dimensioned plan views and sections indicating locations of system components, required clearances, and field connection locations. Include system interconnection schematic diagrams showing all factory and field connections.

Fuel Storage Tank Calculations: Indicate maximum running time for generator set configuration provided.

Specimen Warranty: Submit sample of manufacturer's warranty.

Evidence of qualifications for installer.

Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and operation of product.

Manufacturer's factory emissions certification.

Manufacturer's certification that products meet or exceed specified requirements.

Source quality control test reports.

Provide NFPA 110 required documentation from manufacturer, including but not limited to:
- Certified prototype tests.
- Torsional vibration compatibility certification.
- NFPA 110 compliance certification.
- Certified rated load test at rated power factor.

Manufacturer’s detailed field testing procedures.

Field quality control test reports.

Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.
- Include contact information for entity that will be providing contract maintenance and trouble call-back service.

Executed Warranty: Submit documentation of final executed warranty completed in Owner's name and registered with manufacturer.

Project Record Documents: Record actual locations of system components, installed circuiting arrangements and routing, and final equipment settings.

Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
- See Section 01 6000 - Product Requirements, for additional provisions.
- Extra Fuses: One of each type and size.
- Extra Filter Elements: One of each type, including fuel, oil and air.

QUALITY ASSURANCE

Comply with the following:
- NFPA 70 (National Electrical Code).
- NFPA 110 (Standard for Emergency and Standby Power Systems); meet requirements for Level 1 system.
- NFPA 37 (Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines).
- NFPA 30 (Flammable and Combustible Liquids Code).

Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience with engine generator systems of similar size, type, and complexity; manufacturer's authorized installer.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

DELIVERY, STORAGE, AND HANDLING

Receive, inspect, handle, and store generator sets in accordance with manufacturer's instructions and NECA/EGSA 404.

Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

Handle carefully in accordance with manufacturer's instructions to avoid damage to generator set components, enclosure, and finish.

FIELD CONDITIONS

Maintain field conditions within manufacturer's required service conditions during and after installation.

WARRANTY

See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

Provide minimum two year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

PART 2 PRODUCTS

MANUFACTURERS

Packaged Engine Generator Set:
- Caterpillar Inc: www.cat.com.
- Cummins Power Generation Inc: www.cumminspower.com.
- Generac Power Systems: www.generac.com/industrial.
- Kohler Co: www.kohlerpower.com.

Products other than basis of design are subject to compliance with specified requirements and prior approval of Engineer. By using products other than basis of design, Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.

Source Limitations: Furnish engine generator sets and associated components and accessories produced by a single manufacturer and obtained from a single supplier.

PACKAGED ENGINE GENERATOR SYSTEM

Provide new engine generator system consisting of all required equipment, sensors, conduit, boxes, wiring, piping, supports, accessories, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.

Provide products listed, classified, and labeled as suitable for the purpose intended.

System Description:
- Application: Emergency/standby.
- Configuration: Single packaged engine generator set operated independently (not in parallel).

Packaged Engine Generator Set:
- Type: Diesel (compression ignition).
- Voltage: 480Y/277 V, 3 phase, 60 Hz.
- Main Line Circuit Breaker:
  - Type: Thermal magnetic.
  - Trip Rating: Select according to generator set rating.
  - Features:
    - Shunt trip.
    - Auxiliary contacts.

Generator Set General Requirements:
- Prototype tested in accordance with NFPA 110 for Level 1 systems.
- Factory-assembled, with components mounted on suitable base.
- List and label engine generator assembly as complying with UL 2200.
- Power Factor: Unless otherwise indicated, specified power ratings are at 0.8 power factor for three phase voltages and 1.0 power factor for single phase voltages.
- Provide suitable guards to protect personnel from accidental contact with rotating parts, hot piping, and other potential sources of injury.

Main Line Circuit Breakers: Provide factory-installed line side connections with suitable lugs for load side connections.

Service Conditions: Provide engine generator system and associated components suitable for operation under the service conditions at the installed location.

Starting and Load Acceptance Requirements:

Cranking Method: Cycle cranking complying with NFPA 110 (15 second crank period, followed by 15 second rest period, with cranking limiter time-out after 3 cycles), unless otherwise required.

Cranking Limiter Time-Out: If generator set fails to start after specified cranking period, indicate overcrank alarm condition and lock-out generator set from further cranking until manually reset.

Start Time: Capable of starting and achieving conditions necessary for load acceptance within 10 seconds (NFPA 110, Type 10).

Maximum Load Step: Supports 100 percent of rated load in one step.

Exhaust Emissions Requirements:

Comply with federal (EPA), state, and local regulations applicable at the time of commissioning; include factory emissions certification with submittals.

Do not make modifications affecting generator set factory emissions certification without approval of manufacturer and Engineer. Where such modifications are made, provide field emissions testing as necessary for certification.

ENGINE AND ENGINE ACCESSORY EQUIPMENT

Provide engine with adequate horsepower to achieve specified power output at rated speed, accounting for alternator efficiency and parasitic loads.

Engine Fuel System - Diesel (Compression Ignition):

Fuel Source: Diesel, ASTM D975 No. 2-D or approved cold weather diesel blends.

Fuel Storage: Sub-base fuel tank.

Engine Fuel Supply: Provide engine-driven, positive displacement fuel pump with replaceable fuel filter(s), water separator, check valve to secure prime, manual fuel priming pump, and relief-bypass valve. Provide fuel cooler where recommended by manufacturer.

Engine Fuel Connections: Provide suitable, approved flexible fuel lines for coupling engine to fuel source.

Sub-Base Fuel Tank:

Provide sub-base mounted, double-wall fuel tank with secondary containment; listed and labeled as complying with UL 142.

Tank Capacity: Size for minimum of 48 hours of continuous engine generator operation at 100 percent rated load, but not larger than permissible by applicable codes.

Features:

Direct reading fuel level gage.

Normal atmospheric vent.

Emergency pressure relief vent.

Fuel fill opening with lockable cap.

Dedicated electrical conduit stub-up area.

Low fuel level switch.

Leak detection switch; located within secondary containment interstitial space for detection of primary tank fuel leak.

Engine Starting System:

System Type: Electric, with DC solenoid-activated starting motor(s).

Battery(s):

Battery Type: Lead-acid.

Battery Capacity: Size according to manufacturer's recommendations for achieving starting and load acceptance requirements under worst case ambient temperature; capable of providing cranking through two complete periods of cranking limiter time-outs without recharging.

Provide battery rack, cables, and connectors suitable for the supplied battery(s); size battery cables according to manufacturer's recommendations for cable length to be installed.

Battery-Charging Alternator: Engine-driven, with integral solid-state voltage regulation.

Battery Charger:

Provide dual rate battery charger with automatic float and equalize charging modes and minimum rating of 10 amps; suitable for maintaining the supplied battery(s) at full charge without manual intervention.

Capable of returning supplied battery(s) from fully discharged to fully charged condition within 24 hours, as required by NFPA 110 for Level 1 applications while carrying normal loads.

Recognized as complying with UL 1236.

Furnished with integral overcurrent protection; current limited to protect charger during engine cranking; reverse polarity protection.

Provide integral DC output ammeter and voltmeter with five percent accuracy.

Provide alarm output contacts as necessary for alarm indications.

Engine Speed Control System (Governor):

Single Engine Generator Sets (Not Operated in Parallel): Provide electronic isochronous governor for controlling engine speed/alternator frequency.

Frequency Regulation, Electronic Isochronous Governors: No change in frequency from no load to full load; plus/minus 0.25 percent at steady state.

Engine Lubrication System:

System Type: Full pressure, with engine-driven, positive displacement lubrication oil pump, replaceable full-flow oil filter(s), and dip-stick for oil level indication. Provide oil cooler where recommended by manufacturer.

Engine Cooling System:

System Type: Closed-loop, liquid-cooled, with unit-mounted radiator/fan and engine-driven coolant pump; suitable for providing adequate cooling while operating at full load under worst case ambient temperature.

Fan Guard: Provide suitable guard to protect personnel from accidental contact with fan.

Coolant Heater and Circulation Pump: Provide thermostatically controlled coolant heater to improve starting under cold ambient conditions; size according to manufacturer's recommendations for achieving starting and load acceptance requirements under worst case ambient temperature.

Engine Air Intake and Exhaust System:

Air Intake Filtration: Provide engine-mounted, replaceable, dry element filter.

Engine Exhaust Connection: Provide suitable, approved flexible connector for coupling engine to exhaust system.

Exhaust Silencer: Provide critical grade or better exhaust silencer with sound attenuation not less than basis of design; select according to manufacturer's recommendations to meet sound performance requirements, where specified.

ALTERNATOR (GENERATOR)

Alternator: 4-pole, 1800 rpm (60 Hz output) revolving field, synchronous generator complying with NEMA MG 1; connected to engine with flexible coupling; voltage output configuration as indicated, with reconnectable leads for 3 phase alternators.

Exciter:

Exciter Type: Brushless; provide permanent magnet generator (PMG) excitation system; self-excited (shunt) systems are not permitted.

PMG Excitation Short-Circuit Current Support: Capable of sustaining 300 percent of rated output current for 10 seconds.

Voltage Regulation (with PMG excitation): Plus/minus 0.5 percent for any constant load from no load to full load.

Temperature Rise: Comply with UL 2200.

Insulation System: NEMA MG 1, Class H; suitable for alternator temperature rise.

Enclosure: NEMA MG 1, drip-proof.

Total Harmonic Distortion: Not greater than five percent.

GENERATOR SET CONTROL SYSTEM

Provide microprocessor-based control system for automatic control, monitoring, and protection of generator set. Include sensors, wiring, and connections necessary for functions/indications specified.

Control Panel:

- Control Panel Mounting: Unit-mounted unless otherwise indicated; vibration isolated.
- Generator Set Control Functions:
  - Automatic Mode: Initiates generator set start/shutdown upon receiving corresponding signal from remote device (e.g. automatic transfer switch).
  - Manual Mode: Initiates generator set start/shutdown upon direction from operator.
  - Reset Mode: Clears all faults, allowing generator set restart after a shutdown.
  - Emergency Stop: Immediately shuts down generator set (without time delay) and prevents automatic restarting until manually reset.
  - Cycle Cranking: Programmable crank time, rest time, and number of cycles.
  - Time Delay: Programmable for shutdown (engine cooldown) and start (engine warmup).
  - Voltage Adjustment: Adjustable through range of plus/minus 5 percent.
- Generator Set Status Indications:
  - Voltage (Volts AC): Line-to-line, line-to-neutral for each phase.
  - Current (Amps): For each phase.
  - Frequency (Hz).
  - Real power (W/kW).
  - Reactive power (VAR/kVAR).
  - Apparent power (VA/kVA).
  - Power factor.
  - Duty Level: Actual load as percentage of rated power.
  - Engine speed (RPM).
  - Battery voltage (Volts DC).
  - Engine oil pressure.
  - Engine coolant temperature.
  - Engine run time.
  - Generator powering load (position signal from transfer switch).
- Generator Set Protection and Warning/Shutdown Indications:
  - Comply with NFPA 110; configurable for NFPA 110 Level 1 or Level 2, or NFPA 99 systems including but not limited to the following protections/indications:
    - Overcrank (shutdown).
    - Low coolant temperature (warning).
    - High coolant temperature (warning).
    - High coolant temperature (shutdown).
    - Low oil pressure (warning).
    - Low oil pressure (shutdown).
    - Overspeed (shutdown).
    - Low fuel level (warning).
    - Low coolant level (warning/shutdown).
    - Generator control not in automatic mode (warning).
    - High battery voltage (warning).
    - Low cranking voltage (warning).
    - Low battery voltage (warning).
    - Battery charger failure (warning).

In addition to NFPA 110 requirements, provide the following protections/indications:
High AC voltage (shutdown).
Low AC voltage (shutdown).
High frequency (shutdown).
Low frequency (shutdown).
Overcurrent (shutdown).
Fuel tank leak (warning), where applicable.
Provide contacts for local and remote common alarm.
Provide lamp test function that illuminates all indicator lamps.
Other Control Panel Features:
Event log.

Remote Annunciator:
Remote Annunciator Mounting: Wall-mounted; Provide flush-mounted annunciator for finished areas and surface-mounted annunciator for non-finished areas unless otherwise indicated.
Generator Set Status Indications:
Generator powering load (via position signal from transfer switch).
Communication functional.
Generator Set Warning/Shutdown Indications:
Comply with NFPA 110 for Level 1 systems including but not limited to the following indications:
Overcrank (shutdown).
Low coolant temperature (warning).
High coolant temperature (warning).
High coolant temperature (shutdown).
Low oil pressure (shutdown).
Overspeed (shutdown).
Low fuel level (warning).
Low coolant level (warning/shutdown).
Generator control not in automatic mode (warning).
High battery voltage (warning).
Low cranking voltage (warning).
Low battery voltage (warning).
Battery charger failure (warning).
Provide audible alarm with silence function.
Provide lamp test function that illuminates all indicator lamps.

Remote Emergency Stop: Provide approved red, mushroom style remote emergency stop button where indicated or required by authorities having jurisdiction.

GENERATOR SET ENCLOSURE

Enclosure Type: Sound attenuating, weather protective.

Enclosure Material: Steel or aluminum.

Hardware Material: Stainless steel.

Color: Manufacturer's standard.

Access Doors: Lockable, with all locks keyed alike.

Openings: Designed to prevent bird/rodent entry.

External Drains: Extend oil and coolant drain lines to exterior of enclosure for maintenance service.

Sound Attenuating Enclosures: Line enclosure with non-hydroscopic, self-extinguishing sound-attenuating material.

Exhaust Silencers: Where exhaust silencers are mounted within enclosure in main engine compartment, insulate silencer to minimize heat dissipation as necessary for operation at rated load under worst case ambient temperature.

SOURCE QUALITY CONTROL

Perform production tests on generator sets at factory to verify operation and performance characteristics prior to shipment. Include certified test report with submittals.

Generator Set production testing to include, at a minimum:

- Operation at rated load and rated power factor.
- Single step load pick-up.
- Transient and steady state voltage and frequency performance.
- Operation of safety shutdowns.

Diesel Fuel Storage Tanks: Perform pressurized leak test prior to shipment.

PART 3 EXECUTION

EXAMINATION

Verify that field measurements are as shown on the drawings.

Verify that the ratings and configurations of generator sets and auxiliary equipment are consistent with the indicated requirements.

Verify that rough-ins for field connections are in the proper locations.

Verify that mounting surfaces are ready to receive equipment.

Verify that conditions are satisfactory for installation prior to starting work.

INSTALLATION

Perform work in a neat and workmanlike manner in accordance with NECA 1.

Install products in accordance with manufacturer's instructions.

Install generator sets and associated accessories in accordance with NECA/EGSA 404.

Arrange equipment to provide minimum clearances and required maintenance access.

Unless otherwise indicated, mount generator set on properly sized 6 inch (150 mm) high concrete pad constructed in accordance with Section 03 3000. Provide suitable vibration isolators, where not factory installed.

Provide required support and attachment in accordance with Section 26 0529.

Use manufacturer's recommended oil and coolant, suitable for the worst case ambient temperatures.

Provide diesel fuel piping and venting in accordance with Section 23 1113, where not factory installed.

Provide engine exhaust piping in accordance with Section 23 5100, where not factory installed.

- Include piping expansion joints, piping insulation, thimble, condensation trap/drain, rain cap, hangers/supports, etc. as indicated or as required.
- Do not exceed manufacturer's maximum back pressure requirements.

Install exhaust silencer in accordance with Section 23 5100, where not factory installed.

Provide grounding and bonding in accordance with Section 26 0526.

Identify system wiring and components in accordance with Section 26 0553.

FIELD QUALITY CONTROL

See Section 01 4000 - Quality Requirements, for additional requirements.

Notify Owner and Architect at least two weeks prior to scheduled inspections and tests.

Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.

Provide all equipment, tools, and supplies required to accomplish inspection and testing, including load bank and fuel.

Preliminary inspection and testing to include, at a minimum:

- Inspect each system component for damage and defects.
- Verify tightness of mechanical and electrical connections are according to manufacturer's recommended torque settings.
- Check for proper oil and coolant levels.

Prepare and start system in accordance with manufacturer's instructions.

Perform acceptance test in accordance with NFPA 110.

Inspection and testing to include, at a minimum:

- Verify compliance with starting and load acceptance requirements.
- Verify voltage and frequency; make required adjustments as necessary.
- Verify phase sequence.
- Verify control system operation, including safety shutdowns.
- Verify operation of auxiliary equipment and accessories (e.g. battery charger, heaters, etc.).

Provide field emissions testing where necessary for certification.

Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

306 CLEANING

Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

308 CLOSEOUT ACTIVITIES

Demonstration: Demonstrate proper operation of system to Owner, and correct deficiencies or make adjustments as directed.

Training: Train Owner's personnel on operation, adjustment, and maintenance of system.

- Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
- Provide minimum of four hours of training.
- Instructor: Manufacturer's authorized representative.
- Location: At project site.

After successful acceptance test and just prior to Substantial Completion, replace air, oil, and fuel filters and fill fuel storage tank.

316 PROTECTION

Protect installed engine generator system from subsequent construction operations.

318 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Transfer switches for low-voltage (600 V and less) applications and associated accessories:
- Automatic transfer switches.

RELATED REQUIREMENTS

Section 03 3000 - Cast-in-Place Concrete: Concrete equipment pads.

Section 26 0526 - Grounding and Bonding for Electrical Systems.

Section 26 0529 - Hangers and Supports for Electrical Systems.

Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

Section 26 0573 - Power System Studies: Additional criteria for the selection of equipment specified in this section.

Section 26 3213 - Engine Generators: For interface with transfer switches.
- Includes code requirements applicable to work of this section.
- Includes related demonstration and training requirements.

REFERENCE STANDARDS

NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 2014.

NEMA ICS 10 Part 1 - Industrial Control and Systems Part 1: Electromechanical AC Transfer Switch Equipment; National Electrical Manufacturers Association; 2005.

NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; International Electrical Testing Association; 2013. (ANSI/NETA ATS)

NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

NFPA 110 - Standard for Emergency and Standby Power Systems; National Fire Protection Association; 2013.

UL 1008 - Transfer Switch Equipment; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:
- Coordinate compatibility of transfer switches to be installed with work provided under other sections or by others.
  - Engine Generators: See Section 26 3213.
- Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances required by NFPA 70.
- Coordinate arrangement of equipment with the dimensions and clearance requirements of the actual equipment to be installed.
- Coordinate the work with placement of supports, anchors, etc. required for mounting.
- Closed Transition Transfer Switches:
  - Coordinate source interconnection requirements with Utility Company.
  - Where applicable, coordinate the work to provide engine generators with isochronous governors suitable for closed transition transfer.
  - Coordinate the work to provide shunt trip breakers necessary for protection from source interconnection for longer than specified maximum interconnection time.
  - Arrange for inspections necessary to obtain Utility Company approval of installation.
- Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

35 SUBMITTALS

36 See Section 01 3000 - Administrative Requirements, for submittal procedures.

37 Product Data: Provide manufacturer's standard catalog pages and data sheets for each product, including ratings, configurations, dimensions, finishes, weights, service condition requirements, and installed features.

38 Shop Drawings: Include dimensioned plan views and sections indicating locations of system components, required clearances, and field connection locations. Include system interconnection schematic diagrams showing all factory and field connections.

39 Specimen Warranty: Submit sample of manufacturer's warranty.

40 Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and operation of product.

41 Manufacturer's certification that products meet or exceed specified requirements.

42 Source quality control test reports.

43 Manufacturer’s detailed field testing procedures.

44 Field quality control test reports.

45 Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.

46 Executed Warranty: Submit documentation of final executed warranty completed in Owner's name and registered with manufacturer.

47 Project Record Documents: Record actual locations of system components, installed circuiting arrangements and routing, and final equipment settings.

48 QUALITY ASSURANCE

49 Comply with the following:

50 NFPA 70 (National Electrical Code).

51 NFPA 110 (Standard for Emergency and Standby Power Systems); meet requirements for system Level specified in Section 26 3213.

52 Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

53 Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

54 DELIVERY, STORAGE, AND HANDLING

55 Receive, inspect, handle, and store transfer switches in accordance with manufacturer's instructions.

56 Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

57 Handle carefully in accordance with manufacturer's instructions to avoid damage to transfer switch components, enclosure, and finish.

58 FIELD CONDITIONS

59 Maintain field conditions within manufacturer's required service conditions during and after installation.

60 WARRANTY

61 Provide minimum one year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

PART 2 PRODUCTS

MANUFACTURERS

Transfer Switches:
- ASCO Power Technologies, a brand of Emerson Network Power: www.emersonnetworkpower.com.
- Eaton Corporation: www.eaton.com.
- General Electric Company: www.geindustrial.com.
- Same as manufacturer of engine generator(s) used for this project.

Source Limitations: Furnish transfer switches and accessories produced by a single manufacturer and obtained from a single supplier.

TRANSFER SWITCHES

Provide complete power transfer system consisting of all required equipment, conduit, boxes, wiring, supports, accessories, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.

Provide products listed, classified, and labeled as suitable for the purpose intended.

Construction Type: Only "contactor type" (open contact) transfer switches are acceptable. Do not use "breaker type" (enclosed contact) transfer switches.

Automatic Transfer Switch:
- Transfer Switch Type: Automatic transfer switch.
- Transition Configuration: Closed-transition.
- Voltage: As indicated on the drawings.
- Ampere Rating: As indicated on the drawings.
- Neutral Configuration: Solid neutral (unswitched), except as indicated.
- Load Served: As indicated on the drawings.
- Primary Source: As indicated on the drawings.
- Alternate Source: As indicated on the drawings.

Comply with NEMA ICS 10 Part 1, and list and label as complying with UL 1008 for the classification of the intended application (e.g. emergency, optional standby).

Do not use double throw safety switches or other equipment not specifically designed for power transfer applications and listed as transfer switch equipment.

Load Classification: Classified for total system load (any combination of motor, electric discharge lamp, resistive, and tungsten lamp loads with tungsten lamp loads not exceeding 30 percent of the continuous current rating) unless otherwise indicated or required.

Switching Methods:
- Closed Transition:
  - When both sources are available and synchronized, provide make-before-break transfer without interruption of power to the load and with momentary interconnection of both sources for not more than 100 ms, unless otherwise approved by Utility Company.
  - Provide synchronization/in-phase monitor to initiate transfer when voltage and phase angle difference between sources are within predetermined requirements for synchronization.
  - Source Synchronization Requirements: Phase angle differential within five degrees; voltage differential within five volts.
  - When sources fail to synchronize within a predetermined time period, remain connected to current source and initiate an alarm.
  - When sources remain interconnected for longer than specified maximum interconnection time, provide contact closure signal to shunt trip designated circuit breaker and initiate an alarm.
  - Provide additional protective relaying where required by Utility Company.
  - When only one source is available, automatically utilizes open transition (break-before-make) transfer.

Obtain control power for transfer operation from line side of source to which the load is to be transferred.

Service Conditions: Provide transfer switches suitable for continuous operation at indicated ratings under the service conditions at the installed location.

Enclosures:

Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:

Indoor Clean, Dry Locations: Type 1 or Type 12.

Finish: Manufacturer's standard unless otherwise indicated.

Short Circuit Current Rating:

Withstand and Closing Rating: Provide transfer switches, when protected by the supply side overcurrent protective devices to be installed, with listed withstand and closing rating not less than the available fault current at the installed location as determined by short circuit study performed in accordance with Section 26 0573.

Short Time Rating: Where the requirement for selectivity is indicated, provide transfer switches with short time ratings suitable for the maximum short time delay setting of the supply side overcurrent protective device.

Automatic Transfer Switches:

Description: Transfer switches with automatically initiated transfer between sources; electrically operated and mechanically held.

Control Functions:

Automatic mode.

Test Mode: Simulates failure of primary/normal source.

Voltage and Frequency Sensing:

Undervoltage sensing for each phase of primary/normal source; adjustable dropout/pickup settings.

Undervoltage sensing for alternate/emergency source; adjustable dropout/pickup settings.

Underfrequency sensing for alternate/emergency source; adjustable dropout/pickup settings.

Outputs:

Contacts for engine start/shutdown (except where direct generator communication interface is provided).

Auxiliary contacts; one set(s) for each switch position.

Adjustable Time Delays:

Engine generator start time delay; delays engine start signal to override momentary primary/normal source failures.

Transfer to alternate/emergency source time delay.

Retransfer to primary/normal source time delay.

Engine generator cooldown time delay; delays engine shutdown following retransfer to primary/normal source to permit generator to run unloaded for cooldown period.

Synchronization/In-Phase Monitor (Closed Transition Transfer Switches): Monitors voltage and phase angle difference between sources for initiating synchronized transfer.

Engine Exerciser: Provides programmable scheduled exercising of engine generator selectable with or without transfer to load; provides memory retention during power outage.

Status Indications:

Connected to alternate/emergency source.

Connected to primary/normal source.

Alternate/emergency source available.

Alarm Indications for Closed Transition Transfer Switches:

Failure to synchronize.

Extended source interconnection/transfer switch locked out.

Automatic Sequence of Operations:

Upon failure of primary/normal source for a programmable time period (engine generator start time delay), initiate starting of engine generator where applicable.

When alternate/emergency source is available, transfer load to alternate/emergency source after programmable time delay.

When primary/normal source has been restored, retransfer to primary/normal source after a programmable time delay. Bypass time delay if alternate/emergency source fails and primary/normal source is available.

Where applicable, initiate shutdown of engine generator after programmable engine cooldown time delay.

Interface with Other Work:

Interface with engine generators as specified in Section 26 3213.

SOURCE QUALITY CONTROL

See Section 01 4000 - Quality Requirements, for additional requirements.

Perform production tests on transfer switches at factory to verify operation and performance characteristics prior to shipment. Include certified test report with submittals.

PART 3 EXECUTION

EXAMINATION

Verify that field measurements are as shown on the drawings.

Verify that the ratings and configurations of transfer switches are consistent with the indicated requirements.

Verify that rough-ins for field connections are in the proper locations.

Verify that mounting surfaces are ready to receive transfer switches.

Verify that conditions are satisfactory for installation prior to starting work.

INSTALLATION

Perform work in a neat and workmanlike manner in accordance with NECA 1.

Install transfer switches in accordance with manufacturer's instructions.

Arrange equipment to provide minimum clearances and required maintenance access.

Provide required support and attachment in accordance with Section 26 0529.

Install transfer switches plumb and level.

Unless otherwise indicated, mount floor-mounted transfer switches on properly sized 3 inch (80 mm) high concrete pad constructed in accordance with Section 03 3000.

Provide grounding and bonding in accordance with Section 26 0526.

Identify transfer switches and associated system wiring in accordance with Section 26 0553.

FIELD QUALITY CONTROL

See Section 01 4000 - Quality Requirements, for additional requirements.

Provide services of a manufacturer's authorized representative to observe installation and assist in inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.

Prepare and start system in accordance with manufacturer's instructions.

Automatic Transfer Switches:

Inspect and test in accordance with NETA ATS, except Section 4.

Perform inspections and tests listed in NETA ATS, Section 7.22.3. The control wiring insulation-resistance tests listed as optional are not required.

Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

164 Submit detailed reports indicating inspection and testing results and corrective actions taken.

165 CLEANING

166 Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

167 CLOSEOUT ACTIVITIES

168 Demonstration: Demonstrate proper operation of transfer switches to Owner, and correct deficiencies or make adjustments as directed.

169 Training: Train Owner's personnel on operation, adjustment, and maintenance of transfer switches.

170 Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

171 Instructor: Manufacturer's authorized representative.

172 Location: At project site.

173 Coordinate with related generator demonstration and training as specified in Section 26 3213.

174 PROTECTION

175 Protect installed transfer switches from subsequent construction operations.

176 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Surge protective devices for service entrance locations.

RELATED REQUIREMENTS

Section 26 0526 - Grounding and Bonding for Electrical Systems.

Section 26 2413 - Switchboards.

ABBREVIATIONS AND ACRONYMS

SPD: Surge Protective Device.

REFERENCE STANDARDS

NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 2014.

NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.

SUBMITTALS

See Section 01 3000 - Administrative Requirements, for submittal procedures.

QUALITY ASSURANCE

Conform to requirements of NFPA 70.

DELIVERY, STORAGE, AND PROTECTION

Store in a clean, dry space in accordance with manufacturer's written instructions.

FIELD CONDITIONS

Maintain field conditions within manufacturer's required service conditions during and after installation.

WARRANTY

See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

SURGE PROTECTIVE DEVICES - GENERAL REQUIREMENTS

Description: Factory-assembled surge protective devices (SPDs) for 60 Hz service; listed, classified, and labeled as suitable for the purpose intended; system voltage as indicated on the drawings.

Protected Modes:

UL 1449 Voltage Protection Ratings (VPRs):

UL 1449 Maximum Continuous Operating Voltage (MCOV): Not less than 115% of nominal system voltage.

Enclosure Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:

Equipment Containing Factory-installed, Internally Mounted SPDs: Listed and labeled as a complete assembly including SPD.

SURGE PROTECTIVE DEVICES FOR SERVICE ENTRANCE LOCATIONS

Unless otherwise indicated, provide field-installed, externally mounted or factory-installed, internally mounted SPDs.

List and label as complying with UL 1449, Type 1 when connected on line side of service disconnect overcurrent device and Type 1 or 2 when connected on load side of service disconnect overcurrent device.

Provide SPDs utilizing field-replaceable modular or non-modular protection circuits.

Surge Current Rating: Not less than 120 kA per mode/240 kA per phase.

UL 1449 Nominal Discharge Current (I-n): 20 kA.

UL 1449 Short Circuit Current Rating (SCCR): Not less than the available fault current at the installed location as indicated on the drawings.

Diagnostics:

Protection Status Monitoring: Provide indicator lights to report the protection for each phase.

Alarm Notification: Provide indicator light and audible alarm to report alarm condition. Provide button to manually silence audible alarm.

END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Interior luminaires.

Exit signs.

Ballasts and drivers.

Luminaire accessories.

RELATED REQUIREMENTS

Section 26 0537 - Boxes.

Section 26 0923 - Lighting Control Devices: Automatic controls for lighting including occupancy sensors, outdoor motion sensors, time switches, outdoor photo controls, and daylighting controls.

Section 26 2726 - Wiring Devices: Manual wall switches and wall dimmers.

REFERENCE STANDARDS

11

IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules; Illuminating Engineering Society; 2015.

NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; National Electrical Contractors Association; 2006.

NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; National Electrical Contractors Association; 2006.

NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; National Electrical Manufacturers Association; 2012.

NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

NFPA 101 - Life Safety Code; National Fire Protection Association; 2015.

UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.

UL 1598 - Luminaires; Current Edition, Including All Revisions.

UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
- Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
- Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
- Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

SUBMITTALS

Shop Drawings:

- Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.

Provide photometric calculations where luminaires are proposed for substitution upon request.

Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

LED Luminaires:

Include estimated useful life, calculated based on IES LM-80 test data.

Include IES LM-79 test report upon request.

Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

Operation and Maintenance Data: Instructions for each product including information on replacement parts.

Project Record Documents: Record actual connections and locations of luminaires and any associated remote components.

QUALITY ASSURANCE

Conform to requirements of NFPA 70.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

DELIVERY, STORAGE, AND PROTECTION

Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.

Keep products in original manufacturer's packaging and protect from damage until ready for installation.

FIELD CONDITIONS

Maintain field conditions within manufacturer's required service conditions during and after installation.

WARRANTY

Provide three year manufacturer warranty for all LED luminaires, including drivers.

PART 2 PRODUCTS

LUMINAIRE TYPES

Furnish products as indicated in luminaire schedule included on the drawings.

LUMINAIRES

Provide products that comply with requirements of NFPA 70.

Provide products that are listed and labeled as complying with UL 1598, where applicable.

Provide products listed, classified, and labeled as suitable for the purpose intended.

Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

Recessed Luminaires:

Ceiling Compatibility: Comply with NEMA LE 4.

LED Luminaires:
Components: UL 8750 recognized or listed as applicable.
Tested in accordance with IES LM-79 and IES LM-80.
LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

Luminaires Mounted in Continuous Rows: Provide quantity of units required for length indicated, with all accessories required for joining and aligning.

EXIT SIGNS

Description: Internally illuminated exit signs with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
Number of Faces: Single or double as indicated or as required for the installed location.
Directional Arrows: As indicated or as required for the installed location.

BALLASTS AND DRIVERS

Ballasts/Drivers - General Requirements:
Provide ballasts containing no polychlorinated biphenyls (PCBs).
Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

Dimmable LED Drivers:
Dimming Range: Continuous dimming from 100 percent to five percent relative light output unless dimming capability to lower level is indicated, without flicker.
Control Compatibility: Fully compatible with the dimming controls to be installed.
Wall Dimmers: See Section 26 2726.
Daylighting Controls: See Section 26 0923.

ACCESSORIES

Provide accessory plaster frames for luminaires recessed in plaster ceilings.

PART 3 EXECUTION

EXAMINATION

Verify that field measurements are as shown on the drawings.

Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

Verify that suitable support frames are installed where required.

Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

Verify that conditions are satisfactory for installation prior to starting work.

PREPARATION

Provide extension rings to bring outlet boxes flush with finished surface.

Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

INSTALLATION

Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of luminaires provided under this section.

Install products according to manufacturer's instructions.

Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).

Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

Suspended Ceiling Mounted Luminaires:
Do not use ceiling tiles to bear weight of luminaires.

99 Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.

100 Secure surface-mounted and recessed luminaires to ceiling support channels or framing members or to building structure.

101 Secure pendant-mounted luminaires to building structure.

102 Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.

103 In addition to ceiling support wires, provide two galvanized steel safety wire(s), minimum 12 gage, connected from opposing corners of each recessed luminaire to building structure.

104 See appropriate Division 9 section where suspended grid ceiling is specified for additional requirements.

105 Recessed Luminaires:

106 Install trims tight to mounting surface with no visible light leakage.

107 Suspended Luminaires:

108 Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.

109 Install canopies tight to mounting surface.

110 Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.

111 Install accessories furnished with each luminaire.

112 Bond products and metal accessories to branch circuit equipment grounding conductor.

113 Exit Signs:

114 Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

115 Install lamps in each luminaire.

116 FIELD QUALITY CONTROL

117 Inspect each product for damage and defects.

118 Operate each luminaire after installation and connection to verify proper operation.

119 Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

120 ADJUSTING

121 Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.

122 Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Architect or authority having jurisdiction.

123 CLEANING

124 Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

125 CLOSEOUT ACTIVITIES

126 Demonstration: Demonstrate proper operation of luminaires to Architect, and correct deficiencies or make adjustments as directed.

127 Just prior to Substantial Completion, replace all lamps that have failed.

128 PROTECTION

129 Protect installed luminaires from subsequent construction operations.

130 END OF SECTION

PART 1 GENERAL

SECTION INCLUDES

Exterior luminaires.

Poles and accessories.

Luminaire accessories.

RELATED REQUIREMENTS

Section 03 3000 - Cast-in-Place Concrete: Materials and installation requirements for concrete bases for poles.

Section 26 0526 - Grounding and Bonding for Electrical Systems.

Section 26 0537 - Boxes.

Section 26 0923 - Lighting Control Devices: Automatic controls for lighting including outdoor motion sensors, time switches, and outdoor photo controls.

REFERENCE STANDARDS

IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products; 2008.

IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules; 2015.

NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

NECA/IESNA 501 - Standard for Installing Exterior Lighting Systems; 2006.

NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; 2012.

NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

UL 1598 - Luminaires; Current Edition, Including All Revisions.

UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

ADMINISTRATIVE REQUIREMENTS

Coordination:

- Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.
- Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

SUBMITTALS

Shop Drawings:

- Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
- Provide photometric calculations where luminaires are proposed for substitution upon request.
- Provide structural calculations for each pole proposed for substitution.

Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.

- LED Luminaires:
  - Include estimated useful life, calculated based on IES LM-80 test data.
- Poles: Include information on maximum supported effective projected area (EPA) and weight for the design wind speed.

Certificates for Poles and Accessories: Manufacturer's documentation that products are suitable for the luminaires to be installed and comply with designated structural design criteria.

Project Record Documents: Record actual connections and locations of pole foundations, luminaires, and any pull or junction boxes.

QUALITY ASSURANCE

Conform to requirements of NFPA 70.

Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

DELIVERY, STORAGE, AND HANDLING

Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.

Keep products in original manufacturer's packaging and protect from damage until ready for installation.

WARRANTY

Provide three year manufacturer warranty for all LED luminaires, including drivers.

PART 2 PRODUCTS

LUMINAIRE TYPES

Furnish products as indicated in luminaire schedule included on the drawings.

LUMINAIRES

Provide products that comply with requirements of NFPA 70.

Provide products that are listed and labeled as complying with UL 1598, where applicable.

Provide products listed, classified, and labeled as suitable for the purpose intended.

Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.

Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

Provide luminaires listed and labeled as suitable for wet locations unless otherwise indicated.

Recessed Luminaires:

- Ceiling Compatibility: Comply with NEMA LE 4.
- Luminaires Recessed in Sloped Ceilings: Provide suitable sloped ceiling adapters.

LED Luminaires:

- Components: UL 8750 recognized or listed as applicable.
- Tested in accordance with IES LM-79 and IES LM-80.
- LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

Exposed Hardware: Stainless steel.

BALLASTS

Ballasts/Drivers - General Requirements:

- Provide ballasts containing no polychlorinated biphenyls (PCBs).
- Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

POLES

All Poles:

Provide poles and associated support components suitable for the luminaire(s) and associated supports and accessories to be installed.

Unless otherwise indicated, provide with the following features/accessories:

Top cap.

Handhole.

Anchor bolts with leveling nuts or leveling shims.

Anchor base cover.

Metal Poles: Provide ground lug, accessible from handhole or transformer base.

ACCESSORIES

Stems for Suspended Luminaires: Steel tubing, minimum 1/2" size, factory finished to match luminaire or field-painted as directed.

PART 3 EXECUTION

EXAMINATION

Verify that field measurements are as shown on the drawings.

Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

Verify that suitable support frames are installed where required.

Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

Verify that conditions are satisfactory for installation prior to starting work.

PREPARATION

Provide extension rings to bring outlet boxes flush with finished surface.

Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

INSTALLATION

Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of luminaires provided under this section.

Install products according to manufacturer's instructions.

Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship) and NECA/IESNA 501 (exterior lighting).

Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

Suspended Luminaires:

Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.

Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.

Pole-Mounted Luminaires:

Foundation-Mounted Poles:

Provide cast-in-place concrete foundations for poles as indicated, in accordance with Section 03 3000.

Install anchor bolts plumb per template furnished by pole manufacturer.

Position conduits to enter pole shaft.

Install foundations plumb.

Install poles plumb, using leveling nuts or shims as required to adjust to plumb.

Tighten anchor bolt nuts to manufacturer's recommended torque.

Install non-shrink grout between pole anchor base and concrete foundation, leaving small channel for condensation drainage.

Grounding:

Bond luminaires, metal accessories, metal poles, and foundation reinforcement to branch circuit equipment grounding conductor.

Install separate service conductors, 12 AWG copper, from each luminaire down to handhole for connection to branch circuit conductors.

Install accessories furnished with each luminaire.

Bond products and metal accessories to branch circuit equipment grounding conductor.

Install lamps in each luminaire.

FIELD QUALITY CONTROL

Inspect each product for damage and defects.

Operate each luminaire after installation and connection to verify proper operation.

Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

ADJUSTING

Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.

Luminaires with Field-Rotatable Optics: Position optics according to manufacturer's instructions to achieve lighting distribution as indicated or as directed by Architect.

CLEANING

Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

CLOSEOUT ACTIVITIES

Demonstration: Demonstrate proper operation of luminaires to Architect, and correct deficiencies or make adjustments as directed.

Just prior to Substantial Completion, replace all lamps that have failed.

PROTECTION

Protect installed luminaires from subsequent construction operations.

END OF SECTION

PART 1 GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

Provide a complete bidder-designed automatic and manual fire alarm system with devices and equipment, specified herein. System to include all equipment and wiring as required. The contractor is to design and provide the system including all raceways, boxes, conductors, cables, and equipment required for the complete system.

SUMMARY

Section Includes:

- Fire-alarm control unit.
- Manual fire-alarm boxes.
- System smoke detectors.
- Heat detectors.
- Notification appliances.
- Magnetic door holders.
- Remote annunciator.
- Addressable interface device.
- Digital alarm communicator transmitter.

DEFINITIONS

EMT: Electrical Metallic Tubing.

FACP: Fire Alarm Control Panel.

HLI: High Level Interface.

NICET: National Institute for Certification in Engineering Technologies.

SUBMITTALS

Product Data: For each type of product, including furnished options and accessories.

- Include construction details, material descriptions, dimensions, profiles, and finishes.
- Include rated capacities, operating characteristics, and electrical characteristics.

Shop Drawings: For fire-alarm system.

- Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
- Include plans, elevations, sections, details, and attachments to other work.
- Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
- Detail assembly and support requirements.
- Include voltage drop calculations for notification-appliance circuits.
- Include battery-size calculations.
- Include input/output matrix.
- Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
- Include performance parameters and installation details for each detector.
- Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
- Provide program report showing that air-sampling detector pipe layout balances pneumatically within the airflow range of the air-sampling detector.
- Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.
    - Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.

- Show field wiring required for HVAC unit shutdown on alarm.
- Show field wiring and equipment required for HVAC unit shutdown on alarm and override by firefighters' control system.
- Show field wiring and equipment required for HVAC unit shutdown on alarm and override by firefighters' smoke-evacuation system.
- Locate detectors according to manufacturer's written recommendations.
- Show air-sampling detector pipe routing.

Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.

Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.

General Submittal Requirements:

Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.

Shop Drawings shall be prepared by persons with the following qualifications:

- Trained and certified by manufacturer in fire-alarm system design.
- NICET-certified, fire-alarm technician; Level IV minimum.
- Licensed or certified by authorities having jurisdiction.

Delegated-Design Submittal: For notification appliances and smoke and heat detectors, in addition to submittals listed above, indicate compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

Drawings showing the location of each notification appliance and smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the device.

Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72. Calculate spacing and intensities for strobe signals and sound-pressure levels for audible appliances.

Indicate audible appliances required to produce square wave signal per NFPA 72.

Qualification Data: For Installer.

Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.

Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

Field quality-control reports.

CLOSEOUT SUBMITTALS

Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.

In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following[and deliver copies to authorities having jurisdiction]:

- Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
- Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
- Complete wiring diagrams showing connections between all devices and equipment. Each conductor shall be numbered at every junction point with indication of origination and termination points.
- Riser diagram.

- Device addresses.
- Air-sampling system sample port locations and modeling program report showing layout meets performance criteria.
- Record copy of site-specific software.
- Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:
  - Equipment tested.
  - Frequency of testing of installed components.
  - Frequency of inspection of installed components.
  - Requirements and recommendations related to results of maintenance.
  - Manufacturer's user training manuals.
- Manufacturer's required maintenance related to system warranty requirements.
- Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

Software and Firmware Operational Documentation:

- Software operating and upgrade manuals.
- Program Software Backup: On magnetic media or compact disk, complete with data files.
- Device address list.
- Printout of software application and graphic screens.

Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

- Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but no fewer than one unit.
- Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but no fewer than one unit.
- Smoke Detectors, Fire Detectors: Quantity equal to 10 percent of amount of each type installed, but no fewer than one unit of each type.
- Detector Bases: Quantity equal to two percent of amount of each type installed, but no fewer than one unit of each type.
- Keys and Tools: One extra set for access to locked or tamperproofed components.
- Audible and Visual Notification Appliances: one of each type installed.
- Fuses: Two of each type installed in the system. Provide in a box or cabinet with compartments marked with fuse types and sizes.

QUALITY ASSURANCE

Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level III technician.

NFPA Certification: Obtain certification according to NFPA 72 by an NRTL (nationally recognized testing laboratory).

PROJECT CONDITIONS

Perform a full test of the existing system prior to starting work. Document any equipment or components not functioning as designed.

Use of Devices during Construction: Protect devices during construction unless devices are placed in service to protect the facility during construction.

WARRANTY

Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.

- Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
- Warranty Period: **One** years from date of Substantial Completion. [**Addendum One**]

PART 2 PRODUCTS

SYSTEM DESCRIPTION

Source Limitations for Fire-Alarm System and Components: Components shall be compatible with, and operate as an extension of, existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.

Noncoded, UL-certified addressable system, with multiplexed signal transmission and voice/strobe evacuation.

Automatic sensitivity control of certain smoke detectors.

All components provided shall be listed for use with the selected system.

Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

SYSTEMS OPERATIONAL DESCRIPTION

Fire-alarm signal initiation shall be by one or more of the following devices and systems:
- Manual stations.
- Heat detectors.
- Smoke detectors.
- Duct smoke detectors.
- Automatic sprinkler system water flow.
- Fire standpipe system.
- Dry system pressure flow switch.

Fire-alarm signal shall initiate the following actions:
- Continuously operate alarm notification appliances.
- Identify alarm and specific initiating device at fire-alarm control unit and remote annunciators.
- Transmit an alarm signal to the remote alarm receiving station.
- Release fire and smoke doors held open by magnetic door holders.
- Activate voice/alarm communication system.
- Activate emergency lighting control.
- Record events in the system memory.

Supervisory signal initiation shall be by one or more of the following devices and actions:
- Valve supervisory switch.
- High- or low-air-pressure switch of a dry-pipe or preaction sprinkler system.
- User disabling of zones or individual devices.
- Loss of communication with any panel on the network.

System trouble signal initiation shall be by one or more of the following devices and actions:
- Open circuits, shorts, and grounds in designated circuits.
- Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
- Loss of communication with any addressable sensor, input module, relay, control module, remote annunciator, printer interface, or Ethernet module.
- Loss of primary power at fire-alarm control unit.
- Ground or a single break in internal circuits of fire-alarm control unit.
- Abnormal ac voltage at fire-alarm control unit.
- Break in standby battery circuitry.
- Failure of battery charging.
- Abnormal position of any switch at fire-alarm control unit or annunciator.
- Voice signal amplifier failure.

System Supervisory Signal Actions:
- Initiate notification appliances.
- Identify specific device initiating the event at fire-alarm control unit and remote annunciators.

Record the event on system printer.
After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.
Transmit system status to building management system.
Display system status on graphic annunciator.

PERFORMANCE REQUIREMENTS

Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

FIRE-ALARM CONTROL UNIT

General Requirements for Fire-Alarm Control Unit:
Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864.
System software and programs shall be held in nonvolatile flash, electrically erasable, programmable, read-only memory, retaining the information through failure of primary and secondary power supplies.
Include a real-time clock for time annotation of events on the event recorder and printer.
Provide communication between the FACP and remote circuit interface panels, annunciators, and displays.
The FACP shall be listed for connection to a central-station signaling system service.
Provide nonvolatile memory for system database, logic, and operating system and event history. The system shall require no manual input to initialize in the event of a complete power down condition. The FACP shall provide a minimum 500-event history log.
Addressable Initiation Device Circuits: The FACP shall indicate which communication zones have been silenced and shall provide selective silencing of alarm notification appliance by building communication zone.
Addressable Control Circuits for Operation of Notification Appliances and Mechanical Equipment: The FACP shall be listed for releasing service.

Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
Annunciator and Display: Liquid-crystal type, 80 characters, minimum.
Keypad: Arranged to permit entry and execution of programming, display, and control commands.

Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
Annunciator and Display: Liquid-crystal type, two line(s) of 80 characters, minimum.
Keypad: Arranged to permit entry and execution of programming, display, and control commands and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.

Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:
Pathway Class Designations: NFPA 72, Class B.
Pathway Survivability:Level 0.
Install no more than 256 addressable devices on each signaling-line circuit.
Serial Interfaces:
One dedicated RS 485 port for central-station operation using point ID DACT.

One RS 485 port for remote annunciators, Ethernet module, or multi-interface module (printer port).
One USB port for PC configuration.
One RS 232 port for voice evacuation interface.

Smoke-Alarm Verification:
Initiate audible and visible indication of an "alarm-verification" signal at fire-alarm control unit.
Activate an approved "alarm-verification" sequence at fire-alarm control unit and detector.
Record events by the system printer.
Sound general alarm if the alarm is verified.
Cancel fire-alarm control unit indication and system reset if the alarm is not verified.

Notification-Appliance Circuit:
Audible appliances shall sound in a three-pulse temporal pattern, as defined in NFPA 72.
Where notification appliances provide signals to sleeping areas, the alarm signal shall be a 520-Hz square wave with an intensity 15 dB above the average ambient sound level or 5 dB above the maximum sound level, or at least 75 dBA, whichever is greater, measured at the pillow.
Visual alarm appliances shall flash in synchronization where multiple appliances are in the same field of view, as defined in NFPA 72.

Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke-barrier walls shall be connected to fire-alarm system.

Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out the final adjusted values on system printer.

Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory signals shall be powered by 24-V dc source.
Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
Batteries: Sealed lead calcium.

Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

MANUAL FIRE-ALARM BOXES

General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
Double-action mechanism requiring two actions to initiate an alarm, breaking glass pull-lever type; with intergral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
Station Reset: Key- or wrench-operated switch.
Indoor Protective Shield: Factory-fabricated, clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.

Weatherproof Protective Shield: Factory-fabricated, clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

SYSTEM SMOKE DETECTORS

insert list of manufacturers and products.

General Requirements for System Smoke Detectors:

Comply with UL 268; operating at 24-V dc, nominal.

Detectors shall be four-wire type.

Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.

Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.

Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.

Remote Control: Unless otherwise indicated, detectors shall be digital-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.

Rate-of-rise temperature characteristic of combination smoke- and heat-detection units shall be selectable at fire-alarm control unit for 15 or 20 deg F (8 or 11 deg C) per minute.

Fixed-temperature sensing characteristic of combination smoke- and heat-detection units shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F (57 or 68 deg C).

Multiple levels of detection sensitivity for each sensor.

Sensitivity levels based on time of day.

Photoelectric Smoke Detectors:

Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.

An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

Primary status.

Device type.

Present average value.

Present sensitivity selected.

Sensor range (normal, dirty, etc.).

Ionization Smoke Detector:

Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.

An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

Primary status.

Device type.

Present average value.

Present sensitivity selected.

Sensor range (normal, dirty, etc.).

Duct Smoke Detectors: Photoelectric type complying with UL 268A.

Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.

An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

Primary status.

Device type.
Present average value.
Present sensitivity selected.
Sensor range (normal, dirty, etc.).

Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector for smoke detection in HVAC system ducts.

Each sensor shall have multiple levels of detection sensitivity.

Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.

Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

HEAT DETECTORS

General Requirements for Heat Detectors: Comply with UL 521.

Temperature sensors shall test for and communicate the sensitivity range of the device.

Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or a rate of rise that exceeds 15 deg F (8 deg C) per minute unless otherwise indicated.

Mounting: Twist-lock base interchangeable with smoke-detector bases.

Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F (88 deg C).

Mounting: Twist-lock base interchangeable with smoke-detector bases

Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

Continuous Linear Heat-Detector System:

Detector Cable: Rated detection temperature 155 deg F (68 deg C). Listed for "regular" service and a standard environment. Cable includes two steel actuator wires twisted together with spring pressure, wrapped with protective tape, and finished with PVC outer sheath. Each actuator wire is insulated with heat-sensitive material that reacts with heat to allow the cable twist pressure to short circuit wires at the location of elevated temperature.

Control Unit: Two-zone or multizone unit as indicated. Provide same system power supply, supervision, and alarm features as specified for fire-alarm control unit.

Signals to Fire-Alarm Control Unit: Any type of local system trouble shall be reported to fire-alarm control unit as a composite "trouble" signal. Alarms on each detection zone shall be individually reported to central fire-alarm control unit as separately identified zones.

Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

NOTIFICATION APPLIANCES

General Requirements for Notification Appliances: Individually addressed, connected to a signaling-line circuit, equipped for mounting as indicated, and with screw terminals for system connections.

General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.

Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.

Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet (3 m) from the horn, using the coded signal prescribed in UL 464 test protocol.

Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.
- Rated Light Output:
  - 15/30/75/110 cd, selectable in the field.
- Mounting: Wall mounted unless otherwise indicated.
- For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
- Flashing shall be in a temporal pattern, synchronized with other units.
- Strobe Leads: Factory connected to screw terminals.
- Mounting Faceplate: Factory finished, white.

Voice/Tone Notification Appliances:
- Comply with UL 1480.
- Speakers for Voice Notification: Locate speakers for voice notification to provide the intelligibility requirements of the "Notification Appliances" and "Emergency Communications Systems" chapters in NFPA 72.
- High-Range Units: Rated 2 to 15 W.
- Low-Range Units: Rated 1 to 2 W.
- Mounting: Flush, Semirecessed, or surface mounted and bidirectional.
- Matching Transformers: Tap range matched to acoustical environment of speaker location.

Exit Marking Audible Notification Appliance:
- Exit marking audible notification appliances shall meet the audibility requirements in NFPA 72.
- Provide exit marking audible notification appliances at the entrance to all building exits.
- Provide exit marking audible notification appliances at the entrance to areas of refuge with audible signals distinct from those used for building exit marking.

MAGNETIC DOOR HOLDERS

Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.
- Electromagnets: Require no more than 3 W to develop 25-lbf (111-N) holding force.
- Wall-Mounted Units: Flush mounted unless otherwise indicated.
- Rating: 24V ac or dc.

Material and Finish: Match door hardware.

REMOTE ANNUNCIATOR

Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
- Mounting: Flush cabinet, NEMA 250, Type 1.

Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

ADDRESSABLE INTERFACE DEVICE

General:
- Include address-setting means on the module.
- Store an internal identifying code for control panel use to identify the module type.
- Listed for controlling HVAC fan motor controllers.

Monitor Module: Microelectronic module providing a system address for alarm-initiating devices for wired applications with normally open contacts.

Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall and to circuit-breaker shunt trip for power shutdown.
- Allow the control panel to switch the relay contacts on command.

Have a minimum of two normally open and two normally closed contacts available for field wiring.

Control Module:

Operate notification devices.

Operate solenoids for use in sprinkler service.

DIGITAL ALARM COMMUNICATOR TRANSMITTER

Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632.

Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture two telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.

Local functions and display at the digital alarm communicator transmitter shall include the following:

Verification that both telephone lines are available.

Programming device.

LED display.

Manual test report function and manual transmission clear indication.

Communications failure with the central station or fire-alarm control unit.

Digital data transmission shall include the following:

Address of the alarm-initiating device.

Address of the supervisory signal.

Address of the trouble-initiating device.

Loss of ac supply.

Loss of power.

Low battery.

Abnormal test signal.

Communication bus failure.

Secondary Power: Integral rechargeable battery and automatic charger.

Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

DEVICE GUARDS

Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.

Factory fabricated and furnished by device manufacturer.

Finish: Paint of color to match the protected device.

PART 3 EXECUTION

EXAMINATION

Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.

Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.

Examine roughing-in for electrical connections to verify actual locations of connections before installation.

Proceed with installation only after unsatisfactory conditions have been corrected.

335 EQUIPMENT INSTALLATION

336 Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."

337 Devices placed in service before all other trades have completed cleanup shall be replaced.

338 Devices installed but not yet placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.

339 Equipment Mounting:

340 Install seismic bracing. Comply with requirements in Section 260548.16 "Seismic Controls for Electrical Systems."

341 Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

342 Install wall-mounted equipment, with tops of cabinets not more than 78 inches (1980 mm) above the finished floor.

343 Comply with requirements for seismic-restraint devices specified in Section 260548.16 "Seismic Controls for Electrical Systems."

344 Manual Fire-Alarm Boxes:

345 Install manual fire-alarm box in the normal path of egress within 60 inches (1520 mm) of the exit doorway.

346 Mount manual fire-alarm box on a background of a contrasting color.

347 The operable part of manual fire-alarm box shall be between 42 inches (1060 mm) and 48 inches (1220 mm) above floor level. All devices shall be mounted at the same height unless otherwise indicated.

348 Smoke- or Heat-Detector Spacing:

349 Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.

350 Comply with the "Heat-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.

351 Smooth ceiling spacing shall not exceed 30 feet (9 m)

352 Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Annex A [or Annex B]in NFPA 72.

353 HVAC: Locate detectors not closer than 36 inches (910 mm) from air-supply diffuser or return-air opening.

354 Lighting Fixtures: Locate detectors not closer than 12 inches (300 mm) from any part of a lighting fixture and not directly above pendant mounted or indirect lighting.

355 Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.

356 Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Tubes more than 36 inches (9100 mm) long shall be supported at both ends.

357 Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.

358 Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.

359 Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling. Install all devices at the same height unless otherwise indicated.

360 Device Location-Indicating Lights: Locate in public space near the device they monitor.

361 PATHWAYS

362 Pathways above recessed ceilings and in nonaccessible locations may be routed exposed.

Exposed pathways located less than 96 inches (2440 mm) above the floor shall be installed in EMT.

Pathways shall be installed in EMT.

Exposed EMT shall be painted red enamel.

CONNECTIONS

For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section 087100 "Door Hardware." Connect hardware and devices to fire-alarm system.

Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.

Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 36 inches (910 mm) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.

Smoke dampers in air ducts of designated HVAC duct systems.

Magnetically held-open doors.

Supervisory connections at valve supervisory switches.

Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.

IDENTIFICATION

Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

Install framed instructions in a location visible from fire-alarm control unit.

GROUNDING

Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

Ground shielded cables at the control panel location only. Insulate shield at device location.

FIELD QUALITY CONTROL

Field tests shall be witnessed by Authorities having jurisdiction.

Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

Perform tests and inspections.

Perform the following tests and inspections with the assistance of a factory-authorized service representative:

Visual Inspection: Conduct visual inspection prior to testing.

Inspection shall be based on completed record Drawings and system documentation that is required by the "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.

Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.

System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.

Test audible appliances for the private operating mode according to manufacturer's written instructions.

Test visible appliances for the public operating mode according to manufacturer's written instructions.

Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

Fire-alarm system will be considered defective if it does not pass tests and inspections.

Prepare test and inspection reports.

Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

Owner PERSONNEL INSTRUCTION

Provide the following instruction to designated Owner personnel:

Hands-On Instruction: On-site, using operational system.

Classroom Instruction: Owner furnished classroom, on-site or at other local facility.

Administrative: One-hour session(s) covering issues necessary for non-technical administrative staff; classroom:

Initial Training: 1 session pre-closeout.

Basic Operation: One-hour sessions for attendant personnel, security officers, and engineering staff; combination of classroom and hands-on:

Initial Training: 1 session pre-closeout.

Detailed Operation: Two-hour sessions for engineering staff; assume NICET level I qualifications or equivalent; combination of classroom and hands-on:

Initial Training: 1 session pre-closeout.

Furnish the services of instructors and teaching aids; have copies of operation and maintenance data available during instruction.

SOFTWARE SERVICE AGREEMENT

Comply with UL 864.

Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.

Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within [two] <Insert number> years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.

Upgrade Notice: At least 30 days to allow Owner to schedule access to system and to upgrade computer equipment if necessary.

DEMONSTRATION

Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION

PART 1 GENERAL

SCOPE

This section includes all demolition, removal and/or abandonment of existing above and below grade structures and appurtenances as designated on the drawings or as necessary to clear space for new construction and/or to rehabilitate existing construction.

The work specified under this section includes but is not limited to the following, including removal of materials from the site:

Demolition and removal of designated site structures, retaining walls, foundations, etc.

Demolition and removal of pavements, curbs and gutters, drainage structures, signage, sidewalks, landscaping or similar improvements.

Filling or removal of underground tanks, piping and vaults.

Cutting, capping and removal of existing piping, valves and appurtenances, or existing utilities as required.

Filling voids in subgrade created as a result of removals or demolition.

This section also specifies the salvage of equipment as indicated on the drawing, as specified herein or as designated by the Owner. Attention is directed to the requirements for maintaining operation of the existing facilities during construction. The Work includes transporting salvaged material and equipment to the designated local drop-off site where applicable.

SUBMITTALS

Submittals shall be in accordance with the requirements of these Contract Documents and shall include the following:

When the material and debris resulting from the Contractor's operations are disposed of at locations off the project, the Contractor shall obtain and submit written permission from the Owner of the property upon which the materials and debris is to be placed. Contractor shall provide executed copy of permit to dispose of waste materials from appropriate jurisdictions, if requested by the Owner’s Representative.

An accurate record of actual locations of all existing utilities and subsurface obstructions which are to remain in place shall be submitted to the Owner’s Representative prior to final acceptance of the project.

A time schedule for all demolition work. The schedule shall show demolition in relation to new construction, including any temporary facilities.

COORDINATION AND CONTROL

The Contractor shall:

Conform to all Federal, State and local laws and regulations for demolition, safety of adjacent facilities, dust control, runoff control, and disposal.

Obtain all required permits and licenses and pay all associated fees including disposal charges.

Notify affected utility companies before starting work and comply with their requirements.

Contractor shall:

Not close or obstruct roadways, sidewalks or hydrants without permits.

Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.

Test soils around buried tanks for contamination.

JOB CONDITIONS

Structures to be demolished shall be discontinued in use and vacated prior to start of demolition work.

The Contractor shall notify the Owner immediately upon encountering suspected contaminants such as asbestos, petroleum products, etc. Should the contractor proceed without notification, additional costs shall be borne by the contractor

The Owner assumes no responsibility for actual condition of the facilities or structures to be demolished.

Prior to the submittal of bid, the Contractor shall visit the site and inspect all facilities to become familiarized with all existing conditions and utilities and to verify the correctness of the drawings.

Conditions existing at time of inspection for bidding purposes will be maintained by Owner in so far as practicable. Variations within structures may occur by Owner's removal and salvage operations prior to start of demolition work.

Items of value to Contractor (which are not designated by the Owner to be salvaged and delivered to the Owner) are to be removed from the site by the Contractor. Storage or sale of removed items will not be permitted on site and shall not interfere with any other work specified in the Contract Documents.

PART 2 - PRODUCTS

None

PART 3 - EXECUTION

GENERAL

The contract drawings identify the major equipment and facilities to be removed. Auxiliary utilities such as water, air, drainage, lubrication oil, electrical wiring, controls, and instrumentation are not necessarily shown. These auxiliary utilities, as well as all equipment and pipe supports and all associated instrumentation devices pertaining to piping or equipment designated to be removed shall be removed.
Unless otherwise specified, the Contractor shall demolish and remove existing below grade improvements, structures and concrete slabs on grade to a minimum depth of two (2) feet below proposed subgrade.
Unless otherwise shown or specified, excavation resulting from demolition and removal operations shall be backfilled with clean earth or crushed gravel and compacted to ninety five percent (95%) of maximum dry density per AASHTO T-180. Burial of debris shall be prohibited unless otherwise shown or directed.
Excavated areas shall be graded to adjacent existing levels and left smooth, clean, free draining and free of debris as approved by the Owner's Representative.
Contractor shall conform to all Federal, State and Local laws when abandoning wells, or remaining septic tanks and fuel tanks.
Existing structures and equipment which are damaged in appearance and/or function by performance of demolition work shall be replaced or repaired to Owner's Representative approved condition by the Contractor at no additional cost to the Owner.

BURNING

The use of burning at the project site for the disposal of refuse, debris, and waste materials will not be permitted.

PROTECTION OF EXISTING FACILITIES

Contractor shall provide, erect, and maintain temporary barriers and protection as necessary.
Existing landscaping materials, appurtenances and structures that are not to be demolished shall be protected from damage. Damage caused by demolition operations shall be replaced or repaired at no additional cost to Owner.
Contractor shall provide bracing and shoring as required to prevent movement or settlement of adjacent structures. Bracing and shoring shall be Contractor's design.
The location of all utilities shall be marked prior to demolition. Contractor shall protect and maintain in safe and operable condition the utilities to remain, and prevent interruption of existing utility service except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to governing authorities.
Contractor shall clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to conditions existing prior to the start of the work.
During demolition Contractor shall conform to all Federal, State and local laws and regulations for erosion and pollution control.

SALVAGE

Prior to demolition the Contractor shall carefully remove, for reuse by the Owner, numerous items identified by the Owner. Contractor shall notify the Owner in writing two weeks in advance of demolition to allow for field identification by the Owner of salvage items.
All salvaged items shall be removed in their largest pieces that can be easily handled and stored by the Owner's personnel. The Contractor shall deliver these items to the local location designated by the Owner. Contractor shall contact the Owner's Representative to coordinate delivery of salvaged items. All salvaged mechanical and electrical equipment shall be removed in a workmanlike manner and all necessary precautions shall be taken to prevent damage to the existing equipment

CONDUIT AND WIRING

All disconnected unused wiring shall be removed from the conduits back to their source and any remaining unused conduit shall be capped as close to the originating vault or box as possible.

PAVEMENTS, SIDEWALKS, CURBING AND SIMILAR STRUCTURES

Removal of existing pavements, sidewalks, curbing and similar structures shall end at an existing joint or a sawed joint. Sawed joints shall be straight, neat and free from chipped or damaged edges.

For removal of non-reinforced concrete adjacent to concrete that is to remain, the saw cut shall be the full thickness of the concrete.

For removal of reinforced concrete, the depth of saw cut shall be sufficient to cut all steel unless specified otherwise.

If the concrete is coated with a bituminous surface or other material, the depth of saw cut shall be sufficient to cut into the concrete, not including the coating depth, as specified above.

EXCAVATION OF RIGID PAVEMENT

The Contractor shall excavate rigid pavement, consisting of concrete or concrete base with a wearing surface of brick or bituminous concrete, wherever such excavation is required for the purposes of this Contract.

Pavement shall be excavated to neat lines and to widths required for trenches for pipe laying and for construction of structures. Adequate provision shall be made to prevent settlement and breakage of pavement beyond the approved limits of excavation. Concrete pavement shall be cut with a concrete saw in conformance with this section.

All pavement broken or damaged beyond the limits above stated, or the approved extension thereof, shall be replaced by the Contractor at his expense.

MANHOLES, CATCH BASINS, INLETS AND SIMILAR STRUCTURES

Unless otherwise noted on the drawings, existing manholes, catch basins, inlets and similar structures designated to be removed shall be completely removed unless otherwise noted on the drawings.

Manholes, catch basins, inlets and similar structures designated to be abandoned shall be removed to an elevation of at least four (4) feet below ground surface or two (2) feet below the finished subgrade, whichever is greater. The remaining void shall be filled with granular backfill material compacted to ninety five percent (95%) of maximum dry density per AASHTO T180.

All sewer openings in manholes located on sewer lines shall be plugged with 3300-PSI concrete. Length of all concrete plugs shall be a minimum of one and one-half (1-1/2) times the diameter of the pipe.

In-service sewers connected to structures removed or abandoned shall be rebuilt through the area with new pipe. Sewer flow shall be maintained between removal and replacement operations. Abandoned sewers shall be sealed and made watertight with concrete plugs as specified above.

All castings salvaged from abandoned or removed structures shall become the property of the Contractor unless otherwise shown or directed.

The Contractor shall replace, at no cost to the Owner, materials lost or damaged by negligence or by the use of improper methods.

GUARDRAIL AND FENCE

Existing guardrail and fence shall be carefully dismantled and stored for reuse or for salvage by the Owner unless otherwise shown or directed.

Wood posts and other materials not considered salvageable by the Owner's Representative shall be disposed of by the Contractor.

The Contractor shall replace, at no cost to the Owner, material lost or damaged by negligence or by the use of improper methods.

SUPERSTRUCTURES, TANKS, CHAMBERS AND SIMILAR STRUCTURES

Care shall be used in demolishing structural elements that are continuous with structural elements remaining in service. Unless otherwise permitted by the Owner's Representative, concrete and masonry shall be cut through entirely with a masonry or concrete saw before removing the unwanted portions.

Methods and equipment used in demolition work shall be chosen so the structural integrity and watertightness of both newly constructed and existing structures remain unimpaired by the performance of the demolition work.

Portions of underground structures that are in the way of new sewers, piping, and structures shall be removed from the area of conflict to a distance not less than twelve (12) inches from any closest point on the new construction.

Extreme care shall be used when removing existing concrete from around reinforcing steel that must be used for securing new concrete. If the reinforcing steel is damaged, the Contractor shall remove additional existing concrete until sufficient existing reinforcing steel is exposed to provide adequate embedment length in the new concrete, as approved by the Owner's Representative.

EQUIPMENT REMOVAL

All equipment, valves, piping, fittings and miscellaneous steel structures that are removed shall become the property of the Contractor unless otherwise designated by the Owner.

DISPOSAL OF DEBRIS

Contractor shall not allow debris and/or excess material to accumulate. All debris shall be hauled away from the site as soon as removed.

All debris resulting from demolition operations (i.e. broken concrete, masonry, pipe, miscellaneous metal, trees and brush, etc., as well as mechanical and electrical equipment not designated by the City for salvage) shall be trucked from the work site by the Contractor and disposed of at spoil sites in a legal manner, in full compliance with all Federal, State and local laws and regulations.

The Contractor shall police the hauling of debris to ensure that all spillage from trucks is promptly and completely removed and cleaned up.

During and upon completion of the demolition and salvage operations, the Contractor shall promptly remove unused tools and equipment, surplus materials, rubbish, debris, and dust and shall leave work areas in a clean condition.

The Contractor shall not sweep, grade, or flush surplus materials, rubbish, or debris into storm drains, channels, lakes, or streams.

MAINTENANCE OF OWNER'S OPERATIONS

Demolition shall be scheduled and performed in strict conformance with these Specifications and in a manner which results in no interruption of Owner’s normal operations beyond that provided for and approved by the Owner. The date and time of commencing the separate items of demolition work shall be submitted to the Owner’s Representative for review, and no demolition work shall commence until the Owner’s Representative's approval of date and time is given.

All equipment, labor and material costs which are made necessary by the requirements of the Contractor's sequence of operations shall be borne by the Contractor.

USE OF EXPLOSIVES

The use of explosives for the work of removal of structures and obstructions is PROHIBITED.

END OF SECTION

PART 1 - GENERAL

SCOPE

This section includes grubbing, stripping and otherwise clearing of the construction site in accordance with the drawings and as specified herein or ordered.

This work includes the removing and disposal of all trees, roots, stumps, vegetation and debris as necessary to accommodate new construction or to grade the site and the preservation of all vegetation and other objects designated to remain.

SUBMITTALS

Spoil Site Permit:

When the material and debris resulting from the clearing and grubbing operations are disposed of at locations off the project, the Contractor shall obtain written permission from the Owner of the property upon which the material and debris is to be placed. Contractor shall also obtain any required permits to dispose of waste materials as required by appropriate jurisdictions. Upon request by the Owner, the Contractor shall submit copies of the written permission and permits.

PROTECTION

The Contractor shall provide the necessary protection to prevent damage, injury or loss of property at the site or adjacent thereto, including wetland areas, trees, shrubs, lawns, walks, pavements, roadways, monuments, structures and utilities not designated for removal, relocation or replacement in the course of construction.

PART 2 - PRODUCTS

MATERIALS

Paint required for cut or scarred surfaces of trees or shrubs designated to remain shall be a suitable product designed for the specific application.

PART 3 - EXECUTION

GENERAL

Information on the drawings showing existing conditions does not constitute a guarantee that other items may not be found or encountered. All such items not shown on the drawings or specified to remain shall be removed as a part of this contract at the expense of the Contractor.

Verify actual field conditions. Inspect related work and adjacent surfaces. Report all conditions which prevent proper execution of this work to the Owner/Owner’s Representative.

All materials and work shall conform to the requirements of the Building Code and other agencies of the governing body having jurisdiction over the work.

Contractor shall obtain permits and inspections and pay all fees required for this work.

All companies or authorities owning conduits, wires or pipes running over or under property shall be notified so that arrangements can be made for the removal of any utilities and the capping of any pipes that are to be abandoned. Record location of caps.

Existing trees to remain, as noted on plans. Do not disturb or dig into root system.

CLEARING AND GRUBBING

Only those trees and shrubs shall be removed that are in actual interference with excavation or grading work and such removal shall be subject to approval by the Owner’s Representative. The Owner’s Representative reserves the right to order additional trees or shrubs removed at no additional cost to the Owner if, in his opinion, they cannot be maintained or have been damaged by the Contractor's operations.

All trees, stumps, vegetation and debris not designated to remain shall be cleared and/or grubbed, except for special treatment in non-engineered fills as follows:

In locations to be seeded, stumps, roots and other protruding obstructions shall be removed to a minimum of 6-inches below the final ground surface.

Undisturbed stumps, roots and non-biodegradable solid objects which will be at least 3 feet below the subgrade or embankment surfaces will not require removing, providing they do not extend more than 6 inches above the existing ground surface.

Clear area within work limits of all surface vegetation, including trees, stumps, down timber, brush, roots, weeds, grasses and deleterious matter.

Clear and remove all internal fences from the site. Perimeter property line fences to remain in place unless otherwise shown or directed.

All timber shall become the property of the Contractor unless otherwise specified.
Tree branches which extend into the work areas within 8 feet vertically from finish grade shall be clean-cut off next to the trunk and the cuts shall be treated with an approved tree sealant.
Remove no trees, shrubbery or other vegetation outside of designated clearing limits. Trees and shrubs not designated for removal to be protected from damage during clearing and grubbing operations. Roots shall be neatly cut where removal is required.
Protect existing facilities, adjacent properties and survey monuments from damage.
Comply with safety requirements per Federal, State and local codes.
Cleanup adjacent work areas of all litter and debris resulting from the Contractor's operations under this section.
The clearing and grubbing shall extend 5 feet beyond the top of the backslope and/or toe of embankment, unless otherwise shown or directed.
At all times, the Contractor shall remain within the property lines and/or easement areas.
Except in areas to be excavated, all holes resulting from the clearing and grubbing operations shall be backfilled and compacted in accordance with applicable sections contained herein.

STRIPPING

Areas of excavation or embankment shall be stripped a minimum of six-inches of roots, sod, grass, crop residue, decayed vegetable matters and other organic materials, unless otherwise shown or directed.

DISPOSAL OF DEBRIS

Debris resulting from the clearing and grubbing operations shall be disposed of at spoil sites in a legal manner, in full compliance with applicable codes and ordinances. Stumps, branches, roots, etc. shall not be disposed of within the project limits.

END OF SECTION

PART 1 - GENERAL

GEOTECHNICAL REPORT:
All work shall be completed per the "Geotechnical Investigation and Seismic Site Characterization and Hazard Evaluation for the Proposed Marion County Sheriff's Office, TL No 1901, Aumsville Highway, Salem, Oregon, Marion County for Marion County" dated September 30, 2016. If there is a conflict between these specs and the Geotechnical Report the Geotechnical Report shall govern.

SCOPE
Work shall include, but not be limited to, the following:

- Stripping of sod and organic matter.
- Stripping, stockpiling and placing topsoil
- Rough grading and fine grading.
- Excavations.
- Fill construction.
- Moisture control and compaction.
- Finishing subgrade and slopes.
- Disposal of materials.
- Over-excavation as authorized by the Owner's Representative and Geotechnical Engineer.
- Protection of existing & new facilities, including shoring & bracing.
- Coordinating and obtaining all required testing & inspections.
- Clean up.
- Construction access roads and staging areas
- Excavation dewatering (until backfilling or permanent improvements are complete).
- Conformance with recommendations of project geotechnical report, or requirements of the design drawings, whichever is more stringent.
- Obtaining and providing required certifications for placement & compaction of engineered fills.

LABORATORY SERVICES & CERTIFICATION OF ENGINEERED FILLS
Laboratory & Compaction Testing & Observation of Fill Placement
Unless otherwise specified or shown on the drawings, the Owner shall provide laboratory services by an approved independent laboratory as described below and as noted on the drawings. The Contractor shall be responsible for obtaining & providing all samples requested by the Owner or Geotechnical Engineer as required to complete the work.

Laboratory Testing.
The approved independent laboratory shall complete one moisture density curve (AASHTO T-180) for each type of subgrade material encountered, and for each type of fill material used on or imported to the site. The maximum dry weight and optimum moisture content shall be indicated. The cost of all retests required due to any unauthorized change in fill material shall be borne by the Contractor.

Field Testing & Observation.
The approved independent laboratory shall test the subgrade and compacted fill material for conformance with specified "Compaction Requirements," denoted within the Geotechnical Report, and provide field observation as required to provide required certifications of engineered fills:
Where tests indicate insufficient values, perform additional tests as required by the Owner or Geotechnical Engineer. Testing shall continue until specified values have been attained by additional compaction effort. Retests shall be referenced to the corresponding failing test. The cost of all re-tests shall be borne by the Contractor.
Identification of subgrade soils as uncompactable by the independent laboratory shall not authorize the Contractor to begin overexcavation without written authorization from the Owner's Representative and Geotechnical Engineer.
Certification of Engineered Fills & Subgrade Preparation
The approved independent laboratory retained by the Owner shall provide a final report and certification that the subgrade was prepared and all engineered fills were placed in accordance with the provisions of the construction drawings and the contract documents (including the Geotechnical Report), and that all fills meet the specified compaction standards.

SUBMITTALS

Submittals shall be in accordance with the requirements of these Contract Documents and shall include:
For the Geotechnical Engineer and Owner's Representative's review
Certification that material conforms to the requirements contained herein.
Location of each material source for Owner's Representative's approval.
Geotextile certification shall conform with Level B requirements per OSSC (ODOT/APWA) 02320.10.c.2.

Laboratory and field test results.

The following documentation shall be required when uncompactable soils are identified by the Geotechnical Engineer.
Photocopy of the applicable portion(s) of the construction drawing plan sheet(s) with the approximate areas of uncompactable soils shown and bubbled. Stationing shall be indicated where available.
Dimensions of the areas of uncompactable soils, including proposed depth of overexcavation.
If the uncompactable soils are identified by the independent testing laboratory, the contractor shall submit the date and time of the field visit when the uncompactable soils were identified, along with the name of the laboratory representative.

GEOTEXTILE FABRIC

Unless otherwise specified or noted on the drawings, geotextile fabric shall conform OSSC (ODOT/APWA) 02320, Geosynthetics, with minimum property values conforming to Table 02320-1. Per OSSC (ODOT/APWA) 02320.10.c.2, if submittal information lists typical or average roll values instead of minimum average roll values, the specified table values under OSSC (ODOT/APWA) 02320 shall be increased by 25%.
Unless heavier fabric is specified or noted on the drawings, reinforcement fabric (for over-excavation or under embankments) shall be non-woven fabric (Propex Geotex 1001, Mirafi 1000N, Linq 250EX or approved equal. Slit film fabrics are not allowed.
Unless heavier fabric is specified or noted on the drawings, separation fabric (where successful proofroll allows compaction testing of subgrade to be waived) shall be non-woven fabric (Propex Geotex 701, Mirafi 170N, Linq 160EX or approved equal. Slit film fabrics are not allowed.

STRIPPINGS

Strippings shall be completed per the Geotechnical Report. Building foundations and pavements/concrete walks shall be excavated as described on the geotechnical report. Stripping defined as organic matter such as peat, roots, sod, grass, crop residue, vegetative matter or other materials that cannot be compacted to specified density into a stable mass.
Limits of stripping subject to the Geotechnical Engineer and Owner's Representative's approval.
Stripping materials to be disposed of off-site unless otherwise noted or directed by the Owner's Representative.

TOPSOIL

Refer to Section 32 91 00

EXCAVATIONS

Common excavation defined as all material not classified as rock excavation.
Rock excavation shall be defined as follows:

> *Rock excavation shall consist only of that solid bedrock or ledge rock and boulders over two (2) cubic yards in volume which cannot be removed by a D8K (or approved equal) with four barrel hydraulics and dual rippers or 90,000 pound class Excavator (P.C 400 Komatsu or 450 John Deere or approved equal) with single shank ripper on back of bucket, which shall not be more than thirty-six inches (36") in width, but which requires systematic drilling and blasting or the use of rock splitters, pneumatic hammers and wedges. All D8K's and 90,000 pound class Excavators shall be in excellent operating condition and operated by personnel competent to operate like machinery"*

Removal of existing concrete and asphalt does not qualify as rock excavation.

ENGINEERED FILLS AND EMBANKMENTS

Select native materials available from excavations and borrow areas after stripping.
All materials shall be free of organic matter, sod, soft or spongy earth, clods, large rocks, or broken pavement fragments, etc., which would preclude compaction at specified density into a stable mass.
All materials shall be within moisture content range necessary to achieve specified compaction.

Fill materials at all times shall be subject to approval of the Owner's Representative.
Materials judged unsuitable to be disposed of off-site as provided herein.
Subject to approval of the Owner's Representative, materials may also include gravel if wet weather prevents use of excavated materials.

CURB & SIDEWALK BACKFILL
Backfill behind curbs or sidewalks (and material for dressing up disturbed areas behind curbs or sidewalks) shall be approved topsoil per Section 32 91 00.
All materials shall be free of organic matter and fragments that would interfere with smooth finish and landscaping. Topsoil backfill and grading are the responsibility of the Contractor.

UNCOMPACTABLE SOILS
Uncompactable soils are those that are soft and uncompactable due to their physical nature, as judged by the Geotechnical Engineer. Soil that is wet of optimum shall not be considered as uncompactable unless specifically approved in writing by the Owner's Representative.
Unauthorized over-excavation shall include all over-excavation work commenced prior to written approval of the extent and cost by the Owner's Representative.

IMPROVED AREAS
Improved areas are site areas that are to be covered with an improved surface, including but not limited to the following:

- Public or private streets and sidewalks
- Building crushed rock pads, floor slabs and/or foundations
- Vehicle parking or driveway areas
- Truck docks or truck turnarounds
- Emergency vehicle access drives or turn arounds
- Pedestrian pavement areas (gravel, AC or PCC)
- Utility support structures such as generator slabs, utility vaults and pump stations
- Playground equipment areas with permanent equipment
- Future improved areas when designated as such on the construction drawings
- Playground areas with pavement
- Underground detention areas.

UNIMPROVED AREAS
Site areas that are outside of the boundary of improved areas as defined herein. Examples of unimproved areas are as follows:

- Planter areas
- Landscaping and seeded lawn areas
- Open space areas
- Bioswales, detention pond or other storm water management areas not installed under a parking lot.
- Any unimproved area that is irrigated or non-irrigated

GRASS SEED AND MULCH
See Section 32 92 00 – Seeded Grass for requirements.

PART 3 – EXECUTION

CONTRACTOR RESPONSIBILITY TO OBTAIN ALL REQUIRED INSPECTIONS
The Contractor shall be responsible to ensure that all inspections and testing required by the drawings, contract documents or agencies having jurisdiction are completed or witnessed by the Owners Representative or Geotechnical Engineer, authorized inspectors prior to proceeding with subsequent work that covers or that is dependent on the work to be inspected. Work completed or covered without obtaining required inspections will be considered as unauthorized work as outlined below, and may be ordered removed at the Contractor's expense.
Failure to obtain necessary inspection(s) and approval(s) shall result in the Contractor being fully responsible for all problems arising from uninspected work.
When excess excavated material is disposed of at locations off the project site, the Contractor shall obtain all necessary permits and pay all fees for disposal of material.

PROTECTION, CONSTRUCTION ACCESS & STAGING AREAS

The Contractor shall provide the necessary protection to prevent damage, injury or loss of property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, monuments, structures and utilities, including both new and existing not designated for removal, relocation or replacement in the course of construction.

All construction operations, including but not limited to work involved in excavation, hauling, delivering and/or placing earthwork and/or baserock, delivering or storing other construction materials or equipment, shall be performed in a manner to prevent damage to subgrades or other completed or partially completed work.

The Contractor shall be responsible for design, construction and maintenance of any and all structures required for access to the site for construction or delivery/storage of materials, including but not limited to construction access roads and staging areas. The Owner's responsibility to provide access easements or right-of-ways to the construction site shall not be interpreted as relieving the Contractor of his responsibilities under this section.

Unless otherwise shown or specified, the access road and parking lot sections shown are based upon the anticipated loads following construction and not upon the loads during the construction period. Any increase in road or parking lot size, depth or sections required to accommodate the loads due to the Contractor's choice of construction methods or sequence of operations shall be the responsibility of the Contractor, and shall be supplied at no additional cost to the Owner.

Any advice or recommendations solicited from or given by the Owner's Representative to the Contractor shall not relieve the Contractor of any of his responsibilities under this section.

All site earthwork, including temporary cut slopes, shall be protected from erosion damage caused by groundwater or surface water runoff.

Test Pits:

The Contractor shall dig such exploratory test pits as may be necessary in advance of excavation to determine the exact location and elevation of subsurface structures, pipelines and conduits which are likely to be encountered and shall make acceptable provision for their protection, support, and maintenance in operation.

Sheeting, Shoring and Bracing:

The Contractor shall furnish and install adequate sheeting, shoring, and bracing to maintain safe working conditions, and to protect newly built work and all adjacent and neighboring structures from damage by settlement.

Bracing shall be arranged so as not to place a strain on portions of completed work until the construction has proceeded far enough to provide ample strength. Sheeting and bracing may be withdrawn and removed at the time of backfilling, but the Contractor shall be responsible for all damage to newly built work and adjacent and neighboring structures.

All sheeting, shoring and bracing shall be of Contractor's design and shall be in accordance with all Federal, State and Local codes and requirements.

Construction Sheeting Left in Place:

The Contractor shall furnish, install, and leave in place, construction sheeting and bracing when specified or when indicated or shown on the drawings.

Construction sheeting and bracing, placed by the Contractor to protect adjacent and neighboring structures, may be left in place if desired by the Contractor and approved by the Owner's Representative. All such sheeting and bracing left in place shall be included in the cost for excavation.

Removal of Water:

The Contractor shall at all times during construction provide and maintain ample means and devices with which to remove promptly and dispose of properly all water entering the excavations or other parts of the work and shall keep said excavations dry until the permanent facilities to be placed therein (pipelines, underground structures, pavement, footings, etc) are completed (and backfilled where applicable). In water bearing sand, well points and/or sheeting shall be supplied, together with pumps and other appurtenances of ample capacity to keep the excavation dry as specified.

The Contractor shall dispose of water from the work in a suitable manner without damage to adjacent property or structures.

Contractor shall provide silt fences, straw bales, and/or sedimentation basins as required to clarify waters prior to discharge in accordance with Federal, State and Local requirements.

TOLERANCES AND LINE/GRADE CONTROL

Rough grade per drawing requirements to within 0.30 feet vertically and 1.0 feet horizontally of required lines and grades at any point prior to placing underground utilities unless otherwise specified or shown on the drawings.

Except as otherwise noted on the drawings or specified herein, fine grade per drawing requirements to within 0.10 feet vertically and 0.30 feet horizontally of required lines and grades at any point following installation of underground utilities. Place curb backfill and dress up disturbed areas to same tolerances.

All finished grading surfaces to be smooth, uniform and compact. Unless otherwise shown on the drawings, straight grades shall be run between all finish grade elevations and/or finish grade contours shown on the drawings. Finish grades at transition to existing grades shall match existing grades as required to provide a smooth, free draining surface.

Contractor to provide sufficient survey instruments, blue tops, etc., as necessary to construct subgrades accurately within the above tolerances.

STRIPPING

Areas of excavation, fills or embankments shall be stripped as required of organic matter such as peat, roots, sod, grass, crop residue, vegetative matter (decayed or otherwise) or other materials that cannot be compacted to specified density into a stable mass.

Stripping limits shall be subject to the Geotechnical Engineer and Owner's Representative's approval.

Contractor shall place no engineered fills until stripping has been approved by the Geotechnical Engineer.

Failure to notify the Geotechnical Engineer and Owner's Representative of unsuitable soil conditions or unsuitable material encountered during stripping or excavation shall result in the Contractor being fully responsible for all problems arising from such unsuitable soils or materials being covered over during filling or grading operations.

EXCAVATIONS

Excavate to lines and grades required by drawings and/or as staked in field. Sawcut and remove existing AC pavement and PCC as shown on the drawings or as required to complete the work.

Protect existing facilities from damage when excavating, including construction stakes and survey monuments.

Prior to starting excavations, the Contractor shall have appropriate equipment on site to produce a firm, smooth, undisturbed subgrade, true to grade. The bottom of excavations shall be smooth, free of loose materials or tooth grooves prior to placing the granular baserock material. Covering over or filling tooth grooves in the bottom of excavations with granular bedding material is prohibited, particularly where the subgrade consists of fine grained silt or clay material. If the equipment, means or methods provided by the Contractor do not provide excavation bottom conditions as specified, the Contractor shall stop excavation work until appropriate equipment or methods is available. Failure of the Contractor to pothole or otherwise determine soil conditions at the specified excavation depths in sufficient time to obtain appropriate equipment shall not be grounds for additional contract time.

All excavation cut slopes shall be finished smooth, uniform and compact. Excavate for driveways where required by drawings and/or as field determined.

Unauthorized over-excavation shall be backfilled at Contractor's expense in conformance with these specifications using compacted materials approved by the Owner's Representative.

Unless otherwise shown or specified in the Geotechnical Report excavation resulting from removal of existing foundations, stumps, boulders, rock or other structures shall be backfilled with clean earth or crushed granular material and compacted to ninety five percent (95%) of maximum dry density per AASHTO T-180. Burial of debris shall be prohibited unless otherwise shown or directed in writing by the Owner's Representative.

Excavated areas shall be graded to adjacent existing levels and left smooth, clean, free draining and free of debris as approved by the Owner's Representative.

Haul suitable excavated materials for direct placement in fill areas as designated on the drawings.

Excess and waste materials shall be hauled to off-site disposal arranged for by the Contractor.

Stockpile or windrow topsoil separately from subsoil, as required for placement for curb backfill, planter areas and covering ballfield and/or landscaping areas. Landscaping areas shall be backfilled with a minimum of 12-inches of topsoil and open areas covered with a minimum of 12-inches of topsoil unless otherwise specified in the landscaping specifications or shown on the drawings. See section 329100 – Soil Preparation for further requirements. Landscaping and open areas may need to be stripped of topsoil to salvage a sufficient quantity of topsoil for placement as specified. Protect and maintain stockpiles until topsoil is ready for placement. All landscaping and open area subgrade shall be prepped for topsoil placement as required.

ROCK EXCAVATION

The use of explosives shall be prohibited. Rock excavation shall be by rock hammer, rock saw or other non-explosive method.

After the Contractor has removed all material that does not meet the above definition of "rock excavation," he shall notify the Owner's Representative in writing and request an inspection to verify the extent of rock excavation required. The profiling of the exposed rock surface shall be done prior to commencement of rock removal activities. It shall be the responsibility of the Contractor to mark the rock in a 25 foot maximum grid pattern and provide a laser, rod and benchmark for use in measuring the rock profiles for determining quantities. The profiling of the exposed rock surface shall be done prior to commencement of rock removal activities.

Excavations below design subgrade in rock shall be backfilled to subgrade with approved granular material at the Contractor's expense and thoroughly compacted.

SUBGRADE PREPARATION

Except as required for proofrolls, loaded trucks and other heavy construction equipment shall not be operated on subgrades incapable of supporting the loads without deflection.

Except as otherwise allowed herein or by the drawing details or notes or Geotechnical Report, immediately following stripping and grading operations, compact subgrade to a minimum depth of 8-inches below finish subgrade elevation to 95% of the maximum dry density per AASHTO T-180 test method (Modified Proctor). Subgrade must be inspected and approved by the Owner's authorized representative before placing embankments, engineered fills or fine grading for base rock.

Where compaction of subgrade is required prior to placement of fills or baserock, subgrade that is wet of optimum shall be ripped and aerated as necessary to achieve optimum moisture content for compaction to specified densities. Where compaction of subgrade is required, subgrade that is dry of optimum shall be scarified and sprinkled with water as necessary to achieve optimum moisture content for compaction to specified densities.

Final subgrades shall be finished smooth and uniform to required lines and grades within job tolerances prior to proof rolling or baserock placement.

All design subgrades shall be proof-rolled prior to placement of baserock. Unless otherwise approved by the Geotechnical Engineer, proofrolls shall be conducted with a 10-yard dump truck fully loaded with granular baserock.

Where allowed by the drawing details, compaction testing of street or parking lot subgrades may be waived as outlined below.

Unless otherwise approved by the Geotechical Report or Geotechnical Engineer, if subgrade passes proof-roll but cannot be compacted to 95% optimum density per AASHTO T-180 (or the Contractor chooses not to test the compaction), separation geotextile fabric (as specified) shall be placed on the subgrade prior to placement of the baserock. If the Contractor elects to provide the geotextile separation fabric in lieu of compacting the subgrade, the fabric shall be provided at no additional cost to the Owner. If the Contractor elects to compact the subgrade rather than provide the separation fabric, the Contractor shall not be entitled to additional compensation or contract time in order to complete the specified compaction work.

Granular baserock shall be graded and compacted to the specified density at the finish rock grade.

The Contractor shall notify the Owner's Representative and Geotechnical Engineer immediately if soft and uncompactable native subgrade soils are encountered. Soil that is wet of optimum shall not be considered as un-compactible unless specifically approved in writing by the Geotechnical Engineer.

Native subgrade judged by the Geotechnical Engineer as soft and uncompactable shall be over-excavated to undisturbed soil and backfilled with baserock over reinforcement geotextile fabric as required to allow compaction of upper (design) baserock section and to maintain structural integrity of native subgrade soils, and as outlined below. These provisions shall apply whether the over-excavation consists of small isolated areas, large areas or the entire street, parking lot or pad.

Soft or spongy subgrade that exhibits deflection under proof rolling shall be over excavated and backfilled only as directed by the Geotechnical Engineer. It shall remain the Contractor's responsibility to notify the Owner's Representative immediately if such subgrade is encountered.

Over-excavation of the subgrade shall be accomplished using a large trackhoe with a smooth-edged bucket. Soils that are soft as evidenced by excessive tearing upon excavation by the trackhoe or which evidences excessive pumping under foot pressure may be considered too soft to support and compact the baserock, and additional over-excavation may be required. Excavation work shall not be conducted during nor subgrade left exposed to heavy rains. Typical minimum over-excavation required is 12-inches unless otherwise directed or approved by the Geotechnical Engineer.

Following over-excavation, geotextile reinforcement fabric as specified shall be placed on the subgrade prior to placement of the baserock.
No equipment shall be allowed to run directly on the over-excavated subgrade until the full baserock section is in place. Baserock shall be end dumped into the excavated subgrade in a manner to provide at least the full rock section to distribute truckloads and prevent damage to the subgrade. Granular baserock to be spread in lifts using a small dozer to the full rock section indicated prior to operating loaded trucks on the section.
Granular baserock shall be graded and compacted to the specified density at the finish rock grade.
Any soft spots identified by either compaction testing or which exhibit deflection under proof rolling shall be corrected and retested prior to paving or curb placement. By definition, “soft” spots are defined as any area(s) for which the required compaction specification cannot be met, or which deflect, pump or rut under loads.
Should inclement weather (i.e. significant rain) occur between the time the proof roll is performed and either curb placement or paving, another proof roll may be required prior to paving.

ENGINEERED FILLS AND EMBANKMENTS
Strip and prepare subgrade as specified prior to placing fill to depths required by drawings and required by the Geotechnical Report, or as directed by the Geotechnical Engineer.

Fills and embankment sections shall be constructed to lines and grades shown on the drawings within tolerances specified herein.
Unless otherwise shown on the Geotechnical Report, fills to be constructed in lifts, each lift not to exceed 6-inches in compacted thickness unless otherwise specified on the drawings or approved in writing by the Geotechnical Engineer. Each lift to be compacted to specified density prior to placement of succeeding lift.
Fill material from excavations and borrow areas shall be conditioned to proper moisture content before placing and compacting in fills or embankments.
Material shall not be placed in final position in fills or embankments until the moisture content is such that the required compaction can be achieved. Material that is frozen shall not be placed in fills.
Scarify and sprinkle dry lift surfaces where necessary to ensure bond with succeeding lift.
Fills on slopes steeper than 5H:1V shall be keyed and benched into the slope face. Keyways shall be at least 10 feet wide and embedded into competent soil or bedrock. The keying and benching shall meet the approval of the Geotechnical Engineer.
Place topsoil and dress up disturbed areas to the Owner’s Representative’s satisfaction. Topsoil areas shall be finished smooth, free draining, uniform and free from fragments and debris.

COMPACTION REQUIREMENTS
Unless otherwise required in the Geotechnical Report, compact earthwork to be at least the following densities, relative to the maximum dry density per AASHTO T-180 test method (Modified Proctor)

Subgrade	95%
Fill and embankment lifts	95%
Backfill of over excavation	95%
Curb backfill	85%
Under sidewalk	92%
Unimproved areas	82% min, 90% max

Each lift shall be tested and accepted prior to proceeding with the next lift. Materials not placed in accordance with these specifications shall be reconsolidated or removed and replaced, as the Owner’s Representative directs and at the expense of the Contractor.
Contractor shall coordinate with the independent laboratory, Geotechnical Engineer and the Owner’s Representative in the performance of in-place density tests.
In addition to moisture-density testing, each compacted layer may be proof rolled to check for deflection or reaction and to verify that no soft or pumping areas remain in any layer or foundation soil.

MAINTAIN LOCAL TRAFFIC
Excavate in manner to allow local traffic flow with a minimum of inconvenience during construction.
Provide ramps up to existing grades as required to maintain traffic and vehicular access to existing driveways impacted by the work.
Store materials and equipment to avoid interruption of traffic flow or parking.

CLEAN UP & NATIVE SURFACE RESTORATION

Contractor to clean up site of work of all litter and construction debris caused by him following each of his rough and fine grading operations.

Materials judged unsuitable for placement in any fill area to be removed from site by the Contractor.

Contractor shall replace trees, shrubbery, flowers, and ground cover in kind to match existing as approved by the Owner's Representative.

Reseeding & Mulching:

Contractor shall seed and mulch (hydroseed or uniformly by hand) all exposed slopes and disturbed areas which are not scheduled to be landscaped. Grass seed and mulch shall conform to the requirements of OSSC (ODOT/APWA) Section 01030 unless otherwise required in Section 32 91 00. , Seeding, except as modified herein. Mulch used in landscape or lawn areas shall be either hydromulch or well chopped fescue or rygrass mulch conforming with OSSC (ODOT/APWA) Section 010300.15, unless otherwise required in Section 32 91 00.

All areas to be seeded & mulched shall be made substantially clear and free of debris, weeds, briars, sticks, loose stones greater than 1-inch, and any other debris detrimental or toxic to the growth of grass.

The surface soil in all areas to be seeded shall be in a condition favorable for the germination and growth of grass seed. A minimum of 1/2-inch and maximum of 1-1/2 inches of surface soil shall be in a loose condition.

Soil preparation operations shall be directional along the contours of the areas involved.

Seed and mulch shall be applied at a time approved by the Owner's Representative when conditions are favorable for germination. Seeding during periods where natural moisture is insufficient to allow germination and growth may require thicker mulch layers and watering to ensure establishment of groundcover.

END OF SECTION

PART 1 - GENERAL

SCOPE

This section includes all trench excavation, backfill and related work for the construction of the designated pipelines and other incidental work, including but not limited to insertion and extraction pits, point repair pits, sag removal pits, service lateral exposure pits, sewer lateral replacement trenches or pits, or manhole pits.

Trench Excavation and Backfill Includes:

Work of making all necessary trench excavations for the construction of all contract work.
Furnishing, placing and use of sheeting, shoring and sheet piling necessary in excavating for and protecting the work and workmen.
Performing all pumping and fluming necessary to keep the trenches free from water.
Providing for uninterrupted flow of existing rivers, treatment plant processes, drains and sewers and the temporary disposal of water from other sources during the progress of the work.
Damming and cofferdamming where necessary. To be the Contractor's design.
Supporting and protecting all structures, pipes conduits, culverts, railroad tracks, posts, poles, wires, fences and buildings, as well as other public and private property adjacent to the work.
Removing and replacing existing sewers, culverts, pipelines and bulkheads where necessary.
Removing after completion of the work all sheeting and shoring not necessary to support the sides of excavations.
Removing all surplus excavated material.
Performing all backfilling, rough grading and compaction to the limits specified or ordered by the Owner's Representative.
Restoring all property damaged as a result of the work included under this section.
The Work includes obtaining and transporting suitable fill material from offsite when onsite material is not available.
The Work includes transporting surplus excavated material (not needed for backfill at the location where the excavation is made) to other parts of the work where fill or embankments are required, or to stockpile locations shown on the drawings or directed by the Owner, or disposal of all surplus material to offsite locations provided by the Contractor.

LABORATORY SERVICES

Unless otherwise specified or shown on the drawings, the Owner may provide laboratory services by an approved independent laboratory as described below and as noted on the drawings. The Contractor shall be responsible for providing all samples requested by the Owner or as required to complete the work.

Sieve Analysis (ASTM C136):

One test for each material source and type:
Selected backfill.
Granular backfill.
Backfill Compaction:
One moisture density curve (AASHTO T-180) for each size and type of material used for backfill. The maximum dry weight and optimum moisture content shall be indicated. The cost of all retests required due to any unauthorized change in backfill material shall be borne by the Contractor.
Test consolidated backfill material in trenches above pipes for conformance with specified "Compaction Requirements," contained herein:
Where tests indicate insufficient values, perform additional tests as required by the Owner. Testing shall continue until specified values have been attained by additional compaction effort. Retests shall be referenced to the corresponding failing test. The cost of all retests shall be borne by the Contractor.

SUBMITTALS

Submittals shall be in accordance with the requirements of these Contract Documents and shall include:
Backfill laboratory test results where required, including proctor values.
Documentation that granular baserock meets the requirements of OSSC (ODOT/APWA) 02630, Base Aggregate where applicable.
For the Owner's Representative's review - field compaction test results, CDF cylinder test results.
CDF mix design (if specified or required).

DEFINITIONS

Classification of Excavated Materials

Common Excavation (Unclassified) shall be defined, as all material not classified as rock excavation.

Rock Excavation shall be defined as follows:

> *Rock excavation shall consist only of that solid bedrock or ledge rock and boulders over two (2) cubic yards in volume which cannot be removed by a D8K (or approved equal) with four barrel hydraulics and dual rippers or 90,000 pound class Excavator (P.C. 400 Komatsu or 450 John Deere or approved equal) with single shank ripper on back of bucket, which shall not be more than thirty-six inches (36") in width, but which requires systematic drilling, blasting or the use of rock splitters pneumatic hammers and wedges. All D8K's and 90,000 pound class Excavators shall be in excellent operating condition and operated by personnel competent to operate like machinery*.

Removal of existing concrete and asphaltic surfaces does not qualify as rock excavation."

Trench Backfill Zones

Pipe Bedding - The area from 6-inches under the pipe to springline of the pipe for the width of the trench.

Pipe Zone - The area from the top of the pipe-bedding zone to 12-inches above the pipe for the width of the trench.

Backfill Zone - The area from 12-inches above the pipe to bottom line of surface restoration for the width of the trench.

Trench Classifications

Class I Trench - Class I trench shall have granular material in all three zones for backfill material. For use under paved roadways, gravel and paved driveways, sidewalks, foundation slabs, buildings and other improved areas, or as directed by the Owner's Representative.

Class III Trench - Class III trench shall have granular material in the pipe bedding and pipe zones and native excavated material in the backfill zone for backfill material. For use under unimproved areas or as directed by the Owner's Representative.

Improved Areas (also refer to Section 312000)

Improved areas are site areas that are to be covered with an improved surface, including but not limited to the following:

- Public or private streets and sidewalks
- Building crushed rock pads, floor slabs and/or foundations
- Vehicle parking or driveway areas
- Truck docks or truck turnarounds
- Emergency vehicle access drives or turn arounds
- Pedestrian pavement areas (gravel, AC or PCC)
- Utility support structures such as generator slabs, utility vaults and pump stations
- Playground equipment areas with permanent equipment
- Future improved areas when designated as such on the construction drawings
- Playground areas with pavement such as baseball courts, tether ball, 4-square etc.

Unimproved Area (also refer to Section 312000)

Site areas that are outside of the boundary of improved areas as defined herein. Examples of unimproved areas are as follows:

- Planter areas
- Landscaping and seeded lawn areas
- Open space areas
- Playfield areas
- Bioswales, detention pond or other storm water management areas
- Any unimproved area that is irrigated or non-irrigated

PART 2 - PRODUCTS

GRANULAR BACKFILL
Unless otherwise shown on the drawings, granular backfill shall consist 3/4"-0 dense graded aggregate meeting the requirements of OSSC (ODOT/APWA) 02630, Base Aggregate, subject to the following additional limitations.
Percent passing the #40 sieve shall not exceed 10%
Percent passing the #200 sieve shall not exceed 5%.

NATIVE EXCAVATED MATERIAL
Excavated material free of vegetable matter and debris.
Excavated material approved by the Owner's Representative for use as backfill in designated locations.
Individual particles less than one third (1/3) trench width in greater dimension but no more than 8-inches in diameter.

FOUNDATION STABILIZATION
Gravel or crushed aggregate or Owner's Representative approved clean, well-graded granular material.

PART 3 - EXECUTION

GENERAL
Where a conflict occurs between or within the specifications and drawings as to the type of trench excavation or backfill required, the more stringent or higher quality requirements shall apply (Owner's Representative shall decide which stipulation will provide the best installation).

CONTRACTOR RESPONSIBILITY TO OBTAIN ALL REQUIRED INSPECTIONS
The Contractor shall be responsible to ensure that all inspections and testing required by the drawings, contract documents or agencies having jurisdiction are completed or witnessed by authorized inspectors prior to proceeding with subsequent work that covers or that is dependent on the work to be inspected.
Work completed or covered without obtaining required inspections will be considered as unauthorized work as outlined below, and may be ordered removed at the Contractor's expense.
Failure to obtain necessary inspection(s) and approval(s) shall result in the Contractor being fully responsible for all problems and/or corrective measures arising from uninspected work.
When excess excavated material is disposed of at locations off the project site, the Contractor shall obtain all necessary permits and pay all fees for disposal of material.

UTILITY CONFLICTS
The Contractor shall be responsible for exposing potential utility conflicts far enough ahead of pipeline construction to make necessary adjustments in grade and alignment of the new work within the recommended limits of pipe and fitting deflection and/or the lines and grades stated in the Contract Documents. The Contractor shall field verify location and depth of all existing utilities where new facilities cross. All utility crossings marked or shown on the drawings shall be potholed as necessary prior to excavating or boring to allow the Contractor to prevent grade or alignment conflicts. Contractor shall employ hand tools or other non-invasive methods to determine the exact location and depth of the underground utilities at the designated locations, including both utilities marked in the field and those shown on the drawings.
The Contractor shall be responsible for informing the Owner's Representative of the need for a grade and/or alignment adjustment. Contractor shall be responsible for exposing potential utility conflicts far enough ahead of construction to make necessary grade or alignment modifications without delaying the work. If grade or alignment modification is necessary, Contractor shall notify the Design Engineer, and the Design Engineer or the Owner's Representative shall obtain approval from the regulating authority prior to construction. Where failure to expose potential utility conflicts in advance results in the necessity of removing and/or relocating newly laid pipe; this additional work shall be performed by the Contractor at no additional expense to the Owner.
In cases where the contractor's failure to pothole and verify the location, depth and size of existing utilities in advance of the work results in direct interference with the installation of the work, the contractor shall either remove and/or relocate newly laid pipe as required to resolve the conflict, or relocate the existing pipeline or other utility structure at no additional cost to the Owner. The Contractor will not be paid for time lost or delay due to such direct interference. Where it is the policy of any utility owner to perform

such work with his own forces, the Contractor shall cooperate to the fullest extent with such utility owners. All work shall be done in a manner to protect the public and the work.

PREPARATION

The site of an open cut excavation shall be first cleared of all obstructions preparatory to excavation. It shall be the contractor's responsibility to pothole existing utilities as required or specified to expose potential utility conflicts prior to cutting existing streets.

Wherever trenches are located within paved or hard surfaced areas, a saw wheel, Asphalt Zipper or other approved cutting/grinding devices shall be used prior to excavation. Initial width of pavement cuts shall not be less than the excavated trench width. Final width of pavement cuts shall not be less than 6-inches greater than actual width of the trench just below the pavement (additional sawcutting shall be completed prior to repaving as required to meet T-cut requirements per drawing details or local jurisdiction requirements). All cut or broken pavement shall be removed from site during excavation.

The Contractor shall maintain street and campus traffic (automobile and foot traffic) at all times and erect and maintain barricades, warning signs, traffic cones, and other safety devices during construction in accordance with Manual of Uniform Traffic Control Devices (MUTCD), Part VI, to protect the traveling public. Provide flagmen as required during active work in roadway areas.

Intent of specifications is that all streets, structures, and utilities be left in condition equal to or better than original condition. Where damage occurs and cannot be repaired or replaced, Contractor shall purchase and install new material, which is satisfactory to Owner. Plans and/or specifications cover and govern replacement and restoration of foreseeable damage.

The operations shall be confined to the work limits provided. Avoid encroachment on, or damage to, private property or existing utilities unless prior arrangements have been made with copy of said arrangement submitted to Owner's Representative.

Installation of franchise or private utilities (gas, power, phone, cable, data, communication, control, alarms, etc.) or associated conduits in a common trench with water, sanitary sewer or storm sewer is prohibited. Provide a minimum of 3 foot clear separation between water, sanitary sewer or storm sewer facilities and parallel franchise/private utilities or associated conduits.

TRENCH EXCAVATION

Excavation for trenches in which pipelines and sewers are to be installed shall provide adequate space for workmen to place and joint the pipe properly, but in every case the trench shall be kept to a minimum width. The width of trench at the top of the pipe shall not exceed the limits specified or as shown on the drawings without notification and concurrence in writing by the Owner's Representative. Use of trenches wider than the minimum width will not entitle the Contractor to additional compensation.

Excavation shall be to the depth necessary for placing of granular bedding material under the pipe as shown on the drawings, including proper allowance for pipe thickness. If overdigging occurs, the trench bottom shall be filled to grade with compacted granular bedding material.

Trench Bottom. Prior to starting trench excavation, the Contractor shall have appropriate equipment on site to produce a firm, smooth, undisturbed subgrade at the trench bottom, true to grade (ie. smooth end bucket or method to provide equivalent result). The bottom of the trench excavation shall be smooth, free of loose materials or tooth grooves for the entire width of the trench prior to placing the granular bedding material. Covering over or filling tooth grooves in the trench bottom with granular bedding material is prohibited, particularly where the trench subgrade consists of fine grained silt or clay material. If the equipment, means or methods provided by the Contractor do not provide trench bottom conditions as specified, the Contractor shall immediately stop trench excavation work until appropriate equipment or methods is available. Failure of the Contractor to pothole or otherwise determine soil conditions at the specified trench depths in sufficient time to obtain appropriate equipment shall not be grounds for additional contract time.

Unless otherwise permitted by the Owner's Representative, trenching operations shall not be performed beyond the distance that will be backfilled and compacted the same day. In general, backfilling shall begin as soon as the conduit is in approved condition to receive it and shall be carried to completion as rapidly as possible. New trenching shall not be started when earlier trenches need backfilling or the surfaces of streets or other areas need to be restored to a safe and proper condition.

Where trenching for piping is in the same alignment as existing piping, the trench depth and pipe embedment shall extend to a minimum of 6-inches below the new piping or 6-inches below the existing piping, whichever is deeper.

Where the excavation activities require the removal of portions of an abandoned pipeline, 3,300-psi concrete plugs shall be installed in the open ends of the pipe. Concrete plugs to be a minimum one and one-half (1½) times the diameter of the pipe.

PROTECTION

Test Pits:
The Contractor shall dig such exploratory test pits as may be necessary in advance of excavation to determine the exact location and elevation of subsurface structures, pipelines and conduits which are likely to be encountered and shall make acceptable provision for their protection, support, and maintenance in operation.

Sheeting, Shoring and Bracing:
The Contractor shall furnish and install adequate sheeting, shoring, and bracing to maintain safe working conditions, and to protect newly built work and all adjacent and neighboring structures from damage by settlement.

Bracing
Shall be arranged so as not to place a strain on portions of completed work until the construction has proceeded far enough to provide ample strength. Sheeting and bracing may be withdrawn and removed at the time of backfilling, but the Contractor shall be responsible for all damage to newly built work and adjacent and neighboring structures.
All sheeting, shoring and bracing shall be of Contractor's design and shall be in accordance with all Federal, State and Local codes and requirements.

Construction Sheeting Left in Place:
The Contractor shall furnish, install, and leave in place, construction sheeting and bracing when specified or when indicated or shown on the drawings.
Construction sheeting and bracing, placed by the Contractor to protect adjacent and neighboring structures, may be left in place if desired by the Contractor and approved by the Owner's Representative. All such sheeting and bracing left in place shall be included in the cost for excavation.

Removal of Water:
The Contractor shall at all times during construction provide and maintain ample means and devices with which to remove promptly and dispose of properly all water entering the excavations or other parts of the work and shall keep said excavations dry until the pipelines to be placed therein are completed. In water bearing sand, well points and/or sheeting shall be supplied, together with pumps and other appurtenances of ample capacity to keep the excavation dry as specified.
The Contractor shall dispose of water from the work in a suitable manner without damage to adjacent property or structures.
Contractor shall provide silt fences, straw bales, and/or sedimentation basins as required to clarify waters prior to discharge in accordance with Federal, State and Local requirements.

EXCAVATION OF UNSUITABLE MATERIALS
Unsuitable materials existing below the Contract bottom limits for excavation shall be removed as directed by the Owner's Representative. Unless otherwise authorized by the Owner's Representative, such excavation shall be conducted at a time when the Owner's Representative is present and shall not exceed the vertical and lateral limits as prescribed by the Owner's Representative. These provisions shall apply whether such over-excavation consists of multiple isolated segments or the entire trenchline.
Where soft subgrade is encountered in which satisfactory stability cannot be obtained by moisture control and compaction, the Contractor shall notify the Owner's Representative and the unstable material shall be excavated to the depth required by the Owner's Representative.
Backfill with foundation stabilization material compacted in layers not exceeding 12-inches depth to provide a stable foundation.

DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL
All excavated materials which are unsuitable for use in backfilling trenches or around structures, and materials excavated that are in excess of that required for backfilling and for constructing fills and embankments as shown on the drawings, shall be disposed of by the Contractor at own expense and at disposal sites provided by him as may be required.
Surplus excavated material shall be disposed of at designated spoil sites in a legal manner, in full compliance with applicable codes and ordinances.

ROCK EXCAVATION

The use of explosives shall be prohibited. Rock excavation shall be by rock hammer, rock saw or other non-explosive method.

After the Contractor has removed all material that does not meet the above definition of "rock excavation," he shall notify the Owner's Representative in writing and request an inspection to verify the extent of rock excavation required. The profiling of the exposed rock surface shall be done prior to commencement of rock removal activities. It shall be the responsibility of the Contractor to mark the rock at 25 foot maximum intervals and provide a laser, rod and benchmark for use in measuring the rock profiles for determining quantities.

Contractor to excavate and remove the overburden exposing the rock surface, allowing the Owner's Representative to profile the excavated trench for rock measurement. The profiling of the exposed rock surface shall be done prior to commencement of rock removal activities.

Where the bottom of the trench encounters ledge rock and/or boulders and large stones which meet the definition of "rock", as described herein, said rock shall be removed to provide 6-inches of clearance to each side and below all pipe and accessories.

Excavations below subgrade in rock shall be backfilled to subgrade with approved granular material at the Contractor's expense and thoroughly compacted.

REMOVAL OF PCC CURBS & SIDEWALKS

Where trench excavation requires removal of PCC curbs and/or sidewalks, the curbs and/or sidewalks shall be sawcut as required and removed at a tooled joint unless otherwise authorized by the Owner's Representative.

The intention of this requirement is to facilitate the replacement of curbs and sidewalks to the joint pattern of the existing and surrounding curbs and/or sidewalks. The sawcut lines for PCC sidewalk and curb cuts shown on the drawings are schematic and not intended to show the exact alignment of such cuts.

BACKFILL AND COMPACTION

Backfill Immediately:

All trenches and excavations shall be backfilled immediately after pipe is laid therein, unless otherwise directed by the Owner's Representative. Under no circumstances shall water be permitted to rise in unbackfilled trenches after pipe has been placed.

Backfilling With Excavated Material:

Where specified or directed, material excavated in connection with the work shall be used for backfilling, in accordance with the type of trench classification shown on the contract drawings. No material shall be used for backfilling that contains stones, rock or pieces of masonry greater than 8-inches, frozen earth, debris, and earth with an exceptionally high void content, organic material, or marl. Large pieces of rock or masonry shall not be deposited closer than 12-inches from the completed outside surface of any structure or pipe.

In no case shall backfill material deposited by machinery be allowed to fall directly on the pipe and in all cases the bucket shall be lowered so that the shock of the falling backfill material will not cause damage.

Pipe Bedding

Pipe bedding material shall be placed in the trench, compacted and shaped to provide continuous support for the pipe between joints or fittings.

Pipe shall be laid directly on the bedding materials. Holes shall be provided for all joints or fittings as required to permit assembly.

Backfill shall be placed in uniform layers on both sides of the pipe to springline. Each layer shall be placed, then carefully and uniformly tamped to the specified density to eliminate the possibility of lateral displacement of the pipe. Care shall be taken to ensure that the material under the haunches of the pipe is sufficiently compacted.

Pipe Zone

Pipe zone material shall be carefully placed around the pipe and thoroughly hand compacted in uniform layers to provide complete support of the pipe and to prevent deflection or damage.

The Contractor shall prevent the pipe from moving either horizontally or vertically during placement and compaction of pipe zone material.

Backfill Zone
After the backfill has been placed and compacted around the structures and conduits to a height of 12-inches over the top as specified above, the remainder of the trench may be backfilled by machine. The backfill material shall be deposited in horizontal layers not exceeding18-inches thick, and each layer shall be thoroughly compacted to the specified density by approved methods before the succeeding layer is placed.

Backfilling Under Existing Conduits
Where it is necessary to undercut or replace existing utility conduits and/or service lines, the excavation beneath such lines shall be backfilled the entire length with granular bedding material tamped in place in 6-inch layers to the required density. The granular bedding shall extend outward from the spring line of the conduit a distance of 2 feet on either side and thence downward at its natural slope.

Backfilling Under Pavement, Walks & Improved Areas
Where any pavement, driveway, parking lot, curb and gutter, walk or improved area is to be placed over a backfill area, granular material shall be used. The material shall be placed and compacted to the required density in accordance with the specification contained herein.

COMPACTION REQUIREMENTS
In Class I and III trench classification, compaction in the pipe zone shall be achieved by hand compaction in horizontal lifts or other approved method to ninety percent (90%) of the maximum dry density per AASHTO T-180 test method.

Class I trench classification:
Compaction in the backfill zone shall be achieved by mechanical compaction in horizontal lifts or other approved method to ninety-two percent (92%) of the maximum dry density per AASHTO T-180 test method.

In Class III trench classification:
Compaction in the backfill zone shall be achieved by ramming, vibration or a combination thereof to at least eighty-five percent (85%) of the maximum dry density per AASHTO T-180 test method.

COMPACTION TESTS
Before mandrel testing and/or TV inspection of sewers or storm lines, all trench compaction shall be completed and compaction tests submitted.
Trenches shall be backfilled and consolidated in layers, as specified, to the existing ground surface.
Compaction tests, when performed, shall be performed on each layer immediately after compaction.
The initial test series for each type of backfill material shall be continued until the method of consolidation employed has proven to attain the required compaction. Any change in the proven method of consolidation will not be permitted unless approved by the Owner. Tests shall be in locations and at depths acceptable to the Owner's Representative.
Unless specified on the drawing notes, subsequent tests or series of tests shall be in locations and at depths ordered by the Owner's Representative. The Contractor shall be responsible to perform adequate testing to ensure that settlement does not occur. Any settlement shall be repaired at the Contractor's expense.
The cost of all retests shall be borne by the Contractor.

SURFACE RESTORATION AND CLEAN UP
Surface restoration shall conform to these Contract Documents where applicable. Restore ground surfaces to original conditions and elevations unless otherwise specified or directed.
Maintenance of such surfaces shall be for a minimum of 12 months following acceptance of work, or the length of the warranty period, whichever is longer.
Clean up and remove all excess materials, construction materials, debris from construction, etc. Replace or repair any fences, mailboxes, signs, landscaping, or other facilities removed or damaged during construction. Replace all lawns, topsoil, shrubbery, flowers, etc., damaged or removed during construction. Contractor to be responsible for seeing that lawns, shrubs, etc. remains alive. Leave premises in condition equal to or better than original condition before construction.

END OF SECTION

PART 1 - GENERAL

SCOPE

This section includes all surface restoration and related work for the construction of the designated pipelines and other work as required for the completion of the project.

Surface restoration includes, but is not limited to, the following:

Restoration of all surfaces disturbed during construction including A.C. pavement, concrete, gravel, lawns, topsoil, trees, shrubbery, flowers, fences, mailboxes, signs, landscaping, etc.

Surfaces shall be restored in-kind unless otherwise shown on the drawings or directed by the Owner's Representative.

Maintenance of all surfaces until final surface restoration is completed. Temporary AC pavement cold patching or hot patching shall be required for all street crossings which are not permanently restored within seven (7) days of excavation.

Depth, type and compaction of materials shall be equal to original surfaces unless otherwise specified herein or shown on the drawings.

CLASSIFICATIONS

Class A: Paved street restoration for use on public streets, collectors and arterials, where shown on the drawings, or as directed by the Owner's Representative.

Class B: Paved street restoration for use on minor streets and paved driveways, where shown on the drawings, or as directed by the Owner's Representative.

Class C: Gravel shoulder restoration.

Class D: Graveled road or street restoration, including graveled driveways.

Class E: Unimproved or open areas.

Concrete Curbing, Walks and Driveways: Restoration of existing structures.

LABORATORY SERVICES

Unless otherwise specified or shown on the drawings, the /Owner may provide laboratory services by an approved independent laboratory as described below or as noted on the drawings. The Contractor shall be responsible for obtaining and providing all samples requested by the Owner or as required to complete the work.

Granular Material:

As specified in Section 31 23 16.13 Trench Excavation and Backfill.

AC Pavement Compaction:

Laboratory tests & field compaction tests as specified.

Unless otherwise specified or noted on the drawings, a compaction test shall be performed for every 20 tons of material placed, or a minimum of one test per lift for each 300 linear feet of trench, whichever is greater.

Retests shall be referenced to the corresponding failing test. The cost of all retests shall be borne by the Contractor.

SUBMITTALS

Submittals shall be in accordance with the requirements of these Contract Documents and shall include:

For approval - Manufacturer's or supplier's certificates for bituminous material.

For the Owner's Representative's review - laboratory test results & field compaction test results.

PART 2 - PRODUCTS

GRANULAR MATERIAL

Unless otherwise shown on the drawings (or approved in writing by the Owner's Representative and agency with jurisdiction), granular backfill shall consist 3/4"-0 dense graded aggregate meeting the requirements of OSSC (ODOT/APWA) 02630, Base Aggregate, subject to the following additional limitations.

- Percent passing the #40 sieve shall not exceed 10%
- Percent passing the #200 sieve shall not exceed 5%.

TOPSOIL

Native topsoil shall be used for topsoil replacement when possible.

Imported topsoil shall conform to requirements of OSSC (ODOT/APWA) Section 01040, Planting.
Depth of topsoil shall be determined by actual existing field conditions unless otherwise approved by the Owner's Representative.

A.C. PAVEMENT

A.C. pavement shall conform to the requirements of OSSC (ODOT/APWA) Section 00744, Minor Hot Mixed Asphalt Concrete Pavement, for 1/2" dense graded AC pavement, Level 2 Job Mix Formula.

TACK COAT

The tack coat material shall be CSS-1, or CSS1h, and shall meet the requirements of OSSC (ODOT/APWA) Section 00730, Emulsified Asphalt Tack Coat.

JOINT/CRACK SEAL FABRIC

Where specified or noted on the drawings or details, joint seal fabric shall be self-adhering, non-woven geotextile paving fabric product with rubberized mastic adhesive and pre-tacked (ie. asphalt tack coating on top to ensure strong bond with pavement), and specifically designed for paving.
Unless wider widths are specified on the drawings, all joint/crack seal fabric shall be provided in rolls with a minimum width of 18-inches.
Joint/crack seal fabric shall be PetroTac or Mirafi MTK self-adhesive paving fabric, or approved equal.

PORTLAND CEMENT CONCRETE

All concrete shall conform to the requirements of OSSC (ODOT/APWA) Section 00440, Commercial Grade Concrete, 3,300 psi.

GRASS SEED AND MULCH

Shall be in accordance with Division 32

PART 3 - EXECUTION

GENERAL

The intent of this specification is that cleanup activities and surface restoration work immediately follow the installation of pipe, construction of structures, etc. This is imperative so as to impact activities by the property owner, or other users, as little as possible.
Trench backfill and subgrade shall meet compaction requirements as set forth in the applicable sections contained herein prior to proceeding with surface restoration work.
Where a conflict occurs between or within the specifications and drawings as to the type of surface restoration required, the more stringent or higher quality requirements shall apply (Owner's Representative shall decide which stipulation will provide the best installation).
All workmanship for AC pavement surface restoration shall conform to the requirements of OSSC (ODOT/APWA) Section 00744 (Minor Hot Mixed Asphalt Concrete Pavement) for dense graded AC pavement mix or local jurisdiction requirements, whichever are more stringent.
The Contractor shall notify the Owner's Representative a minimum of 24 hours in advance of performing any A.C. pavement surface restoration work. No AC pavement surface restoration work shall be performed when weather conditions, in the Owner's Representatives opinion, are not suitable for placement of AC pavement. Extensions due to weather conditions shall not result in additional contractor cost.
All workmanship for PCC restoration shall conform to the requirements of OSSC (ODOT/APWA) Section 00440, Commercial Grade Concrete or local jurisdiction requirements, whichever are more stringent.
In areas designated for Class E surface restoration, topsoil shall be removed and stored at an approved location prior to excavation.

PROTECTION

No heavy construction vehicle shall operate on any pavement, curbing or walk until it is fully cured and/or unless fully protected from damage.

Asphalt Pavements:

Bituminous mixtures shall be placed only when the surface is dry and weather conditions are such that proper handling, finishing and compaction can be accomplished. In no case shall bituminous mixtures be placed when the surface temperature is below the minimum established below:

Course Thickness	Min. Surface Temperature
Less than 1½-inch	60°F1,2

1½-inch to 2½-inches..... 50°F1,2
Over 2½-inches..... 45°F1,2

1 - If placing HMAC between March 15 and September 30, surface temperature requirements may be lowered by 5°F if approved by the Owner's Representative.

2 – Use of field burners or other devices to heat existing pavement surfaces to the minimum temperatures is prohibited.

Traffic shall be prohibited on newly installed asphalt pavement until it has cooled sufficiently to avoid marking.

No heavy construction vehicle shall operate on any finished pavement surfaces without prior written approval from the Owner's Representative.

Concrete Curbing and Walks:

No concrete shall be mixed, transported, placed or finished when the temperature of the base, subgrade or air is below 40°F or whenever, in the opinion of the Owner's Representative, the temperature may fall below 40°F within twenty four (24) hours after the concrete has been placed.

The Contractor shall take such precautions as are necessary to protect newly placed concrete from rain.

The Contractor shall protect newly placed concrete from freezing for no less than seven (7) days.

AC TRENCH PATCH EDGE PREPARATION

The width of the pavement T-cut (ie. width that the sawcut pavement exceeds the width at the top of the excavated trench) shall be as indicated on the drawing details or per local jurisdiction requirements.

Where initial trench excavation sawcuts do not provide adequate width to meet T-cut requirements per drawing details or local jurisdiction requirements, additional sawcutting shall be completed as required after completion of trench excavation and backfill.

Where feasible, the Contractor may choose to grind and remove the existing AC using an Asphalt Zipper or similar technology, and then sawcut a clean edge prior to trench patching (in order to eliminate the need to sawcut twice where initial pavement removal widths do not meet the T-cut requirements shown on the drawing details).

The Owner's Representative shall inspect and approve AC pavement edges prior to paving. Damaged edges shall be identified for additional sawcutting.

Where AC pavement cuts are damaged during excavation, pipe installation or backfilling, they shall sawcut after backfilling to provide a clean surface against which to pave at no additional cost to the Owner.

CLASS A - AC SURFACE RESTORATION

Surface restoration shall conform to all standards and requirements of the governing agency.

Surface restoration shall conform to drawing details and specifications contained herein including "T" saw cutting, bench grind where specified, joint seal fabric where specified, tack coat and sand seal. Excess sand shall be removed from the surface after the sand seal has set up.

The wearing course shall match the existing pavement in line and grade but in no case shall the pavement thickness be less than four (4) inches placed in two (2) lifts.

Pavement surface shall be a smooth, well sealed, tight mat.

Compaction for asphalt concrete pavement (all lifts) shall be a minimum of ninety-one percent (91%) for standard duty mix as determined by the Rice Standard Method (AASHTO T-29). A roller pattern shall be established by the Contractor to achieve the required compaction at the beginning of the paving process. The roller pattern and compaction tests results from an independent testing lab retained by the /Owner may be used to verify compaction.

Where designated on the drawings, the edge of trench cuts shall be include a bench grind along the joint between the new AC and existing AC per drawing details (to avoid a full depth joint) prior to trench patching. As an alternate, the contractor may repave the trench full depth (as temporary surface restoration prior to grinding to avoid the long-term need for steel plates), and then bench grind both the new AC across the trench width and along the trench edge (into the existing AC) as shown on the drawing details, followed by an AC inlay that encompasses the trench width plus the bench grind into the existing AC.

CLASS B - AC SURFACE RESTORATION

Surface restoration shall conform to all standards and requirements of governing agency.

Surface restoration shall conform to drawing details and specifications contained herein including "T" sawcutting, tack coat and sand seal. Excess sand shall be removed from the surface after the sand seal has set up.

The wearing course shall match the existing pavement in line and grade, but in no case shall the pavement thickness be less than three (3) inches placed in two (2) lifts.
Pavement surface shall be a smooth, well sealed, tight mat.
Compaction for asphalt concrete pavement (all lifts) shall be a minimum of ninety-one percent (91%) for standard duty mix as determined by the Rice Standard Method (AASHTO T-29). A roller pattern shall be established by the Contractor to achieve the required compaction at the beginning of the paving process. The roller pattern and compaction tests results from an independent testing lab retained by the /Owner may be used to verify compaction.

CLASS C – GRANULAR SURFACE RESTORATION
Surface restoration shall conform to all standards and requirements of the governing agency.
Surface restoration shall conform to drawing details and specifications contained herein.
Where any portion of the trench excavation falls within the shoulder, the shoulder shall be restored & regarded to its full width (24 inches or original width, whichever is greater).
Gravel shoulders shall be compacted by mechanical means to ninety five percent (95%) of the maximum dry density per AASHTO T-180 unless otherwise directed by the Owner's Representative.

CLASS D – GRANULAR SURFACE RESTORATION
Surface restoration shall conform to all standards or requirements of the governing agency.
Surface restoration shall conform to drawing details and specifications contained herein.
The base and leveling course shall match the existing road surface in depth, line and grade, but in no case shall the finish rock surface be less than nine (9) inches in depth.
All Class D surface restoration shall be compacted by means of mechanical compaction to ninety five percent (95%) of the maximum dry density per AASHTO T-180.

CLASS E - NATIVE SURFACE RESTORATION
Surface restoration shall conform to all standards and requirements of the governing agency.
Surface restoration shall conform to drawing details and specifications contained herein, including placement of topsoil in the upper trench zones (6" minimum unless greater depths shown on drawings or details). If native topsoil is not stockpiled by the contractor, imported topsoil shall be provided by the Contractor at no additional expense to the Owner.
Compact by means of wheel loading unless otherwise directed by the Engineer.
Contractor shall replace trees, shrubbery, flowers, and ground cover in kind to match existing as approved by the Owner's Representative.

<u>Reseeding & Mulching:</u>
All areas to be seeded & mulched shall be made substantially clear and free of weeds, briars, and sticks, loose stones greater than 1-inch, and all other debris detrimental or toxic to the growth of grass.
he surface soil in all areas to be seeded shall be in a condition favorable for the germination and growth of grass seed. A minimum of 1/2-inch and maximum of 1-1/2 inches of surface soil shall be in a loose condition.
Soil preparation operations shall be directional along the contours of the areas involved.
Seed and mulch shall be applied at a time approved by the Owner's Representative when conditions are favorable for germination. Seeding during periods where natural moisture is insufficient to allow germination and growth may require thicker mulch layers and watering to ensure establishment of groundcover.
Where Class E surface restoration is placed over granular backfill, the depth of topsoil shall not be less than 8-inches, nor exceed 12 inches unless otherwise specified or shown on the drawings or details.

CONCRETE CURBING, WALKS AND DRIVEWAYS
All soil subgrade under driveways, curbs, curb and gutter and walks shall be compacted in accordance with the requirements of the applicable sections contained herein.
All curbs, sidewalks and driveways shall conform to the lines, grades and thickness' of existing structures, but in no case shall the thickness be less than sixteen (16) inches for Type "C" curbs, four (4) inches for sidewalks, and six (6) inches for driveways and driveway aprons.
A minimum 2-inches of 3/4"-0" granular baserock leveling course shall be provided under all curbs, sidewalks and driveways.
Unless otherwise authorized by the Owner's Representative, sidewalks and/or curbs shall be constructed to match the joint pattern of the existing and surrounding sidewalks and/or curbs.
<u>Restoration of Private Property</u>

This project includes the reconstruction of the private portions of certain sanitary sewer service laterals. This work will include entering onto private property. The Contractor shall restore the private property to equal or better than the preexisting condition.
The Contractor shall furnish the Owner, before final acceptance of the Work by the Owner, a written release from all private property owners, or proper authority citing for the owner of the property affected, stating that the restoration of structures and surfaces has been satisfactorily accomplished. If in the opinion of the Owner the release is arbitrarily withheld, the Owner may at its sole discretion, accept the portion of the Work involved and cause final payment therefore to be made. Otherwise, final payment to the Contractor will not be made until all certifications are provided to the Owner.

Final cleanup

Cleanup of construction area shall closely follow trench backfill activities.

END OF SECTION

PART 1 - GENERAL

SCOPE

It shall be the responsibility of the Contractor to prevent pollution of air, water and soil resulting from his operations.

The Contractor shall perform work required to prevent soil from eroding or otherwise entering onto all paved areas and into natural watercourses, ditches, and public sewer systems and to prevent dust attributable to his operations from entering the atmosphere. This work shall be in accordance with Federal, State and Local codes.

Water containing suspended material from any part of the Contractor's operations shall be clarified before discharging to drains or streams.

Contractor shall procure and conform to all Federal, State and local permit requirements, including but not limited to DEQ 1200-C permit requirements.

The Owner will obtain the DEQ 1200-C permit. The Contractor shall transfer the DEQ 1200-C permit from the Owner's name to his name prior to issuance of the Notice to Proceed. Issuance of the Notice to Proceed prior to completion of this transfer shall not relieve the Contractor of the responsibility of immediately completing any required transfer applications and paying any required fees.

Noise pollution shall be minimized through the use of proper mufflers on all construction equipment.

The Contractor shall seed and mulch all disturbed areas or areas damaged by his operations.

PART 2 - PRODUCTS

GENERAL

Dust palliatives (additives) shall conform to OSSC (ODOT/APWA) Section 00340, Watering.

Other erosion control structures and products as shown on the drawings.

MULCHING MATERIAL

When used, hydromulch shall be applied with grass seed at a rate of 2000 lbs. per acre between April 30 and June 10 or between September 1 and October 1, unless otherwise specified on the drawings or by erosion control permits.

On slopes steeper than 10 percent, hydroseed and mulch shall be applied with a bonding agent (tackifier). Application rate and methodology to be in accordance with seed supplier recommendations.

When used in lieu of hydromulch (in areas other than landscape or lawn areas), dry, loose, weed free fescue or rygrass straw used as mulch shall be applied at a rate of 4000 lbs. per acre (double the hydromulch application requirement). Anchor straw by working in by hand or with equipment (rollers, cleat trackers, etc.). Mulch shall be spread uniformly immediately following seeding.

Mulch used in landscape or lawn areas shall be either hydromulch or chopped fescue or rygrass straw mulch conforming with OSSC (ODOT/APWA) Section 010300.15.

SLOPE PROTECTION MATTING

Slope protection matting shall conform with OSSC (ODOT/APWA) 00280, Erosion & Sediment Control.

For slopes 2H:1V or steeper, the erosion matting shall be a type that has a extended term functional longevity (ie. minimum 24 months degradability) and specifically designed for use of 2:1 or steeper slopes to ensure that the steep slopes are protected until they have adequate vegetation cover established before the matting biodegrades away. For slopes 2H:1V or steeper, matting shall be SC150 matting by North American Green, or approved equal.

PART 3 - EXECUTION

STREETS, SIDEWALKS AND DRIVEWAYS

Streets, haul roads and (if directed by the Owner's Representative) detours and bypass roads shall be swept by automatic self-contained sweepers as required to keep them free of dirt or debris.

Excessive dirt on pavements shall be removed by means of hand shoveling or appropriate mechanical equipment and the area swept as directed above.

Sidewalks and driveways shall be cleaned by means of shovels and handbrooms or appropriate mechanical equipment.

Dust on unsurfaced streets or parking areas and any remaining dust on surfaced streets shall be controlled with an approved dust palliative as directed by the Owner's Representative.

The Contractor shall comply with the above requirements on a daily basis. If the Contractor fails to perform the above work in a satisfactory manner, the Owner's Representative may stop all work, except cleanup operations, until the Contractor has satisfactorily complied with the above requirement.

WATER DISCHARGED TO DRAINS OR STREAMS

The Contractor shall construct and maintain filters, sedimentation traps, or stilling basins with overflows to clarify waters containing suspended materials from fill areas, excavations, deep wells, well points and disposal sites before discharging to drains or streams.

END OF SECTION

PART 1 - GENERAL

SCOPE

This section includes furnishing all material, equipment; labor and supervision required installing aggregate baserock as specified or as shown on the drawings, including streets, driveways, parking areas, building pads, granular backfill (except trenches) around structures, etc. The term 'granular base' as used herein and on the drawings refers to aggregate base rock.

All preparatory work and incidental work required to properly complete the work shall also be included under this section.

LABORATORY SERVICES

Unless otherwise specified or shown on the drawings, the / Owner may provide laboratory services by an approved independent laboratory as described below and as noted on the drawings. The Contractor shall be responsible for providing all samples requested by the Owner or as required to complete the work.

Laboratory tests shall be performed to demonstrate that granular baserock meets the requirements of OSSC (ODOT/APWA) 02630, Base Aggregate where applicable.

The sample shall meet limits established in OSSC (ODOT/APWA) 02630, Base Aggregate. If the sample fails to meet set limits, a new source shall be found. The Owner's Representative shall approve each source of material(s).

Compaction:

One moisture density curve (AASHTO T-180) for each size and type of material used. The maximum dry weight and optimum moisture content shall be indicated. The cost of all retests required due to any unauthorized change in backfill material shall be borne by the Contractor.

Test consolidated fill material for conformance with specified "Compaction Requirements," contained herein: Where tests indicate insufficient values, perform additional tests as required by the Owner. Testing shall continue until specified values have been attained by additional compaction effort.

Retests shall be referenced to the corresponding failing test. The cost of all retests shall be borne by the Contractor.

SUBMITTALS

Submittals shall be in accordance with the requirements of these Contract Documents and shall include:

Backfill laboratory test results where required, including proctor values.

Documentation that granular baserock meets the requirements of OSSC (ODOT/APWA) 02630, Base Aggregate.

For the record - weight tickets for all material delivered (where payment is by weight).

PART 2 - PRODUCTS

BASE AND LEVELING ROCK

Base rock and leveling rock shall be dense graded aggregate in conformance with the requirements of OSSC (ODOT/APWA) Section 2630, Base Aggregate, subject to the following additional limitations.

Percent passing the #40 sieve shall not exceed 10%

Percent passing the #200 sieve shall not exceed 5%.

Gradation shall be as indicated on the drawings. Where not specified on the drawings, gradation shall be as follows:

Base Rock: 1-1/2"-0

Leveling Rock: 3/4"-0

Alternate single size 1"-0 aggregate as approved by the Owner's Representative.

PART 3 - EXECUTION

GENERAL

The subgrade shall be checked for grade and compaction and accepted by the Owner's Representative prior to placement of aggregate baserock.

Aggregate baserock shall be placed over approved subgrade in accordance with OSSC (ODOT/APWA) Section 00641, Aggregate Subbase, Base and Shoulders, except that plant mixing of aggregate and water shall not be required.

Existing graveled driveways shall be re-rocked and restored to match existing surface(s) where disturbed by construction. Finish with 3/4-inch minus aggregate baserock a minimum of 6-inches deep.

Existing aggregate baserock, when specified on the plans to remain in place, shall be scarified to a minimum depth of 6-inches, moisture conditioned, graded and compacted as specified herein prior to placement of additional aggregate baserock or HMAC pavement.

COMPACTION

The maximum compacted thickness of each lift of aggregate baserock shall be 6-inches.
The Owner may have tests performed to determine the maximum dry density and optimum moisture content of the aggregate baserock.
All aggregate baserock shall be compacted to 95 percent (95%) of the maximum dry density per AASHTO T-180.
All structures shall be protected from damage when placing and compacting aggregate baserock and backfill.
Contractor shall sprinkle the aggregate baserock with water as necessary to achieve the required compaction.

TOLERANCES

Aggregate base courses shall be finished accurately to lines and grades shown on the drawings and within the tolerances specified.
The maximum tolerance on finished rock grade is ½-inch on a 16-foot straightedge with no birdbaths.
All rims shall be adjusted to final grade after leveling rock course is placed and compacted.

ACCEPTANCE

Final acceptance of the material will be from samples taken on the finished grade in the compacted state.

END OF SECTION

PART 1 - GENERAL

SCOPE

This section includes the construction of asphalt concrete (AC) pavements as shown on the drawings, specified herein or directed by the Owner's Representative.
This section includes the construction of one or more courses of AC pavement, adjustment of manhole castings, catch basins, junction and valve boxes, etc. to conform to new pavement courses, and other work and materials incidental to the construction of pavements.
This section includes cutting and preparation of joints where new paving will meet existing paving.
This section includes repaving disturbed asphalt concrete driveways to equal the original condition and blend-in to match drop curbs.

LABORATORY SERVICES

Unless otherwise specified or shown on the drawings, Owner may provide laboratory services by an approved independent laboratory as described below or as noted on the drawings. The Contractor shall be responsible for obtaining & providing all samples requested by the Owner or as required to complete the work.
A compaction test shall be performed for every 50 tons of material placed, or a minimum of one test per lift for each 100 linear feet of street, whichever is greater.
The laboratory shall provide a satisfactory certificate furnished by the manufacturer stating that the bituminous materials conform to OSSC (ODOT/APWA) 00744, Minor Hot Mixed Asphalt Concrete (HMAC) Pavements.

Asphalt Concrete:

Plant Certification The laboratory shall certify or furnish recent certification (within one year) from the ODOT that the plant meets State requirements.
Plant Inspection For the first day of production and for every day when more than 200 tons of material is being delivered to the project, the laboratory shall provide a representative at the plant who will inspect the plant, make mix design adjustments, check the temperature and take the required samples.
Quality Control Testing Each day the laboratory representative is on the project, a sample of the mix shall be taken for each 400 tons of bituminous material or fraction thereof delivered to the project. An extraction test AASHTO T16470 and a mechanical analysis AASHTO T-3070 shall be performed on the mix samples.

SUBMITTALS

Submittals shall be in accordance with the requirements of these Contract Documents and shall include:
For approval - Manufacturer's or supplier's certificates for bituminous material.
For the Owner's Representative's review - laboratory test results & field compaction test results.

PART 2 - PRODUCTS

TACK COAT

The tack coat material shall be CSS-1, or CSS1h, and shall meet the requirements of OSSC (ODOT/APWA) Section 00730, Emulsified Asphalt Tack Coat.
Hot oil tack coat shall be used prior to placement of the overlay fabric for AC overlays. Use of emulsion tack coats shall be prohibited.

JOINT SEAL

The joint seal shall meet the test requirements of ASTM D-244.
The joint seal material shall be CRS-1, CRS-2 or approved equal and shall meet the requirements of OSSC (ODOT/APWA) Section 00730, Emulsified Asphalt Tack Coat, for cationic emulsified rapid setting asphalt.

BITUMINOUS MATERIAL AND ASPHALT CONCRETE

Bituminous Material: The asphalt cement shall be PG 64-22 and shall meet the requirements of OSSC (ODOT/APWA) 00744.11, Asphalt Cement & Additives.
Design Mix:
pavement shall meet the requirements of OSSC (ODOT/APWA) 00744, Minor Hot Mixed Asphalt Concrete (HMAC) Pavements, 3/4" dense graded mix (base course) or 1/2" dense graded mix (leveling or

wearing course) as summarized below. Where noted on the drawings, Class B pavement refers to the 3/4" dense graded mix, and Class C refers to 1/2" dense graded mix.
Unless otherwise specified or shown on the drawings, AC pavement for private streets and parking lots shall be Level 2 Job Mix Formula (JMF).

OVERLAY FABRIC
Unless heavier fabric is specified or noted on the drawings, overlay fabric shall be non-woven fabric specifically designed for paving.
Overlay fabric shall be Propex Petromat 4598, Mirafi MPV500 or approved equal.

PART 3 - EXECUTION

GENERAL
All soil subgrade and crushed rock base under pavements and driveways shall be compacted in accordance with the requirements of these Contract Documents.
All valve and service boxes, manholes, inlets, clean outs, junction boxes and other structures shall be adjusted or reconstructed to the finish grades in both new and resurfaced pavement areas.
It shall be the Contractor's responsibility to notify all residents a minimum of two (2) business days prior to paving a street section and to assure that vehicles are removed from street areas prior to paving operations.

PROTECTION
Asphalt Pavements:
Bituminous mixtures shall be placed only when the surface is dry and weather conditions are such that proper handling, finishing and compaction can be accomplished. In no case shall bituminous mixtures be placed when the surface temperature is below the minimum established below:

Course Thickness	Min. Surface Temperature
Less than 1½-inch	60°F1,2
1½-inch to 2½-inches	50°F1,2
Over 2½-inches	45°F1,2

1 - If placing HMAC between March 15 and September 30, surface temperature requirements may be lowered by 5°F if approved by the Owner's Representative.
2 – Use of field burners or other devices to heat existing pavement surfaces to the minimum temperatures is prohibited.

Traffic shall be prohibited on newly installed asphalt pavement until it has cooled sufficiently to avoid marking.
No heavy construction vehicle shall operate on any finished pavement surfaces.

SITE PREPARATION
Unless otherwise specified or directed by the Owner's Representative, edges of existing pavements shall be saw cut in a neat manner wherever new pavement will join existing pavement.
Private utility companies shall be advised of Contractor's construction schedule so their surface appurtenances can be adjusted by them to finished grade prior to commencement of paving operations.
Tack coat material shall be liberally applied to all joints with existing pavement, manhole frames, catch basins, curbs, etc.
Existing aggregate baserock, when specified on the plans to remain in place, shall be scarified to a minimum depth of 6-inches, moisture conditioned, graded and compacted as specified herein prior to placement of additional aggregate HMAC pavement.

PAVEMENT INSTALLATION
All construction shall be in conformance with applicable portions of OSSC (ODOT/APWA) 00744, Minor Hot Mixed Asphalt Concrete (HMAC) Pavements, except as modified herein.
First course shall be placed to the compacted thickness shown on the drawings within two (2) hours of applying tack coat.
Wearing course shall be placed to the compacted thickness shown on the drawings within two (2) hours of completing the placing and compacting the first course. If the wearing course is not placed within the time frame specified, a hot oil tack coat shall be applied prior to placement of the wearing course.
In the event that full width paving is not completed in one work day, the Contractor shall place signs warning the motorists of abrupt edges. Takeoffs and ends of pavement panels unable to be completed

shall be temporarily ramped at the rate of one (1) inch rise per six (6) horizontal feet at the end of the workday and signing placed warning the traffic.

LINES AND GRADES

Lines and grades shall conform accurately to lines and grades shown on the drawings and as staked in the field. Tolerance on grade shall be 3/8-inch on a 16-foot straightedge at any point.

Surface Tolerance:

The top surface of the finished pavement shall be uniform in texture, smooth and conform to the specified crown and grade. The top surface of the asphalt concrete pavement shall not vary more than 0.02 feet (¼-inch) when tested by a 12-foot straightedge. Job control testing shall be performed with a 12-foot straightedge furnished and operated by the Contractor. The Owner's Representative or his authorized representative may observe this testing or require additional testing to be performed under this supervision. Any surface irregularities exceeding the above tolerances shall be corrected by the Contractor at no additional cost to the Owner.

Finish pavement grades at transition to existing pavement shall match existing pavement grades or be feathered past joints with existing pavement as required to provide a smooth, free draining surface.

FINISH AND COMPACTION

Pavement surface shall be a smooth, well sealed, tight mat.

Contractor shall protect new pavement against traffic as required herein.

Compaction for asphalt concrete pavement shall be a minimum of ninety-one percent (91%) at all locations for standard duty mix as determined by the Rice Standard Method (AASHTO T-29). A roller pattern shall be established by the Contractor to achieve the required compaction at the beginning of the paving process. The roller pattern and compaction tests results from an independent testing lab retained by the Owner may be used to verify compaction.

PAVEMENT OVERLAY

Overlay fabric shall be as specified. Fabric shall be installed per manufacturer specifications.

Existing Pavement Preparation & Cleaning.

Prior to placing the pre- leveling course or fabric, the existing pavement shall be thoroughly cleaned of all loose material, dust, sand, dirt, gravel. All vegetation, leaves and other objectionable material shall be completely removed to the satisfaction of the Owner's Representative. Any standard cleaning method is acceptable. However, the following restrictions shall apply.

Means shall be provided to prevent loose aggregate, sand, vegetation or other materials entering catch basins or other drainage structures.

Cracks shall be allowed to dry thoroughly before application of the crack seal or fine AC mix.

Cracks greater the 1/4-inch wide and less than 3/4-inch wide shall be thoroughly cleaned using compressed air to blow out any loose material. A pick, steel wire brush or router shall be used to remove any foreign material that cannot be removed by blowing. After cleaning the cracks, they shall be filled with a hot-poured crack sealant from the current ODOT Approved Qualified Products List.

Cracks greater than 3/4-inch wide shall be thoroughly cleaned by removing all foreign material from the crack within the full depth of the asphalt concrete. The cleaned crack should be tack coated and filled with fine aggregate hot mix asphalt concrete prior to or in conjunction with the pre-leveling course.

Potholes shall be cleaned out to remove dirt or loose material, and to provide as clean of an edge as feasible for pothole patching and pre-leveling, to the satisfaction of the Owner's Representative.

The Contractor shall also remove any raised traffic buttons.

Tack Coat Installation.

After installation of any crack seal, pothole filling and pre-leveling course, the contractor shall install a hot oil tack coat and overlay fabric as specified.

The tack coat shall be installed immediately prior to installation of the overlay fabric. Any traffic not essential to the installation of the overlay fabric shall be kept off the tack coat.

Care shall be taken when applying the tack coat to prevent the spray from adhering to any objects other than the surface to be paved. The Contractor will be responsible for removing tack coat from objects other than the pavement surface.

The contractor shall apply tack coat only to those streets which will be covered with overlay fabric and paved that day.

Overlay Fabric Installation.
The overlay fabric shall be placed on the tack coat using mechanical or manual laydown equipment capable of providing a smooth installation with a minimum of wrinkling or folding.
Slit all wrinkles or folds exceeding 1 inch, and lay flat. Fabric seams shall be shingle lapped not more than 6-inches in the direction of paving. Additional hand-placed tack coat material may be required at laps as necessary to ensure wetting of the overlay fabric.
Limit traffic to the extent possible prior to and during paving. Turn paver machines and other vehicles gradually to avoid overlay fabric movement and damage.
The Contractor shall rake the takeoff and end of each overlaid section (and at driveways) to achieve a ramp that has a rise between 0.25 inches and 2.5 inches in 25 lineal feet. The Contractor shall also rake a feathered taper at curb-lines to feathered thicknesses as noted on drawings. The feathered edges shall be raked such that only the fines in the asphalt material are left in place. The feathered edges shall be finished such that the water will drain without leaving pockets of standing water.
Pavement shall be blended to meet catch basin inlets, existing pavements, etc. The A.C. pavement thickness shall be tapered to match existing catch basin grate elevations. The length of feathered taper shall be six (6) feet and the minimum asphalt thickness shall be 0.25-inch.

ASPHALT CONCRETE PAVEMENT DRIVEWAYS
Disturbed asphalt concrete driveways shall be reconstructed as specified to existing or better conditions, using materials specified for AC pavements.
Existing asphalt concrete driveways shall be reconstructed as specified or shown on the Drawings, using materials specified for AC pavements.

SAND SEAL
Tack coat and sand seal shall be installed at all pavement joints, and as required to completely seal any sawcuts which extend beyond the limits of pavement removal. Excess sand shall be removed from the surface after the sand seal has set up.

END OF SECTION

PART 1 - GENERAL

SCOPE

This section includes the construction of concrete sidewalks and curbs as shown on the drawings, specified herein or directed by the Owner's Representative.

This section includes the construction of driveway aprons, handicap access ramps, extruded curbs, drop curbs, curb weep holes and drain pipes where required or directed and other work and materials incidental to the construction of curbing and walks.

Pedestrian street crossings, including curb ramps, blended transitions, and certain median and refuge islands, are required to have detectable warnings for persons with vision impairments. These surfaces feature a distinctive pattern of raised truncated domes to provide a tactile cue detectable by can or underfoot at the boundary between pedestrian and vehicular routes.

This section includes the protection of all concrete and curbs from damage.

SUBMITTALS

Submittals shall be in accordance with the requirements of these Contract Documents and shall include the following:

Concrete mix design and representative cylinder break test results.

Manufacturer's or supplier's certificates stating that the following conform to the specifications contained herein.

- Concrete
- Joint Sealer
- Preformed Filler
- Curing Materials
- Air Entraining Agents

PART 2 - PRODUCTS

GENERAL

Baserock shall conform to the requirements of OSSC (ODOT/APWA) 02630, Base Aggregate, for 3/4"-0 dense graded aggregate.

Other materials required for placing concrete shall be as follows:

Preformed Filler

Fiber Filler ASTM D1751

Sponge Filler ASTM D1752, Type I

Curing Materials

Burlap Cloth AASHTO M-182, Class 2.

Sheet Materials ASTM C171

Plastic sheeting shall be visqueen with a minimum thickness of 5 mils.

CONCRETE (CAST-IN-PLACE)

All concrete used shall conform to the requirements of OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 3300 psi, with Type 1 or Type 1-D clear curing compound.

TRAFFIC DELINEATOR POSTS

Unless otherwise specified or shown on the drawings, traffic delineator posts mounted on sidewalks, traffic islands or pedestrian islands shall be as follows.

3" diameter impact resistant polypropylene posts.

8" diameter rubber base and rubber stem connecting to post (base mounted to surface with mastic pad).

36" height, bright yellow with a minimum of two (2) 4-inch wide reflective bands around the post top

Delineator posts to be SDR3 (Super Duck) by Carsonite Composites, or approved equal.

DETECTABLE WARNING SURFACES

Detectable Warning Surfaces shall conform to the following physical requirements.

Tactile Panels.

The detectable warning surfaces shall be constructed with precast, high strength concrete, integrally colored, 24-inch square tactile panels, CASTinTACT by Masco, or approved equal.

Dome Pattern

Tactile panels shall have a surface of truncated domes aligned in a square grid pattern.

Dome Size.
Truncated domes in a detectable warning surface shall have a base diameter of 0.9 inches minimum to 1.4 inches maximum, a top diameter of 50 percent of the base diameter minimum to 65 percent of the base diameter maximum, and a height of 0.2 inches.

Dome Spacing.
Truncated domes in a detectable warning surface shall have a center-to-center spacing of 2.0 inches minimum and 2.4 inches maximum, measured between the most adjacent domes on square grid.

Color Contrast.
Detectable warning surfaces shall contrast visually with adjacent walking surfaces. The color of surfacing shall be dark red (Salem Red) and shall be integral to the material. Painting of the surface is not allowed.

PART 3 - EXECUTION

VERIFICATION OF NEW CURB GRADES ALONG EXISTING STREETS
Where new curbs (or curb & gutter) are installed along existing streets, the Contractor shall be responsible to verify that the curb/gutter grades match the existing edge of pavement (or sawcut edges as applicable), based on the design street cross slopes shown on the drawings and the specified curb exposure. Any discrepancies shall be reported to the Owner's Representative prior to installation of curb forms or final setting of stringline, and the curb grades adjusted as required to conform with direction from the Owner's Representative prior to concrete placement. Any such adjustment required shall be at no additional cost to the Owner.
If the Contractor fails to verify grades as specified herein, curbs which are placed too high or too low shall be removed and replaced at no additional cost to the Owner, and such failure shall not entitle the Contractor to additional contract time.

GRADE VERIFICATION WHERE NEW SIDEWALKS CONNECTING TO EXISTING
Where new ADA or pedestrian access ramps or sidewalks are installed in locations where they connect to existing sidewalks, the Contractor shall be responsible to verify that the new sidewalks limits shown on the drawings allow for installation of new sidewalks to ADA standards. Any discrepancies shall be reported to the Owner's Representative prior to sawcutting or installation of new sidewalk forms, and the new sidewalk limits adjusted as required to conform with direction from the Owner's Representative prior to concrete placement. Any such adjustment required shall be at no additional cost to the Owner.
If the Contractor fails to verify grades as specified herein, sidewalks which are installed too steep shall be removed and replaced at no additional cost to the Owner, and such failure shall not entitle the Contractor to additional contract time.

GENERAL
All soil subgrade under driveways, curbs, curb and gutter and walks shall be compacted in accordance with the requirements of these Contract Documents.
Unless greater depths are shown on the drawings or details, a minimum two (2)-inch granular baserock leveling course shall be provided under all curbs, walks and driveways.
All curbs, sidewalks, driveways and handicap ramps shall conform to the lines, grades and details shown on the drawings or modified in the field by the Owner's Representative. The top and face of structures shall be true and straight, free from humps sags or other irregularities. The surface shall not vary more than 0.02 feet from the edge of 12-foot long straightedge laid on the top or face of the structure, except in curves. Contractor shall furnish the straightedge and operate it as directed. Unless otherwise shown or directed, all edges shall be tooled to 1/4-inch radius.
Unless otherwise specified, shown or directed, construction of all curbs, sidewalks, driveways, stairs, etc., shall conform to the requirements of OSSC (ODOT/APWA) Section 00759, Miscellaneous Portland Cement Concrete Structures, including placement, curing and finishing.
Concrete surfaces shall be finished smooth and uniform in texture by troweling, floating and cross brooming. Groove or mark surfaces into squares or other shapes as shown or directed.

Curb Forms.
Curb forms, if any, shall be removed from structures after the concrete has taken its initial set and while the concrete is still green. Plastering on exposed surfaces is prohibited.

Sidewalk ramps shall conform to details of applicable standard details. In situations where a sidewalk ramp is being retrofitted to an existing curb, the curb forms shall be set by the Contractor to provide drainage away from sidewalk ramps. For ramps in areas where gutter grade is less than or equal to 2 percent in either direction, construction curb stakes shall be placed at the beginning, end, and quarter points of the curb return. For sidewalk ramps in areas where gutter grade is greater than 2 percent, construction curb stakes shall be place as needed to comply with plan details.
Approval of forms does not relieve Contractor from the responsibility of settings forms per plan requirements.
Heavy construction vehicles shall not operate on any new pavement, curbing, or sidewalks. Contractor shall keep the concrete structures free from contact, strain and public traffic for at least seven (7) calendar days or as directed by the Owner's Representative.
No concrete shall be mixed, transported, placed, or finished when the temperature of the base, subgrade, or air is below 40°F or whenever, in the opinion of the Owner's Representative, the temperature may fall below 40°F within 24 hours after the concrete has been placed. The Contractor shall protect newly placed concrete from freezing for no less than seven (7) days.
The Contractor shall take such precautions as are necessary to protect newly placed concrete from rain.

CURB or CURB & GUTTER

Curbs not installed with a curb machine shall be formed on both faces with steel or wood forms. Hand shaping of curbs without the use of forms is not acceptable.
Drop curbs shall be installed per the drawing details and as required for driveway and new handicapped access ramps. Contractor shall cooperate with the Owner's Representative in locating and constructing curb depressions for handicapped ramps and driveways.
Contraction joints shall be placed at approximately 15-foot intervals. Contraction joints shall be tooled to separate the aggregate through at least 75% of the curb or curb & gutter. Cracking between contraction joints shall not be acceptable, and shall be removed and replaced as directed by the Owner's Representative at no additional cost to the Owner. Curbs shall be blocked out as required for catch basins.
Where new curbing connects to existing curbing or is installed along existing streets or pavement, the gutter grade shall match the existing street grades so as to allow drainage from the street to the gutter and through any transitions. The Contractor shall notify the Owner's Representative in writing of any grade discrepancies or problems prior to curb placement.
Curbing shall be installed to grades shown on the drawings and so that water drains along the curbline. Any ponding or puddling of water along the curbline will not be acceptable.
The Contractor shall notify the Owner's Representative or Owner and allow them the option of inspecting curb forms or string line prior to concrete placement. It shall remain the Contractor's responsibility to verify that curbs match both design elevations and existing grades prior to curb placement. Inspection by the Owner or the Owner's Representative does not relieve the contractor of his responsibility to construct the curbs in accordance with the approved construction drawings and the tolerances outlined above.
Curbs shall be stamped with an 'S', 'D' or a 'W' at the point where each sanitary sewer, storm drain or water service lateral crosses the curb, respectively. Letters shall be a minimum of 2-inches high.

SIDEWALKS AND DRIVEWAY APRONS

All sidewalks and handicapped access ramps shall be a minimum of four (4)-inches thick. Unless thicker sections are noted or shown on the drawings, all driveway aprons and driveways shall be a minimum of six (6)-inches thick.
Unless otherwise specifically shown on the drawings, public sidewalks or private sidewalks adjacent to a private street or driveway or parking area shall be sloped up 3/16-inch per foot (1.5%) from top of curb to drain over the same. Three (3)-inch diameter smooth wall PVC or ABS drainpipe shall be installed under sidewalks at all curb weep holes, including on both sides of all driveway drops. Contractor shall construct a tooled joint over drain piping. Contractor shall extend the weephole drain pipe beyond the back of sidewalk as required to connect to existing drain pipes, where such drain pipes are within the right-of-way or discharge within 10 feet of the right-of-way.
Expansion joints shall be constructed using ½-inch thick preformed filler at all fixed structures or buildings, and at a maximum spacing of forty-five (45) feet.
Contractor shall lay out and construct contraction joints in all sidewalk and driveway surfaces in squares or orthogonal shapes with a length to width ratio not to exceed 1.25:1. In no case shall concrete joint spacing exceed 15 feet. Additional joint lines shall be provided as necessary at all building corners, bench supports, seat wall corners, roof columns, raised planter corners, retaining wall corners, etc.
Contraction joints shall be tooled to separate the aggregate through at least 75% through the thickness of

the sidewalk or gutter to control cracking to contraction joint locations. Cracking between contraction joints shall not be acceptable, and shall be removed and replaced as directed by the Owner's Representative at no additional cost to the Owner.

Private sidewalks shall conform to the following.

Direction of sidewalk cross slope shall conform with to the slopes shown on the grading plan.

Longitudinal slope shall not exceed 1:20 (5%) without approval from the Owner's Representative (ADA rules require handrails on slopes greater than 5%, except at ADA ramps).

Sidewalk cross slope shall not exceed 1:67 (1.5%), and sidewalks shall have a minimum slope of 1.0% to drain.

The Contractor shall notify the Owner's Representative or Owner and allow them the option of inspecting sidewalk forms prior to concrete placement. It shall remain the contractor's responsibility to verify that sidewalks match both design widths and grades prior to placement. Inspection by the Owner or the Owner's Representative does not relieve the contractor of his responsibility to construct the sidewalks in accordance with the approved construction drawings and the tolerances outlined above.

Place topsoil backfill adjacent to new curb and dress back disturbed area.

DETECTABLE WARNING SURFACE

Detectable warning surfaces shall extend 24 inches minimum in the direction of travel and the width of the curb ramp, landing, or blended transition. The detectable warning surface shall be located so that the edge nearest to the curb line is 6 inches minimum and 8 inches maximum from the curb line.

The panels shall be wet-set in the fresh concrete during the initial placing of the ramp. Clean the surface of the panels immediately following installation to remove any excess concrete from the colored surfaces.

FLOOD TESTING PEDESTRIAN RAMPS & CURBS

Pedestrian Ramps.

Contractor shall be required to conduct a flood test of all pedestrian ramps after concrete is cured to demonstrate that the ramp does not hold water, either in the gutter pan (for Type A curb & gutter) or along the curb face (for Type C full depth curb).

Test Procedure.

A quantity of water, adequate to allow complete wetting and/or flow in the area to be tested (as determined by the Inspector), shall be poured into the pedestrian ramp area or along the curbline.

The Inspector shall check the ramp and/or curbline 10-15 minutes later to determine if water is ponding in the ramp area or the along the curbline/gutter area.

If water ponds in the pedestrian ramp area or along the curbline/gutter area, and the pond is more than 1-foot in length or ¼-inch in depth or greater the Contractor shall be required to make repairs in an approved manner at no cost to the Owner.

CURB & SIDEWALK BACKFILL & SEEDING

Backfill behind curbs or sidewalks (and material for dressing up disturbed areas behind curbs or sidewalks) shall be approved native organic topsoil free of rocks, roots, debris or other debris. Topsoil backfill and grading are the responsibility of the Contractor.

Contractor shall replace trees, shrubbery, flowers, and ground cover in kind to match existing as approved by the Owner's Representative.

Reseeding & Mulching: Contractor shall seed and mulch (hydroseed or uniformly by hand) all exposed slopes and disturbed areas which are not scheduled to be landscaped. Grass seed and mulch shall conform to the requirements of OSSC (ODOT/APWA) Section 01030, Seeding, except as modified herein. Mulch used in landscape or lawn areas shall be either hydromulch or well chopped fescue or ryegrass mulch conforming with OSSC (ODOT/APWA) Section 010300.15.

All areas to be seeded & mulched shall be made substantially clear and free of debris, weeds, briars, sticks, loose stones greater than 1-inch, and any other debris detrimental or toxic to the growth of grass.

The surface soil in all areas to be seeded shall be in a condition favorable for the germination and growth of grass seed. A minimum of 1/2-inch and maximum of 1-1/2 inches of surface soil shall be in a loose condition.

Soil preparation operations shall be directional along the contours of the areas involved.

Seed and mulch shall be applied at a time approved by the Owner's Representative when conditions are favorable for germination. Seeding during periods where natural moisture is insufficient to allow germination and growth may require thicker mulch layers and watering to ensure establishment of groundcover.

END OF SECTION

PART 1 - GENERAL

SCOPE

This section includes pavement marking, including but not limited to parking stalls, handicapped spaces, cross walks, stop bars and curb markings.

This section includes painted striping and/or roadway durable striping in conformance with OSSC (ODOT/APWA) Section 00860 (Longitudinal Pavement Marking – Paint) and Section 00865 (Longitudinal Pavement Marking – Durable), as applicable.

This section includes work necessary to maintain access for vehicular and pedestrian traffic as required for other construction activities, including the use of flagmen, barricades, warning signs and warning lights as required.

RELATED SECTIONS

Section 32 16 00- Concrete Curbs and Sidewalks

Section 32 12 16 - Asphalt Paving

SUBMITTALS

Submittals shall be in accordance with the requirements of these Contract Documents and shall include:

Manufacturers literature & certifications.

Copy of complete manufacturer's application instructions.

Evidence that product is on ODOT's Qualified Products List (QPL).

Evidence that the contractor or subcontractor who will install the pavement markings is certified by the marking materials manufacturer for the specified marking material and method, per OSSC (ODOT/APWA) 00850.31.

After installation, manufacturer's warranty for durable pavement markings shall be submitted per OSSC (ODOT/APWA) 00865.75 (ie. three years for thermoplastic markings and four years for all other durable markings).

PART 2 - PRODUCTS

MATERIALS

Paint shall be a non-bleeding, quick drying, alkyd petroleum base paint suitable for traffic bearing surfaces and shall meet FS TTP-85E and mixed in accordance with manufacturer's instructions before application.

Durable pavement marking products shall be as specified or noted on the drawings, conforming with OSSC (ODOT/APWA) Section 00865, suitable for traffic bearing surfaces and applied in accordance with manufacturer's instructions.

Roadway marking products shall conform to OSSC (ODOT/APWA) Section 00850 (Common Provisions for Pavement Markings) and be on the ODOT Qualified Products List (QPL).

PART 3 - EXECUTION

PREPARATION

Prepare pavement per OSSC (ODOT/APWA) Section 00850 (Common Provisions for Pavement Markings).

Where striping is to be installed within an ODOT right-of-way, Contractor shall schedule a Pre-Striping Conference with ODOT (and the Owner) and attend with the striping subcontractor, and provide all information as required per OSSC (ODOT/APWA) 00850.42.

Contractor shall sweep and clean all surfaces to completely eliminate loose material and dust, prior installation of new pavement markings.

PAVEMENT MARKING REMOVAL

Remove any existing pavement markings noted on the drawings, or which will adversely affect the bond of new pavement markings. Except as otherwise noted herein, existing markings shall be removed per OSSC (ODOT/APWA) 00851 on the same day that permanent markings are applied.

Pavement markings to be removed shall be obliterated until blemishes caused by the pavement marking removal conform to the coloration of the adjacent pavement. Pavement marking removal method shall be such that the pavement surface is not damaged below a maximum depth of 1/16-inch.

Only hydroblasting equipment will be allowed for final removal of pavement markings.

Grinding equipment may be used only to remove durable or profile markings to a point just above the pavement surface, and then hydroblast equipment shall be used for final marking removal.
At the Contractor's option, sandblasting, steel shot blasting or hydroblasting shall be used for removing pavement markings (paint and/or durable/profile markings).

PAINT APPLICATION

Contractor shall apply two (2) coats of paint at manufacturer's recommended rate without the addition of thinner, with a maximum application rate of 125 square feet per gallon.
Apply with mechanical equipment to produce uniform straight edges. At sidewalk curbs and crosswalks, a straightedge shall be used to ensure a uniform, clean and straight stripe.
The following items shall be painted with the colors noted below:

Pedestrian crosswalks	White
Exterior sidewalk curbs and guard posts/bollards	Yellow
Fire lanes.....	Red or per local code
Lane striping	White
Handicap symbols.....	Per local or state code
Parking stall striping.....	White, or per local code

DURABLE MARKING APPLICATION

Durable pavement markings shall be installed in strict conformance with the provisions of OSSC (ODOT/APWA) 00865, based on the marking material specified or noted on the drawings.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Chain link fencing and gates of zinc coated steel including hardware and gate operators.

QUALITY ASSURANCE
Manufacturer: Company specializing in commercial quality chain link fencing and accessories.

REFERENCES
Zinc coating of products fabricated from rolled, pressed, and forged steel shapes, plates, bars, and strips: ASTM A 123.
Installation of chain link fence: ASTM F 567
Hot-dipped zinc coated welded and seamless pipe: ASTM A 428.

PRODUCT DATA
Submit product data and manufacturer's installation instructions in accordance with Section 01 33 00.

DELIVERY, STORAGE, AND HANDLING
Protect against damage.
Store products above ground.

COORDINATION
Coordinate with other trades affecting and affected by work of this section.

PART 2 - PRODUCTS

MANUFACTURERS
Allied, Anchor Fence, US Steel, or accepted substitute.

MATERIALS
Framework: Galvanized steel pipe conforming to ASTM A 120, schedule 40, one piece, without joints.
Fabric: Galvanized steel wire fabric conforming to Fed. Spec. RR-F-191, type I.

CONCRETE MIX
As specified in Section 03 30 00.

COMPONENTS
Line Posts:
1.90 inch diameter steel pipe.
Corner and Terminal Posts:
2.88 inches diameter steel pipe.
Gate Posts:
3.50 inches diameter steel pipe.
Top Rail and Brace:
1.66 inch diameter steel pipe, plain end, sleeve coupled.
Horizontal Slide Gate:
ASTM F1184, Type I, welded construction, minimum 1.900 inch OD pipe members, spaced maximum 8 feet apart horizontally and vertically.
Welded joints protected with zinc-rich paint in accordance with ASTM A780.
Positive locking latch, 5/16 inch thick x 1-3/4 inch pressed steel, galvanized after fabrication.
Fabric to match fencing.
Overhead beam/structure, track, rollers and accessories designed to support load of gate panel including wind load and possible icing, galvanized or corrosion-resistant coated.
Gate posts: ASTM F1043, Group IA, ASTM F1083 Schedule 40 pipe, 3 inch OD.
Electrically operated gates and accessories: ASTM F2200 and UL 325.
Fabric:
2 inch diamond mesh steel wire, interwoven, 9 gauge, top selvage twisted tight, bottom end selvage knuckle end closed.
Caps:

Galvanized cast steel, sized to post dimension, set screw retained.
Fittings:
Galvanized steel sleeves, bands, clips, rail ends, tension bars, fasteners and fittings.
Tension Wire:
Single strand galvanized steel, 6 gauge.
Gate Hardware:
Galvanized steel roller guide assemblies, one-piece track and top rail, solid rubber tire double steel wheel carrier, electric gate operator integrated with access control, subsurface vehicle detection loop at interior side, other hardware necessary for complete installation.

SITE OBSCURING SLATS
None

PART 3 - EXECUTION

EXAMINATION
Verify that surfaces prepared by other trades are accurately graded, compacted, and otherwise properly prepared.
Prior to starting work, notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

PREPARATION
If field measurements differ slightly from Drawing dimensions modify work as required for accurate fit.
If measurements differ substantially notify Architect prior to starting work.

INSTALLATION
General:
Fence height as shown on Drawings.
Posts:
Space line posts at intervals not exceeding 10 feet, equally spaced over length of fence segment.
Set posts plumb in concrete footings with top of footings level with finish grade. Slope top for water runoff.
Provide top rail through line post tops and splice with 7 inch long rail sleeves.
Brace each gate and corner post back to adjacent line post with horizontal center brace and bottom brace rails.
Fabric:
Stretch fabric between terminal posts or at intervals of 100 feet maximum.
Position bottom of fabric 1 inch maximum above finish grade.
Fasten fabric to top rail, line posts, braces, and bottom tension wire with wire ties spaced at maximum 15 inches on center.
Attach fabric to end, corner and gate posts with tension bars and tension bar clips.
Accessories:
Install bottom tension wire stretched taut between terminal posts.
Gate:
Install gate with fabric to match fence.

PRODUCT CLEANING AND REPAIRING
Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section. Remove debris from project site upon work completion or sooner, if directed.

PROTECTION
Monuments:
Carefully maintain bench marks, monuments, and other reference points.
If disturbed or destroyed, replace as directed.
Other Work:
Protect other work against damage and discoloration caused by work of this section.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES
Equipment and installation procedures for lawn and landscaping irrigation systems.

QUALITY ASSURANCE
General:
Each type of material, equipment or model of similar items shall be the product of a single manufacturer.
Acceptable Manufacturers:
Toro, Rain Bird, Hunter.
Requirements of Regulatory Agencies:
Underwriter's Laboratories, Inc. (UL); National Sanitation Foundation (NSF).
Reference Standards:
American Society for Testing and Materials (ASTM); Federal Specifications (FS); American National Standards Institute (ANSI).

SUBMITTALS
Provide in accordance with Section 01 33 00.
Product Data:
Show general product operation, operating range, pressure ratings, details of construction, joining methods, and other pertinent information.
Reports:
Furnish reports of water pressure readings at points of connection before proceeding with work.
Manufacturer's Instructions:
Submit written operating instruction including winterization procedures and a schedule indicating length of time each valve is to remain open.
Submit maintenance instruction on all equipment.
Include in Owner's maintenance manual. Conform to requirements of Section 01 78 23.
Contractor's Record Drawings:
At completion or work, furnish one set of Contractor's Record Drawings on which all significant changes and deviations from design requirements made during performance of work have been recorded to show actual conditions.
Conform to requirements of Section 01 78 39.

PRODUCT DELIVERY, STORAGE AND HANDLING
Protect system components during loading, transporting and unloading to prevent damage.
Store materials together in a location and manner to prevent deterioration or damage.

GUARANTEE
Guarantee entire system against defective material and workmanship for one year following date of acceptance. Make repairs within 5 days of notification.

JOB CONDITIONS
To obtain complete coverage of irrigation system and facilitate proper drainage of system, adjustments may be required from indicated locations of pipe lines, valves and sprinkler heads.

COORDINATION
Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

PIPING MATERIALS
Steel Pipe:
ASTM A 120, zinc coated, threaded, Schedule 40, 125 psi.

Conduit:
Rigid, mild steel, zinc coated: ANSI C80.1 and FS WW-C-581, UL labeled.
Water Pipe:
Plastic Pipe: PVC ASTM D 2441, Class 200.

Plastic Pipe Fittings: ASTM D 2466, Schedule 40.
Flexible Risers: ABS shank, full braid rayon cord reinforcement, connected to threaded polyethylene or PVC plastic fittings with solvent, stainless steel bands or both. Same size as sprinkler or valve connection.

SPRINKLER HEADS

General:
Brass or bronze, of type, size gallonage and coverage indicated.
Provide with adjustable coverage feature.

Sprinkler Heads, Shrubbery:
Adjustable coverage designed for permanent above ground mounting on riser.

Sprinkler Heads, Rotary Pop-Up:
Brass or cast iron housing with aluminum or brass covers and rubber cap.

Sprinkler Heads, Pop-Up:
Brass or bronze only, with adjustable coverage and hi-pop housings.

VALVES

Quick Coupling Valves:
Two-piece, heavy brass construction with vinyl or rubber covered locking top.

Electric Control Valve:
24 volt, globe type, automatic, brass valves; diaphragm type with flow adjustment stem and manually operated exhaust petcock, normally closed, designed for direct burial.

Gate Valves:
Bronze body, wheel handles, Class 125.

Gate Valves:
Screwed, bronze body, wheel-handled, 150 psi rated with non-rising stem.

Drain Valves, Automatic:
Brass Body, ball check type, designed to open automatically when water pressure is turned off.

ELECTRICAL EQUIPMENT

Controller:
Electric, automatic irrigation controller for operating control valves, same manufacturer as valves. Provide each station with 0-60 minute time adjustment. UL approved, with wall-mount, weatherproof housing and lockable cover.

Valve Wire:
Copper, Type UF, UL approved for direct underground burial, AWG Size #14.

Wire Connectors:
Waterproof PVC socket and plug or sealing packs for PVC insulated copper wire designed for underground burial.

ACCESSORIES

Pipe Compounds, Cements, Cleaners, Primers:
Proper type for materials involved, conforming to recognized standards, acceptable to state plumbing code requirements.

Sleeves:
6" PVC pipe conforming to ASTM D 3034, Type PSM, unless otherwise noted on Drawings.

Vacuum Breaker:
Type, size and manufacturer as shown on drawings.

Valve Enclosures:
Round, plastic pipe to enclose electric valves with 6" black or green fitted cover.

Valve Boxes:
Round plastic valve boxes with fitted covers.

Sump Gravel:
1/2" to 3/4" clean, washed, round gravel.

Drain Valve Cover Caps:
Locking metal hinged cover with body capable of solvent welding to 2" PVC pipe.

PART 3 - EXECUTION

EXAMINATION
Verify that site grading has been completed.
Prior to staring work, notify General Contractor of defects requiring correction.
Do not start work until conditions are satisfactory.

EXCAVATION
Excavate 4 inch wide trench to depth of pipe grade.
Backfill and hand tamp over-excavation prior to installing pipe.
Keep trenches free of obstructions and debris which may damage pipe.

INSTALLATION
Cap or otherwise protect open ended pipes, valves and risers after fabrication until additional connections are made or sprinkler heads installed.
Use steel pipe under paved areas, where not encased in sleeves, risers, exposed pipes and pumped or forced pipe.
Use plastic pipe on discharge side of remote control valves, main and live line piping and sleeves.
Provide all main and live line piping and all piping under areas to be paved, with minimum 24 inches cover. All other piping, minimum 18 inches cover.
Provide minimum 3 inches per 100 feet pitch in direction of drain valves.
Provide minimum 4 inches horizontal clearance between parallel pipes and minimum 4 inches vertical clearance between crossing pipes.

PIPING INSTALLATION
Threaded Steel Pipe:
Ream pipe to be threaded and thread in accordance with ANSI B2.1.
Install with pipe compound applied to male end only.
Plastic Pipe:
Solvent cement joints with socket fittings in accordance with ASTM D 2855.
Conduit:
Bend with conduit bender only.
Rigidly support and fasten at nominal 6 foot intervals and within 18 inches of each outlet, wall, fitting and panel.

VALVE INSTALLATION
Gate Valves:
Encase in valve box with cover at grade.
Fit box with additional pipe sleeve extended down to valve body.
Drain Valves, Manual:
Install in 2 inches plastic pipe extending from grade to valve body.
Fit with lock cap and anchor wire. Install 1 cu. yd. gravel sump under valves.
Drain Valves, Automatic:
Encase valves in 12 inches length of pipe and install horizontally with 1 cu. ft. gravel sump under valve; minimum 2 per section.
Quick Coupling Valves:
Install on galvanized pipe risers as indicated with brick under riser.
Set at finished grade and 15 inches from walks, curbs or edges.
Control Valve, Automatic:
Install plumb to within 1/6" in valve box with cover at grade.
Add additional pipe to sleeve extending down to valve body.

SPRINKLER HEAD INSTALLATION
General:
Install plumb to within 1/16".
Apply 1 coat of exterior flat black paint to exposed portion of riser protruding above finished grade.
Do not paint sprinkler heads.
Shrub Area Heads:
Install 12 inches from walks, curbs, lawn edges or cover crop edges and at proper height above finish

grade for surrounding shrub masses.
Lawn Area Heads:
Allow 6" clearance along walks, curbs and shrub planting edges.

CONTROL WIRING INSTALLATION
Bury wires beside pipe in same trench.
Bundle multiple wires and tape together at not over 10 foot intervals.
Provide 10" loop in wire at each valve where controls are connected and 10" loop in wires at not more than 100' intervals.
Make all electrical splices waterproof.
Encase wires passing under paving, or where not buried under pipe, in conduit or sleeve 24" deep.

BACKFILLING
Do not backfill over connection until system has been tested and found acceptable.
Center load pipe between connections before testing.
Backfill with earth fill and compact by water method. Fill trench to within 6 inches of finish grade. Fill top 6 inches with topsoil and wheel roll until compaction of backfill is same as surrounding soil and finish grade is uniform through trench and adjacent grade.

AUTOMATIC CONTROLLER INSTALLATION
Install in accordance with manufacturer's recommendations and as indicated. Neatly mount in compact arrangement.
Connect to valves, pump and power supply.

TESTING AND FLUSHING
Testing:
Notify Architect 24 hours prior to testing. Conduct test in Architect's presence.
Flushing:
After all piping and risers are in place and connected, but prior to installation of sprinkler heads, thoroughly flush piping system under a full head of water for a minimum of 3 minutes through furthermost riser.
After flushing, cap all risers.
Pressure Tests:
Hydrostatically test main, live line piping system in place prior to backfilling. Maintain minimum 100 psi test pressure without pumping for minimum period of 4 hours.
Test is acceptable if no leakage or pressure loss is evident during test period. Detect and repair all leaks.
Retest system until test pressure can be maintained for 4 hours.
Operation Test:
At conclusion of acceptable pressure test, install sprinkler heads and test entire system for operation under normal operating pressure. Test is acceptable if system operates in a satisfactory manner with uniform coverage of areas to be sprinkled.

*****RESTORATION
After installation has been completed, return area to its original condition.
Properly replant all plant material removed during installation.
Replace all permanent features disturbed by installation.

ADJUSTING
General:
Following planting of lawns and shrub areas, adjust heads for optimum coverage without excessive overthrow on walks, roads or buildings. Check and set riser heights.
After lawns are established and prior to first mowing, inspect and set all lawn heads flush with finished grade.
Set all valve enclosures flush with finished grade.
Repair any settling, of trenches occurring during warranty period and restore damaged planting, paving and other property at no additional cost to Owner.
Extra Stock:
At completion of Project, furnish directly to Owner two each of the following:
Valve keys for operating all manual valves wrenches for each type head covering.

Keys for opening quick-coupling valves.
Hose swivels.
Quick couplers.

PRODUCT CLEANING AND REPAIRING

Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by Work of this Section. Remove debris from project site upon work completion or sooner, if directed.

PROTECTION

Monuments:

Carefully maintain bench marks, monuments, and other reference points.
If disturbed or destroyed, replace as directed.

Existing Utilities:

Existing utilities shown on Drawings are located according to best available information, but accuracy is not guaranteed. Contractor shall determine exact location of any of these lines that could be damaged by Contract Work.
Contractor shall assume that other, unknown utility lines do exist, and shall proceed with caution when working in areas that could conceal unknown utilities.
Protect active pipes encountered; notify person owning same.
If utility lines are damaged, remove, repair or replace lines as directed. Additional compensation and/or extensions of time, if any, caused by removing, repairing, or replacing lines will be determined in accordance with the General Conditions.
Remove inactive or abandoned utility lines. Plug or cap at least 3 feet outside building lines.

Street Cleaning:

Maintain public streets and walkways clean at all times.

Dust Control:

Protect persons and property against damage and discomfort caused by dust; water as necessary and when directed.

Existing Trees:

Protect against damage. See Section 01 56 39.

Other Work:

Protect other work against damage and discoloration caused by work of this section.

Work of this Section:

Protect against displacement and intrusion by foreign matter.

END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

Materials and equipment required for installation and preparation of topsoil for planting, and installation and maintenance of lawn, trees, shrubs and ground cover.

QUALITY ASSURANCE

Qualifications for Subcontractor for Landscape Work: Single firm specializing in landscape work.

SUBMITTALS

Submit in accordance with Section 01 33 00.

General:

Submit copies of delivery invoices, labels or other acceptable proof of quantities of mulch, fertilizer, compost and topsoil to Architect.

Submit dealer guarantee statements of analysis for Oregon Certified Bluetag lawn seed, 99% weed free.

Certificates:

Submit certificate of inspection of plant material by State or Federal authorities to Architect.

Samples:

Submit sample of mulch for approval.

SOURCE QUALITY CONTROL

General:

Ship landscape materials with certificates of inspection required by governing authorities.

Comply with regulations applicable to landscape materials.

Substitutions not permitted. If specified landscape material not obtainable, submit proof of non-availability to Landscape Architect together with proposal for use of equivalent material.

Analysis and Standards:

Package standard products with manufacturer's certified analysis.

For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists wherever applicable.

Trees, Shrubs and Ground Cover:

Botanical and Common Name Variety: Conform to American Joint Committee on Horticultural Nomenclature, "Standardized Plant Names, 1942"; plants not listed therein shall conform to the name accepted by the majority of the trade.

Provide trees, shrubs and ground cover of quantity, size, genus, species and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1, "American Standard for Nursery Stock".

Provide healthy, vigorous stock, grown in recognized nursery in accordance with good horticultural practice and free of disease, insects, eggs, larvae, and defects such as knots, sun-scald, injuries, abrasions or disfigurement.

Label at least one tree and one shrub of each variety with a securely attached waterproof tag bearing legible designation of botanical and common name.

Where formal arrangements or consecutive order of trees or shrubs are shown, select stock for uniform height and spread and label with number to assure symmetry in planting.

Inspection:

Inspect plant materials for injury, insect infestation and improper pruning. Begin no planting until deficiencies are corrected or plants replaced.

Architect may inspect trees and shrubs either at place of growth or at site before planting, for compliance with requirements for genus, species, variety, size and quality.

Architect retains right to further inspect trees and shrubs for size and condition of balls and root systems, insects, injuries and latent defects and to reject unsatisfactory of defective material at any time during progress of work. Remove rejected trees or shrubs immediately from project site.

DELIVERY, STORAGE AND HANDLING

Deliver fertilizer to site in original unopened containers bearing manufacturer's guaranteed chemical analysis, name, trade name and trademark. Protect plants during delivery to prevent damage to root ball or desiccation of leaves.

If deciduous trees or shrubs are moved in full-leaf, spray with antidesiccant at nursery before moving.
Notify Architect of delivery schedule in advance so plant materials may be inspected upon arrival at project site.
Remove unacceptable plant material immediately from project site.
Deliver seed to project site in original unopened containers bearing dealer guarantee statement of Oregon Certified Bluetag Lawn seed.
Unless container grown, provide freshly dug trees and shrubs.
Do not prune prior to delivery unless otherwise approved by Landscape Architect.
Do not bend or bind-tie trees or shrubs in such manner as to damage bark, break branches or destroy natural shape.
Provide protective covering during delivery.
Deliver trees and shrubs after preparations for planting have been completed and plant immediately.
Deliver bare-root, balled and burlapped plant stock direct from nursery.
Heel-in immediately upon delivery if not planted within 4 hours.
Protect roots of plant material from drying or other possible injury.
Store plants in shade and protect from weather.
Maintain and protect plant material not to be planted within 4 hours.
Store plants in upright position.
Allow sufficient space for ventilation.
Do not drop plants. Do not pick up container or balled plants by stems or trunks.

PROJECT CONDITIONS AND WARRANTY

Project Conditions:

Proceed with and complete landscape work a rapidly as portions of site become available, working within seasonal limitations for each kind of landscape work required.

Utilities:

Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.

Excavation:

When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions or obstructions, notify Landscape Architect before planting.

PLANTING SEASON

Plant trees, shrubs and ground covers anytime after preparation of plant beds except during freezing or otherwise inclement weather.
Plant trees and shrubs after final grades are established to Landscape Architect.
Seed lawns between March 15 and October 1 and within 15 days of soil preparation.
If planting of trees and shrubs occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.
Do not plant without prior notification and approval of Landscape Architect.

WARRANTY

Provide one year warranty on all work, including new plant material, as specified in General Conditions.
Plant warranty excludes damage or loss due to suppressed peculiarities of site, negligent maintenance by Owner, vandalism, or a typical weather extremes or unusual phenomena or incidents which are beyond landscape installer's control. Repair all damage to other plants, mulch or other property caused by Contractor during replacement of plant materials or weeding during warranty period.

Remove dead and rejected materials within five days of being so directed by Landscape Architect and replace as soon as possible.
Remove perennial-type regenerative material present in imported topsoil. Remove all surface and root growth that may appear within one year following final acceptance of the project, at Contractor's expense.

COORDINATION

Coordinate with other trades affecting or affected by work of this section.

PART 2 - PRODUCTS

PLANT MATERIALS

Well-formed and shaped, full-foliaged when in-leaf, true to type, and free from disease, insects and defects such as knots, sun-scald, windburn, injuries, abrasion or disfigurement.

NURSERY GROWN AND COLLECTED STOCK

General:

Conform to ANSI Z60.1-1973 with the following exceptions and/or additions:

Container Stock:

Grown in the container in which delivered for at least six months and not root-bound or having a hardened-off root system.

Bare-Root Stock:

Well branched and fibrous root system.

Ground Cover Plants:

Well-established, grown in removable containers.

Greenhouse Grown Plants:

Acclimated outside for 30 days prior to delivery.

Trees:

Well branched. Main leader intact; trees not topped

Grafted Trees:

Base grafted or budded only.

Soil Balls for Trees:

Minimum of 10" diameter per caliper inch of tree.

Balled and Burlapped Plants:

All evergreen trees and shrubs balled and burlapped, or grown in container in which delivered for nine months minimum.

Where formal arrangements or consecutive order of trees or shrubs are shown, select stock for uniform height and spread, and label either number to assure symmetry in planting.

TOPSOIL

Import topsoil to site for landscape work

If necessary, provide new topsoil which is fertile, friable, natural loan, surface soil, reasonably free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, stones larger than 2 inches in any dimension, and other extraneous or toxic matter harmful to plant growth.

Supply all topsoil free of horsetail, rush morning glory and other noxious weeds.

SEED

Fresh, clean, dry new crop seed of 100% Pro-time PHD perennial rye grass blend with the following analysis by volume:

- 20% Tophat perennial ryegrass
- 40% Derby Supreme perennial ryegrass
- 39% R2 perennial ryegrass

Seed at 8 lbs. per 1,000 sq. ft.

Deliver seed to the project site in the vendor's unopened container and keep dry until placement in hydro-slurry mix.

Retain packaging for Landscape Architect's inspection.

MULCH

Composted, shredded hemlock or fir bark, free of wood chips.

Maximum size: 3/4"

Free of noxious weed seed and any material harmful to plant life.

GUYING AND STAKING

Deciduous Trees:

Stakes: 2 x 2 x 8' Douglas fir stake with dark brown stain.

Tree Ties: 5/8" rubber hose, black color with #9 ga. galvanized wire.

Coniferous Trees:

Cabling: 10 gage steel wire.

Tree Ties: 5/8" rubber hose, black color.

Stakes: 2 x 2 x 24" Douglas fir.

Turnbuckle: Galvanized, 5/8" with 6" adjustment, one per guy.

WATER
Suitable for irrigation.
Free from ingredients harmful to plant life.
All water provided on site by Contractor.

SOIL AMENDMENTS
Lime:
Natural dolomite limestone, suitable for horticultural lawn area preparation.
Compost:
"Garden Care" (TM) Compost manufactured by Webfoot Fertilizer Co., or accepted substitute.
Fertilizers:
Approved brands meeting requirements of applicable state fertilizer laws. Uniform in composition, draw, and free flowing.
Meet the following guaranteed analysis:
Slow Release Formula: 15-4-4, or accepted substitute.
Commercial Fertilizer: 16-4-8, or accepted substitute, with some nitrogen in slow release form.

SOIL TESTING
Include soil analysis in written instructions for maintenance to Owner. Submit copy of all soil tests and written recommendations to Landscape Architect at time of receipt or time of submittal.

PART 3 - EXECUTION

EXAMINATION
Examine site for conditions adversely affecting execution, permanence, quality of work, and survival of plant material and grasses.
Verify that subgrades and slopes of lawn and planting bed areas are acceptable to Architect prior to commencing work of this section.
Begin work required under this section only after conditions are satisfactory.

PREPARATION - GENERAL
Prepare soil when moisture conditions will permit proper cultivation.
Remove stones, sticks, mortar, concrete, rubbish, debris and all materials harmful to plant life.
Remove or spray as required to eradicate noxious weed growth and roots.
Achieve complete removal or kill. Kill achieved by working soil is permissible for annual non-noxious broad leaf type weeds.
Locate and securely mark or flag irrigation sprinkler heads, area drains, catch basins, cleanouts, manholes, valve boxes, and other site improvements not extending above finish grade.
Request inspection and allow observation by Landscape Architect of prepared soils before planting.

TOPSOIL PLACEMENT
Scarify subgrade prior to spreading topsoil.
Spread topsoil to depths as follows:
6" depth in shrub and ground cover areas: Place approximately half of total amount of topsoil required. Work into top of subgrade to create a transition layer and then place remainder to topsoil.
6" depth in lawn areas: Work into top of subgrade to create a transition layer.

FINE GRADING
Set finish grade after full settlement, including mulch, flush with tops of curbs, walks or existing grades in shrub areas. Refer to civil drawings for indication of finish grades.
Slope all areas to prevent puddling and drain surface water away from buildings or toward catch basins, drains, curbs or off site.
Thoroughly settle soil in all areas with a smooth surface free of humps and hollows, and firm enough to resist undesirable impressions under foot traffic.
Use levels, screeds, drags or any other equipment necessary to establish and verify grades and surfaces.

SHRUB BED PLACEMENT
Spread 3" of compost evenly over topsoil then uniformly and thoroughly incorporate into upper 3" of topsoil, obtaining a homogeneous soil mix.
Topsoil in a moist condition at time of mixing.
Apply compost in two separate lifts if required to obtain a homogeneous soil mix.

GROUND COVER BED PLACEMENT
Spread 3" of compost evenly over topsoil then uniformly and thoroughly incorporate into the 6" of topsoil, obtaining a homogeneous soil mix.
Topsoil in a moist condition at time of mixing.
Apply compost in two separate lifts if required to obtain a homogeneous soil mix.

LAWN BED PLACEMENT
Spread 2" of compost and lime at a rate of 40 lbs. per 1,000 sq. ft. evenly over topsoil then uniformly and thoroughly incorporate into the upper 4" of topsoil, obtaining a homogeneous soil mix.
Topsoil in a moist condition at time of mixing.

SCHEDULE OF PLANTING SOIL MIXTURE REQUIREMENTS
Pit and Trench Backfill at Trees and Shrubs:
1 part compost to 3 parts topsoil by volume.
Bonemeal: Per manufacturer's recommendation.
Slow release formula fertilizer: Per manufacturer's recommendations.
Ground Cover and Shrub Beds:
Compost: 2 inches.
Gypsum: 50 lbs. per 1,000 sq. ft.
Commercial fertilizer: Per manufacturer's recommendations.
Topsoil: 6 inches layer minimum.
Lawn:
Topsoil: 6 inches layer minimum.
Commercial fertilizer: Per manufacturer's recommendations.
Gypsum: 50 lbs. per 1,000 sq. ft
Lime: 40 lbs. per 1,000 sq. ft. 2" in all lawn compost.

INSTALLATION
Excavation for Planting:
Avoid disturbing irrigation system or planting trees directly over pipe; notify Landscape Architect if conflicts occur.
Plant Location:
Stake out location for trees and outline of planting beds on ground. Do not begin excavation until stake out of tree locations and plant beds have been approved by Architect.
Make minor adjustments as required.
Plant Pit Excavation:
Dig individual circular holes with vertical sides, two times larger diameter and same depth as root ball.
Ensure drainage by flooding prior to planting.
Planting Pit:
Mix soil excavated from hole with surrounding soil prepared for planting areas; use for backfill of trees and shrubs.
Set plant to bring top of root ball level to finish grade of surrounding ground. Backfill pit or trench with topsoil until 2/3 full and soak thoroughly to settle soil.
After soil settles, fill pit with topsoil and water thoroughly.
Leave a slight indentation around plants to hold water.
Plant no ground cover plants closer than 12" to curbs or walks.
Remove all tags from plants after installation.
Planting Beds:
Bring to smooth, even surface conforming to established grades after full settlement has occurred.
Remove excess soil from project site.
Balled Plants:
Set in pit on layer of compacted topsoil, plumb and in center of pit with tip of ball at same elevation as adjacent finished landscape grades.

When set, place amended soil around base and sides of ball, and work each layer to settle backfill and eliminate voids and air pockets.
When excavation is approximately 2/3 full, cut twine and remove burlap from sides of root ball to line of backfill.
Do not pull wrapping from under ball.
Do not plant if ball is cracked or broken before or during planting process.
Bare-Root Plants:
Cut off cleanly all broken or frayed roots.
Spread roots out in pit.
Carefully work planting soil amount roots to eliminate voids and air pockets.
Container-Grown Plants:
Carefully remove plants without injury or damage to root ball.
After removing plant, superficially cut edge roots on three sides with knife.
Do not plant if root ball breaks upon removal from container of if plant is root bound.
Mulch:
Provide 2" thick minimum of mulch over plant beds two days after planting.
Rake mulch to a smooth and uniform grade.
Prevent mulch form coming in contact with plant foliage.
Pruning:
Prune plant materials if necessary to balance root and top growth.
Prune all dead and broken limbs.
Prune without distorting basic form of plant an only to the extent necessary to accomplish steps above.
Anti-desiccant:
Hose down planting area with fine spray to wash leaves of plants.
Apply anti-desiccant using power spray to provide an adequate film over trunks, branches, stems, twigs and foliage. If deciduous trees or shrubs are moved in full-leaf, spray with anti-desiccant at nursery before moving and again 2 weeks after planting.

TREE STAKING
Deciduous Trees:
Drive stakes firmly into soil without damaging root ball, minimum two stakes per tree, east and west sides.
Trim stake tops evenly and apply one coat flat brown paint to exposed surfaces. Fasten to trees with tree ties, minimum one per stake.
Set stakes vertically.
Coniferous Trees:
Provide three cables at each tree, evenly spaced.
Drive stakes perpendicular to angle of cable; cable angel to be approximately 60 degrees.
Secure cables taut with tree tie at 2/3 height of tree. Allow for adjustment.
LAWN HYDRO-SEED
Bring areas to a smooth and evenly graded condition prior to hydro-seeding.
Mix specified seed, fertilizer, pulverized mulch and binder in water using equipment specifically designed for hydro-seed application.
Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
Do not use wet seed or seed which is moldy or otherwise damaged in transit or storage.
Apply slurry uniformly to all areas at the specified rate of 6 lbs. per 1,000 sq. ft.

MAINTENANCE
Maintenance of New Work:
Begin immediately after each item is planted and continue until final acceptance.
Maintain a healthy growing condition by watering, pruning, spraying, weeding and other necessary maintenance operations.
Keep planting beds free of weeds, grass and other undesired vegetation growth.
Inspect plants at least once a week and perform maintenance promptly.
Remove and replace impaired or dead plants promptly during specified planting season.
Water when soil moisture is below optimum level for best plant growth.
Restore all soil settlement to original grade.
Lawns:
Irrigate as required for germination and growth.

Mow and remove clippings each time grass becomes 2" to 2 1/2" high. After first mowing, evenly spread commercial fertilizer, specified above at 15 lbs. per 1,000 sq. ft. and water in.
Keep lawn area substantially free of weeds.
Seeded areas to be uniform in color and texture and contain no bare spots over 6" in diameter; repair and reseed damaged or weak areas.
Regrade and reseed as required to establish a smooth acceptable lawn, free of depressions or high spots.
Mow lawn prior to time of final inspection. (Minimum two mowings before acceptance).

CLEANING AND REPAIRING

During landscape work, keep pavements clean and work area in an orderly condition.
Sweep and wash paved surfaces to remove soil and soil stains.
Clean all mud and debris from catch basins, which is caused by landscape work. Remove plant containers, trimmings, clippings and all extraneous debris unearthed or resulting from any operation specified herein, from project site.

PROTECTION

Protect landscape work and materials from damage due to landscape operations, operation by other Contractors and trades and trespassers.
Maintain protection during installation and maintenance period.
Treat, repair or replace damaged landscape work as directed.

INSPECTION

When landscape work is completed, including maintenance, Landscape Architect will, upon request, make an inspection to determine acceptability.
When inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until reinspected by Landscape Architect and found acceptable.
Remove rejected plants and materials promptly from project site.

END OF SECTION

PART 1 - GENERAL

SCOPE

This section includes furnishing and installing (or modifying) concrete manholes with precast or reinforced cast-in-place bottoms as specified, including drops and manhole stacks of types and at locations shown on the drawings and scheduled.

This section includes removing existing structures, additional excavation to widen and deepen trenches for manhole construction, furnishing and installing concrete, Portland cement mortar, reinforcing steel, concrete base sections, bottom riser sections, transition sections, and riser sections, eccentric cones, flat slab tops and grade rings, flexible manhole connections, pipe for drop connections, manhole steps, manhole frames and covers, plugging lifting holes, pointing joints, forming channels through manhole bottoms, making watertight connections to new and existing sewers, and other work incidental to manhole construction and testing.

SUBMITTALS

Submittals shall be in accordance with the requirements of these Contract Documents and shall include:

Shop drawings.

Manufacturer's literature and certification for review purposes.

PART 2 - PRODUCTS

GENERAL

Precast concrete pipe manhole bases, riser sections, transition sections, eccentric cones, flat slab tops, and adjusting rings shall conform to the requirements of ASTM C478 except as modified herein.

Reinforcing in transition sections shall be equal to the requirements of that specified for wall sections of the larger diameter.

Unless otherwise shown and noted on the drawings, all sanitary sewer manhole bases shall be precast, and rubber boots shall be provided at all pipe penetrations.

Unless otherwise allowed on the drawings or details, all joints between manhole sections shall be O-ring type conforming to ASTM C-443.

The standard length of riser sections shall be 48-inches. Lengths of 12-inches through 60-inches may be used to meet required dimensions and as specified.

Unless otherwise specified, openings for connecting pipes in riser sections, bottom riser sections, and integral base sections, and for access in flat slabs shall be preformed or cored by the manufacturer.

Flat-top manholes shall be supplied for all manholes 5 feet or less in depth from rim to invert.

PRECAST BASES

Precast base sections shall be of monolithic construction and shall be manufactured such that the base riser section is integral with the base slab.

The bottom of the precast base section shall be a minimum of six (6) inches thick, and contain a minimum of 0.32 sq. inches of reinforcing steel each way in the top of the slab.

Sanitary sewer manhole bases shall be provided with core-drilled openings and flexible manhole-to-pipe connectors (rubber boots) for the connection of stubouts.

Openings for stubouts in storm drain manhole bases shall be either core-drilled or formed by blocking out a section of the wall during the casting process.

Flexible joints for precast pipe openings shall be "Res-Seal" type as manufactured by Price Brothers Company, "Kor-n-seal" as manufactured by National Pollution Control Systems, Inc., or approved equal.

MANHOLE GRADE RINGS

Concrete grade rings shall have precast concrete. The distance from rim to top of cone or bottom of flattop section shall not exceed 12 inches.

MANHOLE STEPS

Where specified or shown on the drawings, manhole steps shall be of polypropylene plastic reinforced with a ½-inch grade 60 reinforcing rod.

Specified manhole steps shall be factory installed to provide a continuous ladder of 12-inch center-to-center rung spacing. Steps shall be placed in the forms and cast into the pipe wall or placed immediately after the pipe is removed from casting and carefully mortared in place with non-metallic non-shrink mortar to ensure a watertight joint. If the outer surface of the pipe wall is pierced the patch shall be completely covered with a bituminous sealer.

MANHOLE FRAME AND COVER ASSEMBLIES

General

Manhole frames and covers shall be as shown on the drawings and in conformance with requirements as contained herein.

Where pressure tight (lock down) manhole covers are called for, lid seals shall be a continuous round rubber gasket supplied by the manufacturer.

Where pressure tight (lock down) manhole frames and covers are called for, threaded inserts shall be cast in eccentric cones or flat slab tops and holes formed or cored in adjusting rings to match bolt size and spacing specified for the manhole casting. Anchor bolts shall be stainless steel (provide with anti-seize).

Unless otherwise specified or shown on the details, all storm sewer manholes shall be provided with 16-hole lids, and all standard sanitary manholes shall be provided with 2 hole lids.

Manholes located in pedestrian walks shall be ADA compliant.

Materials

Castings, unless specified otherwise, shall be gray iron castings conforming to the requirements of ASTM A-48, Class 30.

All castings shall be free from pouring faults, sponginess, cracks, blowholes, blisters, shrinkage strains and other defects affecting their strength and value for the services intended. No plugging of defective castings will be permitted.

Workmanship

Iron castings shall be true to pattern in form and dimensions and shall be made accurately to dimensions shown on the drawings or ordered. All castings shall be planed or ground where necessary, whether marked or not, to secure perfectly flat bearing surfaces. Allowances shall be made in the patterns so that the specified thickness of metal will not be reduced.

Lettering shall be cast on manhole covers, and covers shall be provided with bolts, locks, perforations, lifting rings and for pick holes as shown on the drawings or as specified.

MORTAR AND GROUT

Mortar

Mortar used for the structures specified herein shall conform to ASTM C-270, Type S, containing no masonry cement. The mortar shall be composed of one part Portland cement to two parts sand by volume.

Non-Shrink Grout

Non-metallic non-shrink grout shall be Preco-Patch, or approved equal.

Provide that all voids are filled during application of the interior coating system, it is not necessary to grout the vertical riser joints prior to application of the interior coating.

Applicator shall mask manhole steps, and take all precautions necessary to prevent coating material from entering the pipelines. Removal of any coating material from pipelines or manholes steps will be the sole responsibility of the Contractor.

As an alternative to coating the manholes as specified in “b” above, the Contractor can choose to have all concrete for manhole components consist of Calcium Aluminate Cement (>43% Al2O3), Secar 41 Cement or approved equal, with a minimum 28 day compressive strength of 6000 psi. Concrete for manhole channeling shall also utilize Calcium Aluminate Cement, Secar 41 by Kerneos or approved equal, and grout shall be as specified above.”

CAST-IN-PLACE CONCRETE

All cast-in-place concrete used for forming channels in manhole bottoms shall conform to OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 3,300 psi.

REINFORCING STEEL

All bar reinforcing shall be grade 60 deformed bars conforming to ASTM A-615 or ASTM-616.

CLEAN-OUTS

Pipe, fittings and joints shall conform to specifications for adjacent pipe.

Castings shall be as shown on standard detail.

PIPE ANCHORS

Anchor bolts and anchor straps for inside drop pipe connections shall be stainless steel.
Anchor bolts shall be Type 304 stainless steel and be of the sizes shown on the drawings or directed by the Owner's Representative.

Inside Drop Assemblies

Inside drop assemblies shall be fitted with collection bowl at the top of the drop pipe. The bowl assembly shall be shall be as manufactured by Reliner/Duran inc., or approved equal.
Force main discharges and inlet pipes with slopes greater than 5% shall be fitted with a bowl with the optional hood.
Unless otherwise shown on the drawings, the drop pipe to be the same size as the inlet pipe. The collection bowl sizing and installation shall conform to the manufacturer's recommendations, including use of stainless steel fasteners. The drop tube shall be anchored with stainless steel pipe brackets are 4 foot maximum intervals, and provided with a 45° elbow at the base rotated to direct flow toward the manhole outlet.

Manhole lid inserts

All sanitary sewer manholes in low areas outside of paved streets, in low areas of parking lots, in gravel areas or within 4 feet clear of curblines (streets or parking lots) shall be provided with inflow protector lid inserts.
The manhole lid insert shall be made of ABS or HDPE plastic. The insert body shall be manufactured to match the dimensions and style of each specific manhole frame & cover. Each insert shall be provided with a factory installed closed cell neoprene gasket bonded to the underside of the insert rim, designed for wet or dry conditions. The insert shall have leak-down rate not exceeding 10 gallons in 24 hours.
Each insert shall be provided with a 1" wide polyester nylon lift strap attached to the insert body with a sealed aluminum or stainless steel rivet.
Each insert shall be provided with a gas relief valve designed to relieve at a pressure of 1 psi or less. The valve body shall be made of medium density polyethylene. The venting tube shall be capable of sealing out dirt and small debris. The gas relief valve shall have no metal parts. The valve shall be recessed into the bottom center of the insert so that it is protected and will not be broken by any movement of the cover over the valve, and to allow the shallowest practicable insert design, eliminating unnecessary water retention or weight accumulation.
Manhole lid inserts shall be Inflow Protector inserts by FRW Industries, or approved equal.

PART 3 - EXECUTION

GENERAL

Location and type of manholes installed shall be as shown on the drawings or directed by the Owner's Representative.

Construction shall be in conformance with details shown on the drawings and as specified.
Pipe connections shall be let into precast concrete walls smoothly. Any broken out concrete shall be grouted back solid for a minimum of six (6) inches around the entire connection.
All connections to new or existing manholes shall be watertight. Any visible infiltration of water in sanitary sewer manholes shall be considered unacceptable.

EXCAVATION

Excavation for manhole construction shall be unclassified.
Backfill and compaction around manholes and other appurtenances shall be as specified for the adjacent trench backfill.

BASE SECTIONS

Excavations shall be dewatered prior to placement of base sections.

Precast Base Sections

Aggregate base shall be placed to a minimum compacted depth of six (6) inches prior to placement of precast base section.
The manhole base shall be fully and uniformly supported by the base rock at the specified grade and alignment and shall be set such that the top of the base section is level and plumb.
The use of spacers between riser sections to accommodate an out-of-plumb base section is prohibited.

Stubouts for Future Pipe Extensions

Pipe stubs out of manholes for future pipe extensions shall be ended outside the manhole with a bell end with a watertight plug meeting local jurisdiction requirements. If screw plugs are used, the contractor shall install a short length of plain-end pipe as required for the plug to seal completely. The ears shall not be removed from screw-in plugs. Unless otherwise noted or shown on the drawings, the stubouts shall extend a minimum of 2 feet from the outside wall of the manhole and shall be installed at the specified grade.

MANHOLE RIM ELEVATION & PRECAST CONCRETE RISER SECTIONS

The manhole rim elevations shown on the drawings may need to be adjusted upward or downward up to 6-inches from the design elevation called out on the drawings, if required to match with existing or finish grade conditions. The Contractor shall be responsible for verifying existing and future grade elevations to verify manhole depths, or be responsible for installing the manhole such that the rim elevation can be adjusted without removal and replacement of the manhole barrel sections.

All manhole barrel section joints shall be grouted smooth on the interior and lifting holes filled with non-shrink grout.

The longest lengths of riser sections to be incorporated into the manhole shall not be installed immediately below the eccentric cone section or the flat slab top.

INSTALLATION OF MANHOLE FRAMES

Manhole frames and covers shall be installed to grades shown on the drawings, as specified herein or as directed by the Owner's Representative.

Adjustment of manhole castings to finished grade shall be made using specified precast concrete grade rings. Frames and extension rings shall not be grouted in until rims can be set accurately to finished grade.

Grade rings shall be set in mortar without offsets. The joints between grade rings shall be watertight.

Grade rings shall be limited to a maximum height of twelve (12) inches.

The contractor shall confirm rim elevations required to match existing or new grades, and shall notify the Owner's Representative of any discrepancies from the design elevation on the drawings. After notification of and concurrence by the Owner's Representative, the contractor shall adjust the manhole rim as required to match the existing or design grades as applicable.

Each pressure tight (lock down) manhole casting shall be anchored in place using four 5/8-inch stainless steel bolts with nuts as detailed on the drawings or as directed by the Owner's Representative.

MANHOLE RIM ELEVATIONS

The rims of all manholes located within paved or other hard surfaced areas shall be set to finished grade.

Manholes located in unpaved traffic areas to be provided with a minimum 8-foot by 8-foot AC pad (3" minimum compacted thickness) or concrete pad (6" minimum thickness) centered on the manhole lid, unless otherwise approved in writing by the Owner's Representative.

The rims of all sanitary sewer manholes located outside of paved or other hard surfaced areas shall be set 6-inches above surrounding grade. Surrounding grade shall be defined as the final ground surface (after grading and landscaping), measured a maximum of 3 feet clear from the manhole frame casting. The purpose of this requirement is to prevent sanitary sewer manhole rims from becoming low points and collecting surface drainage.

Unless otherwise shown on the drawings or details, or where otherwise directed in writing by the Owner's Representative, finish grading or landscaping shall be sloped up (from surrounding grade) to within 1-inch below rim elevation for sanitary sewer manhole located outside of paved or hard surfaced areas.

MANHOLE CHANNELS

Manhole channels shall be constructed in conformance with the appropriate details. Water and debris shall be removed from precast base sections prior to placing concrete for the channels.

Channels shall be constructed with troweled surfaces and smooth transitions at all changes in direction.

Channels depths shall be to the heights shown on the drawings, but in no case shall be the channel depth be less than 2/3 of the pipe diameter. Shelves between the channels and the manhole walls shall be sloped to drain per plan details (1:12 typical).

Channel bottoms and shelves shall not impound water.

The channel configuration shall allow a three (3) foot long by six (6)-inch diameter television camera assembly to be placed into, or removed from the pipe without difficulty.

DROP CONNECTIONS

Inside drop connection assemblies shall only be permitted where shown on the drawings or approved by the Owner's Representative. Where permitted, inside drop assemblies shall be constructed in conformance with drawings details, as specified, or as approved by the Owner's Representative. Where shown on the drawings, drop connection assemblies shall be installed on the outside of the manhole. Outside drop connections shall be constructed in conformance with the drawings details.

Manholes Over Existing Concrete Pipes

Prior to construction of the manhole base, existing concrete pipe shall be cleaned and an approved commercial concrete bonding agent applied to all surfaces of the pipe that will be in contact with the poured-in-place manhole base slab or grouted pentrations.

Manholes Over Existing PVC Pipes

Prior to construction of the manhole base, existing PVC pipes shall be cleaned and a dense coating of clean mortar sand mixed with PVC solvent cement applied to all pipe surfaces that will be in contact with the manhole. After the PVC solvent cement has cured, commercial concrete bonding agent shall be applied to the sand prior to placement of the poured-in-place concrete manhole base slab.

All sanitary sewer manholes shall be vacuum tested in accordance with the requirements contained herein.

After completion of any required manhole testing, the top of the pipe shall be broken out to the spring line for the full width of the manhole. The exposed edge of the pipe shall be smoothed and grouted with mortar.

The Contractor shall prevent broken material or debris from entering the line.

Flow shall be maintained at all times. The Owner's Representative's approval shall be obtained prior to diverting flows.

CONNECTION TO EXISTING MANHOLES

Openings for new connections to existing manholes shall be made by core-drilling the existing manhole structure. Use of pneumatic jackhammers shall be prohibited. Small chipping hammers or similar light tools which will not damage or crack the manhole base may be used to shape channels or enlarge existing openings as authorized by the Owner's Representative. Connections to be watertight and shall provide a smooth flow into and through the manholes.

Sanitary Sewer Manhole Connection.

All connections to existing sanitary sewer manholes shall be done using cored holes and a commercially prepared rubber boot specifically designed for this purpose. Where existing openings or existing pipe interferes or conflicts with new core hole locations, the existing pipe shall be removed completely and the existing opening grouted closed prior to core drilling the new opening, in order to provide a clean hole for the rubber boot.

All existing manholes to which new pipes are connected or reconnected shall be sealed as required and vacuum tested prior to final approval.

Storm Drain Manhole Connection.

Connections to storm manholes may use either a rubber boot or a PVC sand collar. Prior to installation of the sanded PVC collar, a commercial concrete bonding agent shall be applied to the sand prior to placement of concrete or grout. Openings shall be large enough to allow non-shrink grout to completely surround the sand collar and seal it in place.

Reshaping/Reconstruction of flow channels in existing manholes shall be accomplished with the use of a "clipping gun" or other similar light tool which will not damage or crack the existing manhole base. The channel shall be shaped to provide smooth uniform flow of sewage. After modifying flow channel, thoroughly clean manhole base and apply Preco Patch as manufactured by Fosroc or approved equal non-shrink grout to provide a smooth and finished flow channel.

The Contractor shall prevent broken material and debris from entering the line.

LEAKAGE TESTING OF MANHOLES

All new sanitary sewer manholes (and existing manholes to which new pipes are connected, including replacement of existing pipes) shall be tested in accordance with the requirements of the 2008 APWA Standard Specification, OSSC (ODOT/APWA) 00470.71.b, Vacuum Testing, except as modified herein.

Any visible infiltration of water in sanitary sewer manholes shall be considered unacceptable. Sanitary sewer manholes that exhibit visible water infiltration or do not pass leakage testing shall be replaced or repaired by the Contractor at no additional cost to the Owner.
All new storm drain manholes shall be subjected to leakage testing when such testing is required by regulating authorities having jurisdiction or when such testing is determined to be necessary by the Owner's Representative.
All adjacent surface restoration shall be completed prior to conducting manhole acceptance tests, including finish paving and final adjustments to grade. Any test conducted prior to completion of surface restoration shall be considered informal, and will not count for acceptance.
The Contractor shall conduct leakage testing using the following method(s) as directed by the Owner's Representative:

Vacuum Testing

Vacuum testing shall be used for all manholes requiring testing unless otherwise approved in writing by the Owner's Representative.
The Contractor shall furnish the vacuum pump, connections, plugs, vacuum gauges and other necessary equipment and perform vacuum tests on all new manholes unless otherwise directed in writing by the Owner's Representative.

Test Vacuum Gauges

All vacuum gauges used for pressure measurement shall be in excellent condition, and shall be provided with graduations not greater than 1" mercury. Any evidence of gauge damage or stickiness (ie. gauge will not zero, needle creeping upwards during test, needle moves to higher or lower reading when gauge is tapped, etc.) will result in the test being aborted until the gauge is replaced.
The test shall consist of plugging all inlets and outlets and placing the vacuum test head in the casting at the top of the cone or flattop section. The test head seal shall be inflated in accordance with the manufacturer's recommendations, but in all cases the grade rings and casting shall be included in the test.

A vacuum of 10-inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9-inches.
The manhole shall pass if the time for the vacuum reading to drop to 9-inches meets or exceeds the values indicated on the following table.

REQUIRED MANHOLE VACUUM TEST TIMES

Manhole Depth (feet)	Required Test Time (sec) (OSSC/ODOT/APWA 00470.71.b)		
	48-inch diameter	60-inch diameter	72-inch diameter
8 or less	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	67
18	45	59	73
20	50	65	81
22	55	72	89
24	60	78	97

MANHOLE VACUUM TEST REPORT

Marion County Sheriff's Office, Salem, OR							
Inspector: (Print)				Date: (Separate Report Required for Each Test Session)			
Testing Company: (Name & Phone #)							
Manhole No.	Manhole Diameter (inch)	Manhole Depth (ft)	Surface Restoration Complete?	Time Required3 (sec)	Time to Drop from 10" Hg to 9" Hg (sec)	Results	Comments (Visible groundwater infiltration or leakage constitutes a failed test)
			☐Yes ☐NO			☐Pass ☐Fail	
			☐Yes ☐NO			☐Pass ☐Fail	
			☐Yes ☐NO			☐Pass ☐Fail	
			☐Yes ☐NO			☐Pass ☐Fail	
			☐Yes ☐NO			☐Pass ☐Fail	
			☐Yes ☐NO			☐Pass ☐Fail	
			☐Yes ☐NO			☐Pass ☐Fail	
			☐Yes ☐NO			☐Pass ☐Fail	

All adjacent surface restoration shall be completed prior to conducting manhole acceptance tests, including finish paving and final adjustments to grade. Any test conducted prior to completion of surface restoration shall be considered informal, and will not count for acceptance.

The vacuum test head seal shall be inflated in accordance with the manufacturer's recommendations, but in all cases the grade rings and casting shall be included in the test. A vacuum of 10-inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9-inches.

The manhole shall pass if the time for the vacuum reading to drop to 9-inches meets or exceeds the values indicated on the following table. Times for deeper depths as required by the City Engineer. Note: Visible groundwater infiltration or leakage constitutes a failed test.

REQUIRED MANHOLE VACUUM TEST TIMES

Manhole Depth (feet)	Required Test Time (OSSC/ODOT/APWA 00470.71.b) (sec)		
	48-inch diameter	60-inch diameter	72-inch diameter
8 or less	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	67
18	45	59	73
20	50	65	81
24	60	78	97

END OF SECTION

PART 1 - GENERAL

SCOPE

This section includes the furnishing and installing of all pressure piping 4-inches in diameter and larger and appurtenances as shown on the drawings or as required to complete the work.
Work under this section shall include, but not be limited to the following:
Furnish and install all pipe, fittings, specials, bends, beveled pipe, adapters, bulkheads, stoppers, plugs, joint restraints, joints and jointing materials, and pipe supports.
Furnish and install pipe anchorage and thrust restraint systems as specified or as shown on the drawings, including but not limited to concrete for blocking and encasement of pipelines.
Make connections to all existing and/or new facilities and provide temporary services as required.
Install temporary plugs and/or stoppers and harnessing.
Install valves, valve boxes and fire hydrants as shown or specified.
Test and clean pipelines and appurtenances.
Disinfect pipelines and appurtenances.
Furnish and install water services and meters as shown.
Replace sewer laterals with C900 PVC pipe where necessary.
Work shall be in conformance to public agency specifications for public waterlines and services where applicable.
Work shall be in conformance to Uniform Plumbing Code for all private domestic waterlines and private fire lines where applicable.
Work shall be in conformance to the Oregon Fire Code for all private fire lines where applicable.
All work performed under this section shall be in accordance with all approved trade practices and manufacturers' recommendations, including provisions for insulation between dissimilar metals where applicable.

RELATED SECTIONS

31 23.16.13, Trench Excavation and Backfill
31 23 16.15, Trench Surface Restoration

QUALITY CONTROL

Laboratory Services:

Water quality testing services shall be provided by a laboratory certified by the State of Oregon.

Field Inspection:

All pipe sections, fittings, specials, jointing materials, etc., shall be carefully examined for defects and no piece shall be laid that is known to be defective. Any defective piece discovered after installation shall be removed and replaced with a sound one in a manner satisfactory to the Owner’s Representative at the Contractor's expense.
Defective material shall be marked with lumber crayon and removed from the job site before the end of the following day.

Field Testing:

All materials, process of manufacturing, and finished pipe shall be subject to inspection and approval. The Owner’s Representative may select one sample of pipe on the job site of each production run of each size and type of pipe to be tested by the laboratory. The Contractor shall furnish the first test piece or pipe core and any additional samples required because of failures. Should the sample fail to meet specifications, retests shall be conducted by the laboratory in conformance with the specifications. Cost of all retests shall be borne by the Contractor.

SUBMITTALS

Submittals shall be in accordance with the requirements of these Contract Documents showing and shall include the following:
Schedule of pipe fittings and specials.
Material and class for each size and type of pipe.
Joint details and any special provisions required for assembly.
Manufacture's literature for each size and type of pipe, fittings and valve used.
Manufacturer's certification that all materials and products, including pipe and fitting lining, which will come in contact with potable water conform to the requirements of NSF 61. The Owner’s Representative may require evidence of certification.

A certificate from the pipe manufacturer stating that the materials have been sampled and tested in accordance with the provisions of and meet the requirements of the designated specification. The certificate shall be signed by an authorized agent of the manufacturer.
Where set screw adaptor flanges are shown or proposed for use, a listing of the manufacturer's torque installation requirements for all pipe thicknesses shall be included with the fitting submittal.
Copies of all test results for inclusion in the O&M manuals.

CONTRACTOR'S RECORD DRAWINGS
The Contractor shall maintain a neatly marked set of record drawings showing the locations and depths of all waterlines, storm and sanitary sewer laterals, buried conduits and other utilities encountered during construction. Drawings shall be kept current with the work as it progresses and shall be subject to inspection by the Owner's Representative at any time.
Record drawings shall specifically show and note any fittings installed (approved by the Owner) which are different than those shown or noted on the drawings, including the location of all retainer glands (or other joint restrainers) in addition to those shown on the drawings.

PART 2 - PRODUCTS

GENERAL
All materials or products specified under this section which will come in contact with or which will be used on materials or products which will come in contact with potable water shall conform to the requirements of OAR 333-61-087, Product Acceptability Criteria. All materials or products as specified above shall meet the requirements of the National Sanitation Foundation Standard 61, Drinking Water System Components - Health Effects, or equivalent as approved by the Oregon Health Division (ie. Oregon Department of Human Services, Public Health Division, Drinking Water Section).
Any material or product installed without submittal of certification that it conforms to requirements specified herein shall be removed and replaced by the Contractor at no additional cost to the Owner.
Whenever any material or product is indicated or specified by patent or proprietary name, name of manufacturer or model number, such specification is used for the purpose of establishing a standard of quality and facilitating the description of the material or process desired. Such specification of a particular product shall not be construed as acceptability under the above listed criteria. It shall be the Contractor's responsibility to provide certification as required above or provide an equal quality product for which certification can be provided.

PIPE
General
Pipe buried underground, unless otherwise specified or shown, shall be bell and spigot with rubber gasket (push-on) type joints in straight runs and mechanical joints each way from bends. The spigot end of each pipe shall be marked to indicate when the pipe is "home."
All gaskets shall be a single molded rubber ring fitted into a specially shaped recess and forming a pressure tight seal.
The thickness class or pressure class of the pipe, as well as the material type, size and designation (ie. AWWA ____) shall be permanently stencilled on the exterior of each pipe at the factory.
Ductile Iron (DI) Pipe
All ductile iron pipe shall be centrifugally cast in conformance to AWWA C-151 unless otherwise specified.
All ductile iron pipe shall be minimum Class 52 thickness, unless otherwise shown or specified.
All ductile iron pipe shall be as manufactured by Pacific States, US Pipe, Tyler Pipe, or approved equal.
PVC Pressure Pipe 3-inch and Smaller (Schedule 40 PVC)
Unless otherwise shown on the drawings, PVC pressure pipe 3-inches and smaller shall be Schedule 40 PVC.
4-inch Through 12-inch (AWWA C-900)
Unless otherwise shown on the drawings, PVC pressure pipe 4-inches through 12-inches in diameter shall conform to the requirements of AWWA C-900 (design stress of 4000 psi), NSF approved, with cast iron pipe equivalent (CI) outside diameter dimensions, with wall thickness equivalent to a standard dimension ratio (SDR) of 18, Pressure Class 235 (per C900-07).
4-inch Through 12-inch (ASTM D 2241, Class 200)
PVC pressure pipe 4-inches through 12-inches in diameter shall conform to the requirements of ASTM D 2241, NSF approved. PVC pipe shall be Class 200 pipe with wall thickness equivalent to a standard dimension ration (SDR) of 21.
All PVC pipe shall be as manufactured by J-M Pipe and P-W Pipe, or approved equal.

DUCTILE AND CAST IRON COATINGS AND LININGS

All pipe and fittings, with the exception of solid sleeve couplings, shall be cement-mortar lined and seal coated in accordance with AWWA C-104.

Pipe or fittings which have a damaged cement lining or no cement lining will be rejected at the job site. Cement linings that are installed or repaired by the distributor/supplier shall be completed in strict accordance with AWWA C-104. Cement linings shall not be repaired at the job site.

All cast pipe and fittings buried underground shall be coated on the outside with a standard coating of black bituminous paint a minimum of 1 mil thick unless otherwise specified. The finished coating shall be continuous, smooth, neither brittle when cold nor sticky when exposed to the sun, and shall be strongly adherent to the pipe.

Unless otherwise specified, cast pipe used within buildings and structures and that is to receive field coats of paint shall not be coated with any black bituminous paint. Such pipe, after proper cleaning, shall be painted with one coat of primer paint that is compatible with the field coats. Painting specifications shall be followed for cleaning and painting.

PIPE JOINTS

General

Gaskets and glands shall be provided by the manufacturer of the fitting on which they are to be used and shall be specifically designed for the pipe O.D. equivalent used.

Where required a non-toxic vegetable soap lubricant shall be supplied with the pipe or fittings in sufficient quantities for installing the pipe.

Ductile Iron Pipe Joints

Push-On Joints

All push-on joints shall be single rubber gasket push-on joints conforming with the requirements of AWWA C-111 unless otherwise specified. Gaskets and lubricant shall be provided by the manufacturer of the pipe or fitting on which they are to be used.

Restrained Push-On Joints

Restrained joint ductile iron pipe and fittings shall have a flexible, positively restrained boltless push-on joint system capable of being deflected after assembly.

Mechanical Joints

All components of mechanical joints, including nuts and bolts, shall be in conformance with AWWA C-111.

Retainer Glands

Retainer gland casting bodies shall have all surfaces polyester based fusion bond powder coated after pretreatment with a phosphate wash, rinse & sealer coating (Mega-Bond or equal).

Retainer gland set wedge assemblies and bolts shall have all surfaces coated with a minimum of two coats of fluoropolymer coating after pretreatment with a phosphate wash & rinse (to control thread friction torque during tightening of set wedges).

Retainer glands for use on ductile iron, cast iron or schedule 40 steel pipe shall utilize wedge type set screws and shall be "Mega-Lug" Series 1100 as manufactured by EBAA Iron Inc., or approved equal.

Flanged Joints

Flanged joints for ductile iron pipe shall conform with the requirements of AWWA C-115. Unless otherwise shown or specified, flanged spools shall be minimum Class 53 thickness. Gaskets shall be 1/8-inch thick SBR rubber, full face, conforming to the pipe manufacturer's requirements and AWWA C-111.

All nuts and bolts used for flanged joints shall conform to the requirements of ASME/ANSI B18.2.1 and shall be low carbon steel conforming to the requirements of ASTM A-307 Grade B.

Flange Adapters

Where shown on the drawings or approved by the Owner’s representative, flange adapters for connecting plain-end pipe to flanged fittings in buried locations or in making custom ductile iron spools in exposed (not buried) locations shall be Mega-Flange Series 2100, as manufactured by EBBA Iron, or approved equal.

Restraint devices for nominal pipe sizes 3 inch through 36 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA/ C111/ A21.11. Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts. Gland body, wedges and wedge actuation component shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536, and shall be fusion bond epoxy coated.

Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after

assembly. Flange adapters shall be designed to allow at least 0.8-inches gap between the cut end of the pipe (6" & larger) and the mating flange without affecting the integrity of the seal.

PVC PIPE JOINTS

Push-On Joints

All push-on joints shall be single rubber gasket push-on joints conforming with the requirements of AWWA C-111 unless otherwise specified. Gaskets and lubricant shall be provided by the manufacturer of the pipe on which they are to be used.

Mechanical Joints

All components of mechanical joints shall be in conformance with AWWA C-111.

Retainer Glands for PVC Pipe.

Retainer gland casting bodies shall have all surfaces polyester based fusion bond powder coated after pretreatment with a phosphate wash, rinse & sealer coating (Mega-Bond or equal).

Retainer gland set wedge assemblies and bolts shall have all surfaces coated with a minimum of two coats of fluoropolymer coating after pretreatment with a phosphate wash & rinse (to control thread friction torque during tightening of set wedges).

Retainer glands for use on PVC pipe shall utilize wedge type set screws and shall be "Mega-Lug" Series 2000 PV as manufactured by EBAA Iron Inc., or approved equal.

Joint Restrainers

The use of joint restrainers in lieu of concrete for thrust restraint is limited to applications specified in the Contract Documents or approved by the Owner's Representative.

Joint restrainers shall be specifically designed for use on PVC pipe. Joint restraints at push on PVC bells shall be Series 1500/1600 for C900 PVC and Series 2800 for C905 PVC, as manufactured by EBBA Iron or approved equal.

Flange Adaptors

Where shown on the drawings or approved by City, adaptor flanges for use in connecting PVC pipe to flanged fittings locations shall be Mega-Flange Series 2100, as manufactured by EBBA Iron, or approved equal.

Restraint devices for nominal pipe sizes 3 inch through 36 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA/ C111/ A21.11.

Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts. Gland body, wedges and wedge actuation component shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536, and shall be fusion bond epoxy coated.

Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly. Flange adapters shall be shall be designed to allow at least 0.8-inches gap between the cut end of the pipe (6" & larger) and the mating flange without affecting the integrity of the seal.

DUCTILE AND CAST IRON FITTINGS

General

All fittings shall be mechanical joint unless otherwise specified or shown on the drawings.

The size, gasket manufacturer's mark, county where molded, year of manufacture shall be molded or permanently marked on all gaskets on non-sealing surfaces. In addition, the letters MJ shall be appear on all MJ gaskets.

Unless otherwise shown or specified, all fittings shall be as manufactured by Mueller, Tyler, US Pipe or approved equal.

Mechanical Joint Fittings

All follower glands shall be ductile iron. In addition to casting marks on the fittings, follower glands shall have cast or stamped on them the manufacturer's identification, country where cast, nominal size, and the letters DI or ductile.

4-inch through 24-inch

All MJ tees, crosses, elbows, reducers, adapters, combinations thereof, and other miscellaneous fittings 4-inches through 24-inches in diameter shall be ductile iron compact fittings in conformance with AWWA C-153.

Unless other specified, the minimum working pressure for all MJ cast iron or ductile iron fittings 4-inches through 24-inch in diameter shall be 350 psi.

Short Coupled MJ Fittings or Fittings & Valves

Unless otherwise specified or shown on the drawings, close coupled mechanical joint (MJ) valves and fittings shall be connected using a ductile iron ultra-compact bolt-through positive restraint (Infact Corporation Foster Adapter or approved equal). In cases where a Foster Adapter will not fit on BOTH the

branch and run of certain compact tees or crosses due to bolt lengths, an Infact Corporation Flex Adapter (or approved equal) shall be used on the branch and the Foster Adapter on the run. The MJ positive restraining devices shall be supplied with a fusion bond epoxy coating. The devices shall be designed for use with standard mechanical joint fittings (AWWA C110 or C153) and valves.

Flanged Fittings

All flanged tees, crosses, elbows, reducers, adapters, combinations thereof, and other miscellaneous fittings 4-inches through 48-inches in diameter shall be cast iron or ductile iron fittings in conformance with AWWA C-110.

Unless otherwise specified, the minimum working pressure for all flanged cast iron or ductile iron fittings shall be 250 psi.

All fitting shall have distinctly cast on the outside of the fitting the pressure rating, nominal diameter of openings, manufacturer's identification, country where cast, and number of degrees or fraction of the circle on all bends. Size of lettering shall conform to AWWA C-110.

COUPLINGS AND ADAPTERS

Mechanical joint couplings and adapters shall be limited in their application to connection of new pipe work to existing waterlines, temporary installations, and where specifically called for in the Contract Documents or approved by Owner's Representative.

Mechanical joint couplings and adapters shall be solid sleeve type couplings consisting of a ductile iron sleeve, ductile iron follower rings, rubber gaskets, and corrosion-resistant bolts and hex nuts.

Mechanical joint couplings and adapters shall have minimum pressure ratings that will accommodate maximum pressures which will be experienced during hydrostatic and leakage testing.

Unless otherwise specified, all mechanical joint couplings shall be furnished with a fusion bonded epoxy coating inside and outside conforming to the requirements of AWWA C-550.

Mechanical joint couplings and adapters shall be as manufactured by Romac, Smith Blair, Dresser, Rockwell or approved equal.

Rubber couplings for sewer line or sewer lateral replacement shall be Fernco RC Series (Strong Back) Repair Couplings with stainless steel shear bands and stainless steel clamps, or approved equal.

VALVES

General

All valves and appurtenances shall have the name, monogram, or initials of the manufacturer cast thereon. They shall be built and equipped for the type of operation as specified herein or as shown on the drawings.

Where requested by the Contractor and approved by the Owner's Representative, additional valves may be installed by the Contractor to facilitate installation, testing, or connection to existing pipe work. Unless otherwise specified in writing by the Owner's Representative, such valves requested by the Contractor shall be provided at no additional cost to the Owner.

Unless otherwise specified, all valves shall have a minimum pressure rating that will accommodate maximum pressure which will be experienced during hydrostatic leakage testing.

Valve Coating

Unless otherwise specified, all valves shall be furnished with a fusion-bonded epoxy coating inside and outside conforming to the requirements of AWWA C-550.

Valve Operators

Unless otherwise specified or shown on the drawings, all buried valves shall be supplied with a 2-inch square operating nut. Nuts shall have a flanged base on which shall be cast an arrow at least 2-inch long with the word "OPEN" cast on the nut to clearly indicate the direction of opening.

Extension stems shall be provided for buried valves when the operating nut is four (4) feet or more below finished grade. Extension stem shall extend to within twelve (12) inches (maximum) of the finished ground surface and shall be provided with spacers which will center the stem in the valve box.

Valve Wrenches:

Unless otherwise specified, T-handle valve wrenches shall be delivered to the Owner by the Contractor prior to final acceptance. A minimum of two (2) valve wrenches, or one (1) valve wrench for each five (5) square nut operated valves or portion thereof, whichever is greater, shall be supplied by the Contractor. The length of the valve wrench stems shall be such that the valves can be properly operated from a standing position (i.e., handle at ±3 feet above floor or finish grade).

Unless otherwise specified or shown on the drawings, handwheel operators shall be provided on all exposed valves. Handwheels shall be of the spoked type only. An arrow with the word "OPEN" shall be cast into the handwheel, located so as to be readily readable, showing the opening direction of the valve. The outside diameter of the handwheels shall not be less than shown on the table below.

Valve Diameter	Minimum Diameter of Handwheel
3-Inch	10-Inch
4-Inch	10-Inch
6-Inch	12-Inch
8-Inch	14-Inch
10-Inch	16-Inch
12-Inch & larger	16-Inch

Valve Boxes (VB)

All buried valves shall be provided with valve boxes. Valve boxes shall conform to Standard Details. Lid to read “Water” for water system valves.
All parts of valve boxes and covers shall be coated by dipping in bituminous varnish.
All valve boxes shall be provided with VC212 self centering valve box bases as manufactured by 3 Dimensional Contracting, or approved equal.

Gate Valves (GV)

Unless otherwise specified or shown on the drawings, all gate valves shall be resilient seat wedge gate valves.
Except as modified herein, gate valves and appurtenances shall conform to the requirements of AWWA C-509 or AWWA C-515 covering iron-body, resilient seat non-rising stem gate valves 3-inches through 12-inches diameter.
All internal parts shall be accessible without removing the valve from the line. The top stem O-rings shall be field replaceable (in the full open position) without removing the valve from service.
Valves shall be tested and certified by the manufacturer for shut-off at a working pressure of 200 psi and shell tested to a minimum pressure of 300 psi.

Butterfly Valves (BFV)

All butterfly valves shall conform to AWWA C-504, except as herein modified.
Unless otherwise specified or shown on the drawings, butterfly valves shall be mechanical joint, short body type AWWA Type-B valves. The pipe ends inserted into the valve shall be beveled as required to ensure that there is no interference between the disc and the pipe ends. Flanges, where required or shown on the drawings, shall be 125 pound, full faced, drilled per ANSI B16.1 unless otherwise specified.
Unless otherwise specified or shown on the drawings, all valve operators shall be totally enclosed traveling nut type manual operators, sealed and lubricated for underground service, and shall be rated for submerged operation up to 10 psi (± 23 feet).
Valves shall be tested and certified by the manufacturer for shut-off at a working pressure of 150 psi and hydrostatically tested to a minimum test pressure of 200 psi.

SERVICE PIPE FITTINGS AND SERVICE SADDLES

All water service piping shall conform to the construction drawings and standards of the public agency with jurisdiction over the water systems.

WATER METERS AND METER BOXES

Water meters shall be as required by the City or other agency having authority.
Contractor shall supply water meters where required by the public agency with jurisdiction over the public water system.
Meter boxes within traffic areas shall be traffic rated with steel covers and cast iron reading lids conforming to the requirement of the public agency with jurisdiction over the public water system.
Where connecting to existing water meters, Contractor shall supply all required fittings to make connection, including replacement of riser pipe and fittings on the discharge side of the meter.

FIRE HYDRANTS

All fire hydrants shall conform to local fire district requirements, and shall be UL listed and FM approved.
Unless otherwise required by local fire district requirements, all fire hydrants shall conform to the following:

All fire hydrants shall be improved, dry barrel, 5¼ inch compression type valve, traffic model.
Fire hydrants shall be equipped with two 2½ inch hose ports (NST), one 4½ inch pumper port (NST), 1½ inch pentagon nut, and barrel drains.
Fire Hydrant Extensions.
Extension assemblies for fire hydrants shall be supplied by the manufacture of the hydrant for which the extension is required.
Fire hydrants shall be oriented per Marion County Fire Marshall, or as directed by the Owner's Representative. Where required by the Owner or fire department, all port cap chains shall be removed completely.

MAINLINE BLOWOFFS
Minimum allowable blowoff size shall be 2-inch.
Unless otherwise shown or authorized by the Owner's Representative, all mainline blowoffs shall have consist of brass or bronze fittings and valves as specified herein or shown on the drawings tapped into a blind flange, cap or plug as appropriate.
Unless otherwise shown or authorized by the Owner's Representative, all blowoffs shall be provided with valve boxes and/or meter boxes as shown or specified.

TAPPING TEES
Tapping tees used for making connections to existing, in-service lines shall have Class 125 outlet flanges with resilient wedge gate valve tapping valves.
In all cases, the tapping tee shall be designed for use with the existing pipe materials and O.D. equivalent.
Unless otherwise specified or approved by the Owner's Representative, all tapping tees shall be all stainless steel construction with full perimeter gaskets, conforming with the minimum requirements of AWWA C223.
The tapping tees shall be Mueller Model H304, JCM Industries Model 432, or approved equal.

BACKFILL AND BEDDING MATERIAL
Unless otherwise shown on the drawings or specified herein, all pipe bedding materials shall be in conformance with the applicable excavation and backfill specifications contained herein.
Concrete bedding and encasement in lieu of standard bedding material shall be installed as shown on the drawings or as specified.

CONCRETE
Concrete shall conform to OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 3,300 psi.
Reinforcing steel shall be deformed bars conforming to ASTM A-615, Grade 60.

TONING WIRE
A continuous insulated 12 gauge solid core copper toning wire shall be supplied with non-metallic pipe.
Insulation shall be blue in color for potable water piping. All splices in toning/tracer wire shall be completed with watertight and corrosion resistance splices (waterproof wire nuts).
Additional wire shall be supplied as necessary to allow the toning wire to be looped up at all valve boxes on all lines.

BACKFLOW DEVICES
Backflow devices shall conform with Oregon Health Division requirements and standards of the public agency with jurisdiction over the water systems.
Backflow device installation shall conform to OAR 333-061-0071 "Backflow Installation Standards."

PART 3 - EXECUTION

PRODUCT HANDLING
Care shall be taken in handling and transporting to avoid damaging pipe and appurtenances. Loading and unloading shall be accomplished with the material under control at all times and under no circumstances shall the material be dropped. Material shall be securely wedged and restrained during transportation and supported on blocks when stored in the shop or field. Manufacturer's recommendations shall be carefully followed during material handling and storage.

Store all pipe on a flat surface so that the blocking will support the barrel evenly. It is not recommended that pipe be stacked higher than four (4) feet. Plastic pipe, if stored outside, shall be covered with an opaque material to protect it from sunlight.
Lower all pipe and fittings into trench in a manner to prevent damage to pipe or fittings. Heavy impact may cause a slight longitudinal indentation in the outside of PVC pipe and a crack on the inside. This may result in a split as soon as the pipe is placed under pressure. Any pipe that has been impacted shall be examined closely for this type of damage.

PREPARATION OF TRENCH

Trench excavation shall conform to requirements of applicable sections contained herein.
Unless otherwise specified or shown on the drawings, the width of the trench at the top of the pipe shall not exceed the values outlined below. Trench widths are based on the width of the pipe plus the distance from each side of the pipe to the face of the trench (or the back of the sheeting, if used). For pipe twenty-four (24)-inches in diameter or less, trench width shall not exceed width of the pipe plus nine (9) inches on each side.
Unless otherwise directed or called for on the drawings, all pipe trenches shall be excavated below the proposed pipe invert as required to accommodate the depths of pipe bedding material as scheduled on the drawings.

DEPTH, GRADE AND ALIGNMENT

Unless a deeper depth is shown on the drawings, all waterlines shall be installed with a minimum depth of bury of three (3) feet measured from the top of pipe to finish grade. A greater depth may be necessary to avoid underground obstructions or as shown on the drawings. A minimum of six (6) inches of clearance shall be maintained between the pipe and obstructions, including other underground utilities.
When waterlines are designed to be laid in a straight line and/or at a specific grade, the deviation from line and grade shall not be in excess of 0.2 feet horizontally for line and 0.1 feet vertically for grade. Upward or downward grade shall be maintained as shown on the drawings to avoid air entrapment at unintended high points in lines.

UTILITY CONFLICTS

The Contractor shall be responsible for exposing potential utility conflicts far enough ahead of pipeline construction to make necessary adjustments in grade and alignment of the new work within the recommended limits of pipe and fitting deflection and/or the lines and grades stated in the Contract Documents.
The Contractor shall be responsible for informing the Owner's Representative of the need for a grade and/or alignment adjustment. Where failure to expose potential utility conflicts in advance results in the necessity of removing and/or relocating newly laid pipe, this additional work shall be performed by the Contractor at no additional expense to the Owner.
The Contractor shall not deviate from the design line and grade stated in these Contract Documents without the approval of the Owner's Representative.

SANITARY SEWER CROSSINGS

Where sanitary sewer lines are above or within 18-inches vertical separation below a public waterline, center one full length of waterline pipe at point of crossing the sewer main or sewer lateral. Furthermore, unless otherwise specifically approved in writing by the public agency with jurisdiction over the public water system on a case-by-case basis, the sewer main and/or lateral shall be replaced with a 12 foot length of AWWA C-900 PVC pipe (DR 18) centered at the waterline crossing in accordance with OAR 333-061. Connect to existing sewer lines with City-approved rubber couplings with a stainless steel shear band, or solid sleeve repair couplings.
Contractor shall contact Owner's Representative and the public agency with jurisdiction over the public water system when sewer lines are found within the above described zone. Owner's Representative may field verify the need for replacing sewer lines based on OAR 333-061-0050(9)c. Contractor shall perform work required for the Owner's Representative to make such determination. Contractor shall install C-900 PVC sewer lines only after direction from the Owner's Representative.
When pressure sewers must be replaced as outlined above, they shall be replaced at the time the waterline crossing. Where gravity sewer mains or laterals must be replaced as outlined above, they shall be replaced prior to pressure testing the new waterline.

OPERATION OF EXISTING VALVES

The Owner or the public agency with jurisdiction over the public water system will operate or supervise the operation of all existing valves during the course of the work. The Contractor shall not operate any existing valve unless specifically instructed to do so by the Owner, the Owner's Representative, or the public agency with jurisdiction over the public water system.
The Contractor shall be responsible for coordination of the work with the Owner or the public agency with jurisdiction over the public water system to provide for the timely operation of existing valves.
The Contractor shall coordinate and perform the work so as not to require the Owner's personnel or the public agency with jurisdiction over the public water system to operate any valves outside of normal work hours.

SANITARY PRACTICES DURING INSTALLATION

Pipe shall not be laid in standing water. Precautions shall be taken to prevent dirt, debris, or other foreign materials from entering the pipe during all phases of construction. Tools, rags, and other materials shall be kept out of the pipe at all times.
At the end of each day, or at other times when the trench site is left unattended, the open ends of the pipe shall be sealed with a water tight plug to prevent trench water and foreign materials from entering the pipe. If water is in the trench, the seal shall remain in place as long as water is able to enter the pipe.

PIPE INSTALLATION

Pipe shall be laid and joined one length at a time to the required line and grade. Pipe shall be placed with the bell end facing the direction of laying unless otherwise specified.
Where pipe is laid on grades in excess of fifteen percent (15%), the bells shall face upgrade. Where pipe is laid on grades in excess of twenty percent (20%), pipe anchorage systems shall be required.
The outside of the spigot and the inside of the bell shall be clean before the pipe or fittings are installed. If the pipe contains dirt or other foreign matter, the interior of the pipe shall be cleaned as necessary to remove the material prior to installation.
As the pipe is placed in the trench, bell holes shall be dug and the pipe supported on bedding materials the full length of the barrel.
Where required, lubricate the outer surface of the rubber gaskets and the spigot end of the pipe using approved lubricant.
Assemble the pipe in accordance with the manufacturers recommendations. Regardless of the method used to assemble the pipe, the pipe shall be kept in alignment during installation of the spigot into the bell end or the fitting.
After each length of pipe is installed in the trench, the pipe shall be secured in place with approved backfill material tamped under and along sides to prevent movement. Additional backfill material shall be placed and compacted in layers to the height shown on the plans and details or as directed. The remainder of the trench shall be backfilled as specified and called for in these Contract Documents.
Pipe ends shall be kept clear of backfill at all times.
Wherever piping passes through walls, a wall casting pipe or sleeve shall be installed unless otherwise shown on the drawings.

<u>Above Grade Restrained Push-On Joint Pipe</u>

Where restrained joint ductile iron pipe and fittings having a flexible, positively restrained boltless push-on joint system capable of being deflected after assembly is installed in non-buried applications, the Contractor shall exercise care to ensure that the make-up slack is taken out of all joints during assemble prior to pressurizing the pipe.

TRACER WIRE

A continuous 12 gauge solid core copper toning wire shall be supplied with all non-metallic pipe.
Toning wire shall be looped up into water valve boxes, fire hydrant valves and backflow devices.

FITTING INSTALLATION

All connections shall be made in strict accordance with manufacturer's recommendations.
The connection of ductile iron pipe with plain ends of the same diameter in new construction shall be accomplished with ductile iron, mechanical joint sleeve couplings unless otherwise approved by the Owner's Representative.
All fittings shall be supported by concrete independently of the pipe.
Contractor shall use the correct rubber ring with the ductile iron bell or fitting, (Tyton ring with Tyton bell; MJ ring with MJ fitting) and specifically designed for the pipe O.D. equivalent used.

CUTTING PIPE

General

Where new or existing pipe requires cutting in the field it shall be done in a manner to leave a smooth end at right angles to the pipe centerline. The pipe shall be marked around its entire circumference prior to cutting.

After cutting and dressing or beveling, the reference mark on the spigot shall be accurately relocated and marked at the proper distance from the end as recommended by the manufacturer. The reference mark may be located by using a factory marked end of the same size as a guide.

Ductile Iron Pipe

Ductile iron pipe shall not be flame cut.

The cut end of the pipe shall be ground smooth as required. For push-on joint connections, the cut end shall be beveled as necessary to remove sharp edges which may damage the gasket. The width and general appearance of the bevel shall closely resemble the bevel on an original pipe end.

Any lining or coating damaged during the cutting process, as determined by the Owner's Representative, shall be cause for removing the damaged section by recutting the pipe or for rejecting the pipe altogether.

PVC Pipe

For push-on joint connections, the cut end shall be beveled as specified herein.

Factory finished beveled end may be used as a guide to determine the angle and length of taper. The end may be beveled using a plastic pipe beveling tools which will cut the correct taper automatically. A portable type sander or abrasive disc may also be used to bevel the pipe end. Any equivalent tool or equipment which will produce a smooth bevel surface may be substituted.

CONNECTION TO EXISTING, IN-SERVICE MAINS

Immediately prior to installation, all fittings, valves and appurtenances, including tool surfaces which will come in contact with potable water, shall be thoroughly cleaned by washing with potable water and then swabbed or sprayed with a one percent (1%) hypochlorite solution in accordance with the requirements of AWWA C-651 and OAR 333-061.

Cut-In Connections

All valves shall be operated by or under the supervision of the Owner. Prior to starting construction on cut-in connections, the Contractor shall coordinate with the Owner for a test shutdown on the affected waterline segment to ensure that the existing waterline valves are operable and isolate the affected waterline segment. If the existing valves are not operable, the waterline connection shall be rescheduled for a time after the valves are repaired. Failure to coordinate such a test shutdown far enough in advance to avoid scheduling impacts will not entitle the Contractor to additional compensation or time due to delays while the existing valves are repaired or replaced.

Prior to taking any waterline out of service, the Contractor shall assemble all personnel, equipment, and materials necessary to complete the work, completely assemble all fitting assemblies and check components for compatibility with the existing waterline, and accomplish all excavation that is required to make the connection.

Existing valves may leak. The Contractor shall be prepared to make required connections in situations where there is still a partial flow of water after the isolation valves have been closed. The Contractor shall not be entitled to additional compensation for making connections under such conditions.

In situations where an existing pipe joint is found adjacent to a proposed connection and the Owner's Representative determines that construction operations may compromise the joint, the Contractor shall remove the existing pipe between the joint and the new work as directed by the Owner's Representative, and replace that section with new materials.

Tapping Tees

Contractor shall fully support the weight of the tapping tee, associated valve and the existing pipeline. Under no circumstances shall the weight of the tapping unit be supported by the existing pipe. Pipe which is damaged due to failure of the Contractor to follow this requirement shall be replaced at no additional cost to the Owner.

Couplings & Adapters

Where solid sleeve MJ couplings are used to insert a valve or connection in an existing mainline, the configuration of the fittings shall be such that there no more than 1/8" gap between the cut end of the new

pipe and the cut end of the existing pipe. The use of a “wedding band” ring to make up a gap is not acceptable.

STANDARD MAIN BLOW-OFFS

At all permanent dead-ends on new waterlines and at other locations specified or shown on the drawings, a blow-off assembly shall be installed as specified herein and in accordance with drawing details.

On all lines not specifically designated as permanent dead-end lines, thrust blocks shall not be placed in front of the end of the pipe. The mainline shall be tied back to allow for future connection without taking the line out of service.

Valve boxes and/or meter boxes shall be provided for all blow-offs as shown and shall be installed flush with finished grade and be kept free of rocks and debris .

PIPE ANCHORAGE

Pipe anchorage systems shall be installed as shown on the drawings or as specified herein.

All plugs, caps, tees, and bends of 11¼° or more on waterlines that are 4-inches in diameter or larger shall be securely anchored by concrete thrust blocking. The use of threaded tie back rods for permanent thrust restraint shall not be used unless specifically shown on the drawings or directed by the Owner’s Representative.

Thrust blocks shall be installed where specified herein, shown on the drawings, or as directed by the Owner’s Representative. Installation shall be in conformance with drawing details and the following:

All concrete thrust blocks shall be placed using forms as necessary to allow access to the bolt circles after the placement of the thrust blocking concrete. The bearing surface shall be placed so that the pipe and fitting joints will be accessible for repair. Concrete shall in no case extend around more than one-half the circumference of the fitting at any point.

A plastic sheet or other similar protection shall be placed between the concrete and any portions of the valve, fitting, or nuts and bolts with which the concrete comes in contact. Do not encase pipe joints or cover bolt circles with concrete.

Concrete thrust blocking shall be placed between undisturbed earth and the fittings to be anchored. If, in the opinion of the Owner’s Representative, the undisturbed earth against which the bearing surface will be established is compromised by adjacent trenches or excavations, the Contractor shall excavate additional material as required to establish a new bearing surface that is consistent with the size, configuration, and location of the piping.

SERVICE TAPS

All service pipe and fittings shall conform to requirements of the public agency with jurisdiction over the public water system. Installation shall be in accordance with pipe manufacturer's recommendations.

FIRE HYDRANTS

Installation of hydrants shall conform to plan details and local fire department requirements. Installation shall be in accordance with AWWA C-600 and set where indicated on plans or directed by the Owner’s Representative.

Hydrants shall be installed true and plumb.

Hydrants shall be set a minimum of three (3) feet behind the curb/sidewalk unless otherwise shown or directed.

Hydrants shall set so that the center of the safety breakaway flange is located a minimum of 2 inches and a maximum of 6 inches above finished curb, sidewalk or finished grade.

Where utility conflicts may require changes in grade, Contractor shall pothole existing utilities far enough in advance to allow the proper height hydrants to be on hand.

Hydrants set too high shall be removed and replaced with an appropriate hydrant by the Contractor at no additional cost to the Owner. Extensions required for hydrants set too low shall be supplied and installed by the Contractor at no additional cost to the Owner. Grading around hydrants shall be such that drainage is directed away from the hydrant base.

All new hydrants shall be bagged with opaque plastic and taped until they are placed into service.

New hydrants which have the factory coating chipped or otherwise damaged prior to substantial completion (including damage during shipping or delivery), shall be repainted by the Contractor with an approved epoxy paint, at no additional cost to the Owner. The epoxy paint shall approved in writing by the hydrant manufacturer (with information on the epoxy paint system and evidence of manufacturer’s approval submitted to the Owner’s Representative), color to match the factory coating color.

VALVE AND VALVE BOX INSTALLATION

Valve installation shall be in accordance with AWWA C-600 and applicable sections contained herein. Valves not being connected to new or existing pipelines or to a blowoff assembly shall be provided with a blind flange or restrained MJ plug. A valve box shall be supplied for each valve, conforming to plan requirements and at locations shown on plans or staked in field.
Contractor shall install an extension stem on all valves where operator nut is four (4) or more feet below finish grade.
Valve boxes shall be centered over the valve and installed plumb, with the cover flush with the finished grade. Valve boxes shall be set so they do not transmit shock or stress to the valves.
Backfill shall be placed around the valve boxes and thoroughly compacted in conformance with the compaction requirements for the adjacent backfill, and in a manner that will not damage or displace the valve box from proper alignment or grade. Misaligned valve boxes shall be excavated, plumbed and backfilled at Contractor's expense. Valve boxes shall be kept free of rocks and debris at all times.
Toning wire, where required, shall be looped up at all valve boxes.
After any valve has been opened or closed, the valve actuator shall be backed of about ¼ turn from the fully open/closed end stop position.
A 6-inch thick, 3300 psi concrete collar (minimum 18-inch diameter) shall be placed around all valve boxes installed in non-paved areas.

PRESSURE AND LEAKAGE TESTS FOR PRESSURE PIPE
The Contractor shall furnish the pump, pipe connections, taps, pressure gauges, auxiliary water container, bulkheads, plugs, calibrated containers and other necessary equipment and perform pressure and leakage tests on all mainline and water services unless otherwise directed by the Owner's Representative.
Test Pressure Gauges.
All pressure gauges used for pressure measurement shall be in excellent condition, and shall be provided with graduations not greater than 2 psi. Any evidence of gauge damage or stickiness (ie. gauge will not zero, needle creeping upwards during test, needle moves to higher or lower reading when gauge is tapped, etc.) will result in the test being aborted until the gauge is replaced.
Tests shall be conducted on all pipelines or valved sections thereof. Tests on lines anchored or blocked by concrete shall not be conducted until the concrete has taken permanent set. The contractor shall install temporary thrust restraint (straddle blocks, tie-back blocks, etc.) as required to anchor pipelines or valves that must be pressure tested prior to installation of permanent thrust restraint.

Valve Position Verification.
Where test pressure is 250 psi or less, the hydrostatic test shall be performed with the hydrant line valves open. Prior to the start of each pressure test, the position (i.e., open or closed) of all mainline valves and hydrant line valves in the test segment shall verified. At the discretion of the Owner's Representative, the position of all mainline and hydrant line valves may be verified at the end of the pressure test prior to bleeding pressure off the mainline.

Service Lines.
All new service lines shall be installed to the meter location prior to conducting the pressure test. Prior to the start of each pressure test, the position of all corporation stops in the test segment shall verified by bleeding water from the meter stop. The hydrostatic test shall be performed with all service line corporation stops open and meter stops closed.

Air Removal
Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the Contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged or left in place at the discretion of the Owner.
Hydrostatic leakage testing shall be performed in conformance to the applicable sections of AWWA C-600 or local jurisdiction requirements, whichever is more stringent, except as modified below. Unless otherwise authorized by the Owner, all hydrostatic leakage tests shall be witnessed by the Owner's Representative.
The test pressure for private domestic water service lines shall be 150 percent (150%) of the maximum static pressure.

The test pressure for fire lines, including backflow devices, shall be 200 psi unless otherwise approved by the local fire department.
Hydrostatic pressure shall be applied by pumping water from an auxiliary supply. The Contractor shall accurately determine the amount of water required to reach the initial test pressure and the amount required to re-pressurize the pipe structure at the completion of the test period.
The test pressure shall be maintained for a minimum of two (2) hours and additional time as required for thorough inspection to find any leaks or defects in the water main and appurtenances. Should the pipe section fail to pass the test, or if the test is aborted due to faulty pressure gauges, the Contractor shall find and correct failures and repeat the tests until satisfactory results are obtained, all at no additional cost to the Owner.

Allowable Leakage

No pipe installation will be accepted if the leakage is greater than that determined by the formula outlined below or local jurisdiction requirements, whichever is more stringent.
L = SD(P)½/133,200
Where:
L=allowable leakage, in gallons per hour
S=length of pipe tested, in feet
D=nominal diameter of the pipe, in inches
P=average test pressure during the leakage test, in pounds per square inch (gauge)
NOTE:This formula is based on an allowable leakage of 11.65 gpd/mi/in. of nominal diameter at a pressure of 150 psi.
The allowable leakage in gallons per hour at various pressures and pipe sizes is shown below. In the event of discrepancies between formulas and table values, the more stringent shall apply. All visible leaks shall be repaired regardless of the allowance used for testing. The maximum pressure drop over the duration of the test shall not exceed 5 psi.

ALLOWABLE LEAKAGE PER 1,000 FEET OF PIPELINE - gph

AVG. TEST PRESSURE Psi	NOMINAL PIPE DIAMETER - in.									
	3	4	6	8	10	12	14	16	18	20
250	0.36	0.47	0.71	0.95	1.19	1.42	1.66	1.90	2.14	2.37
225	0.34	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.25
200	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12
175	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	1.98
150	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84
125	0.25	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51	1.68
100	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50

If the pipe structure under test contains sections of various diameters, the allowable leakage shall be the sum of the computed leakage for each size. No additional leakage allowance will be given for fire hydrant assemblies or valves.

CLEANING POTABLE WATER MAINS

All water mains shall be cleaned in accordance with AWWA C-650.
After the pressure test and prior to disinfecting, the water lines shall be thoroughly flushed through hydrants, blow offs or by other means as approved by the Owner's Representative.

DISINFECTING POTABLE WATER MAINS

All water mains and service lines shall be disinfected in accordance with the requirements of AWWA C-651 or OAR 333-061, whichever is more stringent, except as modified herein.
The Contractor shall furnish required materials and apparatus and perform the work of disinfection. If additional taps and open trenches at points of connection are required, the Contractor shall bear the responsibility of making taps and maintaining open trenches until a satisfactory laboratory analysis has been obtained.
Unless otherwise approved by the Owner's Representative, water distribution systems shall be disinfected by the introduction of calcium or sodium hypochlorite as a water mixture. Chlorinating powders shall be mixed with water, in proportions of 5% powder to 95% water by weight, to a paste and

thinned to a slurry, to be introduced into the pipe by pumping, or other means approved by the Owner's Representative.
Application shall be made at the beginning of the line through a corporation stop with water supplied from the pressure side of a valve to fill the line, controlled to a very low flow. Extremities of the lines being treated shall be opened to ensure removal of air and complete filling.
The dosage of chlorinating agent shall be of the amount to produce a minimum chlorine residual of 25 mg/L of free chlorine at all points in the line. Tests with the DPD method shall be made at selected points, including the meterstop end of service laterals, to determine the residual. Where required by the public agency with jurisdiction over the water system, the agency's representative shall witness the application of the chlorine solution.
Treated water shall be retained in the lines for sufficient time to accomplish the desired disinfection but not less than 24 hours. All valves in the mainline segment being tested, other than valves used to isolate the mainline test segment (including fire hydrant valves), shall be operated at least once during the first half of the disinfection period (i.e. closed and re-opened). At the end of this 24 hour disinfection period, the treated water in all portions of the main shall have a remaining residual of not less than 10 mg/L free chlorine.
Following chlorination, all treated water shall be flushed from the lines at their extremities until the replacement water throughout the lines shall, upon test, be chemically and bacteriologically acceptable to the Public Authority having jurisdiction. Contractor to pay for laboratory analysis of water samples taken by the Owner's Representative. Should the initial treatment prove ineffective, the chlorination shall be repeated at no additional cost to the Owner until confirmed tests show acceptable results.

Disposal of Heavily Chlorinated Water
Unless otherwise approved, the chlorine residual of water being disposed of shall be neutralized by treating with one of the chemicals listed below.

Pounds of Chemicals Required to Neutralize Various Residual Chlorine Concentrations in 100,000 Gallons of Water				
Residual Chlorine Concentration Mg/L	Sulfur Dioxide (SO2) lb	Sodium Bisulfite (NaHSO3) lb	Sodium Sulfite (Na2SO3) lb	Sodium Thiosulfate (Na2S2O3 5H2O) lb
1	0.8	1.2	1.4	1.2
2	1.7	2.5	2.9	2.4
10	8.3	12.5	14.6	12.0
50	41.7	62.6	73.0	60.0

A substantial excess of dechlorinating chemical may be harmful to the environment. Care should be exercised to balance the amount of dechlorinating chemical against the chlorine present.
The dechlorinating chemical shall not be added directly to the water holding structure.

CERTIFICATION TESTING OF BACKFLOW DEVICES
Following pressure testing and disinfection, the Contractor shall have all backflow devices tested by a state certified backflow tester, and provide written copies to the Owner's Representative.

CLEANUP
Cleanup of construction area shall closely follow pipe-laying activities.
Contractor shall remove all excess materials, broken pavement, construction equipment, etc., within three (3) days after pipe is laid in any area.
Contractor shall level and reseed lawn areas, grade and gravel shoulder or parking areas, and replace any signs, mailboxes, etc. which were removed or damaged.
Surface restoration shall conform to the requirements contained herein.

1 WATERLINE PRESSURE TEST REPORT

Marion County Sheriff's Office		
Date:	Waterline to be tested	
Inspector:	From Station:	To Station:
Prior to start of test, verify that all in-line valves, including hydrant mainline valves, are open? ☐ Yes ☐ No		
Prior to start of test, verify that all services installed to meter location and all corp stops are open? ☐Yes ☐ No		
Verify that pressure gauge is mounted at high point of line to be tested? ☐ Yes ☐ No If no, correct for elevation difference (ie. add 0.433 psi per foot elevation difference).		
System Static Pressure_____	Starting Pressure _____ (greater of 150 psi or 1.5 times static)	Ending Pressure:_____
Test Length: (2 hours minimum)	Starting Time:	Ending Time:
Volume Required to Reach Initial Test Pressure (gal):	Allowable Leakage (gal): (2 times table value below)	Measured Leakage (gal):
TEST RESULTS: ☐ Pass ☐ Fail		

2

3 ALLOWABLE LEAKAGE PER 1,000 FEET OF PIPELINE - gph

Test Pressure Psi	NOMINAL PIPE DIAMETER - in.									
	3	4	6	8	10	12	14	16	18	20
200	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12
175	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	1.98
150	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84

If the pipeline under test contains various diameters, the allowable leakage shall be the sum of the allowable leakage for each size. No additional leakage allowance will be given for fire hydrant assemblies or valves.

Allowable leakage based on : $L = SD(P)^{1/2}/133{,}200$

Where:

L = allowable leakage, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of the pipe, in inches
P = test pressure during the leakage test, in psig

Regardless of leakage, maximum pressure drop during test period shall not exceed 5 psi.

4

5 TEST PROCEDURE

6 Apply hydrostatic pressure by pumping water from an auxiliary supply basin. Accurately determine the
7 amount of water required to reach the initial test pressure by refilling the supply basin with a calibrated
8 container following pressurization of pipeline.
9 Monitor test pressure for 2 hour period.
10 At the completion of the test period, re-pressurize the pipeline by pumping water from the auxiliary supply
11 basin. Accurately determine the amount of water required to reach the test pressure by refilling the
12 supply basin with a calibrated container following pressurization of pipeline. If the measured leakage is
13 less than the allowable leakage, the test is successful.
14
15 END OF SECTION

PART 1 - GENERAL

SECTION INCLUDES

This section includes the furnishing, installing and testing of all sanitary sewer lines as shown on the drawings or as required to complete the work.

Material to be furnished and installed shall include, but not be limited to all-sanitary sewer piping, fittings, accessories, joints, and jointing materials.

Work shall include maintaining existing sanitary sewer flows at all times during the course of construction.

Notify Owner's Representative when existing conditions differ from that shown on the drawings.

Replacement of designated mainline segments & service lateral connections.

RELATED SECTIONS

Section 33 05 13, Concrete Manholes.

Section 31 23 16.13, Trench Excavation and Backfill.

QUALITY CONTROL

Field Inspection:

All pipe sections, specials, and jointing materials shall be carefully examined for defects and no piece shall be laid that is known to be defective. Any defective piece discovered after installation shall be removed and replaced with a sound one in a manner satisfactory to the Owner's Representative at the Contractor's expense.

Defective material shall be marked with lumber crayon and removed from the job site before the end of the following day.

Field Testing:

All materials, process of manufacturing and finished pipe shall be subject to inspection and approval.

The Owner's Representative may select one sample of pipe on the job site of each production run of each size and type of pipe to be tested by the laboratory. The Contractor shall furnish the first test piece or pipe core and any additional samples required because of failures. Should the sample fail to meet specifications, retests shall be conducted by the laboratory in conformance with the specifications. Cost of all retests shall be born by the Contractor.

SUBMITTALS

Submittals shall be in accordance with the requirements of these Contract Documents showing and shall include the following:

Manufacture's literature for each size and type of pipe and fittings used.

Joint details and any special provisions or tools required for assembly

A certificate from the pipe manufacturer stating that the materials have been sampled and tested in accordance with the provisions of and meet the requirements of the designated specification. The certificate shall be signed by an authorized agent of the manufacturer.

CONTRACTOR'S RECORD DRAWINGS

The Contractor shall maintain a neatly marked set of record drawings showing the locations and depths of all waterlines, storm, and sanitary sewer laterals, buried conduits and other utilities encountered during construction. Drawings shall be kept current with the work as it progresses and shall be subject to inspection by the Owner's Representative at any time.

PART 2 - PRODUCTS

GENERAL PIPE

Non-Pressure (Gravity) PVC Pipe

Unless otherwise shown on the drawings, gravity PVC pipe and fittings fifteen (15)-inches in diameter or less shall conform to ASTM D-3034, SDR 35.

Unless otherwise shown on the drawings, gravity PVC pipe and fittings eighteen (18) inches and larger in diameter shall conform to ASTM F 679, PS 46.

Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM classification.

PVC Pipe Joints

Joints for PVC pipe shall be push-on joints using factory installed elastomeric ring gaskets.

Unless otherwise specified, the gaskets shall be securely fixed into place by the manufacturer so that they cannot be dislodged during joint assembly.

The gaskets shall be of a composition, texture, which is resistant to common ingredients of sewage and industrial wastes, including; oils, and groundwater and which will endure permanently under the conditions of the proposed use.

The joints for all gravity sewers shall conform to ASTM D-3212, Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

Ductile Iron Pipe

All ductile iron pipe shall be centrifugally cast in conformance to AWWA C-151 unless otherwise specified. All ductile iron pipe shall be minimum Class 52 thickness, unless otherwise shown or specified.

All ductile iron pipe and fittings, with the exception of solid sleeve couplings, shall be cement mortar lined and seal coated in accordance with AWWA C-104.

MANHOLES

Manholes shall be constructed as shown on the drawings to size, shape, depth and at locations indicated, but never less than 4'-0" inside diameter.

Main and Lateral Pipes: Neatly cut off main and lateral pipes flush with inside of manhole or inlet where they enter structure walls, and point up irregularities and rough edges with non-metallic non-shrink grout.

Inverts: Shape inverts for smooth flow across structure floor as shown on drawings. Use concrete and mortar to obtain proper grade and contour and finish surface to allow smooth transition.

PIPE ACCESSORIES

Fittings shall be of the same material as the pipe, molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations as required.

Repair Couplings for Gravity PVC Sewer Pipe (D3034 or F679)

Repair couplings for PVC gravity sewer mainlines or laterals shall be solid sleeve slip PVC couplings (no stop coupling designed to be slid fully onto the pipe on one side of the repair, and then slid back over and centered on the repair joint).

Flexible, Mechanical Couplings and Adapters for Non-Compatible Pipes Sizes or Types.

Flexible, mechanical couplers and adapters shall be used for connecting plain ends of non-compatible types or sizes of pipe and for the installation of cut-in tee connections and other fittings into existing lines.

Couplers and adapters shall be supplied with stainless steel bands.

Flexible mechanical couplers and adapters shall be as manufactured by Fernco or approved equal.

MAINLINE CLEANOUTS

Unless otherwise specified or shown in the drawings, mainline cleanouts shall consist of the following:

Lid and frame of heavy-duty cast iron construction with closed lid design, and cast iron shaft of internal diameter as shown on the drawing.

Provide an 18” minimum square, 6-inch thick, 3,300-psi concrete collar for mainline cleanouts located in non-paved areas.

SERVICE LATERAL CONNECTIONS

Unless otherwise specifically noted on the drawings, manufactured fittings (tee or wye per local jurisdiction standards) shall be used for all lateral connections to new sewer mainlines.

Connections to existing mainlines shall utilize Inserta-Tees or service saddles as noted on the drawings or per local jurisdiction standards.

SERVICE LATERAL CLEANOUTS

Unless otherwise shown in the drawings or specified, service lateral cleanouts shall be of the same size, pipe and material as the service lateral.

Unless otherwise directed by the Owner's Representative, the top of all property line service lateral cleanouts shall be set at finish grade.

UNDERGROUND WARNING TAPE

Detectable or non-detectable acid and alkali resistant safety warning tape shall be provided with all mainline and service lateral construction not located under paved portions of public streets.

The tape shall consist of a minimum 4.0 mil (0.004") thick, virgin low density polyethylene plastic film formulated for extended use underground. The tape shall be in accordance with the APWA national color code and shall be permanently imprinted in lead free black pigments suitable for direct burial.

For gravity sewers, the tape shall be safety green and shall be provided with the legend "CAUTION BURIED SANITARY SEWER LINE BELOW" or approved equivalent printed continuously down the length of the tape.

For force mains, the tape shall be safety green and shall be provided with the legend "CAUTION BURIED SEWER FORCE MAIN BELOW" or approved equivalent printed continuously down the length of the tape.

TONING WIRE

A continuous insulated 12 gauge solid core copper toning wire shall be supplied with non-metallic pipe. Insulation shall be green in color for sanitary sewer piping. All splices in toning/tracer wire shall be completed with watertight and corrosion resistance splices (waterproof wire nuts).

Additional wire shall be supplied as necessary to allow the toning wire to be looped up at all service laterals on all lines.

VALVE BOXES (VB)

All buried valves shall be provided with valve boxes. Valve boxes shall conform to Standard Details. Lid to read "Sewer" for sewer system valves.

All parts of valve boxes and covers shall be coated by dipping in bituminous varnish.

All valve boxes shall be provided with VC212 self centering valve box bases as manufactured by 3 Dimensional Contracting, or approved equal.

PART 3 - EXECUTION

PRODUCT HANDLING

Care shall be taken in handling and transporting to avoid damaging pipes and their coatings. Loading and unloading shall be accomplished with the pipe under control at all times and under no circumstances shall the pipe be dropped. Pipe shall be securely wedged and restrained during transportation and supported on blocks when stored in the shop or field.

Storage: Store all pipe on a flat surface so as to support the barrel evenly. Pipe shall not be stacked higher than 4 feet. Plastic pipe, if stored outside, shall be covered with an opaque material to protect it from sunlight.

PREPARATION OF TRENCH

Trench excavation shall conform to requirements of the applicable sections contained herein.

GRADE AND ALIGNMENT

The Contractor shall utilize sufficient string lines, targets, batterboards and survey instruments as necessary for accurate installation.

Deviation from line and grade shall not exceed ½ -inch (0.04 feet) on line and ¼ -inch (0.02 feet) on grade at any point, provided such variations in grade do not result in a pipe or run of pipe having a level or reverse slope.

Any pipe or run of pipe that has not been installed within the allowable tolerance for line and grade or impounds water to any extent shall be removed and reinstalled or replaced as necessary to bring the work into compliance with the specified requirements.

UTILITY CONFLICTS

The Contractor shall be responsible for exposing potential utility conflicts far enough ahead of pipeline construction to make necessary adjustments in grade and alignment of the new work as may be directed by the Owner's Representative.

The Contractor shall be responsible for informing the Owner's Representative of the need for a grade and/or alignment adjustment.

The Contractor shall not deviate from the design line and grade stated in these Contract Documents without the approval of the Owner's Representative.

INSTALLATION

All pipes shall be installed in accordance with methods set forth by the manufacturers written installation manuals. All pipe and fittings shall be lowered into trench in a manner to prevent damage to pipe.

Granular backfill shall be thoroughly compacted under all tee and wye fittings. Granular backfill shall be laterally contained so as to prevent unraveling and subsequent loss of support for fitting.

Pipes shall be let into manholes and connections grouted in with non-metallic non-shrink grout.

Pipe laid directly over or within eighteen (18) vertically inches of proposed or existing water mains shall have one full length of ductile iron pipe centered over the waterline and shall be cradled in 3,300 psi concrete cushion to adequately spread imposed loads and prevent crushing of the pipe.

Unless otherwise specifically shown on the drawings, any field connections to existing sewers such as cut-in tees shall be subject to approval by the Owner's Representative.

TEMPORARY PLUGS

When pipe installation work in trenches is not in progress, the open ends of the pipe shall be closed with temporary watertight plugs. Plugs shall have ears or a lip to prevent the plug from entering the pipe. Contractor shall take all precautions necessary to prevent flotation of pipe.

If water is in the trench when work is resumed, plugs shall not be removed until all danger of water entering the pipe is eliminated.

The use of pipelines as conductors for trench drainage during construction shall be prohibited.

SEWER SERVICE LATERALS

Sewer service laterals shall be a minimum diameter of 4 inches.

Unless otherwise shown on the drawings, sewer service laterals shall be installed at a minimum slope of ¼ inch per foot of run (2% minimum).

Minimum depth of service laterals at the edge of the easement or public right-of-way shall be 4 ½ feet below finish surface grade.

Individual sewer service laterals shall not be connected to manholes unless shown on the drawings or approved by the Owner's Representative.

Unless otherwise shown on the drawings, the maximum line or grade change made with any one fitting shall not exceed 22½°. All changes in line or grade within the public right-of-way or public easements shall be accomplished with "long radius" type bends.

Ends of all new service laterals and service fittings shall be provided with approved watertight plugs, caps, or stoppers, suitably braced to prevent blow-off during internal air testing. Such plugs or caps shall be removable without damage to the pipe or fitting.

MARKERS

The ends of all service lateral pipe not reconnected to existing service lines and that are to be covered with backfill shall be marked with a 2 x 4-inch lumber marker wired to the pipe stub.

Markers shall be in one piece. Splicing of lumber used for markers is only permitted in situations where the depth of the pipe is in excess of standard lumber lengths.

Markers shall be installed in a vertical position with the bottom end of the marker against the end of the pipe. Markers shall be extended a minimum of twelve (12) inches above finish grade of the ground surface. Markers that are broken, too short, or are not installed vertically in the ground shall be replaced by removing the backfill and replacing and/or repositioning the marker.

The entire portion of the marker above ground level shall be painted with weatherproof white paint. After the paint has dried, weatherproof black paint or other permanent materials shall be used to neatly indicated the distance from the ground surface at the marker to the top of the pipe.

In areas where it is not practical to extend markers above the ground surface, as determined by the Owner's Representative, the tops of the markers shall be installed flush with the ground surface.

UNDERGROUND WARNING TAPE

Underground warning tape shall be placed a minimum of 12-inches and a maximum of 18-inches below the finish ground surface, and shall be continuous the entire length of the mainline and service laterals installed.

CLEANUP

Cleanup of construction area is to closely follow pipe-laying activities.

Removal of all excess materials, broken pavement, construction equipment, etc., to be done within three (3) days after pipe is laid in any area.

Level and reseed lawn areas. Grade and gravel shoulder or parking areas. Replace any signs, mailboxes, etc., which were removed or damaged.

TRENCH COMPACTION, PIPE FLUSHING AND CLEANING

Before mandrel testing and/or TV inspection of sewer lines, all trench compaction shall be completed and compaction tests submitted, and all sewer/storm lines flushed & cleaned to remove all foreign material from the mainlines, manholes and catch basins.

In cases where a new sewer line is connected to an existing sewer line and extended upstream, the contractor shall clean the debris from the existing line segment downstream of the connection point as required to ensure a smooth and uninterrupted flow line. In all cases, the entire line segment between structures shall be cleaned to ensure that debris is not left in the lines.

TESTING GRAVITY SANITARY SEWERS

The Contractor shall be responsible for submitting completed test report forms to the Owner's Representative for all sewer lines tested. The Contractor shall furnish the pump, pipe plugs, pressure gauges, compressor and other necessary equipment and perform pressure leakage tests on all mainlines and laterals unless otherwise directed by the Owner's Representative.

Air Testing Gravity Sewers

All gravity sanitary sewers, including service laterals and appurtenances, shall successfully pass the air test prior to final acceptance and shall be free of leakage or visible infiltration of water.

Except as modified herein, test methods shall conform to the requirements of 2008 APWA Standard Specification, OSSC (ODOT/APWA) 00445.72.c, Air Testing, or local jurisdiction requirements, whichever are more stringent. Per OSSC (ODOT/APWA) 00445.75, visible infiltration of ground water in any pipe section (after completion of a successful air test) will be considered evidence that the original test was in error or that a failure of the section has occurred.

Sewer pipe thirty (30)-inches in diameter and larger may be tested using an approved pneumatic joint testing device. Such testing methods and equipment shall meet the approval of the Owner's Representative.

Sanitary sewers shall not be coated internally or externally with any substance of any kind in an effort to improve the performance of the pipe when tested.

Test Pressure Gauges.

All pressure gauges used for pressure measurement shall be in excellent condition, and shall be provided with graduations not greater than 0.5 psi, with a minimum range of 0 to 9.0 psi. Any evidence of gauge damage or stickiness (ie. gauge will not zero, needle creeping upwards during test, needle moves to higher or lower reading when gauge is tapped, etc.) will result in the test being aborted until the gauge is replaced.

Minimum test pressure is 4.0 psi.

Test pressure shall be increased by 0.433 psi for each foot of average ground water depth over the exterior crown of the pipe under test, with the maximum test pressure not to exceed 9.0 psi (for other than pneumatic joint testing devices approved by the Owner's Representative for larger diameter pipe as noted above).

The Owner's Representative may require testing of manhole-to-manhole sections as they are completed in order to expedite the acceptance of completed portions of the system and allow connections before the whole system being completed.

Deflection Testing for Flexible Pipe

In addition to hydrostatic or air testing, the Contractor shall conduct deflection tests of sanitary sewers constructed of flexible pipe. The testing shall be conducted by pulling an approved mandrel through the completed pipeline. The diameter of the mandrel shall be 95 percent of the pipe initial inside diameter.

Testing shall be conducted on a manhole-to-manhole basis and shall be done after the line has been completely flushed out with water and all backfill is compacted and tested. Unless otherwise approved by the Owner's Representative, the tests shall be conducted not less than 15 days after the trench backfill and compaction has been completed and may be conducted concurrently with television inspection.

TV INSPECTION

TV inspection will be arranged by the Contractor and at the Contractor's expense. After completion of the gravity sanitary sewer installation, trench backfilling, compaction and surface restoration, leakage and mandrel testing, each line will be inspected using closed circuit television. Any deficiencies or violations during these inspections or during the warranty period shall be corrected immediately by the Contractor at the direction of the Owner's Representative, all at the expense of the Contractor. Sufficient water to reveal low areas or reverse grades shall be discharged into the pipe immediately before initiation of the TV inspection. Any reinspection required by the City or the Owner's Representative will be at the Contractor's expense. Copies of all DVDs and written reports shall be delivered to the Engineer by the Contractor.

MAINTAINING SANITARY SEWER FLOWS

All sanitary sewer system components shall remain in service throughout the construction operations unless specific exceptions are approved in writing by the Owner's Representative.

All construction that requires interruption of sanitary sewage flow shall be executed during periods designated by the public agency with jurisdiction over the sewers. Bypassing of untreated or partially treated wastewater to storm drains, ditches or surface waters is prohibited. Surcharging of upstream sewers is prohibited unless specifically approved in writing by the public agency with jurisdiction over the sewers.

The methods used to maintain flow shall be the Contractor's design (subject to approval by the public agency with jurisdiction over the sewers), and may include bypass pumping, use of flow through plugs with periodic release of sewage flow, sewage hauling, etc. The bypass system, if used, shall be capable of conveying flows when the sewers are flowing full.

Bypass pumping shall consist of furnishing, installing and maintaining all power, primary and standby pumps, appurtenances and bypass piping required to maintain existing flows and services. Bypass systems left in place or operated outside of normal working hours be provided with on-site 100% redundancy for the bypass pumping equipment, and shall be monitored continuously by the Contractor personnel unless alternate arrangements are proposed by the Contractor acceptable to the public agency with jurisdiction over the sewers (ie. high level and pump fail alarm callouts, etc). The Contractor shall provide all submittal information required to demonstrate compliance with the requirements of the public agency with jurisdiction over the sewers.

Bypass pumping shall be done in such a manner as not to damage private or public property, or create a nuisance or public menace. The pumped sewage shall be in an enclosed hose or pipe that is adequately protected from traffic, and shall be redirected into the sanitary sewer system. Dumping or free flow of sewage on private property, gutters, streets, sidewalks, or into storm sewers is prohibited.

SANITARY SEWER AIR TEST REPORT

Marion County Sheriff's Office										
Inspector(Print)						Date:				
TV Inspection Required? Yes / No						Mandrel Testing Completed? Date Completed or Scheduled:				
Station (& Manhole #)		Main/ Lateral	Size & Material	Total Length (ft)	C^1	K^1	Test Time (Seconds) for Pressure Drop Shown (psi)			Comments
From	To						Required[2]	4.0 3.5	3.5 2.5	
		Main								Pass / Fail
		Laterals								
		Totals								
		Main								Pass / Fail
		Laterals								
		Totals								
		Main								Pass / Fail
		Laterals								
		Totals								
		Main								Pass / Fail
		Laterals								
		Totals								

For total C ≤ 1.0, test time (seconds) required = 2 times K

For total C > 1.0, test time (seconds) required = 2 times (K/C)

TEST PROCEDURE

Add air slowly to the portion of the pipe installation under test until the internal air pressure is raised to 4.0 psig (or higher pressure as required to address groundwater). Increase the test pressure by 0.433 psi for each foot of average ground water depth over the exterior crown of the pipe under test, with the maximum test pressure not to exceed 9.0 psi.

Add air slowly until the internal air pressure is raised to 4.0 psig (or higher pressure as required due to groundwater).

After required test pressure is reached, allow 2-minutes minimum for air temperature to stabilize, adding only the amount of air required to maintain pressure.

After the temperature stabilization period, disconnect the air supply.

Record the time required for the internal air pressure to drop from 3.5 psi (or higher as required due to groundwater backpressure) to 2.5 psi (or higher as required due to groundwater

backpressure). If this time exceeds the required time (or if there is less than 1.0 psi pressure drop), the test is successful.

ACCEPTANCE:

The tested sewer section shall be considered acceptable if the pressure drop during the test time is less than 1.0 psi from the starting pressure.

SEWER AIR TEST C AND K VALUES

1 C = 0.0003882dL Where d = diameter (inches)

2 K = 0.011d2L L = Length (ft)

Example:

Air Test a system consisting of two mainline segments as follows:

For total C $\leq$ 1.0, test time (seconds) required = 2 times K

For total C > 1.0, test time (seconds) required = 2 times (K/C)

The tested sewer section shall be considered acceptable when tested as described herein if the section under test does not loose air at a rate greater than 0.0015 cfm per square foot of internal sewer surface.

Mandrel testing shall conducted on a manhole to manhole (or cleanout) basis and shall be done after the line has been completely flushed out with water.

Mandrel testing shall be conducted after trench backfill and compaction has been completed.

The mandrel diameter shall be 95% of the pipe initial inside diameter. The inspector shall verify the diameter of each mandrel used during each test session.

END OF SECTION

PART 1 - GENERAL

SCOPE

This section includes furnishing, installing and testing of all storm sewer lines as shown on the drawings or as required to complete the work.

Material to be furnished and installed shall include, but not be limited to all storm sewerage drainage piping, fittings, accessories, joints and jointing materials.

RELATED SECTIONS

Section 33 44 13.13, Catch Basins, Inlets and Junction Structures.

Section 33 05 13, Concrete Manholes.

QUALITY CONTROL

Field Inspection:

All pipe sections and jointing materials shall be carefully examined for defects and no piece shall be laid that is known to be defective. Any defective piece discovered installed shall be removed and replaced with a sound one in a manner satisfactory to the Owner's Representative at the Contractor's expense. Defective material shall be marked with lumber crayon and removed from the job site before the end of the following day.

Field Testing:

All materials, process of manufacturing, and finished pipe shall be subject to inspection and approval. The Owner's Representative may select one sample of pipe on the job site of each production run of each size and type of pipe to be tested by the laboratory. The Contractor shall furnish the first test piece or pipe core and any additional samples required because of failures. Should the sample fail to meet specifications, retests shall be conducted by the laboratory in conformance with the specifications. Cost of all retests shall be born by the Contractor.

SUBMITTALS

Submittals shall be in accordance with the requirements of these Contract Documents showing and shall include the following:

Manufacturer's literature for each size and type of pipe and fittings used.

Joint details and any special provisions required for assembly.

A certificate from the pipe manufacturer stating that the materials have been sampled and tested in accordance with the provisions of and meet the requirements of the designated specification. The certificate shall be signed by an authorized agent of the manufacturer.

CONTRACTOR'S RECORD DRAWINGS

The Contractor shall maintain a neatly marked set of record drawings showing the locations and depths of all waterlines, storm and sanitary sewer laterals, buried conduits and other utilities encountered during construction. Drawings shall be kept current with the work as it progresses and shall be subject to inspection by the Owner's Representative at any time.

PART 2 - PRODUCTS

PVC Gravity Storm Pipe

Unless otherwise shown on the drawings, gravity PVC pipe and fittings fifteen (15)-inches in diameter or less shall conform to ASTM D-3034, SDR 35.

Unless otherwise shown on the drawings, gravity PVC pipe and fittings eighteen (18) inches and larger in diameter shall conform to ASTM F 679, PS 46.

Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM classification.

Joints for PVC pipe shall be push-on joints using factory installed elastomeric ring gaskets.

Unless otherwise specified, the gaskets shall be securely fixed into place by the manufacturer so that they cannot be dislodged during joint assembly.

The joints shall conform to ASTM D-3212, Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

Couplings to be Ring-tie or Fluid-Tite, manufactured by Johns-Manville or CertainTeed or approved equal.

Unless otherwise specified or shown on the drawings, the use of PVC pipe is allowed with a minimum pipe cover of 24-inches. Contractor may lower the pipe grade to achieve minimum cover as approved by the Owner's Representative.

High Density Polyethylene Pipe (HDPE)

The use of HDPE shall be allowed only where shown on the drawings.
Pipe and fittings shall have integrally formed smooth interior pipe surface for storm drain and for perforated pipe applications.
HDPE (High Density Polyethylene) pipe conforming to AASHTO M-252 (8"-10") or AASHTO M-294 (≥12").
For slopes less than 6% the pipe shall be ADS N-12 IB ST, Hancor Sure-Lok F477, or approved equal.
For slopes greater than 6% the pipe shall be ADS N-12 IB WT, Hancor Blue Seal, or approved equal with watertight pressure testable fittings."
Pipe and fittings shall have integrally formed smooth interior pipe surface for.
Couplings shall be corrugated to match the pipe corrugations and the width shall not be less than one-half the nominal diameter of the pipe. Where approved by the Owner's Representative, a mastic type gasket may be utilized.
Unless otherwise specified or shown on the drawings, use of HDPE pipe is allowed with a minimum pipe cover of 30-inches. Contractor may lower the pipe grade to achieve minimum cover only as approved by the Owner's Representative.

FITTINGS

Unless otherwise specified, Fittings to be same material, type, class and grade as sewer pipeline in which it is installed, and shall conform to same specifications as sewer pipe.
Connection of service laterals to the mainline shall be accomplished with manufactured fittings or Inserta-Tees. All holes in mainline pipe shall be core drilled.

DRAINAGE GEOTEXTILE FABRIC

Geotextile fabric used in conjunction with perforated pipe drainage application shall be of non-woven, needle punched construction and consist of long chain polymeric filaments or fibers. Under no circumstances shall slit film or woven geotextiles be allowed.
The geotextile fabric shall be a Type 2 drainage geotextile conforming to OSSC (ODOT/APWA) 00350, Geotextile Installation, and OSSC (ODOT/APWA) 02320, Geosynthetics.
Drainage geotextile fabric shall be non-woven fabric (Geotex 601, Mirafi 160N, Linq 150EX or approved equal).

UNDERGROUND WARNING TAPE

Detectable or non-detectable acid and alkali resistant safety warning tape shall be provided with all mainline and service lateral construction not located under paved portions of public streets.
The tape shall consist of a minimum 4.0 mil (0.004") thick, virgin low density polyethylene plastic film formulated for extended use underground. The tape shall be in accordance with the APWA national color code and shall be permanently imprinted in lead free black pigments suitable for direct burial.
The tape shall be safety blue and shall be provided with the legend "CAUTION BURIED STORM DRAIN LINE BELOW" or approved equivalent printed continuously down the length of the tape.

TONING WIRE

A continuous insulated 12 gauge solid core copper toning wire shall be supplied with non-metallic pipe.
Insulation shall be green in color for sanitary sewer piping. All splices in toning/tracer wire shall be completed with watertight and corrosion resistance splices (waterproof wire nuts).
Additional wire shall be supplied as necessary to allow the toning wire to be looped up at all service laterals on all lines.

CATCH BASINS & INLETS

Catch basin & inlet sizes and configurations shall be as specified in Section 02606, or as shown or noted on the drawings, and as required to conform with local jurisdiction requirements.

PART 3 - EXECUTION

PRODUCT HANDLING

Care shall be taken in handling and transporting to avoid damaging pipes and their coatings. Loading and unloading shall be accomplished with the pipe under control at all times and under no circumstances shall the pipe be dropped. Pipe shall be securely wedged and restrained during transportation and supported on blocks when stored in the shop or field.
Storage: Store all pipe on a flat surface so as to support the barrel evenly. Pipe shall not be stacked higher than 4 feet. Plastic pipe, if stored outside, shall be covered with an opaque material to protect it from the sunlight.

PREPARATION OF TRENCH
Trench excavation shall conform to requirements of the applicable sections contained herein.

GRADE AND ALIGNMENT
The Contractor shall utilize sufficient string lines, targets, batterboards and survey instruments as necessary for accurate installation based on the line and grade stakes provided by the surveyor.
Deviation from line and grade shall not exceed ½-inch on line and ¼-inch on grade at any point, provided such variations in grade do not result in a pipe or run of pipe having a level or reverse slope.
Any pipe or run of pipe that has not been installed within the allowable tolerance for line and grade or impounds water to any extent shall be removed and reinstalled or replaced as necessary to bring the work into compliance with the specified requirements.

UTILITY CONFLICTS
The Contractor shall be responsible for exposing potential utility conflicts far enough ahead of pipeline construction to make necessary adjustments in grade and alignment of the new work within the recommended limits of pipe and fitting deflection and/or the lines and grades stated in the Contract Documents.
The Contractor shall be responsible for informing the Owner's Representative of the need for a grade and/or alignment adjustment.
The Contractor shall not deviate from the design line and grade stated in these Contract Documents without the approval of the Owner's Representative.

PIPE INSTALLATION
All pipes shall be installed in accordance with methods set forth by the manufacturers written installation manuals and per OSSC (ODOT/APWA) 00445, Sewer, Storm, Culvert, Siphon and Irrigation Pipe.
Pipes shall be let into manholes and connections grouted in with non-metallic non-shrink grout.
Pipe laid directly over existing water mains shall have one full length of ductile iron pipe centered over the waterline and shall be cradled in 3,300 psi concrete cushion to adequately spread imposed loads and prevent crushing of the pipe.
Any field connections to existing storm sewers such as cut-in tees, shall be subject to approval by the Owner's Representative. Where existing field tile, trench drains, etc., are intercepted by new trunk storm sewers, they shall be plumbed into the trunk in an approved manner.
Storm Drain Pipe Replacement
Unless otherwise shown or noted on the drawings, when replacing piping manhole to manhole, existing pipe shall be sawcut within six (6) inches of the outside face of the manhole, and the new pipe connected to the stubs with approved couplings only after the condition of the existing stub is approved by the agency with jurisdiction. Otherwise, the existing pipe shall be removed (and the hole re-cored as necessary), and the new pipe shall be let into the manhole and connections grouted with non-metallic non-shrink grout. The existing manhole shall be protected from damage at all times.
Replacement work shall be started from the downstream end and proceed upstream, and shall conform to lines and grades established by the Owner's Representative.
Contractor shall locate & expose all storm pipe laterals, roof drain connections, sump discharge laterals, building drainage systems, etc. as work progresses and determine which are live. Contractor shall provide tees and reconnect live storm pipe laterals as main construction progresses. Interruption of storm drain service to any building for more than two (2) hours shall be prohibited. Contractor shall notify any property owner a minimum of 24 hours before any interruption in storm drain service occurs.
Storm drain systems shall be intact during non-work hours. All trenches within ten (10) feet of a traveled roadway or driveway shall be backfilled at the end of each work day. All other excavations shall be completely covered and adequately barricaded during non-construction times.
Contractor shall remove all pipe and fittings excavated during storm pipe replacement, and dispose of these materials in an approved manner within eight (8) hours after their excavation.

The Contractor shall run dye through every building drainage fixture, downspout, catch basin, cleanout, etc. that drains to the reconnected storm main or storm lateral. The Contractor shall certify in writing to the Owner that the dye testing as performed as specified herein, and that all existing storm drains, storm laterals and building drain lines are reconnected to the new storm drain system and are fully operational.

UNDERGROUND WARNING TAPE

Unless otherwise approved by the Owner's Representative, underground warning tape shall be placed a minimum of 12-inches and a maximum of 18-inches below the finish ground surface, and shall be continuous the entire length of the mainline and service laterals installed.

CLEANUP

Cleanup of construction area is to closely follow pipe-laying activities.
Removal of all excess materials, broken pavement, construction equipment, etc., to be done within three (3) days after pipe is laid in any area.
Level and reseed lawn areas. Grade and gravel shoulder or parking areas. Replace any signs, mailboxes, etc. which were removed or damaged.

TRENCH COMPACTION, PIPE FLUSHING AND CLEANING

Before mandrel testing and/or TV inspection of storm lines, all trench compaction shall be completed and compaction tests submitted, and all sewer/storm lines flushed & cleaned to remove all foreign material from the mainlines, manholes and catch basins.
In cases where a new storm sewer line is connected to an existing storm sewer line and extended upstream without a structure at the connection point, the contractor shall clean the debris from the existing line segment downstream of the connection point as required to ensure a smooth and uninterrupted flow line. In all cases, the entire line segment between structures shall be cleaned to ensure that debris is not left in the lines.

TESTING STORM SEWERS

All storm sewers shall be tested in accordance with local jurisdiction requirements.
The contractor shall be responsible for submitting completed test report forms to the Owner's Representative for all storm lines tested. The Contractor shall furnish the pump, pipe plugs, pressure gauges, compressor and other necessary equipment and perform pressure leakage tests on all mainlines and laterals unless otherwise directed by the Owner's Representative.

Leakage Testing

All storm drains, including service laterals and appurtenances, shall be free of leakage and visible infiltration of water.

Deflection Testing for Flexible Pipe

In addition to verifying pipes are free of leakage, the Contractor shall conduct deflection tests of storm drains constructed of flexible pipe. The testing shall be conducted by pulling an approved mandrel through the completed pipeline. The diameter of the mandrel shall be 95 percent of the pipe initial inside diameter.
Testing shall be conducted on a manhole-to-manhole basis and shall be done after the line has been completely flushed out with water. The tests shall be conducted not less than 30 days after the trench backfill and compaction has been completed.

Storm Sewer Mandrel Test Report

Project: Marion County Sheriffs Office, Salem, OR							
Inspector:				Printed Name:			
Inspection Company:				Date:			
Mandrel Diameters Verified? ☐ Yes ☐ No							
Station (& Manhole #)		Size & Material	Length (ft)	Results	Backfill Compaction Completed?	Date Sewer Flushed & Cleaned	Comments
From	To						
				☐ Pass ☐ Fail	☐ Yes ☐ No		
				☐ Pass ☐ Fail	☐ Yes ☐ No		
				☐ Pass ☐ Fail	☐ Yes ☐ No		
				☐ Pass ☐ Fail	☐ Yes ☐ No		
				☐ Pass ☐ Fail	☐ Yes ☐ No		
				☐ Pass ☐ Fail	☐ Yes ☐ No		
				☐ Pass ☐ Fail	☐ Yes ☐ No		
				☐ Pass ☐ Fail	☐ Yes ☐ No		
				☐ Pass ☐ Fail	☐ Yes ☐ No		
				☐ Pass ☐ Fail	☐ Yes ☐ No		
				☐ Pass ☐ Fail	☐ Yes ☐ No		
				☐ Pass ☐ Fail	☐ Yes ☐ No		
				☐ Pass ☐ Fail	☐ Yes ☐ No		

Mandrel testing shall conducted on a manhole to manhole (or cleanout) basis and shall be done after the line has been completely flushed out with water.

Mandrel testing shall be conducted after trench backfill and compaction has been completed.

The mandrel diameter shall be 95% of the pipe initial inside diameter. The inspector shall verify the diameter of each mandrel used during each test session.

END OF SECTION

PART 1 - GENERAL

SCOPE

This section includes furnishing and constructing precast or cast-in-place inlets, catch basins and junction boxes of designated types and at locations shown on the drawings and schedule details.
This section includes all necessary excavation, removal of existing structures, furnishing and installation of concrete, reinforcing steel, precast solid concrete block, Portland cement mortar and/or non-shrink grout, precast concrete inlet structures, flexible joints where specified, inlet castings, making watertight connections to new or existing storm sewers, and other incidental work.

DEFINITIONS

The terms catch basins, inlets, junction boxes and area drains as used herein refer to nomenclature on standard drawings for specified structures and on details shown on the drawings.
Types of catch basins, inlets, junction boxes and area drains included under this section shall be as designed and detailed on the drawings or as required by regulating authority.

SUBMITTALS

Submittals shall be in accordance with the requirements of these Contract Documents and shall include:
Shop drawings
Manufacturer's literature and certification for review purposes.

PART 2 - PRODUCTS

CAST-IN-PLACE CONCRETE

Cast-in-place concrete shall conform to OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 3,300 psi.

PRECAST CONCRETE

Unless otherwise allowed on the drawings or details, all cast-in-place or precast concrete shall be 4,000 psi at 28 days.

MORTAR AND GROUT

Mortar

Mortar used for the structures specified herein shall conform to ASTM C-270, Type S, containing no masonry cement. The mortar shall be composed of one part Portland cement to two parts sand by volume.

Non-Shrink Grout

Non-metallic non-shrink grout shall be Preco-Patch, or approved equal.

PRIVATE PVC CATCH BASINS

Private catch basin sizes and configuration shall be as shown or noted on the drawings, and as required to conform with local jurisdiction requirements and the Oregon Plumbing Code.
Unless otherwise shown on the drawings or required by local jurisdiction, all private catch basins shall be PVC body (24” diameter) traffic rated drain basins, with a ductile iron frame and a ductile iron herring-bone style grate, and shall be provided with a removable HPDE outlet trap secured with stainless steel clips.
Private catch basin castings shall conform to standard details for frame and grate, and shall be ductile iron per ASTM A536 Grade 70-50-05.
Private catch basins shall be Nyloplast traffic rated drain basin or approve equal with Nyloplast frame & grate.

PRIVATE PVC JUNCTION STRUCTURES (24” DIAMETER STORM MANHOLES)

Private PVC junction structure sizes and configuration shall be as shown or noted on the drawings, and as required to conform with local jurisdiction requirements and the Oregon Plumbing Code.
Unless otherwise shown on the drawings or required by local jurisdiction, all private junction structures shall be PVC body (24” minimum diameter) traffic rated drain basins, with a ductile iron frame and a ductile or cast iron solid cover.
Private catch basins shall be Nyloplast traffic rated drain basin or approve equal with Nyloplast frame & storm drain manhole lid.

PRIVATE PVC AREA DRAINS

Private area drains sizes and configuration shall be as shown or noted on the drawings, and as required to conform with local jurisdiction requirements.

Unless otherwise shown on the drawings, area drains shall consist of the following.

15-inch inline drain basin with a 15" ductile iron hinged grate with cast iron frame mounted to a PVC drain basin, as manufactured by Nyloplast or approved equal.

The PVC drain basin fitting shall include an integral single piece transition from the 15-inch grate to a gasketed socket the size of the area drain riser pipe shown on the drawings.

A 22½° bend shall be installed immediately below the PVC drain basin fitting to allow the 15-inch grate to be installed at an incline. The grate hinge shall be installed on the upper edge of the area drain.

PART 3 - EXECUTION

GENERAL

Location and type of inlets and catch basins installed shall be as shown on the drawings, scheduled and specified herein.

Standard detail drawings of the regulating authorities required catch basins and inlets shall be obtained by the Contractor.

INSTALLATION

Installation shall be in conformance with standard detail drawings.

Catch basin concrete shall be free from fractures, honeycombs, surface roughness and slipped edges. Damaged precast sections will be rejected.

All work shall conform to requirements of OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, as to workmanship for cast-in-place concrete.

Contractor shall dewater excavations prior to installation of structures.

Base section shall be placed on four (4) inches of compacted granular material.

Backfill shall be placed and compacted in 8-inch lifts around structures. Backfill type and compaction shall be the same as for adjacent pipe.

Pipe connections shall be let into precast or monolithic concrete walls smoothly. Any broken out concrete shall be grouted back solid for minimum of six (6) inches around the entire connection using non-metallic non-shrink grout.

Catch basins on public or private streets shall have two four (4)-inch diameter weepholes with granular material surrounding at subgrade level per standard drawing details.

Frames and extension rings shall not be grouted in until rims can be set accurately to final grade.

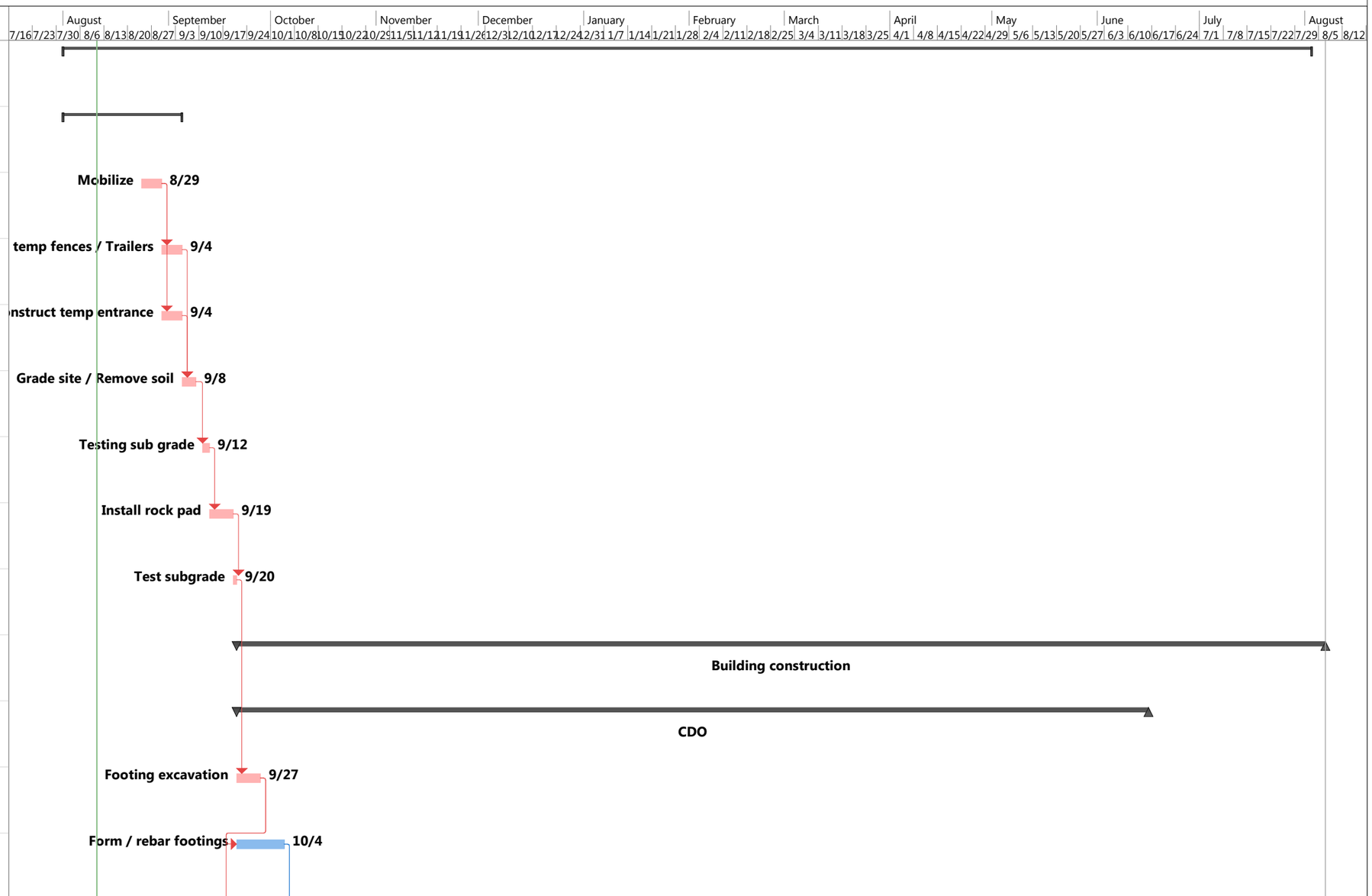
Unless otherwise specified or shown on the drawings, catch basin rims in paved areas shall be set one (1)-inch below grade and the pavement apron feathered thereto per standard details.

Unless otherwise specified or shown on the drawings, public catch basins (ie. those located within public streets) shall be provided with sumps with a minimum depth of 12-inches. Unless otherwise approved the Owner's Representative and agency with jurisdiction (on a case-by-case basis), the sump depths for public catch basin shall not exceed 24 inches.

END OF SECTION

Marion County Sheriff's Office Public Safety Building

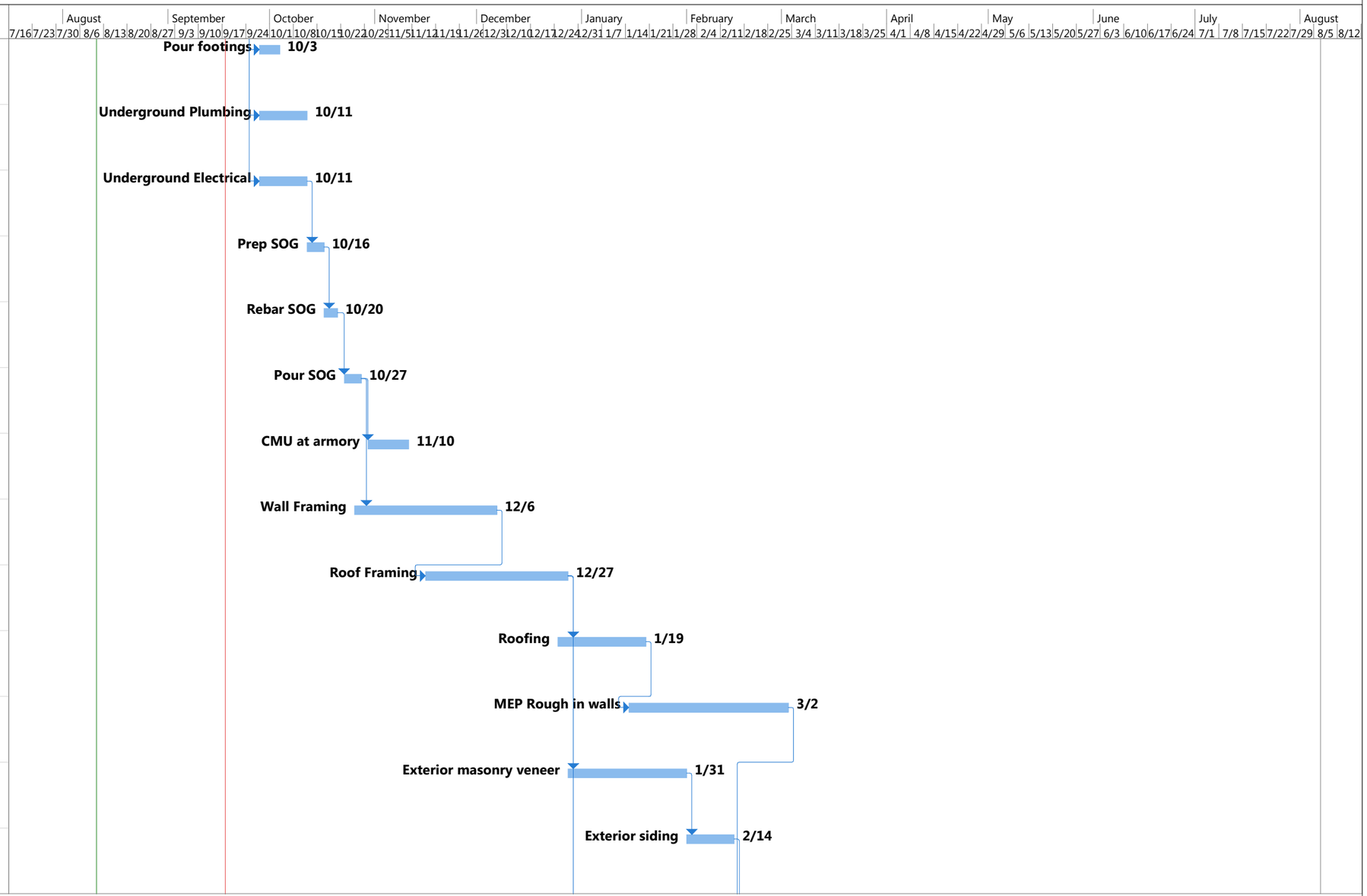
ID	Task Mode	Task Name	Duration	Start
1		**Construction**	**263 days**	**8/1/17**
2		**Site Package**	**25 days**	**8/1/17**
3		Mobilize	4 days	8/24/17
4		Set up temp fences / Trailers	4 days	8/30/17
5		Construct temp entrance	4 days	8/30/17
6		Grade site / Remove soil	4 days	9/5/17
7		Testing sub grade	2 days	9/11/17
8		Install rock pad	5 days	9/13/17
9		Test subgrade	1 day	9/20/17
10		**Building construction**	**228 days**	**9/21/17**
11		**CDO**	**192 days**	**9/21/17**
12		Footing excavation	5 days	9/21/17
13		Form / rebar footings	10 days	9/21/17



Critical	Split	Finish-only	Baseline Milestone	Manual Summary	Inactive Task
Critical Split	Task Progress	Duration-only	Milestone	Project Summary	Inactive Milestone
Critical Progress	Manual Task	Baseline	Summary Progress	External Tasks	Inactive Summary
Task	Start-only	Baseline Split	Summary	External Milestone	Deadline

Marion County Sheriff's Office Public Safety Building

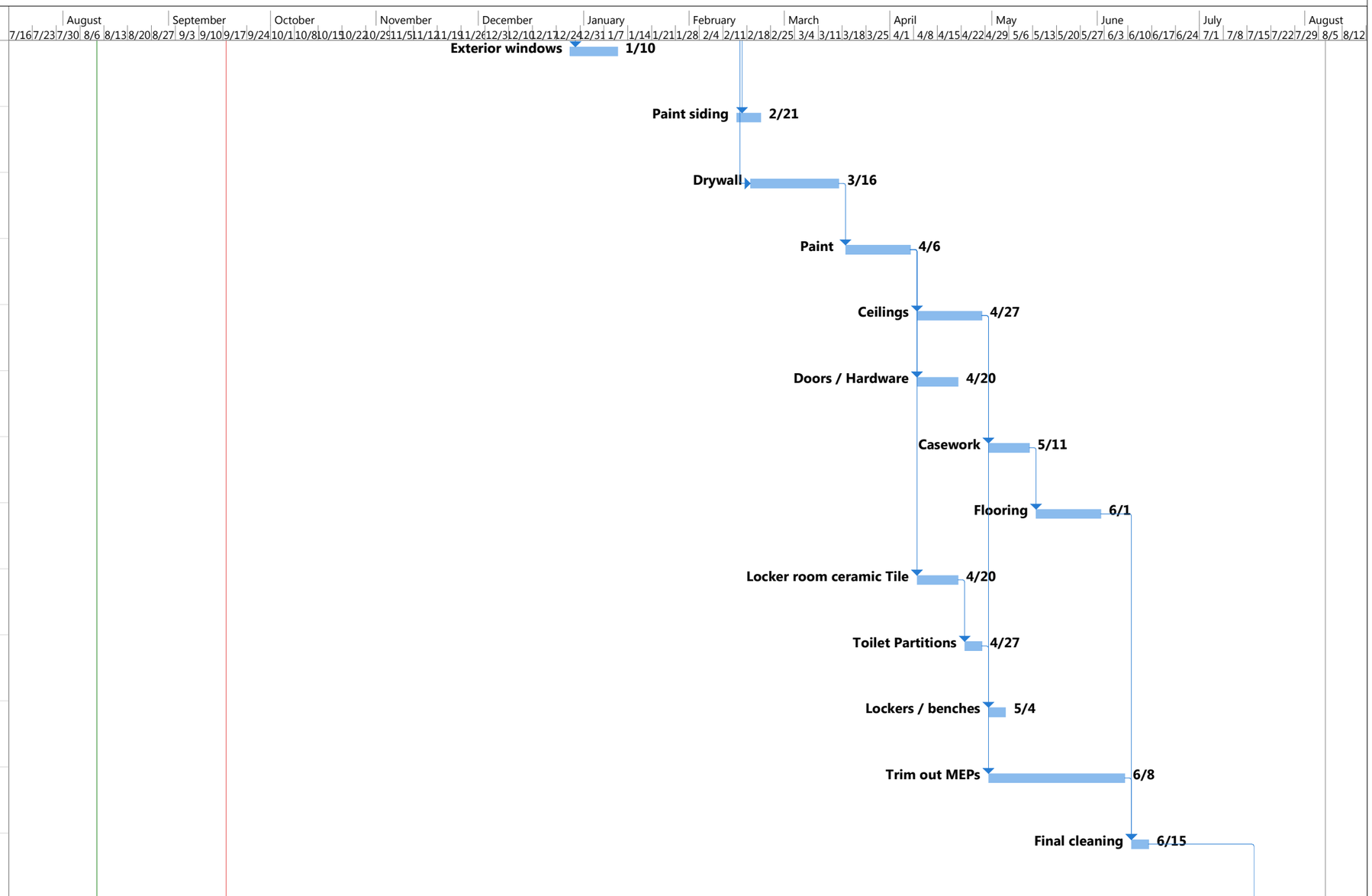
ID	Task Mode	Task Name	Duration	Start
14		Pour footings	4 days	9/28/17
15		Underground Plumbing	10 days	9/28/17
16		Underground Electrical	10 days	9/28/17
17		Prep SOG	3 days	10/12/17
18		Rebar SOG	4 days	10/17/17
19		Pour SOG	5 days	10/23/17
20		CMU at armory	10 days	10/30/17
21		Wall Framing	30 days	10/26/17
22		Roof Framing	30 days	11/16/17
23		Roofing	20 days	12/25/17
24		MEP Rough in walls	35 days	1/15/18
25		Exterior masonry veneer	25 days	12/28/17
26		Exterior siding	10 days	2/1/18



Critical	Split	Finish-only	Baseline Milestone	Manual Summary	Inactive Task
Critical Split	Task Progress	Duration-only	Milestone	Project Summary	Inactive Milestone
Critical Progress	Manual Task	Baseline	Summary Progress	External Tasks	Inactive Summary
Task	Start-only	Baseline Split	Summary	External Milestone	Deadline

Marion County Sheriff's Office Public Safety Building

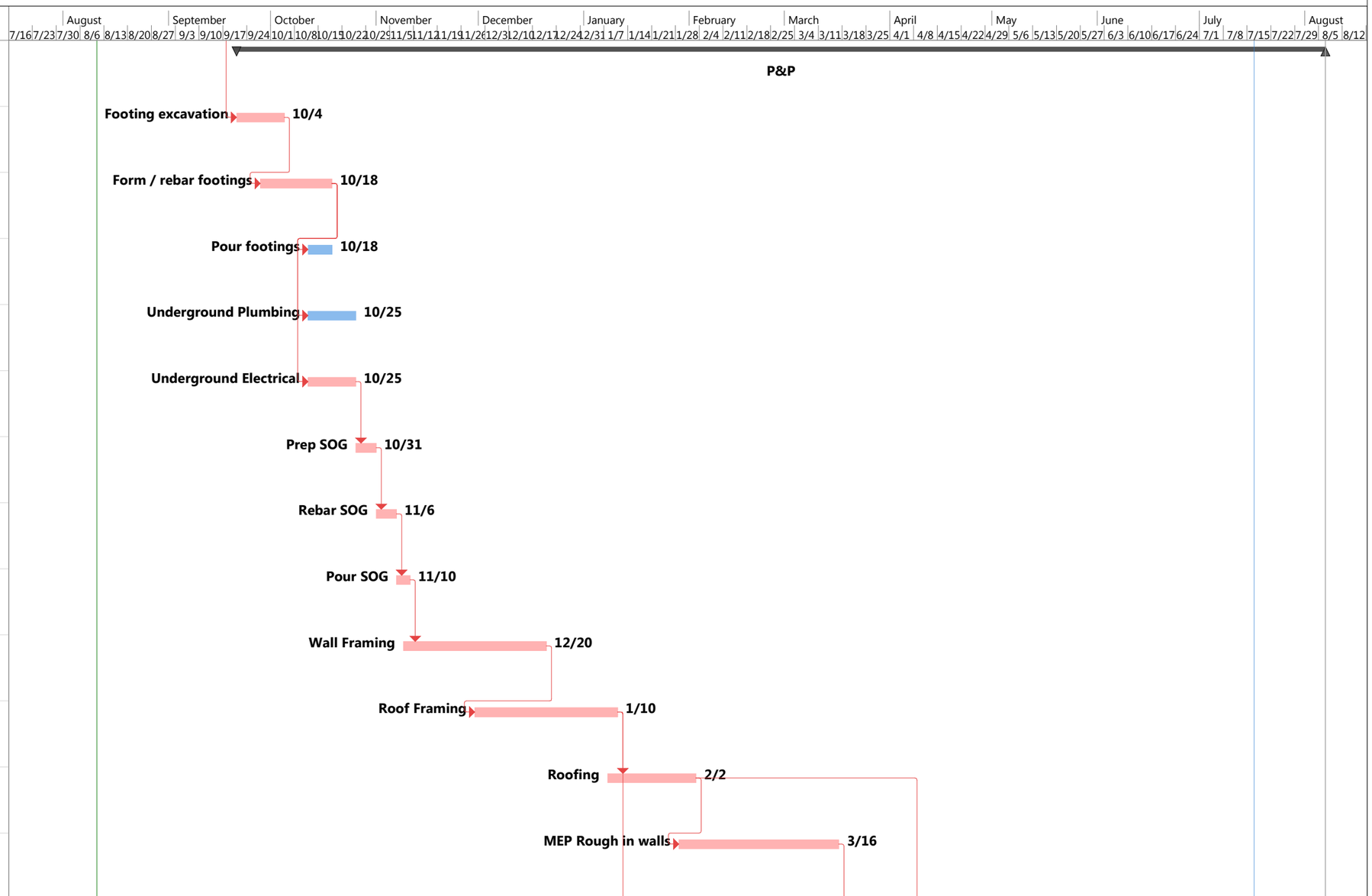
ID	Task Mode	Task Name	Duration	Start
27		Exterior windows	10 days	12/28/17
28		Paint siding	5 days	2/15/18
29		Drywall	20 days	2/19/18
30		Paint	15 days	3/19/18
31		Ceilings	15 days	4/9/18
32		Doors / Hardware	10 days	4/9/18
33		Casework	10 days	4/30/18
34		Flooring	15 days	5/14/18
35		Locker room ceramic Tile	10 days	4/9/18
36		Toilet Partitions	5 days	4/23/18
37		Lockers / benches	5 days	4/30/18
38		Trim out MEPs	30 days	4/30/18
39		Final cleaning	5 days	6/11/18



Critical	Split	Finish-only	Baseline Milestone	Manual Summary	Inactive Task
Critical Split	Task Progress	Duration-only	Milestone	Project Summary	Inactive Milestone
Critical Progress	Manual Task	Baseline	Summary Progress	External Tasks	Inactive Summary
Task	Start-only	Baseline Split	Summary	External Milestone	Deadline

Marion County Sheriff's Office Public Safety Building

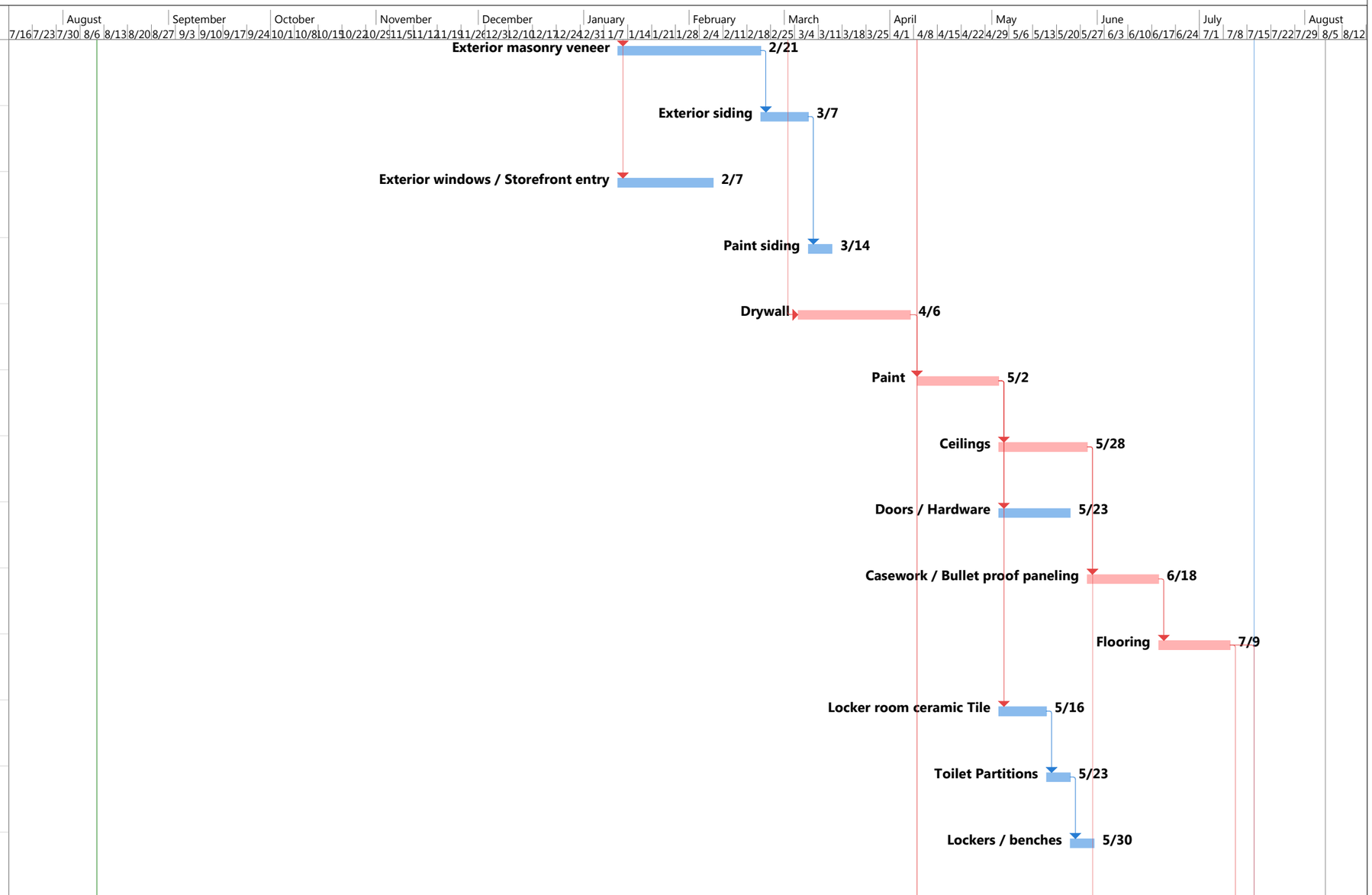
ID	Task Mode	Task Name	Duration	Start
40		**P&P**	**228 days**	**9/21/17**
41		Footing excavation	10 days	9/21/17
42		Form / rebar footings	15 days	9/28/17
43		Pour footings	5 days	10/12/17
44		Underground Plumbing	10 days	10/12/17
45		Underground Electrical	10 days	10/12/17
46		Prep SOG	4 days	10/26/17
47		Rebar SOG	4 days	11/1/17
48		Pour SOG	4 days	11/7/17
49		Wall Framing	30 days	11/9/17
50		Roof Framing	30 days	11/30/17
51		Roofing	20 days	1/8/18
52		MEP Rough in walls	35 days	1/29/18



Critical	Split	Finish-only	Baseline Milestone	Manual Summary	Inactive Task
Critical Split	Task Progress	Duration-only	Milestone	Project Summary	Inactive Milestone
Critical Progress	Manual Task	Baseline	Summary Progress	External Tasks	Inactive Summary
Task	Start-only	Baseline Split	Summary	External Milestone	Deadline

Marion County Sheriff's Office Public Safety Building

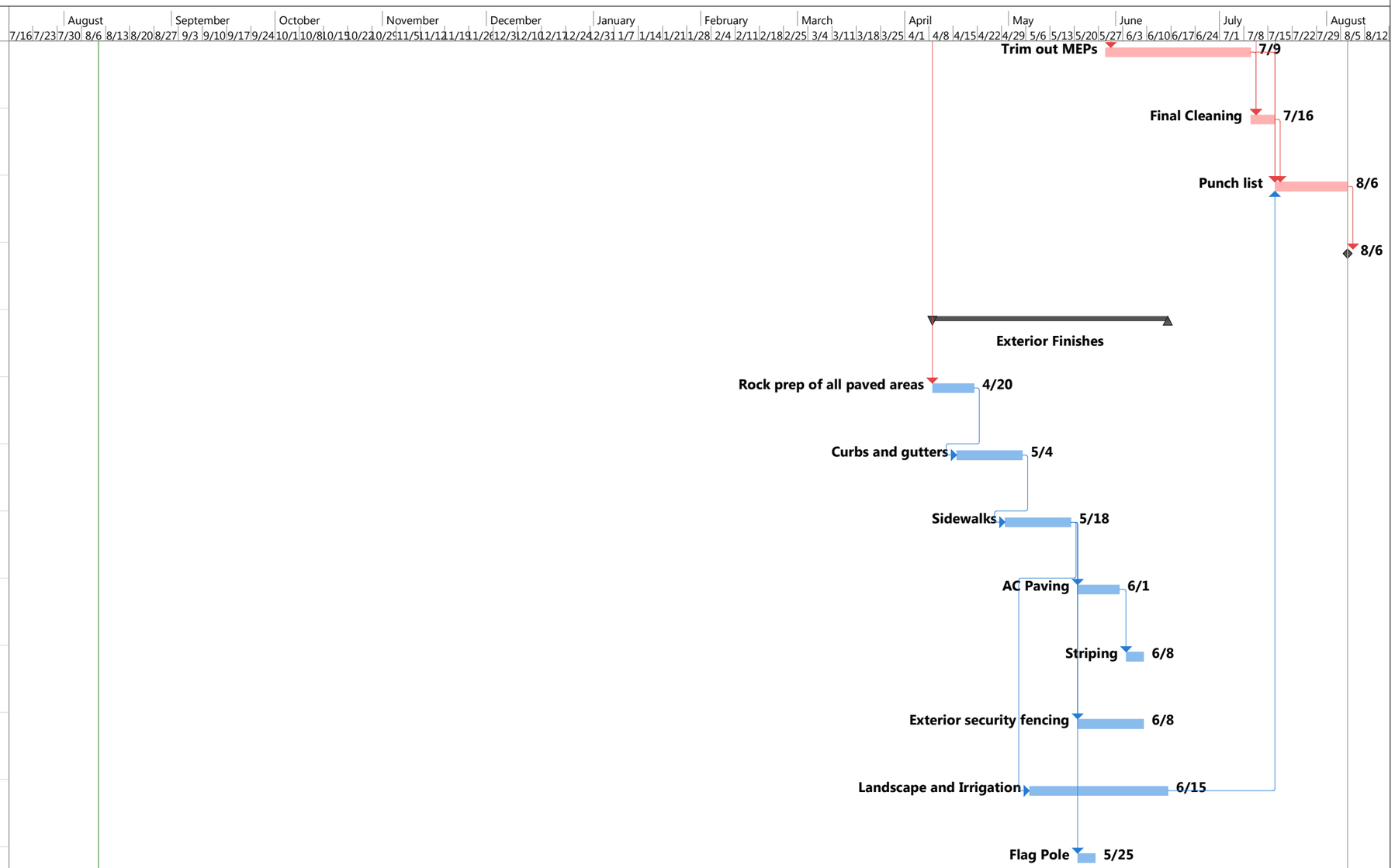
ID	Task Mode	Task Name	Duration	Start
53		Exterior masonry veneer	30 days	1/11/18
54		Exterior siding	10 days	2/22/18
55		Exterior windows / Storefront entry	20 days	1/11/18
56		Paint siding	5 days	3/8/18
57		Drywall	25 days	3/5/18
58		Paint	18 days	4/9/18
59		Ceilings	18 days	5/3/18
60		Doors / Hardware	15 days	5/3/18
61		Casework / Bullet proof paneling	15 days	5/29/18
62		Flooring	15 days	6/19/18
63		Locker room ceramic Tile	10 days	5/3/18
64		Toilet Partitions	5 days	5/17/18
65		Lockers / benches	5 days	5/24/18



Critical	Split	Finish-only	Baseline Milestone	Manual Summary	Inactive Task
Critical Split	Task Progress	Duration-only	Milestone	Project Summary	Inactive Milestone
Critical Progress	Manual Task	Baseline	Summary Progress	External Tasks	Inactive Summary
Task	Start-only	Baseline Split	Summary	External Milestone	Deadline

Marion County Sheriff's Office Public Safety Building

ID	Task Mode	Task Name	Duration	Start
66		Trim out MEPs	30 days	5/29/18
67		Final Cleaning	5 days	7/10/18
68		Punch list	15 days	7/17/18
69		Construction Completion	0 days	8/6/18
70		**Exterior Finishes**	**50 days**	**4/9/18**
71		Rock prep of all paved areas	10 days	4/9/18
72		Curbs and gutters	15 days	4/16/18
73		Sidewalks	15 days	4/30/18
74		AC Paving	10 days	5/21/18
75		Striping	5 days	6/4/18
76		Exterior security fencing	15 days	5/21/18
77		Landscape and Irrigation	30 days	5/7/18
78		Flag Pole	5 days	5/21/18



Critical	Split	Finish-only	Baseline Milestone	Manual Summary	Inactive Task
Critical Split	Task Progress	Duration-only	Milestone	Project Summary	Inactive Milestone
Critical Progress	Manual Task	Baseline	Summary Progress	External Tasks	Inactive Summary
Task	Start-only	Baseline Split	Summary	External Milestone	Deadline

Marion County Sheriff's Office - Public Safety Building
Alternate Summary

Alt. #	Description	Total
Alt. #1	Patio roof at break area	$ 88,460
Alt. #2	Paving at Sheriff's office parking	$ 53,863
Alt. #3	Canopy at Sheriff's office parking area	$ 174,433
Alt. #4	Temp roof system	$ 28,355
	Alternates Subtotal	$ 345,112

Marion County Sheriff's Office - Public Safety Building

Alternate #1

Patio roof at break area

DESCRIPTION: Patio roof at break area

Spec.	Description		Amount
	Concrete	$	15,750.00
	Steel Furnish	$	5,475.00
	Steel Install	$	14,000.00
	Wood Framing		in above
	Sheetmetal	$	2,500.00
	Roofing	$	27,005.00
	Painting	$	2,120.00
	Fire Sprinkler	$	13,800.00
	Electrical	$	1,998.00
	Earthwork	$	1,600.00
		$	84,248.00
	Contractor's Fee & Bond	$	4,212.40
	Total	$	88,460

Marion County Sheriff's Office - Public Safety Building

Alternate #2

DESCRIPTION: Paving at Sheriff's office parking

Spec.	Description		Amount
	AC Paving	$	46,038.00
	Stripping	$	400.00
	Earthwork	$	4,860.00
		$	51,298.00
	Contractor's Fee & Bond	$	2,564.90
	Total	$	53,863

Marion County Sheriff's Office - Public Safety Building

Alternate #3

DESCRIPTION: Canopy at Sheriff's office parking area

Spec.	Description		Amount
	Concrete	$	28,125.00
	Steel Supply	$	25,762.00
	Steel Install	$	28,000.00
	Steel Decking	$	16,960.00
	Sheetmetal	$	36,870.00
	Fire Sprinkler	$	19,500.00
	Electrical	$	6,845.00
	Earthwork	$	4,065.00
		$	166,127.00
	Contractor's Fee & Bond	$	8,306.35
	Total	$	174,433

Marion County Sheriff's Office - Public Safety Building

Alternate #4

DESCRIPTION: Temp roof system

Spec.	Description		Amount
	Roofing	$	27,005.00
	Subtotal	$	27,005.00
	Contractor's Fee & Bond	$	1,350.25
	Total	$	28,355