North Santiam Canyon Regional Wastewater Analysis

January 2017

Marion County
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Oregon IFA Infrastructure Finance Authority

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Regional Wastewater Analysis

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TABLE OF CONTENTS

LIST OF TABLES:

LIST OF CHARTS:

APPENDIX A: FIGURES

APPENDIX B: MFA REPORT

APPENDIX C: FLOW TABLES

APPENDIX D: COST ESTIMATE DETAILS

APPENDIX E: MWMC AGREEMENT

Acronyms, Abbreviations, and Selected Definitions

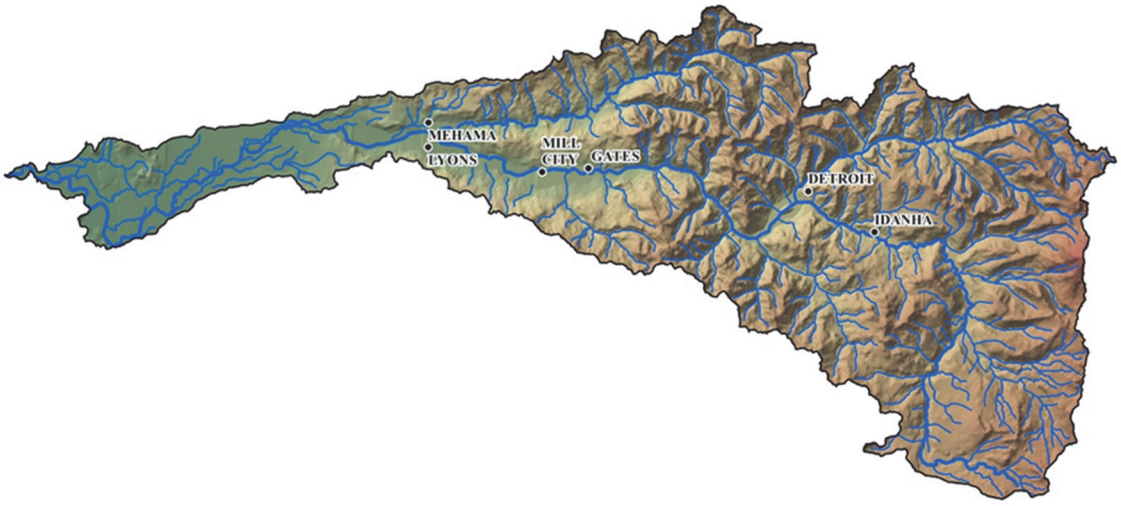
AACE	American Association of Cost Estimating
AADF	average annual daily flow
ADWF	average dry weather flow
AWWF	average wet weather flow
BOD	biochemical oxygen demand
CIP	Capital Improvement Plan
DEQ	Oregon Department of Environmental Quality
DWAF	dry weather average flow
EDU	equivalent dwelling unit
EPA	Environmental Protection Agency
EQC	Environmental Quality Commission
EWEB	Eugene Water & Electric Board
FEMA	Federal Emergency Management Agency
ft	feet (or) foot
FWS	Fish and Wildlife Service
gal	gallon
GIS	geographic information system
gpad	gallon per acre per day
gpd	gallons per day
gpm	gallons per minute
hrs	hours
I/I	inflow and infiltration
IFA	Infrastructure Finance Authority
in	inch
lbs	pounds
MBR	membrane bioreactor system
MCPW	Marion County Public Works
MFA	Maul Foster & Alongi
MG	million gallons
MGD	million gallons per day
mg/L	milligrams per liter
MMDWF	maximum monthly average dry-weather flow
MMWWF	maximum monthly average wet-weather flows
MWMC	Metropolitan Wastewater Management Commission
NFPA	National Fire Protection Association
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NTU	Nephelometric turbidity units
OAR	Oregon Administrative Rules
OAWU	Oregon Association of Water Utilities

ODOT	Oregon Department of Transportation
O&G	greases and oil
O&M	operation and maintenance
ORS	Oregon Revised Statutes
ORV	Outstandingly Remarkable Value
PDAF	peak daily average flow
PIF	peak instantaneous flow
PWkF	peak week flow
Rpm	revolutions per minute
RWUP	recycled water use plan
SBR	sequence batch reactor
SCADA	supervisory control and data acquisition
SDC	system development charge
STEP	Septic Tank Effluent Pump
TKN	total Kjeldahl nitrogen
TMDL	total maximum daily load
TSS	total suspended solids
UGB	urban growth boundary
US	United States
USDA	U.S. Department of Agriculture
VE	value engineering
WPCF	water pollution control facility
WW	wastewater
WWAF	wet weather average flow
WWMM	wet weather maximum month
WWTF	wastewater treatment facility
WWTP	wastewater treatment plant

1. PROJECT BACKGROUND & PURPOSE

1.1 BACKGROUND

The lack of community wastewater systems in Idanha, Detroit, Gates, Mehama and Lyons (all five communities are on individual septic systems only) and the need for upgrades to Mill City's wastewater system is identified as a limiting factor to economic and community development in the North Santiam Canyon.



Over the years, studies have been undertaken to determine the feasibility and design of a wastewater system to meet the individual needs of these canyon communities. Below is a list of the known studies to-date.

- Detroit/Idanha
  - Detroit-Idanha VE Study Conceptual Design Review, 2002
  - Detroit-Idanha WW Facilities Pre-Design Report 2001
  - Detroit-Idanha WWTF & Sewerage Collection System Improvements, 2001
  - Sanitary Survey of On-Site Sewage Disposal Systems – Detroit & Idanha, 2003
  - Upper North Santiam River Canyon Sewage Treatment Feasibility Study, 1996
- Detroit
  - Detroit Wastewater Feasibility Study, 2015
- Idanha
  - Idanha Wastewater Facility Plan Update, 2008/2009
- Gates
  - Sanitary Survey, 1999
- Lyons-Mehama
  - Lyons Sanitary Sewerage Plan, 1988
  - Lyons Sanitary Sewerage Feasibility Analysis & Plan Update, 1995
- Mill City
  - Sanitary Sewer System Improvements, 2008

- Sewage Collection System, 1990
- Wastewater Treatment Plant, 1990
- O&M Manual Collection, 2010
- O&M Manual Treatment, 1994

The distressed nature of the communities along with the challenge of designing an individual system in compliance with the "Three Basin Rule" have proven cost prohibitive. A comparison of alternative approaches is needed to move forward. The North Santiam Canyon Regional Wastewater Analysis is intended to provide this comparison of alternative approaches. The results of this analysis, presented in this report, is a concept level planning document that has considered the feasibility and evaluated alternatives for providing wastewater services for the communities identified above. Subsequent work will be needed to refine costs and details of the preferred alternative.

1.2 PURPOSE

The purpose of this study is to provide community leaders and staff with a feasible approach and associated cost to providing sanitary sewer services to the North Santiam Canyon communities, specifically Lyons/Mehama, Mill City, Gates, Detroit, and Idanha. This approach and the cost estimates can then be used for securing a practical funding mechanism.

1.3 STUDY AREA

The study area consists of 5 communities (See Section 5):

- Lyons-Mehama
- Mill City
- Gates
- Detroit
- Idanha

Mehama is the only unincorporated community that has been included in the study area. Figure 1 in Appendix A shows the study area. Figures 2 through 7 present the zoning, topography and floodplain, soil designation, wetlands and waterways for each of the communities. The study area slopes generally to the west toward the Willamette River valley. The County line dividing Marion and Linn Counties runs along the river the length of the study area. Some communities are split by the County line (Gates, Mill City), while others are completely in Marion County (Mehama, Detroit, Idanha) or in Linn County (Lyons).

A more detailed report for the development potential of the economy was completed by Maul Foster & Alongi (MFA). Their report can be referenced in Appendix B. This report provides:

- Demographic trends and projections
- Industrial and commercial land demand summary
- A redevelopment "site readiness" matrix

The MFA report identifies economic incentives to address the lack of community sanitary sewer systems within the study area. Keller Associates utilized the employment land demand from the MFA report in developing the sanitary sewer flow projections (See Section 5)

2. STAKEHOLDER MEETINGS AND INTERVIEWS SUMMARY

2.1 STAKEHOLDER MEETINGS SUMMARY

The feasibility study included meeting with various stakeholders and agencies in an effort to include their information and perspective in evaluating alternatives. These stakeholders included representatives from the following communities/agencies: Lyons, Mehama, Mill City, Gates, Detroit, Idanha, ODOT, Marion County, Linn County, Mid-Willamette Valley Council of Governments, Oregon DEQ, IFA, and local contractors. The information and suggestions gathered throughout the stakeholder input was integrated into the analysis and recommendations found in later sections of this report.

The first group of stakeholder meetings was held with the communities. On the 6th and 7th of June, Peter Olsen (Keller Associates), Grant Herbert (MFA) and Danielle Gonzales (Marion County) met with community leaders and city staff for Idanha, Detroit, Gates, Mill City and Lyons. Below is a list of staff and elected officials that represented each community in these meetings/interviews.

Idanha
Mayor Jeff Skeeters

Detroit
Bob Bruce, Water Tech
Christine Pavoni, City Recorder
Debbie Ruyle, City Council
Sandy Franz, City Council

Lyons
Micki Valentine, City Recorder
Richard Berkey
Darrel Ritchie

Mill City
Thorin Thacker, Mayor
Stacie Cook
Russ Foltz

Gates
Greg Benthin, Water Superintendent
Jerry Marr, Mayor
Gary Crum, Water Commissioner
Traci Archer, City Recorder

The purpose of these interviews was to gather community-specific perspective on alternatives, septic system performance in the community, and existing community governance for utilities.

The second group of stakeholder meetings was held with the Counties. Linn County was extended the invitation to meet, but was not able to participate. Meetings with Marion County occured on July 11th. The first meeting involved Matt Knudson, Mark Terrill and Claudia Hill from Marion County Public Works. The purpose of this meeting was to gather information on the County's existing experience with community wide sanitary sewer services, existing staffing, and recommendations for providing sanitary sewer services to the Canyon communities. One additional purpose for the meeting was to gather information to build a better understanding of specific issues, if any, with the existing onsite septic systems in the Canyon communities.

The current County staff for sanitary sewer services holds level 1 and 2 operating licenses. The County staff were looking at getting under contract with Oregon Association of Water Utilities (OAWU) for their existing systems for the times that the level 2 operator may not be available.

The second meeting included Marion County staff from the legal and community development departments as well as Kevin Cameron, County Commissioner. The purpose of the meeting was to gather initial feedback on governance, especially as it pertains to the Counties' involvement in the governance of the sanitary sewer facilities.

Onsite Septic Summary

The onsite septic systems performance was a topic at each of the stakeholder meetings. Claudia Hill, one of two onsite septic inspectors for Marion County, participated in the first County meeting and was able to provide a list of issues (see below) related to onsite septic performance for the North Santiam Canyon communities.

- City of Detroit lots are too small.
    - Acreage issue as well as setbacks.
    - If platted before 1974, than different requirements apply.
- Not a lot of failing systems in the Canyon communities with the exception of the downtown area of Detroit. A lot of repairs and replacements are happening without involvement of the County.
- The onsite septic failures are not the only concern. There are very sandy soils in some areas throughout the North Santiam Canyon which allow the water to move very fast. This is a concern when these systems are in close proximity to a waterway.
- A lot of repairs take place throughout the Canyon communities which is typical.
- Some onsite septic systems continually have problems.
- The County does not see a large amount of applications for new onsite septic systems because it will be tough to get a new permit anyways.
- Whether an existing system is currently failing or not, there are a lot of older homes and systems that will eventually fail and will require expensive replacement systems.

3. MILL CITY EXISTING FACILITIES

3.1 WASTEWATER COLLECTION SYSTEM

Mill City's community wastewater collection system includes remote treatment in interceptor and septic tank treatment units. From these remote treatment units, the effluent is either pumped to a gravity main or directly to a pump station – River Road, Spring Street, or First Street – for transport to the wastewater treatment plant (WWTP). The River Road Pump Station discharges to a gravity main which discharges in the First Street Pump Station. The pump stations were rebuilt in 2009. Each lift station includes a permanent diesel generator with transfer switch in the event of power loss. The piping network is constructed of 4-, 6-, and 8-inch PVC pipe.
The pump stations have the characteristics summarized in Table 3.1.

Table 3.1: Pump Station Design

Parameter	River Road	Spring Street	First Street
Number of Pumps	2	2	2
Capacity (gpm)	60	350	125
Total Dynamic Head (ft)	58	90	85
Suction Lift (ft)	12	14.5	9
Horsepower	7.5	20	10
Maximum Speed (rpm)	1,750	2,000	1,750
Pump Type	Hydronix Model 183	Hydronix Model 185	Hydronix Model 183

3.2 WASTEWATER TREATMENT SYSTEM

Mill City's WWTP was built in 1990 and consists of influent metering, a recirculation/equalization tank (with two compartments), a recirculating gravel filter, and disposal drain fields. After passing through the influent Parshall flume, the wastewater passes through static screens into the recirculation/equalization tank. The screens are cleaned manually. Filter feed pumps transport the wastewater from the recirculation/equalization tank to the gravel filter. Microbial organisms grow on the gravel filter to treat the wastewater. After passing through the filter, approximately 80% of the filtrate water is recirculated to the recirculation/equalization tank. The remaining 20% is routed, using manual slide gates to control the flow, to the effluent pumps. The effluent pumps are used to dispose of the treated wastewater in the drain fields.

Automatic samplers are used to collect the influent and effluent wastewater samples. The influent sample is taken from the influent metering manhole. The effluent sample is taken from the effluent pump chamber. The samples are sent to Waterlab Corporation (Salem, OR) for testing. Solids from the WWTP are disposed of by a licensed sewage disposal service.
Odors at the WWTP are treated by a biofilter using fan to draw air from the influent metering manhole, energy absorption manhole, and recirculation/equalization tank influent chamber. A permanent diesel generator with automatic transfer switch is installed at the WWTP for use in the event of power loss. The City's SCADA system monitors the collection system pump stations and WWTP.

3.3 PERMITTING REQUIREMENTS

Mill City's current Water Pollution Control Facility (WPCF) permit requirements are shown in Table 3.2.

Table 3.2: WPCF Permit Requirements

Parameter	Maximum Daily Limit
Influent Max. BOD_5 (mg/L)	300
Influent Max. O&G (mg/L)	25
Influent Max. TSS (mg/L)	150
Influent Max. TKN (mg/L)	150
Effluent Flow (MGD)	0.185
Effluent Max. BOD_5 (mg/L)	20
Effluent Max. TSS (mg/L)	20

BOD_5 = five-day biochemical oxygen demand
mg/L = milligrams per liter
MGD = million gallons per day
TSS = total suspended solids
TKN = total Kjeldahl nitrogen
O&G = greases and oil

3.4 WASTEWATER TREATMENT CAPACITY

The Mill City WWTP design criteria from the 1990 bid documents are shown in Table 3.3.

Table 3.3: WWTP Design

	Design Parameter
Influent	
Average Dry Weather Flow (gpd)	92,500
Average Wet Weather Flow (gpd)	170,000
Peak Day Wet Weather Flow (gpd)	185,000
Influent Biochemical Oxygen Demand (BOD_5, mg/L)	200
Influent BOD_5 (lbs/day)	307
Recirculation/Equalization Tank	
Volume (gallons)	185,000
Hydraulic Retention Time @ Peak Day Wet Weather Flow (hr)	24
Recirculation (Filter Feed) Pumps	
Number of Pumps	3
Total Combined Pump Capacity (gpm)	1,200
Effluent Pumps	
Number of Pumps	3
Total Combined Pump Capacity (gpm)	900
Gravel Filter	
Surface Area (ft^2)	36,864
Average Dry Weather Hydraulic Loading ($gal/ft^2/day$)	2.5
Average Wet Weather Hydraulic Loading ($gal/ft^2/day$)	4.6
Peak Day Wet Weather Hydraulic Loading ($gal/ft^2/day$)	5.0
Drainfield	
Area (acres)	10
Design Hydraulic Loading (gal/ft)	12.5
Linear Feet	15,200

Keller Associates was provided WWTP data from January 2015 through May 2016 (excluding April 2015). A summary of the influent flow and influent concentration data is shown in Charts 3.1 and 3.2, respectively.

Chart 3.1: WWTP Flow

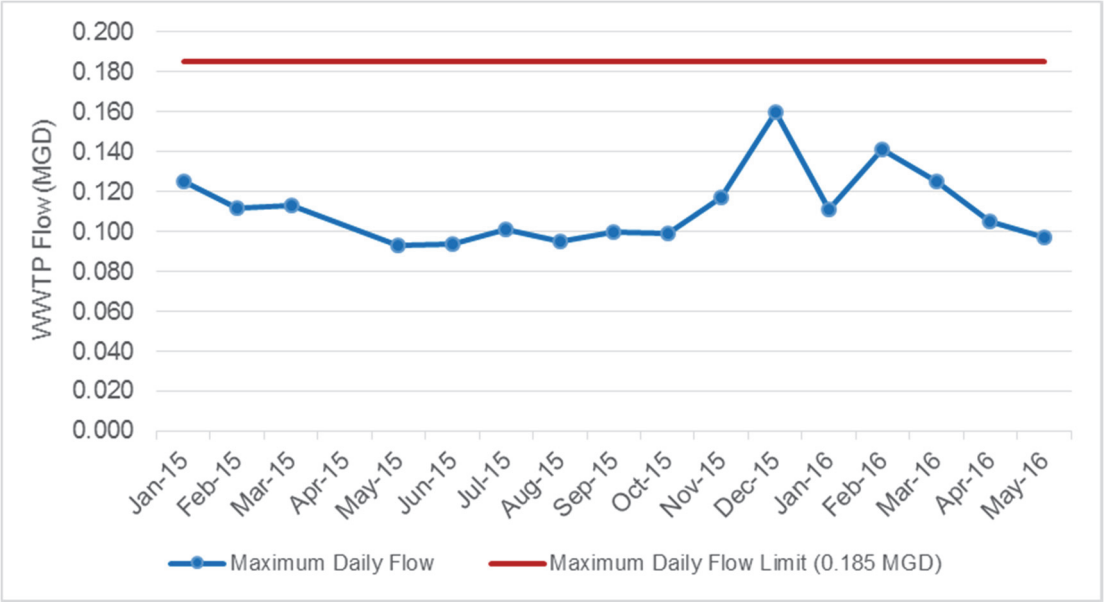
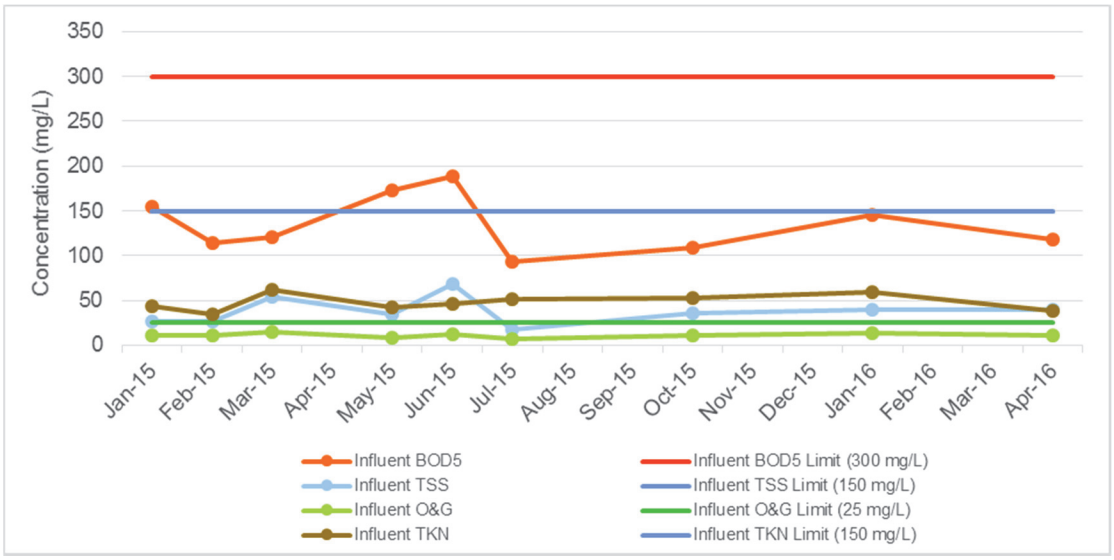


Chart 3.2: Influent Concentrations

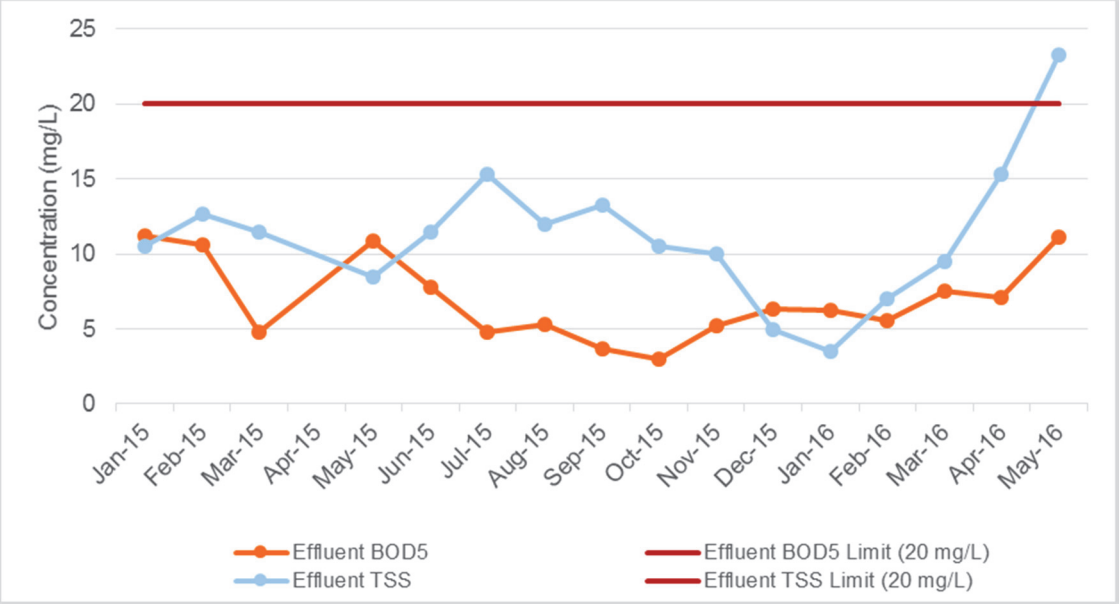


No permit violations for the influent flow, BOD_5, TSS, O&G, and TKN occurred during the reporting period. Since the collection system includes treatment which clarifies the wastewater, the influent TSS and O&G measured at the WWTP are lower than a typical domestic influent.

According to the 1990 bid documents, the WWTP has a maximum daily flow capacity of 0.185 MGD and a maximum BOD_5 loading capacity of 307 lbs./day. The maximum daily flow reported was 0.160 MGD; however, the average of the maximum daily flows reported was 0.112 MGD. The maximum daily and average BOD_5 load reported was 129 lbs./day and 97 lbs./day, respectively. Thus, the WWTP may have some hydraulic and BOD_5 loading capacity available. (An independent evaluation of the WWTP capacity was not conducted as part of this study).

Keller Associates also reviewed the Mill City WWTP effluent data as shown in Chart 3.3.

Chart 3.3: Effluent Concentrations



During the report period the WWTP was in compliance with the effluent permit requirements with the exception of May 2016 when the effluent TSS concentration was 23.3 mg/L. Mill City resampled within 14 days after the exceedance and the effluent TSS concentration decreased to 20 mg/L. The Mill City WWTP operator believes the problem may be coming from cottonwood tree seeds getting into the filter.

3.5 WASTEWATER OPERATIONS

Based on a discussion with the Mill City WWTP operator, the only required repair during the last couple of years was an ultrasonic level sensor. In general the equipment is functioning well. However, with the WWTP increasing in age (25+ years), there may begin to be more repairs required.

4. THREE BASIN RULE

The communities of Idanha, Detroit, Gates, Mill City, Lyons, and Mehama are all located in the North Santiam River Subbasin. The lack, or poor condition, of community wastewater collection and treatment systems in this region has been identified as a limiting factor for economic and community growth.

One of the major obstacles to these communities having wastewater systems is a regulation called the Three Basin Rule. Keller Associates met with the Oregon Department of Environmental Quality (DEQ) concerning the rule. This section summarizes the likely regulatory requirements for community wastewater systems in the North Santiam River Sub-basin.

4.1 THREE BASIN RULE (OAR 340-041-0350)

The Three Basin Rule, originally adopted in 1978 and modified in 1995, was established to preserve/improve the existing high quality of water in the Clackamas River, the McKenzie River (above the Hayden Bridge), and the North Santiam River Subbasins for municipal water supplies, recreation, and preservation of aquatic life. This rule prohibits new (after January 28, 1994) or increased wastewater discharges requiring a National Pollution Discharge Elimination System (NPDES) permit, Water Pollution Control Facility (WPCF) permit, or 401 Water Quality Certification. Individual on-site sewage disposal systems (subject to issuance of a construction-installation permit), small domestic facilities (less than 5,000 gpd), land-applied biosolids, and reclaimed domestic wastewater are exceptions to this rule. Domestic wastewater is understood to mean "municipal" wastewater that may contain domestic, commercial, and industrial wastewater.

The DEQ may issue a WPCF permit for a new domestic sewage treatment facility in the three subbasins, contingent on the following terms: **1) there is no waste discharge to surface water**; 2) all groundwater protection requirements of OAR 340-040-0030 are met; and 3) the Environmental Quality Commission (EQC) finds that the new domestic sewage treatment facility provides a preferable means of disposal compared to the current means of disposal. A preferable means must meet one of the following three criteria:

i. There are a significant number of failing individual collection systems that would be replaced by the new domestic treatment facility that cannot be repaired adequately or cost effectively,

ii. The impact of all individual treatment systems to groundwater is greater than the anticipated impact of the new sewage treatment facility, or

iii. If an individual, or several, on-site collection system would not normally be utilized (e.g., the system is frequently hydraulically overloaded due to flows exceeding the design flow of the system), a new sewage treatment facility may be allowed if the social and economic benefits outweigh the possible environmental impacts.

Applications for domestic wastewater WPCF permits must also not include wastes that would incapacitate the treatment system; be operated or supervised by a certified wastewater treatment plant operator per ORA 340-249-0015 (however, may be exempt per ORS 44.430); and provide annual written certification of proper treatment and disposal system operation from a qualified Registered Sanitarian, Professional Engineer, or certified wastewater treatment system operator.

Once the DEQ has reviewed a domestic wastewater WPCF permit application, drafted a permit, and allowed a time for public comment, the draft permit is placed before the EQC. The EQC serves as the DEQ's policy and rulemaking board, and reviews all permits to be approved. It is a five-member committee appointed by the governor, composed of citizens with backgrounds in politics, education, engineering, finance, etc. that serve four-year terms. The EQC will review the draft WPCF permit, and may have additional comments or questions that need to be addressed before the draft permit is approved.

4.2 DEQ DISCUSSION

Because of the Three Basin Rule's strict limitations, and also due to the communities' financial distress, it has been difficult to establish a community wastewater system. According to the DEQ, the Three Basin Rule most likely cannot be removed; however, it may be possible to modify. Modification could include an exception allowing discharges from domestic sewage treatment facilities with effluents that meet DEQ requirements for Class A Recycled Water (defined in OAR 340-055-0012(7)). Success in modifying the rule would be more probable if it were driven by the counties and the State, but would also require buy-in from downstream communities such as Salem and Stayton. A draft of the modifications would then need to be presented to the DEQ Director, who would ultimately have to obtain approval from the EQC.

If a modification to the Three Basin Rule is not feasible, according to the DEQ, the most likely option for a community wastewater system in the North Santiam River Subbasin is year-round subsurface discharge in the root zone with water that meets the DEQ requirements for Class A Recycled Water (defined in OAR 340-055-0012(7)). Subsurface discharge satisfies the Three Basin Rule's requirement to not discharge to surface water. According to the DEQ, it is most likely that they will require the effluent to meet the requirements for Class A Recycled Water in order to ensure the groundwater is protected. This type of effluent will have much less of an effect on groundwater than the combined cumulative effect of the individual septic systems to groundwater.

Land application of treated wastewater was also discussed; however, due to high precipitation in the area (80 inches or more per year), storage of the wastewater was recognized to be problematic. The treated wastewater would either need to be stored in a closed tank or in a storage basin with extra capacity to store precipitation.

An example of a recently-issued WPCF permit with similar treatment and disposal is the Eugene Water & Electric Board's (EWEB) Operations Center. This facility has approximately 260 employees, and wastewater from this facility is treated so there is no discharge to surface waters. The treatment is to Class B Recycled Water standards as defined in OAR 340-055-

0012(6). The treatment system was designed for Class A treatment (included filtration for turbidity removal), but shortly after it was installed, the permit was modified to Class B. The Class B treated water is used as non-residential toilet flush water year-round, subsurface drip irrigation for facility landscaping during the summer, and shallow subsurface discharge during the winter. The method of shallow subsurface disposal qualifies as a Class V(a) underground injection under OAR 340-044.

Another factor for the DEQ in approving the EWEB system was determining that there would not be significant contamination to the local groundwater. The following conditions led to this determination: 1) site soils are of low permeability, thus the treated wastewater is likely to stay higher in the soil column; 2) the uppermost aquifer is comprised of highly permeable soils and could dilute contamination quickly if necessary; 3) the site receives over 30 inches of rain per year, which would provide further dilution; and 4) there are no drinking water wells nearby, and it is unlikely that new drinking water wells would be installed.

Similar conditions that allowed the DEQ to issue EWEB's WPCF permit may exist in the North Santiam River Subbasin. Populations of the communities are relatively small, ranging from 141 to 1,878 residents. Annual rainfall (average of approximately 80 inches) is even greater than that in Eugene. Each of these communities already has a community water system, thus it is very unlikely that many new, shallow domestic supply wells would need to be constructed.

4.3 CONCLUSION

The Three Basin Rule prohibits communities in the North Santiam River Subbasin (Idanha, Detroit, Gates, Mill City, Lyons, and Mehama) from surface discharge of wastewater, requires the protection of groundwater, and requires new treatment systems to provide better treatment than the current means of disposal. If the Three Basin Rule cannot be modified, it is most likely that subsurface discharge with water that meets the DEQ requirements for Class A Recycle Water will be the required means for community wastewater disposal.

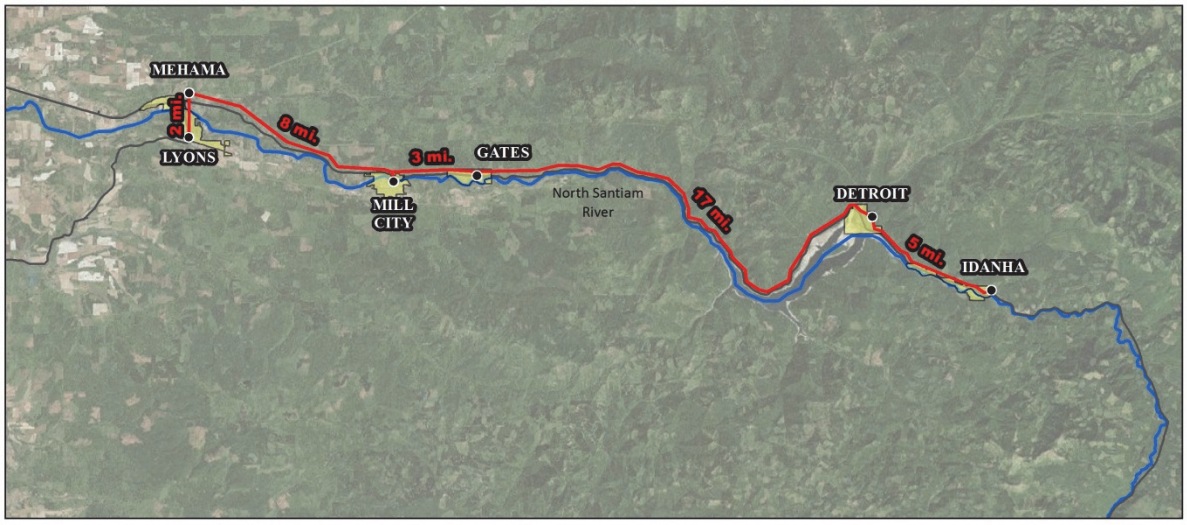
5. ANALYSIS CRITERIA

This chapter outlines the criteria which will be used for an analysis of alternative approaches to provide communities within the study area with wastewater services.

5.1 LOCATION

The project planning area includes all areas within the city limits of Idanha, Detroit, Gates, Mill City, Lyons, and Mehama. Chart 5.1 shows the study area and city limits of the identified communities. Figure 1 in Appendix A presents similar information. The communities are all located within the narrow canyon of the North Santiam River. Both sides of the canyon, and portions of the valley floor, are covered with dense pine forests. The topography of the study area generally slopes west following the flow of the river.

Chart 5.1: Study Area



5.2 ENVIRONMENTAL RESOURCES PRESENT

An inventory of the existing environmental resources is used to consider the environmental impacts of alternatives. The factors analyzed in this section include zoning, water resources, floodplains, soils, and wetlands.

5.2.1 Zoning

The current property zoning for the study area is shown in Figures 2a through 7a in Appendix A. The majority of the property within the North Santiam Canyon communities is zoned for residential uses. There is some commercial zoning, mainly along North Santiam Highway 22. Most of the communities also have a small amount of farming/agricultural, industrial, and public zoning as well.

5.2.2 Water Resources

The communities within the North Santiam Canyon have an abundance of surface and ground water resources. The largest surface water resource is the North Santiam River itself, stretching 92 miles from its origin high in the Cascade Mountains, to where it joins the South Santiam River just south of Jefferson. The North Santiam River basin drains approximately 766 square miles of land; and serves as a drinking water source, wildlife habitat, and recreation area. The North Santiam River basin is subject to the Three Basin Rule (OAR 340-041-0350), which currently prohibits new surface wastewater discharge permits. The National Parks Service classifies the North Santiam River as a scenic river, and has Outstandingly Remarkable Values (ORVs) for scenery, recreation, and fish.

The Lyons-Mehama Water District and the City of Gates both use the North Santiam River as its primary drinking water source. Mill City historically used the North Santiam River as its sole drinking water source, until it switched to two groundwater wells within the city limits in 2005. Both of these wells are subject to a well head protection area that will need to be considered in all future developments. The City of Detroit uses its Mackey Creek-Intake #1 as its primary source from October through April/May, and the Breitenbush River for supplemental flows when Mackey Creek's flows decrease during the summer months. Both of these streams are part of the upper North Santiam River watershed. The City of Idanha uses Chittum Creek, Mud Puppy Creek, and Rainbow Creek as its sources, all three of which are part of the upper North Santiam River watershed.

The North Santiam River Subbasin is part of the Willamette basin Total Maximum Daily Load (TMDL) that was approved by the EPA on September 29, 2006. Chapters 4 and 8 of the TMDL pertain to the North Santiam Subbasin, and describe the methodology of developing the temperature TMDL for the rivers within the subbasin. The temperature criteria for the North Santiam River are shown in Table 5.1 below:

Table 5.1: Willamette Basin TMDL Temperature Criteria

River Mile	Season	Criteria
0 to 10	September 1 – June 30	Spawning: 12.8 °C
10 to 26.5	September 15 – June 30	Spawning: 12.8 °C
0 to 10	Summer	Rearing: 17.8 °C

5.2.3 Floodplains

The Federal Emergency Management Agency (FEMA) publishes flood insurance studies that classify land into different flood zone designations. As shown in Figures 2b through 7b in Appendix A, some portions of the study area are located inside of the 100 and 500-year flood plains for the North Santiam River. Much of the floodplain areas do not extend

very far from the North Santiam River due to the narrow and steep characteristics of the North Santiam Canyon.

In Lyons, the 100-year floodplain encompasses John Neal Memorial Park and a few riverfront residences on the north side of town, and the 500-year floodplain encompasses the residences near John Neal Memorial Park. In Mehama, the 100 and 500-year floodplain boundaries overlap with some of the farmland located inside the city limits, and a few residences near the North Santiam River. The floodplains in Mill City and Gates do not extend beyond the riparian boundary of the river. In Detroit, the 100-year floodplain boundary overlaps the Detroit Flats Day Use Area and adjacent residential areas. In Idanha, the 100-year floodplain overlaps with areas zoned for residential, commercial, and industrial. This floodplain also crosses the North Santiam Highway 22.

5.2.4 Soils

The study area contains a wide array of soil types with loams being the most common in the more western communities. In Detroit and Idanha, cryic cold soils are more common. Soil designation Figures 2c through 7c can be found in Appendix A. These figures were produced using data from the National Cooperative Soil Survey.

5.2.5 Wetlands

The classes of wetlands delineated within the study area are lakes, riverine, freshwater ponds, freshwater emergent, and freshwater shrub/forested. Freshwater emergent wetlands are classified as being dominated by erect, rooted, herbaceous hydrophytes, and can be either persistent or non-persistent in nature. Freshwater shrub/forested wetlands are classified as being dominated by woody vegetation. The U.S. Fish and Wildlife Service (FWS) National Wetlands Inventory was used to produce Figures 2d through 7d in Appendix A, which display the wetlands that exist within and near the study area.

5.3 POPULATION TRENDS

Historical populations of Idanha, Detroit, Gates, Mill City, and Lyons (including Mehama) were evaluated to identify population trends in the region. The population of Lyons and the unincorporated community of Mehama were included together because of their close proximity to each other, the communities have a combined water district, and previous feasibility studies have grouped these two communities together as well. The communities are grouped as part of a census tract as Lyons' UGB extends into part of the unincorporated Mehama area. It is also very likely that these two communities would be served by a single wastewater treatment facility.

For the years of 1970 and 1980, historical populations were obtained from the North Santiam Canyon Economic Opportunity Study published in 2014. US Census population data was used to determine the population for the years of 1990, 2000, and 2010. The population for the year

2015 was obtained from the Portland State University's Certified Population Estimates for 2015. The assumed growth rates used in this projection were obtained for each community from Portland State University's 2008 population forecasts. From the historical data, each community's 20-year population projection was calculated using the coordinated growth rate method. Overall, the North Santiam Canyon area is projected to have an annual growth rate of approximately 1% per year, from 3,964 in 2018 to 4,771 in 2038. Table 5.2 and Charts 5.2 and 5.3 show each community's historical and projected populations.

Table 5.2: Historical and Projected Populations

		Community					
	Year	Idanha	Detroit	Gates	Mill City	Lyons (+Mehama)	Total
Historical Populations	**1970**[1]	382	328	250	1,451	645	**3,056**
	1980[1]	319	367	455	1,565	877	**3,583**
	1990[2]	289	331	499	1,555	938	**3,612**
	2000[2]	232	262	471	1,537	1,008	**3,510**
	2010[2]	134	202	471	1,855	1,161	**3,823**
	2015[3]	140	210	485	1,855	1,160	**3,850**
Projected Populations	**2018**	143	216	493	1,925	1,186	**3,964**
	2023	148	227	502	2,049	1,222	**4,148**
	2028	153	237	509	2,180	1,261	**4,341**
	2033	161	248	515	2,320	1,306	**4,550**
	2038	169	259	521	2,468	1,353	**4,771**

1. Historical population from the North Santiam Canyon Economic Opportunity Study published in 2014.
2. Historical population from US Census Data.
3. Historical population from Portland State University's Certified Population Estimates.

Chart 5.2: Community Historical and Projected Populations

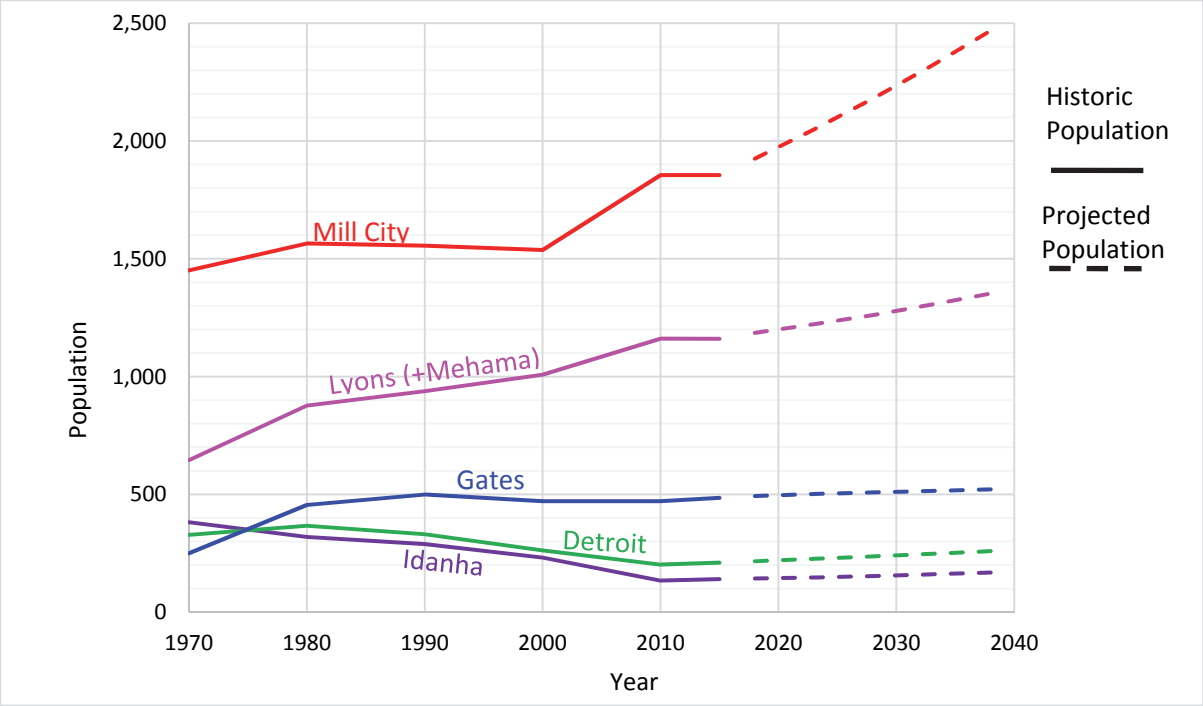
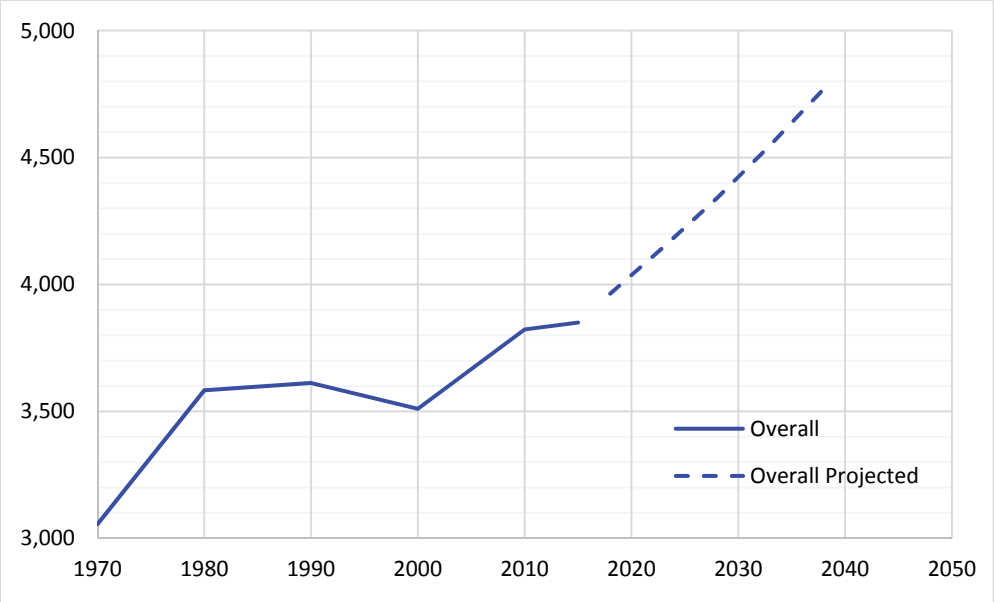


Chart 5.3: Combined Historical and Projected Populations



5.4 FLOWS

Mill City is the only community that has an existing community wastewater system; therefore, the method of using historical plant flow data to develop design flows and projections was not possible for most of the communities. Each of these communities, however, does have a drinking water system. For Idanha, Detroit, and Gates, the sewer flows are estimated based on

the water usage. Detroit's per capita flows are significantly higher than the other communities, which reflects the influx of seasonal tourism for recreation within the lakeside community. For Lyons and Mehama, the Sanitary Sewage Plan developed by Westech Engineering, Inc. was used to estimate the sewer flows. While these estimates are helpful in determining the feasibility of proposed wastewater projects, a more detailed analysis should be conducted in future planning studies and future wastewater projects. Improved accuracy in wastewater flow projections could be realized by a more frequent metering schedule of water usage during the winter months, such as weekly, and a more detailed investigation into water consumption patterns and makeup for each community. For Mill City, the historic wastewater flows were used to develop flow projections.

Flow estimates were made for each community and projected for the 20-year planning period. The flows include: average annual daily flow (AADF), average dry-weather flow (ADWF), average wet-weather flow (AWWF), max month dry-weather flow ($MMDWF_{10}$), max month wet-weather flow ($MMWWF_5$), peak week flow (PWkF), peak daily average flow ($PDAF_5$), and peak instantaneous flow (PIF).

5.4.1 Industrial and Commercial Flows

The estimated flows need to consider increases in demand for industrial and commercial land development. The total demand for industrial and commercial was taken from the "North Santiam Corridor Industrial & Commercial Land Demand Forecast – Elesco Limited" provided by MFA. Based on the general recommendations for the distribution of projected development amongst the communities, Keller Associates further coordinated with MFA to allocate the forecasted demand. Table 5.3 displays the forecasted 20-year flows for industrial and commercial lands and the associated AADF flow estimates on a gallon per acre per day basis (gpad).

Table 5.3: Projected Industrial and Commercial Flows

Land Type	20 yr Land Demand (Acres) [1]	AADF Estimates (gpad)[2]
Commercial	11.8	1500
Industrial	15.6	1500

[1] *North Santiam Corridor Industrial & Commercial Land Demand Forecast* - Elesco Limited
[2] Metcalf & Eddy, 5th Edition

The projected overall commercial and industrial land demand for each community is displayed in Table 5.4.

Table 5.4: Land Appropriation

Community	Industrial (Acres)	Commercial (Acres)
Lyons/Mahema	7.02	2.36
Mill City	7.02	2.36
Gates	0.78	0.59
Detroit	0.00	5.90
Idanha	0.78	0.59
Total	**15.6**	**11.8**

The industrial and commercial peaking factors for the other design flows are slightly lower than typical domestic peaking factors due to the flow characteristics of commercial and industrial flows. Industrial and commercial flows for each community are listed in Appendix C.

5.4.2 Flow Composition

The estimated wastewater composition from the communities within the North Santiam Canyon region is not well known, primarily because the majority of the communities do not have wastewater treatment facilities. Mill City has the only wastewater treatment plant, but they utilize treatment in their collection system (i.e., individual sewer service connections are made to the back end of septic tanks). In the absence of historical influent composition data, a medium strength wastewater was assumed (200 mg/L BOD5; 195 mg/L total suspended solids; and 35 mg/L total nitrogen; Metcalf & Eddy, 5th Edition). It was also assumed that the wastewater composition of the commercial or industrial wastewater will be similar to domestic wastewater. If necessary, pretreatment to produce wastewater similar in composition to domestic wastewater would be required of the industry to protect the community wastewater system.

5.4.3 Mill City

Wastewater flow analysis for Mill City used the method recommended by DEQ in "Guidelines for Making Wet-Weather and Peak Flow Projections for Sewage Treatment in Western Oregon" for determining design flow for Mill City's system. The method generally requires multiple years of historical data; however, flow data was only available for 2015. Details of how each design flow was derived are discussed in the following paragraphs:

Average Annual Daily Flow (AADF)

The average annual daily flow (AADF) is the average daily flow for the entire year (2015).

Average Dry-Weather Flow (ADWF)

The average dry-weather flow (ADWF) is the average daily flow for the period of May through October (2015).

Average Wet-Weather Flow (AWWF)

The average wet-weather flow (AWWF) is the average daily flow for the period of January through April, and November through December (2015).

Max Month Dry-Weather Flow ($MMDWF_{10}$)

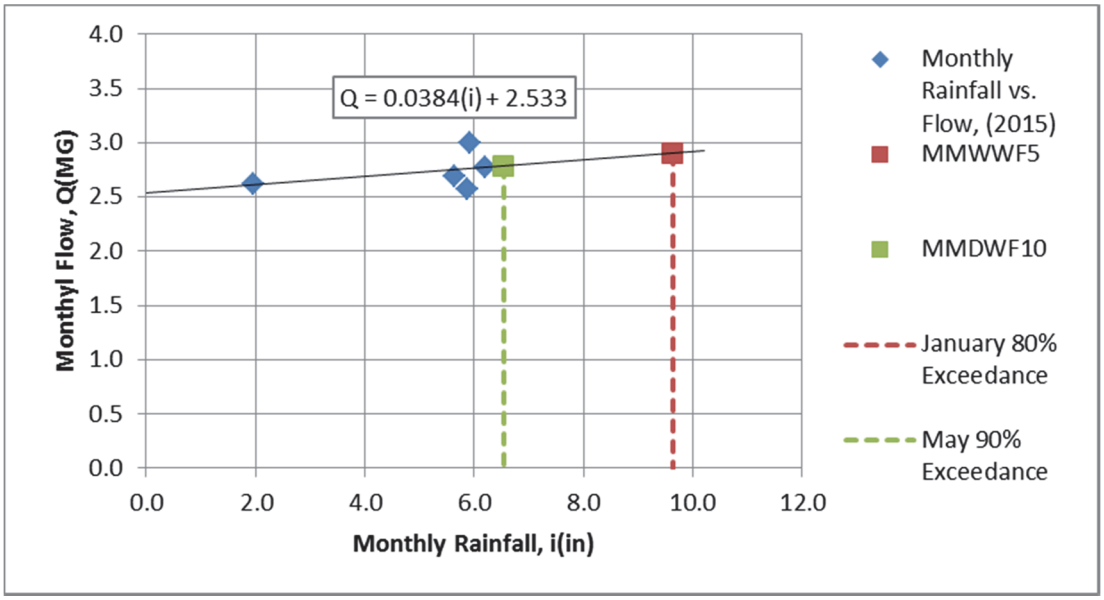
The max month dry-weather flow ($MMDWF_{10}$) represents the rainiest summer month of high groundwater. The DEQ method for calculating $MMDWF_{10}$ is to graph the January-May total monthly flows for each month of the most recent year against total precipitation for the month. A trend line is fit to the data, and the $MMDWF_{10}$ is read from the trend line at a precipitation equal to the May 90% precipitation exceedance value extrapolated from the 1981-2010 U.S Climate Normals[1]. Because Oregon DEQ states that May is typically the maximum month for the dry-weather period of May-October, selecting the May 90% precipitation exceedance most likely corresponds to the maximum month during the dry-weather period for a 10-year event. Data from 2015 was used to estimate $MMDWF_{10}$. Chart 5.4 shows the graph from the DEQ guidance for calculation of the $MMDWF_{10}$.

Max Month Wet-Weather Flow ($MMWWF_5$)

The $MMWWF_5$ represents the highest monthly average during the winter period of high groundwater. The DEQ method for calculating $MMWWF_5$ is to enter the graph of January-May average daily flows vs. monthly precipitation and read $MMWWF_5$ from the trend line at a precipitation equal to the January 80% precipitation exceedance value extrapolated from the 1981-2010 U.S Climate Normals1. Because Oregon DEQ states that January is typically the maximum month for the wet-weather period of January-April, selecting the January 80% precipitation exceedance most likely corresponds to the maximum month during the wet-weather period for a 5-year event. Data from 2015 was used to estimate $MMWWF_5$. Chart 5.4 shows the graph from the DEQ guidance for calculation of the $MMWWF_5$.

[1] Produced by NOAA and the U.S. Department of Commerce. Data from the Foster Dam station (Sweet Home) was the closest in proximity to Mill City.

Chart 5.4: Flow vs Rainfall (MMDWF$_{10}$ and MMWWF$_5$)



Peak Week Flow (PWkF)

A 7-day average flow was calculated for every day using the seven previous days of data (rolling average). Peak Week Flow (PWkF) was then calculated as the maximum of all weekly (7-day) rolling averages in a given year. The maximum week was selected as the PWkF. Oregon DEQ defines PWkF as the flowrate corresponding to a probability of 1/52 (1.9%) chance of occurrence. The PWkF was found to occur the week of December 12th, 2015 with a value of 0.136 MGD.

Peak Daily Average Flow (PDAF5)

As outlined by Oregon DEQ, the PDAF$_5$ typically corresponds to the 5-year storm event, and therefore, is calculated as the flow resulting from a 5-year storm event during a period of likely high groundwater (January-April). The DEQ method for determining PDAF$_5$ requires several years of historical flow data. Because only one year of flow data was available (2015), Keller Associates suggests estimating the PDAF$_5$ by converting MMWWF$_5$ to PDAF$_5$ by using a typical residential peaking factor of 1.7.

Peak Instantaneous Flow (PIF5)

As outlined by the DEQ, the PIF$_5$ is the peak instantaneous flow attained during a 5-year PDAF$_5$ event. The DEQ method for determining PIF$_5$ requires several years of historical flow data. Because only one year of flow data was available (2015), Keller Associates suggests estimating the projected PIF$_5$ by converting PDAF$_5$ to PIF$_5$ by using a typical residential peaking factor of 1.4.

Infiltration and Inflow (I/I)

The average dry weather flow per capita are within 7 gpcd of the average wet weather per capita flows; therefore, I/I is not a major contributor to sewer flows in Mill City. I/I can be expected to increase over time as the collection system ages and cracks in the sewer mains and manholes develop.

Design flows and the 20-year flow projections for Mill City are summarized in Table 5.5, and include the projected residential flows in addition to the projected industrial and commercial flows.

Table 5.5: Mill City Projected Flows

Year	2018	2023	2028	2033	2038
Population	1925	2049	2180	2320	2468
Flow Scenario	Projected Design Flows (gpd)				
ADWF	89,000	98,000	108,000	117,000	129,000
$MMDWF_{10}$	97,000	107,000	117,000	128,000	141,000
AADF	96,000	105,000	115,000	125,000	138,000
AWWF	102,000	112,000	123,000	134,000	147,000
$MMWWF_5$	104,000	115,000	126,000	138,000	153,000
PWkF	143,000	157,000	172,000	187,000	205,000
$PDAF_5$	176,000	195,000	213,000	233,000	258,000
PIF_5	243,000	267,000	292,000	318,000	351,000
Loading Rates	Projected Design Loading Rate (lbs/day)				
BOD_5	173	192	210	230	255
TSS	169	187	205	224	249
TKN	30	34	37	40	45

5.4.4 Idanha, Detroit, Gates, Lyons, and Mehama

The cities of Idanha, Detroit, Gates, Lyons, and unincorporated community of Mehama do not have existing community wastewater systems. Therefore, the DEQ method of using historical plant flow data to develop design flows and projections was not possible. Design flows and peaking factors were estimated using a combination of water usage data, previous planning studies, and data from planning studies from other communities in the surrounding region.

Flows for Detroit are different from the other communities due to influence from tourism and seasonal recreation. This is reflected in the total projected flows by a much higher per capita residential flow, and a higher commercial land demand than other communities. Keller Associates recommends a closer look into the volume of tourism and recreational activities to better gauge its impact on peak and seasonal flows for future planning studies.

Average Dry-Weather Flow (ADWF)

The average dry-weather flow (ADWF) represents the average daily flow for the period of May through October. For Idanha, Detroit, and Gates, ADWF was estimated by averaging the community's wet weather water usage (Jan-Mar and Nov-Dec), and assuming a 10% consumption of water during these months. Wet weather usage was used in effort to eliminate usages associated with commercial and residential irrigation. For Lyons and Mehama, the ADWF was estimated using a dry month peaking factor of 1.2 to convert $MMDWF_{10}$ to ADWF.

Average Annual Daily Flow (AADF)

The average annual daily flow (AADF) represents the average daily flow for the entire year, and was calculated for each community by averaging ADWF and AWWF for each community.

Average Wet-Weather Flow (AWWF)

The average wet-weather flow (AWWF) is the average daily flow for the period of January through April, and November through December for each year. For Idanha, Detroit, and Gates, AWWF was estimated by utilizing the wet month peaking factor of 1.3 to convert $MMWWF_{10}$ to AWWF. For Lyons and Mehama, the AWWF was estimated based on flow estimates reported in the Sanitary Sewage Plan conducted in 1988 by Westech Engineering, Inc.

Max Month Dry-Weather Flow ($MMDWF_{10}$)

The max month dry-weather flow ($MMDWF_{10}$) represents the rainiest summer month of high groundwater. For Idanha, Detroit, and Gates, $MMDWF_{10}$ was estimated by utilizing a ratio of the corresponding community's average wet weather water usage to peak month wet weather water usage. This peaking factor was then used to convert ADWF to $MMDWF_{10}$. For Lyons and Mehama, $MMDWF_{10}$ was estimated by utilizing the I/I peaking factor of 1.2 to convert $MMWWF_5$ to $MMDWF_{10}$.

Max Month Wet-Weather Flow ($MMWWF_5$)

The $MMWWF_5$ represents the highest monthly average during the winter period of high groundwater. For Idanha, Detroit, and Gates, $MMWWF_5$ was estimated by utilizing the I/I peaking factor of 1.2 to convert $MMDWF_{10}$ to $MMWWF_5$. For Lyons and Mehama, $MMWWF_5$ was estimated by utilizing the wet month peaking factor of 1.3 to convert AWWF to $MMWWF_5$.

Peak Week Flow (PWkF)

The PWkF corresponds to the highest 7-day rolling average within the year and inevitably occurs during the months of high ground water (January-April). For all of the

communities excluding Mill City, PWkF was estimated by utilizing the peak week peaking factor of 1.2 to convert $MMWWF_5$ to PWkF.

Peak Daily Average Flow (PDAF5)

As outlined by Oregon DEQ, the $PDAF_5$ typically corresponds to the 5-year storm event, and therefore, is calculated as the flow resulting from a 5-year storm event during a period of likely high groundwater (January-April). For all of the communities, $PDAF_5$ was estimated utilizing the PDAF peaking factor of 1.7 to convert $MMWWF_5$ to $PDAF_5$.

Peak Instantaneous Flow (PIF5)

As outlined by the DEQ, the PIF_5 is the peak instantaneous flow attained during a 5-year $PDAF_5$ event. For all of the communities, PIF_5 was estimated by utilizing the PIF peaking factor of 1.4 to convert $PDAF_5$ to PIF_5.

Infiltration and Inflow (I/I)

When collection systems are installed in these communities, I/I is expected to be minimal. New wastewater collection systems have significantly less I/I than established collection systems that have been in use for several decades.

Tables 5.6 through 5.9 summarize the flow projections for Idanha, Detroit, Gates, and Lyons/Mehama; and include the projected industrial and commercial flows in addition to the projected residential flows.

Table 5.6: Idanha Projected Flows

Year	2018	2023	2028	2033	2038
Population	143	148	153	161	169
Flow Scenario	Projected Design Flows (gpd)				
ADWF	12,400	13,200	14,200	15,300	16,700
$MMDWF_{10}$	28,900	30,400	32,100	34,100	36,600
AADF	19,600	20,700	21,900	23,500	25,300
AWWF	26,800	28,100	29,700	31,600	33,900
$MMWWF_5$	34,700	36,400	38,400	40,800	43,700
PWkF	40,000	41,900	44,200	46,900	50,200
$PDAF_5$	58,900	61,700	65,000	69,100	73,900
PIF_5	81,200	85,000	89,300	94,900	102,000
Loading Rates	Projected Design Loading Rate (lbs/day)				
BOD_5	58	61	64	68	73
TSS	56	59	62	66	71
TKN	10	11	11	12	13

Table 5.7: Detroit Projected Flows

Year	2018	2023	2028	2033	2038
Population	216	227	237	248	259
Flow Scenario	Projected Design Flows (gpd)				
ADWF	31,100	34,800	38,300	42,000	46,900
$MMDWF_{10}$	54,500	59,600	64,500	69,700	76,400
AADF	40,800	45,000	49,000	53,300	58,900
AWWF	50,400	55,200	59,800	64,600	70,900
$MMWWF_5$	65,300	71,300	77,000	83,000	90,800
PWkF	75,200	82,000	88,400	95,300	104,000
$PDAF_5$	110,800	120,600	130,100	140,100	152,800
PIF_5	152,600	165,700	178,200	191,400	208,000
Loading Rates	Projected Design Loading Rate (lbs/day)				
BOD_5	109	119	128	138	151
TSS	106	116	125	135	148
TKN	19	21	22	24	27

Table 5.8: Gates Projected Flows

Year	2018	2023	2028	2033	2038
Population	493	502	509	515	521
Flow Scenario	Projected Design Flows (gpd)				
ADWF	38,400	39,600	40,600	41,600	42,800
$MMDWF_{10}$	56,000	57,700	58,900	60,200	61,800
AADF	45,100	46,500	47,500	48,700	50,100
AWWF	51,800	53,400	54,500	55,700	57,300
$MMWWF_5$	67,200	69,100	70,600	72,100	74,000
PWkF	77,500	79,600	81,300	83,000	85,200
$PDAF_5$	115,000	118,000	120,000	123,000	126,000
PIF_5	158,000	162,000	165,000	169,000	173,000
Loading Rates	Projected Design Loading Rate (lbs/day)				
BOD_5	112	115	118	120	123
TSS	109	112	115	117	120
TKN	20	20	21	21	22

Table 5.9: Lyons (+Mehama) Projected Flows

Year	2018	2023	2028	2033	2038
Population	1186	1222	1261	1306	1353
Flow Scenario	Projected Design Flows (gpd)				
ADWF	134,000	142,000	149,000	158,000	168,000
$MMDWF_{10}$	157,000	166,000	175,000	184,000	197,000
AADF	140,000	148,000	155,000	164,000	175,000
AWWF	145,000	154,000	162,000	171,000	182,000
$MMWWF_5$	188,000	199,000	209,000	220,000	235,000
PWkF	217,000	229,000	240,000	253,000	269,000
$PDAF_5$	319,000	336,000	353,000	372,000	396,000
PIF_5	440,000	463,000	485,000	511,000	542,000
Loading Rates	Projected Design Loading Rate (lbs/day)				
BOD_5	314	332	349	367	392
TSS	306	324	340	358	382
TKN	55	58	61	64	69

Total flow for the North Santiam Canyon region was also estimated by summing each of the community flows. Table 5.10 summarizes the 20-year flow projections for the North Santiam Canyon region, and includes the projected residential flows in addition to the projected industrial and commercial flows.

Table 5.10: Total Projected Flows

Year	2018	2023	2028	2033	2038
Population	3964	4148	4341	4550	4771
Flow Scenario	Projected Design Flows (gpd)				
ADWF	305,000	328,000	351,000	374,000	404,000
$MMDWF_{10}$	394,000	421,000	448,000	476,000	513,000
AADF	342,000	366,000	389,000	415,000	448,000
AWWF	376,000	403,000	429,000	457,000	492,000
$MMWWF_5$	460,000	491,000	521,000	554,000	597,000
PWkF	553,000	590,000	626,000	666,000	714,000
$PDAF_5$	780,000	832,000	882,000	939,000	1,007,000
PIF_5	1,076,000	1,143,000	1,211,000	1,285,000	1,376,000
Loading Rates	Projected Design Loading Rate (lbs/day)				
BOD_5	767	819	869	924	996
TSS	748	799	847	901	971
TKN	134	143	152	162	174

6. TREATMENT / COLLECTION ALTERNATIVES

This section outlines the treatment and site alternatives to provide the North Santiam Canyon communities (Idanha, Detroit, Gates, Mill City, Lyons, and Mehama) with wastewater services. The individual septic systems place the cost and responsibility of proper installation, use and maintenance on the individual property owners. Managed collection and treatment through community and/or regionalized sewer services shares the burden and places trained professionals at the helm of the shared community asset. The community and/or regionalized sewer services reduces the likelihood of failure, unauthorized and potentially hazardous wastewater discharges. Mill City is the only community that has a wastewater system and the absence of community wastewater systems in this region has been recognized as a limiting factor for economic community development and growth. This region is also subject to the Three Basin Rule (OAR 340-041-0350), which complicates the allowed wastewater disposal for the communities.

6.1 ANTICIPATED TREATMENT

The Three Basin Rule was established to preserve/improve the existing high quality of water in the North Santiam River basin. This rule prohibited any discharge of wastewater to surface waters requiring a National Pollution Discharge Elimination System (NPDES) permit, a Water Pollution Control Facility (WPCF) permit, or a 401 Water Quality Certification. The Three Basin Rule did allow the Oregon Department of Environmental Quality (DEQ) the ability to issue a WPCF permit for a new domestic sewage treatment facility contingent on three terms: 1) there is no discharge to surface water, 2) all groundwater protection requirements of OAR 340-040-0030 are met, and 3) the Environmental Quality Commission (EQC) finds that the new sewage treatment facility provides a preferable means of disposal from the current means of disposal. Currently the majority of the communities rely on onsite septic tank treatment.

After discussions with DEQ, the most likely option for a community wastewater system in the North Santiam River basin to receive a WPCF permit is for year-round subsurface discharge in the root zone with water that meets the DEQ requirements for Class A Recycled Water (defined in OAR 340-055-0012(7)). In addition to the WPCF permit, a Recycled Water Use Plan (RWUP) must be developed which may include a groundwater monitoring plan. Subsurface discharge would satisfy the Three Basin Rule's requirement to not discharge to surface water. According to the DEQ, in order to ensure the groundwater is protected it is likely that the effluent will need to meet the requirements for Class A Recycled Water. Additionally, Class A Recycled Water disposal in the root zone should be looked at by the DEQ as a preferable means of disposal to individual septic systems.

The reason that Class A Recycled Water is more protective of groundwater than other categories of recycled water is because of the level of treatment that is required. OAR 340-055 defines five categories of effluent, identifies allowable uses for each category, and provides requirements for treatment, monitoring, public access, and setback distances. Fewer restrictions are imposed for higher quality effluent, as shown in Table 6.1.

Table 6.1: Recycled Water Requirements by Category

	Class A	Class B	Class C	Class D	Non-disinfected
Treatment					
Oxidized	✓	✓	✓	✓	✓
Disinfected	✓	✓	✓	✓	
Filtered	✓				
Effluent Requirements					
Turbidity, NTU	2 [1]				
Total coliform, # organisms/100 mL	2.2 [2]	2.2 [3]	23 [4]	- [5]	Per WPCF permit
Restrictions					
Setback to property line[6]	-	-	10 feet	10 feet	Per RWUP
Setback to water supply source	- [7]	50 feet	100 feet	100 feet	150 feet

[1] Not exceed an average of 2 Nephelometric Turbidity Units (NTU) in a 24-hr. period; Not exceed 5 NTU more than 5% of the time within a 24-hr. period; Not exceed 10 NTU at any time; Monitoring every hour.
[2] Not exceed a median of 2.2 total coliform per 100 ml based on the results of the last 7 days; Not exceed 23 total coliform per 100 ml in any single sample; Monitoring once per day.
[3] Same as Note 2 except monitoring is three times per week rather than once per day.
[4] Not exceed a median of 23 total coliform per 100 ml based on the results of the last 7 days; Not exceed 240 total coliform per 100 ml in any two consecutive samples; Monitoring once per week.
[5] Rather than total coliform, Class D Recycled Water is required to only sample for E. coli. E. coli is a subgroup of the total coliform organisms, so a total coliform analysis includes the E. coli organisms. For Class D Recycled Water, the 100 ml sample must not exceed a 30-day log mean of 126 E. coli organisms per 100 ml; and must not exceed 406 E. coli organisms per 100 ml in a single sample; Monitoring once per week.
[6] Setback for applying water directly to the soil. If sprinkler irrigation is used, the setback distance may be greater.
[7] Even with Class A, the groundwater quality protection requirements of OAR 340.40 must be met. The recycled water must be used or land applied in a manner and at a rate that minimizes the movement of contaminants to groundwater and does not adversely impact groundwater quality.

Treatment of wastewater to produce a Class A Recycled Water includes oxidation, disinfection, and filtration. Lower categories of recycled water (such as Class B or C) do not require the level of treatment that is required of Class A, which makes them less likely to protect the groundwater as well as Class A Recycled Water. There is more monitoring associated with Class A Recycled Water, which means there is more assurance that the groundwater is receiving high quality water. The filtration system included in Class A systems (and not included in the lower categories) should help protect the subsurface disposal system from becoming plugged and requiring repeated maintenance.

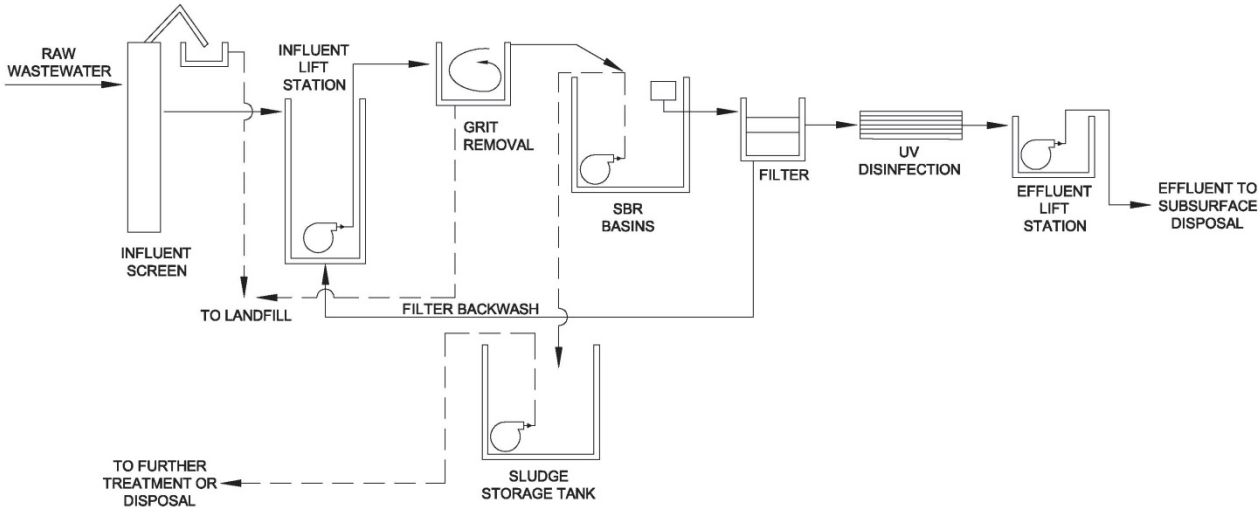
Subsurface disposal, in addition to complying with the Three Basin Rule, is advantageous because of the high precipitation in the area (80 inches or more per year). It would be difficult, if not impossible to land apply the annual volume of wastewater so that it one, does not create surface runoff; two, does not exceed the agronomic rate of whichever crop is grown; and three, dispose of the total volume. The rainfall would also make storage more difficult as the treated wastewater would either need to be stored in a large closed tank or in a storage basin with extra capacity to store precipitation. There may be land available for the storage, but for reasons mentioned above as well as the cost, storage is less likely than subsurface disposal.

6.1.1 Treatment Approach

In order to compare the siting alternatives equitably, a single treatment system approach is recommended. Class A treatment requires oxidation, filtration, and disinfection. The

treatment approach recommended includes a mechanical influent screen (with bypass bar screen), influent lift station, vortex grit removal, 2-basin sequencing batch reactor (SBR) followed by a cloth filter, UV disinfection system, and effluent lift station to the subsurface disposal area. The treatment system would also include a sludge storage tank with aeration to keep the sludge aerobic to control odors. For this study, it was assumed that the sludge would periodically be hauled away to Salem, Oregon for further treatment/disposal. The treatment system also includes a standby generator for backup power. A process flow diagram for this treatment system is shown in Chart 6.1.

Chart 6.1: Treatment System Process Flow Diagram



An SBR was chosen for the Class A treatment because it has a smaller footprint than a conventional activated sludge system or oxidation ditch, both of which require secondary clarifiers. This smaller footprint may work well for the limited space available in each community. The SBR also requires less maintenance and operational expertise than a membrane bioreactor system (MBR). The treatment system is estimated to be a Class 3 system according to OAR-049-0020.

6.1.2 Disposal Approach

The required subsurface disposal area was approximated using OAR 340-071-0220, which is typically used for adsorption trenches receiving partially treated sewage from septic tanks. The calculation takes into account the design flow, the USDA hydraulic soil class (soil class), the depth to groundwater, the trench dimensions, and separation distances. Assuming a shallow groundwater level (less than 4 ft.), the minimum loading rates are: 100 liner feet per 150 gallons per day for soil class A; 125 liner feet per 150 gallons per day for soil class B; and 150 liner feet per 150 gallons per day for soil class C. Using the OAR method should be conservative for disposal of Class A Recycled Water, since it should be a higher quality than septic tank effluent.

6.2 PLANT ALTERNATIVES

Based on discussions with the communities the following alternatives are recommended for evaluation and are discussed below:

Alternative 1: Separate treatment system for each community (five (5) plants total; Lyons and Mehama are combined)

Alternative 2: Combined system for (1) Idanha and Detroit; Separate treatment systems for (2) Gates, (3) Mill City, and (4) Lyons / Mehama

Alternative 3: Combined systems for (1) Idanha and Detroit; (2) Gates and Mill City, and (3) Lyons / Mehama

Alternative 4: Combined systems for (1) Idanha and Detroit; and (2) Gates, Mill City, and Lyons / Mahama

Due to the long distance between Detroit and Gates (17 miles), steep topography, geology, and limited right-of-way for a pipeline, a single combined system alternative was not evaluated.

6.2.1 Site Evaluation

Potential locations for treatment and disposal sites were selected based on some self-imposed guidelines. These included: (1) 100 foot setbacks from private property and the North Santiam River; (2) slopes less than 30 percent; (3) located outside of the 500-year floodplain; and (4) if the land is not currently in use (vacant). A detailed investigation of nearby wells was not included in this feasibility assessment, but should be included at a facility planning level. The likely minimum setback distances are 100 feet from a municipal well and 50 feet from a private well. Potential treatment and disposal locations are shown for Idanha (Figure 8), Detroit (Figure 9), Gates (Figure 10), Mill City (Figure 11), and Lyons (+Mehama; Figure 12) in Appendix A. Table 6.2 is a matrix evaluating each potential location.

Table 6.2: Site Evaluation Matrix

Treatment System	2038 Peak Daily Average Flow (gallons per day)	USDA Soil Class	Required Area (acres) [1]	Location Area (acres) [2,3]	Sufficient Area?	Slope <30%?	Outside of Floodplain and Vacant Land?	Recommended?
Idahna								
Location 1	73,900	B	20.4	9.85		✓	✓	
Location 2				12.34		✓	✓	
Location 3				4.26		✓	✓	
Location 4				3.78		✓	✓	
Locations 1&2				22.19	✓	✓	✓	✓
Detroit								
Location 1	152,800	B	38.4	7.13			✓	
Gates								
Location 1	126,000	B	32.4 [4]	91.32 (71.9 B; 19.42 C)	✓	✓	✓	✓
Location 2				23.85 (21.5 B; 2.35 C)		✓	✓	
Mill City								
Location 1	258,000	A	52.5	3.99		✓	✓	
Location 2				12.67		✓	✓	
Location 3				9.07		✓	✓	
Location 4				10.49		✓	✓	
Lyons (+Mehama)								
Location 1	396,000	A	78.1	276.21	✓	✓	✓	✓
Idanha & Detroit								
Locations 1&2 (in Idanha)	226,700	B	54.7	22.19		✓	✓	
Gates & Mill City								
Locations 1&2 (in Gates)	384,000	B	90.6 [4]	115.17 (93.4 B; 21.77 C)	✓	✓	✓	✓
Gates, Mill City, & Lyons (+Mehama)								
Location 1 (in Lyons)	780,000	A	150.4	276.21	✓	✓	✓	✓

[1] Includes the subsurface disposal area and 3 acres for a wastewater treatment facility.
[2] Each location has a 100 foot buffer from private property and the North Santiam River.
[3] Each location is outside the 500-year floodplain.
[4] Assumes only class B soil will be used for the disposal area.

There may not be a good location for a disposal system in Detroit in terms of both slope and sufficient area. Likewise, if the flows for Detroit and Idanha are combined, there may not be sufficient land for the combined flows. Interestingly, based on the selection criteria, a third location that may not have sufficient land is Mill City (this is including the drain field at their existing WWTP). However, Gates and Lyons (+Mehama) both have sufficient land to accommodate extra flow from Mill City.

As mentioned previously, OAR 340-071-0220 is typically used for onsite septic tanks. Since the expected treatment approach is to produce Class A Recycled Water, it may be possible to pursue a variance from DEQ for the loading rates. Manufacturers of subsurface disposal systems typically recommend higher loading rates, which results in smaller areas. This may be acceptable to DEQ if accompanied by field tests and infiltration studies to show that the soils hydraulic conductivities are greater than shown in OAR 340-071-0220. For example, Mill City's WWTP has a higher hydraulic loading rate than is shown in the OAR standard.

6.2.2 Alternatives Evaluation

With the plant locations identified, the alternatives can be evaluated. Part of this evaluation is a cost estimate including concept-level life cycle costs. This evaluation also includes a summary of the advantages and disadvantages of the alternatives. The cost estimates are classified as a Class 5, concept-level cost estimate according to the American Association of Cost Estimating (AACE). Annual O&M costs are included in the cost estimates to arrive at a present value for comparison of alternatives. The present value analysis was conducted using a real discount rate of 1.2% and a 20-year time period. The equipment (unless a short-lived asset) is assumed to have a 20-year useful life, so no salvage value is included for comparing the alternatives.

The cost opinions are concept-level information only and accuracy is subject to significant variation, depending upon project definition and other factors. The cost opinions have been prepared solely for this preliminary assessment of feasibility. The cost opinions are in September 2016 dollars and do not include escalation to time of actual construction. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final schedule and other variable factors. As a result, the final project costs will vary from those presented below. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.

For the purposes of alternative cost comparison, only costs that differ between each alternative were considered. These comparative costs are treatment plant capital and life cycle costs, transfer force main capital and life cycle costs, disposal land purchase, and land clearing efforts. The shared costs for each alternative include $21,600,000 for 20-year life cycle, and $80,900,000 for capital.

Alternative 1: Five (5) plants total; Lyons and Mehama are combined

As discussed above, there is no location in Detroit for disposal. It is assumed that wastewater from Detroit can be disposed in Idanha. It is also assumed that a variance can be received for Mill City, so that treatment and disposal can be performed at the available locations. The majority of the equipment at the Mill City WWTP is approaching the end of its life and is not suitable for the Class A treatment approach. For this feasibility study it was assumed that a new WWTP would be constructed near the location of the existing WWTP so the existing collection system can be reused. The existing subsurface discharge system is also assumed to be reused as part of the Mill City disposal system.

Concept pipeline layouts from Mehama to Lyons and from Detroit to Idanha are shown in Figures 13 through 16 in Appendix A. Comparative costs for the five treatment facilities, transfer force main and pump station, land purchase, and tree removal are shown in Table 6.3. These include associated 20-year life cycle costs. A more detailed breakdown of costs for alternative 1 is shown in Appendix D.

TABLE 6.3: Alternative 1 – Comparative Costs

Item	Cost
Idanha	
Treatment	$ 7,050,000
Detroit	
Treatment	$ 8,160,000
Gates	
Treatment	$ 7,880,000
Disposal Land Purchase	$ 450,000
Mill City	
Treatment	$ 9,850,000
Disposal Land Purchase	$ 750,000
Lyons Mehema	
Treatment	$ 10,970,000
Disposal Land Purchase	$ 750,000
Tree and Stump Removal	$ 562,500
Comparative Cost (ROUNDED):	**$ 46,500,000**

Alternative 2: Four (4) plants total; Lyons & Mehama and Idanha & Detroit combined

In this alternative the wastewater from Detroit is pumped to Idanha for treatment. Pipeline layouts from Mehama to Lyons and from Detroit to Idanha are shown in Appendix A. Again, it is assumed that a variance can be received for Mill City, so that treatment and disposal can be performed at the available locations. Comparative costs for the four treatment, transfer force mains and pump

stations, land purchase, and tree removal are shown in Table 6.4. These include associated 20-year life cycle costs. A more detailed breakdown of costs for alternative 2 is shown in Appendix D.

TABLE 6.4: Alternative 2 – Comparative Costs

Item	Cost
Idanha-Detroit	
Treatment	$ 9,850,000
Gates	
Treatment	$ 7,880,000
Disposal Land Purchase	$ 450,000
Mill City	
Treatment	$ 9,850,000
Disposal Land Purchase	$ 750,000
Lyons Mehema	
Treatment	$ 10,970,000
Disposal Land Purchase	$ 750,000
Tree and Stump Removal	$ 562,500
Comparative Cost (ROUNDED):	**$ 41,100,000**

Alternative 3: Lyons & Mehama, Idanha & Detroit, and Gates & Mill City

Pipeline layouts from Mehama to Lyons, from Detroit to Idanha, and from Mill City to Gates are shown in Appendix A. Comparative costs for the three treatment facilities, transfer force mains and pump stations, land purchase, and tree removal are shown in Table 6.5. These Costs include associated 20-year life cycle. A more detailed breakdown of costs for alternative 3 is shown in Appendix D.

TABLE 6.5: Alternative 3 – Comparative Costs

Item	Cost
Idanha-Detroit	
Treatment	$ 9,850,000
Mill City-Gates	
FM Mill City-Gates	$ 3,707,000
Treatment	$ 10,970,000
Disposal Land Purchase	$ 1,200,000
Lyons Mehema	
Treatment	$ 10,970,000
Disposal Land Purchase	$ 750,000
Tree and Stump Removal	$ 562,500
Comparative Cost (ROUNDED):	**$ 38,100,000**

Alternative 4: Lyons & Mehama & Gates & Mill City and Idanha & Detroit

Pipeline layouts from Mehama to Lyons, from Lyons to Gates, from Mill City to Gates, and from Detroit to Idanha are shown in Appendix A. Comparative costs for the two treatment facilities, transfer force mains and pump stations, land purchase, and tree removal are shown in Table 6.6. These Costs include associated 20-year life cycle. A more detailed breakdown of costs for alternative 3 is shown in Appendix D.

TABLE 6.6: Alternative 4 – Comparative Costs

Item	Cost
Idanha-Detroit	
Treatment	$ 9,850,000
Lyons Mehema-Mill City-Gates	
FM Gates-Mill City-Lyons Mehema	$ 10,844,000
Treatment	$ 15,530,000
Disposal Land Purchase	$ 1,550,000
Tree and Stump Removal	$ 1,162,500
Comparative Cost (ROUNDED):	**$ 39,000,000**

6.2.3 Benefits and Drawbacks of Alternatives

A summary of the benefits and drawbacks of each of the alternatives is shown in Table 6.7.

TABLE 6.7: Summary of Advantages and Disadvantages

Advantages	Disadvantages
Alternative 1: Five (5) plants; Lyons and Mehama are combined	
• Only a couple of agreements needed [1]	• Highest capital and 20 year life-cycle cost
• Autonomy	• Highest administrative demand on each community
	• Highest operating expense
	• Lack of suitable disposal sites
Alternative 2: Four (4) plants; Lyons & Mehama and Idanha & Detroit combined	
• Only a couple of agreements needed [1]	• Second highest capital and 20 year life-cycle cost
• More autonomy	• Higher administrative demand on each community
	• Higher operating expense
	• Lack of suitable disposal sites
Alternative 3: Three (3) plants; Lyons & Mehama, Idanha & Detroit, and Gates & Mill City	
• Lowest capital and 20 year life-cycle cost	• Several agreements needed
• Lower administrative demand on each community	• Less autonomy
• Lower operating expense	
• More growth potential with plants/disposal in Lyons and Gates	
• Most desirable for phasing the systems	
Alternative 4: Two (2) plants; Lyons & Mehama & Gates & Mill City and Idanha & Detroit	
• Second lowest capital and 20 year life-cycle cost	• Several agreements needed
• Least administrative demand on each community	• Least autonomy
• Least operating expense	
• More growth potential with plants/disposal in Lyons and Gates	

[1] In addition to the agreement between Lyons and Mehama, Alternative 1 will also require an agreement between Detroit and Idanha for subsurface disposal of Detroit's treated wastewater. The same parties would be involved in the agreements of Alternatives 1 and 2.

6.3 SUMMARY

Alternative 3 has the lowest comparative 20-year life cycle cost and provides the most advantages when looking at a regionalization concept. The alternative that is implemented will have to factor in the management/ownership options presented in Section 7 as well as influences from the political and funding areas. Section 8 will summarize the recommended alternative in more detail and include the total estimated cost to install the collection, treatment, and disposal systems for the North Santiam Canyon communities.

7. MANAGEMENT / OWNERSHIP STRUCTURE

7.1 GOVERNANCE OPTIONS

Keller Associates identifies Alternative 3 as the recommended option for the development of wastewater treatment facilities (WWTF) and wastewater collection systems to serve the five cities in the North Santiam Canyon.

1.	Detroit and Idanha	A combined WWTF to serve the two cities
2.	Gates	Phase 1: Independent Gates WWTF Phase 2: Combine Mill City to Gates when expansion is required
3.	Mill City	Phase 1: Mill City WWTF (continue operating existing City facility) Phase 2: Combine with Gates when expansion is required
4.	Lyons/Mehama	Independent Lyons WWTF when system is needed or the community is driving the need.

This chapter reviews several alternatives for the governance, operation and management of these wastewater facilities which may be developed to serve the North Santiam Canyon communities. The study reviewed the following governance options for consideration:

- City-owned and operated facilities
- City-owned facilities operated jointly under an ORS 190 Agreement
- An ORS 190 agency owned and operated facilities
- Creation of a special district
    - Sanitary Sewer Authority under ORS 450 (Local Governing Body)
    - County Service District under ORS 451 (County Commissioners)

7.2 STUDY AREA

The North Santiam Canyon includes five cities (Lyons, Mill City, Gates, Detroit and Idanha), one unincorporated community (Mehama) and unincorporated rural areas within Linn County and Marion County. The North Santiam River serves as the boundary between Linn County and Marion County. See Section 1.3 for additional study area details.

Three of the cities (Mill City, Gates and Idanha) straddle the river. Each of these three cities has an area north of the North Santiam River that is in Marion County, with the remainder of the city south of the river in Linn County. The City of Lyons is located entirely in Linn County, but the Lyons UGB includes the unincorporated community of Mehama north of the river. The City of Detroit is located entirely in Marion County.

Chart 7.1: Lyons, Mill City and Gates Showing UGB Areas

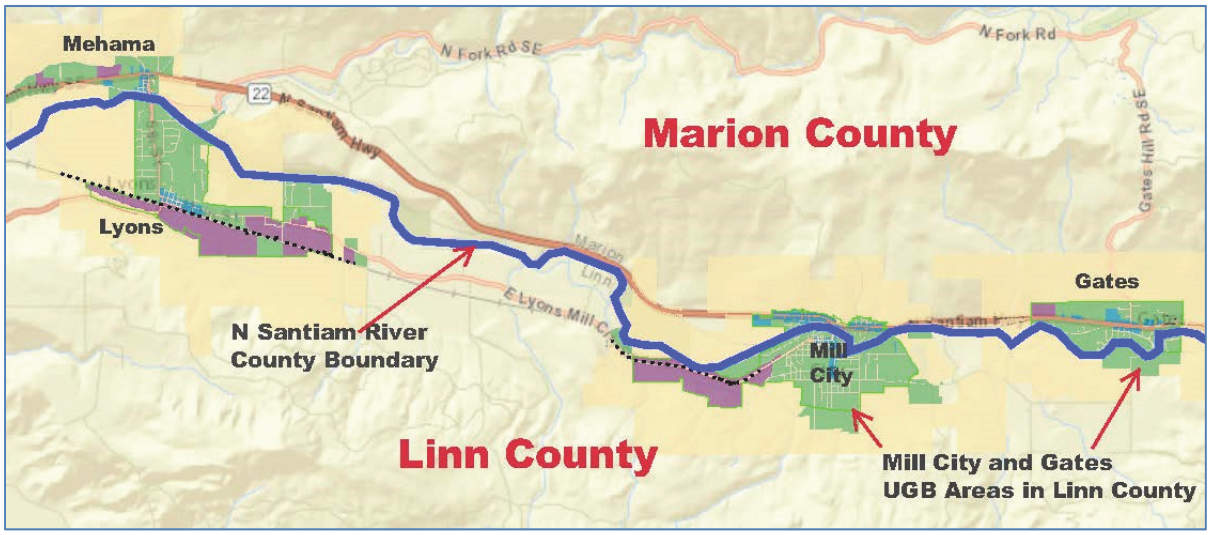


Chart 7.2: Detroit and Idanha Showing UGB Areas

With portions of multiple cities and their associated urban growth boundaries located in Marion County and in Linn County, the selection of a governance structure will require coordination with the city councils in each of the five cities as well as the Board of County Commissioners and appointed officials in each of the two counties.

The establishment of city-owned wastewater facilities can occur without participation from county governments. The creation of an ORS 190 agency or formation of a special district will require formal action from the counties.

7.3 COMMUNITY INTERVIEWS: OBSERVATIONS AND CONCERNS

Interviews were held in June and July 2016 with city elected officials and staff in the five cities and Marion County to identify local issues, observations and concerns that must be addressed during any discussion about the ownership, operation and governance of wastewater facilities to serve the North Santiam Canyon communities.

1. General Observations:
   - Businesses cannot grow and new housing development cannot occur without a sewer system. [Detroit, Idanha and Gates].
   - In Detroit, there is insufficient land available to install new on-site sewage disposal systems or to provide required drain fields for new or repaired systems. When feasible on-site sewage disposal systems are very costly for individual property owners.
   - Property owners in Detroit, Idanha, Gates, and/or Lyons who have invested in on-site sewage disposal systems that are operating effectively do not need or want a community-wide system.
   - In Mill City, the sewer system is nearing capacity and usable life for vital components of the step system. Expansion of the existing system is necessary to allow for development of the entire Mill City UGB. See assessment of existing facilities in Mill City in Section 3 of this report.
2. Needs and Benefits of a Community Sewer System must be clearly articulated:

   City officials in each of the cities emphasized the needs and benefits of a community-wide sewer system must be clearly articulated. As each city government weighs its options, the pro's and con's of developing or not developing a sewer system must be shared with the citizens in a clear, straightforward manner. Key questions and answers were:

   - Why is a Sewer System needed in our city?
     - What are the public health issues?
     - Are there septic system failures or limits for use of on-site disposal systems in our community?
     - Are there environmental concerns?
   - What are the economic development constraints if there is no sewer system?
   - What are the economic development opportunities if a sewer system is developed?
   - What are the benefits for our City? Our residents?
3. Rates:

   Assuming a sewer system is constructed, elected officials emphasized costs and rates issues are paramount.

   - Sewer rates must be reasonable. All cities have a significant proportion of low- to moderate-income residents. The primary concern is the monthly service charge cannot place an undue burden on customers.

- Sewer rates must be equitable. Monthly rates in one community should not subsidize rates for others.
- Debt assumption. Residents in one city should not assume the current debt of another community.
- Mill City officials expressed concern that future sewer rates be competitive with current rates, particularly if Mill City is a partner in a sewer agency or sewer district.

4. Form of Government (Individual City vs. Cooperative Entity):

   - Officials in cities without sewers expressed a willingness to discuss a cooperative entity if it is more efficient and cost effective for their residents.
   - Mill City officials want to know how a joint sewer agency or sewer district will impact the operation of their wastewater facilities.

5. Intergovernmental Cooperation

   The evaluation of alternatives will require open discussion, time and trust by representatives of each community, Marion County, regulatory agencies and funding agencies.

   - Regional meetings are needed to openly discuss issues and options.
   - Concerns of individual cities must be addressed.
   - Each City government will need agree on the benefits of participating in a regional group to pursue wastewater funding and construction.
   - County leadership is essential to convene a regional study committee and provide direction.
   - It will take time to build trust and reach consensus on how to proceed.

7.4 CITY-OWNED AND CITY-OPERATED WASTEWATER SYSTEMS

Each of the five cities in the North Santiam Canyon is an incorporated city with a city charter, an elected Mayor/Council form of government, and a small city staff to manage the City's day-to-day operations.

Mill City currently owns and operates a WWTF and collection system and a city water system. The cities of Detroit, Gates and Idanha operate a city-owned water utility. In each city, the City Council adopts an annual budget, sets utility rates, operates a utility billing system and provides fiscal management services. Municipal accounting standards are followed to track annual utility revenues and account for the annual operation, maintenance, debt service, system depreciation and capital expenses. Each of these four cities has a small one-person or two-person public works department to manage the systems. The City of Lyons does not operate a water utility.

7.4.1 Establishment and Governance of a City-owned Sewer Utility:

Each city government has the authority under its city charter to establish a city-owned and operated sewer utility. The following table shows the cities of Detroit and Idanha should

have a joint wastewater treatment facility and the cities of Gates, Mill City and Lyons could each have a separate city-owned and city-operated sewer system.

City-Owned & Operated Wastewater Facilities

Detroit / Idanha WWTF	Gates WWTF	Mill City WWTF	Lyons WWTF
•Set up a Wastewater Utility in each city. •The City of Detroit operates the system under a joint ORS 190 Management Agreement	•Set up a Wastewater Utility when a new system is built. •The City of Gates will own & operate its system.	•Mill City currently owns and operates a sewer collection and treatment facility inside the city limits. •Mill City will expand its system as needed to accomodate growth.	•Set up a Wastewater Utility when a new system is built. •The City of Lyons will own and operate its system.

The City Council in each city will create a Sewer Utility and assume planning, administrative, financial management and operational responsibilities. Those duties include:

- Planning:
  - Adopt a Wastewater Facilities Master Plan.
  - Adopt an Effluent Disposal Plan for treated wastewater.
  - Prepare and Adopt a Pre-Design Report for the proposed WWTF.
  - Develop and Update Public Facilities Goals and Policies in the City's Comprehensive Plan.
  - Adopt Public Works Design Standards for a Wastewater System.
- Administrative:
  - Adopt a Sewer System Ordinance to ensure compliance with the Federal Clean Water Act, ORS 454, ORS 468 and Oregon Department of Environmental Quality regulations in OAR 340.
  - Obtain DEQ approval for the Wastewater Facilities Master Plan, Effluent Disposal Plan, Sewer Ordinance and Public Works Design Standards.
  - Apply for and comply with the National Pollution Discharge Elimination System (NPDES) permit for the city's wastewater treatment facility.
- Financing:
  - Secure funding for capital improvements.
  - Establish a Sewer Utility Fund.
  - Set utility rates.
  - Adopt an annual budget for the new Sewer Fund.
- Capital Improvements and Capital Replacement

- Develop a Capital Improvement Plan (CIP) for long-term facility improvements, major maintenance items and capital facility replacement.
- Prepare and implement an Asset Management System.

- Operations and Maintenance Requirements
  - Hire a certified wastewater operator (OAR 340-049).
  - Develop and adopt operational performance standards to ensure compliance with the NPDES and EPA/DEQ reporting requirements and parameters.
  - Provide on-going training for employees.
  - Provide a public works shop and small laboratory facility.
  - Acquire vehicles and equipment.

7.4.2 Benefits of a City-owned Sewer Utility:

There are several benefits for city ownership and operation of a sewer utility in a small city.

(1) Local Control. The City is responsible for providing services to city residents by a locally controlled utility. The City Council adopts ordinances and policies to govern the operation of the system. As the governing body, the City Council adopts the Wastewater System Master Plan, identifies capital improvement priorities, sets spending priorities and establishes utility rates.

(2) Customer Service and Emergency Response. A local public works department can emphasize customer service and immediately response to calls for service and emergencies.

(3) Budget Support for City Staff. In most small cities, the Water Fund and/or Sewer Fund provide a large share of the funding to hire public works staff and city hall staff. Without contributions from these funds, a small Oregon city may not be able to afford to hire both public works staff and city hall employees.

7.4.3 Challenges of a City-owned Sewer Utility:

City ownership of a sewer utility create a variety of challenges for elected officials, public works and city hall staff in Oregon's communities under 5,000 population.

(1) Training & Certification for Public Works Employees. Keller Associates recommends construction of wastewater treatment facilities with a Sequential Batch Reactor (SBR) unit as the primary treatment element and a land application root-zone disposal of treated Class A effluent. Class A treatment facilities require a wastewater operator with a WW Treatment–Level 3 certification, as required by DEQ. That level of operator would also address compliance with the Three Basin Rule.

Small city public works employees are generalists with a wide-diversity of skills in sewer, water, streets, parks and building maintenance. Employees may have a WW Collections-Level-1 and/or a WW Treatment-Level 1 certification, but rarely an advanced WW Treatment-Level 2 or Level 3 certifications for wastewater treatment.

(2) Lack of System Maintenance: Small cities may not have an active maintenance program for the sewer collection system or annual scheduled maintenance activities. An annual maintenance program may typically include:

a. Pump Station maintenance

b. Collection System maintenance

i. TV Inspection and sewer main cleaning.
ii. Manhole inspection and repairs
iii. Pipeline repairs
iv. Inflow and infiltration program.
v. Maintenance software / GIS inventory and mapping of system.
vi. 75-year replacement schedule.

c. Daily Wastewater Facility operation, sampling, testing and reporting to DEQ.

(3) Lack of capital investment in vehicles, equipment and major maintenance projects for either the collection system or for the wastewater treatment facility.

(4) Lack of financial management expertise to pursue grant or loan opportunities and/or manage projects. This includes the expertise to analyze and adopt rates necessary to cover personnel, operating costs, debt service and capital projects.

(5) Council decisions are based on a short-term priority of keeping rates low and not creating reserves for capital replacement and major maintenance.

7.5 ORS 190 –INTERGOVERNMENTAL AGREEMENT

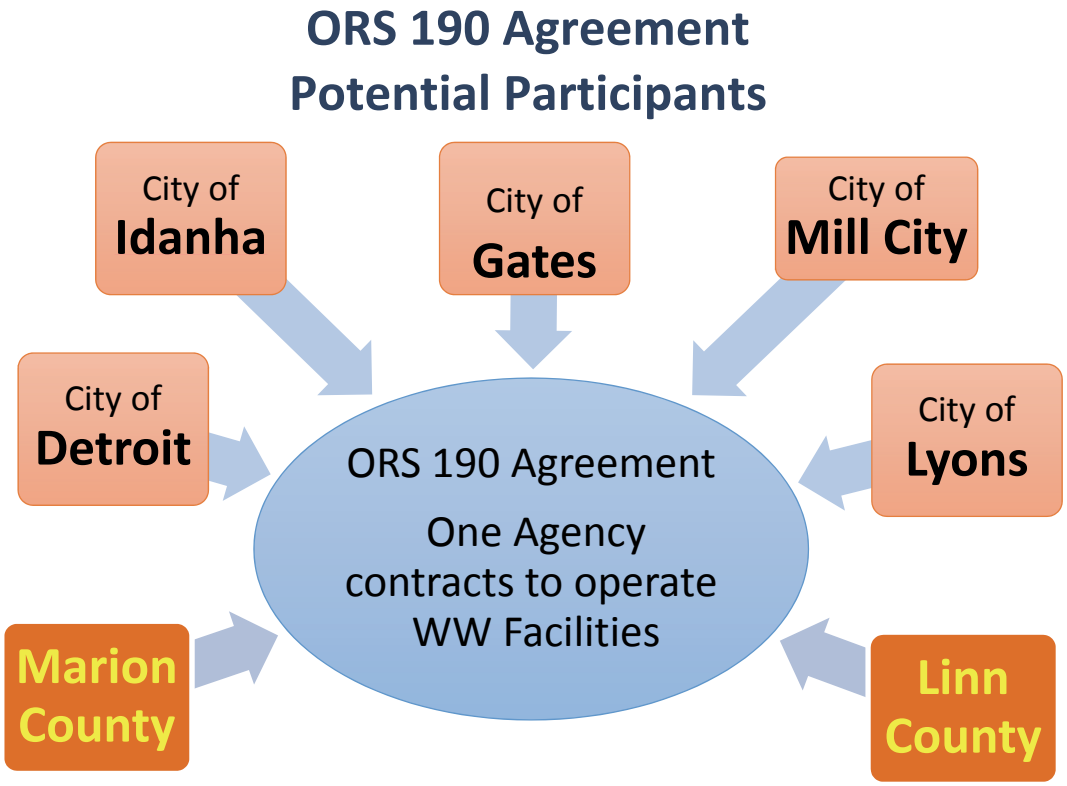
Under authority granted in ORS 190.010, any city or county may voluntarily enter into an intergovernmental agreement to provide any governmental function or service, including sanitary sewer services.

Three types of intergovernmental agreements appear to be feasible alternatives for the provision of sewer services for North Santiam Canyon communities:

Option 1: Contract with Marion County to operate the wastewater treatment plants and collection systems.

Option 2: Contract with one City to operate the wastewater treatment plants and collection systems.

Option 3: Create an ORS 190 Agency to operate the wastewater systems in each City. The ORS 190 Agency would be governed by a board of directors appointed by and responsible to and acting on behalf of the units of local government. [Discussed separately below].



7.5.1 Assumptions for an ORS 190 Agreement

Under either Option 1 "Contract with Marion County" or Option 2 "Contract with a City" each city will retain ownership of its sewer system and will be ultimately responsible for the wastewater collection system and ensuring the wastewater treatment system within its jurisdiction complies with DEQ NPDES permit requirements. The duties and responsibilities of each city are identical to those discussed the previous section on a city-owned sewer utility.

Each city will:

- Own the wastewater collection system within its urban growth boundary.
- Establish a Sewer Utility Fund and budget for annual operating revenues and expenses.
- Finance capital improvements for wastewater facilities within its jurisdiction.
- Set rates for its customers.

The ORS 190 Agreement contracts with and delegates administrative and operational duties and responsibilities a county or a city as the "LEAD AGENCY". Prior to the execution of an ORS 190 Agreement the parties need to thoroughly discuss and resolve issues regarding the day-to-day responsibility, customer service, utility billing and other operational issues.

7.5.2 Elements of an ORS 190 Agreement for Wastewater Management Services

An ORS 190 Agreement for Wastewater Management Services can provide a consistent governance framework, financial management and administration of day-to-day operations of the wastewater treatment and collections systems within its service area. Participating cities may delegate any or all of the following duties and responsibilities to the "LEAD AGENCY":

- Wastewater Facilities Planning
- Financial Management and Utility Billing
    - Application and securing funding for capital improvements
    - Development of annual O & M budgets for each city
    - Allocation of debt for proposed or completed capital improvements
    - Rate analysis and recommending rates for each city
    - Provide utility billing services (if desired)
- Operations and Maintenance
- Facilities and Equipment Acquisition
- Capital Improvements Planning and Capital Replacement
- Management Oversight: Membership, terms, meeting schedules, agenda format
- Agency Cooperation: Ensure communication on key issues

The administrative provisions of the intergovernmental agreement describe the primary purpose and establish an administrative management of the wastewater system. An interagency management committee may be created to ensure all cities are involved in the oversight of the wastewater system.

Option 1: ORS 190 Agreement with Marion County

Under this option, any or all of the five North Santiam Canyon cities may enter into an ORS 190 Agreement with Marion County. The ORS 190 Agreement can delegate responsibility to manage and operate wastewater collection and treatment facilities. Marion County would be the LEAD AGENCY responsible for the day-to-day operations of the facilities.

Marion County currently operates two special service districts that provide wastewater treatment and collection services to residents in rural Marion County:

(1) Fargo District (Donald interchange w/ I-5).

(2) Brooks District (Unincorporated community north of Salem)

The Fargo District is a small service district that collects and pumps effluent from several businesses at the Donald interchange with Interstate-5 to the City of Donald wastewater system. The Fargo District does not have a wastewater treatment facility. The Brooks District provides wastewater treatment and collection services to 275 public, commercial and residential customers in the unincorporated community of Brooks, north of Salem and adjacent to Interstate 5. The Brooks system is a Septic Tank Effluent Pump (STEP) system, similar to Mill City's. Sewerage from homes and businesses is collected in interceptor tanks

located on individual properties. Solids are collected in the interceptor tanks and the liquids are delivered to the Brooks Lagoon. The treated effluent from the lagoon is discharged into the Willamette River in accordance with the parameters of the Brooks Sewer District's NPDES permit. The interceptor tanks are periodically pumped out and the solids are taken to a DEQ approved disposal facility.

The Marion County Board of Commissioners serve as the governing body for the Fargo and Brooks sewer districts and the Marion County Public Works Department oversees the operation, maintenance and management of the two systems. The County has one certified WW Operator 2 and two public works maintenance staff with WW-1 collection and treatment certifications. Engineering is provided on an as-needed basis by the County's engineering staff. Part-time administrative support staff in the public works department handles utility billing, monthly reports and general district administrative services. Residential customers pay $30 per month per EDU. Commercial user charges are based on sewer flows. County staff reports customers are generally satisfied with the quality and level of service provided.

Key Elements in a ORS 190 Agreement for Wastewater Services

1. **Purpose**
2. **Administrative Structure**
3. **Facilities Planning**
4. **Financial Management**
   - **Annual Costs**
   - **Utility Rates**
   - **Debt Allocation**
5. **Operations and Maintenance**
6. **Vehicle & Equipment Acquisition**
7. **Future Capital Improvements**

Benefits of Option 1- An ORS 190 Agreement between Cities and Marion County:

There are several benefits for the cities to enter into an agreement with Marion County.

(1) County Experience Operating Two Small Sewer Districts.

(2) Staffing Levels and Expertise: Marion County can hire a single WW Treatment Operator with a Level-3 certification to operate multiple SBR treatment facilities and handle the daily operations of the collection system. Marion County Public Works (MCPW) can also utilize its existing staff to work under and provide backup to the lead operator.

(3) Administrative Support: Marion County can utilize existing administrative, human resources, public works engineering, public works fleet services and operations staff to support the contract with the small cities.

Challenges of Option 1 - An ORS 190 Agreement with Marion County:

With the exception of the two small sewer service districts, Marion County does not contract with small cities to manage or operate a sewer utility. Several challenges or issues would need to be addressed before this option is strongly considered:

(1) Marion County must agree to provide services to the North Santiam Canyon communities for the long-term including planning, seeking funding, design, construction and operation of the wastewater facilities.

(2) Most, or all, of the small cities will need to participate to make it cost-effective for Marion County to provide services.

(3) MCPW will need to establish a local public works office and shop facility in the N. Santiam Canyon. The closest MCPW facility is in Aumsville.

(4) MCPW operation of a sewer utility adds another "utility" provider in each small city, which may be confusing to residents.

(5) Oversight and Coordination. A Wastewater Coordinating Council composed of representatives from each participating city and Marion County will be needed to address financial management, operational and administrative issues that arise in the communities.

(6) Annual Cost: The ORS 190 Agreement must specify a mechanism to establish an annual cost to each City. The financing section of the agreement will address the process for reviewing and setting monthly sewer rates, systems development charges, connection charges and fees for development review and how those revenues are distributed.

(7) Utility Billing: With the exception of Lyons, all cities have a utility billing system for water customers. The Agreement must address who is responsible for monthly billing.

Option 2: ORS 190 Agreement with or between Cities:

Under Option 2, any or all of the five North Santiam Canyon cities may enter into an ORS 190 Agreement with another City to operate the wastewater treatment and collection system in its city limits. One City will serve as the LEAD AGENCY and will operate the wastewater treatment and collection facilities in all the participating cities.

Three opportunities for intergovernmental agreements can be readily identified:

Option 2a: Detroit / Idanha Agreement

Keller Associates recommends a joint wastewater treatment facility to serve Detroit and Idanha. As the larger city, the City of Detroit may own and operate the wastewater facility that serves both cities. Idanha can contract with the City of Detroit to receive and treat sewage influent from Idanha and for either City to operate and maintain the collection system inside the City of Idanha.

Option 2b: City of Mill City Agreement with one or more cities

The City of Mill City is the only North Santiam Canyon community with an existing wastewater facility. Upon completion of wastewater facilities in any of the other canyon communities, the City of Mill City may contract to operate and maintain the wastewater treatment plants and/or the wastewater collection systems in the other cities.

Option 2c: Multi-City Agreement with a Private Contractor

One or more cities can enter into an agreement with a private firm to operate and maintain each city's wastewater treatment plan and/or wastewater collection system. By entering into a multi-city agreement with a private firm, the cities may be able to negotiate a lower cost and higher level of service.[1]

Benefits of Option 2a and 2b - An ORS 190 Agreement between Cities:

The benefits of an intergovernmental agreement between cities are similar to those listed in Option 1 – Agreement with Marion County. The Cities combine financial resources to pay for personnel, materials and equipment and increase quality and level of services.

(1) Personnel. The Lead City will have funding to hire a WW Treatment Operator with a Level-3 certification to operate multiple SBR treatment facilities and handle the daily operations of the collection system. Funding will enable the City to hire other operators/maintenance workers to provide day-to-day services and after-hours emergency response.

(2) Administrative Support: The Lead City can utilize its existing city hall staff to provide customer service, utility billing and financial management.

(3) Public Works Management: The Lead City will be able to more efficiently manage two or more wastewater facilities and collection systems, establish a regular O&M maintenance program, upgrade equipment and have sufficient staff to respond to after-hours emergency requests.

(4) Local Service: Citizens throughout the North Santiam Canyon will be provided with service by an existing local agency.

Challenges of Options 2a and 2b - An ORS 190 Agreement between Cities:

The participating cities will face several challenges:

(1) Administrative Structure: The Lead City will need a management structure with a City Recorder/Administrator/Manager and a Wastewater/Public Works Director with clear lines of authority and responsibilities to effectively manage the Sewer Utility.

(2) Governance:

a. City Council. The City Council in the Lead City will be responsible for making policy and budget decisions in the best interest of all participating cities.

b. ORS 190 Management Committee: The purpose, structure, duties and policy role of the management committee must be clearly defined and adhered to. It will address capital financing, annual costs and administrative issues that arise.

[1] The scope of work for this North Santiam Canyon Regional Wastewater Feasibility Study did not include an evaluation of the future management of wastewater treatment or collection facilities by a private contractor. This section includes a brief discussion because it is a feasible alternative that may be evaluated by any of the North Santiam Canyon cities when they have constructed and begin operation of a wastewater treatment facility or collection system in the future.

Open discussion, consensus driven decision making and trust are essential for the committee to be effective.

(3) Customer Service / Community Outreach: The Lead City will need to communicate effectively with customers and emphasize customer service.

(4) Consistent Standards and Policies: Each city will need to adopt the same public works standards and administrative policies.

(5) Annual Cost: The Lead Agency will need to track and clearly explain the Sewer Utility costs. The management committee must understand the process used by the Lead City in setting its budget, establishing monthly sewer rates, systems development charges, connection charges and fees for development review and how those revenues are distributed.

(6) Consistent Leadership: Oregon's small cities can have high rates of turnover in appointed and elected officials. Due to the high turnover rate, there is potential for inconsistent leadership and commitment to following adopted policies and agreements.

(7) Professional Expertise: Local government employees in small cities typically are generalists without extensive professional training in management, public works administration or higher level professional certifications. They may lack the skills to competently manage multiple wastewater facilities or systems.

7.6 ORS 190 - INTERGOVERNMENTAL AGENCY

Under authority granted in ORS 190.010 any city or county may voluntarily enter into an intergovernmental agreement to provide any governmental function or service, including sanitary sewer services. An independent intergovernmental agency may be established to own and operate the wastewater treatment facilities and/or collections system.[2]

The cities of Eugene, Springfield and Lane County have entered into an agreement to establish the Metropolitan Wastewater Management Commission (MWMC), an independent agency to

[2] There are several examples in the State of Oregon where cities and counties have entered into an intergovernmental agreements or created sewer districts to provide wastewater treatment and/or wastewater collection services within one or more cities and the surroundings unincorporated areas of a county. Examples include:

- The Metropolitan Wastewater Management Commission serves Eugene, Springfield and rural areas of Lane County that are located inside the Urban Growth Boundaries (UGB) of the two cities.
- The Nehalem Bay Wastewater Agency serves the cities of Manzanita, Nehalem Bay, Wheeler and the surrounding areas in Tillamook County.
- The Rogue Valley Sewer Services (formally Bear Creek Valley Sanitary Authority) is a sewer district that provides wastewater services to communities in the Rogue Valley in southern Oregon including Central Point, Jacksonville, Medford, Phoenix, Talent and unincorporated communities in Jackson County.
- The City of Myrtle Creek owns and operates a wastewater facility that serves the City of Myrtle Creek, the unincorporated areas of the Myrtle Creek UGB and the nearby Tri-City Sanitary Sewer Authority in rural Douglas County.
- The City of Stayton owns and operates a wastewater treatment facility that serves the cities of Stayton and Sublimity. Each city owns and operates their own wastewater collections systems.

provide regional sewerage services. MWMC has the same authority of a local government in Oregon and may finance, build and operate wastewater facilities. MWMC owns and operates the regional wastewater plant, pump stations and major collection system, but each city operates its own collection system.[3]

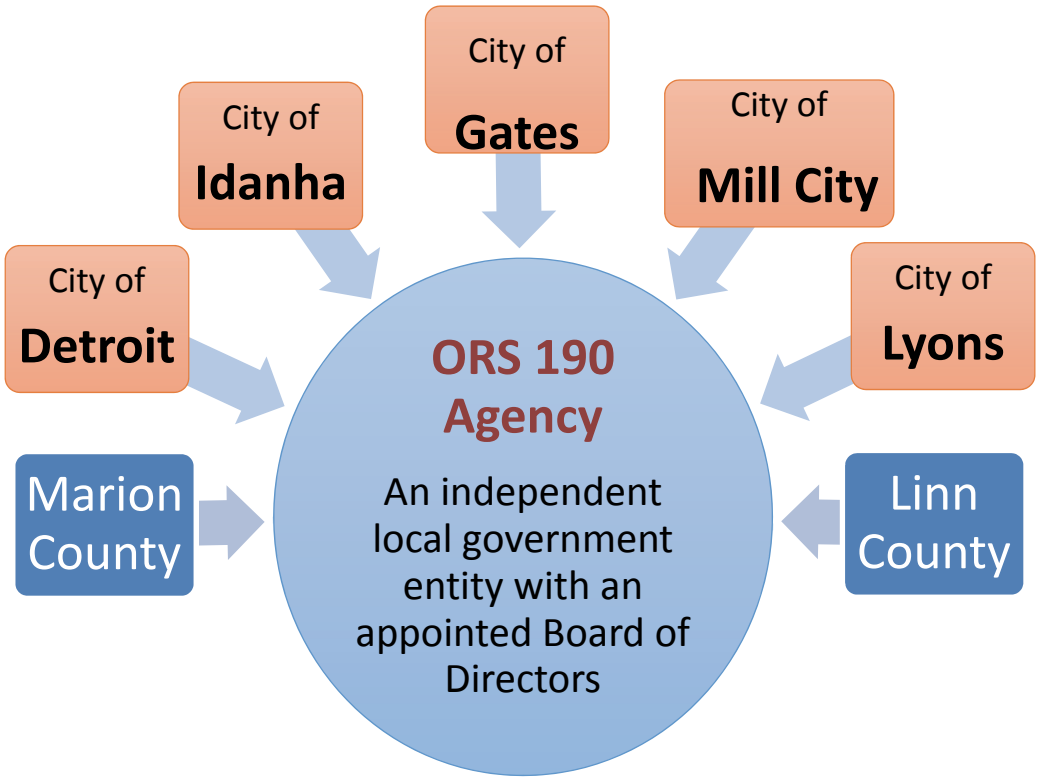
MWMC's jurisdiction covers the cities of Eugene and Springfield as well as the unincorporated areas of Lane County that are within the Urban Growth Boundaries of the two cities. MWMC has a seven-member (7) board of directors comprised of elected officials and appointed members. The parties have updated the intergovernmental five time since it was originally adopted. A copy of the 2005 MWMC intergovernmental agreement is included in Appendix E.

7.6.1 Participants in an ORS 190 Agency – North Santiam Regional Sewer Agency

Two or more local government agencies can enter into an agreement to form an ORS 190 Agency. However, in order to be effective in planning and seeking funding for wastewater improvements, an ORS 190 Agency will need to include Marion County, Detroit, Idanha and Gates. The inclusion of Lyons and Mill City at the time of initial formation of an ORS 190 Agency would strengthen the ORS 190 Agency, but these two cities could join in the future.

[3] There are several examples in the State of Oregon where cities and counties have entered into an intergovernmental agreements or created sewer districts to provide wastewater treatment and/or wastewater collection services within one or more cities and the surroundings unincorporated areas of a county. Examples include:

- The Metropolitan Wastewater Management Commission serves Eugene, Springfield and rural areas of Lane County that are located inside the Urban Growth Boundaries (UGB) of the two cities.
- The Nehalem Bay Wastewater Agency serves the cities of Manzanita, Nehalem Bay, Wheeler and the surrounding areas in Tillamook County.
- The Rogue Valley Sewer Services (formally Bear Creek Valley Sanitary Authority) is a sewer district that provides wastewater services to communities in the Rogue Valley in southern Oregon including Central Point, Jacksonville, Medford, Phoenix, Talent and unincorporated communities in Jackson County.
- The City of Myrtle Creek owns and operates a wastewater facility that serves the City of Myrtle Creek, the unincorporated areas of the Myrtle Creek UGB and the nearby Tri-City Sanitary Sewer Authority in rural Douglas County.
- The City of Stayton owns and operates a wastewater treatment facility that serves the cities of Stayton and Sublimity. Each city owns and operates their own wastewater collections systems.



7.6.2 Benefits of an ORS 190 Agency – North Santiam Regional Sewer Agency

An ORS 190 Agency is an independent local government entity with statutory powers and authority and an appointed board of directors. The organizing intergovernmental agreement defines the purpose of the ORS 190 Agency and limits its scope and authority. Some of the benefits of an ORS 190 Agency include:

(1) Formation: Formation of the Agency can occur whenever two or more agencies decide to form the Agency.

(2) Partner cities can be added as needed: Cities can be added at any time they want to plan for and construct wastewater facilities.

(3) Single-purpose Regional Sewer Agency: As a single-purpose agency, the Board of Directors is solely focused on providing sewer services for its customers.

(4) Local Service: Citizens throughout the North Santiam Canyon will be provided with service by a local agency.

(5) Staffing / Administrative Structure: A regional sewer agency has several options to begin operations:

a. Hire new staff.
b. Contract with one of the cities or counties.
c. Contract with a private firm.

7.6.3 Challenges of an ORS 190 Agency

A North Santiam Canyon Regional Sewer Agency faces several challenges at the time it is created.

(1) Opposition to creation of another local government entity.

(2) Delegation of authority from individual cities to the new regional sewer agency.

(3) Funding. Each participating agency will need to contribute funds to pay for staff and the administrative costs in setting up the new agency.

(4) If Mill City is a participant, deciding whether or not to transfer ownership of Mill City's WWTF and collection system, assumption of debt and whether or not to transfer personnel to the new agency.

7.7 ORS 450- SPECIAL DISTRICT – SANITARY SEWER AUTHORITY

Under authority granted in ORS 450, the County Board of Commissioners can initiate the formation of a special district to serve as a Sanitary Sewer Authority. The proposed district may include territory in one or more counties, cities and unincorporated areas. Land need not be contiguous to be included within the new district.

A Sanitary Sewer Authority is authorized to provide wastewater treatment and collection services within the geographic boundaries of the new district. The new district is formed following the organizational procedures set forth in ORS 198.720 to ORS 198.830. If formed, the Sanitary Sewer Authority is governed by an elected 5-member board of directors and has all the powers of a special district.

ORS 198.749 requires preparation of a preliminary report on the proposed district. The preliminary report describes the purpose and services to be provided by the new district, the geographic area, legal description and boundary map, an economic feasibility analysis, 1st and 3rd year budget and the impact the proposed district may have on services provided by any other special districts or cities within the proposed district.

Formation of a Sanitary Authority may be initiated in the following ways:

(1) Petition by interested citizens filed with the Board of Commissioners in the principal county of the proposed district. (ORS 198.748 to ORS 198.775)

(2) Resolutions of two or more cities filed with the Board of Commissioners in the principal county of the proposed district. (ORS 450.787).

(3) Board Order initiating the district formation process adopted by the Board of Commissioners in the principal county of the proposed district. (ORS 450.785)

The principal county means the county in which the proposed district, or the greater portion of the assessed value of all taxable property in the proposed district, as shown by the most recent

assessment roll of the counties, is located at the time proceedings are initiated to form a district.[4] See the most recent assessed values below in Table 7.1.

Table 7.1: Assessed Values in the North Santiam Canyon City & UGB areas

City	Marion County Assessed Value	Linn County Assessed Value	Total Assessed Value	Percentage of Total Value
Detroit	50,400,182	0	50,400,182	20.1%
Idanha	4,495,019	3,845,214	8,340,233	3.3%
Gates	22,935,559	3,549,214	26,484,773	10.6%
Mill City	18,831,036	68,767,415	87,598,451	35.0%
Lyons	0	77,718,357	77,718,357	31.0%
Totals	**96,661,796**	**153,880,200**	**250,541,996**	**100%**

The North Santiam Canyon includes cities and unincorporated areas that are located in both Linn County and Marion County. Depending on the geographic area included, the principal county may be Linn County or it may be Marion County.

7.7.1 Formation by Two or More Cities

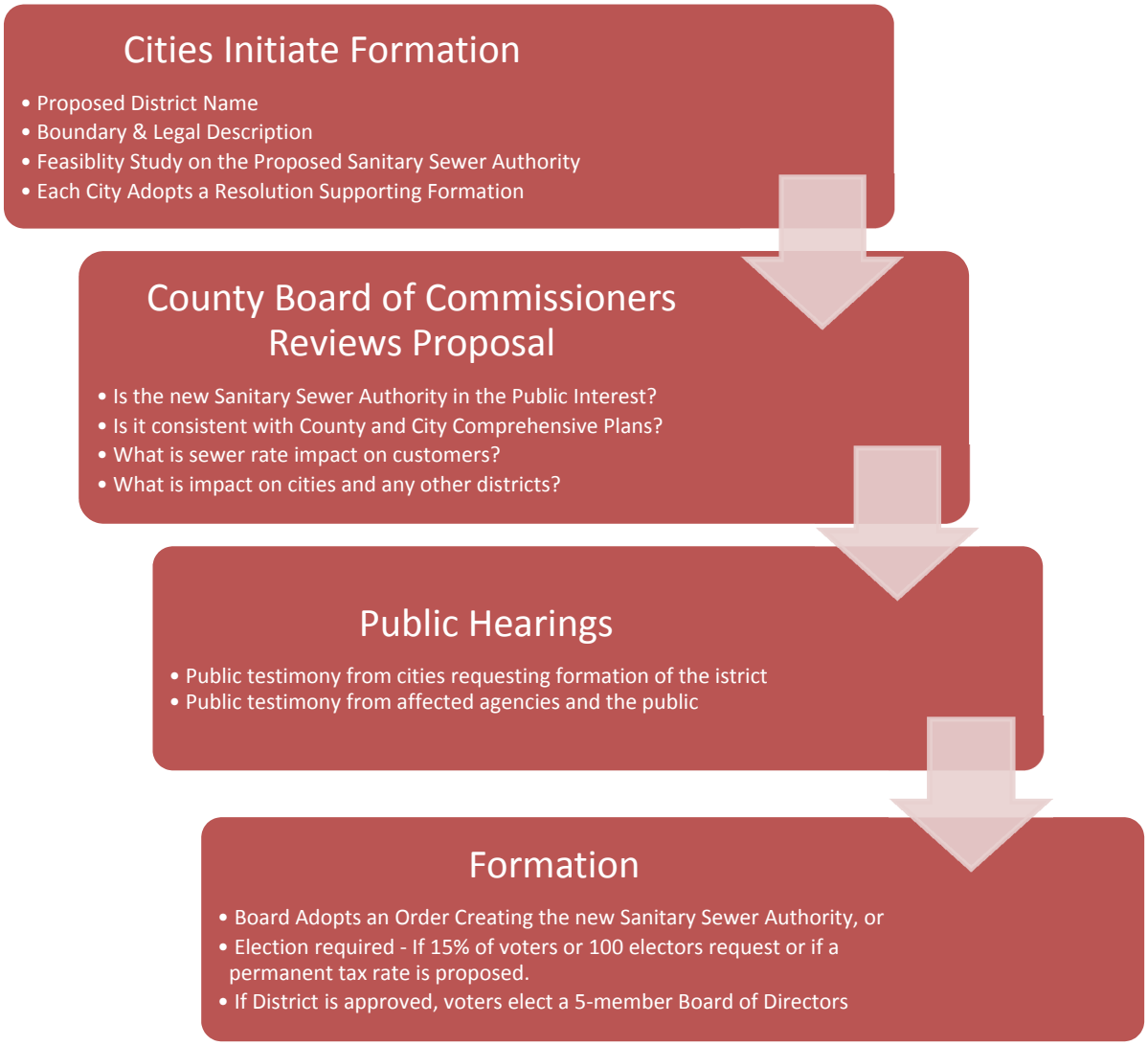
Two or more cities may initiate the formation of Sanitary Sewer Authority by adopting resolutions. The formation resolutions are then referred to the Board of Commissioners in the principal county for consideration.

The Board of Commissioners is required to hold public hearings to consider the proposal, address questions about whether or not the proposed district is in the public interest, whether or not the proposal complies with the County and City comprehensive plans, what impact the new Sewer Authority will have on customers and ratepayers and any potential impact on any city or special district.

If the Board of Commissioners concurs with the formation of the Sanitary Sewer Authority, then the Board adopts an Order either forming the District without an election or calling an election within the proposed area asking voters to either approve/deny the formation of the district, establish a permanent tax rate and if the District is formed, to elect a 5-member Board of Directors.

[4] ORS 198.705

ORS 450 Sanitary Authority
City Initiated Formation Process

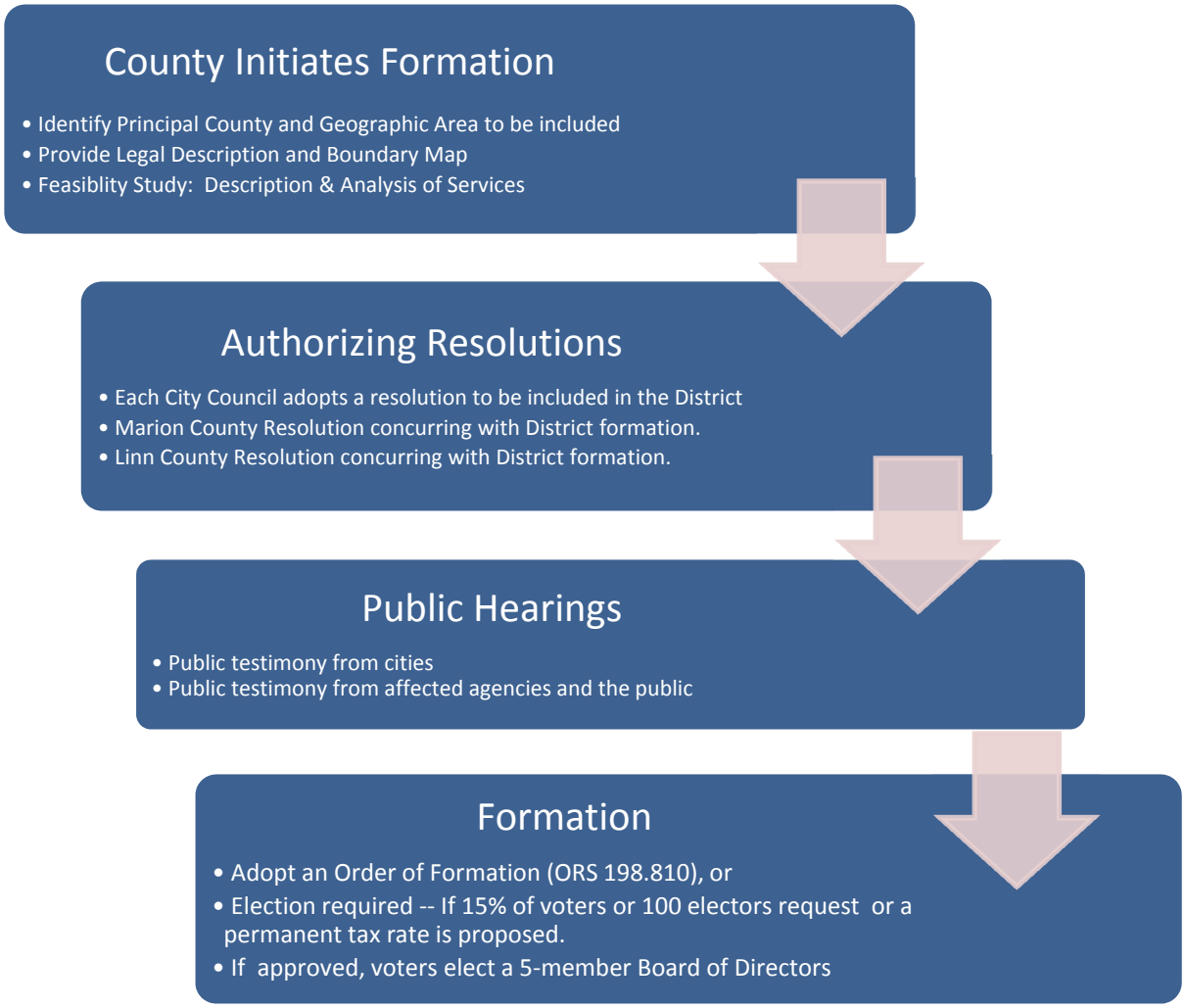


7.7.2 Formation by Linn County

The Linn County Board of Commissioners may initiate formation of a new district if the proposed district includes all of the cities or a combination of cities that includes Mill City and Lyons. For any city in the proposed district, the City Council must adopt a resolution concurring with the district formation. If any portion of Marion County is included, the Marion County Board of Commissioners must adopt a resolution in support of the district formation.

The following chart shows the formation process if a principal county initiates the formation of a new Sanitary Sewer Authority under ORS 450 following the formation procedures outlined in ORS 198.720 to ORS 198.830.

ORS 450 Sanitary Authority
County Initiated Formation Process

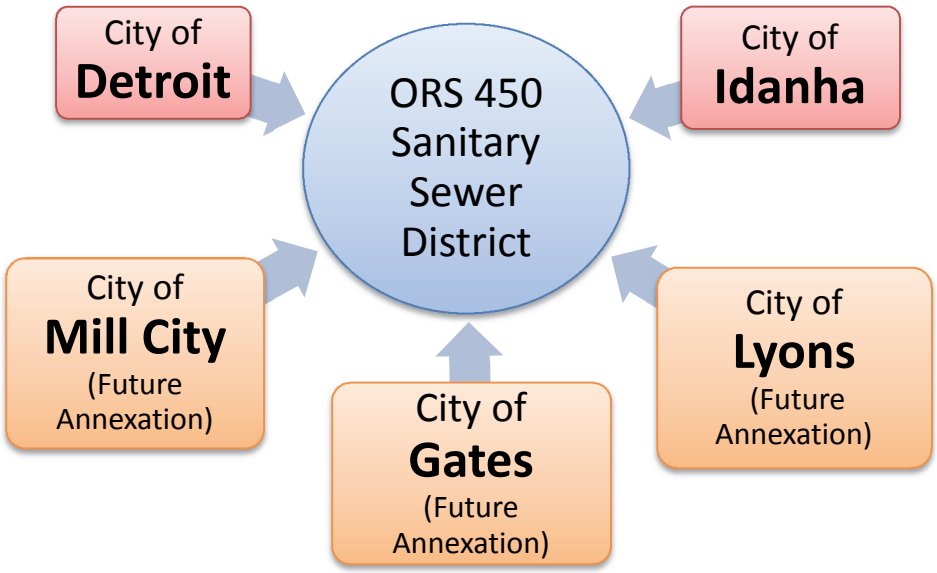


7.7.3 Formation by Marion County

Marion County may initiate formation of new district if the proposed district only includes (1) Detroit and Idanha, (2) Detroit, Idanha and Gates or (3) Detroit, Idanha, Gates and Mill City.

For any city in the proposed district, the City Council must adopt a resolution concurring with the district formation. If any portion of Linn County is included, the Linn County Board of Commissioners must adopt a resolution in support of the district formation. The following graphic illustrates the formation of a new Sanitary Sewer Authority that initially includes Detroit and Idanha.

ORS 450 –North Santiam Sanitary Sewer Authority
Detroit & Idanha as Original Cities



7.7.4 Annexation of a City to an Existing District

Using the chart shown above, the cities of Gates, Lyons and Mill City may elect to be annexed into the district. Under ORS 198.866 a city council may adopt a resolution proposing the entire city be annexed to the North Santiam Sanitary Sewer Authority. The district board can either approve or disapprove the annexation request. If desired, the district board may approve the annexation of a city without an election if less than 20% of the population lives in the annexation area or the entire boundary of the city is encompassed within the district boundary. Otherwise voters in both the City and the district must approve the annexation.

7.7.5 Benefits of an ORS 450 – North Santiam Sanitary Sewer Authority

The primary benefit of a Sanitary Sewer Authority is it is an independent special district governed by a locally elected board of directors with a sole focus on wastewater treatment and collection services. A Sanitary Sewer Authority has statutory powers and authority granted under ORS 450 and related local government statutes.

(1) Single-purpose Regional Sewer Agency: The Board of Directors is solely focused on providing sewer services for its customers.

(2) Local Service: Citizens throughout the North Santiam Canyon will be provided with service by a local agency.

(3) Staffing / Administrative Structure: Staffing and administrative issues are similar to those for an ORS 190 Agency.

(4) Operations and Maintenance: The Sanitary Sewer Authority may hire, train and retain staff with expertise in wastewater treatment and collections systems with higher level certifications.

(5) Operations and Maintenance: The Sanitary Sewer Authority can develop a focused O & M program and make capital investments for vehicles, equipment and facility improvements.

7.7.6 Challenges of an ORS 450 - Sanitary Sewer Authority

A Sanitary Sewer Authority faces several formation, annexation and administrative challenges.

(1) Creation of a small Sanitary Sewer Authority may not be financially feasible unless all cities have sewer systems and are included in the district.

(2) Formation requires cooperation between the cities, Linn and Marion County to prepare the formation documents, organize a campaign in favor of the district formation and recruiting candidates for the initial board of directors.

(3) Cities can be annexed to a Sanitary Sewer Authority. However, the process requires city council approval, district board approval and in most cases voter approval within the existing district and the city to be annexed to the district.

(4) Opposition to creation of another local government entity.

(5) If Mill City is annexed to the district, the Sanitary Authority will need to address several legal issues related to ownership of Mill City's wastewater facilities, debt consolidation and status of city employees, if they are to be employed by the Sanitary Sewer Authority.

(6) Mill City may not wish to participate because the Sanitary Sewer Authority will take away their local authority and/or reduce funds available to pay for city hall and public works staff. Without Mill City's customer base, the Sanitary Sewer Authority may not have the revenue stream to pay for the annual personnel, operations and maintenance expenses for Detroit, Idanha and/or Gates.

7.8 ORS 451 – SPECIAL SERVICE DISTRICT (COUNTY GOVERNED)

Under authority granted in ORS 451, the County Board of Commissioners can initiate the formation of a special service district to provide sewage works, including all facilities necessary for collecting, pumping, treating and disposing of sanitary or storm sewage. The proposed district may include territory in one or more counties, cities and unincorporated areas. Land need not be contiguous to be included within the new district.

A service district is formed following the organizational procedures set forth in ORS 198.720 to ORS 198.830. The district is governed by the Board of County Commissioners in the County initiating formation of the district.

7.8.1 Formation Options:

Formation of a special service district may be initiated in the following ways:

(1) Petition by interested citizens filed with the Board of Commissioners in the principal county of the proposed district. (ORS 198.748 to ORS 198.775)

(2) Board Order initiating the district formation process adopted by the Board of Commissioners in the principal county of the proposed district. (ORS 451.435)

As with formation of a Sanitary Sewer Authority under ORS 450, the principal county is the county with the majority of the property value inside the proposed special service district boundary. Either Marion County or Linn County may be the principal county, depending on the geographic area included in the proposed district boundary.

If any city or any portion of a second county is included in the proposed service district, then each of the cities and county must adopt and file a resolution with the Board of Commissioners in the principal county concurring with the formation of the new district.

7.8.2 Master Plan and Preliminary Feasibility Report:

ORS 451.110 to ORS 451.140 requires preparation of a "master plan" for the development of sewage facilities and grants the County Board of Commissioners authority to prepare surveys, engineering analysis, financing and implementation of the master plan.

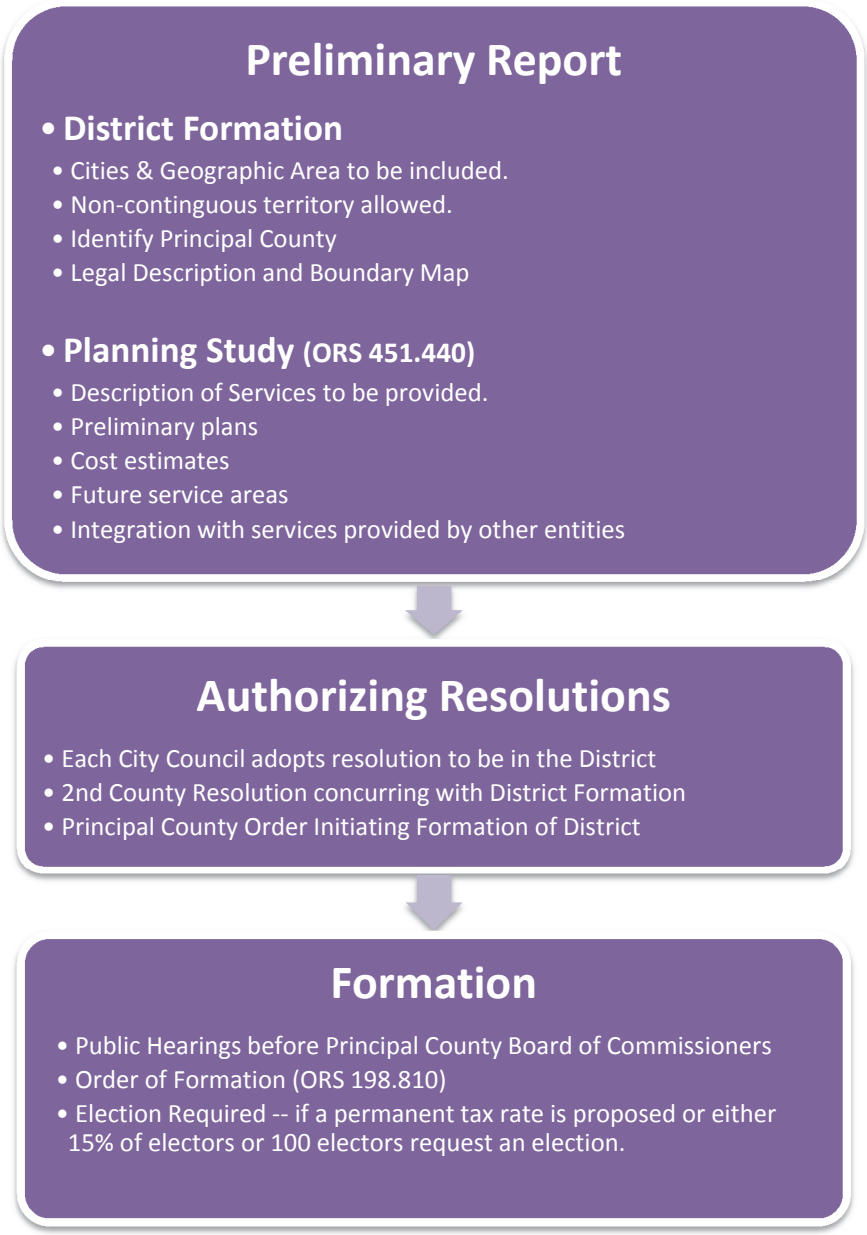
Prior to the adoption of an order initiating formation of a district, the County Board of Commissioners may prepare a preliminary report on the proposed district (ORS 451.440). The preliminary report describes the purpose and services to be provided by the new district, an engineering feasibility of proposed services to be provided, the geographic area, legal description and boundary map, future service areas, and the impact the proposed district may have on services provided by any other special districts or cities within the proposed district.

7.8.3 Authority to Develop and Operate Sewage Facilities:

Once a district is formed, ORS 451.410 to ORS 451.420 grants authority to the Board of Commissioners to construct and operate the sewage works and facilities. ORS 451.550 outlines the general powers of the service district to operate the district, acquire real property and facilities, construct facilities, hire employees and exercise all other authorities vested in counties.

ORS 451 – County Service District Formation Process

Organized per ORS 198.705 to 198.955



7.8.4 Benefits of an ORS 451 – County Service District

The primary benefit of a County Service District is it is a single purpose special district with a sole focus on wastewater treatment and collection services.

(1) County Experience Operating Two Sewer Districts: Marion County has experience operating two small sewer districts: Fargo Interchange and Brooks.

(2) Staffing Levels and Expertise: Marion County can hire a single WW Treatment Operator with a Level-3 certification to operate multiple SBR treatment facilities

and handle the daily operations of the collection system. Marion County Public Works (MCPW) can also utilize its existing staff to work under and provide backup to the lead operator.

(3) Administrative Support: Marion County can utilize existing administrative, human resources, public works engineering, public works fleet services and operations staff to support the contract with the small cities.

(4) Operations and Maintenance: The County Service District can develop a focused O & M program and utilize the Marion County public works department's expertise in acquiring vehicles and equipment and making capital investments for wastewater facility improvements.

7.8.5 Challenges of an ORS 451 – County Service District:

With the exception of the two small sewer service districts, Marion County does not contract with small cities to manage or operate a sewer utility. Several challenges or issues would need to be addressed before this option is strongly considered:

(1) MCPW operation of a sewer utility adds another "utility" provider in each small city, which may be confusing to residents and developers.

(2) MCPW will need to establish a local public works office and shop facility in the N. Santiam Canyon. The closest MCPW facility is in Aumsville.

(3) If Mill City is included in the district, the County will need to address several legal issues related to ownership of Mill City's wastewater facilities, debt consolidation and status of city employees, if they are to be employed by the Sanitary Sewer Authority.

(4) Mill City may not wish to participate because the County service district will take away their local authority and/or reduce funds available to pay for city hall and public works staff.

7.9 SUMMARY AND CONCLUSION

The consultant concludes there are a number of feasible options for governance of new wastewater facilities in the North Santiam communities. Before selecting an option that will work best in the North Santiam Canyon, the consultant recommends a thorough discussion with city officials in Detroit, Idanha, Gates, Mill City and Lyons and with Linn County.

7.9.1 Community Observations:

City officials provided several observations about the development of wastewater facilities to serve all of the North Santiam Canyon communities.

- Needs and Benefits of a Sewer System must be articulated and agreed upon.
- Economic Development. Lack of sewers is currently limiting growth.
- Funding: Where will funding come from to construct the projects.
- Rates: Monthly rates must be reasonable and equitable.
- Governance: City officials are open to discuss cooperative governance.

7.9.2 Summary of Governance Alternatives:

A. City-Owned & Operated Facilities

- Very small cities (< 1,000 population) cannot afford to set up a WW Utility and keep rates competitive.
- Administration, utility billing, O&M for WW treatment & collection and hiring certified Level 3 Wastewater Operator is likely to be cost prohibitive.
- A city-owned sewer utility provides local control, customer service and budget support for city hall staff and public works operations.
- Individual cities may seek to keep rates low and not commit funds for system maintenance and capital improvements.

B. ORS 190 Agreement – County or One City Operates All Wastewater Facilities

- Cooperative operation and management provides economy of scale and is a cost-effective option.
- Financial management, administrative policies, design, construction and operation & maintenance are focused and consistent for all cities. One agency can afford to hire a qualified Level 3-WW Operator and professional management staff.
- The Lead Agency manages the wastewater services; the smallest cities are subject to the priorities and commitments of the lead agency.
- Annual costs and rates must be mutually agreed by all agencies.
- An effective wastewater coordinating council, based on open communication, trust and mutual understanding is essential.

C. ORS 190 Agency

- A single-purpose agency owns and manages all wastewater facilities. The 190 Agency manages finances, operates and maintains the system.
- Representatives from each agency serve on the Board of Directors. Local governance will be viewed positively by local cities.
- Cooperative operation and management provides economy of scale and is a cost-effective option.
- Financial management, administrative policies, design, construction and operation & maintenance are focused and consistent for all cities. One agency can afford to hire a qualified Level 3-WW Operator and professional management staff.
- Annual costs and rates are analyzed and established. Rates must be mutually agreed by all participants.

D. ORS 450 Sewer Authority or ORS 451 County Service District

- A single-purpose district owns, manages, finances and operates all of the wastewater facilities.
- For an ORS 450, voter approval is required. A locally elected board of directors manages the district.
- For an ORS 451 service district, the County Board of Commissioners may create the

district and serves as the governing body.

- Marion County provides staffing, leadership and management for a local service district, which could have significant cost advantages.
- Annexation of any city not included in the original district requires a strong, cooperative working relationship between the district and the city.
- Other benefits and issues are similar to those of an ORS 190 Agency.

7.9.3 Conclusion and Recommendations:

Before selecting any preferred option for governance, a wastewater facilities planning committee should be formed. This committee and the effort to form the committee should be led by Marion County.

This report presents engineering recommendations and governance alternatives for proposed wastewater facilities to serve each city. A wastewater facilities planning committee is recommended to give city leaders in the North Santiam Canyon time to consider options, create a unified vision of future wastewater facilities and services and develop a strategic plan that outlines a path forward. A wastewater facilities planning committee composed of local officials can also demonstrate to state and federal funding agencies that there is agreement on the need for the proposed projects and a desire to obtain funding for wastewater facilities in the North Santiam Canyon.

The purpose of the committee will be to:

- Set priorities for wastewater system improvements.
- Seek funding for priority projects.
- Based on funding availability and timetable for construction of wastewater improvement projects, the wastewater facilities planning committee can select and recommend a preferred governance structure to all of the participating cities and counties.

The wastewater facilities planning committee may be created by an intergovernmental agreement or by invitation from Marion County. Representatives from Idanha, Detroit, Gates, Mill City, Lyons, Linn County and Marion County will be asked to make a 2-year to 5-year commitment. It is recommended that each agency appoint one representative, and one alternate member, to participate on the committee. This time frame will provide sufficient time to review issues, seek funding, perform additional pre-design or planning studies for individual projects and obtain funding for an initial project.

8. RECOMMENDED PROJECT

The purpose of this study is to provide community leaders and staff with a feasible approach and associated cost to providing sanitary sewer services to the North Santiam Canyon communities. This approach and the cost estimates can then be used for securing a practical funding mechanism.

8.1 SUMMARY OF TREATMENT / COLLECTION RECOMMENDATIONS

The recommendation from this study is to proceed with Alternative 3. Alternative 3 consists of new collection systems for each community with the exception of the existing Mill City collection system, new treatment plants in Idanha (Idanha/Detroit), Gates (Gates/Mill City), and Lyons (Lyons/Mehama), and disposal systems for each treatment plant at or near the same site for each treatment plant. For the analysis criteria used, refer to Section 5 of this report.

Collection - The rough layouts of the collection system, including lift stations for Lyons, Gates, Detroit, and Idanha can be referenced below as Charts 8.1 through 8.4. Charts 8.5 through 8.6 present the anticipated alignments for the transfer force mains from Detroit to Idanha, and Mill City to Gates. Larger versions of these can be referenced in Appendix A (Figures 13 through 19).

Chart 8.1: Lyons Collection System

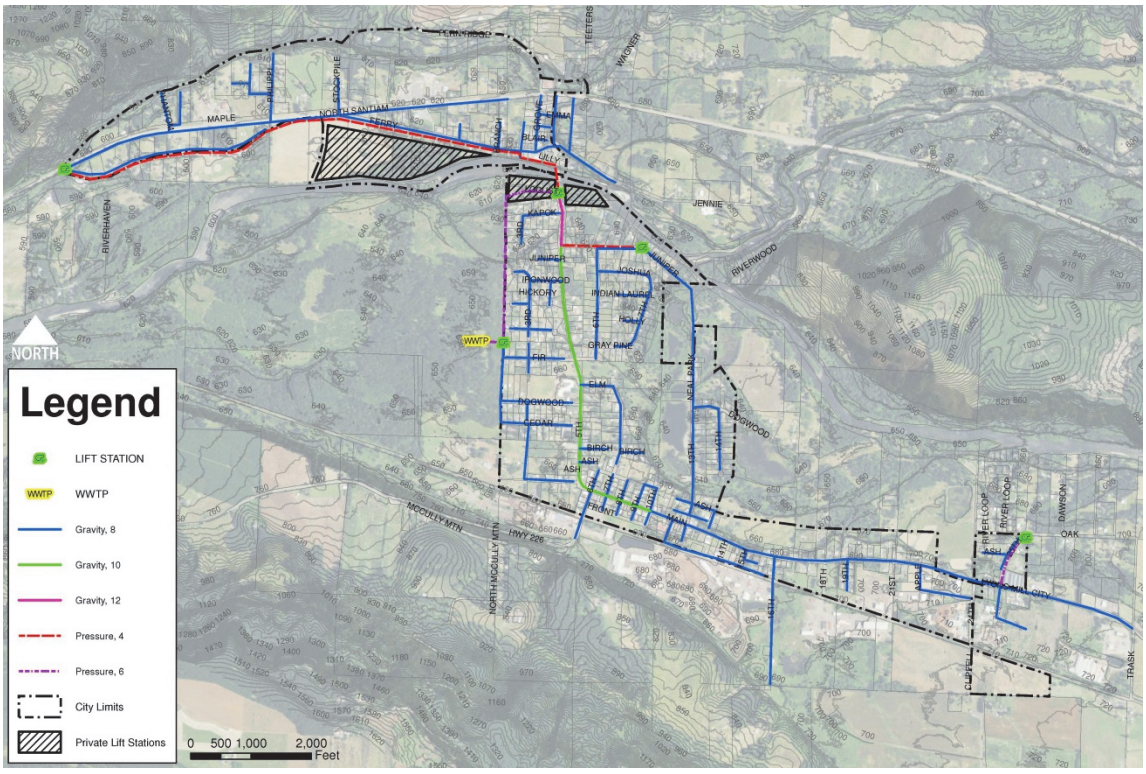


Chart 8.2: Gates Collection System

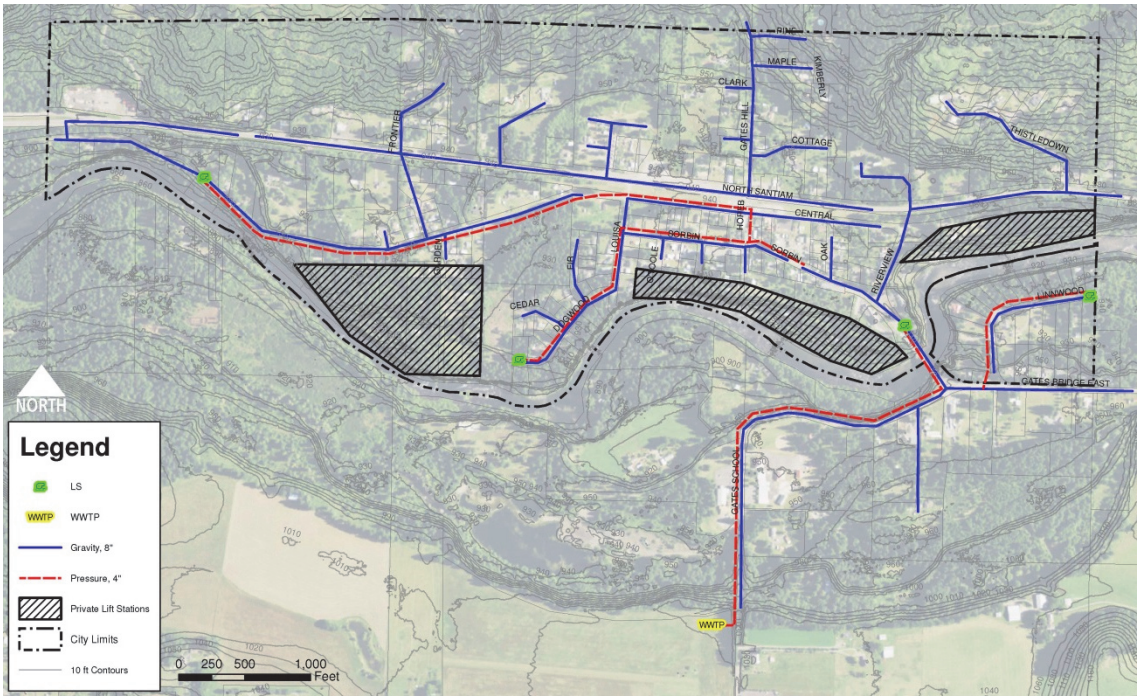


Chart 8.3: Detroit Collection System

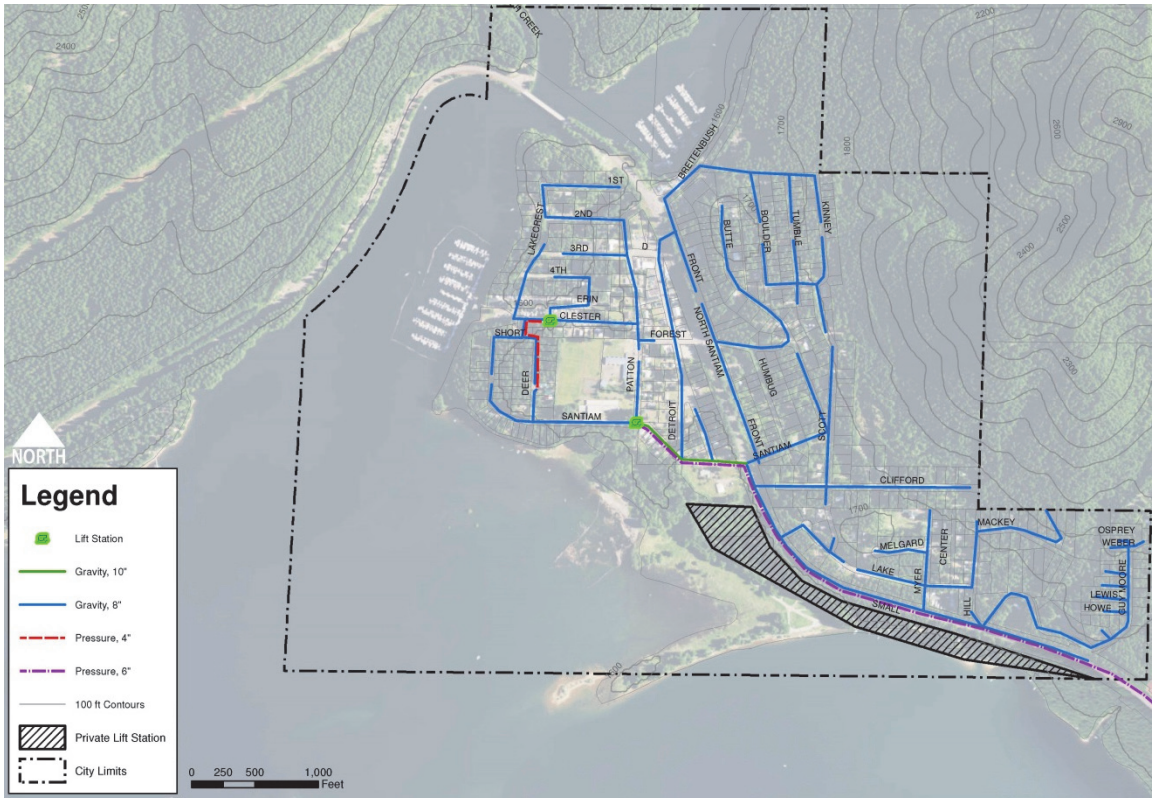


Chart 8.4: Idanha Collection System

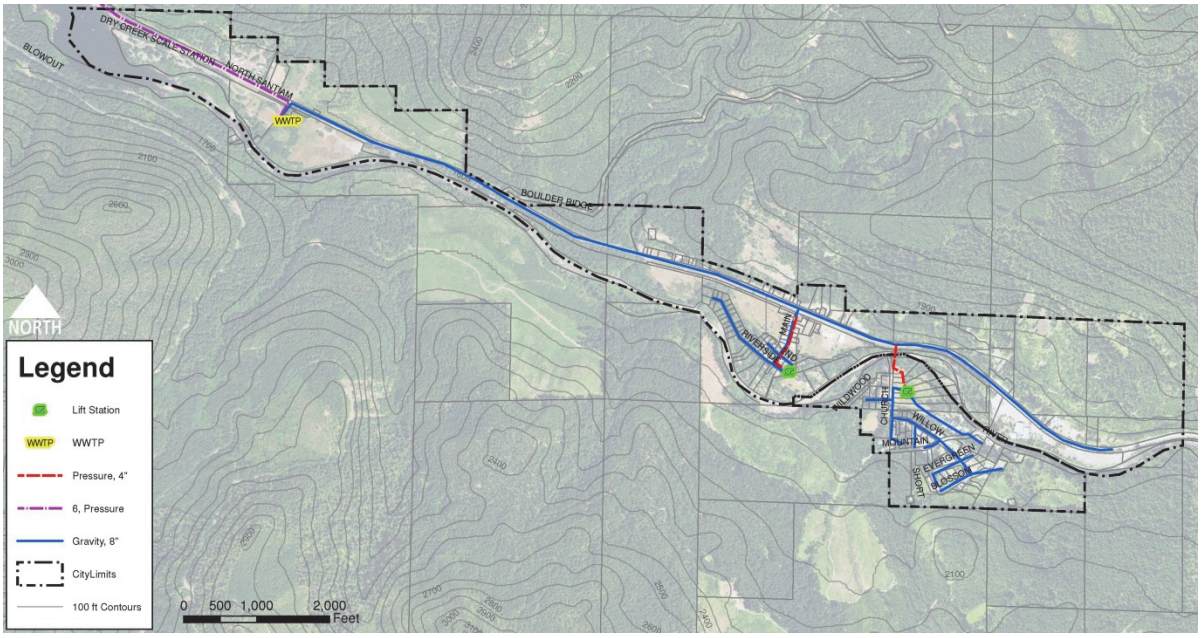


Chart 8.5: Detroit to Idanha Transfer Force Main

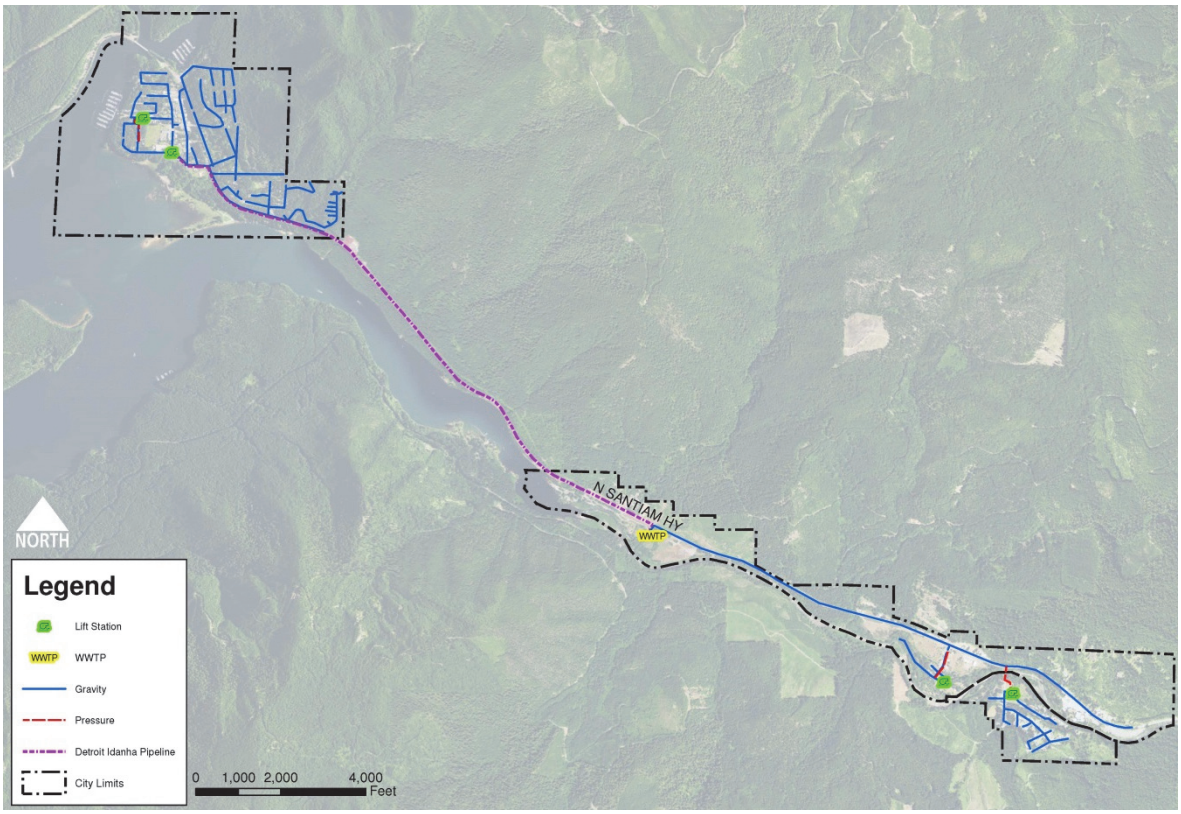
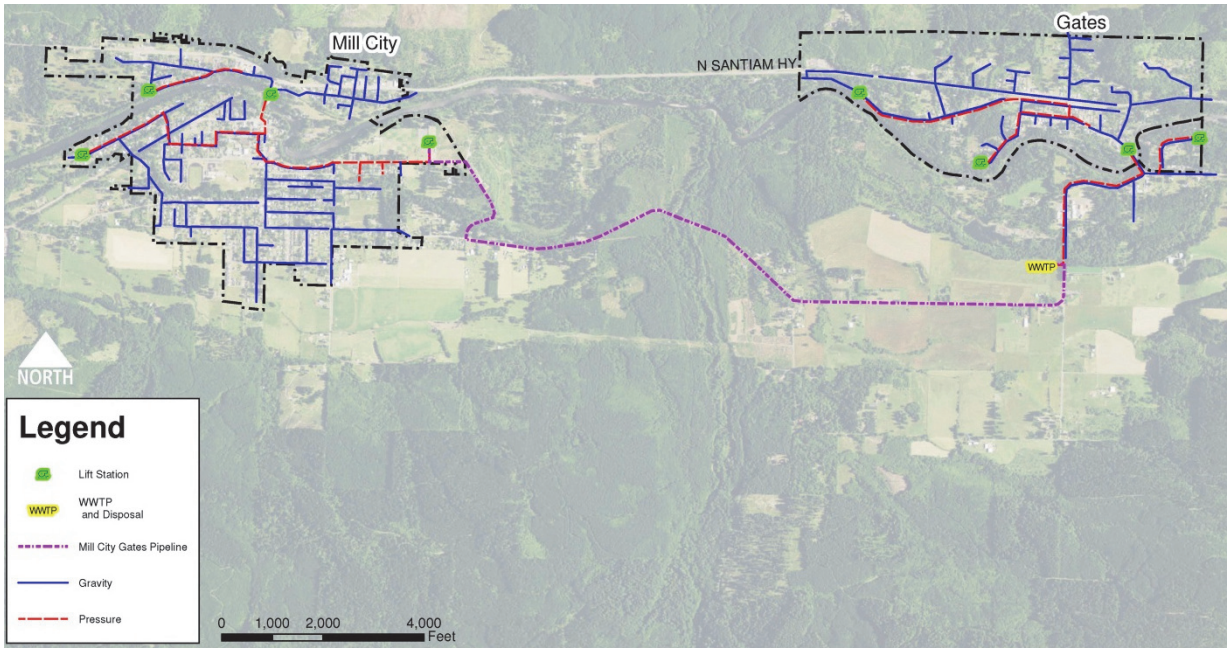
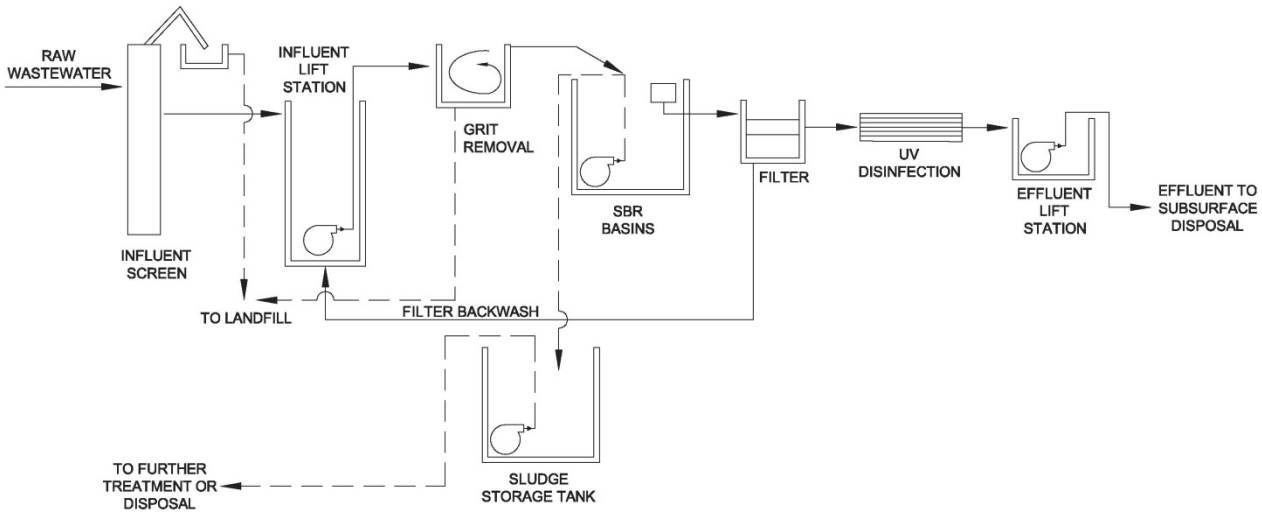


Chart 8.6: Mill City to Gates Transfer Force Main



Treatment - The location of the treatment plant for each system is reflected in Figures 8.1, 8.2, and 8.4. The treatment approach recommended includes a mechanical influent screen (with bypass bar screen), influent lift station, vortex grit removal, 2-basin sequencing batch reactor (SBR) followed by a cloth filter, UV disinfection system, and effluent lift station to the subsurface disposal area. The treatment system would also include a sludge storage tank with aeration to keep the sludge aerobic to control odors. For this study, it was assumed that the sludge would periodically be hauled away to Salem, Oregon for further treatment/disposal. The treatment system also includes a standby generator for backup power. A process flow diagram for this treatment system is shown in Chart 8.7.

Chart 8.7: Treatment System Process Flow Diagram



An SBR was chosen for the Class A treatment because it has a smaller footprint than a conventional activated sludge system or oxidation ditch, both of which require secondary clarifiers. This smaller footprint may work well for the limited space available in each community. The SBR also requires less maintenance and operational expertise than a membrane bioreactor system (MBR). The treatment system is estimated to be a Class 3 system according to OAR-049-0020. The treatment system should be evaluated in greater detail in the facilities planning study or predesign phases of the process.

Disposal - The required subsurface disposal area was approximated using OAR 340-071-0220, which is typically used for adsorption trenches receiving partially treated sewage from septic tanks. Using the OAR method should be conservative for disposal of Class A Recycled Water, since it should be a higher quality than septic tank effluent.

Potential locations for treatment and disposal sites were selected based on guidelines outlined in Section 6. There may not be a good location for a disposal system in Detroit in terms of both slope and sufficient area. Likewise, if the flows for Detroit and Idanha are combined, there may not be sufficient land for the combined flows. It is recommended that Lyons (+Mehama) be used for disposal of the treatment plant effluent from its own treatment plant. It is recommended that surrounding land in Gates be used for disposal of the treatment plant effluent for both Gates and Mill City.

Next Steps - The collection, treatment, and disposal systems and layouts should be further evaluated and refined as part of a facilities planning study which should follow the DEQ guidance documents. Prior to the facilities planning study phase, it is recommended that additional efforts be made to gather data for potential disposal sites. This data can be collected and analyzed ahead of the facilities planning phase to further evaluate the potential disposal sites and continue discussions. Concurrent with the data analysis, discussions should be undertaken with DEQ staff to request and approval of variances from the more conservative OAR method for adsorption trenches.

Comparative Costs - The comparative costs for each alternative were discussed and evaluated in Section 6. For the purposes of alternative cost comparison, only costs that differ between each alternative were considered in Section 6. Table 8.1 below summarizes the total capital costs for the recommended alternative. These costs do not include operation, maintenance, replacement, short-lived assets, staffing and administration expenses for a sanitary sewer system. These other costs to own and maintain a system should be evaluated as a part of the facilities planning phase and should involve a financial consultant with expertise in establishing wastewater utility rates and system development charges (SDC's).

If 100% of the costs were carried by the collective users from each community the monthly user fee would be expected to be much higher than a typical urban sewer customer. In order to continue to preserve the pristine outdoor recreational areas and host guests for these recreational areas, funding would likely be required from outside partners and various grant agencies. There are not enough residents to spread this burden out to make it more economical, although the benefits are enjoyed by many who come from outside the North Santiam Canyon.

The individual septic systems place the cost and responsibility of proper installation, use and maintenance on the individual property owners. Managed collection and treatment through community and/or regionalized sewer services shares the burden and places trained professionals at the helm of the shared community asset. The community and/or regionalized sewer services reduces the likelihood of failure, unauthorized and potentially hazardous wastewater discharges.

Table 8.1: Total Capital Costs for Recommend Project

Item	Cost
Idanha-Detroit	
Collection	$ 18,500,000
Treatment	$ 6,100,000
Disposal	$ 5,100,000
Mill City-Gates	
Collection	$ 11,700,000
FM Mill City-Gates	$ 4,000,000
Treatment	$ 6,190,000
Disposal	$ 7,500,000
Lyons Mehema	
Collection	$ 24,600,000
Treatment	$ 6,190,000
Disposal	$ 7,400,000
Alternative 3 Total Cost (ROUNDED):	**$ 97,300,000**

8.2 SUMMARY OF MANAGEMENT / OWNERSHIP STRUCTURE RECOMMENDATIONS

Before selecting any preferred option for governance, a wastewater facilities planning committee should be formed. This committee and the effort to form the committee should be led by Marion County. This committee can review the merits of each of the governance options outlined in Section 7.

This committee is recommended to give city leaders in the North Santiam Canyon time to consider options, create a unified vision of future wastewater facilities and services and develop a strategic plan that outlines a path forward. A wastewater facilities planning committee composed of local officials can also demonstrate to state and federal funding agencies that there is agreement on the need for the proposed projects and a desire to obtain funding for wastewater facilities in the North Santiam Canyon.

The purpose of the committee will be to:

- Work with engineering and planning firms to set priorities for wastewater system improvements.
- Lead effort for future planning, engineering and design studies.
- Seek funding for priority projects.
- Based on funding availability and timetable for construction of wastewater improvement projects, the wastewater facilities planning committee can select and recommend a preferred governance structure to all of the participating cities and counties.

The wastewater facilities planning committee may be created by an intergovernmental agreement or by invitation from Marion County. Representatives from Idanha, Detroit, Gates, Mill City, Lyons, Linn County and Marion County will be asked to make a 2-year to 5-year commitment. It is recommended that each agency appoint one representative, and one alternate member, to participate on the committee. This time frame will provide sufficient time to review issues, seek funding, perform additional pre-design or planning studies for individual projects and obtain funding for an initial project.

8.3 SUMMARY OF REGULATORY RECOMMENDATIONS

The Three Basin Rule limits the options for a treatment approach. According to the DEQ, the Three Basin Rule most likely cannot be removed; however, it may be possible to modify it. Potential cost savings could be realized if a modification was successful. Because a modification would be more successful if it were driven by the counties and the State, Keller Associates recommends that the same intergovernmental committee recommended for the management and ownership structure partner with the state to seek a modification to the Three Basin Rule. Their efforts would also require buy-in from downstream communities such as Salem and Stayton. With that buy-in, a draft of the modifications would then need to be presented to the DEQ Director, who would ultimately have to obtain approval from the EQC.

The recommended modification to the Three Basin Rule is the addition of a section that allows new NPDES permits for domestic sewage treatment facilities that produce effluents that meet DEQ requirements for Class A Recycled Water. A large portion of the cost of compliance with the current Three Basin Rule comes from the proposed root zone disposal method. The costs associated with an NPDES permitted outfall for the treatment plants would be significantly less. This capital cost of compliance is roughly estimated to be 20% of the total capital cost ($18.1M).

8.4 NEXT STEPS AND PHASING

1. Establish a North Santiam Canyon Wastewater Facilities Planning Committee as recommended.
2. Once the committee is established,
    a. Pursue a modification to the Three Basin Rule.
    b. Seek funding.
    c. Begin pre-design and planning studies.
        i. This effort should start with Detroit/Idanha and Gates systems.
        ii. Combine Mill City to Gates when expansion of Mill City is required.
        iii. Develop Lyons/Mehama system when local community is driving the need.

Appendix A:
Figures

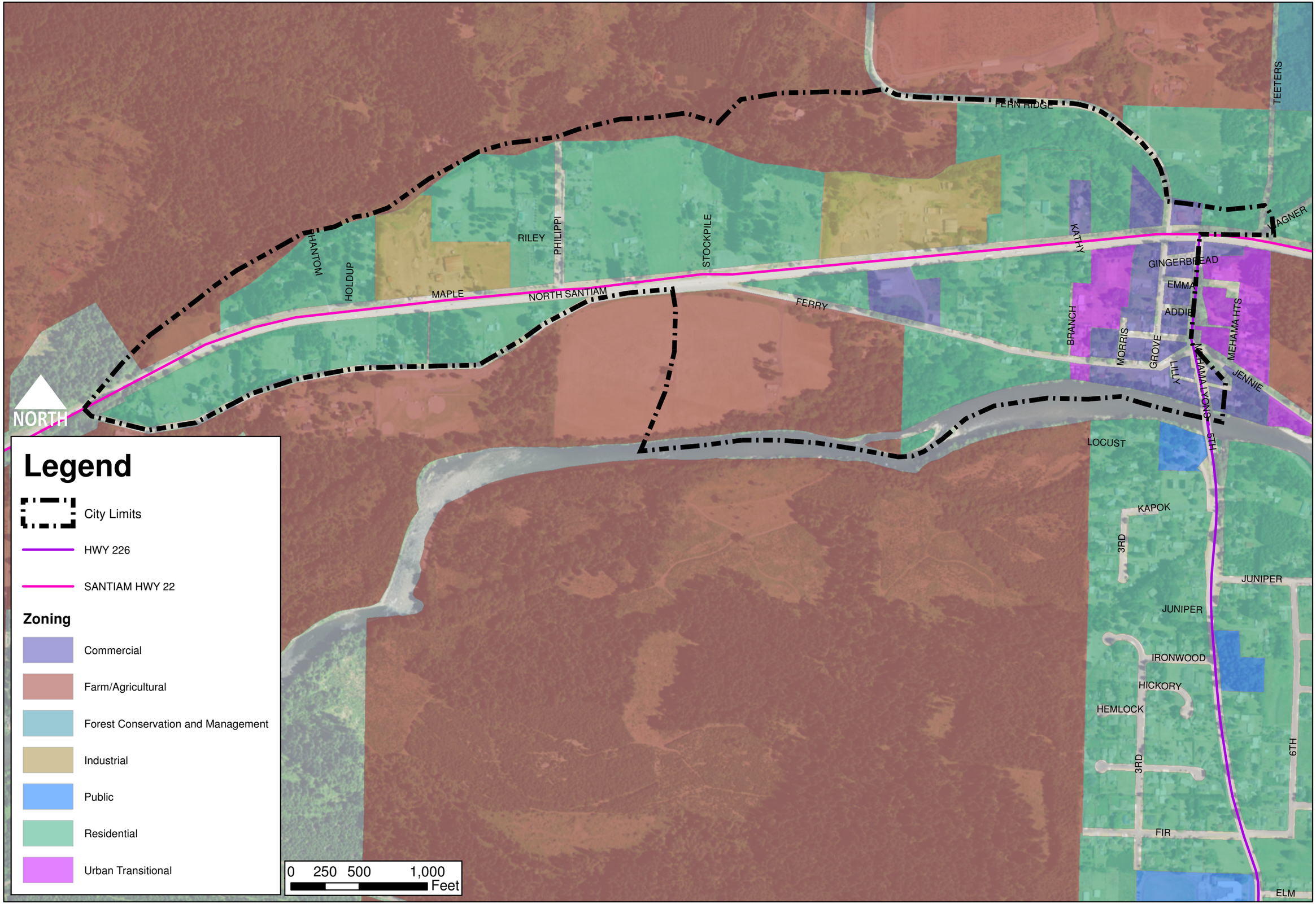
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon Feasibility Study

Title:
Project Area Overview

Figure:
1



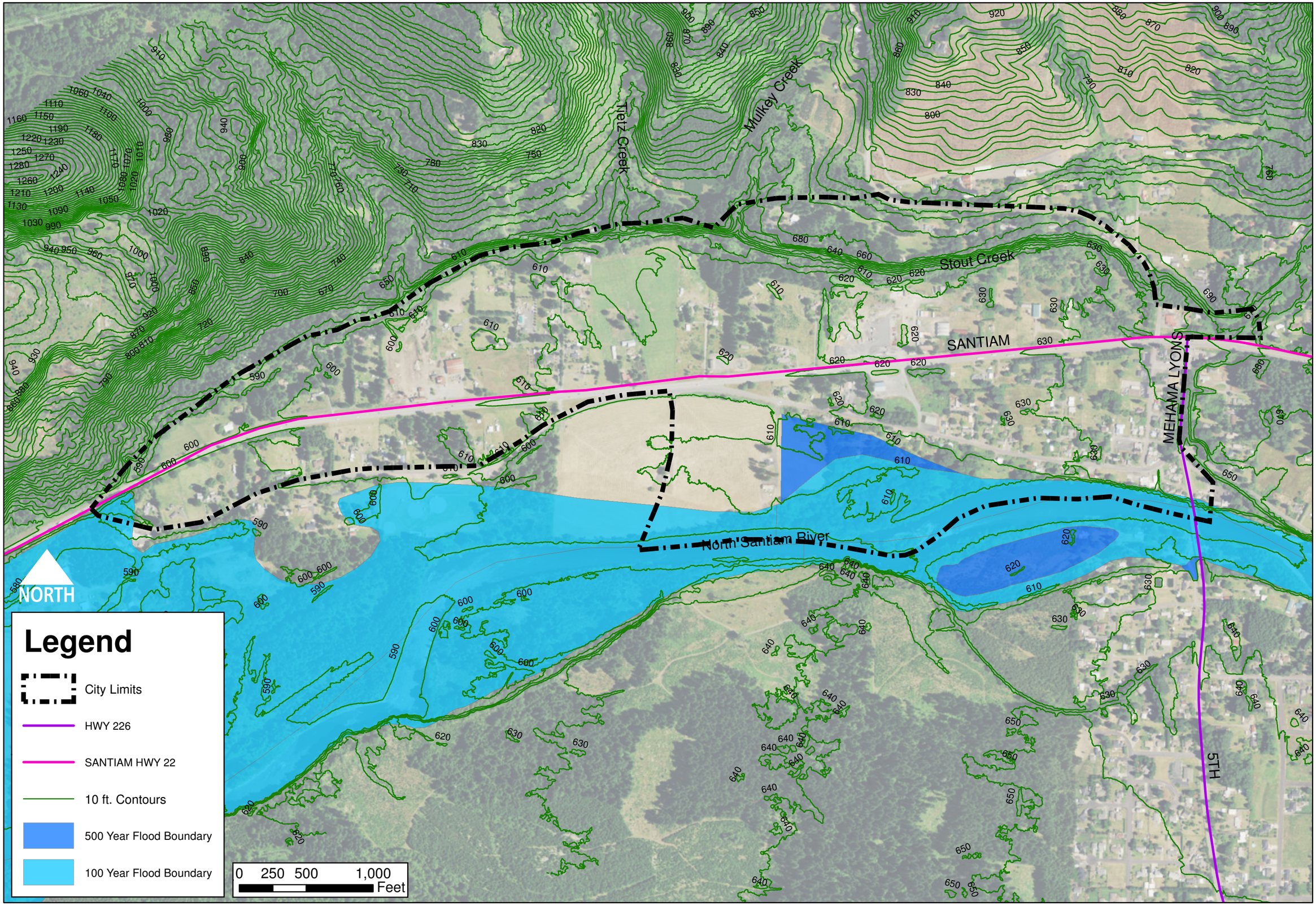
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Mehama Zoning

Figure:
2a



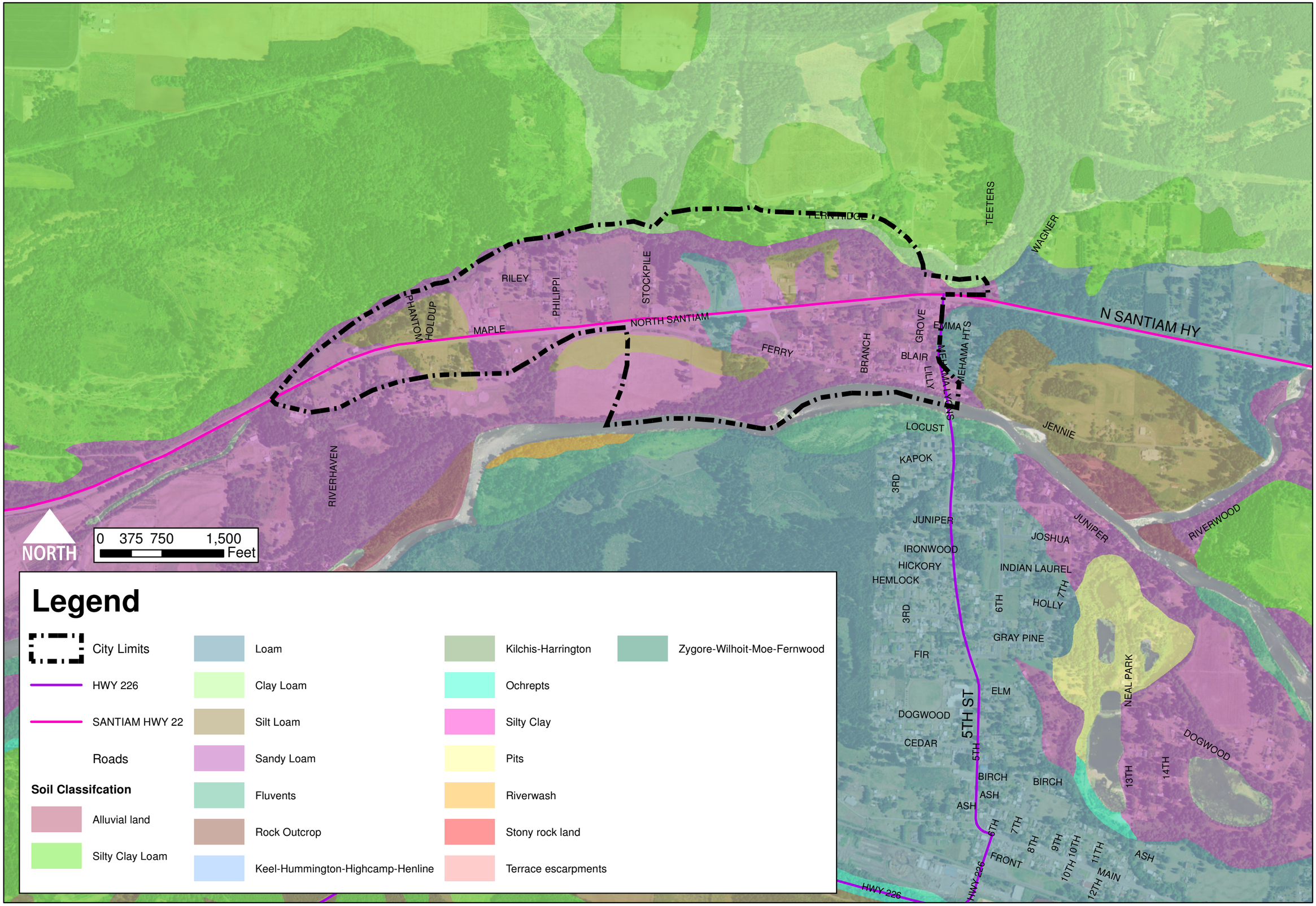
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Mehama
Topography and
Flood Plain

Figure:
2b



Legend

- City Limits
- HWY 226
- SANTIAM HWY 22
- Roads

Soil Classifcation

- Alluvial land
- Silty Clay Loam
- Loam
- Clay Loam
- Silt Loam
- Sandy Loam
- Fluvents
- Rock Outcrop
- Keel-Hummington-Highcamp-Henline
- Kilchis-Harrington
- Ochrepts
- Silty Clay
- Pits
- Riverwash
- Stony rock land
- Terrace escarpments
- Zygore-Wilhoit-Moe-Fernwood

KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Mehama
Soil Designation

Figure:
2c

Tietz Creek

Mulkey Creek

Stout Creek

MEHAMA LYONS HY

N SANTIAM HY

North Santiam River

Little North Santiam River

5TH ST

HWY 226

NORTH

Legend

City Limits

Rivers

HWY 226

SANTIAM HWY 22

Wetland Type

Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

Freshwater Pond

0 375 750 1,500 Feet

KELLER associates

Prepared for:

North Santiam Canyon

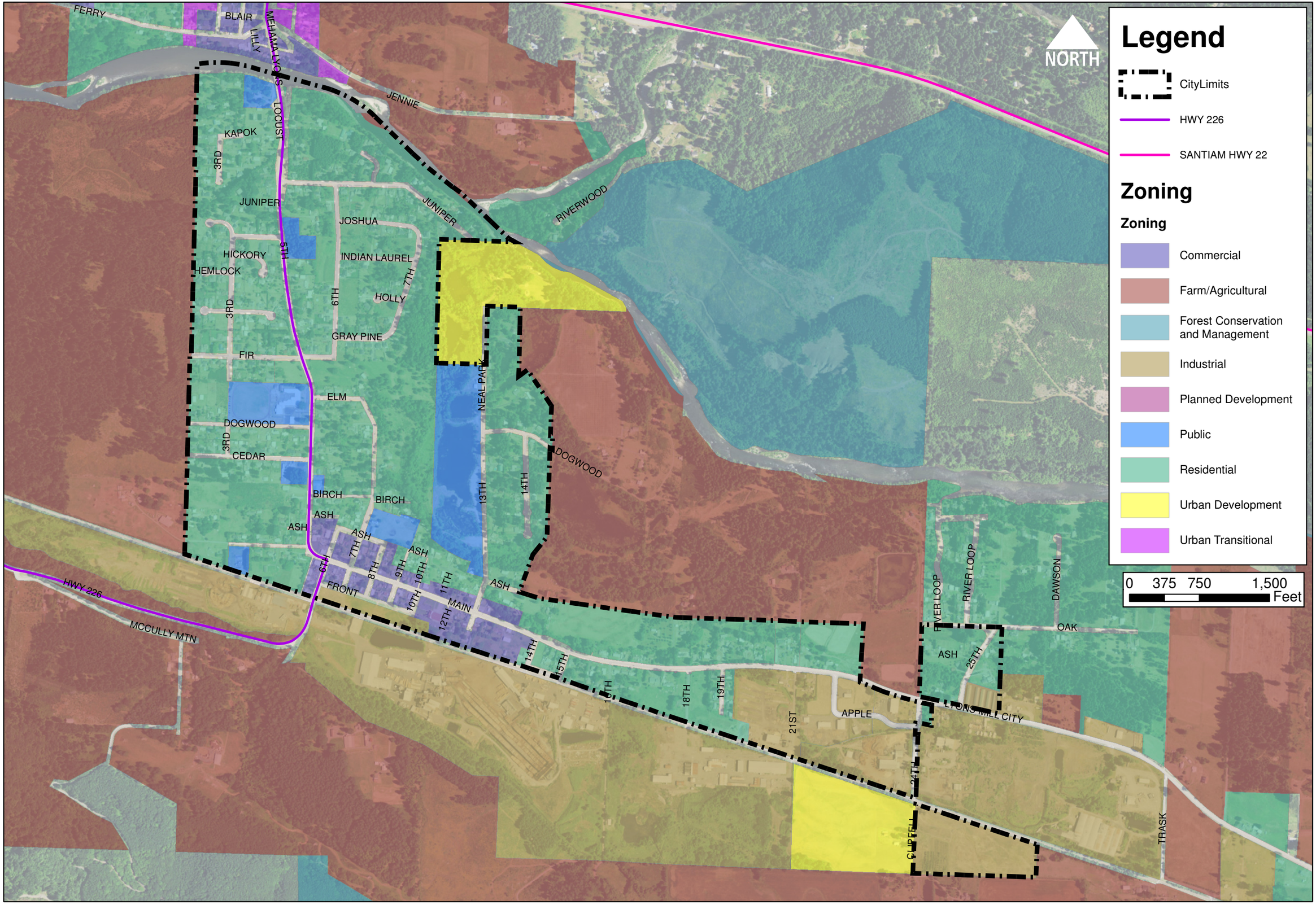
North Santiam Canyon WW Feasibility Study

Title:

Mehama Wetlands and Rivers

Figure:

2d



Legend

- CityLimits
- HWY 226
- SANTIAM HWY 22

Zoning

Zoning

- Commercial
- Farm/Agricultural
- Forest Conservation and Management
- Industrial
- Planned Development
- Public
- Residential
- Urban Development
- Urban Transitional

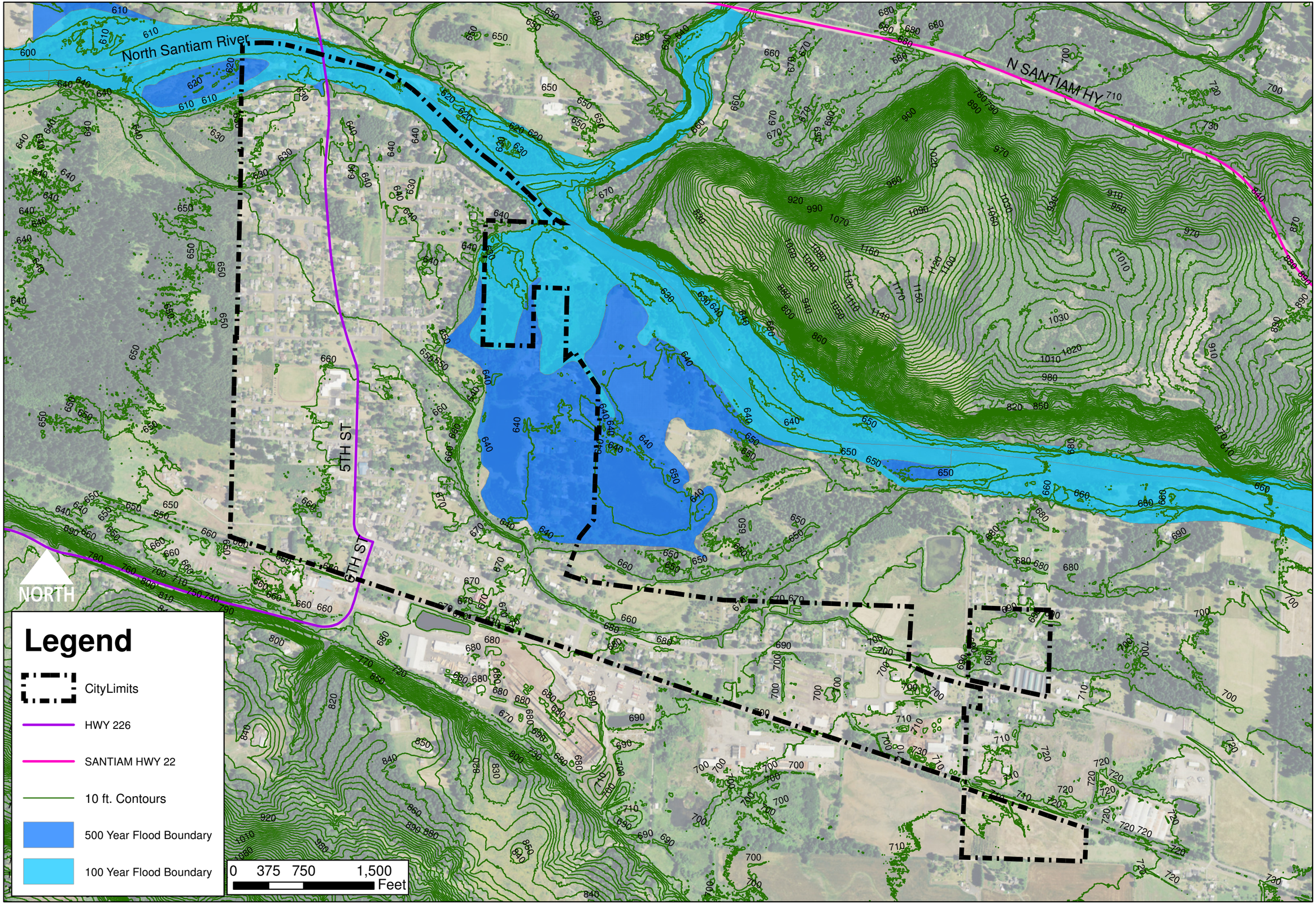
KELLER associates

Prepared for: North Santiam Canyon

North Santiam Canyon WW Feasibility Study

Title: Lyons Zoning

Figure: 3a



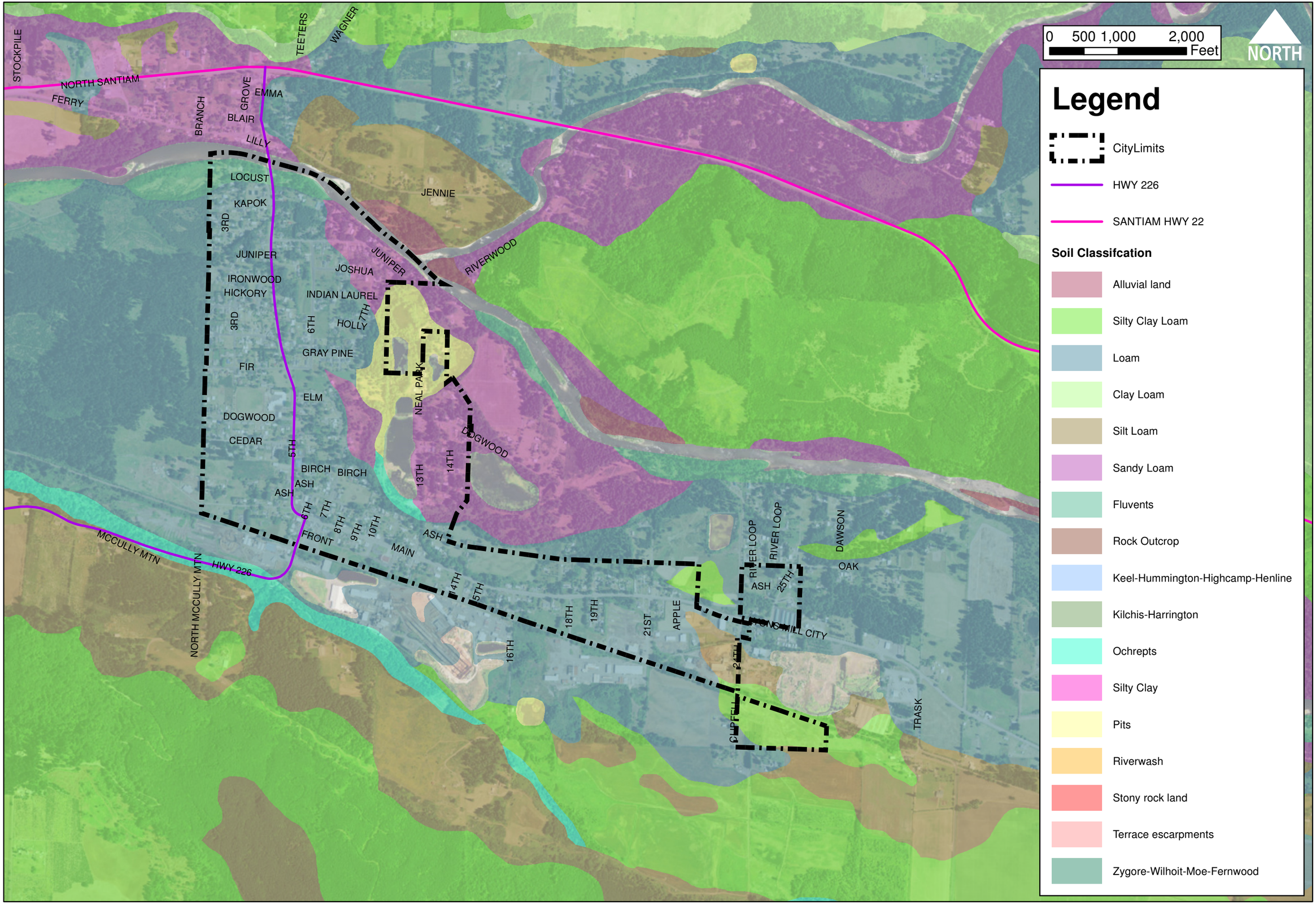
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Lyons
Topography and
Flood Plain

Figure:
3b



Legend

- CityLimits
- HWY 226
- SANTIAM HWY 22

Soil Classifcation

- Alluvial land
- Silty Clay Loam
- Loam
- Clay Loam
- Silt Loam
- Sandy Loam
- Fluvents
- Rock Outcrop
- Keel-Hummington-Highcamp-Henline
- Kilchis-Harrington
- Ochrepts
- Silty Clay
- Pits
- Riverwash
- Stony rock land
- Terrace escarpments
- Zygore-Wilhoit-Moe-Fernwood

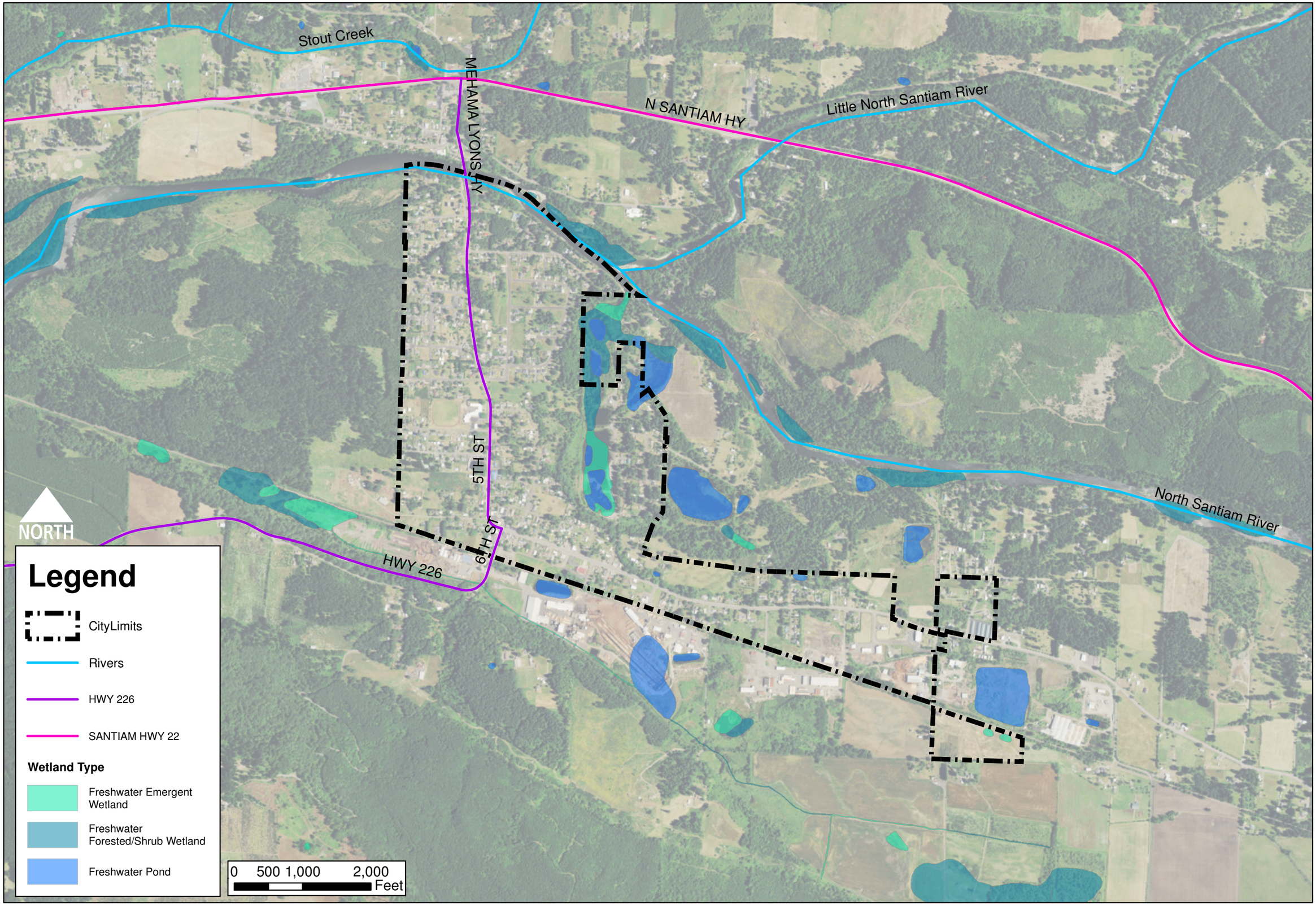
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Lyons Soils Characterization

Figure:
3c



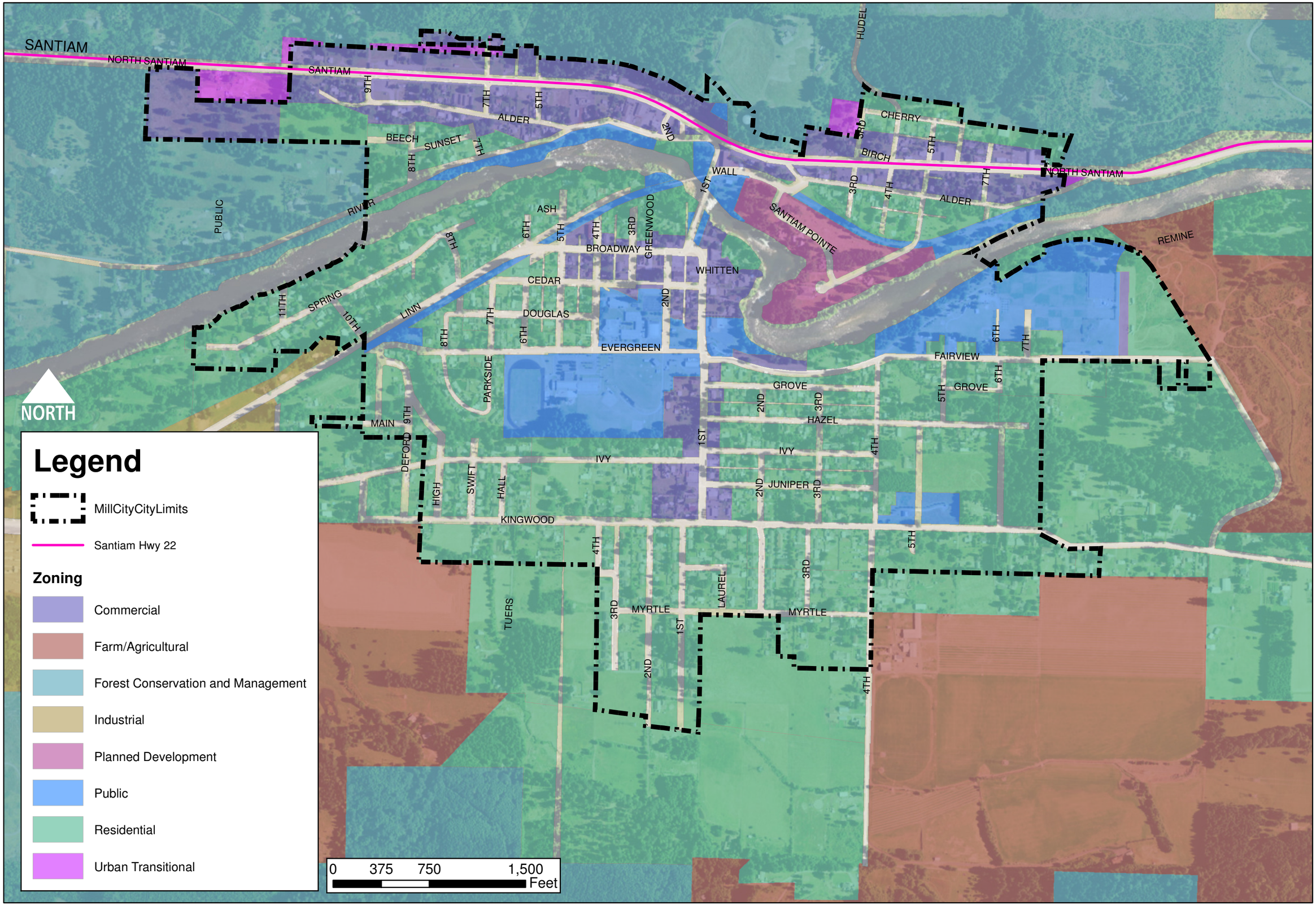
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Lyons
Wetlands
and Rivers

Figure:
3d



Legend

- MillCityCityLimits
- Santiam Hwy 22

Zoning

- Commercial
- Farm/Agricultural
- Forest Conservation and Management
- Industrial
- Planned Development
- Public
- Residential
- Urban Transitional

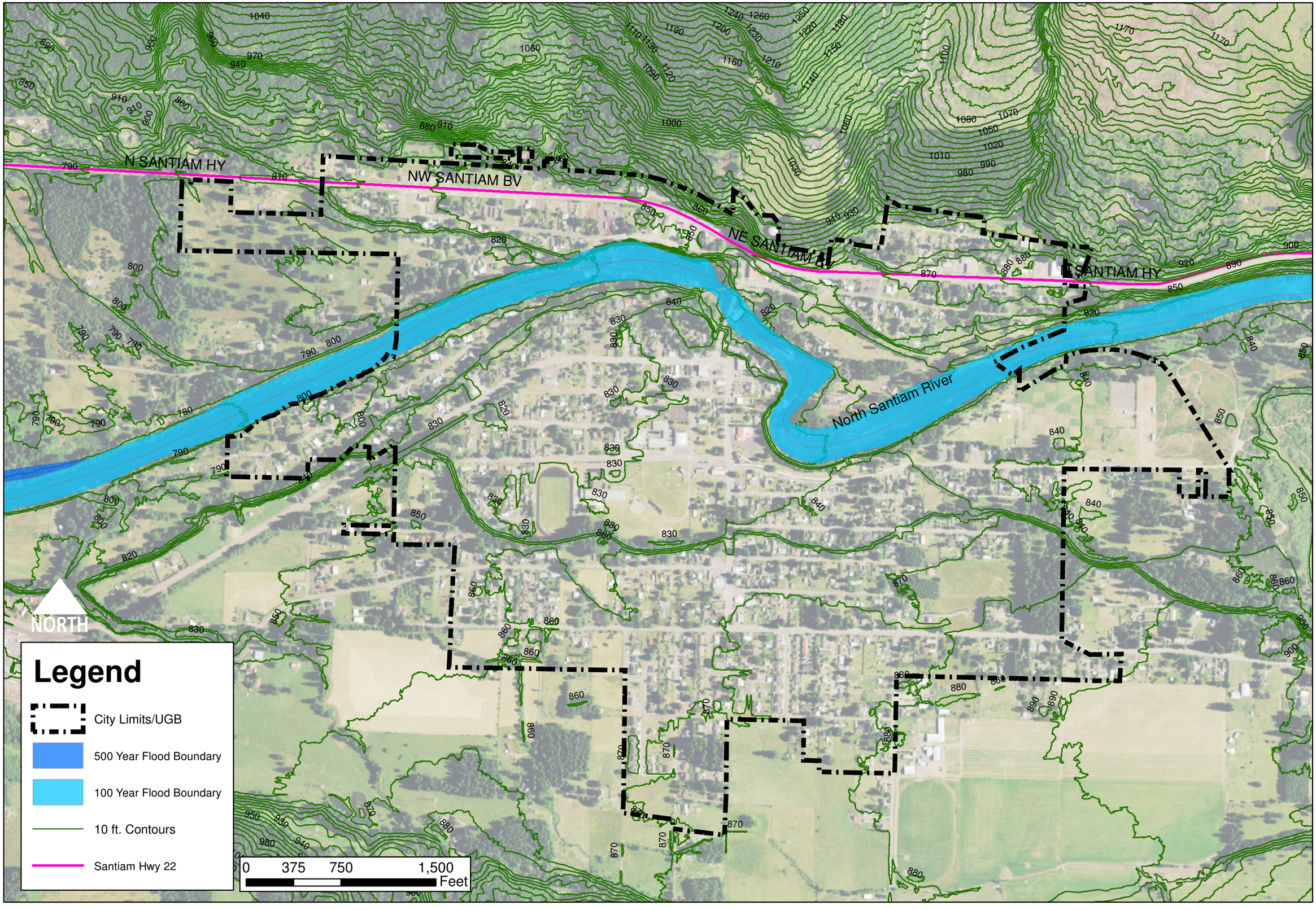
KELLER associates

Prepared for:
North Sanitam Canyon

North Santiam Canyon WW Feasibility Study

Title:
Mill City Zoning

Figure:
4a



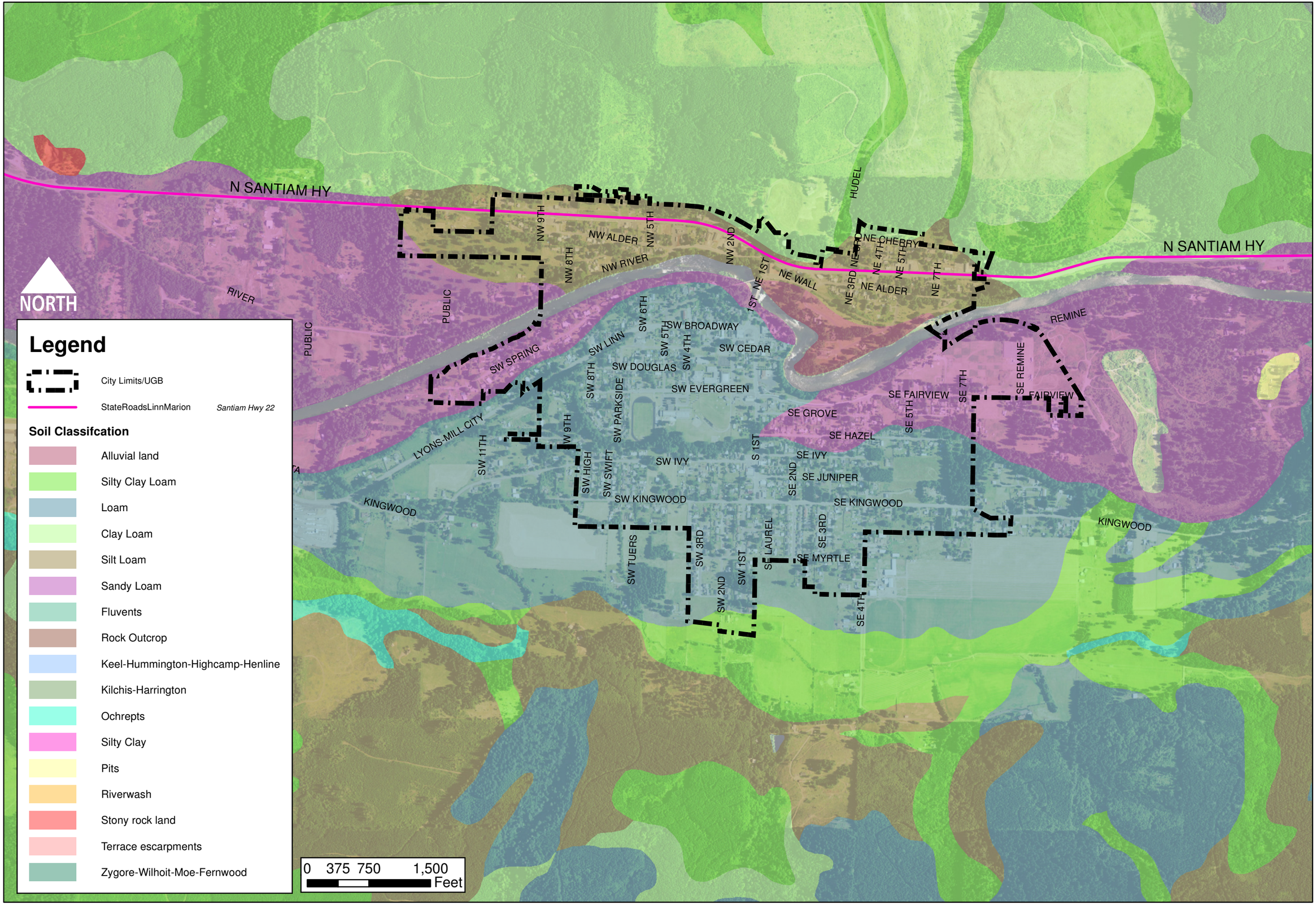
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Mill City
Topography and
Flood Plain

Figure:
4b



Legend

City Limits/UGB

StateRoadsLinnMarion *Santiam Hwy 22*

Soil Classifcation

- Alluvial land
- Silty Clay Loam
- Loam
- Clay Loam
- Silt Loam
- Sandy Loam
- Fluvents
- Rock Outcrop
- Keel-Hummington-Highcamp-Henline
- Kilchis-Harrington
- Ochrepts
- Silty Clay
- Pits
- Riverwash
- Stony rock land
- Terrace escarpments
- Zygore-Wilhoit-Moe-Fernwood

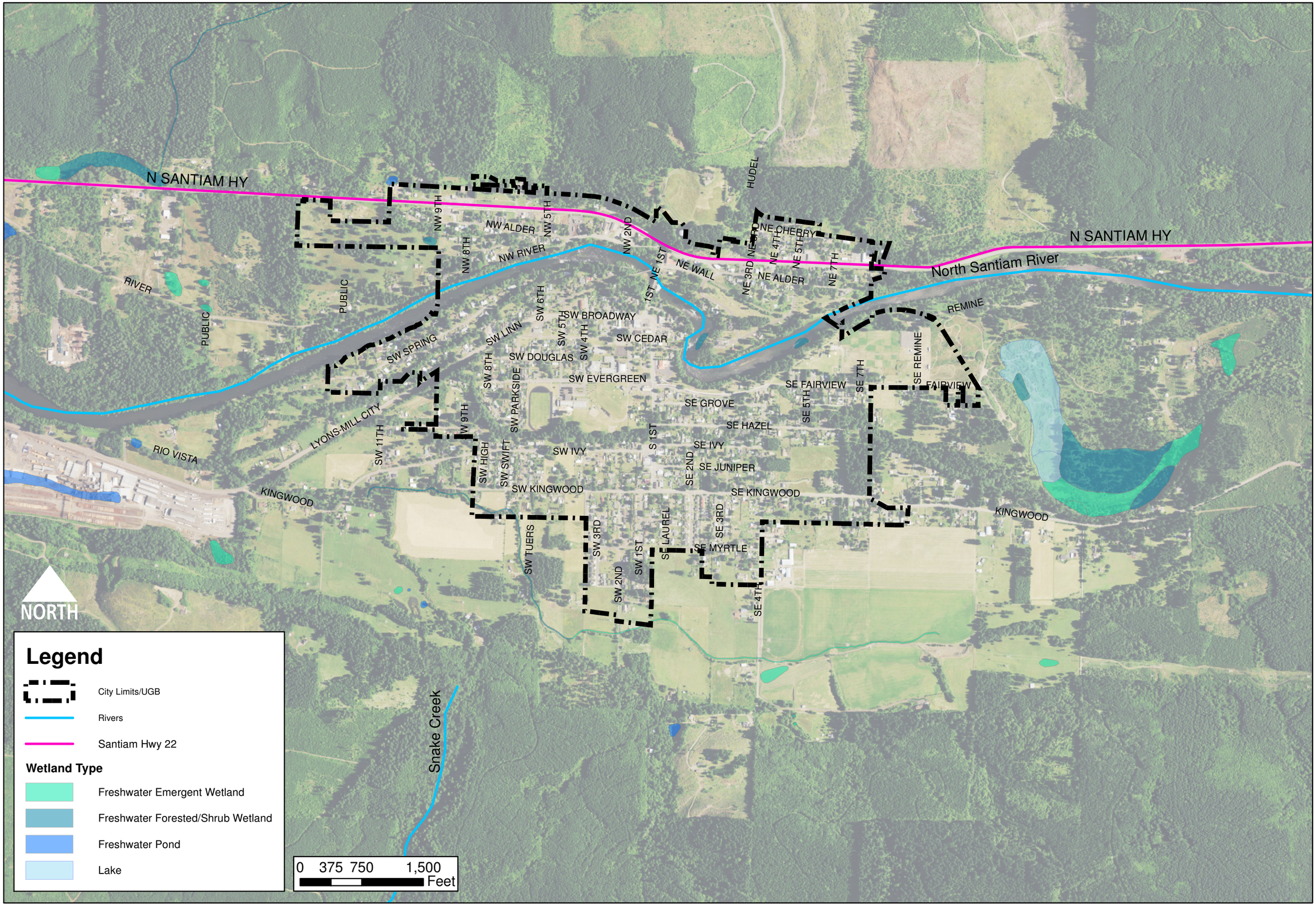
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Mill City
Soils Designation

Figure:
4c



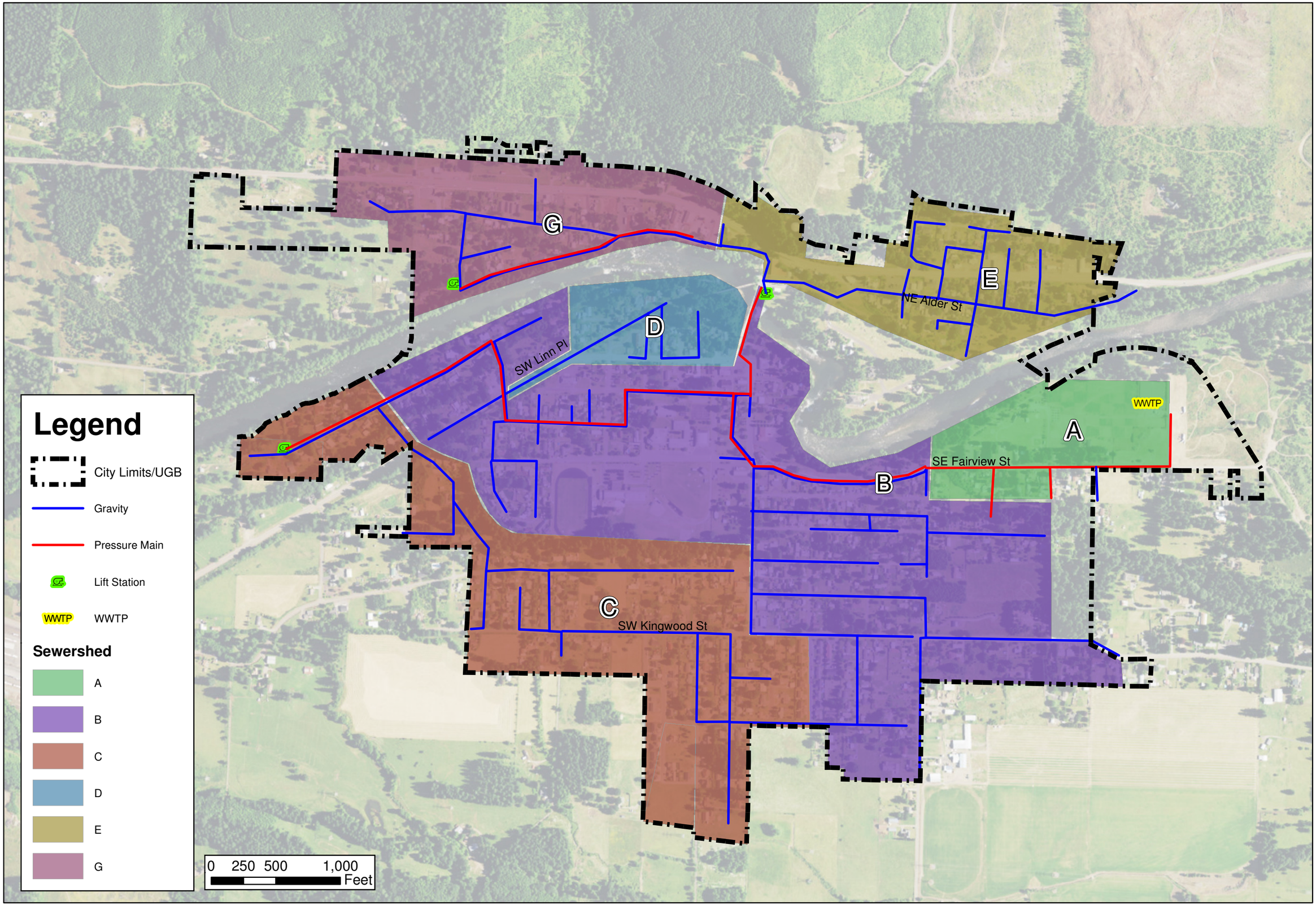
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Mill City
Wetlands
and Rivers

Figure:
4d



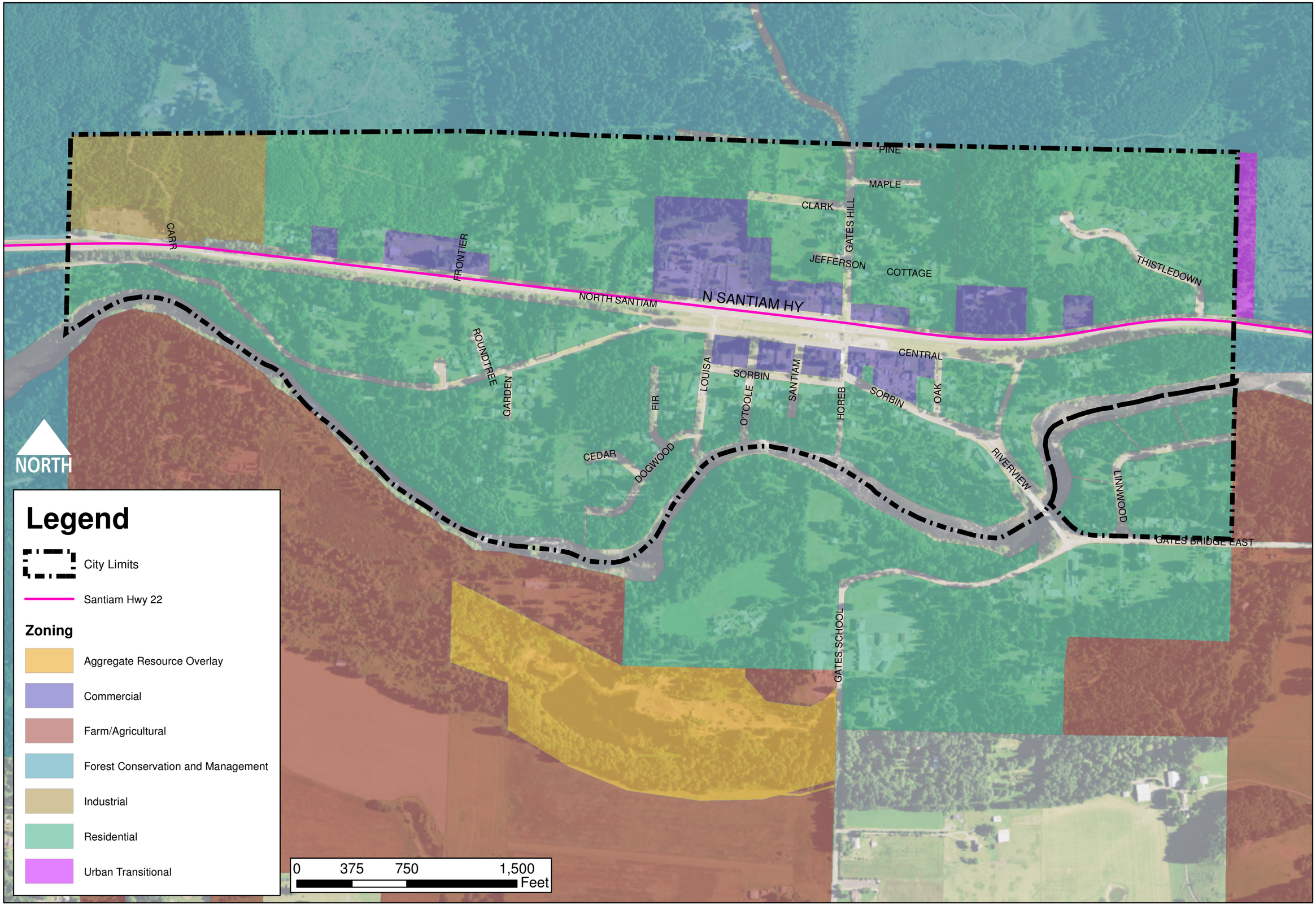
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Mill City
Existing Sewersheds

Figure:
4e



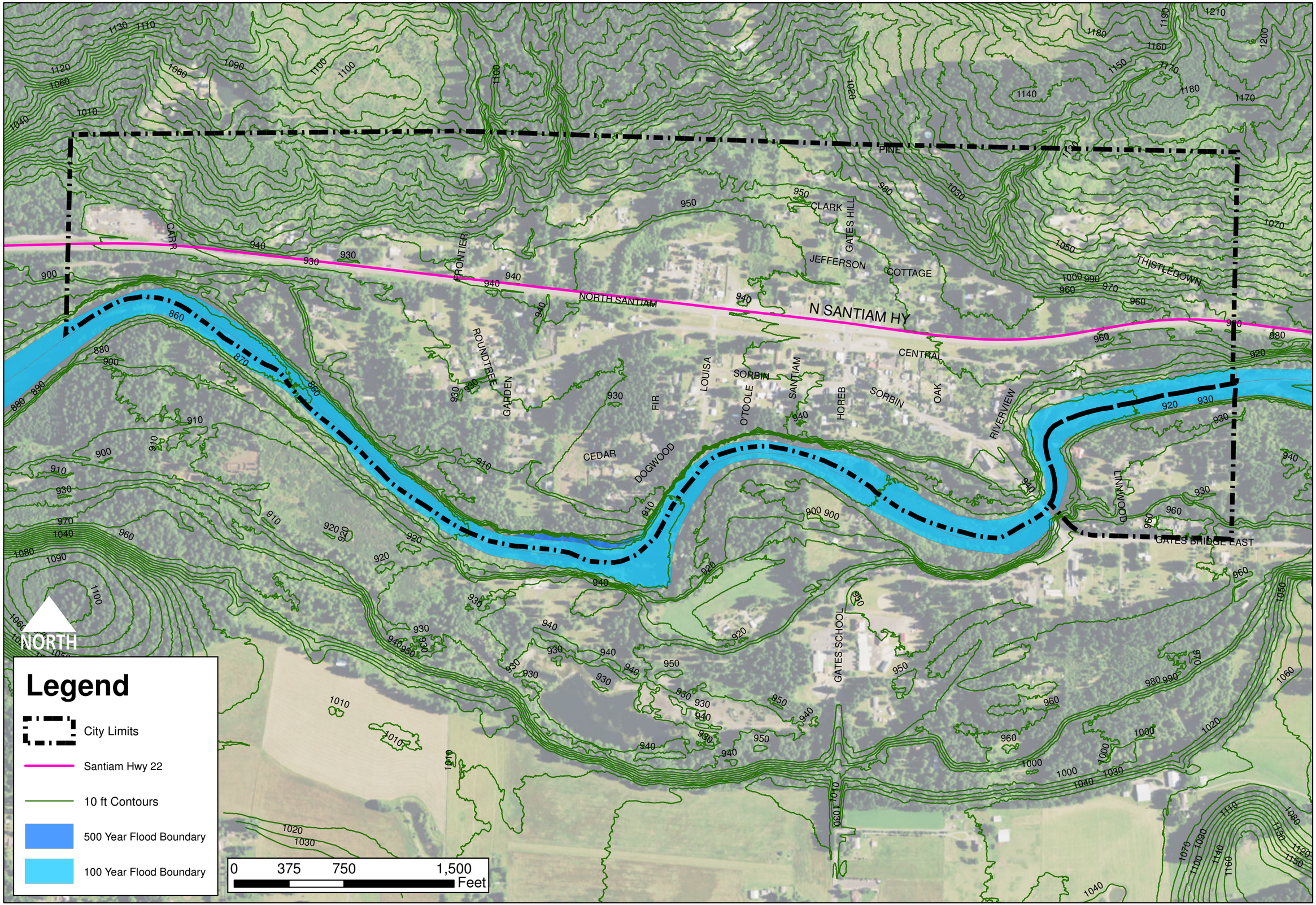
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Gates Zoning

Figure:
5a



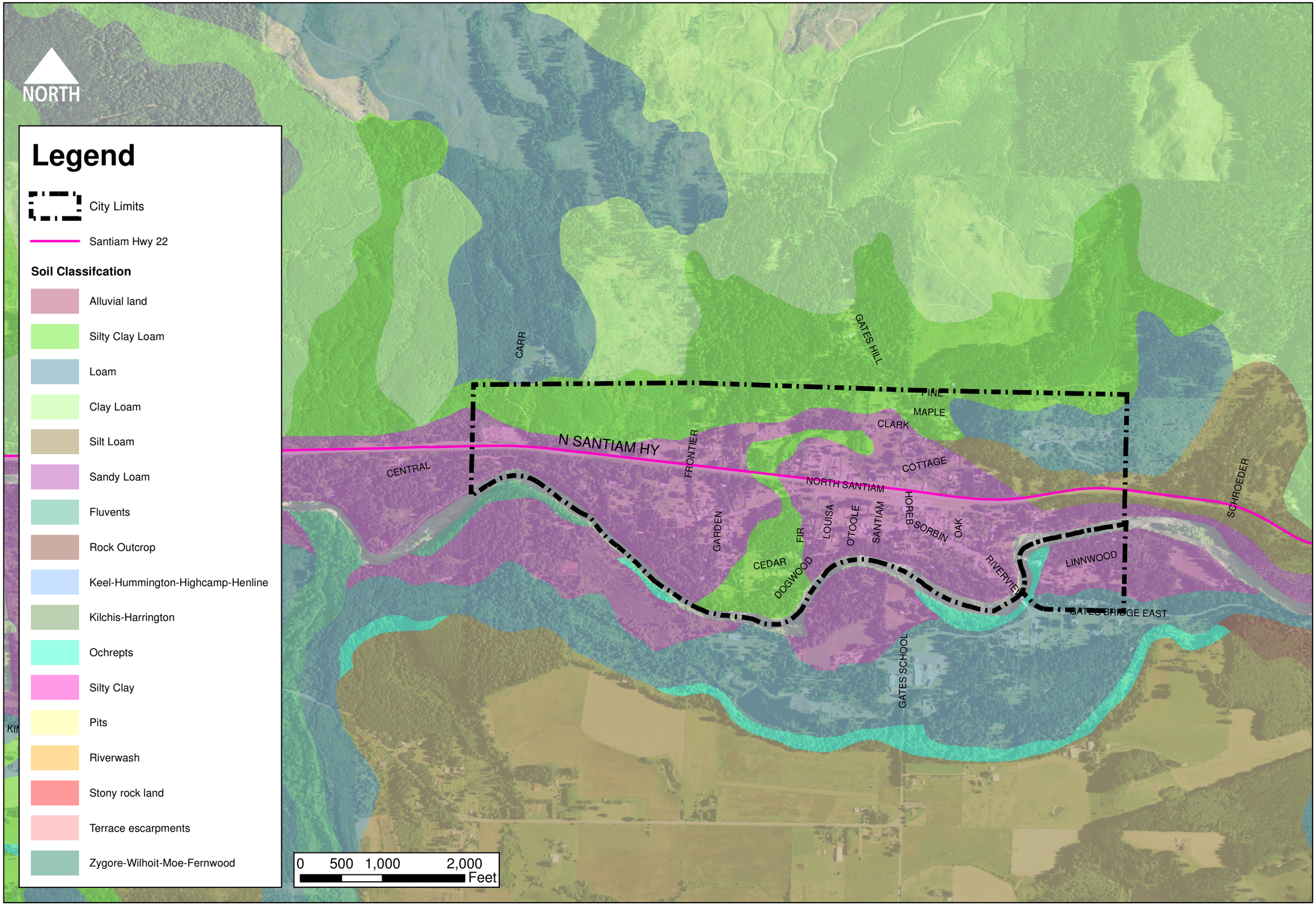
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Gates Topography and Flood Plain

Figure:
5b



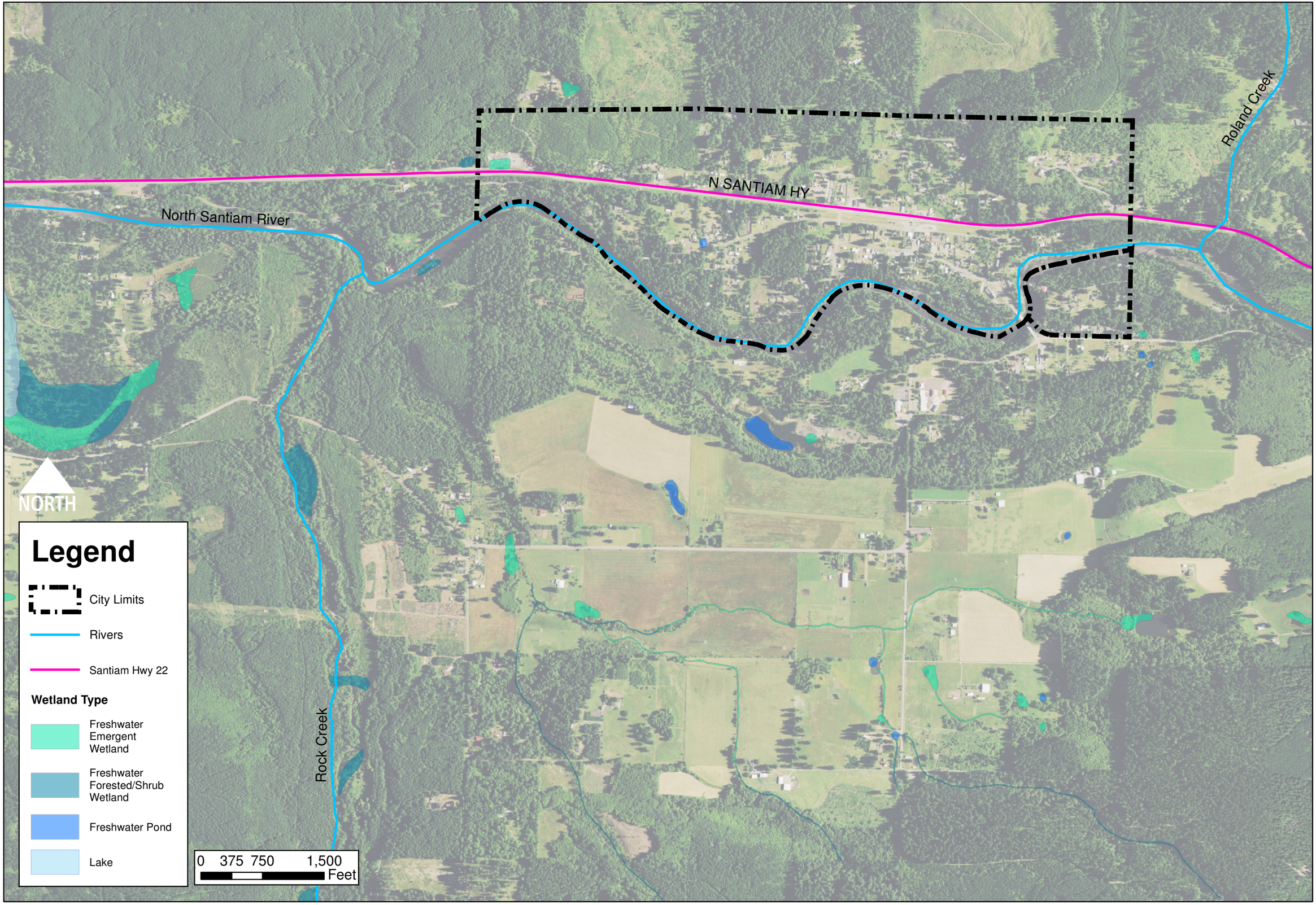
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Gates
Soil Designation

Figure:
5c



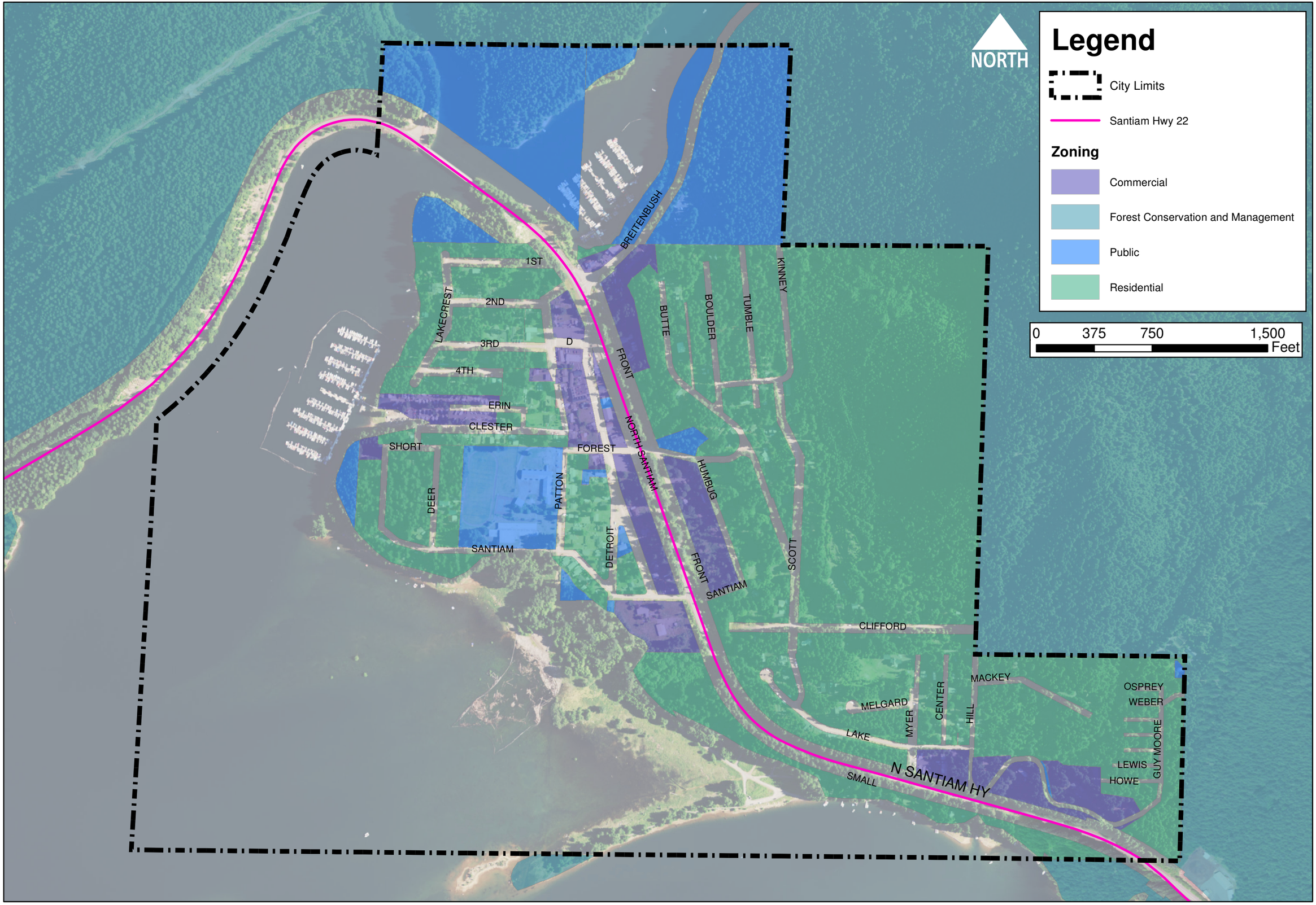
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon WW Feasibility Study

Title:
Gates Wetlands and Rivers

Figure:
5d



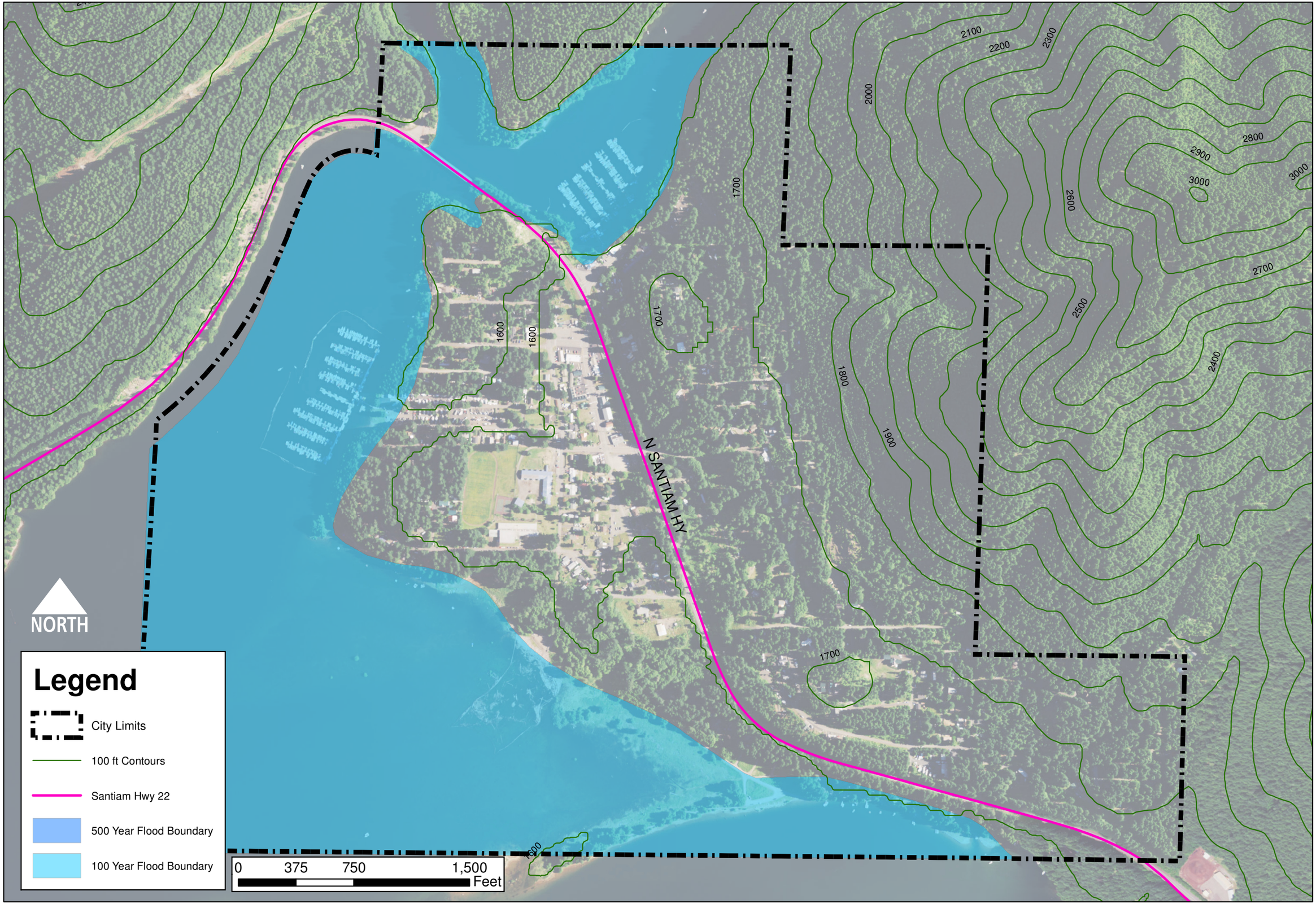
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Detroit Zoning

Figure:
6a



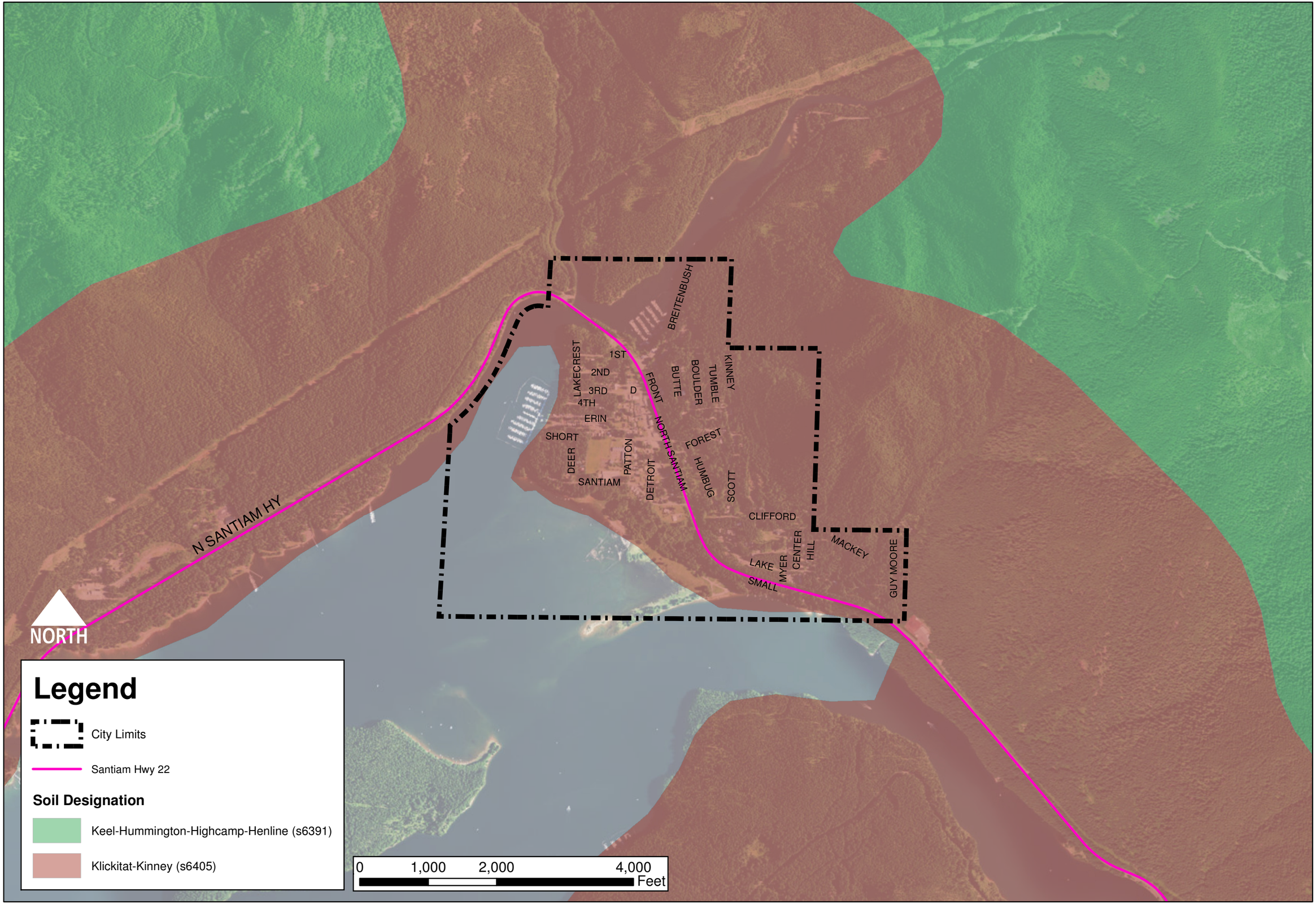
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Detroit
Topography and
Flood Plain

Figure:
6b



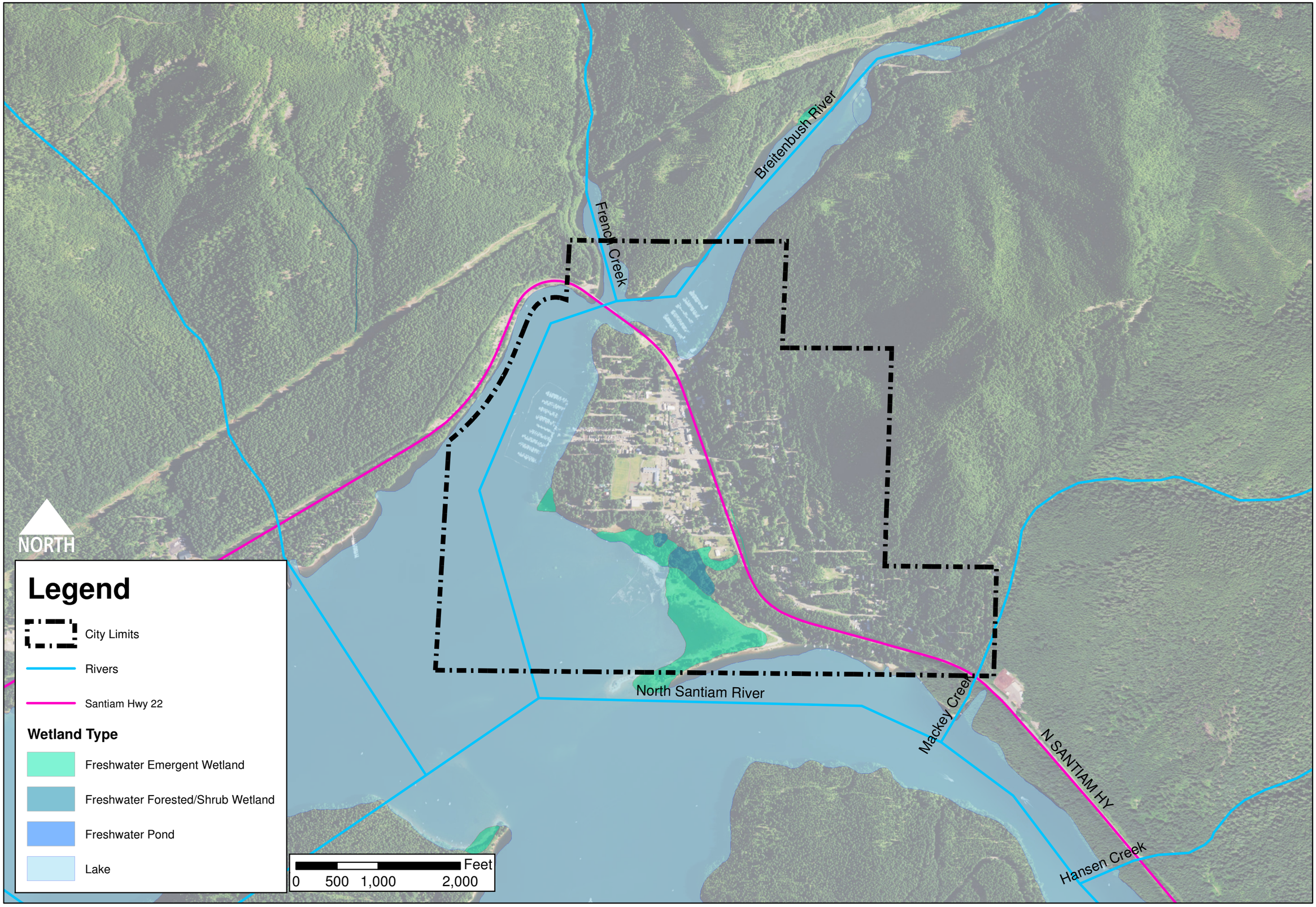
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Detroit
Soil Designations

Figure:
6c



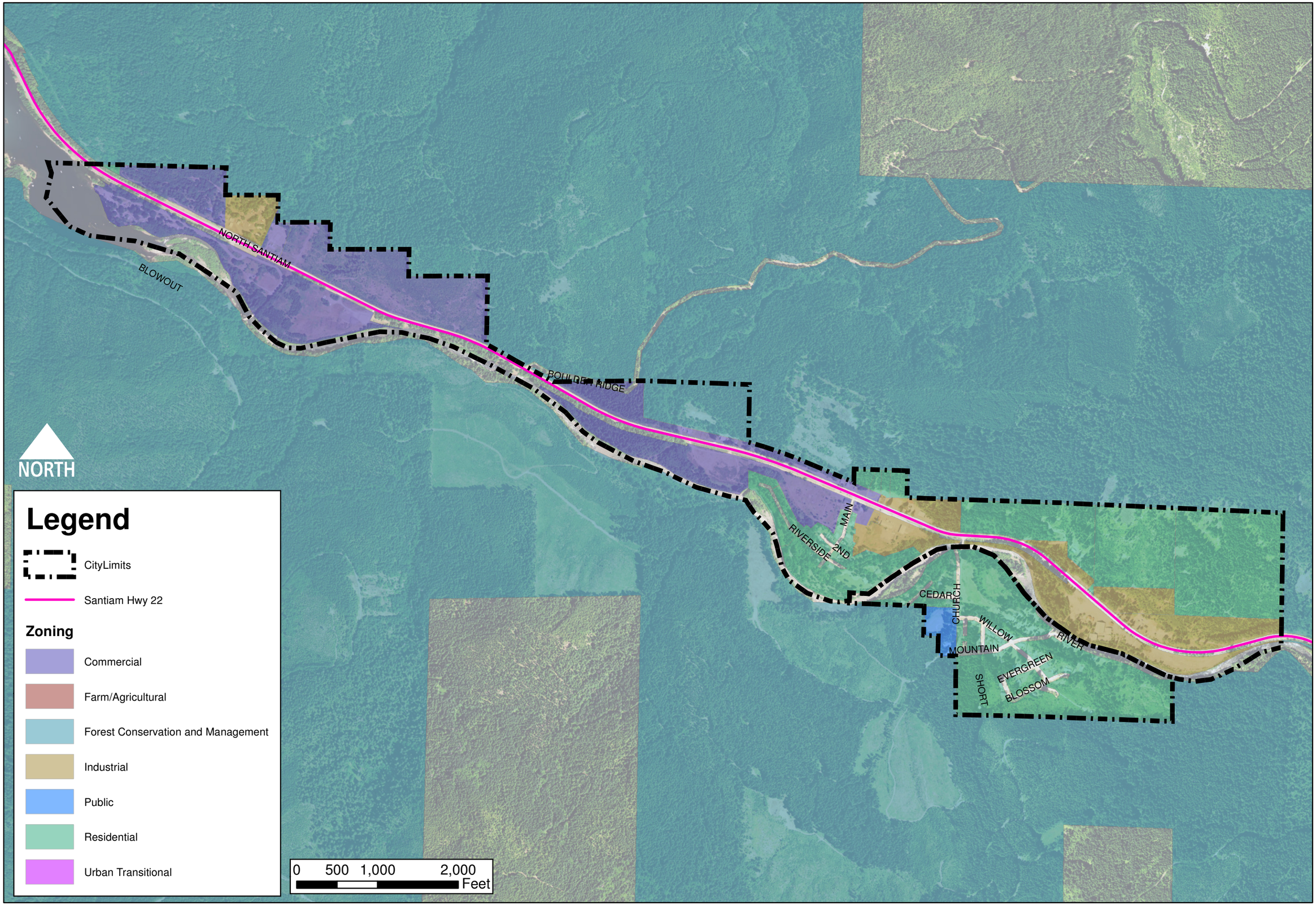
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon WW Feasibility Study

Title:
Detroit Wetlands and Rivers

Figure:
6d



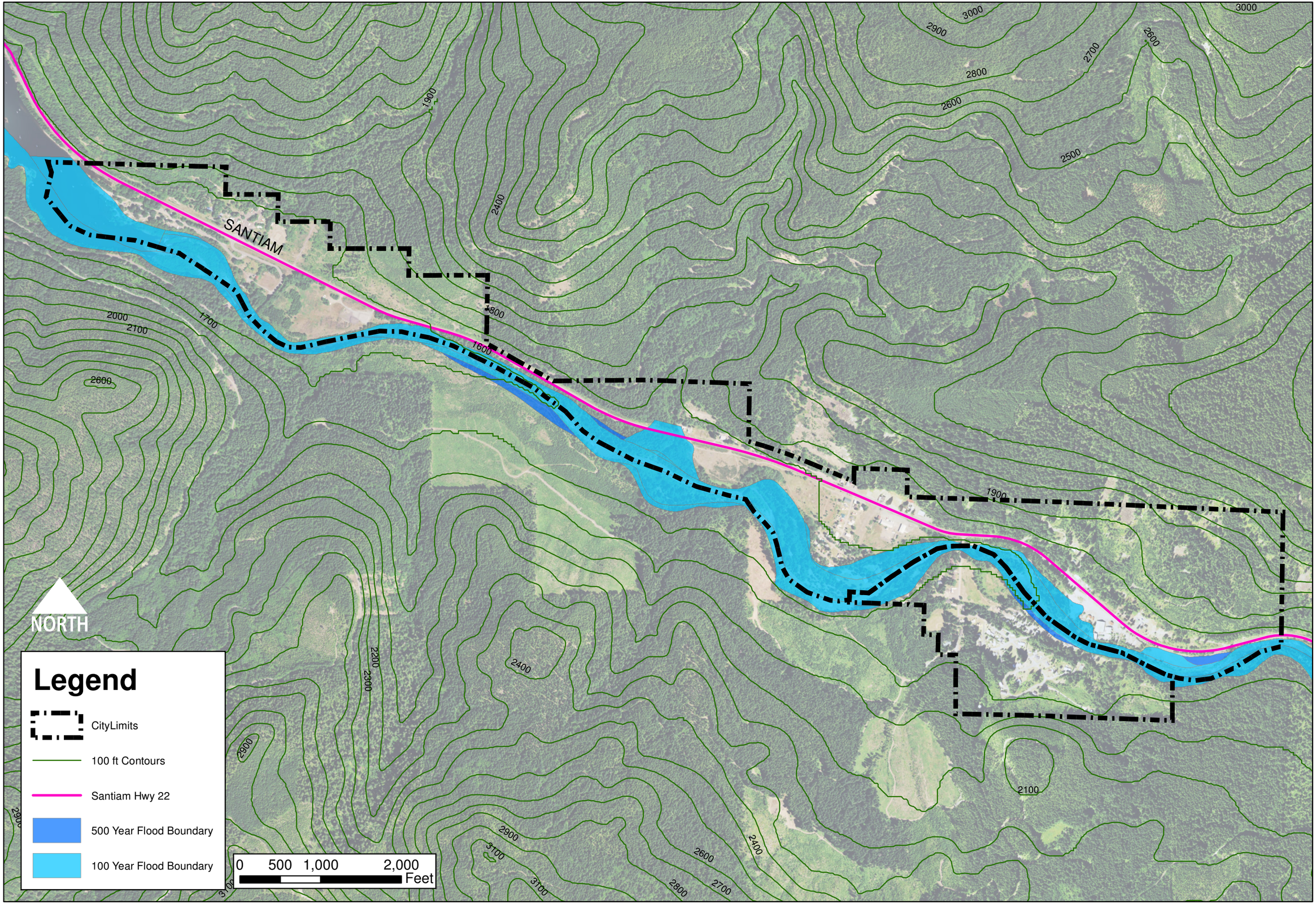
KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Idanha Zoning

Figure:
7a



KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
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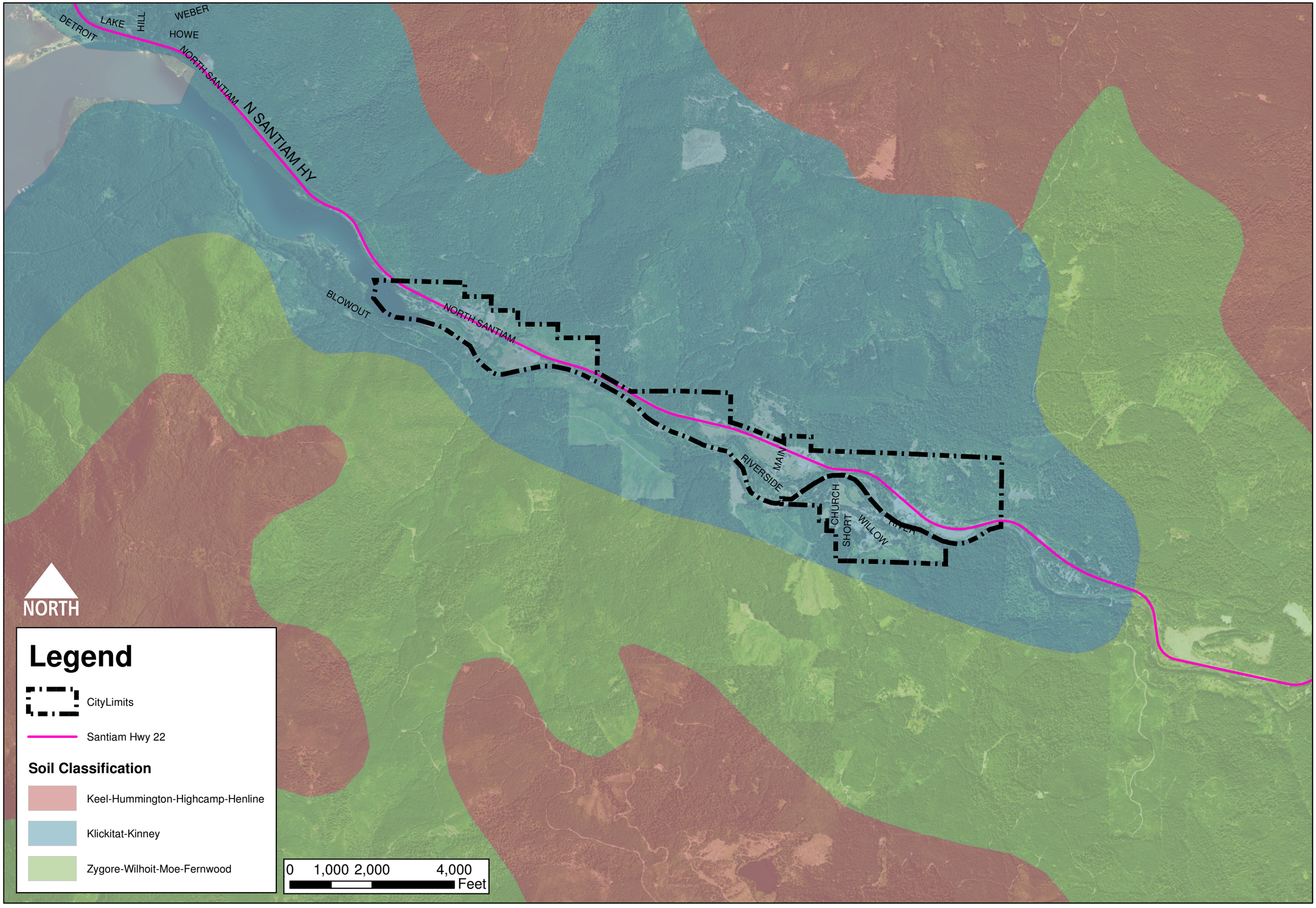
Topography and
Flood Plain

Figure:
7b



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North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Idanha
Soil Designations

Figure:
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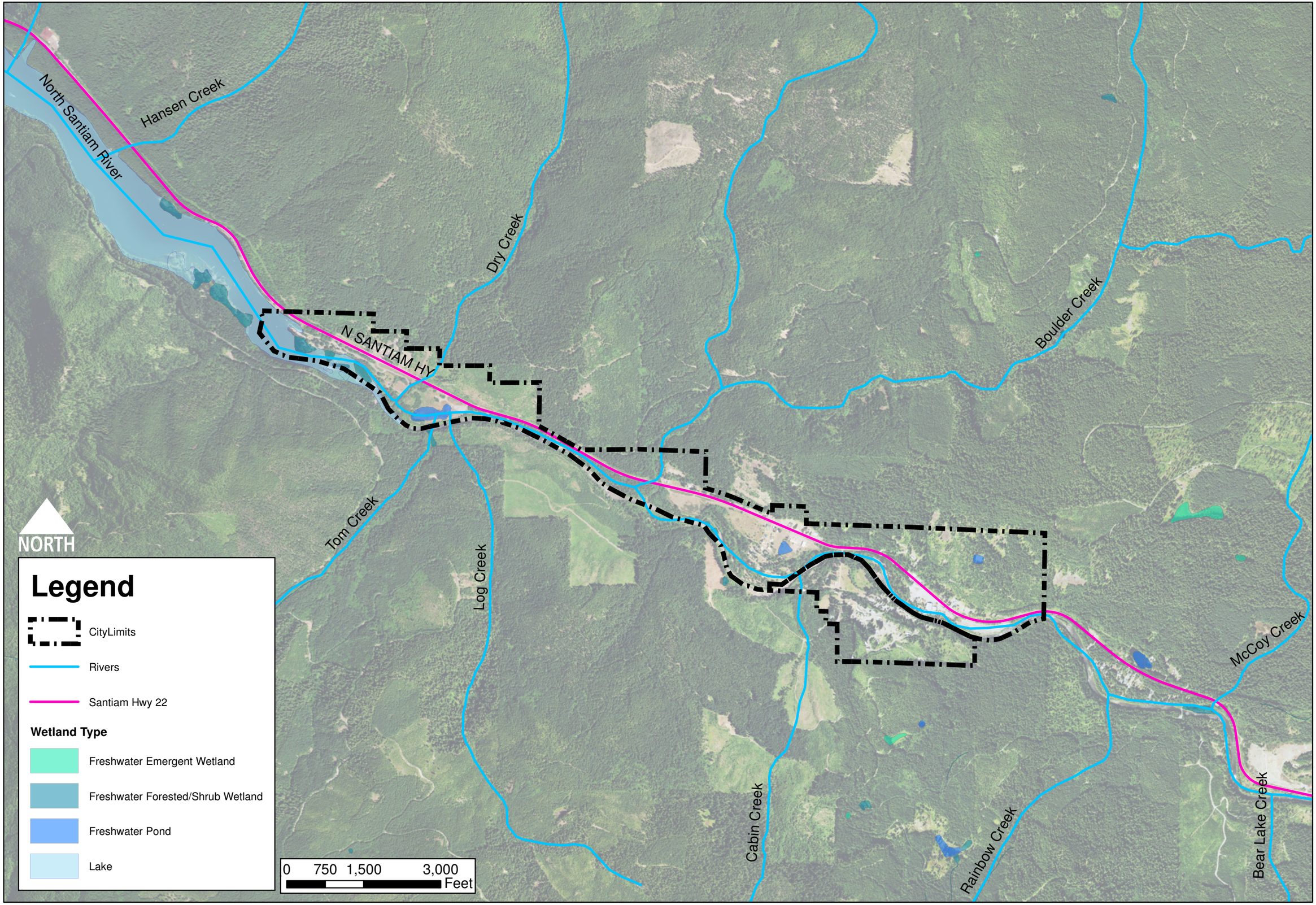

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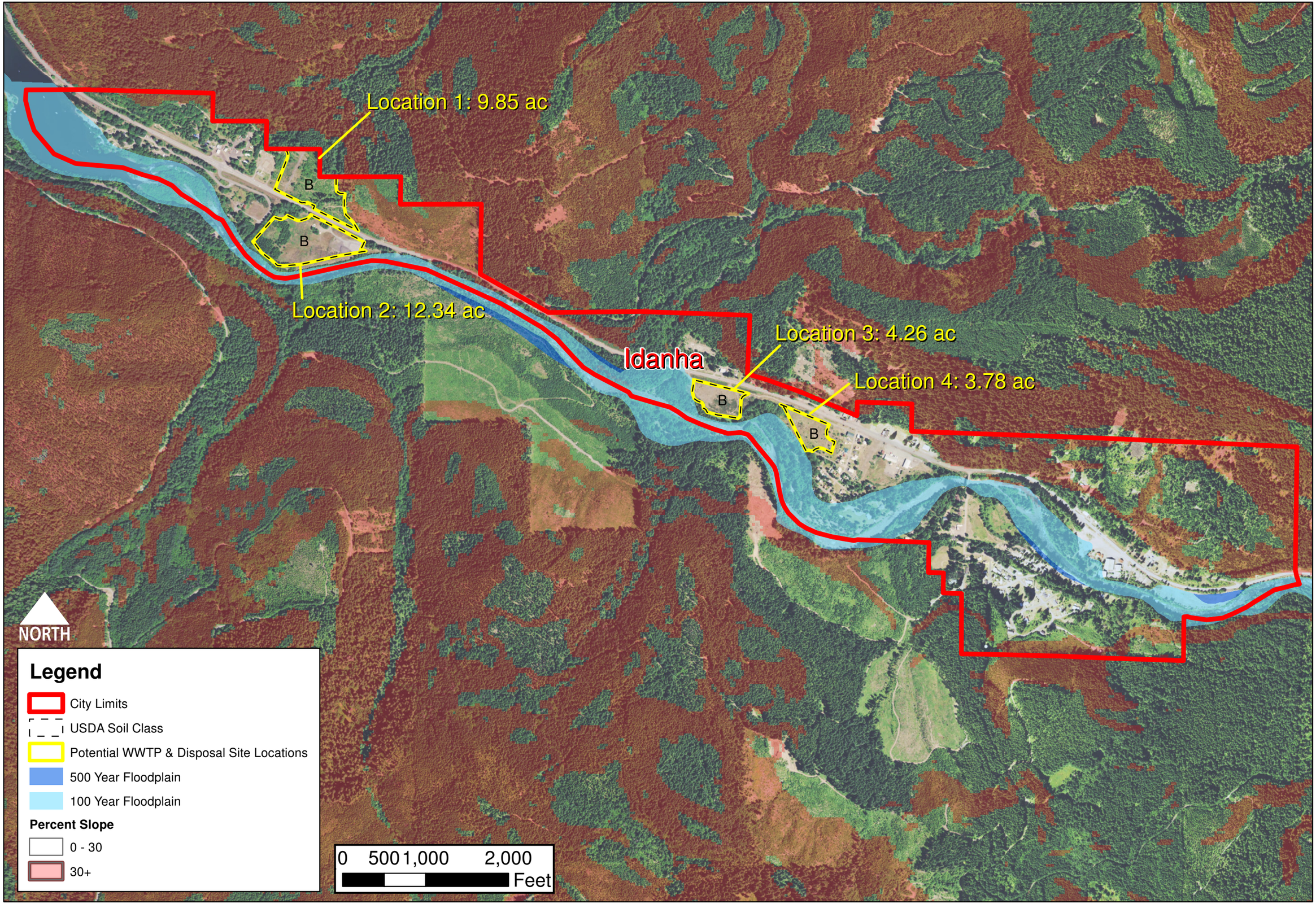
Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Idanha Wetlands and Rivers

Figure:
7d



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KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Idanha - Potential WWTP and Disposal Locations

Figure:
8

KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon WW Feasibility Study

Title:
Detroit- Potential WWTP and Disposal Locations

Figure:
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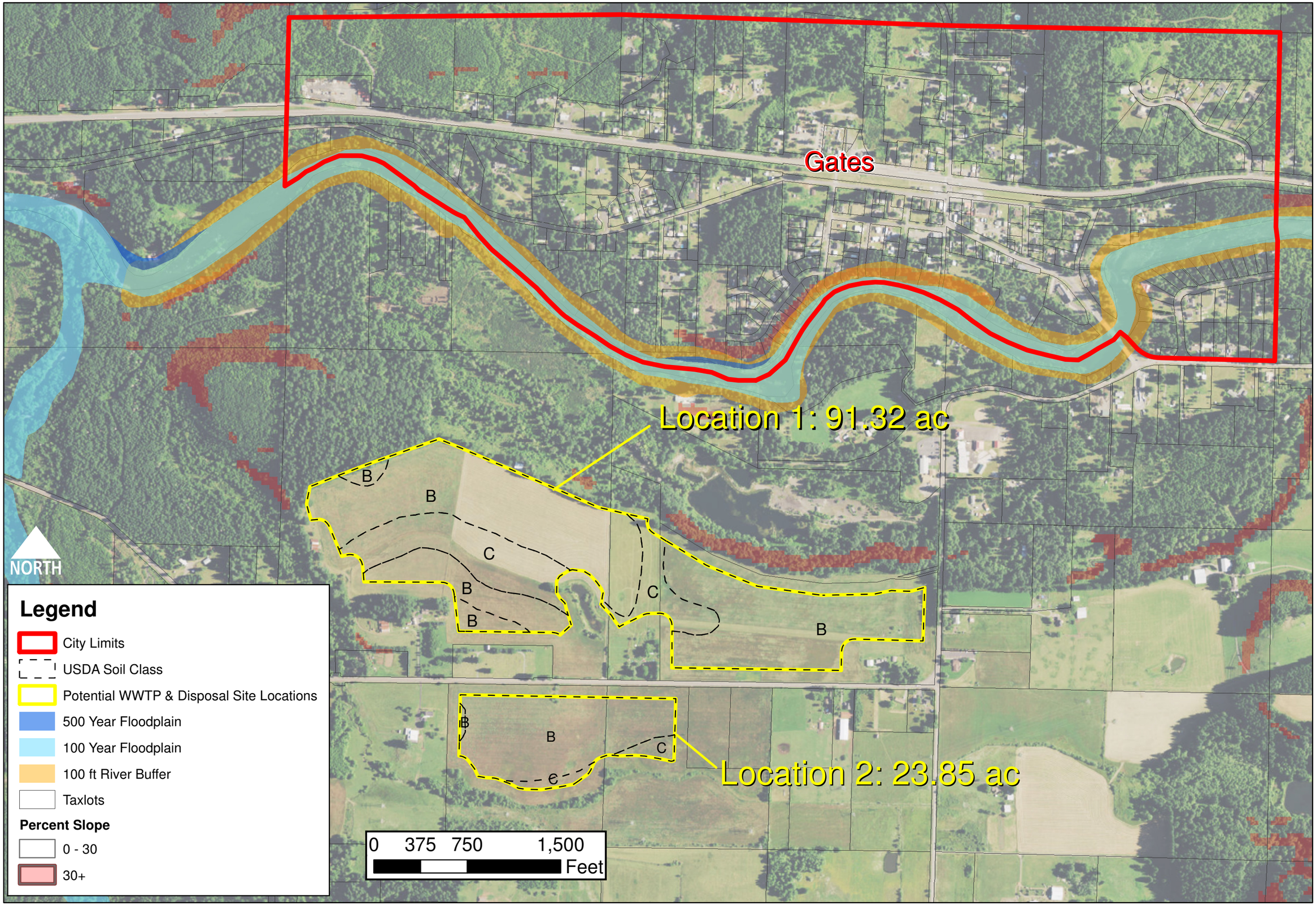

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North Santiam Canyon

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WW Feasibility Study

Title:
Gates - Potential WWTP and Disposal Locations

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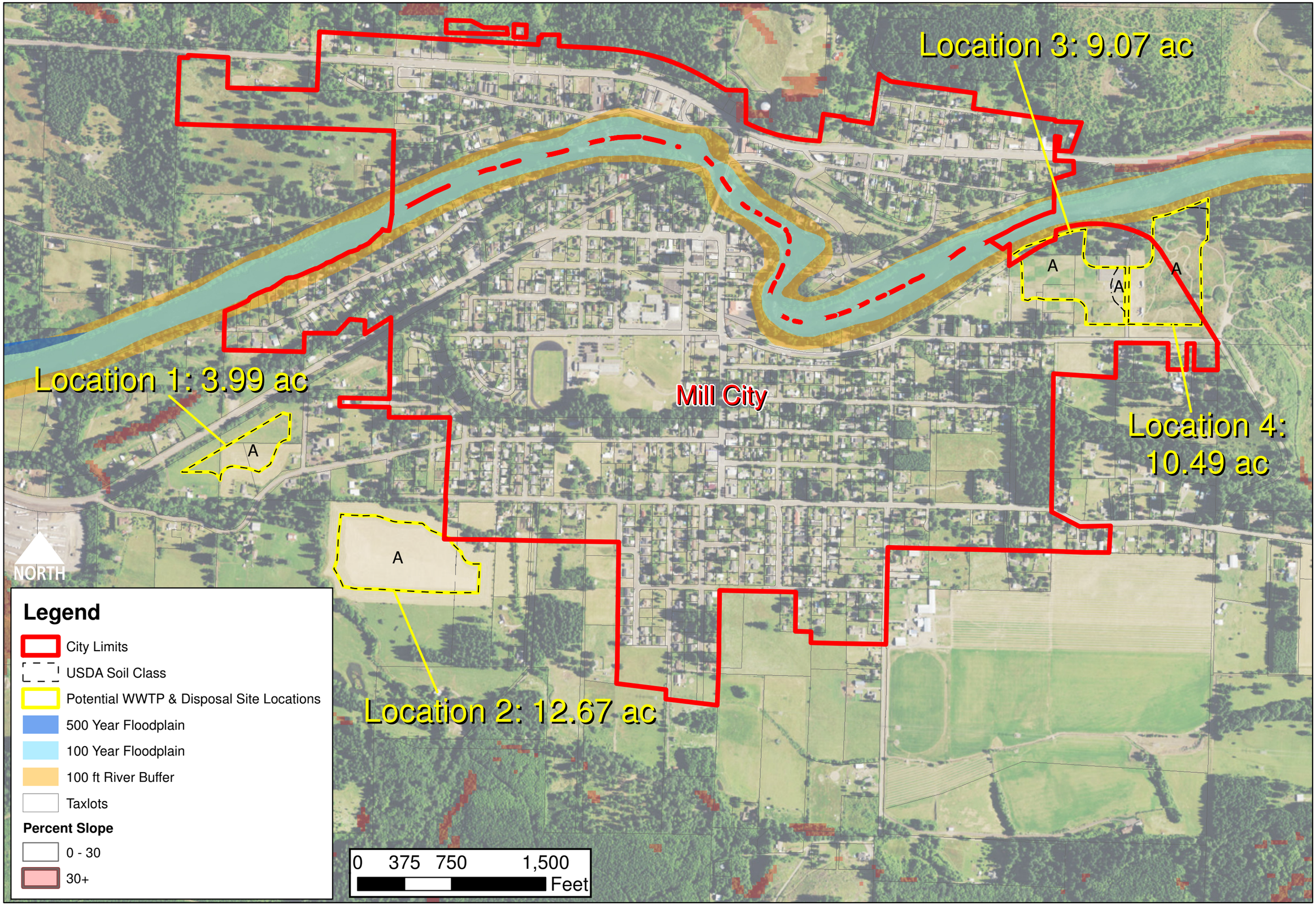

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North Santiam Canyon

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WW Feasibility Study

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Mill City - Potential WWTP and Disposal Locations

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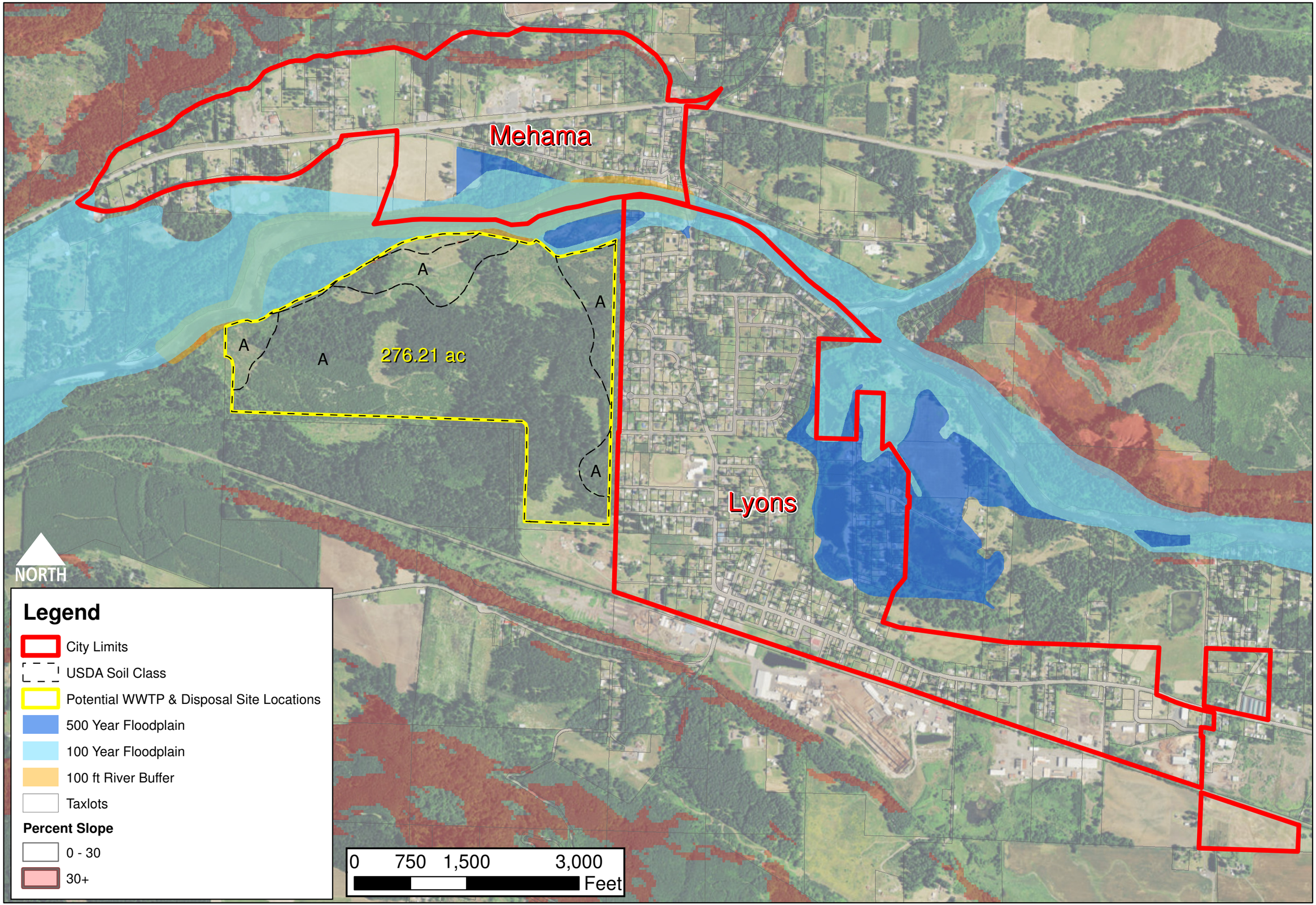

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North Santiam Canyon

North Santiam Canyon WW Feasibility Study

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Lyons - Potential WWTP and Disposal Locations

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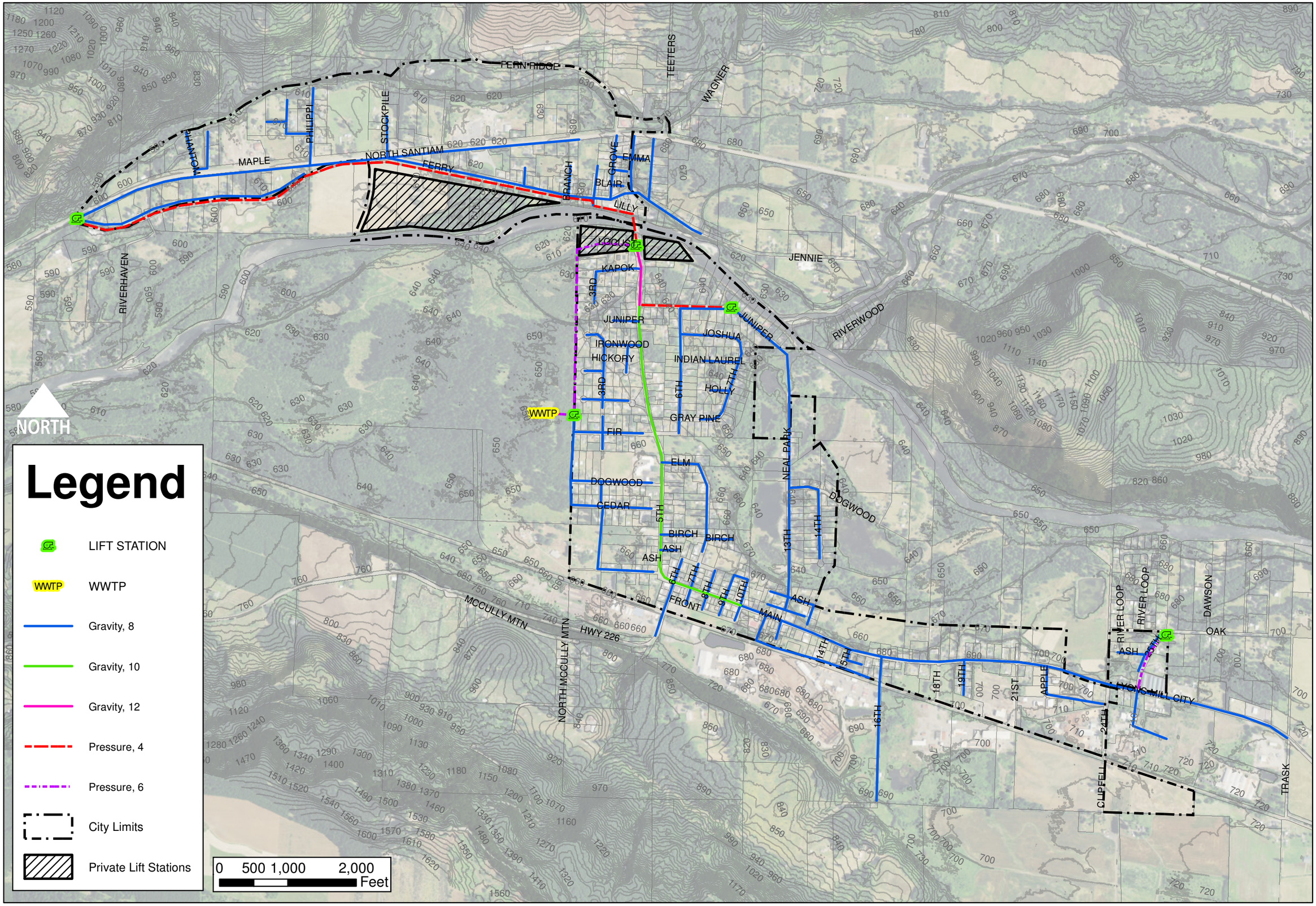

KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Alternative 1, 2, & 3
Lyons Mehema

Figure:
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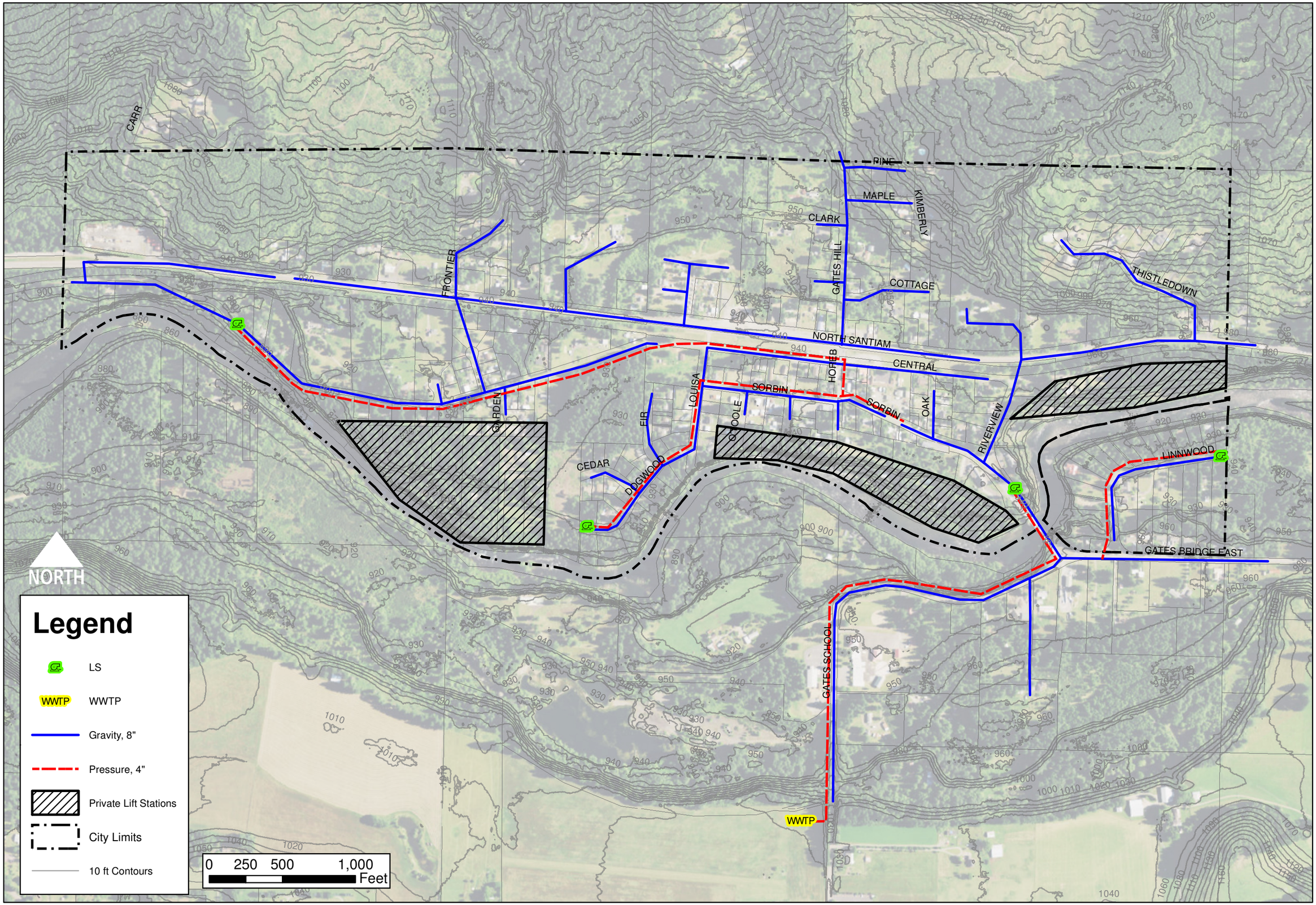

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North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Alternative 1 & 2
Gates

Figure:
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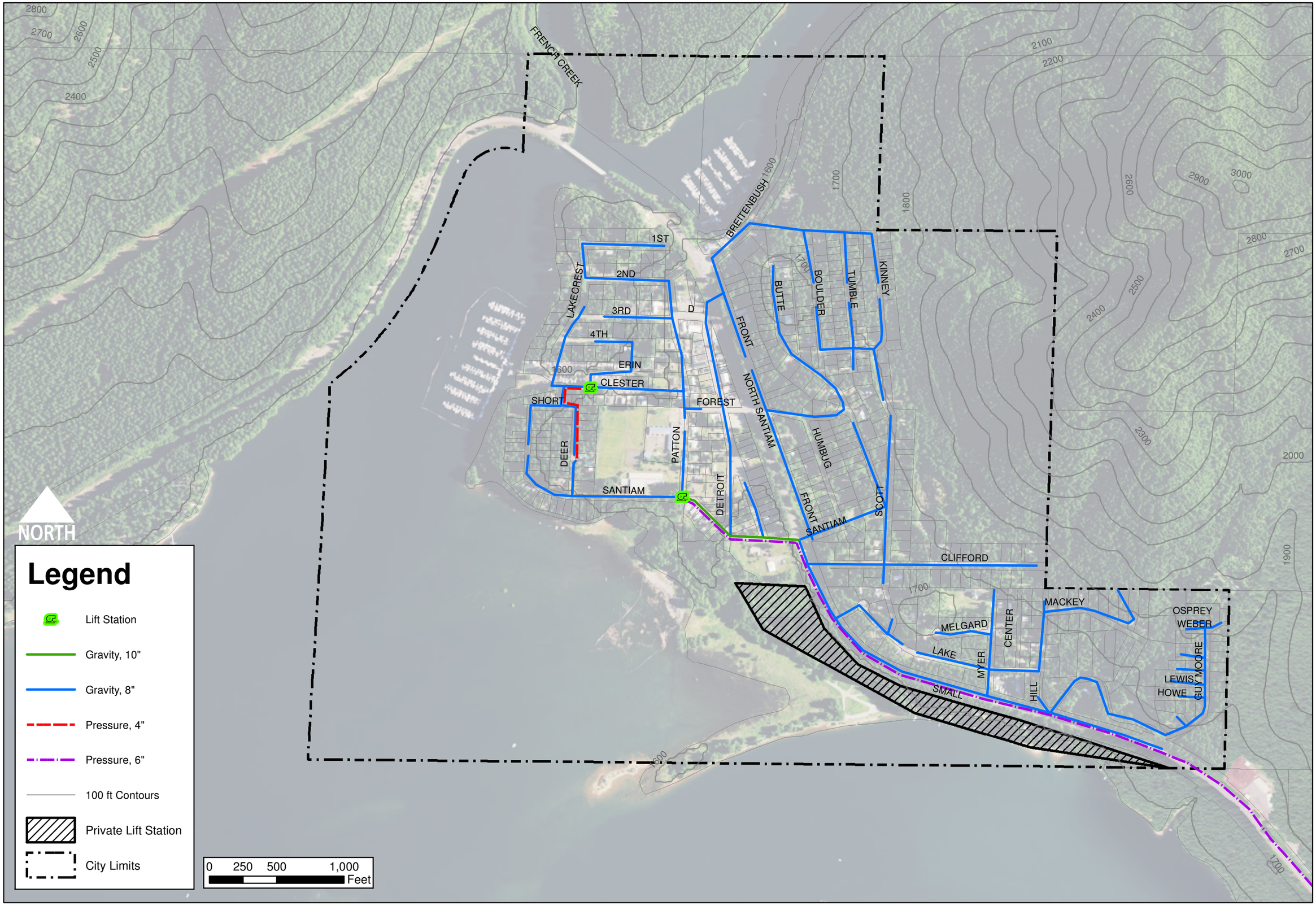

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North Santiam Canyon

North Santiam Canyon
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Title:
Alternative 1, 2, 3, & 4
Detroit

Figure:
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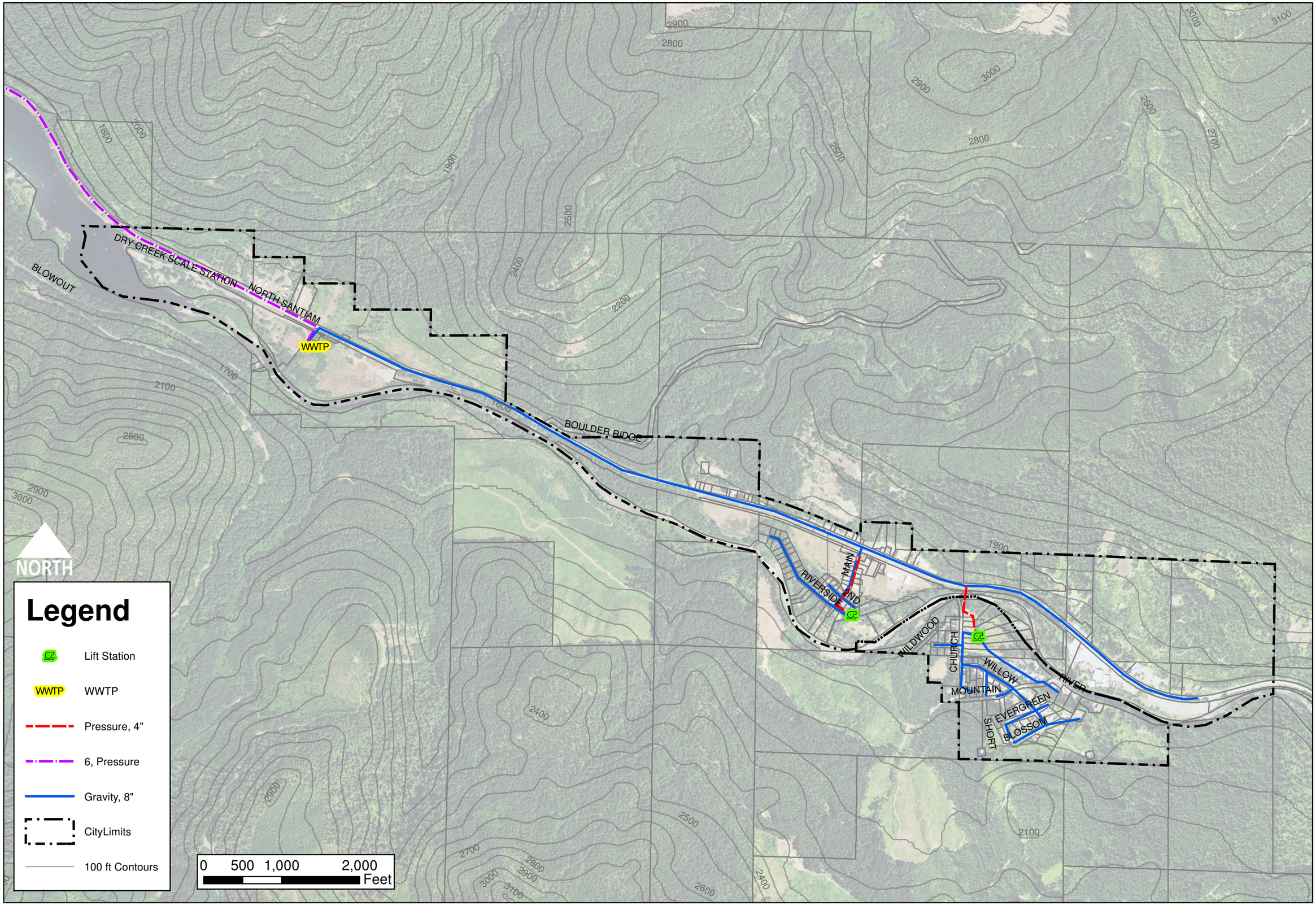

KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Alternative 1, 2
3, & 4
Idanha

Figure:
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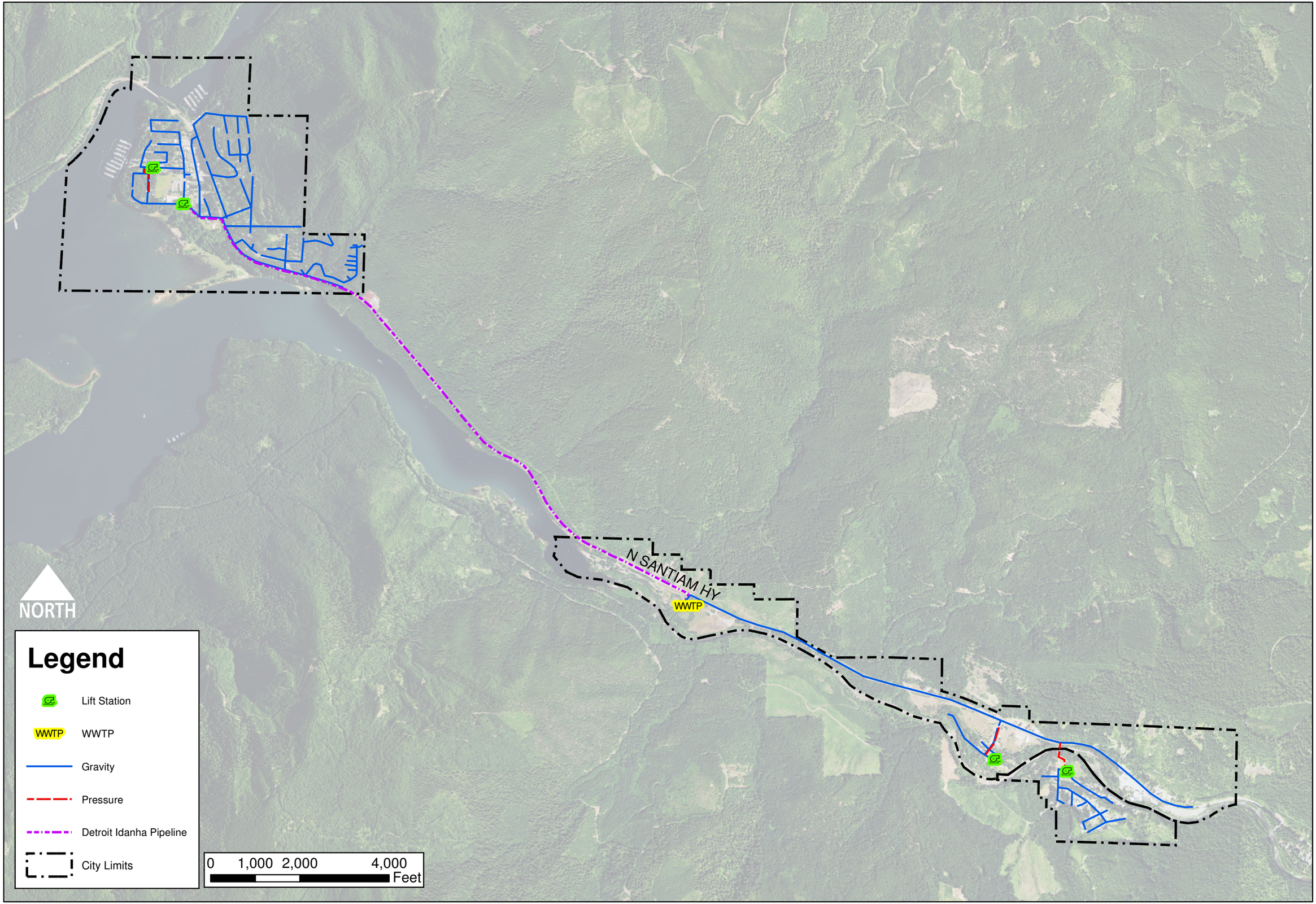

KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Alternative 1, 2, 3, and 4
Detroit-Idanha

Figure:
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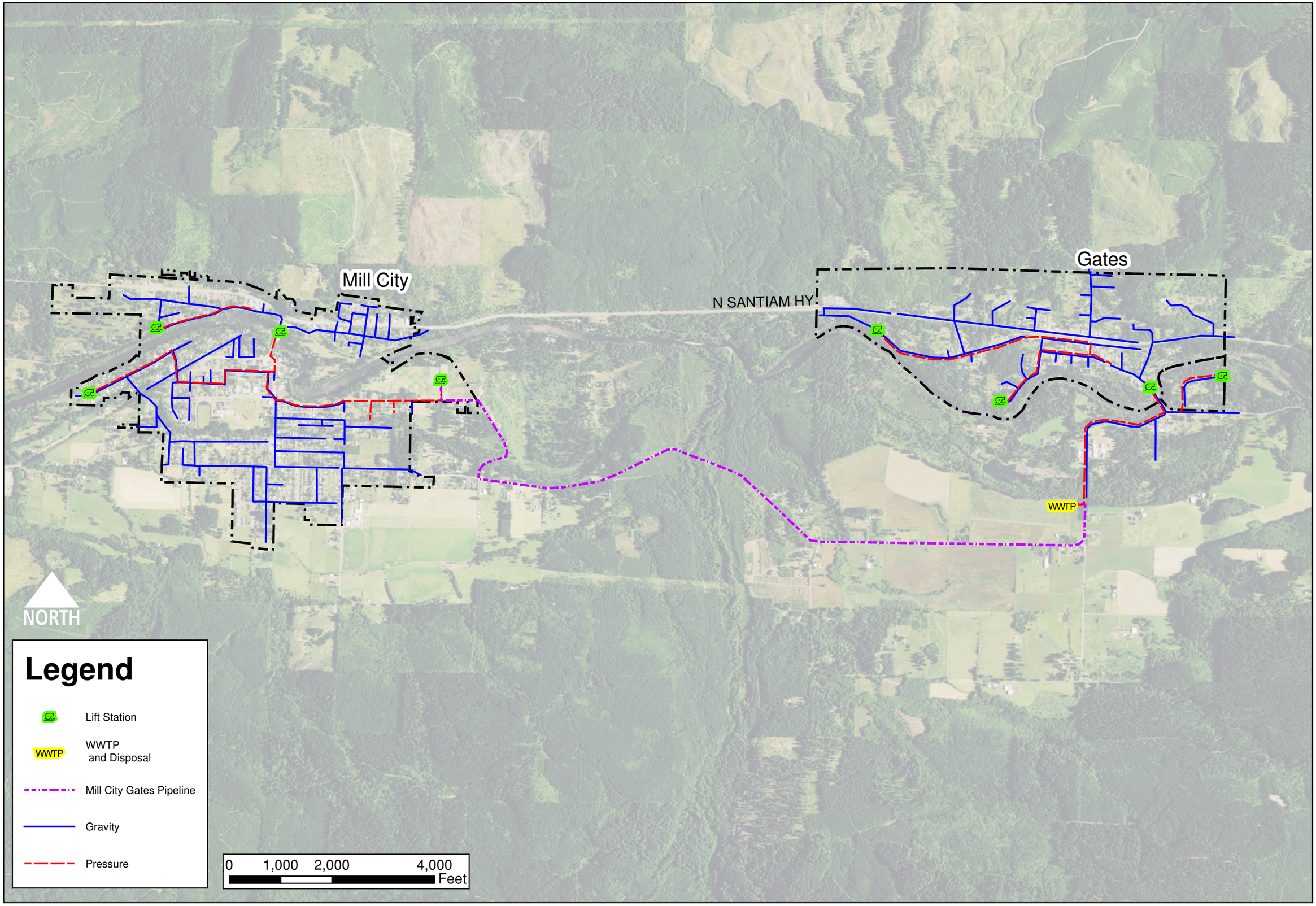

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Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Alternative 3
Mill City-Gates

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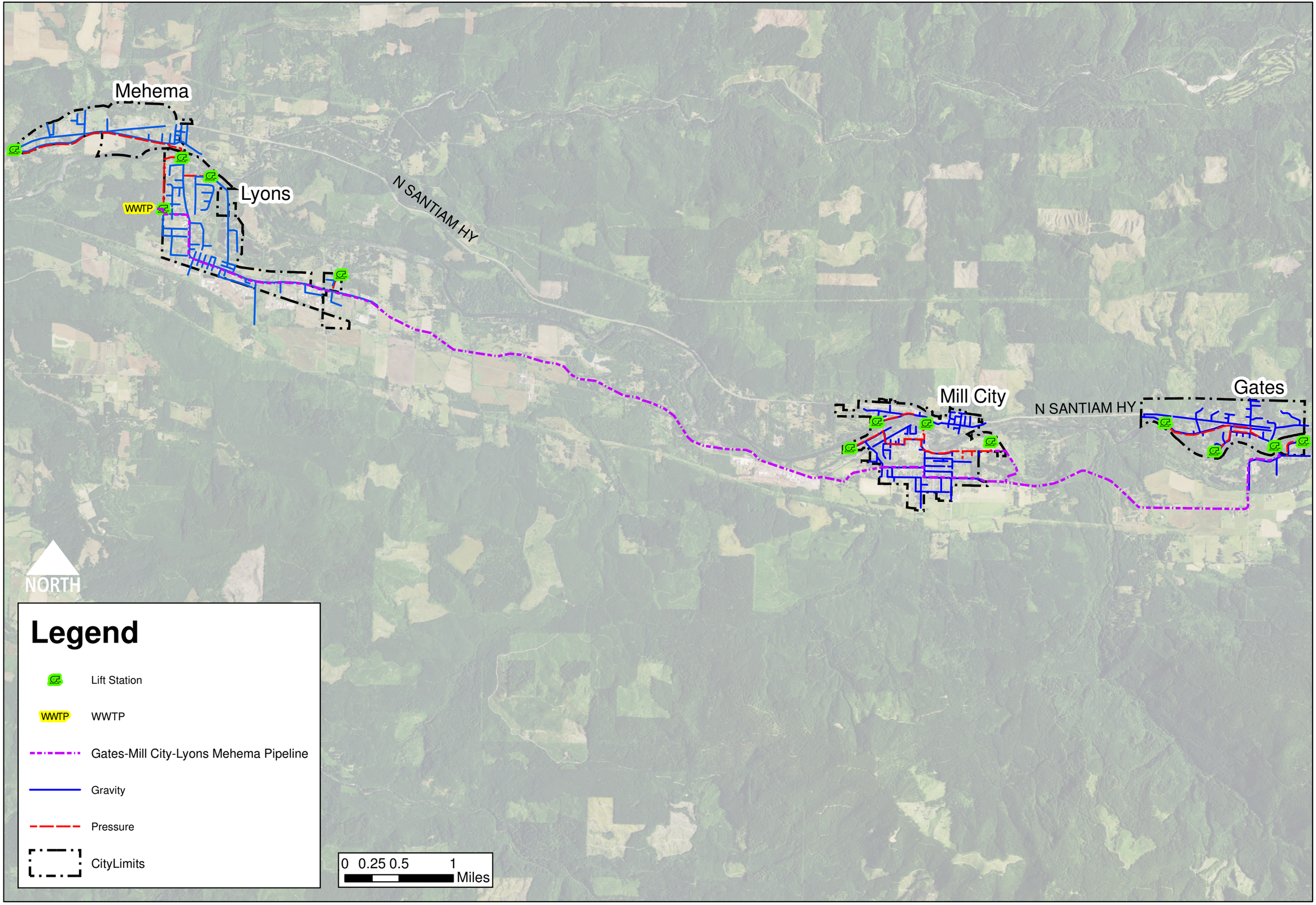


KELLER associates

Prepared for:
North Santiam Canyon

North Santiam Canyon
WW Feasibility Study

Title:
Alternative 4
Gates-Mill City-
Lyons Mehema

Figure:
19

Appendix B:
MFA Report

North Santiam Canyon Regional Land Inventory

SUMMARY REPORT

Prepared for:
Marion County and Business Oregon
January 9, 2017

Project No: 0612.03.01

MAUL FOSTER ALONGI

NORTH SANTIAM CANYON REGIONAL LAND INVENTORY

SUMMARY REPORT

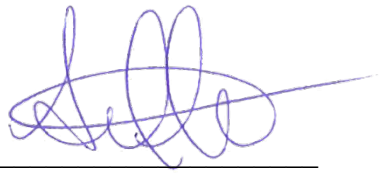
Prepared for
MARION COUNTY
BUSINESS OREGON
January 9, 2017
Project No. 0612.03.01

Prepared by
Maul Foster & Alongi, Inc.
2001 NW 19th Avenue, Suite 200, Portland OR 97209

MAUL
FOSTER
ALONGI

The material and data in this report were prepared under the supervision and direction of the undersigned.

MAUL FOSTER & ALONGI, INC.



Seth Otto, AICP, LEED AP
Senior Planner

Grant Herbert
Senior Analyst

CONTENTS

TABLES AND ILLUSTRATIONS

FOLLOWING REPORT:

SUMMARY

This summary is not intended as a stand-alone document and must be evaluated in context with the entire document.

This report summarizes the work completed by Maul Foster & Alongi, Inc. (MFA) in support of the North Santiam Canyon Regional Wastewater Analysis and Land Inventory project. The project was commissioned by the Oregon Business Development Department (Business Oregon) and with financial support from Marion County on behalf of regional stakeholders, which include Marion and Linn counties, the Mid-Willamette Valley Council of Governments, and the incorporated communities of the North Santiam Canyon: Mehama, Lyons, Mill City, Gates, Detroit, and Idanha.

MFA completed a regional land inventory and redevelopment analysis that included the development of a comprehensive geodatabase, regional growth projections, and analysis of redevelopment opportunities in the canyon study area. This work was completed in parallel with a regional wastewater analysis performed by Keller & Associates), which evaluated the preliminary feasibility and cost of a regional sewer system for the canyon; and a regional health impact analysis completed by the Oregon Health Authority. The outcome of the three studies is a high-level summary of the conditions that determine economic growth and development in the study area, and a preliminary assessment of the cost and impact of implementing one of the priority improvements: a regional wastewater management system.

1 INTRODUCTION

1.1 Project Objectives

Marion County (the County) and the Mid-Willamette Valley Council of Governments (COG), in partnership with Oregon Business Development Department (Business Oregon), has embarked on a study of obstacles to community and economic development in the North Santiam Canyon (the study area). The lack of community municipal wastewater management and a commensurate over-reliance on on-site septic and small-scale sewage systems is regarded as one of the most pressing impediments to economic and population growth in the region.

A starting point for the study is a regional land inventory (inventory) of properties and existing conditions in the region. Maul Foster & Alongi, Inc. (MFA), in partnership with the economic consulting firm Elesco Limited (Elesco), has completed the inventory, which will support short- and long-range planning around issues of land use, infrastructure, real estate marketability, and redevelopment potential.

In parallel with the inventory, Keller & Associates is evaluating options for governance over a shared regional water/wastewater district (the wastewater study). This will include conceptual design for constructing wastewater systems in the study area as well as estimated costs and potential phasing of construction projects.

Work on this project was guided in part by a technical advisory committee (TAG) consisting of representatives of state and local agencies. Their assistance and advice were invaluable in refining our technical analyses of population and employment growth demand as well as developing the site suitability redevelopment matrix. We want to acknowledge the following for their role in this project:

Barb Young	Marion County Sr. Policy Analyst/Government Relations
Danielle Gonzalez	Marion County Management Analyst
James LaBar	Regional Solutions—Governor's Office
Renata Wakeley	Mid-Willamette Valley Council of Governments
Matt Knudson	Marion County Public Works
Dennis Mansfield	Marion County Public Works
Karen Homolac	Infrastructure Finance Authority—Business Oregon

Execution of the inventory has focused on these primary objectives:

- Developing an understanding of specific opportunities and constraints affecting community and economic development goals in the study area
- Using the best available data to provide the COG, study area communities, and regional stakeholders with an analytical tool to assist in appropriate and successful decision-making and prioritization of resources

Completion of the inventory has provided the following:

- An interactive Geographic Information Systems (GIS) database providing insight into priority development areas, specific properties, and catalytic projects to stimulate economic and community development in the region
- Analysis related to understanding the impact of modeling wastewater treatment options explored in a parallel wastewater study on population and employment growth projections

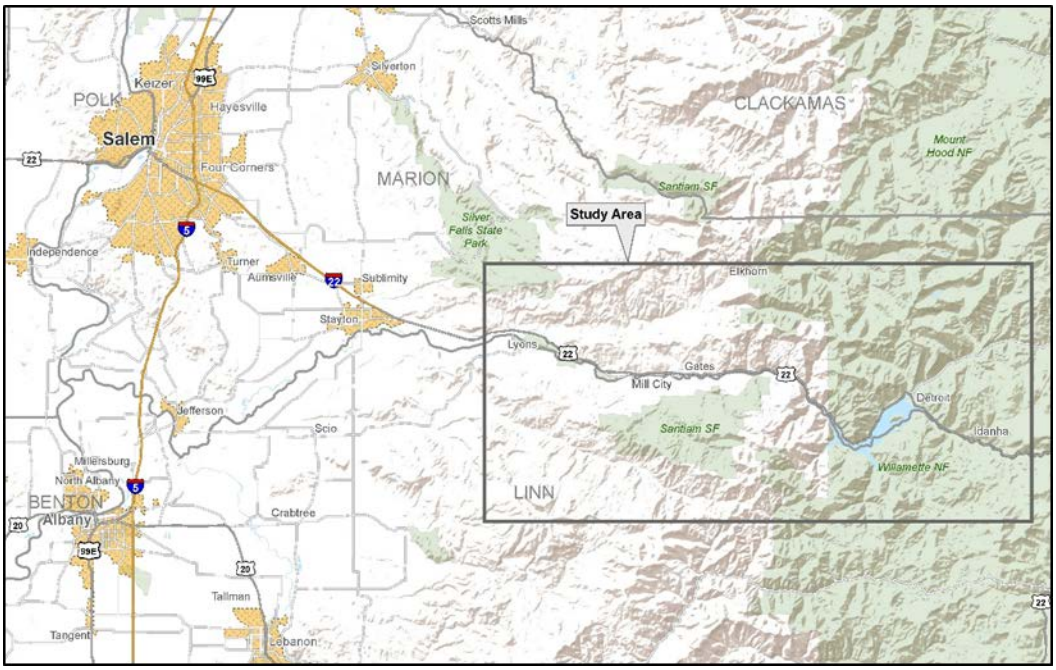
1.2 Study Area

The study area, shown on Figure 1-1, starts approximately 25 miles east of Salem along Oregon State Highway 22 and extends 31 miles farther east to the city of Idanha.

There are five communities in the study area where primarily industrial and commercial activities are conducted. For the purposes of the analysis completed for this project, the city of Lyons in Linn County was combined with unincorporated Mehama, which is a Census Defined Place for data collection. This unincorporated community is within Marion County and included by request of Mehama and the county, as a portion of the Mehama area is within the Lyons Urban Growth Boundary (UGB) and is entirely zoned for commercial uses. The other cities in the study area are Mill City, Gates, Detroit, and Idanha.

The cities of Mill City, Gates, and Idanha are partially in Marion County and partially in Linn County; only the city of Detroit is entirely in Marion County.

Figure 1-1: Location Overview Map



1.3 Scope of Work

The following tasks were completed as part of the inventory project.

1.3.1 Data Compilation and Review

The project kicked off by gathering available data from multiple sources and compiling them into a single geodatabase. The data were made available for access and use through a secure Web-based interactive map application.

1.3.2 Field Surveys

This task involved direct data gathering and analysis of the study area through property windshield surveys and targeted interviews with key area stakeholders. The purpose of this task was to gather information that was otherwise not available and/or quantifiable through existing data sets. MFA compiled and digitized hard copies of information (e.g., plans and infrastructure as-builts) pertaining to the study area but not incorporated into GIS.

1.3.3 Redevelopment Analysis

MFA and Elesco modeled growth projections to determine future land demand in the study area. These growth projections helped inform the parallel wastewater study.

MFA used the North Santiam Canyon Corridor Industrial & Commercial Land Demand Forecast (Land Demand Forecast) (see Appendix A) to assess and rank commercial and industrial properties according to readiness to develop or redevelop, using the following approach:

1. Develop typologies to sort commercial and industrial properties for modeling redevelopment options and impact.

2. Apply a Site Suitability comparative ranking matrix to show weighted scores for each typology factor and total comparative scores to rank the suitability of the types for various uses. The TAG was convened to review the data and help prioritize matrix variables.

3. Apply the matrix to the population of properties identified by typology.

4. Rank the properties according to matrix under different growth scenarios.

1.3.4 Impact Analysis

MFA was initially tasked with completing an order-of-magnitude analysis to determine potential utility demand generated by property redevelopment. As we progressed through the development of the inventory and the analysis of redevelopment, it became clear that this new demand would be included in the model generated through the wastewater study, and that it was more valuable to understand the impact of a sewer system on growth projections and land demand. Therefore, in collaboration with staff from the county and COG, MFA developed and applied an alternative "augmented" growth scenario to the Land Demand Forecast (Appendix A).

1.3.5 Project Deliverables

1.3.5.1 Interactive GIS Database of Properties

This final deliverable consists of a secure Web-based interactive map application that enables project stakeholders and partners to interact with the compiled datasets and deliverables.

In tandem with the Web application, ArcGIS file geodatabases have been provided to appropriate project partners at the county. The geodatabases consist of all supporting datasets integrated into the analysis, along with the final layers generated through project-specific analysis. The geodatabases contain appropriate metadata and is accompanied by documentation describing the methodology and analysis (summarized in Appendix B).

1.3.5.2 Land Demand Forecast and Redevelopment Matrix

Elesco completed the Land Demand Forecast (Appendix A), which modeled land demand for industrial and commercial uses, based on employment growth projections for the study area. The analysis was complemented by the impact analysis, which modeled the potential growth, based on the availability of sewer infrastructure and services in the study area. The growth projections and the Land Demand Forecast were provided to project partners to support system modeling in the wastewater study.

Working with the TAG, we sorted the commercial and industrial properties into typologies for modeling redevelopment options and impact. The typologies are based on zoning and parcel size. Our team then developed a unique site suitability comparative ranking matrix to calculate weighted scores for each typology factor and generate total comparative scores to rank the suitability of the parcels for development. MFA and the TAG reviewed and revised the comparative matrix; final scores are included in the GIS dataset.

1.3.5.3 Catalyst Property Cut Sheets

Based on the outputs of the redevelopment and impact analyses, MFA identified the highest scored properties that met the anticipated growth demands for development or redevelopment based on the output of the redevelopment site suitability matrix analysis for the baseline growth scenario. These are the properties that are considered the most generally desirable for development, based on the relative weighting established in the site suitability matrix; however, individual business requirements may identify additional criteria that were not included in this study and may not score the properties in the same way. Regional scale maps identifying the distribution of these properties are included in this report. Summary cut sheets for these properties are included as Appendix C.

2 STUDY AREA

2.1 Summary Overview

2.1.1 Communities

The analysis completed in the Land Demand Forecast (see Appendix A) and summarized in this section shows that the communities of Lyons/Mehama and Mill City have strong economic bases anchored by the manufacturing sector concentrated primarily in lumber and wood products. They are employment centers for residents of other communities, such as Gates, in the study area. While their dependence on the volatile wood-products industry puts them at risk, companies in these communities appear to have adjusted to changes in the industry and have stabilized their employment.

Put together, these two communities provide a complete range of commercial and public services to keep them self-sustaining. This will enable them to continue to draw new residents as the population in the Willamette Valley grows.

Gates is a rural residential community and there are no signs that this will change in the near future. There may be minor additions to its commercial base to service an increasing volume of tourists from the Willamette Valley. Detroit should also see increased demand for tourist commercial services in its central business district and at lakefront businesses.

Opportunities for Idanha are limited. The former mill properties likely will be purchased at some point and used primarily for transportation and warehousing facilities that would require only limited improvements to existing infrastructure.

2.1.2 Employment

Overall, total primary employment in the study area averaged 24.94 percent of the total population compared to a ratio of 42.6 percent for the whole state of Oregon. Several reasons have been cited for this disparity, including an aging labor force, more seasonal and part-time employment, and volatility in the lumber and wood products sector of the economy.

Observations of traffic flows also indicate there are significant numbers of workers who commute to jobs in Salem, Albany, and other cities along the I-5 corridor, especially from the Lyons/Mehama and Mill City communities. There is also a large population of retirees, consistent with the aging of the labor force. (See Appendix A)

2.1.3 Land Demand

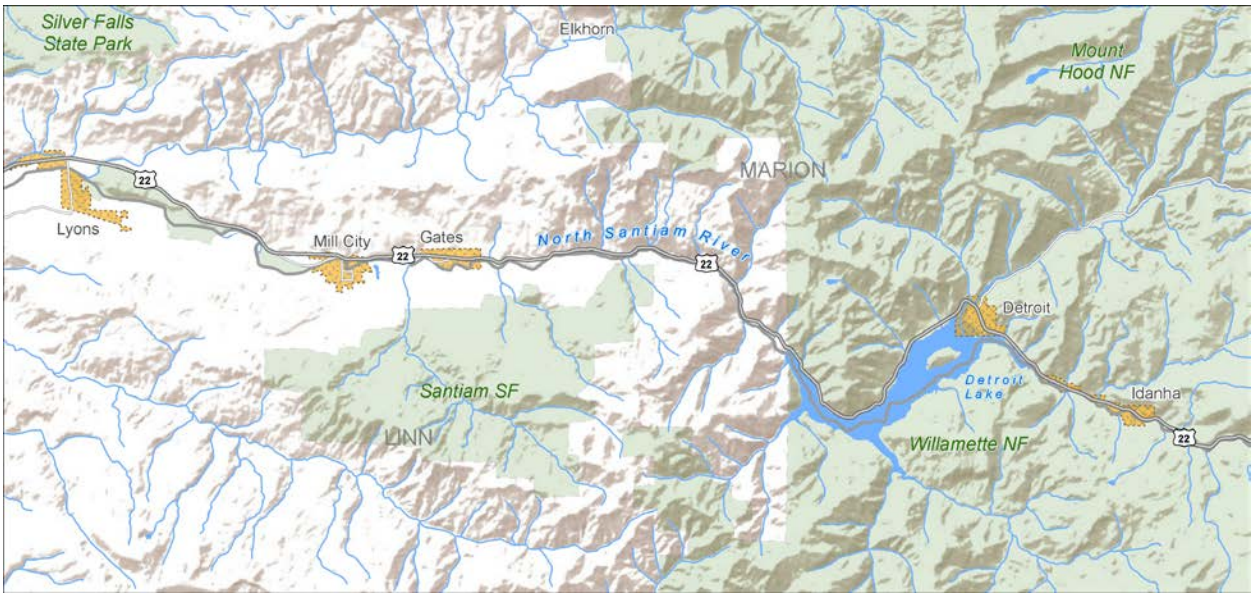
For the North Santiam Corridor, the analysis indicates that there will be demand for both industrial and commercial land over the next 20 years. Demand for industrial land is estimated at 17.0 acres under the baseline average annual growth rate (aagr) projections, and demand for commercial land is estimated at 7.4 acres, for a combined total of 24.4 acres. Under the augmented aagr assumptions, new demand would rise by 34.4 acres for industrial land and 15.0 acres for commercial land, for a combined increase of 49.4 acres.

2.2 Study Area

The study area is an eastern extension from the Salem metropolitan area in Oregon's Willamette Valley, about 50 miles south of Portland. Its main distinguishing feature is the North Santiam River, which runs through the entire study area. The cities along the corridor are all served by Oregon State Highway 22, which is a two-lane main arterial that connects at its western end with U.S. Highway 101 (also known as the Oregon Coast Highway) and, at its eastern end, with U.S. Highway 20 at Santiam Junction. U.S. Highway 20 extends eastward to Bend and points beyond. Add ODOT recent traffic Count along Hwy 22.

A geographic feature of the study area shown on Figure 2-1 is that the terrain changes significantly from the relatively flat Willamette Valley to mountainous conditions with steep slopes of 25 percent or more. That forces virtually all of the residential, commercial, and industrial development into the relatively narrow river valley.

Figure 2-1. Study Area Communities



2.3 Population

2.3.1 Description

The 2000–2015 population numbers for the five communities in the study area are shown below in Table 2-1 to provide comparison of their growth rates. Greater detail on population growth and characteristic is provided in the attached Land Demand Forecast (Appendix A).

Table 2-1: Combined Population Trends for North Santiam Study Area, 2000 to 2015

City	2000	2015	Total Δ # 2000–2015	Annual Δ % 2000–2015
Lyons/Mehama	1,301	1,452	151	0.73%
Mill City	1,563	1,855	292	1.15%
Gates	471	485	14	0.20%
Detroit	262	210	-52	-1.46%
Idanha	232	140	-92	-3.31%
TOTAL	3,829	4,142	313	0.53%

Source: 2000 U.S. Census; 2015 from PSU Certified Population Estimates 7/1/2015; projections from *Population Forecasts for Marion County, 2008*, extrapolated to 2035 and including portions of communities in Linn County.

2.3.2 Growth Projection—Baseline standard

The baseline growth rate used in the study is the 20-year growth rate produced by the Population Research Center of Portland State University and certified by the county. That report covered the period from 2010 to 2030 and the projections were extrapolated an additional five years to provide estimates for 2015 to 2035. The individual baseline aagr for each community is calculated and aggregated for a total canyon-wide population growth rate of 0.89 percent.

Table 2-2: Baseline Population Growth Projections

City	Baseline	Certified Population 2015	Population with Baseline 2035
Lyons/Mehama	1.70%	1,452	2,034
Mill City	0.50%	1,855	2,050
Gates	0.07%	485	492
Detroit	0.40%	210	228
Idanha	0.18%	140	145
Total Corridor	0.89%	4,142	4,949
Source: Land Demand Forecast (see Appendix A).			

2.3.3 Augmented Growth—with Sewer

Augmented aagrs assume an increase in the rate of population growth, based on the availability of sewer infrastructure and services. This percentage was calculated by Brandon Reich, senior planner for Marion County Public Works/Planning, and based on a survey of similarly sized and located communities. The increase in growth rate after sewer is 190 percent of the baseline aagr.

This augmented rate is applied to the baseline rate for each community in the model. Because the sewer system does not currently exist (except in Mill City, which was excluded from the augmented aagr increase) and will take time to design, permit, and construct, the model assumes that the augmented rate will not apply until year 11 (2025) of the 20-year planning period. In the augmented-rate scenario, the model shows baseline growth for years 1 through 10 and the augmented rate for years 11 through 20. This is expected to reflect a conservative and realistic growth scenario.

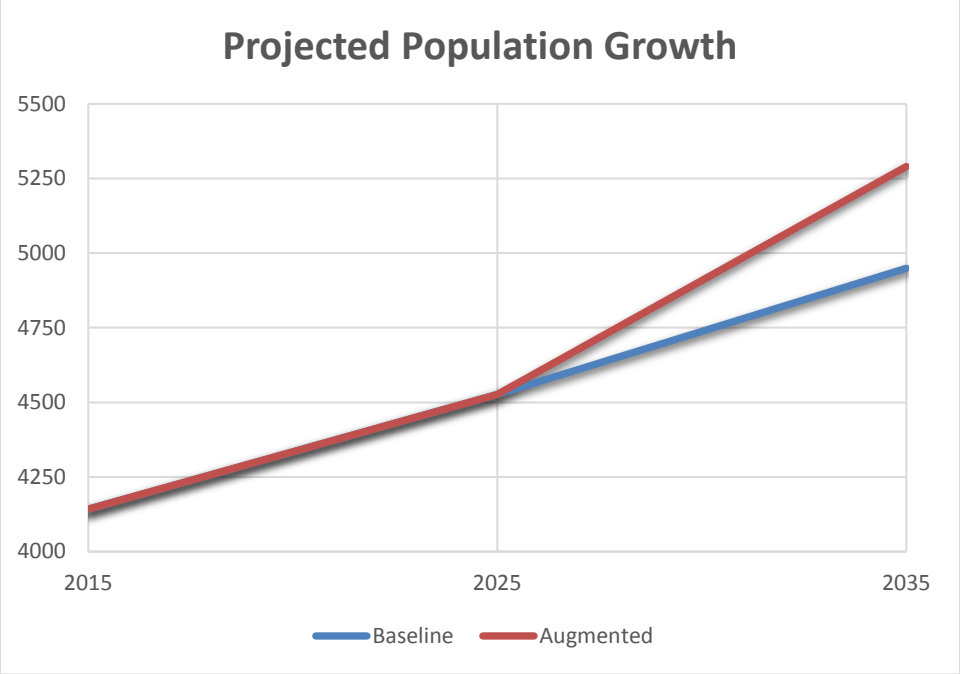
Table 2-3: Augmented Population Growth Projections

City	Baseline	Augmented Growth Rate with Sewer	Certified Population 2015	Population with Baseline 2035	Augmented Growth Rate with Sewer 2035
Lyons/Mehama	1.70%	3.23%	1,452	2,034	2,362
Mill City*	0.50%	0.50%	1,855	2,050	2,050
Gates	0.07%	0.14%	485	492	495
Detroit	0.40%	0.76%	210	228	236

City	Baseline	Augmented Growth Rate with Sewer	Certified Population 2015	Population with Baseline 2035	Augmented Growth Rate with Sewer 2035
Idanha	0.18%	0.33%	140	145	147
Total Corridor	0.89%	1.69%	4,142	4,949	5,290

*Mill City has sewer in place already and so was excluded from the augmented growth calculations.
Source: Land Demand Forecast (see Appendix A).

Figure 2-2. Projected Population Growth



2.4 Employment and Land Demand

Employed population is calculated as a ratio of total population. The statewide ratio of employment to population in Oregon is 42.6 percent. In discussions with the TAG, it was agreed to use the current rate for the study area, again calculated as a unique ratio for each community. This is reflected in the Land Demand Forecast model (see Appendix A). The average employed population percentage across the study area was rounded to 25 percent for the model. As a benchmark, this rate will be closer to the current conditions in the study area.

The numbers in Table 2-4 show that total combined primary employment in the study area increased from 848 workers in 2002 to 1,033 workers in 2014, for a gain of 185 workers and a percentage gain of 21.8 percent. That represents an average annual employment increase of 1.7 percent, even with the effects of the recession and the slow recovery that has followed.

Table 2-4: Combined Employment Numbers, 2002 and 2014

City	Total Jobs 2002	Total Jobs 2014
Lyons	559	559
Mill City	216	408
Gates	23	14
Detroit	50	47
Idanha	0	5
Total	848	1,033
Source: Land Demand Forecast (see Appendix A).		

Calculating total annual average increases at 0.89 percent over the 20-year period from 2015 to 2035 produces an estimated increase in the study area population from 4,142 in 2015 to 4,949 in 2035. However, adding the augmented growth rate due to the development of sewers in 2025 raises the total 2035 population to 5,290. That is an increase of 1,148 persons over the 20-year period versus an increase of only 807 persons at the base rate without sewers.

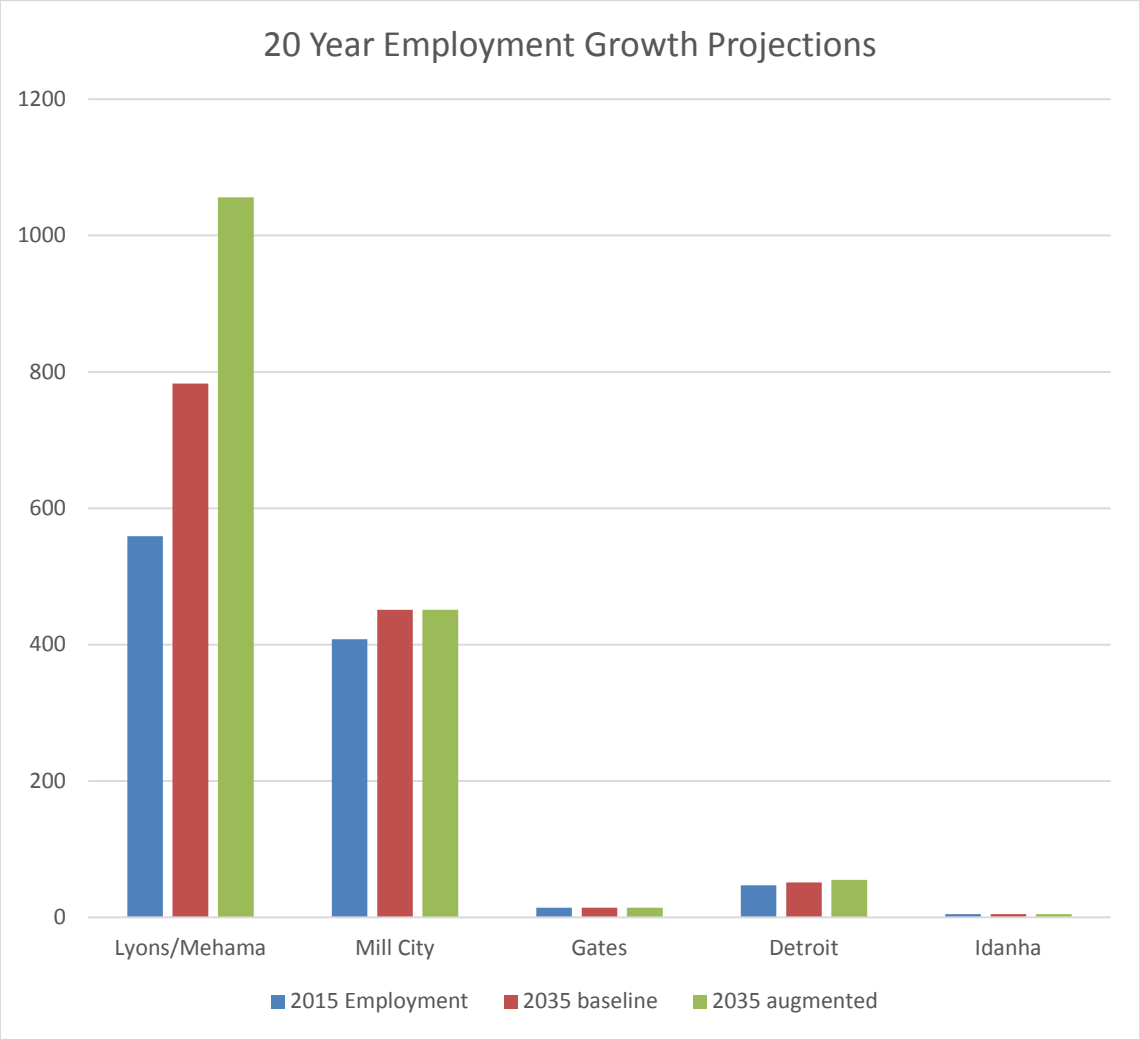
Similar estimates can be calculated for total employment in the study area over the 20-year period using the employment-to-population ratio of 25 percent.

Table 2-5: 20-Year Employment Growth Projections, 2015 to 2035

City	Employment 2015	Employed Percentage 2015	Baseline aagr 2035	Augmented aagr 2035
Lyons/Mehama	559	0.38	783	1056
Mill City	408	0.22	451	451
Gates	14	0.03	14	14
Detroit	47	0.22	51	55
Idanha	5	0.04	5	5
Total	1033	0.25	1304	1581
			Change	Change
			271	548
Source: Land Demand Forecast (see Appendix A).				

Under this scenario, applying the augmented aagr to the second half of the 20-year projection period raises total employment from 271 additional workers to 548 additional workers in 2035.

Figure 2-3. Projected Employment Growth



Based on the industrial and commercial employment projections developed in this report for the study area, those utilization factors result in the following tables of 20-year demand.

Table 2-6: Industrial and Commercial Land Requirements, 2015 to 2035, on Baseline AAGR

Land Use Type	Employment Growth	USEPA (Net Acres)	Land Demand (Net Acres)	Land Demand (Gross Acres)
Industrial	148	10	14.8	17.0
Commercial	123	20	6.2	7.4
Total	271		21.0	24.4

USEPA = U.S. Environmental Protection Agency.
Source: Land Demand Forecast (see Appendix A).

Table 2-7: Industrial and Commercial Land Requirements, 2015 to 2035, on Augmented AAGR

Land Use Type	Employment Growth	USEPA (Net Acres)	Land Demand (Net Acres)	Land Demand (Gross Acres)
Industrial	299	10	29.9	34.4
Commercial	249	20	12.5	15.0
Total	548		41.4	49.4
Source: Land Demand Forecast (see Appendix A).				

For the study area, the analysis indicates that there will be demand for both industrial and commercial land over the next 20 years. Demand for industrial land is estimated at 17.0 acres under the baseline aagr projections, and for commercial land at the estimate is 7.4 acres, for a combined total of 24.4 acres. Under the augmented aagr assumptions, new demand would rise by 34.4 acres for industrial land and 15.0 acres for commercial land, for a combined increase of 49.4 acres.

3 INVENTORY

This section summarizes the process and general methodology for compiling the source data and generating the inventory. Additional detail can be found in the technical memorandum in Appendix B.

3.1 Data Sources

GIS-formatted source data for the project were obtained from the following entities in May 2016:

- Linn County
- Marion County
- COG
- City of Detroit
- City of Gates
- City of Idanha

GIS data included tax parcel and assessor information, zoning and comprehensive plan data, rail lines, roads, city limits and UGBs, Federal Emergency Management Agency floodplains, river and stream data, and aerial imagery. Records from the Oregon Department of Environmental Quality (DEQ) Leaking Underground Storage Tank (LUST) Cleanup Site Database (as of April 5, 2016) and Environmental Cleanup Site Information (ECSI) (as of April 2016) were downloaded. Ten-meter-resolution elevation data were obtained from the U.S. Geological Survey Digital Elevation Model (2012) obtained from the Oregon Spatial Library.

Sewer and water data were obtained in paper format from each of the cities involved. Text data pertaining to environmental issues for the area were obtained from DEQ. Additional health GIS data were obtained from the Environmental Public Health Tracking Network database, Oregon Health Authority Public Health Division, for inclusion in the online viewer (for comparison purposes).

3.2 Methodology

The study area was delineated by creating a GIS polygon. The source GIS data were consolidated into an Esri filegeodatabase format, and the coordinate systems were standardized to NAD 1983 HARN State Plane International Feet (WKID 2913). DEQ text data were processed to extract the site addresses, and these were geocoded using Esri address geocoders (May 2016) and converted to point locations in the GIS database.

Paper utilities maps were scanned and georeferenced, and the general utility lines and basic attributes were digitized into GIS format.

Parcels intersecting a quarter mile buffer from a combined UGB and city limit dataset were extracted, to ensure that all appropriate parcels would be included. The two counties' datasets were merged and harmonized for selected attributes relevant to the project, and the combined dataset was then checked manually. The combined dataset formed the basis for the field inventory dataset.

Zoning datasets were updated to incorporate splitzones where needed, and comprehensive plan/zoning information was added to the parcel datasets, using a majority rules approach. In addition, the UGB and/or city that contained the parcel were added as attributes.

All sites falling in commercial or industrial zones were identified and attributed for the field inventory. Additional fields were added to allow for the capture of relevant information, such as the presence of a DEQ LUST or ECSI record in that parcel (by address location), the utilization ratio, the likely presence of water or sewer infrastructure and services at the property (based on the distance from the main lines digitized), as well as fields to be populated during the fieldwork, such as current land use, site configuration, likely brownfield status, and business type. The data were then set up in an online collector tool for field inventory.

3.3 Fieldwork and Inventory

Fieldwork (a "windshield study") was undertaken to inventory the identified commercial and industrial sites. This was conducted in a day by two MFA staff members using a tablet-based GIS collector application. This allowed staff to identify the parcel in question on a map, update a series of attributes for the parcel, and add a photograph if required. Fields populated during this assessment included an assessment of brownfield status, the business type (if applicable), a qualitative assessment of site configuration, and the general development status. A summary of the initial fieldwork is provided in Table 3-1.

Table 3-1. Field Inventory Summary

Type	Count	Acres
Total Parcels Inventoried	653	1073.16
Parcels assessed Developed	459	690.12
Parcels assessed Undeveloped	147	234.82
Parcels assessed as Vacant	43	146.93
Parcels assessed Suspect Brownfield	77	512.02
Parcels known LUST/ECSI record	14	99.47

3.4 Parcel Typologies

Working with the TAG, MFA grouped the commercial and industrial properties into typologies for modeling redevelopment options and impact.

The following formula was used to assign parcels to typologies:

Small Commercial < 0.57 acres / 25,000 sq. ft. (min .25 ac.)
Large Commercial > 0.57 acres / 25,000 sq. ft.
Small Industrial < 5 acres / 217,800 sq. ft. (min 1 ac.)
Large Industrial > 5 acres / 217,800 sq. ft.

Examples of the types of businesses that make up each typology are listed in Table 3-2.

Table 3-2. Typology and Example Businesses

Typology	Use
Small Commercial	Highway commercial Small Office—Professional Restaurant Small Service—Laundry, Dentist
Large Commercial	Grocery Store Retail Cluster Recreational Cluster
Small Industrial	Specialized Manufacturing Custom Boat Building Equipment Service and Repair
Large Industrial	Secondary Wood Products Metal Fabrication and Machinery Construction Materials Manufacturing

The assignment of typologies and criteria resulted in a significant reduction in the number of parcels used as analysis properties (mainly because the parcel-size criteria excluded a large number of small parcels from consideration, but also from exclusion of parcels not within an identified city limit or UGB). A summary of the inventoried parcels used for analysis is provided in Table 3-3.

Table 3-3. Typology Summary

Type	Count	Acres
Total Parcels	281	902.82
Parcels assessed Developed	208	598.03
Parcels assessed Undeveloped	51	162.07
Parcels assessed Vacant	22	142.71
Parcels assessed Suspect Brownfield	55	493.42
Parcels known LUST/ECSI record	9	91.72
Highway Access	116	303.44
Parcels with Utility access	143	123.95

A detailed summary of the typology parcels is given in Table 3-4, which breaks down each of the typologies and describes the acreage and square footage totals for key metrics. For a detailed breakdown of the data, please refer to the attached Summary Tables section.

Table 3-4. Summary Statistics by Typology

ALL PROPERTIES	Commercial (Large)		Commercial (Small)		Industrial (Large)		Industrial (Small)	
	(Acres)	(Sq. Ft.)	(Acres)	(Sq. Ft.)	(Acres)	(Sq. Ft.)	(Acres)	(Sq. Ft.)
Criteria	> 0.57/ 25,000		< 0.57 / 25,000 (min .25 ac)		> 5 / 217,800		< 5 / 217,800 (min 1 ac)	
No. of Properties	67		152		28		34	
Average Parcel Size	2.94	128066	0.37	16117	20.53	894286	2.23	97138
Min Parcel Size	0.57	24829	0.25	10890	5.02	218671	1	43560
Max Parcel Size	45.1	1964556	0.57	24829.	108.6	4730616	4.65	202554
Developed Land								
No. of Properties	45		122		20		21	
Total Acreage	62.81	2736004	44.61	1943212	447.87	19509217	42.74	1861754
Average Parcel Size	1.4	60984	0.37	16117	22.4	975744	2.04	88862
Undeveloped Land								
No. of Properties	14		21		5		11	
Total Acreage	51.97	2263813	7.83	341075	77.36	3369801	24.91	1085080
Average Parcel Size	3.71	161608	0.37	16117	15.47	673873	2.26	98445
Vacant Land								
No. of Properties	8		9		3		2	
Total Acreage	82.71	3602848	3.33	145055	49.51	2156655	7.16	311890
Average Parcel Size	10.34	450410	0.37	16117.2	16.5	718740	3.58	155945
No. Suspect Brownfields	10		15		18		12	
No. LUST/ECSI	1		4		4		0	
No. on Highway	40		60		8		8	
No. with Utility Access	40		98		3		2	

4 REDEVELOPMENT ANALYSIS

4.1 Summary of Analysis

4.1.1 Redevelopment Matrix

The site suitability redevelopment matrix was developed to sort and rank properties, based on variables affecting the general development desirability of the property for its zoned use. Each matrix and the variables involved is described below.

4.1.1.1 Variables

The variables used for ranking the properties are listed in the matrix table (Table 4-1) below, along with the weighting applied. A positive weighting reflects a positive impact of that variable, a negative weighting reflects the opposite. A neutral variable (or one excluded from consideration) would have a weighting of 0. Water and sewer access was assigned as a positive if the property has access (or assumed access), and a negative if it did not (or was assumed not).

The matrix was developed and adjusted for two different ranking scenarios:

1. Baseline Growth Scenario: Growth occurs as forecast, with no additional sewer system in place.

2. Augmented Growth Scenario: Growth occurs as forecast in the case of a sewer system being built in the study area (e.g., water and sewer access was assumed for all properties).

Table 4-1: Summary of Redevelopment Matrix Scenarios

Matrix	Baseline	Augmented
Variable	*Weighting*	*Weighting*
Underutilized	0	0
Undeveloped	+1	+1
Vacant	+1	+1
Suspect Brownfield	-1	-1
LUST/ECSI	-2	-2
Water Utility	-1 / +1	+1 / +1
Sewer Utility	-1 / +1	+1 / +1
Visibility (Commercial)	+1	+1
Highway Access (Industrial)	0	0
Distance to I-5 (Industrial) (20 mi)	+1	+1
Good Site Configuration	+1	+1

4.1.1.2 Ranking

The output of the matrix calculations was a rank for each property. This allows identification of a parcel's general level of desirability in terms of development in comparison to other parcels in the study area. In general, a higher rank indicates that the parcel could be considered more desirable from a development standpoint. The ranking is subjective and does not incorporate specific business needs, the cost of the property, or the land preparation that may be required.

Using the Land Demand Forecast, the highest-ranked properties that would meet that demand were identified to determine if capacity was available, and indicate likely locations for development to occur. Typologies were assigned to the estimated land demand, using the following ratios: Large Industrial 65 percent, Small Industrial 35 percent; Large Commercial 25 percent, Small Commercial 75 percent, in line with estimates generated by Elesco. Properties were selected until the projected land demand acreage was met or exceeded (all properties with the same rank were added each time to reflect the equal consideration of variables).

4.2 Evaluation and Identification of Catalyst Properties

The properties identified as the most desirable for development and meeting the baseline growth scenario projected demand are considered to be catalyst properties. While not the only properties with a high potential for development, those identified are considered to be generally easily developable for a range of activities, and likely to be more readily available and without significant visible restrictions that would delay development.

A further comparison was conducted to estimate the impact of a sewer system in the study area on the desirability of industrial and commercial zoned parcels. In this case the difference in ranking between the baseline and augmented scenarios was calculated, with a positive difference indicating a parcel that increased in desirability following the development of a sewer system in the study area. In this last analysis, all parcels (undeveloped, vacant, and developed), were included.

To identify the catalyst properties, the total area of the highest-ranked properties (by typology) was applied to the projected demand, and if this was insufficient, the total area of the next-lowest-ranked properties was added. This continued until the projected demand was met or exceeded. The properties ranked for development were located inside city UGBs. There may be alternative properties, not involved in the study, on federal or state lands surrounding the communities but it was assumed in this study that properties within a UGB are most appropriate for development.

The total acreage of catalyst properties identified in the baseline growth scenario is shown in Table 4-2.

Table 4-2. Count of Catalyst Properties

UGB	Typology	Count	Acres
Total	Large Commercial	4	2.86
Total	Small Commercial	19	7.13
Total	Large Industrial	2	12.72
Total	Small Industrial	5	10.58

See the matrix calculations section for further information on the variables and weighting.

4.3 Property Cut Sheets

Following the identification of the catalyst properties, a one-page summary of each was developed. The purpose of these "cut sheets" is to generate discussion and consideration of the type of properties available, and allow stakeholders to more easily visualize, assess, and compare the properties identified as meeting the forecast demand. Each cut sheet includes the property ranking (baseline score) from the matrix calculation, as well as summary information about the property, including the acreage, assessed value, average slope, zoning and typology, and field data collected. A map of the property and its overall location, along with a photograph (if available), are included. While useful, the cut sheets do not represent the only properties that could be considered desirable for all potential business uses in the study area, and should not be considered an endorsement of any particular property, nor should it be inferred that the property is available for development or on the market.

5 IMPLICATIONS

The purpose of the inventory was to support community and economic development initiatives such as the wastewater study. This project was not intended to evaluate specific initiatives or evaluate economic opportunities (for a better overview of those issues, see the North Santiam Canyon Economic Opportunity Study [COG, 2014]). However, it is clear from the redevelopment analysis completed through this project that the study area communities are not necessarily achieving their full potential and that a range of issues presents legitimate challenges. The analysis presented in this report attempts to make the case that the study area includes properties that will be highly developable under certain foreseeable conditions and especially after investments are made in improving infrastructure and formalizing an economic development strategy.

Based on our observations, analysis, research, and engagement with local stakeholders (summarized in Appendix C), we offer the following strategies for addressing obstacles to development in the study area. The following recommendations are based on the best professional judgment of this report's authors. They do not reflect the outcome of a focused market and business development plan, which is included in the recommendations.

5.1 Recommended Strategy

5.1.1 Rural Regional Visioning

Set up an event or series of events to bring community members together to undergo "right-sized" regional visioning. Planning to determine potential tourism/recreation related growth (emergency response, housing/accommodation, food & beverage, transportation, public services) and cost impact associated with continued growth in that industry. Develop a unified long-range vision(s) for the study area. Community buy-in to community and economic development projects (such as a regional wastewater system) is crucial to success.

5.1.2 Regional Marketing Strategy

- Create a unique identity for the North Santiam Canyon and market all of the communities together as part of that region. Consider building the identity around recreation and livability. Create a regional marketing coalition.
- Inventory and promote all of the recreational and environmental advantages of the region, such as campgrounds, parks, hiking trails, fishing, and boating. Plan and develop opportunities for targeted activities such as mountain biking.
- Develop a unified marketing strategy including a Web site, flyers and brochures, billboards, and other tourism advertising.

5.1.3 Improvement and Redevelopment

- Persuade local communities to focus on cleanup and dress-up projects. Consider storefront improvement and other beautification programs to give the communities a physical uplift and present a vibrant face to visitors.
- Address vacant and underutilized properties. Consider developing a regional brownfield land bank authority to take ownership of orphaned and foreclosed brownfield properties. Allow the transfer of legacy industrial properties to public ownership so that they can be cleaned up and used for public purposes or sold for private development.

5.1.4 Business Development

- Develop a strategic business plan for short- and long-term initiatives. Coordinate this with all regional stakeholders to ensure a consistent message and vision.
- Promote and support entrepreneurial business development. Create a shared-space working facility (incubator or maker space) to support tech development, arts and crafts, and other homegrown opportunities.
- Use the inventory to promote and market the study area to attract businesses. Promote those through Business Oregon and the real estate community.

5.1.5 Regional Investment Board

We echo the recommendation, provided by the COG in its 2014 Economic Opportunity Study, that a Regional Investment Board be established:

> to provide a regional decision-making mechanism for establishing investment priorities and monitoring the effectiveness of investments in the region. The board will also provide a means for improving communications between, and among, the communities and interests within the region on development matters.

LIMITATIONS

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

SUMMARY TABLES

Augmented Property Information

TAXLOT ID	Typology	ACRES	ZONING	Prop Class Code Descr	LAND VAL	IMPR VAL	TOTAL VAL	Utilization Ratio	AGOL UGB	AGOL CITY LIMIT	Status	Land Use	Storefront Appeal
093E27DA01700	Small Commercial	0.34926188	Commercial	RESIDENTIAL IMPROVED-COMM ZONE	61450	23680	85130	0.385354012	Gates	Gates	Vacant	Commercial	Poor
093E27DB01100	Large Commercial	0.622948064	Commercial	COMMERCIAL IMPROVED	66960	2000	68960	0.02986858	Gates	Gates	Undeveloped	Open Space	
093E27DD00900	Large Commercial	0.574706851	Commercial	COMMERCIAL VACANT	59980	0	59980	0	Gates	Gates	Undeveloped	Open Space	
093E30C 00601	Large Commercial	9.392738162	Commercial	RURAL SPECIAL IMPROVED	7920	0	18490	0	Mill City	Mill City	Undeveloped	Open Space	
093E30DB02500	Small Commercial	0.369841942	Commercial	COMMERCIAL VACANT	56160	0	56160	0	Mill City	Mill City	Undeveloped	Open Space	
093E30DB03401	Small Commercial	0.324188641	Commercial	COMMERCIAL VACANT	30960	0	30960	0	Mill City	Mill City	Undeveloped	Open Space	
105E01CB07500	Small Commercial	0.433131121	Commercial	COMMERCIAL VACANT	90600	0	90600	0		Detroit	Undeveloped	Open Space	
106E16CA01100	Large Commercial	8.283376614	Commercial	COMMERCIAL VACANT	155450	0	155450	0	Idahna	Idanha	Undeveloped	Open Space	
106E16CB01300	Large Commercial	11.82986489	Commercial	COMMERCIAL VACANT	204130	0	204130	0	Idahna	Idanha	Undeveloped	Open Space	
106E16D 01400	Small Commercial	0.479132311	Commercial	COMMERCIAL VACANT	6990	0	6990	0	Idahna	Idanha	Undeveloped	Open Space	
092E18BC01000	Small Commercial	0.256886528	Commercial	RESIDENTIAL IMPROVED	64000	25660	89660	0.400937498		Mehama	Undeveloped	Commercial	
093E27CB00100	Large Industrial	18.51613505	Industrial	SPECIAL FOREST VACANT	6700	0	10920	0	Gates	Gates	Undeveloped	Open Space	
093E27DA01800	Small Commercial	0.566966408	Commercial	COMMERCIAL IMPROVED	88910	191950	280860	2.158925056	Gates	Gates	Vacant	Commercial	Fair
093E27DD00902	Small Commercial	0.285509407	Commercial	COMMERCIAL VACANT	30020	0	30020	0	Gates	Gates	Undeveloped	Open Space	
093E27DD01200	Small Commercial	0.341288145	Commercial	COMMERCIAL VACANT	54000	0	54000	0	Gates	Gates	Undeveloped	Open Space	
093E29CB02300	Small Commercial	0.383230832	Commercial	COMMERCIAL IMPROVED	60180	71590	131770	1.189597964	Mill City	Mill City	Vacant	Commercial	Poor
093E29CD02100	Small Commercial	0.498325442	Commercial	RESIDENTIAL VACANT	45960	0	45960	0	Mill City	Mill City	Undeveloped	Open Space	
093E30DA00400	Small Commercial	0.336170262	Commercial	RESIDENTIAL VACANT	35660	0	35660	0	Mill City	Mill City	Undeveloped	Open Space	
093E30DA01100	Small Commercial	0.399447938	Commercial	STATE	17180	0	17180	0	Mill City	Mill City	Undeveloped	Open Space	
106E16CA00400	Small Commercial	0.35078728	Commercial	COMMERCIAL VACANT	36000	0	36000	0	Idahna	Idanha	Undeveloped	Open Space	
106E16CA00700	Small Commercial	0.469650451	Commercial	COMMERCIAL VACANT	48000	0	48000	0	Idahna	Idanha	Undeveloped	Open Space	
106E16CB00600	Small Commercial	0.452078308	Commercial	COMMERCIAL VACANT	48000	0	48000	0	Idahna	Idanha	Vacant	Commercial	
106E16CB01200	Small Commercial	0.538536712	Commercial	COMMERCIAL VACANT	22760	0	22760	0	Idahna	Idanha	Undeveloped	Open Space	
106E17B 00700	Small Commercial	0.313403985	Commercial	STATE	16990	0	16990	0	Idahna	Idanha	Undeveloped	Open Space	
09S02E19DB02100	Small Commercial	0.294504758	Commercial	COMMERCIAL VACANT	57970	0	57970	0	Lyons	Lyons	Undeveloped	Open Space	
09S02E19C 00100	Small Industrial	3.903135437	Industrial	COUNTY RESP INDUSTRIAL, LAND & B	0	0	0	0	Lyons	Lyons	Undeveloped	Industrial	
09S03E31 00900	Large Industrial	7.210472437	Industrial	TRACT IMPROVED	118430	56420	174850	0.476399601	Mill City		Vacant	Other	
09S03E31BA00600	Small Industrial	2.64846005	Industrial	TRACT WITH MFG STRUCTURE	89920	380	90300	0.004225979	Mill City		Undeveloped	Open Space	
092E18BC02100	Small Commercial	0.289196482	Commercial	COMMERCIAL IMPROVED	43910	146930	190840	3.346163034		Mehama	Vacant	Commercial	Poor
092E18BC04300	Small Commercial	0.277918786	Commercial	COMMERCIAL IMPROVED	46620	0	46620	0		Mehama	Undeveloped	Open Space	
093E30CA01200	Small Commercial	0.264546662	Commercial	RESIDENTIAL VACANT	33000	0	33000	0	Mill City	Mill City	Undeveloped	Open Space	
106E16D 00202	Small Industrial	2.21683027	Industrial	SPECIAL FOREST VACANT	530	0	870	0	Idahna	Idanha	Undeveloped	Open Space	
106E17B 00900	Small Commercial	0.354139124	Commercial	FEDERAL	46070	0	46070	0	Idahna	Idanha	Undeveloped	Open Space	
106E22B 00200	Small Industrial	1.406407596	Industrial	TRACT VACANT >1A	44060	0	44060	0	Idahna	Idanha	Undeveloped	Open Space	Poor
106E22B 00500	Small Industrial	2.39234649	Industrial	COMMERCIAL VACANT	39850	0	39850	0	Idahna	Idanha	Undeveloped	Open Space	
09S02E19DB03100	Small Commercial	0.449276593	Commercial	RESIDENTIAL VACANT	14200	0	14200	0	Lyons	Lyons	Undeveloped	Open Space	
09S03E31AA02200	Small Commercial	0.444020164	Commercial	COMMERCIAL IMPROVED	52660	4660	57320	0.088492207	Mill City	Mill City	Vacant	Commercial	
09S02E19A 00900	Small Commercial	0.480786566	Commercial	RESIDENTIAL VACANT	10140	0	10140	0	Lyons	Lyons	Undeveloped	Open Space	
09S02E19DB02000	Small Commercial	0.31226143	Commercial	COMMERCIAL VACANT	57970	0	57970	0	Lyons	Lyons	Undeveloped	Open Space	
09S02E19BD08700	Small Commercial	0.278436271	Commercial	COMMERCIAL VACANT	55840	0	55840	0	Lyons	Lyons	Vacant	Open Space	
09S02E19BD08701	Small Commercial	0.293239587	Commercial	COMMERCIAL VACANT	36150	0	36150	0	Lyons	Lyons	Vacant	Open Space	
09S02E20C 02600	Small Industrial	1.451913659	Industrial	INDUSTRIAL VACANT	77860	0	77860	0	Lyons	Lyons	Undeveloped	Industrial	
09S02E20C 02000	Small Industrial	1.386869056	Industrial	INDUSTRIAL VACANT	69360	0	69360	0	Lyons	Lyons	Undeveloped	Open Space	
09S02E36 00101	Small Industrial	2.096040901	Industrial	VACANT TRACT	96160	0	96160	0	Mill City		Undeveloped	Other	
09S03E31BA00500	Small Industrial	3.845018318	Industrial	VACANT TRACT	69360	0	69360	0	Mill City		Undeveloped	Open Space	
093E27DA01300	Small Commercial	0.278358973	Commercial	COMMERCIAL VACANT	30320	0	30320	0	Gates	Gates	Vacant	Commercial	

Augmented Property Information

TAXLOT ID	Business Type	Tourism Primary	Site Configuration	Brownfield	Avg Slope	Distance I5 mi	Augmented Rank	Comments
093E27DA01700	None	No	Good	Non-Suspect	1.268317	30.08145653	5	
093E27DB01100		No	Good	Non-Suspect	2.73518	29.69587791	5	
093E27DD00900		No	Good	Non-Suspect	0.636721	30.03566763	5	
093E30C 00601	None	No	Good	Non-Suspect	1.358471	26.62760999	5	
093E30DB02500		No	Good	Non-Suspect	4.790418	27.07121339	5	
093E30DB03401		No	Good	Non-Suspect	2.247484	26.93721796	5	
105E01CB07500	None	No	Good	Non-Suspect	1.30764	43.00238227	5	
106E16CA01100		No	Good	Non-Suspect	3.244446	46.70834888	5	
106E16CB01300	None	No	Good	Non-Suspect	4.451275	46.45483829	5	Narrow parcel blocks access to property from road
106E16D 01400	None	No	Good	Non-Suspect	0.850077	47.00010998	5	Neighboring parcel blocks street access
092E18BC01000	None	No	Good	Non-Suspect	1.57039	20.04250327	4	
093E27CB00100		No	Good	Non-Suspect	9.569336	29.17088278	4	
093E27DA01800	None	No	Fair	Non-Suspect	1.363756	30.09406828	4	
093E27DD00902	None	No	Good	Non-Suspect	1.832122	30.06370353	4	
093E27DD01200		No	Good	Non-Suspect	1.663588	30.15364762	4	
093E29CB02300	Auto Related	No	Good	Suspect	4.263043	27.65622666	4	
093E29CD02100	None	No	Good	Non-Suspect	3.484222	27.82099186	4	
093E30DA00400	None	No	Fair	Non-Suspect	5.580475	27.18019553	4	
093E30DA01100	None	No	Poor	Non-Suspect	12.24663	27.29433047	4	Long, narrow and steep grade
106E16CA00400		No	Fair	Non-Suspect	10.66246	46.89368652	4	Flat, lots of trees
106E16CA00700		No	Fair	Non-Suspect	10.3835	46.82738465	4	
106E16CB00600		No			6.362835	46.5782861	4	Garbage collection storage
106E16CB01200	None	No	Poor	Non-Suspect	4.365722	46.55999542	4	Long narrow road front parcel
106E17B 00700	None	No	Poor	Non-Suspect	0.687367	45.46080576	4	Long and narrow parcel
09S02E36 01305	None	No	Good	Non-Suspect	1.693489	25.70679695	4	
09S01E24 01101	Timber Indust	No	Poor	Non-Suspect	1.505566	19.98914419	4	
09S02E19DB02100		No	Good	Non-Suspect	0	21.1761812	4	
09S02E19C 00100	Timber Indust	No	Good	Non-Suspect	0.773523	20.76855237	4	
09S03E31 00900	None	No	Good	Non-Suspect	0.954742	26.82871922	4	Unknown business activity, appears to be farm
09S03E31BA00600		No	Good	Non-Suspect	1.863689	26.97095175	4	
092E18BC02100	None	No	Fair	Non-Suspect	2.208303	20.08288751	3	
092E18BC04300		No		Non-Suspect	4.593102	20.06102863	3	
093E30CA01200		No	Poor	Non-Suspect	1.687823	26.86303858	3	Steep
106E16D 00202		No	Poor	Non-Suspect	18.01837	47.36770832	3	Trees
106E17B 00900	None	No	Poor	Non-Suspect	0.230433	45.41482507	3	Narrow and adjacent to river
106E22B 00200		No	Poor	Non-Suspect	13.88997	47.77076077	3	
106E22B 00500		No	Poor	Non-Suspect	5.265851	47.50443663	3	Not developable
09S02E19DB03100		No		Non-Suspect	0	21.16240636	3	
09S03E31AA02200		No	Fair	Non-Suspect	1.115601	27.57489791	3	Half parking, half field
09S02E19A 00900		No		Non-Suspect	4.694342	21.12542566	3	
09S02E19DB02000		No		Non-Suspect	0.775036	21.15733743	3	
09S02E19BD08700	None	No	Fair	Non-Suspect	0.811467	20.9547258	3	
09S02E19BD08701	None	No	Poor	Non-Suspect	1.749869	20.96006246	3	
09S02E20C 02600		No		Non-Suspect	0.920567	21.80707296	3	
09S02E20C 02000		No		Non-Suspect	0.409874	21.72098077	3	
09S02E36 00101		No	Fair	Non-Suspect	6.409228	26.45076756	3	
09S03E31BA00500		No		Non-Suspect	2.599755	26.93561595	3	
093E27DA01300		No	Fair	Suspect	0.871968	30.01346361	2	Junk yard?

Baseline Property Information

TAXLOT ID	Typology	ACRES	ZONING	Prop Class Code Descr	LAND VAL	IMPR VAL	TOTAL VAL	Utilization Ratio	AGOL UGB	AGOL CITY LIMIT	Status
093E30DB02500	Small Commercial	0.369841942	Commercial	COMMERCIAL VACANT	56160	0	56160	0	Mill City	Mill City	Undeveloped
093E30DB02700	Large Commercial	0.607336291	Commercial	COMMERCIAL VACANT	83110	0	83110	0	Mill City	Mill City	Vacant
093E30DA00400	Small Commercial	0.336170262	Commercial	RESIDENTIAL VACANT	35660	0	35660	0	Mill City	Mill City	Undeveloped
093E30DA01100	Small Commercial	0.399447938	Commercial	STATE	17180	0	17180	0	Mill City	Mill City	Undeveloped
093E27DB01100	Large Commercial	0.622948064	Commercial	COMMERCIAL IMPROVED	66960	2000	68960	0.02986858	Gates	Gates	Undeveloped
093E27DD00900	Large Commercial	0.574706851	Commercial	COMMERCIAL VACANT	59980	0	59980	0	Gates	Gates	Undeveloped
09S03E29CC00804	Large Commercial	1.055997602	Commercial	RESIDENTIAL VACANT	78480	0	78480	0	Mill City	Mill City	Undeveloped
093E30DB03401	Small Commercial	0.324188641	Commercial	COMMERCIAL VACANT	30960	0	30960	0	Mill City	Mill City	Undeveloped
105E01CB07500	Small Commercial	0.433131121	Commercial	COMMERCIAL VACANT	90600	0	90600	0		Detroit	Undeveloped
106E16D 01400	Small Commercial	0.479132311	Commercial	COMMERCIAL VACANT	6990	0	6990	0	Idahna	Idanha	Undeveloped
093E27DD00902	Small Commercial	0.285509407	Commercial	COMMERCIAL VACANT	30020	0	30020	0	Gates	Gates	Undeveloped
093E27DD01200	Small Commercial	0.341288145	Commercial	COMMERCIAL VACANT	54000	0	54000	0	Gates	Gates	Undeveloped
093E29CD02100	Small Commercial	0.498325442	Commercial	RESIDENTIAL VACANT	45960	0	45960	0	Mill City	Mill City	Undeveloped
093E29CB02300	Small Commercial	0.383230832	Commercial	COMMERCIAL IMPROVED	60180	71590	131770	1.189597964	Mill City	Mill City	Vacant
093E30CA01200	Small Commercial	0.264546662	Commercial	RESIDENTIAL VACANT	33000	0	33000	0	Mill City	Mill City	Undeveloped
106E16D 02200	Large Industrial	5.516169316	Industrial	COMMERCIAL VACANT	84580	0	84580	0	Idahna	Idanha	Undeveloped
093E27DA01700	Small Commercial	0.34926188	Commercial	RESIDENTIAL IMPROVED-COMM ZONE	61450	23680	85130	0.385354012	Gates	Gates	Vacant
09S03E31AA02200	Small Commercial	0.444020164	Commercial	COMMERCIAL IMPROVED	52660	4660	57320	0.088492207	Mill City	Mill City	Vacant
092E18BC01000	Small Commercial	0.256886528	Commercial	RESIDENTIAL IMPROVED	64000	25660	89660	0.400937498		Mehama	Undeveloped
106E16CA00400	Small Commercial	0.35078728	Commercial	COMMERCIAL VACANT	36000	0	36000	0	Idahna	Idanha	Undeveloped
106E16CA00700	Small Commercial	0.469650451	Commercial	COMMERCIAL VACANT	48000	0	48000	0	Idahna	Idanha	Undeveloped
106E16CB01200	Small Commercial	0.538536712	Commercial	COMMERCIAL VACANT	22760	0	22760	0	Idahna	Idanha	Undeveloped
106E17B 00700	Small Commercial	0.313403985	Commercial	STATE	16990	0	16990	0	Idahna	Idanha	Undeveloped
09S02E19DB02100	Small Commercial	0.294504758	Commercial	COMMERCIAL VACANT	57970	0	57970	0	Lyons	Lyons	Undeveloped
09S03E31 00900	Large Industrial	7.210472437	Industrial	TRACT IMPROVED	118430	56420	174850	0.476399601	Mill City		Vacant
09S02E36 01305	Small Industrial	2.292989778	Industrial	VACANT TRACT	59670	0	59670	0	Mill City		Undeveloped
09S01E24 01101	Small Industrial	1.267139663	Industrial	INDUSTRIAL VACANT	740	0	740	0	Lyons		Undeveloped
09S02E19C 00100	Small Industrial	3.903135437	Industrial	COUNTY RESP INDUSTRIAL, LAND & B	0	0	0	0	Lyons	Lyons	Undeveloped
09S03E31BA00600	Small Industrial	2.64846005	Industrial	TRACT WITH MFG STRUCTURE	89920	380	90300	0.004225979	Mill City		Undeveloped

Baseline Property Information

TAXLOT ID	Land Use	Storefront Appeal	Business Type	Tourism Primary	Site Configuration	Brownfield	Avg Slope	Distance I5 mi	Baseline Rank	Comments
093E30DB02500	Open Space			No	Good	Non-Suspect	4.790417647	27.07121339	5	
093E30DB02700	Open Space			No	Good	Non-Suspect	3.550458221	27.03649131	5	Buildings cleared
093E30DA00400	Open Space		None	No	Fair	Non-Suspect	5.58047545	27.18019553	4	
093E30DA01100	Open Space		None	No	Poor	Non-Suspect	12.24663236	27.29433047	4	Long, narrow and steep grade
093E27DB01100	Open Space			No	Good	Non-Suspect	2.735179931	29.69587791	3	
093E27DD00900	Open Space			No	Good	Non-Suspect	0.636721172	30.03566763	3	
09S03E29CC00804	Open Space			No	Fair	Non-Suspect	2.630309645	27.58372216	3	For sale
093E30DB03401	Open Space			No	Good	Non-Suspect	2.247483945	26.93721796	3	
105E01CB07500	Open Space		None	No	Good	Non-Suspect	1.307640251	43.00238227	3	
106E16D 01400	Open Space		None	No	Good	Non-Suspect	0.850076879	47.00010998	3	Neighboring parcel blocks street access
093E27DD00902	Open Space		None	No	Good	Non-Suspect	1.832121706	30.06370353	2	
093E27DD01200	Open Space			No	Good	Non-Suspect	1.663587887	30.15364762	2	
093E29CD02100	Open Space		None	No	Good	Non-Suspect	3.484221923	27.82099186	2	
093E29CB02300	Commercial	Poor	Auto Related	No	Good	Suspect	4.263042882	27.65622666	2	
093E30CA01200	Open Space			No	Poor	Non-Suspect	1.687822825	26.86303858	1	Steep
106E16D 02200	Open Space		None	No	Fair	Non-Suspect	6.999941562	47.24685116	1	Dirt access road
093E27DA01700	Commercial	Poor	None	No	Good	Non-Suspect	1.268316529	30.08145653	1	
09S03E31AA02200	Commercial			No	Fair	Non-Suspect	1.11560095	27.57489791	1	Half parking, half field
092E18BC01000	Commercial		None	No	Good	Non-Suspect	1.570390034	20.04250327	0	
106E16CA00400	Open Space			No	Fair	Non-Suspect	10.66245679	46.89368652	0	Flat, lots of trees
106E16CA00700	Open Space			No	Fair	Non-Suspect	10.38350401	46.82738465	0	
106E16CB01200	Open Space		None	No	Poor	Non-Suspect	4.365721828	46.55999542	0	Long narrow road front parcel
106E17B 00700	Open Space		None	No	Poor	Non-Suspect	0.68736738	45.46080576	0	Long and narrow parcel
09S02E19DB02100	Open Space			No	Good	Non-Suspect	0	21.1761812	0	
09S03E31 00900	Other		None	No	Good	Non-Suspect	0.954742056	26.82871922	0	Unknown business activity, appears to be farm
09S02E36 01305	Industrial		None	No	Good	Non-Suspect	1.693489352	25.70679695	0	
09S01E24 01101	Open Space		Timber Industry	No	Poor	Non-Suspect	1.505566027	19.98914419	0	
09S02E19C 00100	Industrial		Timber Industry	No	Good	Non-Suspect	0.773523085	20.76855237	0	
09S03E31BA00600	Open Space			No	Good	Non-Suspect	1.863688939	26.97095175	0	

Inventoried Sites Typology Statistics

ALL PROPERTIES	Commercial (Large)		Commercial (Small)		Industrial (Large)		Industrial (Small)	
	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)
Criteria	> 0.57 / 25,000		< 0.57 / 25,000 (min .25 ac)		> 5 / 217,800		< 5 / 217,800 (min 1 ac)	
# of Properties	67		152		28		34	
Avg Parcel Size	2.94	128066.4	0.37	16117.2	20.53	894286.8	2.23	97138.8
Min Parcel Size	0.57	24829.2	0.25	10890	5.02	218671.2	1	43560
Max Parcel Size	45.1	1964556	0.57	24829.2	108.6	4730616	4.65	202554
Developed Land								
# of Properties	45		122		20		21	
Total Acreage	62.81	2736003.6	44.61	1943211.6	447.87	19509217.2	42.74	1861754.4
Average Parcel Sz	1.4	60984	0.37	16117.2	22.4	975744	2.04	88862.4
Undeveloped Land								
# of Properties	14		21		5		11	
Total Acreage	51.97	2263813.2	7.83	341074.8	77.36	3369801.6	24.91	1085079.6
Average Parcel Sz	3.71	161607.6	0.37	16117.2	15.47	673873.2	2.26	98445.6
Vacant Land								
# of Properties	8		9		3		2	
Total Acreage	82.71	3602847.6	3.33	145054.8	49.51	2156655.6	7.16	311889.6
Average Parcel Sz	10.34	450410.4	0.37	16117.2	16.5	718740	3.58	155944.8
# Suspect Brownfields	10		15		18		12	
# LUST/ECSI	1		4		4		0	
# on Highway	40		60		8		8	
# with Utility Access	40		98		3		2	
Site Configuration								
# Good	33		79		18		14	
# Fair	16		24		3		4	
# Poor	7		11		1		5	
# <Null>	11		38		6		11	

Inventoried Sites Typology Statistics

LYONS	Commercial (Large)		Commercial (Small)		Industrial (Large)		Industrial (Small)	
	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)
Criteria	> 0.57 / 25,000		< 0.57 / 25,000 (min .25 ac)		> 5 / 217,800		< 5 / 217,800 (min 1 ac)	
# of Properties	5		31		14		15	
Avg Parcel Size	0.85	37026	0.36	15681.6	22.67	987505.2	1.89	82328.4
Min Parcel Size	0.61	26571.6	0.25	10890	5.02	218671.2	1.05	45738
Max Parcel Size	1.16	50529.6	0.57	24829.2	108.61	4731051.6	4.65	202554
Developed Land								
# of Properties	3		25		12		11	
Total Acreage	2.41	104979.6	8.97	390733.2	271.05	11806938	20.4	888624
Average Parcel Sz	0.8	34848	0.36	15681.6	22.59	984020.4	1.85	80586
Undeveloped Land								
# of Properties	1		4		1		4	
Total Acreage	0.67	29185.2	1.54	67082.4	16.51	719175.6	8.01	348915.6
Average Parcel Sz	0.67	29185.2	0.38	16552.8	16.51	719175.6	2	87120
Vacant Land								
# of Properties	1		2		1		0	
Total Acreage	1.16	50529.6	0.57	24829.2	29.87	1301137.2	0	0
Average Parcel Sz	1.16	50529.6	0.28	12196.8	29.87	1301137.2	0	0
# Suspect Brownfields	0		6		12		6	
# LUST/ECSI	0		0		3		0	
# on Highway	0		0		0		0	
Utility Access - Sewer	0		0		0		0	
Utility Access - Water	0		0		0		0	
Site Configuration								
# Good	0		10		10		7	
# Fair	0		4		0		3	
# Poor	1		1		0		1	
# <Null>	4		16		4		6	

Inventoried Sites Typology Statistics

MEHAMA	Commercial (Large)		Commercial (Small)		Industrial (Large)		Industrial (Small)	
	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)
Criteria	> 0.57 / 25,000		< 0.57 / 25,000 (min .25 ac)		> 5 / 217,800		< 5 / 217,800 (min 1 ac)	
# of Properties	6		12		2		1	
Avg Parcel Size	1.38	60112.8	0.36	15681.6	13.99	609404.4	3.86	168141.6
Min Parcel Size	0.62	27007.2	0.25	10890	8.19	356756.4	3.86	168141.6
Max Parcel Size	3.75	163350	0.53	23086.8	19.8	862488	3.86	168141.6
Developed Land								
# of Properties	6		9		2		1	
Total Acreage	8.27	360241.2	3.44	149846.4	27.99	1219244.4	3.86	168141.6
Average Parcel Sz	1.38	60112.8	0.38	16552.8	13.99	609404.4	3.86	168141.6
Undeveloped Land								
# of Properties	0		2		0		0	
Total Acreage	0	0	0.53	23086.8	0	0	0	0
Average Parcel Sz	0	0	0.27	11761.2	0	0	0	0
Vacant Land								
# of Properties	0		1		0		0	
Total Acreage	0	0	0.29	12632.4	0	0	0	0
Average Parcel Sz	0	0	0.29	12632.4	0	0	0	0
# Suspect Brownfields	3		0		2		1	
# LUST/ECSI	0		0		0		0	
# on Highway	2		2		2		1	
Utility Access - Sewer	0		0		0		0	
Utility Access - Water	0		0		0		0	
Site Configuration								
# Good	3		6		2		1	
# Fair	1		3		0		0	
# Poor	0		0		0		0	
# <Null>	2		4		0		0	

Inventoried Sites Typology Statistics

MILL CITY	Commercial (Large)		Commercial (Small)		Industrial (Large)		Industrial (Small)	
	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)
Criteria	> 0.57 / 25,000		< 0.57 / 25,000 (min .25 ac)		> 5 / 217,800		< 5 / 217,800 (min 1 ac)	
# of Properties	25		70		6		11	
Avg Parcel Size	1.29	56192.4	0.37	16117.2	28.06	1222293.6	2.2	95832
Min Parcel Size	0.57	24829.2	0.25	10890	5.06	220413.6	1	43560
Max Parcel Size	9.39	409028.4	0.55	23958	75.07	3270049.2	3.85	167706
Developed Land								
# of Properties	17		62		4		6	
Total Acreage	16.26	708285.6	22.65	986634	132.85	5786946	10.76	468705.6
Average Parcel Sz	0.96	41817.6	0.37	16117.2	33.21	1446627.6	1.79	77972.4
Undeveloped Land								
# of Properties	5		6		1		4	
Total Acreage	13.31	579783.6	2.19	95396.4	28.32	1233619.2	10.88	473932.8
Average Parcel Sz	2.66	115869.6	0.37	16117.2	28.32	1233619.2	2.72	118483.2
Vacant Land								
# of Properties	3		2		1		1	
Total Acreage	2.77	120661.2	0.82	35719.2	7.21	314067.6	2.57	111949.2
Average Parcel Sz	0.92	40075.2	0.41	17859.6	7.21	314067.6	2.57	111949.2
# Suspect Brownfields	1		5		1		1	
# LUST/ECSI	0		3		0		0	
# on Highway	13		39		0		0	
Utility Access - Sewer	20		67		0		0	
Utility Access - Water	11		45		0		0	
Site Configuration								
# Good	13		41		2		4	
# Fair	5		9		2		1	
# Poor	2		4		0		1	
# <Null>	5		16		2		5	

Inventoried Sites Typology Statistics

GATES	Commercial (Large)		Commercial (Small)		Industrial (Large)		Industrial (Small)	
	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)
Criteria	> 0.57 / 25,000		< 0.57 / 25,000 (min .25 ac)		> 5 / 217,800		< 5 / 217,800 (min 1 ac)	
# of Properties	11		13		1		1	
Avg Parcel Size	2.26	98445.6	0.37	16117.2	10.78	469576.8	3.04	132422.4
Min Parcel Size	0.57	24829.2	0.25	10890	3.04	132422.4	3.04	132422.4
Max Parcel Size	14.39	626828.4	0.57	24829.2	18.52	806731.2	3.04	132422.4
Developed Land								
# of Properties	6		8		0		1	
Total Acreage	6.52	284011.2	3	130680	0	0	3.04	132422.4
Average Parcel Sz	1.09	47480.4	0.38	16552.8	0	0	3.04	132422.4
Undeveloped Land								
# of Properties	3		2		1		0	
Total Acreage	2.94	128066.4	0.63	27442.8	18.52	806731.2	0	0
Average Parcel Sz	0.98	42688.8	0.31	13503.6	18.52	806731.2	0	0
Vacant Land								
# of Properties	2		3		0		0	
Total Acreage	15.35	668646	1.19	51836.4	0	0	0	0
Average Parcel Sz	7.68	334540.8	0.4	17424	0	0	0	0
# Suspect Brownfields	4		2		0		1	
# LUST/ECSI	0		1		0		0	
# on Highway	11		7		1		1	
Utility Access - Sewer	0		0		0		0	
Utility Access - Water	8		9		0		0	
Site Configuration								
# Good	7		9		1		1	
# Fair	4		3		0		0	
# Poor	0		1		0		0	
# <Null>	0		0		0		0	

Inventoried Sites Typology Statistics

DETROIT	Commercial (Large)		Commercial (Small)		Industrial (Large)		Industrial (Small)	
	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)
Criteria	> 0.57 / 25,000		< 0.57 / 25,000 (min .25 ac)		> 5 / 217,800		< 5 / 217,800 (min 1 ac)	
# of Properties	10		17		0		0	
Avg Parcel Size	1.36	59241.6	0.38	16552.8	0	0	0	0
Min Parcel Size	0.61	26571.6	0.25	10890	0	0	0	0
Max Parcel Size	3.13	136342.8	0.53	23086.8	0	0	0	0
Developed Land								
# of Properties	10		16		0		0	
Total Acreage	13.58	591544.8	5.96	259617.6	0	0	0	0
Average Parcel Sz	1.36	59241.6	0.37	16117.2	0	0	0	0
Undeveloped Land								
# of Properties	0		1		0		0	
Total Acreage	0	0	0.43	18730.8	0	0	0	0
Average Parcel Sz	0	0	0.43	18730.8	0	0	0	0
Vacant Land								
# of Properties	0		0		0		0	
Total Acreage	0	0	0	0	0	0	0	0
Average Parcel Sz	0	0	0	0	0	0	0	0
# Suspect Brownfields	1		3		0		0	
# LUST/ECSI	1		0		0		0	
# on Highway	4		5		0		0	
Utility Access - Sewer	0		0		0		0	
Utility Access - Water	10		17		0		0	
Site Configuration								
# Good	7		12		0		0	
# Fair	2		3		0		0	
# Poor	1		1		0		0	
# <Null>	0		1		0		0	

Inventoried Sites Typology Statistics

IDAHNA	Commercial (Large)		Commercial (Small)		Industrial (Large)		Industrial (Small)	
	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)
Criteria	> 0.57 / 25,000		< 0.57 / 25,000 (min .25 ac)		> 5 / 217,800		< 5 / 217,800 (min 1 ac)	
# of Properties	10		9		5		6	
Avg Parcel Size	11.42	497455.2	0.4	17424	8.48	369388.8	2.55	111078
Min Parcel Size	0.79	34412.4	0.25	10890	5.52	240451.2	1.03	44866.8
Max Parcel Size	45.11	1964991.6	0.54	23522.4	12.43	541450.8	4.59	199940.4
Developed Land								
# of Properties	3		2		2		2	
Total Acreage	15.77	686941.2	0.57	24829.2	15.98	696088.8	4.69	204296.4
Average Parcel Sz	5.26	229125.6	0.29	12632.4	7.99	348044.4	2.34	101930.4
Undeveloped Land								
# of Properties	5		6		2		3	
Total Acreage	35.06	1527213.6	2.5	108900	14.01	610275.6	6.02	262231.2
Average Parcel Sz	7.01	305355.6	0.41	17859.6	7.01	305355.6	2.01	87555.6
Vacant Land								
# of Properties	2		1		1		1	
Total Acreage	63.42	2762575.2	0.45	19602	12.43	541450.8	4.59	199940.4
Average Parcel Sz	31.71	1381287.6	0.45	19602	12.43	541450.8	4.59	199940.4
# Suspect Brownfields	1		0		3		2	
# LUST/ECSI	0		0		1		0	
# on Highway	10		8		5		6	
Utility Access - Sewer	0		0		0		0	
Utility Access - Water	2		2		3		1	
Site Configuration								
# Good	3		1		3		1	
# Fair	4		3		1		3	
# Poor	3		4		1		3	
# <Null>	0		1		0		0	

SEWER IMPROVED PARCEL STATISTICS 12/8/16

Total by Typology	Count	Acres
Large Commercial	57	188.49
Small Commercial	110	40.4
Large Industrial	26	529.04
Small Industrial	34	74.81
	227	**832.74**

Total by Site Status	Count	Acres
Developed	159	530.73
Undeveloped	47	159.91
Vacant	21	142.11
	227	**832.75**

Gates	Count	Acres
Large Commercial	11	24.81
Small Commercial	13	4.83
Large Industrial	1	18.52
Small Industrial	1	30.4
	26	**78.56**

Idahna	Count	Acres
Large Commercial	10	114.25
Small Commercial	9	3.53
Large Industrial	5	42.42
Small Industrial	6	15.3
	30	**175.5**

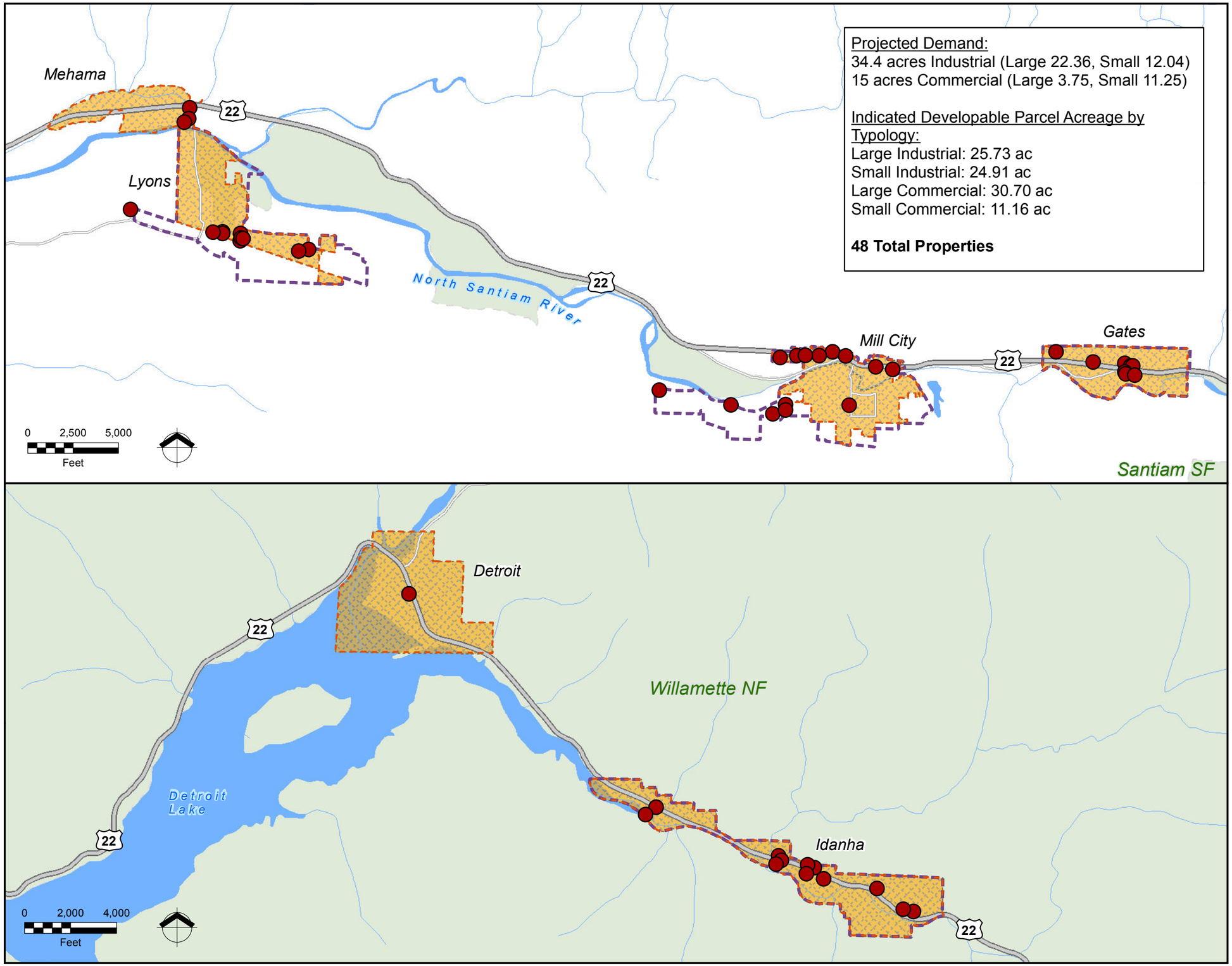
Lyons	Count	Acres
Large Commercial	5	4.24
Small Commercial	31	11.07
Large Industrial	12	271.74
Small Industrial	15	28.41
	63	**315.46**

Mill City	Count	Acres
Large Commercial	15	23.33
Small Commercial	28	10.3
Large Industrial	6	168.38
Small Industrial	11	24.21
	60	**226.22**

Detroit	Count	Acres
Large Commercial	10	13.58
Small Commercial	17	6.4
Large Industrial	0	0
Small Industrial	0	0
	27	**19.98**

Mehama	Count	Acres
Large Commercial	6	8.28
Small Commercial	12	4.27
Large Industrial	2	27.99
Small Industrial	1	3.86
	21	**44.4**

MAPS



Projected Demand:
34.4 acres Industrial (Large 22.36, Small 12.04)
15 acres Commercial (Large 3.75, Small 11.25)

Indicated Developable Parcel Acreage by Typology:
Large Industrial: 25.73 ac
Small Industrial: 24.91 ac
Large Commercial: 30.70 ac
Small Commercial: 11.16 ac

48 Total Properties

Figure
Augmented Assessment Identified Developable Parcels (Matrix 3)

Business Oregon
North Santiam River Valley, Oregon

Legend

- Identified Developable Properties
- City Limits
- Urban Growth Boundary
- Urban Area
- Parks/State & National Forests

Source: Aerial photograph obtained from Esri ArcGIS Online

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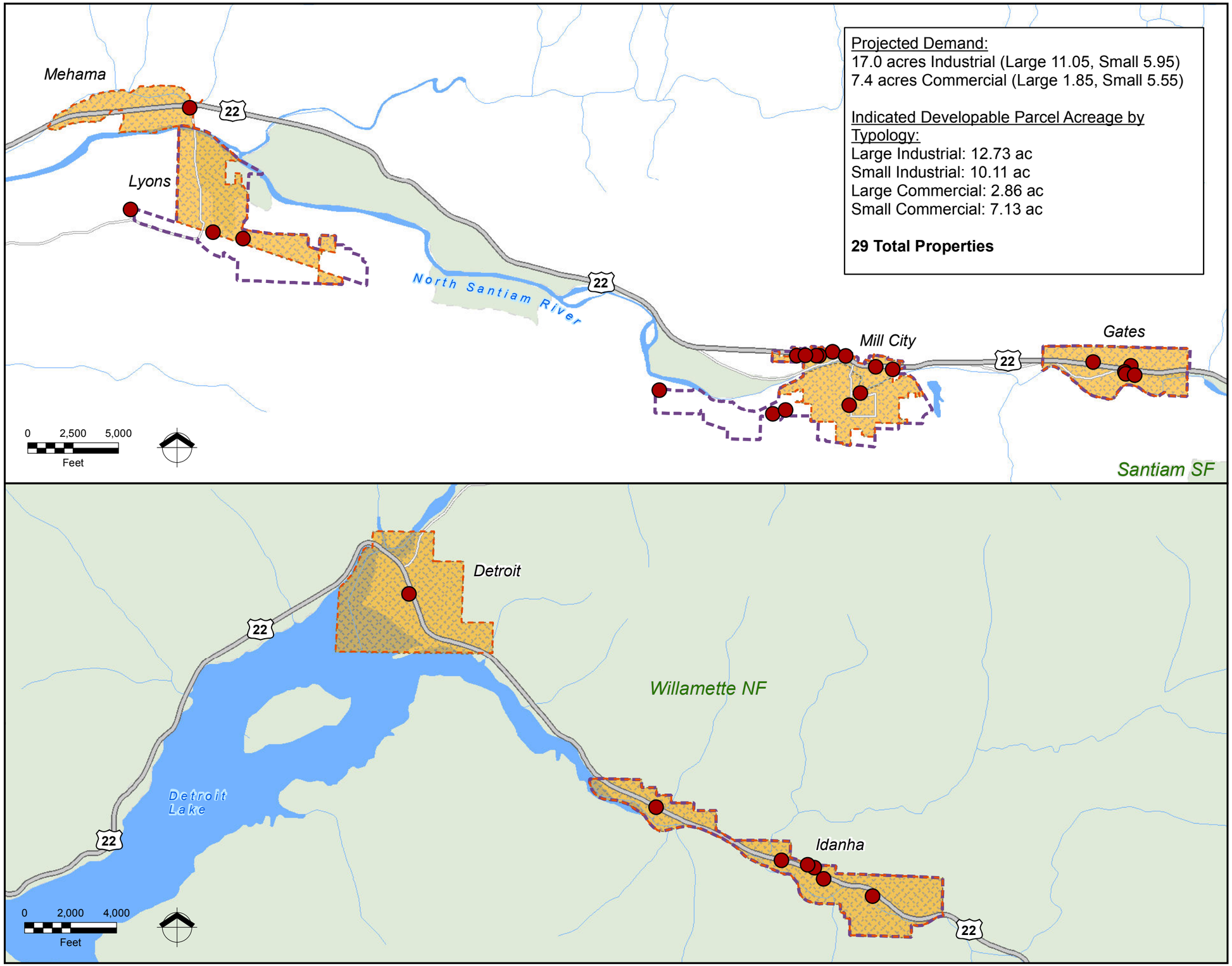

Projected Demand:
17.0 acres Industrial (Large 11.05, Small 5.95)
7.4 acres Commercial (Large 1.85, Small 5.55)

Indicated Developable Parcel Acreage by Typology:
Large Industrial: 12.73 ac
Small Industrial: 10.11 ac
Large Commercial: 2.86 ac
Small Commercial: 7.13 ac

29 Total Properties

Figure
Baseline Assessment
Identified Developable Parcels (Matrix 2)

Business Oregon
North Santiam River Valley, Oregon

Legend

- Identified Developable Properties
- City Limits
- Urban Growth Boundary
- Urban
- Parks/State & National Forests

Source: Aerial photograph obtained from Esri ArcGIS Online

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Print Date: 12/20/2016
Approved By: sotto
Produced By: jschane
Project: 0612.03

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Print Date: 12/8/2016

Approved By: sotto

Produced By: jschane

Project: 0612.03

Mehama

Lyons

Mill City

Gates

Detroit

Idanha

North Santiam River

Detroit Lake

Santiam SF

Willamette NF

22

0 2,500 5,000

Feet

0 2,000 4,000

Feet

Indicated Developable Parcel Acreage by Typology:
Large Industrial: 26 properties, 529.04 ac
Small Industrial: 34 properties, 74.81 ac
Large Commercial: 57 properties, 188.49 ac
Small Commercial: 110 properties, 40.40 ac

227 Total Properties

Figure
Sewer Improved Properties
Identifying an increase in development desirability score following sewer improvements

Business Oregon
North Santiam River Valley, Oregon

Legend

- Sewer Improved Properties
- City Limits
- Urban Growth Boundary
- Urban
- Parks/State & National Forests

Source: Aerial photograph obtained from Esri ArcGIS Online

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APPENDIX A

LAND DEMAND FORECAST

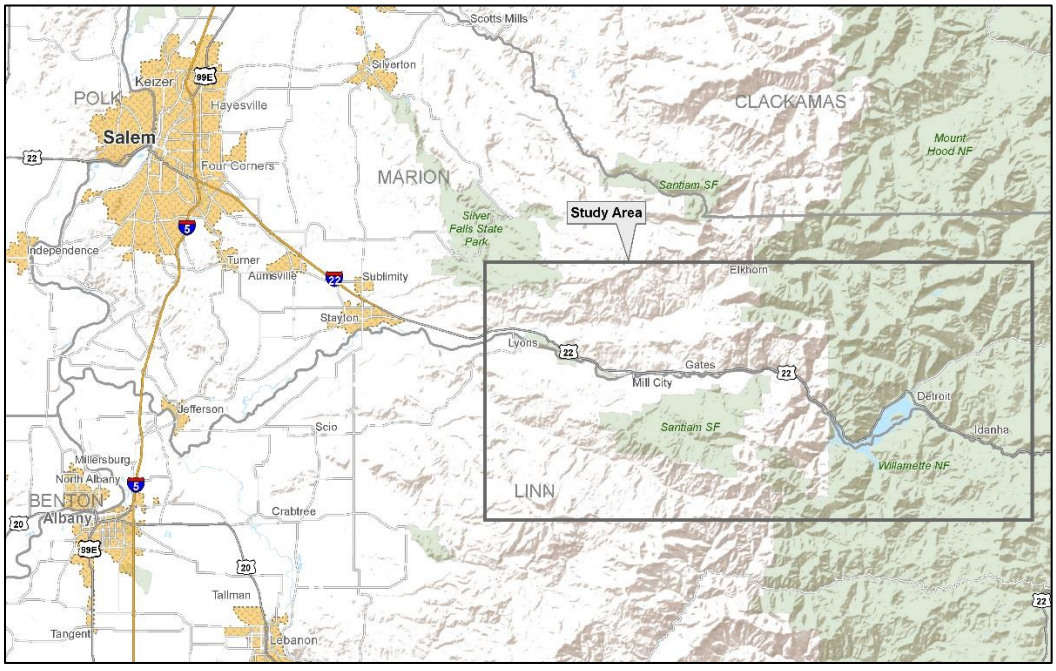
TECHNICAL MEMORANDUM

To: Seth Otto, Maul Foster & Alongi, Inc.
Prepared by: Leland F. Smith, President & Chief Economist, Elesco Limited
Re: North Santiam Canyon Corridor Industrial & Commercial Land Demand Forecast
October 17, 2016

Orientation

This Technical Memorandum is provided to Maul Foster & Alongi, Inc., (MFA) by Elesco Limited in support of the North Santiam Canyon Regional Land Inventory. Its purpose is to assess commercial and industrial land use patterns and to forecast future demand for zoned business sites served by appropriate infrastructure. The demand focus is a 20-year forecast from 2015 to 2035. The information and forecasts in this report will be used by MFA to assess the economic growth impacts of developing sewer infrastructure in the several communities.

The North Santiam Canyon Corridor, shown on Map 1, starts approximately 25 miles east of Salem along State Highway 22 and extends 31 miles farther east to the city of Idanha.



Map 1: Location Overview Map, with North Santiam Corridor Outlined

There are five communities where industrial and commercial activities are located along the Corridor. The analysis combines the city of Lyons in Linn County with unincorporated Mehama, which is a Census Defined Place (CDP) for data collection. This unincorporated community is included by request of Mehama and Marion County as a portion of the Mehama area is within the Lyons Urban Growth Boundary and is entirely zoned for commercial uses. The other cities in the study area are Mill City, Gates, Detroit, and Idanha. A location overview map is shown below with the study area outlined. It shows the location of the study area in relation to the city of Salem and the I-5 Corridor.

The cities of Mill City, Gates, and Idanha are partially in Marion County and partially in Linn County; only the city of Detroit is entirely within Marion County. This limits some of the forecast references in this model because each county has a separate methodology and time frame for its population forecasts for its urban areas.

While the larger study looks at the entire North Santiam Corridor, this analysis only examines patterns and trends of employment and land demand for the communities listed above. Oregon's land use laws generally prohibit extension of municipal utilities to serve industrial and commercial activities outside of urban growth boundaries.

Methodology

Organization of the Report

This Report is organized in three parts. Part 1 provides a general overview of recent patterns and trends of population changes along with industrial and commercial employment in each of the five communities that comprise the North Santiam Canyon Corridor. Its' purpose is to provide the base data upon which future patterns and trends can be estimated and employment projections translated into demand for industrial and commercial sites.

Recent trends in population were obtained from the U.S. Census Bureau for the year 2000 along with certified estimates of population on July 1, 2015 by Portland State University's Center for Population Research and Census (PRC).

Standard sources of employment data such as the Oregon Department of Employment, the U.S. Bureau of Labor Statistics, and the U.S. Bureau of Economic Analysis generally do not provide employment by industry sectors for small areas such as the communities in the North Santiam Corridor in order to avoid disclosing data for individual companies. For that reason, the primary source of data used in this analysis is the U.S. Census Bureau's program "On the Map" (http://onthemap.ces.census.gov/. This is an interactive tool that allows the user to define areas for examination that are not confined to certified boundaries such as city limits, zip codes, or census districts. The areas selected in this report include all concentrations of employment within city limits and/or their UGBs but are extended to capture any existing employment concentrations in rural areas adjacent to those cities.

The On the Map program provides a Work Area Profile that includes all employment data within the defined boundaries. Most of its data is drawn from Census Tracts which enables it to be comprehensive even for undefined geographical areas. This can also be tailored by specific qualifiers. For this report, only "primary" jobs are counted meaning that a person with two jobs is not counted twice. Also, the counts are for place of "work" rather than place of "residence".

Population and Employment Projections

Part 2 provides projections of population and employment for the 20-year period of 2015 to 2035 for each of the five communities along with aggregate projections for the Corridor. The analysis uses approved methodologies for making those projections and conforms to statutory requirements. Several planning staff of Marion County and the Mid-Willamette Valley Council of Governments (MWVCOG) participated in developing the models. The basis of the

population forecasts used in this report were provided by Marion County[1] with 20-year growth rates projected to the year 2030 and extrapolated to the year 2035. More details on the methodology of the forecasts are provided in the introduction to Part 2.

The only exception to this methodology was forecasting population growth rates for the city of Lyons. Based on contacts with City officials and the Oregon Cascades West Council of Governments, it was determined that an adopted forecast for Lyons was not available. As an alternative, growth rates for the three cities located between Salem and Lyons/Mehama were averaged and applied to the certified July 1, 2015 population estimate for Lyons produced by the Portland State University Population Research Center. Those three communities share the common trait with Lyons of attracting residents and economic activities from the population centers along the I-5 Corridor.

At the time this report was written, the PSU Population Research Center was in the process of developing 50-year coordinated forecasts for all cities and counties in the state of Oregon but those data were not yet available. Preliminary projections were available for only eastern and southern areas of Oregon and only at the county level. The North Santiam Corridor is part of Region 3 for the forecast project and that data will be released over the time period of July 2016 to July 2017.

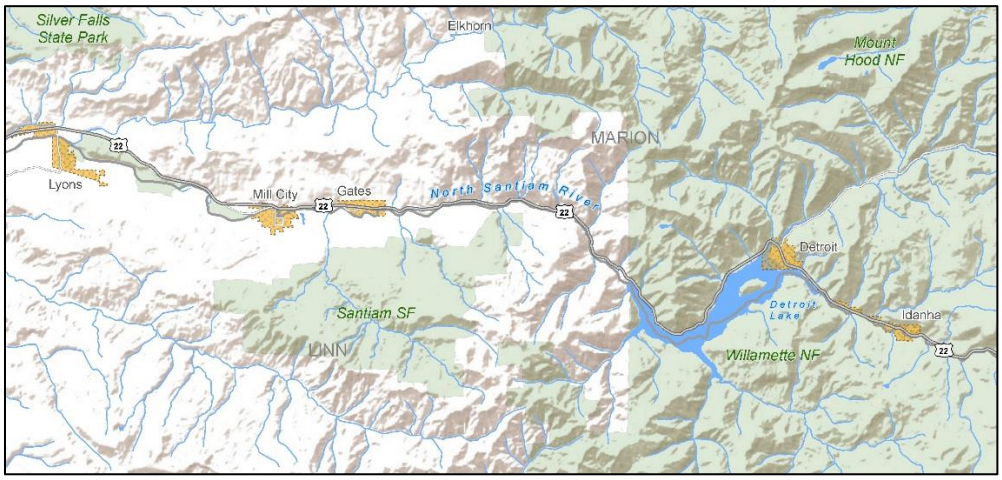
Part 3, Land Demand, was also calculated using formulas developed by collaboration with Marion County and MWVCOG planning staff. The methodology is further described in the introduction to Part 3 of this report.

[1] Population Forecasts for Marion County, its Cities and Unincorporated Area - 2010-2030. Prepared by: Population Research Center, College of Urban and Public Affairs, Portland State University, September 2008

PART 1: OVERVIEW OF RECENT POPULATION AND EMPLOYMENT PATTERNS AND TRENDS

Overview of the North Santiam Corridor

As Map 1 shows, the North Santiam Corridor is an eastern extension from the Salem Metropolitan Area in the Willamette Valley of Oregon, which is about 50 miles south of Portland. Its main distinguishing feature is the North Santiam River that runs through the entire Corridor. The cities along the Corridor are all served by Oregon State Highway 22, which is a two-lane arterial that connects with U.S. Hwy 101 (aka the Oregon Coast Highway) at its western end and with U.S. Hwy 20 at Santiam Junction at its eastern end. U.S. Hwy 20 extends eastward to Bend and points beyond.



Map 2: Locations of Cities in the North Santiam Corridor

A geographic feature of the Corridor shown on Map 2 is that the terrain changes significantly from the relatively flat Willamette Valley to mountainous conditions with steep slopes of 25% or greater. That forces virtually all of the residential, commercial and industrial development into the relatively narrow river valley.

This report looked specifically at whether there might be externalities or linkages between Salem and the I-5 Corridor with the North Santiam Corridor. Where those occur, most of the impacts are observed in Stayton and the other communities west of Lyons/Mehama and most of those are in residential development and special-purpose commercial. For example, there are two major automobile dealerships along OR 22 at Stayton that advertise their ability to sell vehicles for lower costs because they are located on lower priced land than is found in Salem. There is also expansion of population and housing eastward from Salem as residents seek lower costs and a suburban lifestyle.

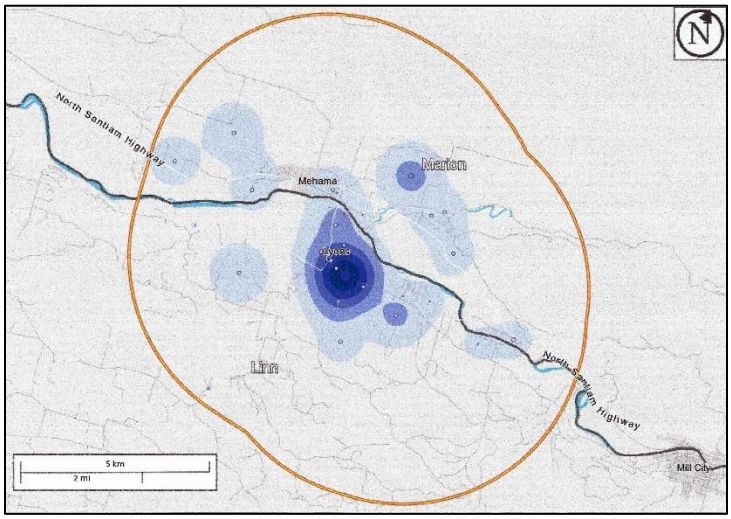
Those trends do not appear to have had any significant effects on the North Santiam Corridor at this time but are likely to do so in the future, especially in the Lyons/Mehama and Mill City areas as population grows in the Willamette Valley.

The other impact that Salem and the I-5 Corridor is having on the North Santiam Corridor is the recreational draw from the larger population of that region. The primary beneficiary of this is the city of Detroit because of its location on Detroit Lake, a major boating and fishing destination. The North Santiam River is also a prime fishing destination and there are numerous campgrounds, parks, trailheads and commercial services to meet the needs of recreational visitors.

With this overview, this report continues by examining recent patterns and trends of population growth and industrial and commercial employment in the individual communities.

LYONS/MEHAMA

Map 3: Lyons/Mehama Employment Analysis Area



Most of the employment in the Lyons/Mehama area is concentrated in the city of Lyons with several outlying smaller employment clusters. Those include a hardwood lumber mill on the north side of OR Hwy 22 in Mehama and a U.S. Forest Service complex on the North Santiam Road. The ring drawn for this analysis extends approximately two miles from the center of the city of Lyons.

Recent trends in population growth in the Lyons/Mehama area are shown in Table 1. For the year 2000, the U.S. Census numbers are combined for the City of Lyons and the Mehama CDP. For 2015, the PSU certified population number for the City of Lyons is combined with the estimated population for the Mehama CDP using U.S. Census numbers for 2000 and 2010 with the growth rate extrapolated an additional five years to 2015.

Table 1: Population Trends for Lyons/Mehama, 2000 to 2015

	2000	2015	Total Δ # 2000 - 2015	Annual Δ % 2000 - 2015
Lyons/Mehama	1,301	1,452	151	0.73%
North Santiam Study Area	3,829	4,142	313	0.53%
Oregon	3,431,100	4,001,600	570,500	1.03%

Source: 2000 U.S. Census; 2015 from PSU Certified Population Estimates 7/1/2015 for the City of Lyons, plus the extrapolated growth for Mehama CDP based on U.S. Census population numbers for 2000 and 2010.. North Santiam Study Area figures are aggregated from individual community numbers in this report. Oregon population figures from U.S. Census 2000 plus PSU certified estimates for 2015.

Table 2: Employment Profile, Lyons/Mehama Area, 2002 Compared to 2014

			LYONS/MEHAMA			
	2002		2014		Change	
Total Primary Jobs	559	100.0%	559	100.0%	0	0.0%
Jobs by NAICS Sector						
Ag., Forest, Fishing, Hunting	34	6.1%	33	5.9%	-1	-2.9%
Mining, Quarry, Oil, Gas	0	0.0%	0	0.0%	0	0%
Utilities	0	0.0%	2	0.4%	2	*200.0
Construction	16	2.9%	34	6.1%	18	112.5%
Manufacturing	396	70.8%	328	58.7%	-68	-17.2%
Wholesale Trade	23	4.1%	47	8.4%	24	104.3%
Retail Trade	20	3.6%	21	3.8%	1	5.0%
Transportation, Warehouse	7	1.3%	7	1.3%	0	0%
Information	0	0.0%	0	0.0%	0	0%
Finance & Insurance	0	0.0%	1	0.2%	1	*100.0
Real Estate, Renting & Lease	0	0.0%	3	0.5%	3	*300.0
Professional, Scientific, Tech.	3	0.5%	10	1.8%	7	133.3%
Mgt. of Companies, Enterprise.	0	0.0%	0	0.0%	0	0%
Admin. & Support, Waste Mgt.	6	1.1%	1	0.2%	-5	-83.3%
Educational Services	13	2.3%	17	3.0%	4	30.8%
Health Care & Social Assistance	1	0.2%	3	0.5%	2	200.0%
Arts, Entertainment, Recreation	0	0.0%	0	0.0%	0	0%
Accommodation, Food Service	0	0.0%	18	3.2%	18	*1800.0
Other Services	12	2.1%	9	1.6%	-3	-25.0%
Public Administration	28	5.0%	25	4.5%	-3	-10.7%

Source: On the Map profile for area selected. * Measuring an increase from zero cannot be calculated as a percentage gain. The changes shown by the asterisks in these tables indicate gains as numbers of basis points.

It is not known why employment in the Lyons/Mehama area shows the same total amount in 2014 as it was in 2002, especially since the population of Lyons increased by 11.6% during the period of 2000 to 2015. However, the jobs figures represent place of "work" so it may be that most of the population increase represents persons who commute to work in Albany or other nearby cities.

The breakdown by industrial sector shows that the Lyons/Mehama area is dominated by Manufacturing, most of it concentrated in the Lumber & Wood Products industry. Manufacturing

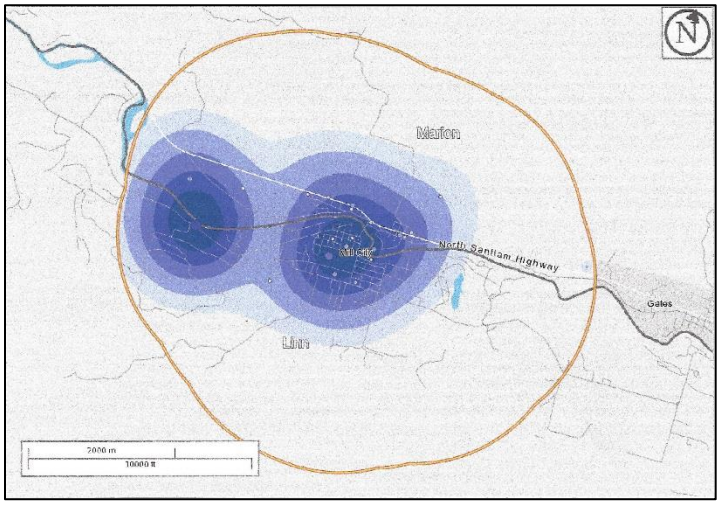
represented 70.8% of all primary jobs in 2002, falling to 58.7% in 2014. Those percentages are far greater than the statewide average of 10.4% in 2014.

The largest gainers during this period were Construction, Wholesale Trade, Professional Services, and Accommodations & Food Service.

One trend that is common to all the communities along the North Santiam Corridor is the aging of the labor force. The Lyons/Mehama area showed a 69.1% increase in the 55+ component of the work force while the 30 to 54 component grew by only 2.2% and the 29 and younger component shrank by -47.3%. This raises questions about whether the region can sustain its current employment levels as the older workers retire.

MILL CITY

Map 4: Mill City Employment Analysis Area



Mill City shows a more concentrated employment pattern than the Lyons/ Mehama area. The downtown area sits south of the North Santiam Highway but that highway also supports a strip of commercial businesses that cater to tourists passing through as well as local residents. There are several closed businesses along the highway, such as service stations, that could be redeveloped into new retail locations to serve that tourist market as population in the region and traffic volumes increase in the area.

Table 3: Population Trends for Mill City, 2000 to 2015

	2000	2015	Total Δ # 2000 - 2015	Annual Δ % 2000 - 2015
Mill City	1,563	1,855	292	1.15%
North Santiam Study Area	3,829	4,142	313	0.53%
Oregon	3,431,100	4,001,600	570,500	1.03%

Source: 2000 U.S. Census; 2015 from PSU Certified Population Estimates 7/1/2015.

Mill City had the largest population of all the communities along the North Santiam Corridor in 2015 and had an annual population growth rate higher than that for the State of Oregon. It was not determined whether any of that growth was due to annexations.

Employment figures for Mill City produce an anomaly. In an area that includes all of the city limits plus a radius of .3 miles, the Census Bureau reports there were only 215 total primary jobs in 2002 and 237 primary jobs in 2014 as measured by place of work. To get a better picture of the overall employment situation, the radius around the city was extended to 1.3 miles to include a greater part of the surrounding unincorporated area.

It was found that there are two large forest products operations southwest of the city limits – the Freres Plywood Plant #3 and a Frank Lumber Company sawmill, along with C W Specialty Lumber Company, a smaller mill. Including those operations increased primary employment at Mill City to 408 workers in 2014.

This is still well below the total number of 699 Mill City residents who worked in primary jobs in 2014 when the parameters of the analysis were shifted to place of *residence* rather than place of *work*. It is reasonable to assume that a very large number of Mill City residents commute to jobs outside of the immediate area, possibly to the mills at Lyons or even commuting to jobs in Salem or other nearby communities.

Table 4: Employment Profile, Mill City Area, 2002 Compared to 2014

			MILL CITY			
	2002		2014		Change	
Total Primary Jobs	216	100.0%	408	100.0%	192	88.9%
Jobs by NAICS Sector						
Ag., Forest, Fishing, Hunting	25	11.6%	4	1.0%	-21	-84.0%
Mining, Quarry, Oil, Gas	0	0.0%	0	0.0%	0	0.0%
Utilities	0	0.0%	0	0.0%	0	0.0%
Construction	4	1.9%	8	2.0%	4	100.0%
Manufacturing	5	2.3%	183	44.9%	178	3560.0%
Wholesale Trade	3	1.4%	0	0.0%	-3	-100.0%
Retail Trade	40	18.5%	41	10.0%	1	2.5%
Transportation, Warehouse	0	0.0%	0	0.0%	0	0.0%
Information	5	2.3%	0	0.0%	-5	-500.0%
Finance & Insurance	2	0.9%	5	1.2%	3	150.0%
Real Estate, Renting & Lease	3	1.4%	0	0.0%	-1	-300.0%
Professional, Scientific, Tech.	0	0.0%	8	2.0%	8	*800.0
Mgt. of Companies, Enterprise.	0	0.0%	0	0.0%	0	0.0%
Admin. & Support, Waste Mgt.	1	0.9%	2	0.5%	1	100.0%
Educational Services	67	31.0%	80	19.6%	13	19.4%
Health Care & Social Assistance	7	3.2%	8	2.0%	1	14.3%
Arts, Entertainment, Recreation	2	0.9%	0	0.0%	-2	-200.0%
Accommodation, Food Service	38	17.6%	49	12.0%	11	28.9%
Other Services	7	3.2%	8	2.0%	1	14.3%
Public Administration	7	3.2%	12	2.9%	5	71.4%

Source: On the Map profile for area selected.

Mill City also shows the trend of an aging work force, with the 55+ component growing by 207.7% between 2002 and 2014. Unlike the Lyons/Mehama area however, Mill City was able to capture a growing segment of its workers aged 29 and younger.

Manufacturing employment, mostly in the Lumber & Wood Products sector, showed only five employees in 2002 so the percentage growth to 183 workers in 2014 was exceptionally high. The reason for such a low figure in 2002 is not known. The nation was still in a recession that year caused by the dot.com bust in 2000 and the events of 9/11/2001 so it is possible the mills

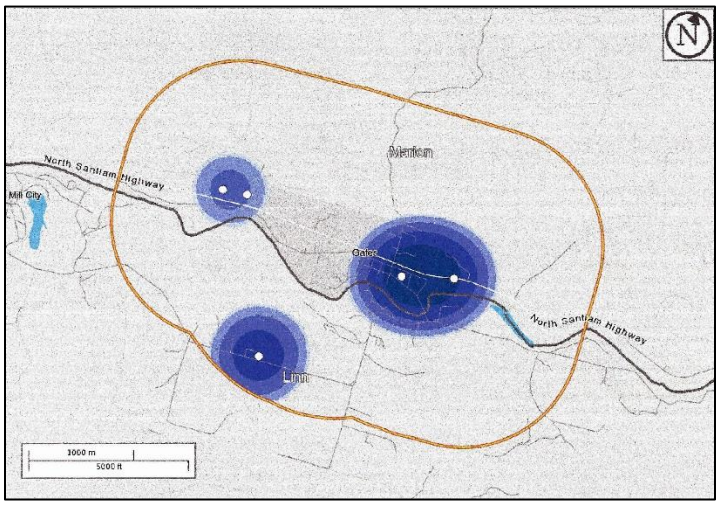
were temporarily shut down. In any case, it would not be reasonable to assume that level of growth could be sustained into the future.

Mill City has approximately double the employment in Retail Trade than was shown in the Lyons/Mehama area. That may be partly due to the commercial businesses along OR 22 that cater to tourists passing through the area. It is also possible that Mill City attracts retail traffic from Gates and Lyons.

The other notable differences are in the sectors of Educational Services and Accommodation & Food Services. These numbers indicate a relatively strong commercial sector overall for the Mill City area.

GATES

Map 5: Gates Employment Analysis Area



It needs to be noted that while the colored circles appear the same on each map, they represent different scales of employment for each community. The job density for the center of Gates represents only 10-14 primary jobs per square mile while at Lyons the center of the circle represented a job density of 582-905 primary jobs per square mile. The smaller circle at the upper left shows a maximum density at the center of only 7-9 primary jobs per square mile. The purpose of these circles is to show locations of job concentration rather than densities or comparative sizes.

Table 5: Population Trends for Gates, 2000 to 2015

	2000	2015	Total Δ # 2000 - 2015	Annual Δ % 2000 - 2015
Gates	471	485	14	0.20%
North Santiam Study Area	3,829	4,142	313	0.53%
Oregon	3,431,100	4,001,600	570,500	1.03%

Source: 2000 U.S. Census; 2015 from PSU Certified Population Estimates 7/1/2015.

The population of Gates showed an increase of only 14 persons during the period from 2000 to 2015 for an annual average growth rate of 0.20%. An aerial view of Gates shows that it is mostly a rural residential community located only 3.4 miles east of Mill City. It has a Post Office, school, and limited commercial services to serve the needs of local residents along with a motel and restaurant on OR 22 to serve highway travelers.

Table 6: Employment Profile, Gates, 2002 Compared to 2014

			GATES			
	2002		2014		Change	
Total Primary Jobs	23	100.0%	14	100.0%	-9	-39.1%
Jobs by NAICS Sector						
Ag., Forest, Fishing, Hunting	1	4.3%	0	0.0%	-1	-100.0%
Mining, Quarry, Oil, Gas	0	0.0%	0	0.0%	0	0.0%
Utilities	0	0.0%	0	0.0%	0	0.0%
Construction	2	8.7%	1	7.1%	-1	-50.0%
Manufacturing	0	0.0%	0	0.0%	0	0.0%
Wholesale Trade	0	0.0%	0	0.0%	0	0.0%
Retail Trade	0	0.0%	0	0.0%	0	0.0%
Transportation, Warehouse	0	0.0%	0	0.0%	0	0.0%
Information	0	0.0%	0	0.0%	0	0.0%
Finance & Insurance	0	0.0%	0	0.0%	0	0.0%
Real Estate, Renting & Lease	0	0.0%	0	0.0%	0	0.0%
Professional, Scientific, Tech.	0	0.0%	0	0.0%	0	0.0%
Mgt. of Companies, Enterprise.	0	0.0%	0	0.0%	0	0.0%
Admin. & Support, Waste Mgt.	2	8.7%	1	7.1%	-1	-50.0%
Educational Services	8	34.8%	0	0.0%	-8	-800.0%
Health Care & Social Assistance	0	0.0%	1	7.1%	1	*100.0
Arts, Entertainment, Recreation	0	0.0%	0	0.0%	0	0.0%
Accommodation, Food Service	8	34.8%	3	21.4%	-5	-62.5%
Other Services	1	4.3%	4	28.6%	3	300.0%

			GATES			
	2002		2014		Change	
Public Administration	1	4.3%	4	28.6%	3	300.0%

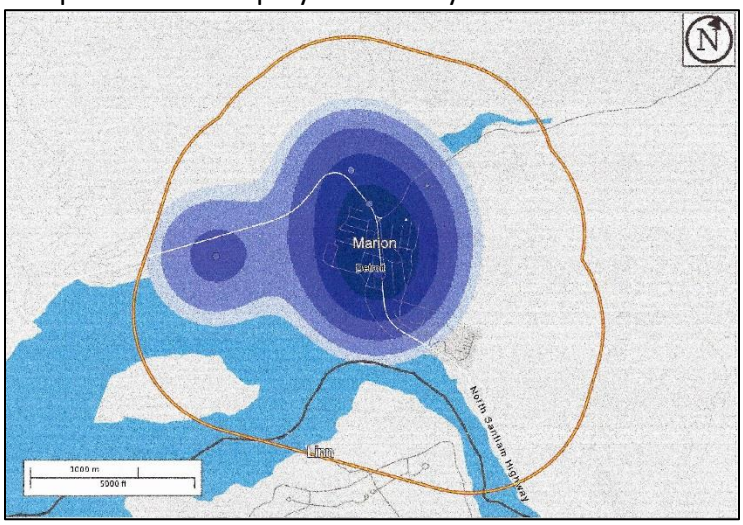
Source: On the Map profile for area selected.

The employment numbers confirm the overview above, that Gates is primarily a residential community and commercial service center. There was no manufacturing employment in either 2002 or 2014. Of the 14 primary jobs in 2014, eleven were in Accommodation & Food Service, Other Services, and Public Administration. Fourteen of the twenty sectors listed in the table showed no employment at all in 2014.

It appears that Gates supplies workers to other communities, primarily Mill City, but does not have a significant commercial / industrial base of its own.

DETROIT

Map 6: Detroit Employment Analysis Area



Detroit is often referred to as the "Detroit Recreation Area". While it is an incorporated city, the surrounding area is predominately owned by State and Federal agencies such as the BLM and Forest Service and the area has a large number of State parks, boat ramps, campgrounds, hiking trails, and other recreational amenities. It is also an important commercial service area for travelers on OR 22 between the Willamette Valley and central and eastern Oregon. The Oregon Department of Transportation operates a highway maintenance facility at Detroit and there is a major U.S. Forest Service Ranger District office located within a mile west of the community.

Table 7: Population Trends for Detroit, 2000 to 2015

	2000	2015	Total Δ # 2000 - 2015	Annual Δ % 2000 - 2015
Detroit	262	210	-52	-1.46%
North Santiam Study Area	3,829	4,142	313	0.53%
Oregon	3,431,100	4,001,600	570,500	1.03%

Source: 2000 U.S. Census; 2015 from PSU Certified Population Estimates 7/1/2015.

According to the U.S. Census of 2000 and PSU certified estimates as of July 1, 2015, the population of Detroit fell by 52 persons between those two benchmark dates. That represents a decline of just under 20% and an average annual rate of decline of 1.46%.

Table 8: Employment Profile, Detroit, 2002 Compared to 2014

			DETROIT			
	2002		2014		Change	
Total Primary Jobs	50	100.0%	47	100.0%	-3	-6.0%
Jobs by NAICS Sector						
Ag., Forest, Fishing, Hunting	0	0.0%	0	0.0%	0	0.0%
Mining, Quarry, Oil, Gas	0	0.0%	0	0.0%	0	0.0%
Utilities	0	0.0%	0	0.0%	0	0.0%
Construction	6	12.0%	7	14.9%	1	16.7%
Manufacturing	0	0.0%	0	0.0%	0	0.0%
Wholesale Trade	0	0.0%	0	0.0%	0	0.0%
Retail Trade	9	18.0%	5	10.6%	-4	-44.4%
Transportation, Warehouse	0	0.0%	0	0.0%	0	0.0%
Information	0	0.0%	0	0.0%	0	0.0%
Finance & Insurance	0	0.0%	0	0.0%	0	0.0%
Real Estate, Renting & Lease	0	0.0%	0	0.0%	0	0.0%
Professional, Scientific, Tech.	0	0.0%	0	0.0%	0	0.0%
Mgt. of Companies, Enterprise.	0	0.0%	0	0.0%	0	0.0%
Admin. & Support, Waste Mgt.	0	0.0%	5	10.6%	5	*500.0
Educational Services	0	0.0%	0	0.0%	0	0.0%
Health Care & Social Assistance	0	0.0%	0	0.0%	0	0
Arts, Entertainment, Recreation	0	0.0%	11	23.4%	11	*1100.0
Accommodation, Food Service	25	50.0%	14	29.8%	-11	-44.0%
Other Services	4	8.0%	2	4.3%	-2	-50.0%
Public Administration	6	12.0%	3	6.4%	-3	-50.0%

Source: On the Map profile for area selected.

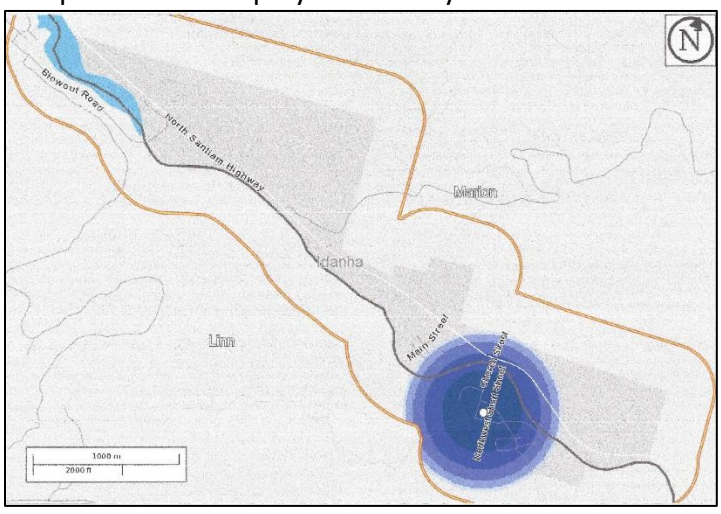
Employment numbers for Detroit clearly show its orientation to tourism. The largest single category of employment in 2014 was Accommodation & Food Service. This sector declined from 25 workers in 2002 to 14 workers in 2014. The Arts, Entertainment & Recreation sector was in second place in 2014 with 11 workers but showed no employment in this sector in 2002. That may have been due to changes in industry classifications following the shift from the former Standard Industrial Classification (SIC) codes to the North American Industrial Classification System (NAICS) codes.

The only other sectors showing employment in 2014 were Construction, Retail Trade, Administration & Support Services, Other Services, and Public Administration.

Overall, total primary jobs fell from 50 workers in 2002 to 47 workers in 2014. While this was a fairly small numerical decline of only 3 workers, it still represented a loss of 6.0% on the small employee base.

IDANHA

Map 7: Idanha Employment Analysis Area



Idanha is located at the eastern end of the North Santiam Corridor. It is 31 miles east of the Lyons/Mehama area at the western end of the Corridor and only 4.3 miles east of Detroit. As seen on the map, all employment in Idanha is concentrated around a commercial center although the city limits extend both east and west for some distance. Most of the population of Idanha lives in a cluster of homes on the south side of the North Santiam River in an area shown on some maps as “New Idanha”. That part of town also contains the River Mountain RV Park.

Table 9: Population Trends for Idanha, 2000 to 2015

	2000	2015	Total Δ # 2000 - 2015	Annual Δ % 2000 - 2015
Idanha	232	140	-92	-3.31%
North Santiam Study Area	3,829	4,142	313	0.53%
Oregon	3,431,100	4,001,600	570,500	1.03%

Source: 2000 U.S. Census; 2015 from PSU Certified Population Estimates 7/1/2015;

As seen in Table 9, Idanha had a significant decline in population from 2000 to 2015 due to the closure of its major industry, Green Veneer and Lumber Mill. This facility was located on 17 acres of land between OR 22 and the North Santiam River. Much of the mill plant has been demolished, the equipment removed, and the land cleared for new development. However, a few of the buildings remain and are used for storage of boats, campers, and other recreational vehicles. While this makes use of some of the property, it produces virtually no employment.

Table 10: Employment Profile, Idanha, 2002 Compared to 2014

			IDANHA			
	2002		2014		Change	
Total Primary Jobs	0	100.0%	5	100.0%	5	500.0%
Jobs by NAICS Sector						
Ag., Forest, Fishing, Hunting	0	0.0%	0	0.0%	0	0.0%
Mining, Quarry, Oil, Gas	0	0.0%	0	0.0%	0	0.0%
Utilities	0	0.0%	0	0.0%	0	0.0%
Construction	0	0.0%	0	0.0%	0	0.0%
Manufacturing	0	0.0%	0	0.0%	0	0.0%
Wholesale Trade	0	0.0%	2	40.0%	2	*200.0
Retail Trade	0	0.0%	0	10.6%	0	0.0%
Transportation, Warehouse	0	0.0%	3	60.0%	3	*300.0
Information	0	0.0%	0	0.0%	0	0.0%
Finance & Insurance	0	0.0%	0	0.0%	0	0.0%
Real Estate, Renting & Lease	0	0.0%	0	0.0%	0	0.0%
Professional, Scientific, Tech.	0	0.0%	0	0.0%	0	0.0%
Mgt. of Companies, Enterprise.	0	0.0%	0	0.0%	0	0.0%
Admin. & Support, Waste Mgt.	0	0.0%	0	0.0%	0	0.0%
Educational Services	0	0.0%	0	0.0%	0	0.0%
Health Care & Social Assistance	0	0.0%	0	0.0%	0	0.0%
Arts, Entertainment, Recreation	0	0.0%	0	0.0%	0	0.0%

			IDANHA			
	2002		2014		Change	
Accommodation, Food Service	0	0.0%	0	0.0%	0	0.0%
Other Services	0	0.0%	0	0.0%	0	0.0%
Public Administration	0	0.0%	0	0.0%	0	0.0%

Source: On the Map profile for area selected.

Knowing that Idanha has a Post Office, a small general store, and an equipment repair shop makes it improbable that there was no employment in the community in 2002 and only five workers in 2014, all in the two sectors of Wholesale Trade and Transportation & Warehousing. It is possible that the other workers are part-time and/or seasonal so are not counted as primary workers. In any case, there does not appear to be any stimulus for new business development in Idanha.

The Mill property is currently listed with a realtor who works out of Salem. In a discussion about potential buyers, she reported that several people have expressed interest in the property, primarily to use for additional dry storage of boats and other recreational vehicles and equipment. There appears to be demand for that kind of storage so that owners will not have to trailer their boats to Detroit Lake during the prime recreational season. She said that the main reason it has not been sold is that offers have provided for small down payments and extended terms which were not acceptable to the owners.

NORTH SANTIAM CANYON CORRIDOR

The 2000 - 2015 population numbers for the five communities in the North Santiam Canyon Corridor are shown below in Table 11 to provide comparison of their growth rates. The combined *employment* numbers are shown in Tables 12, 13 and 14.

Table 11: Combined Population Trends for North Santiam Corridor, 2000 to 2015

	2000	2015	Total Δ # 2000 - 2015	Annual Δ % 2000 - 2015
Lyons/Mehama	1,301	1,452	151	0.73%
Mill City	1,563	1,855	292	1.15%
Gates	471	485	14	0.20%
Detroit	262	210	-52	-1.46%
Idanha	232	140	-92	-3.31%
Total	3,829	4,142	313	0.53%

Source: 2000 U.S. Census; 2015 from PSU Certified Population Estimates 7/1/2015; Projections from Population Forecasts for Marion County, 2008, extrapolated to 2035 and including portions of communities in Lynn County.

Table 12: Combined Employment Numbers by Sector, **2002**

			2002			
	Lyons	**Mill City**	**Gates**	**Detroit**	**Idanha**	**Total**
Total Primary Jobs	559	216	23	50	0	848
Jobs by NAICS Sector						
Ag., Forest, Fishing, Hunting	34	25	1	0	0	60
Mining, Quarry, Oil, Gas	0	0	0	0	0	0
Utilities	0	0	0	0	0	0
Construction	16	4	2	6	0	28
Manufacturing	396	5	0	0	0	401
Wholesale Trade	23	3	0	0	0	26
Retail Trade	20	40	0	9	0	69
Transportation, Warehouse	7	0	0	0	0	7
Information	0	5	0	0	0	5
Finance & Insurance	0	2	0	0	0	2
Real Estate, Renting & Lease	0	3	0	0	0	3
Professional, Scientific, Tech.	3	0	0	0	0	3
Mgt. of Companies, Enterprise.	0	0	0	0	0	0
Admin. & Support, Waste Mgt.	6	1	2	0	0	9
Educational Services	13	67	8	0	0	88
Health Care & Social Assistance	1	7	0	0	0	8
Arts, Entertainment, Recreation	0	2	0	0	0	2
Accommodation, Food Service	0	38	8	25	0	71
Other Services	12	7	1	4	0	24
Public Administration	28	7	1	6	0	42

Source: Combined employment profiles from On the Map, U.S. Census Bureau

Table 13: Combined Employment Numbers by Sector, **2014**

			2014			
	Lyons	**Mill City**	**Gates**	**Detroit**	**Idanha**	**Total**
Total Primary Jobs	559	408	14	47	5	1033
Jobs by NAICS Sector						
Ag., Forest, Fishing, Hunting	33	4	0	0	0	37
Mining, Quarry, Oil, Gas	0	0	0	0	0	0
Utilities	2	0	0	0	0	2
Construction	34	8	1	7	0	50
Manufacturing	328	183	0	0	0	511
Wholesale Trade	47	0	0	0	2	49
Retail Trade	21	41	0	5	0	67
Transportation, Warehouse	7	0	0	0	3	10
Information	0	0	0	0	0	0
Finance & Insurance	1	5	0	0	0	6
Real Estate, Renting & Lease	3	0	0	0	0	3
Professional, Scientific, Tech.	10	8	0	0	0	18
Mgt. of Companies, Enterprise.	0	0	0	0	0	0
Admin. & Support, Waste Mgt.	1	2	1	5	0	9
Educational Services	17	80	0	0	0	97
Health Care & Social Assistance	3	8	1	0	0	12
Arts, Entertainment, Recreation	0	0	0	11	0	11
Accommodation, Food Service	18	49	3	14	0	84
Other Services	9	8	4	2	0	23
Public Administration	25	12	4	3	0	44

Source: Combined employment profiles from On the Map, U.S. Census Bureau

The numbers in tables 12 and 13 show that total combined primary employment in the North Santiam Corridor increased from 848 workers in 2002 to 1,033 workers in 2014 for a gain of 185 workers and a percentage gain of 21.8%. That represents an average annual employment increase of 1.7% even with the effects of the recession and the slow recovery that has followed.

Some of that gain was caused by the data showing only 5 persons employed in Manufacturing in Mill City in 2002 and increasing to 183 workers in that sector in 2014. However, that increased the base on which employment projections can be made from 2015 to 2035.

The combined employment numbers comparing 2002 with 2014 are shown in Table 14.

Table 14: 2002 and 2014 Combined Employment Numbers

	NORTH SANTIAM CORRIDOR					
	2002	%	2014	%	Change	% Change
Total Primary Jobs	848	100.0%	1,033	100.0%	185	21.8%
Jobs by NAICS Sector						
Ag., Forest, Fishing, Hunting	60	7.1%	37	0.0%	-23	-38.3%
Mining, Quarry, Oil, Gas	0	0.0%	0	0.0%	0	0.0%
Utilities	0	0.0%	2	0.0%	2	200.0%
Construction	28	3.3%	50	7.1%	22	78.6%
Manufacturing	401	47.3%	511	49.5%	110	27.4%
Wholesale Trade	26	3.1%	49	0.0%	23	88.5%
Retail Trade	69	8.1%	67	0.0%	-2	-2.9%
Transportation, Warehouse	7	0.8%	10	0.0%	3	42.9%
Information	5	0.6%	0	0.0%	-5	-100.0%
Finance & Insurance	2	0.2%	6	0.0%	9	450.0%
Real Estate, Renting & Lease	3	0.4%	3	0.0%	0	0.0%
Professional, Scientific, Tech.	3	0.4%	18	0.0%	15	500.0%
Mgt. of Companies, Enterprise.	0	0.0%	0	0.0%	0	0.0%
Admin. & Support, Waste Mgt.	9	1.1%	9	7.1%	-1	-11.1%
Educational Services	88	10.4%	97	0.0%	9	10.2%
Health Care & Social Assistance	8	0.9%	12	7.1%	3	37.5%
Arts, Entertainment, Recreation	2	0.2%	11	0.0%	9	450.0%
Accommodation, Food Service	71	8.4%	84	21.4%	13	18.3%
Other Services	17	2.0%	23	28.6%	-2	-11.8%
Public Administration	35	4.1%	44	28.6%	-3	-8.6%

Source: On the Map data aggregated by Elesco Limited.

SUMMARY OF PART 1

The analysis in Part 1 shows that the communities of Lyons/Mehama and Mill City have strong economic bases anchored by the Manufacturing sector concentrated primarily in Lumber & Wood Products. They are employment centers for residents of other communities in the Corridor, such as Gates. While their dependence on the volatile wood products industry puts them at risk, those companies appear to have adjusted to changes in the industry and have stabilized their employment.

Put together, these two communities provide a complete range of commercial and public services to keep them self-sustaining. That will enable them to continue to draw new residents as the population in the Willamette Valley grows.

Gates is a rural residential community and there are no signs that will change in the near future. There may be minor additions to its commercial base to service an increasing tourism volume from the Willamette Valley. Detroit should also see increased demand for tourist commercial services in its central business district and at lakefront businesses.

Opportunities for Idanha are limited. The former mill properties will likely be purchased at some point and used primarily for transportation and warehousing facilities that would require only limited improvements to existing infrastructure.

Overall, total primary employment in the North Santiam Corridor averaged 24.94% of the total population compared to a ratio of 42.6% for the whole state of Oregon. Several reasons have been cited for this disparity including an aging labor force, greater seasonal and part time employment, and volatility in the lumber and wood products sector of the economy.

Observations of traffic flows also indicate there are significant numbers of workers who commute to jobs in Salem, Albany and other cities along the I-5 corridor, especially from the Lyons/Mehama and Mill City communities. There is also a large population of retirees consistent with the aging of the labor force.

With this overview of current patterns and trends of population and employment in the North Santiam Corridor, the next section of this report provides projections of those patterns and trends for the 20-year period of 2015 to 2035.

PART 2: POPULATION AND EMPLOYMENT PROJECTIONS

As noted in the introductory section of this report, Portland State University's Center for Population Research and Census is currently producing a 50-year projection of population in Oregon's counties and cities but the data for Marion County and the adjacent parts of Linn County had not yet been released at the time this report was written. The timeframe for release of data for Region 3, which contains those two counties, is July 2016 to July 2017. County data will be released during the first part of that time period followed by projections for cities during the latter part.

As a consequence of this absence of certified projections, there were extensive discussions among local planning officials and the consultants on alternative ways to forecast population and employment growth in the communities of the North Santiam Corridor using methodologies that conform to statutory requirements and were based on defensible planning assumptions. In addition, the discussions considered methodologies to estimate accelerated growth rates of population and employment that would be caused by the provision of sewer infrastructure to those communities.

The *baseline* growth rate used in this report is the 20-year growth rate produced by the Population Research Center (PRC) of Portland State University certified by Marion County, cited above. That report covered the period from 2010 to 2030 and the projections were extrapolated an additional five years to provide estimates for 2015 to 2035. The individual baseline average annual growth rate (baseline aagr) for each community is calculated in a spreadsheet and aggregated for a total canyon-wide population growth rate of 0.89%.

Augmented average annual growth rates assume an increase in the rate of population growth based on the availability of sewer. This percentage was calculated by Brandon Reich, Senior Planner for Marion County Public Works/Planning based on a survey of similarly sized and located communities. The increase in growth rate after sewer is 190% of the baseline aagr.

This augmented rate is applied to the baseline rate for each community individually in the model. Because the sewer system does not currently exist (except in Mill City which was excluded from the aagr increase) and will take time to design, permit and construct, the model assumes the augmented rate does not apply until year 11 (2025) of the 20-year planning period. In the augmented rate scenario, the model shows baseline growth for years 1 to 10 and the augmented rate for years 11 to 20. This is expected to reflect a conservative and realistic growth scenario.

Employed population is calculated as a ratio of total population. It was originally proposed to use the statewide ratio of employment to population of 42.6% but after the discussions it was agreed to use the rate that is currently found in the Canyon area, again calculated as a unique ratio for each community. This is reflected in the model. The average employed population percentage was shown above as 24.94% and is rounded to 25% for the model across the Canyon. As a benchmark, this rate will be closer to the current conditions in the Canyon.

Following are the numbers copied from the spreadsheets that are the result of these calculations.

Table 15: 20-Year Population Growth Projections, 2015 to 2035

City	Baseline aagr	Augmented Growth Rate 190% increase with sewer		Certified Population 2015	Population with Baseline aagr 2035	First 10-Year Population at Base aagr 2015-2025	Second 10-Year Population at Augmented aagr 2025-2035
Lyons/Mehama	1.70%	3.23%		1452	2034	1719	2362
Mill City*	0.50%	0.50%	*has sewer	1855	2050	1950	2050
Gates	0.07%	0.14%		485	492	488	495
Detroit	0.40%	0.76%		210	228	219	236
Idanha	0.18%	0.33%		140	145	142	147
Total Corridor	0.89%	1.69%		4142	4949	4,526	5290

Calculating total annual average increases at 0.89% over the 20-year period of 2015 to 2035 produces an estimate that the population of the Corridor will increase from 4,142 in 2015 to 4,949 in 2035. However, adding the augmented growth rate due to the development of sewers in 2025 raises the total population in 2035 to 5,290. That is an increase of 1,148 persons over the 20-year period versus an increase of only 807 persons at the base rate without sewers.

Similar estimates can be calculated for total employment in the Corridor over the 20-year period using the employment-to-population ratio of 25%.

Table 16: 20-Year Employment Growth Projections, 2015 to 2035

City	Employment	Employed Percentage	Baseline aagr	Augmented aagr
	2015	**2015**	**2035**	**2035**
Lyons/Mehama	559	0.38	783	1056
Mill City*	408	0.22	451	451
Gates	14	0.03	14	14
Detroit	47	0.22	51	55
Idanha	5	0.04	5	5
Total	1033	0.25	1304	1581
			Change	Change
			271	548

Under this scenario, applying the Augmented Average Growth Rate to the second half of the 20-year projection period raises total employment from 271 additional workers to 548 additional workers in the year 2035.

PART 3: DEMAND FOR INDUSTRIAL AND COMMERCIAL SITES

Assumptions and Land Demand Forecasts

Two categories of land zoning are included in the forecast: Industrial and Commercial. The Industrial land category includes the following sectors, which represented 54.6% of all primary jobs in the Corridor in 2014:

Utilities
Construction
Manufacturing
Wholesale Trade
Transportation and Warehousing

These five sectors combined employed a total of 462 workers in the North Santiam Corridor in 2002, increasing to 622 workers in 2014. The additional 160 workers represented a total increase of 34.6% over the 12-year period or an annual average growth rate of 2.5%.

That growth rate is unlikely to be sustained in the future. The largest industries in the Corridor are engaged in the Lumber and Wood Products sector of Manufacturing. There are many pressures on that industry, especially the diminished supply of timber from Federal lands. However, there are opportunities to compete successfully in the market with specialty products such as engineered structural members and cross laminated timber (CLT) beams. For example, CLT beams are increasingly being used for high-rise building structures in place of concrete and steel. The companies located in the Corridor have proven they can adapt to changes in the industry and it is reasonable to assume that they still have growth potential.

As population in the Willamette Valley grows and expands into the suburban and exurban areas east of Salem, it can be assumed that new industries will be developed in places such as Lyons and Mill City. Along the U.S. Hwy 99W corridor northwest of Salem, the viticulture and winery industry has stimulated significant growth of both population and employment. There is no certainty that will happen in the North Santiam Corridor but it cannot be ruled out.

There is a wide range of models showing the amount of building space per employee in industrial sectors. For this report, a model is used that was developed by the consulting firm

ECONorthwest as part of the Economic Opportunities Analysis (EOA) for the Buildable Lands Inventory for the City of Newport in 2012.[2]

The study allocates future employment to land use types with similar building and site requirements, based on the North American Industry Classification System (NAICS), which assigns a classification code to every business with employment. The land use types are:

Industrial businesses in the following sectors: Natural Resources and Mining, Construction, Manufacturing, Wholesale Trade, and Transportation, Warehousing, and Utilities.

Commercial businesses in the following sectors: Retail trade, Information, Finance and Insurance, Real Estate, Professional and Scientific Services, Management of Companies, Administrative and Support Services, Private Educational Services, Health Care and Social Assistance, Accommodations and Food Services, and Other Services.

Government includes employment local, state, and federal agencies, including public educational services.

The ECONorthwest analysis then assumes the following employment densities per acre of future employment: Industrial will have an average of 10 employees per acre (EPA) and Commercial and Government will have an average of 20 EPA.

The report then recognizes that some types of employment will have higher employment densities (e.g., a multistory office building) and some will have lower employment densities (e.g., a convenience store with a large parking lot). In Prineville, Oregon, the Facebook data center was initially established on 122 acres to accommodate planned permanent employment of only 35 workers.

[2] Commercial and Industrial Buildable Lands Inventory and Economic Opportunities Analysis. Prepared for City of Newport by ECONorthwest, Eugene, Oregon. July 2012

Finally, the ECONorthwest study converts net acres to gross acres by adding a factor for public right of way. For the Newport study, the conversion factor from net to gross was 15% for industrial and 20% for commercial and government land uses.

Based on the projections of industrial and commercial employment in the North Santiam Corridor developed in this report, those utilization factors result in the following tables of 20-year demand:

Table 17: Industrial and Commercial Land Requirements, 2015 – 2035, on **Baseline** AAGR

Land Use Type	Employment Growth	EPA (Net Acres)	Land Demand (Net Acres)	Land Demand (Gross Acres)
Industrial	148	10	14.8	17.0
Commercial	123	20	6.2	7.4
Total	271		21.0	24.4

Calculations by Elesco Limited based on ECONorthwest model

Table 18: Industrial and Commercial Land Requirements, 2015 – 2035, on **Augmented** AAGR

Land Use Type	Employment Growth	EPA (Net Acres)	Land Demand (Net Acres)	Land Demand (Gross Acres)
Industrial	299	10	29.9	34.4
Commercial	249	20	12.5	15.0
Total	548		41.4	49.4

Calculations by Elesco Limited based on ECONorthwest model

Based on visual observations of employment concentrations, it appears that about 70% of the industries in the North Santiam Corridor would fit the requirements for “large industry lots” while about 30% are located on “small Industry lots”. However, most commercial facilities are smaller buildings located in the downtown centers indicating that about 80% of the commercial uses would require “small commercial lots” and 20% would require “large commercial lots”.

While the ECONorthwest model produces the numbers shown in Table 18, it needs to be noted that the projections contain an element of variability. The population forecasts by Marion

County contain a comparison of population growth for both high growth scenarios and low growth scenarios. While these are not developed at the level of the smaller communities, for the whole county the low population growth projections are based on a growth rate of 0.85% while the high population growth projections are based on a growth rate of 1.53%. Holding the percentage of population employed in the labor force as a constant would result in employment matching the growth rate of the population.

The employment growth rates shown in tables 15 and 16 reflect a base average annual growth rate of 0.89% which is close to the lower end of the Marion County population growth rates. If those rates should reach the high rate projections, then employment growth in the whole county would be 72% higher. Those higher growth rates would not necessarily be the same in the smaller communities or the unincorporated areas of the county.

SUMMARY OF PART 3

For the North Santiam Corridor, the analysis indicates that there will be demand for both industrial and commercial land over the next 20 years. Demand for industrial land is estimated at 17.0 acres under the baseline aagr projections and demand for commercial land is estimated at 7.4 acres, for a combined total of 24.4 acres. Under the augmented aagr assumptions, new demand would rise by 34.4 acres for industrial land and 15.0 acres for commercial land for a combined increase of 49.4 acres.

No effort has been made to allocate the locations of that demand but it must be assumed that most of the industrial demand will occur at the western end of the Corridor around Lyons/Mehama and Mill City. There will be very little demand of either type at Gates or Idanha, and most of the demand at Detroit will be for tourist commercial uses.

It also needs to be noted that the analysis does not include a review of lands within the UGB areas of the cities that can accommodate this demand. It is possible that all this demand will be

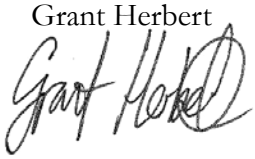
met inside existing UGBs. No conclusions have been drawn in this analysis that apply to zone changes, infill, redevelopment or other land use issues.

APPENDIX B

TECHNICAL MEMORANDUM

MEMORANDUM

To:	Danielle Gonzalez, Marion County	Date:	January 9, 2017
From:	Grant Herbert	Project:	0612.03.01



RE: North Santiam Canyon Regional Land Inventory—Technical Memorandum

This technical memorandum describes the data sources and methodology used in the North Santiam Canyon Regional Land Inventory. It is intended to accompany both the report and the geodatabase deliverables.

Geodatabase Description

The data deliverable is made up of two geodatabases: SourceData and Inventory. The SourceData geodatabase contains the primary data, including scanned images. The Inventory geodatabase contains all derived data, including the inventory dataset with captured imagery.

Data Sources

Source data were obtained from the following entities in May 2016:

- Linn County
- Marion County
- Mid-Willamette Valley Council of Governments
- City of Detroit
- City of Gates
- City of Idanha
- Oregon Department of Environmental Quality (DEQ).

The GIS data obtained included tax parcel and assessor information, zoning and comprehensive plan data, rail lines, roads, city limits and urban growth boundaries (UGBs), Federal Emergency Management Agency floodplains, river and stream data, and aerial imagery. Records from the DEQ Leaking Underground Storage Tank (LUST) Cleanup Site Database (as of April 5, 2016) and Environmental Cleanup Site Information (ECSI) (as of April 2016) were downloaded. Ten-meter-resolution elevation data (2012) was obtained from the U.S. Geological Survey (USGS).

In addition to GIS data, sewer and water information was obtained in paper format from each of the cities involved. Supplemental GIS health data were obtained from the Environmental Public Health Tracking Network database, Oregon Health Authority Public Health Division, for inclusion in the online viewer (for comparison purposes).

City Discussions

As part of the discovery process, interviews were held with city officials regarding their opinions on the types of industries they wanted to have in their communities, the industries they thought were growing, and any barriers and opportunities that they recognized. This data was summarized and included in the final report.

Data Processing

All GIS data were consolidated into Esri filegeodatabase formats. Coordinate systems were standardized to NAD 1983 HARN State Plane International Feet (WKID 2913). DEQ data were processed to extract the site addresses and were geocoded using Esri address geocoders (May 2016).

A general area of interest was created to delineate the study area.

Tax parcels were selected by intersecting with a quarter-mile buffer from a combined Urban Growth Boundary and City Limit dataset, to ensure that all appropriate parcels would be included. This dataset was then manually checked. The two county datasets were merged and harmonized for selected attributes relevant to the project, and the combined dataset was then manually checked. The combined dataset formed the basis for the field inventory dataset.

Zoning datasets were updated to incorporate splitzones where needed, and comprehensive plan/zoning information was added to the parcel datasets, using a majority rules approach. In addition, the UGB and/or city that contained the parcel were added as attributes.

Paper utilities maps were scanned and georeferenced, and the general utility lines and basic attributes were digitized into GIS format.

Imagery obtained from Linn County was clipped to the study area.

All sites falling within areas zoned commercial or industrial were identified for the field inventory. Additional fields were added to a combined parcels dataset to allow for the capture of relevant information, such as the presence of a DEQ LUST or ECSI record in that parcel (by address location), the utilization ratio, the likely presence of water or sewers at the property (based on a distance from the main lines digitized), as well as fields to be populated during the fieldwork, such as current land use, site configuration, likely brownfield status, and business type. The data were then set up in an online collector tool for field inventory.

Inventory

A field data inventory of the identified commercial and industrial parcels in the North Santiam study area was conducted on July 14, 2016, by two MFA staff members using an online GIS collector application and a mixture of iPad tablets and Android phones. This allowed staff to identify the parcel in question, collect a series of attributes, add a photograph, etc. Fields populated during this assessment included an assessment of brownfield status, the business type, a qualitative assessment of site configuration, and the general development status.

Field work captured fields and brief description:

Status: Subjective visual assessment of property status. Undeveloped properties are greenfields, Vacant properties may have an empty building or remains of a building/structure on site, developed has a building in use at time of assessment.

Land Use: Subjective visual assessment of current land use (residential, commercial, industrial).

Site Configuration: Subjective visual assessment of general site configuration as assessed during field work.

Brownfield: Subjective visual assessment of property regarding suspect brownfield status.

Road Type: Largest road type abutting property (eg Highway larger than local)

On Highway: Property has highway access

Tourism Primary: Subjective visual assessment of whether Tourism is a primary driver of the business

Business Type: Subjective visual assessment of general business type

Storefront Appeal: Subjective visual assessment of the general appeal of the storefront

Field Survey Results

A brief summary of the parcel inventory conducted:

Type	Count	Acres
Total Parcels Inventoried	653	1073.16
Parcels assessed Developed	459	690.12
Parcels assessed Undeveloped	147	234.82
Parcels assessed Vacant	43	146.93
Parcels assessed Suspect Brownfield	77	512.02
Parcels known LUST/ECSI record	14	99.47

Typologies

Four typologies were developed to categorize the properties, based on property size and zoning. Parcel area and minimums were decided following discussion with the Technical Advisory Group.

1. Industrial—large (> 217,800 square feet)
2. Industrial—small (< 217,800 square feet), minimum 1 acre
3. Commercial—large (> 25,000 square feet)
4. Commercial—small (< 25,000 square feet), minimum 0.25 acre

The Large Industrial typology consists of parcels zoned industrial and larger than 5 acres (217,800 square feet). The Small Industrial typology comprises parcels zoned industrial and smaller than 5 acres. Small Industrial parcels smaller than 1 acres were excluded from further consideration.

The Large Commercial typology consists of parcels zoned commercial and larger than 1 acre (25,000 square feet). The Small Commercial typology consists of parcels zoned commercial and smaller than 1 acre. Small Commercial parcels smaller than 0.25 acre were excluded from further consideration.

Below are examples of the possible types of businesses for each typology. Note that these are indicative only.

Typology	Use
Small Commercial	Highway commercial Small Office—Professional Restaurant Small Service—Laundry, Dentist
Large Commercial	Grocery Store Retail Cluster Recreational Cluster
Small Industrial	Specialized Manufacturing Custom Boat Building Equipment Service and Repair
Large Industrial	Secondary Wood Products Metal Fabrication and Machinery Construction Materials Manufacturing

Following the typology assessment, the effective number of parcels to be evaluated and analyzed was reduced to 281 properties (mainly because the parcel-size criteria excluded a large number of small parcels from consideration, but also from exclusion of parcels not within an identified city limit or UGB). A summary of these is provided below:

Type	Count	Acres
Total parcels inventoried	281	902.82
Parcels assessed Developed	208	598.03
Parcels assessed Undeveloped	51	162.07
Parcels assessed Vacant	22	142.71
Parcels assessed Suspect Brownfield	55	493.42
Parcels known LUST/ECSI record	9	91.72
Highway access	116	303.44
Parcels with utility access	143	123.95

Parcel summary by typology:

ALL PROPERTIES	Commercial (Large)		Commercial (Small)		Industrial (Large)		Industrial (Small)	
	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)	(Acres)	(Sq Feet)
Criteria	> 0.57sc / 25,000sqft		< 0.57ac / 25,000sqft (min .25 ac)		> 5ac / 217,800sqft		< 5ac / 217,800sqft (min 1 ac)	
No. of Properties	67		152		28		34	
Average Parcel Size	2.94	128066	0.37	16117.2	20.53	894286.8	2.23	97138.8
Min Parcel Size	0.57	24829.2	0.25	10890	5.02	218671.2	1	43560
Max Parcel Size	45.1	1964556	0.57	24829.2	108.6	4730616	4.65	202554
Developed Land								
No. of Properties	45		122		20		21	
Total Acreage	62.81	2736004	44.61	1943212	447.87	19509217.2	42.74	1861754
Average Parcel Size	1.4	60984	0.37	16117.2	22.4	975744	2.04	88862.4
Undeveloped Land								
No. of Properties	14		21		5		11	
Total Acreage	51.97	2263813	7.83	341075	77.36	3369801.6	24.91	1085080
Average Parcel Size	3.71	161608	0.37	16117.2	15.47	673873.2	2.26	98445.6
Vacant Land								
No. of Properties	8		9		3		2	
Total Acreage	82.71	3602848	3.33	145055	49.51	2156655.6	7.16	311890
Average Parcel Size	10.34	450410	0.37	16117.2	16.5	718740	3.58	155945
No. Suspect Brownfields	10		15		18		12	
No. LUST/ECSI	1		4		4		0	
No. on Highway	40		60		8		8	
No. with Utility Access	40		98		3		2	

Redevelopment Analysis

Additional calculated fields

A number of additional fields were calculated into the inventory dataset to assist with assessing parcel development potential.

Distance to Interstate 5: Parcel distance from Interstate 5 was calculated as the straight-line distance from a geographically registered point location at the intersection of Highway 22 and Interstate 5 to each parcel centroid, using the Esri ArcGIS Spatial Analyst "Near" geoprocessing tool. This gives an indicated distance to the entry to Interstate 5.

Slope: For each property, slope was calculated from a 10-meter spatial resolution USGS digital elevation model. The percent-slope was calculated using the Esri ArcGIS Spatial Analyst "Slope" geoprocessing tool to derive an average percent-slope for each property.

Water and Sewer Utilities: Utility main locations were digitized from the georeferenced maps provided by individual municipalities for areas where there is coverage. Where attributes were available on the maps, these were added to the dataset. A spatial selection of all parcels that fell with 65 feet from a utility line was used to estimate which parcels had, or could have, utility access. Note: sewer data were available only for Mill City.

Utilization Ratio

Using assessor data provided by Linn and Marion counties, a utilization ratio was calculated for each property. The utilization ratio is the relationship between assessed improved value divided by the assessed land value. In general terms, a property with a ratio greater than 50 percent is considered "utilized." Properties with lower utilization may be more suitable targets for development, either in potential extra buildings/infrastructure, or in the potential for expansion or replacement.

Residential Property Septic System Requirements

Residential properties were not a focus of this study; however, individual parcels that did not meet the current minimum septic system size (assuming a representative house) were identified for future reference.

Guidance received from Keller & Associates as to the minimum viable lot size was used to identify lots that would not meet septic system installment requirements without being combined with neighboring lots. For the analysis, it was assumed that all lots met the general assumptions discussed below, and only the size of the lot was considered. An aerial analysis yielded an average house size of 3,600 square feet, and this was incorporated into the calculation. The minimum lot size (including setback) provided below was doubled to represent Marion County requirements that a replacement area be provided.

Criteria provided by Keller & Associates:

The minimum area required for a septic absorption trench (area free of property lines, foundation lines for any building, groundwater supply wells, and all utilities) is **5,600 square feet** (minimum of 46'x122') (including setback from property line) or **2,652 square feet** (26'x102') without a 10-foot property line buffer (not including setback from property line). This represents a looped equal distribution system based on the following assumptions:

- All groundwater depth requirements met.
- Trench width of 24" (minimum without increasing length of trench) using 2.25" to .75" gravel as drainage media.
- Ground slope less than 30 percent (separate guidelines for >30%).
  - Sewage production of 450 gallons per day.
  - Four-bedroom single-family dwelling.
- Trench length of 450' (linear).
  - Type C soil (conservative—soil in the communities is a mix from A through D).
  - Effective soil depth of 24" to 36".
  - Depth to temporary groundwater table 24" to 48".
- Property lines are free of:
  - Groundwater supply wells
  - Surface waters
  - Ground water interceptors
  - Irrigation canals
  - Downgradient escarpments or manmade cuts >30"
- Property topography allows the abovementioned dimensions.
- Absorption trenches must be on elevation contours with tolerance of 1".

Also, Marion County requires twice the needed area so that there is enough area to completely replace the drain field if needed.

Guidelines used:

- OAR 340-071-0220(2)
- Supporting Tables
- Marion County Onsite Sewage Disposal

Matrices and Property Ranking

A calculation matrix was developed to rank properties, based on variables affecting the general development desirability of the property for its currently zoned use. Each matrix and the variables involved are described below.

The variables considered included the utilization ratio, developed status, brownfield and LUST/ECSI status, utility access, visibility from the highway and highway access, distance to Interstate 5, and the general site configuration as assessed in the field (a qualitative value). Each of these was assigned a value, positive or negative, to develop a rank for the parcel.

A positive weighting reflects a positive impact of that variable; a negative weighting reflects the opposite. A neutral variable (or one excluded from consideration) would have a weighting of 0. Water and sewer access was assigned as a positive if the property had access, and a negative if it did not. In the final scenario, water and sewer access was assumed for all properties.

Matrix 1 was investigated and compared with Matrix 2; after discussion with the Technical Advisory Group, it was decided to go ahead with Matrix 2, as it was more representative of identifying developable properties. Matrix 2 was used for the Baseline Growth impact calculations, and Matrix 3 was used for the Augmented Growth calculations as well as to assess the improvement in ranking if sewer and water access was assumed equal throughout the study area. Matrix 3 removes the positive/negative effect of sewer and water, as it assumes a post-sewer-installation scenario.

MATRIX 1		
Variable	*Weighting*	*Notes*
Underutilized	0	
Undeveloped	0	
Vacant	0	
Suspect Brownfield	-1	
LUST/ECSI	-2	
Water Utility	-1 / +1	negative if no access
Sewer Utility	-1 / +1	negative if no access
Visibility (Commercial)	+1	
Highway Access (Industrial)	0	
Distance to I-5 (Industrial) (20 mi)	+1	
Good Site Configuration	+1	

MATRIX 2		
Variable	*Weighting*	*Notes*
Underutilized	0	
Undeveloped	+1	
Vacant	+1	
Suspect Brownfield	-1	
LUST/ECSI	-2	
Water Utility	-1 / +1	negative if no access
Sewer Utility	-1 / +1	negative if no access
Visibility (Commercial)	+1	
Highway Access (Industrial)	0	
Distance to I-5 (Industrial) (20 mi)	+1	
Good Site Configuration	+1	

MATRIX 3		
Variable	*Weighting*	*Notes*
Underutilized	0	
Undeveloped	+1	
Vacant	+1	
Suspect Brownfield	-1	
LUST/ECSI	-2	
Water Utility	+1 / +1	Assumed all properties
Sewer Utility	+1 / +1	Assumed all properties
Visibility (Commercial)	+1	
Highway Access (Industrial)	0	
Distance to I-5 (Industrial) (20 mi)	+1	
Good Site Configuration	+1	

Ranking

The output of the matrix calculations was a parcel rank value. Higher-ranked properties are considered more desirable from a development standpoint. The ranking is subjective and does not incorporate specific business needs, the cost of the property, or the land preparation that may be required.

Analysis

Using land demand estimates generated by Elesco Limited (Elesco), the highest-ranked properties that would meet the demand were identified to determine if capacity was available, and indicate likely locations for development to occur.

The Baseline Growth scenario used Matrix 2 to identify the highest-ranked vacant and undeveloped industrial and commercial parcels that meet the projected Baseline Growth rate land demand, and indicate those more desirable for development. Typologies were assigned to the estimated land demand, using the following ratios: Large Industrial 65 percent, Small Industrial 35 percent; Large Commercial 25 percent, Small Commercial 75 percent, in line with Elesco estimates.

The Augmented Growth scenario used Matrix 3 to identify the highest-ranked vacant and undeveloped industrial and commercial parcels that meet the Augmented Growth rate land demand, and indicate those more desirable for development. Typologies were assigned to the estimated land demand using the following ratios: Large Industrial 65 percent, Small Industrial 35 percent; Large Commercial 25 percent, Small Commercial 75 percent, in line with Elesco estimates.

A comparison was made between Matrix 2 and Matrix 3 rankings to estimate the impact of a sewer system in the canyon on the desirability of industrial and commercial zoned parcels. A positive difference indicates a parcel that increased in desirability following the development of a sewer system in the canyon. In this analysis, all parcels (undeveloped, vacant, and developed), are included.

APPENDIX C

PROPERTY CUT SHEETS

Property 1
SR22 & Northwest 7th Avenue Mill City, Oregon

BASELINE SCORE
5

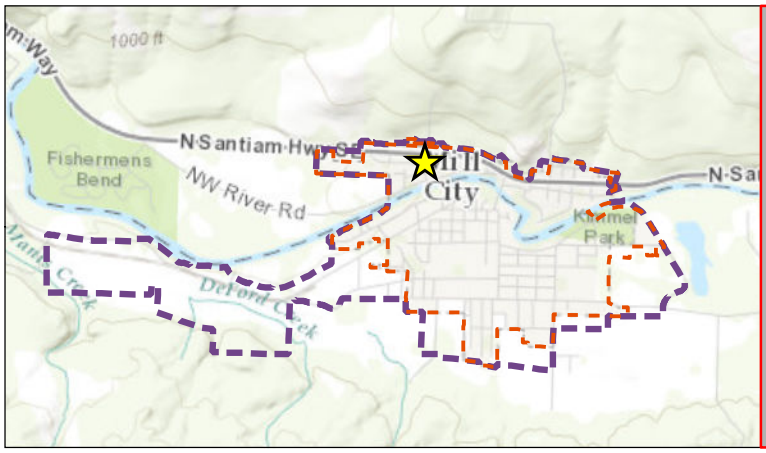
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph obtained from Linn County. Site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



NO PHOTO AVAILABLE

Tax Lot ID	093E30DB02500
Acreage	0.37
Avg % Slope	4.79
Property Class	COMMERCIAL VACANT
Zoning	Commercial
Land Value	$56,160
Improvement Value	$0
Total Value	$56,160
Utilization Ratio	0
Brownfield	Non-Suspect

Typology	Small Commercial
Status	Undeveloped
UGB	Mill City
City Limit	Mill City
Storefront Appeal	N/A
Business Type	N/A
Tourism	No
Site Configuration	Good
Distance to I5 (mi)	27.07
Field Notes	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop1_SR22 & NW 7th Ave.mxd
Print Date: 11/30/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 2
718 Northwest Santiam Boulevard

Mill City, Oregon

BASELINE SCORE

5

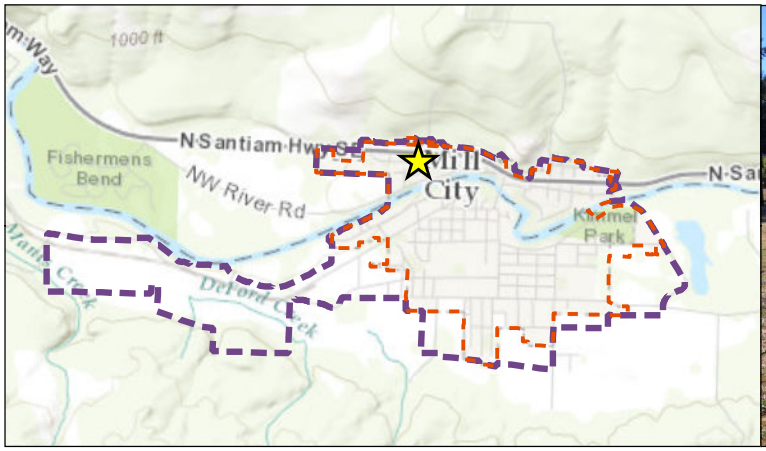
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph obtained from Linn County. Site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	093E30DB02700
Acreage	0.61
Avg % Slope	3.55
Property Class	Commercial Vacant
Zoning	Commercial
Land Value	$83,110
Improvement Value	$0
Total Value	$83,110
Utilization Ratio	0.00%
Brownfield	Non-Suspect

Typology	Large Commercial
Status	Vacant
UGB	Mill City
City Limit	Mill City
Storefront Appeal	N/A
Business Type	N/A
Tourism	No
Site Configuration	Good
Distance to I5 (mi)	27.04
Field Notes	Buildings cleared

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop2_718 NW Santiam Blvd.mxd
Print Date: 11/22/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 3
415 Northwest Santiam Boulevard

Mill City, Oregon

BASELINE SCORE

4

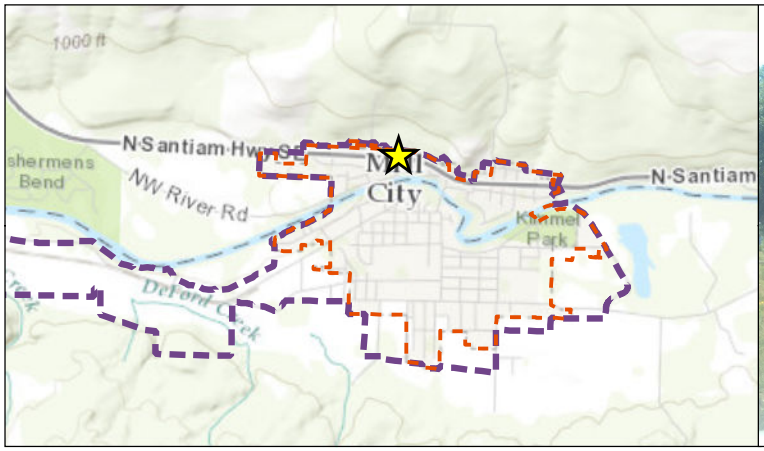
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph obtained from Linn County. Site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	093E30DA00400
Acreage	0.34
Avg % Slope	5.58
Property Class	Residential Vacant
Zoning	Commercial
Land Value	$35,660
Improvement Value	$0
Total Value	$35,660
Utilization Ratio	0.00%
Brownfield	Non-Suspect

Typology	Small Commercial
Status	Undeveloped
UGB	Mill City
City Limit	Mill City
Storefront Appeal	N/A
Business Type	None
Tourism	No
Site Configuration	Fair
Distance to I5 (mi)	27.18
Field Notes	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

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Print Date: 11/22/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

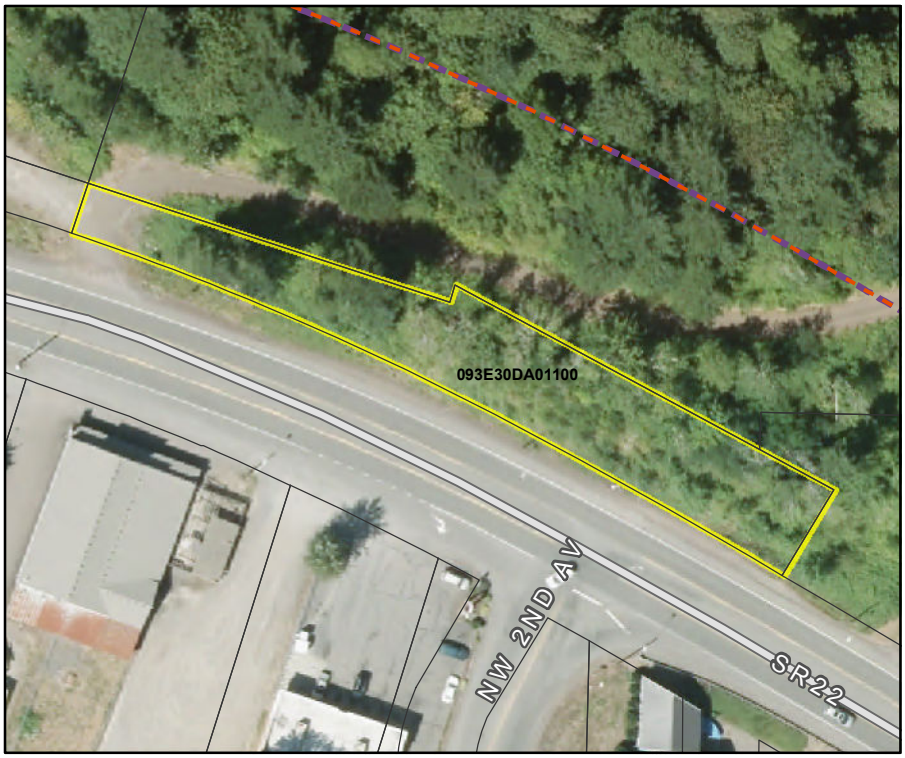
Property 4
223 Northwest Santiam Boulevard

Mill City
Oregon

BASELINE SCORE

4

Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

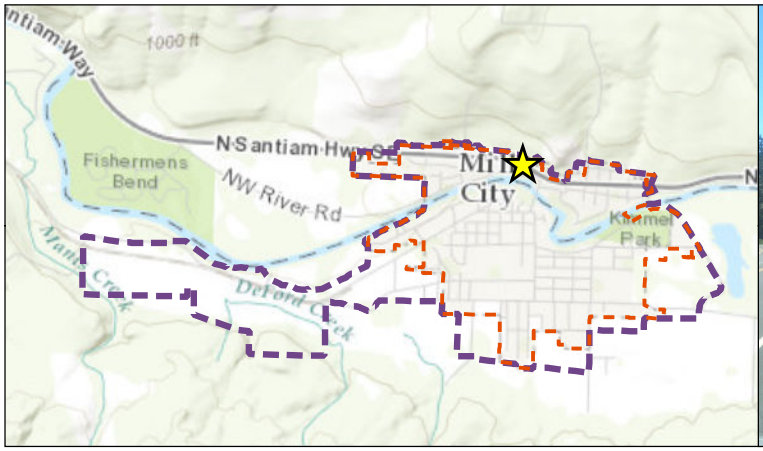


Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph obtained from Linn County. Site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	093E30DA01100	**Typology**	Small Commercial
Acreage	0.40	**Status**	Undeveloped
Avg % Slope	12.25	**UGB**	Mill City
Property Class	State-Owned	**City Limit**	Mill City
Zoning	Commercial	**Storefront Appeal**	N/A
Land Value	$17,180	**Business Type**	None
Improvement Value	$0	**Tourism**	No
Total Value	$17,180	**Site Configuration**	Poor
Utilization Ratio	0.00%	**Distance to I5 (mi)**	27.29
Brownfield	N/A	**Field Notes**	Long, narrow/steep grade

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop4_223 NW Santiam Blvd.mxd
Print Date: 11/22/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 5
650 North Santiam Highway Gates, Oregon

BASELINE SCORE

3

Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph obtained from Linn County. Site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.

Tax Lot ID	093E27DB01100	**Typology**	Large Commercial
Acreage	0.62	**Status**	Undeveloped
Avg % Slope	2.74	**UGB**	Gates
Property Class	Commercial Improved	**City Limit**	Gates
Zoning	Commercial	**Storefront Appeal**	N/A
Land Value	$66,960	**Business Type**	N/A
Improvement Value	$2,000	**Tourism**	No
Total Value	$68,960	**Site Configuration**	Good
Utilization Ratio	2.99%	**Distance to I5 (mi)**	29.70
Brownfield	Non-Suspect	**Field Notes**	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop5_650 N Santiam Hwy.mxd
Print Date: 11/22/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 6
West Central Avenue & Louisa Street

Gates, Oregon

BASELINE SCORE

3

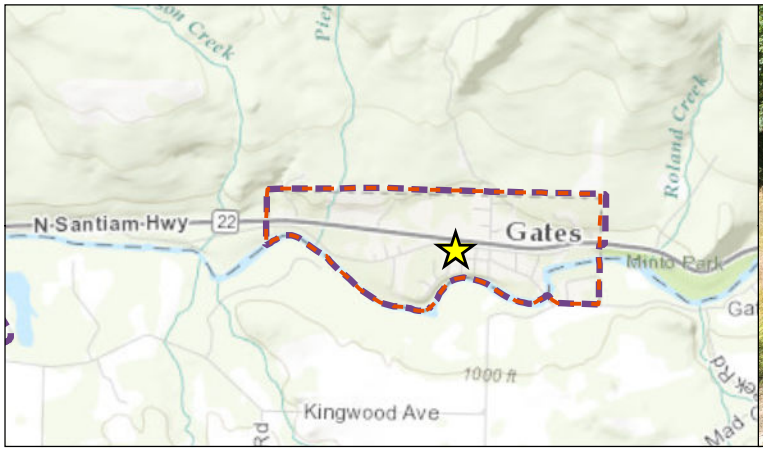
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph obtained from Linn County. Site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	093E27DD00900	**Typology**	Large Commercial
Acreage	0.57	**Status**	Undeveloped
Avg % Slope	0.64	**UGB**	Gates
Property Class	Commercial Vacant	**City Limit**	Gates
Zoning	Commercial	**Storefront Appeal**	N/A
Land Value	$59,980	**Business Type**	N/A
Improvement Value	$0	**Tourism**	No
Total Value	$59,980	**Site Configuration**	Good
Utilization Ratio	0.00%	**Distance to I5 (mi)**	30.04
Brownfield	Non-Suspect	**Field Notes**	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop6_W Central Ave & Louisa St.mxd
Print Date: 11/22/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 7
301-375 Southeast Fairview Street

Mill City, Oregon

BASELINE SCORE

3

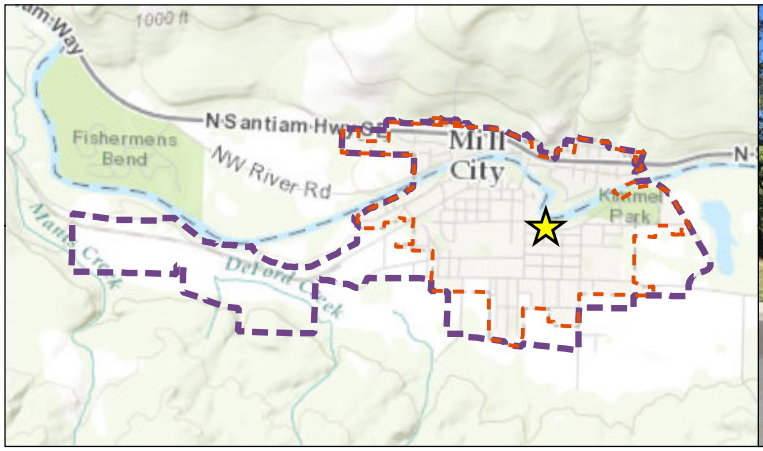
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 75 150
Feet

Source: Aerial photograph obtained from Linn County. Site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	09S03E29CC00804	**Typology**	Large Commercial
Acreage	1.06	**Status**	Undeveloped
Avg % Slope	2.63	**UGB**	Mill City
Property Class	RESIDENTIAL VACANT	**City Limit**	Mill City
Zoning	Commercial	**Storefront Appeal**	N/A
Land Value	$78,480	**Business Type**	N/A
Improvement Value	$0	**Tourism**	No
Total Value	$78,480	**Site Configuration**	Fair
Utilization Ratio	0.00%	**Distance to I5 (mi)**	27.58
Brownfield	Non-Suspect	**Field Notes**	For sale

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop7_301-375 SE Fairview St.mxd
Print Date: 11/22/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 8
250 Northwest 9th Avenue Mill City, Oregon

BASELINE SCORE

3

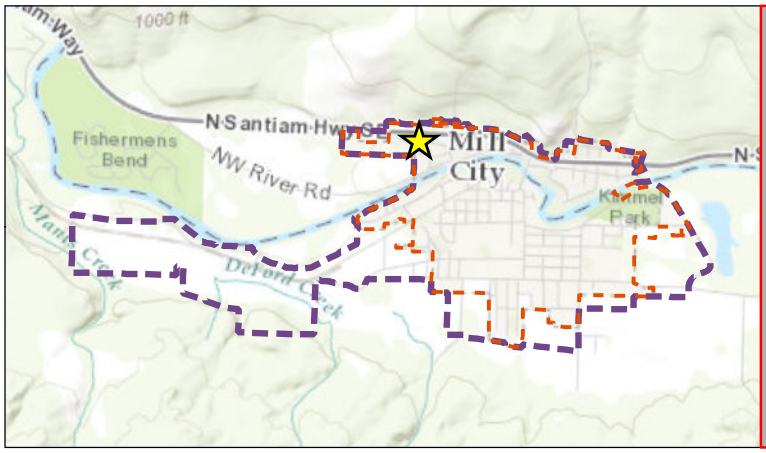
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph obtained from Linn County. Site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



NO PHOTO AVAILABLE

Tax Lot ID	093E30DB03401	**Typology**	Small Commercial
Acreage	0.32	**Status**	Undeveloped
Avg % Slope	2.25	**UGB**	Mill City
Property Class	Commercial Vacant	**City Limit**	Mill City
Zoning	Commercial	**Storefront Appeal**	N/A
Land Value	$30,960	**Business Type**	N/A
Improvement Value	$0	**Tourism**	No
Total Value	$30,960	**Site Configuration**	Good
Utilization Ratio	0.00%	**Distance to I5 (mi)**	26.94
Brownfield	Non-Suspect	**Field Notes**	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop8_250 NW 9th Ave.mxd
Print Date: 11/22/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 9
125 Detroit Avenue South

Detroit, Oregon

BASELINE SCORE

3

Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.

Tax Lot ID	105E01CB07500
Acreage	0.43
Avg % Slope	1.31
Property Class	Commercial Vacant
Zoning	Commercial
Land Value	$90,600
Improvement Value	$0
Total Value	$90,600
Utilization Ratio	0.00%
Brownfield	Non-Suspect

Typology	Small Commercial
Status	Undeveloped
UGB	N/A
City Limit	Detroit
Storefront Appeal	N/A
Business Type	None
Tourism	No
Site Configuration	Good
Distance to I5 (mi)	43.00
Field Notes	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop9_125 Detroit Ave S.mxd
Print Date: 11/22/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 10
112 North Santiam Highway Idanha, Oregon

BASELINE SCORE

3

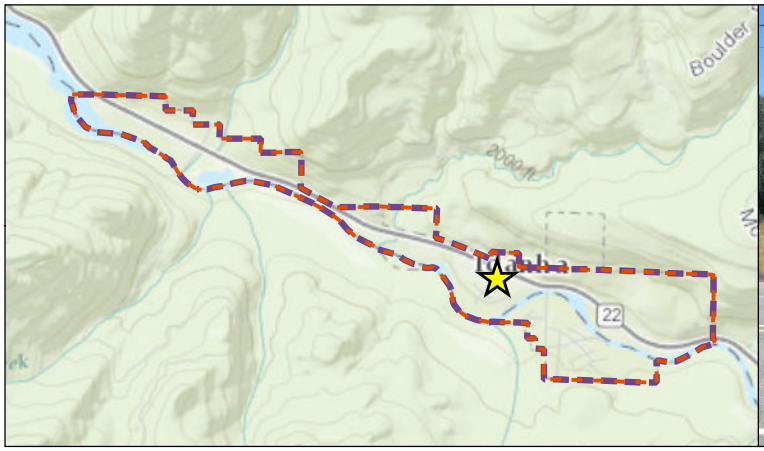
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	106E16D 01400
Acreage	0.48
Avg % Slope	0.85
Property Class	Commercial Vacant
Zoning	Commercial
Land Value	$6,990
Improvement Value	$0
Total Value	$6,990
Utilization Ratio	0.00%
Brownfield	Non-Suspect

Typology	Small Commercial
Status	Undeveloped
UGB	Idahna
City Limit	Idanha
Storefront Appeal	N/A
Business Type	None
Tourism	No
Site Configuration	Good
Distance to I5 (mi)	47.00
Field Notes	Neighboring parcel blocks street access

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop10_112 N Santiam Hwy.mxd
Print Date: 11/23/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 11
110 O'Toole Street Gates, Oregon

BASELINE SCORE

2

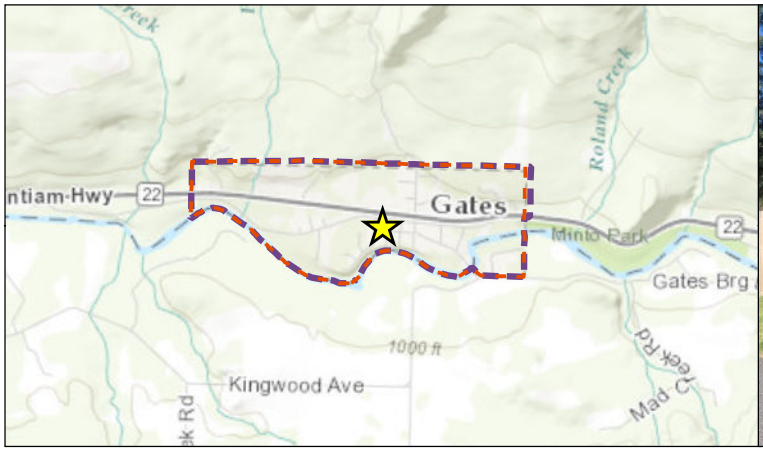
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	093E27DD00902
Acreage	0.29
Avg % Slope	1.83
Property Class	Commercial Vacant
Zoning	Commercial
Land Value	$30,020
Improvement Value	$0
Total Value	$30,020
Utilization Ratio	0.00%
Brownfield	Non-Suspect

Typology	Small Commercial
Status	Undeveloped
UGB	Gates
City Limit	Gates
Storefront Appeal	N/A
Business Type	None
Tourism	No
Site Configuration	Good
Distance to I5 (mi)	30.06
Field Notes	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop11_110 O'Toole St.mxd
Print Date: 11/23/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 12
West Sorbin Avenue & Santiam Street

Gates, Oregon

BASELINE SCORE
2

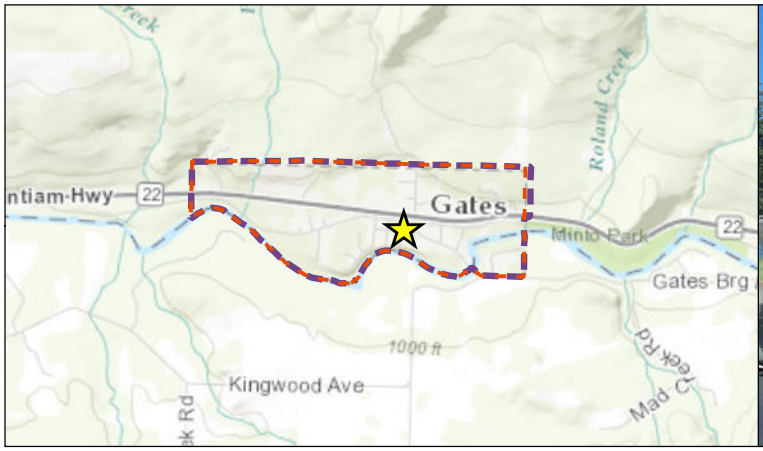
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	093E27DD01200	**Typology**	Small Commercial
Acreage	0.34	**Status**	Undeveloped
Avg % Slope	1.66	**UGB**	Gates
Property Class	Commercial Vacant	**City Limit**	Gates
Zoning	Commercial	**Storefront Appeal**	N/A
Land Value	$54,000	**Business Type**	N/A
Improvement Value	$0	**Tourism**	No
Total Value	$54,000	**Site Configuration**	Good
Utilization Ratio	0.00%	**Distance to I5 (mi)**	30.15
Brownfield	Non-Suspect	**Field Notes**	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheetsv2\Prop12_W Sorbin Ave & Santiam St.mxd
Print Date: 11/23/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 13
220 Northeast 7th Avenue

Mill City, Oregon

BASELINE SCORE

2

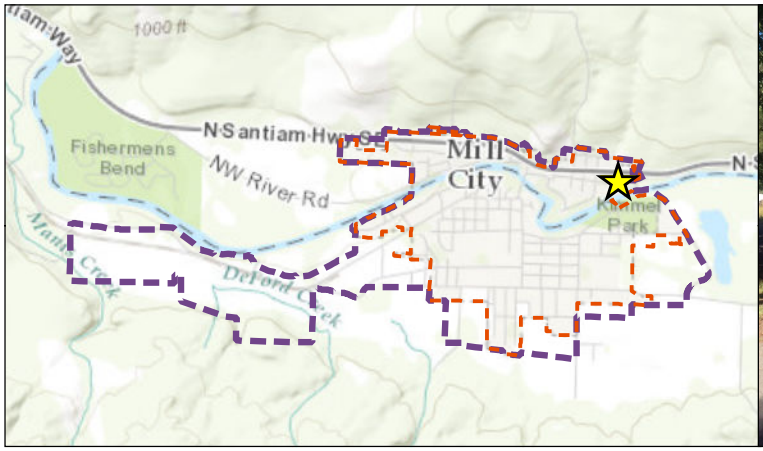
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	093E29CD02100
Acreage	0.50
Avg % Slope	3.48
Property Class	Residential Vacant
Zoning	Commercial
Land Value	$45,960
Improvement Value	$0
Total Value	$45,960
Utilization Ratio	0.00%
Brownfield	Non-Suspect

Typology	Small Commercial
Status	Undeveloped
UGB	Mill City
City Limit	Mill City
Storefront Appeal	N/A
Business Type	None
Tourism	No
Site Configuration	Good
Distance to I5 (mi)	27.82
Field Notes	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop13_220 NE 7th Ave.mxd
Print Date: 11/23/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 14
382 Northeast Santiam Boulevard

Mill City, Oregon

BASELINE SCORE

2

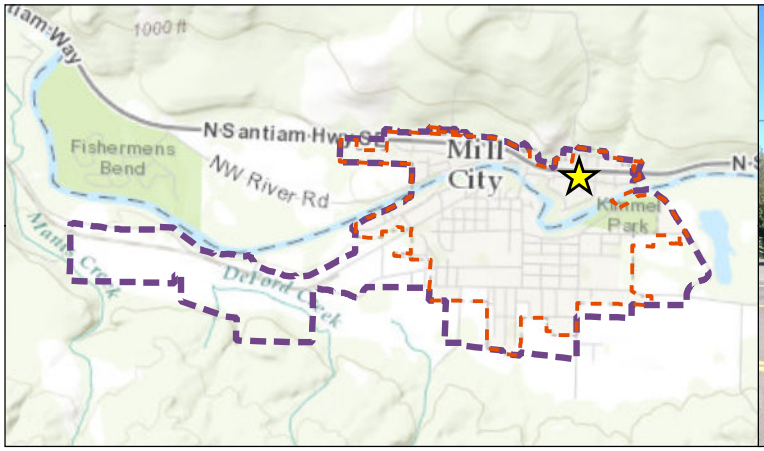
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	093E29CB02300
Acreage	0.38
Avg % Slope	4.26
Property Class	Commercial Improved
Zoning	Commercial
Land Value	$60,180
Improvement Value	$71,590
Total Value	$131,770
Utilization Ratio	118.96%
Brownfield	Suspect

Typology	Small Commercial
Status	Vacant
UGB	Mill City
City Limit	Mill City
Storefront Appeal	Poor
Business Type	Auto Related
Tourism	No
Site Configuration	Good
Distance to I5 (mi)	27.66
Field Notes	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop14_382 NE Santiam Blvd.mxd
Print Date: 11/23/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 15
1090 Northwest Alder Street Mill City, Oregon

BASELINE SCORE
1

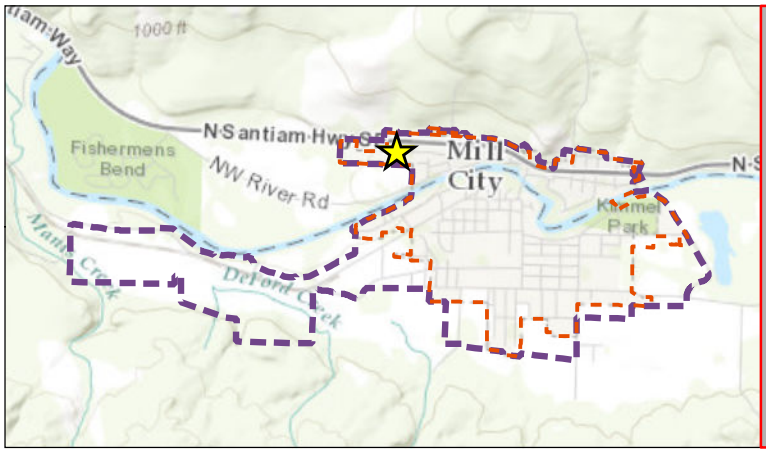
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



NO PHOTO AVAILABLE

Tax Lot ID	093E30CA01200	**Typology**	Small Commercial
Acreage	0.26	**Status**	Undeveloped
Avg % Slope	1.69	**UGB**	Mill City
Property Class	Residential Vacant	**City Limit**	Mill City
Zoning	Commercial	**Storefront Appeal**	N/A
Land Value	$33,000	**Business Type**	N/A
Improvement Value	$0	**Tourism**	No
Total Value	$33,000	**Site Configuration**	Poor
Utilization Ratio	0.00%	**Distance to I5 (mi)**	26.86
Brownfield	Non-Suspect	**Field Notes**	Steep grade

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheetsv2\Prop15_1090 NW Alder St.mxd
Print Date: 11/23/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

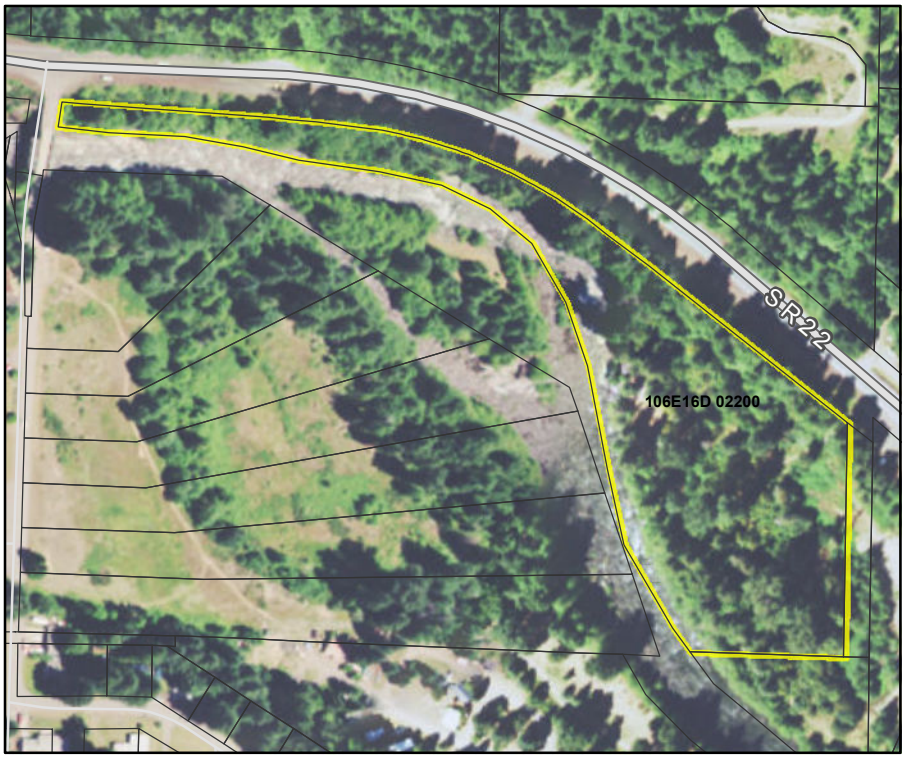
Property 16
North Santiam Highway & Church Street

Idanha, Oregon

BASELINE SCORE

1

Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

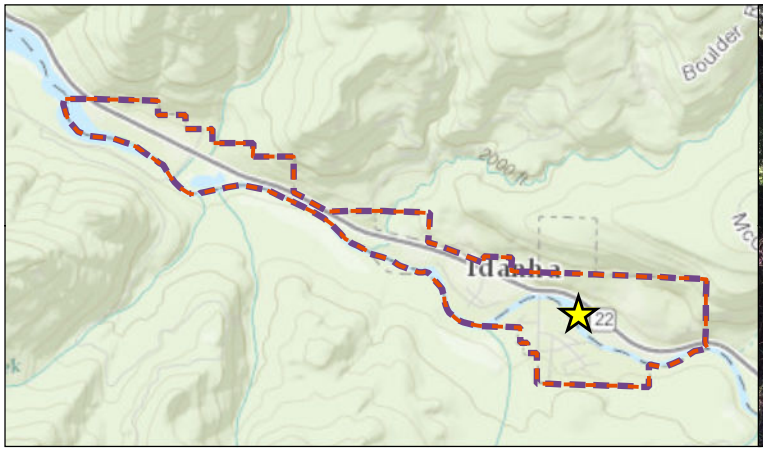


Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 150 300
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	106E16D 02200	**Typology**	Large Industrial
Acreage	5.52	**Status**	Undeveloped
Avg % Slope	7.00	**UGB**	Idahna
Property Class	Commercial Vacant	**City Limit**	Idanha
Zoning	Industrial	**Storefront Appeal**	N/A
Land Value	$84,580	**Business Type**	None
Improvement Value	$0	**Tourism**	No
Total Value	$84,580	**Site Configuration**	Fair
Utilization Ratio	0.00%	**Distance to I5 (mi)**	47.25
Brownfield	Non-Suspect	**Field Notes**	Dirt access road

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop16_N Santiam Hwy & Church St.mxd
Print Date: 11/23/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 17
212 North Santiam Highway Southeast

Gates, Oregon

BASELINE SCORE

1

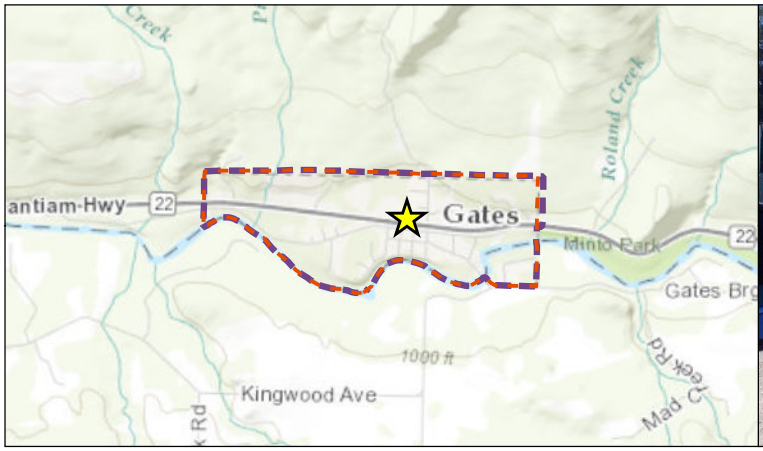
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	093E27DA01700
Acreage	0.35
Avg % Slope	1.27
Property Class	Residential Improved Comm-Zone
Zoning	Commercial
Land Value	$61,450
Improvement Value	$23,680
Total Value	$85,130
Utilization Ratio	38.54%
Brownfield	Non-Suspect

Typology	Small Commercial
Status	Vacant
UGB	Gates
City Limit	Gates
Storefront Appeal	Poor
Business Type	None
Tourism	No
Site Configuration	Good
Distance to I5 (mi)	30.08
Field Notes	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop17_212 N Santiam Hwy SE.mxd
Print Date: 11/28/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 18
829 Southwest 1st Street Mill City, Oregon

BASELINE SCORE
1

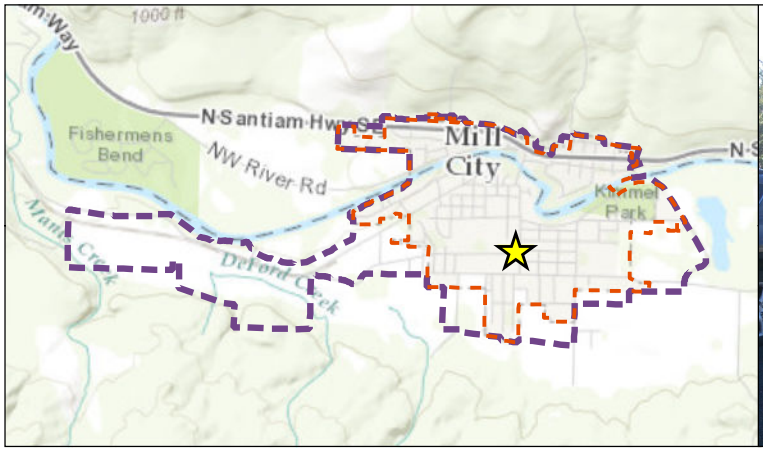
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	09S03E31AA02200	**Typology**	Small Commercial
Acreage	0.44	**Status**	Vacant
Avg % Slope	1.12	**UGB**	Mill City
Property Class	Commercial Improved	**City Limit**	Mill City
Zoning	Commercial	**Storefront Appeal**	N/A
Land Value	$52,660	**Business Type**	N/A
Improvement Value	$4,660	**Tourism**	No
Total Value	$57,320	**Site Configuration**	Fair
Utilization Ratio	8.85%	**Distance to I5 (mi)**	27.57
Brownfield	Non-Suspect	**Field Notes**	Half parking, half field

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop18_829 SW 1st St.mxd
Print Date: 11/28/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 19
21937 Emma Street Southeast

Mehama, Oregon

BASELINE SCORE
0

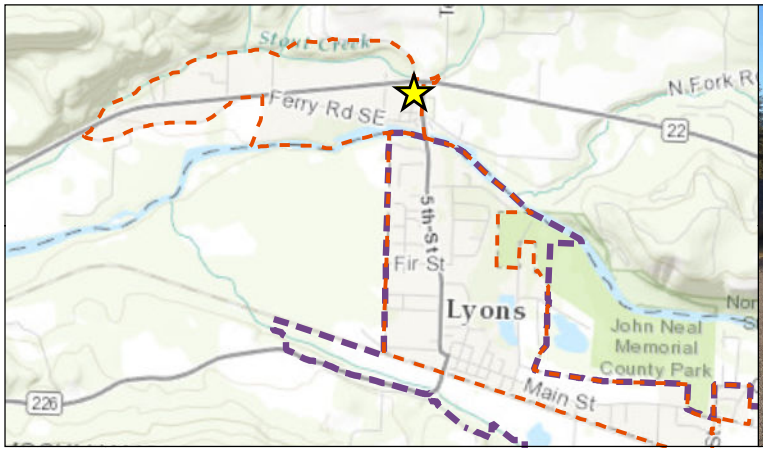
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	092E18BC01000	**Typology**	Small Commercial
Acreage	0.26	**Status**	Undeveloped
Avg % Slope	1.57	**UGB**	N/A
Property Class	Residential Improved	**City Limit**	Mehama
Zoning	Commercial	**Storefront Appeal**	N/A
Land Value	$64,000	**Business Type**	None
Improvement Value	$25,660	**Tourism**	No
Total Value	$89,660	**Site Configuration**	Good
Utilization Ratio	40.09%	**Distance to I5 (mi)**	20.04
Brownfield	Non-Suspect	**Field Notes**	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop19_21937 Emma St SE.mxd
Print Date: 11/29/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 20
111 North Santiam Highway (1) Idanha, Oregon

BASELINE SCORE

0

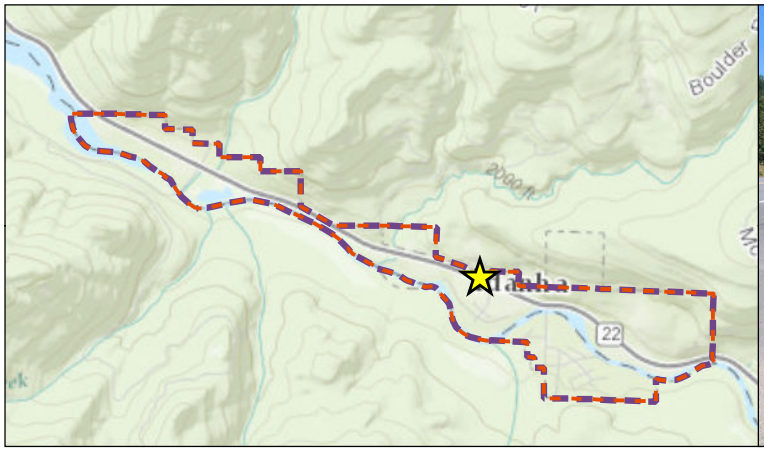
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.

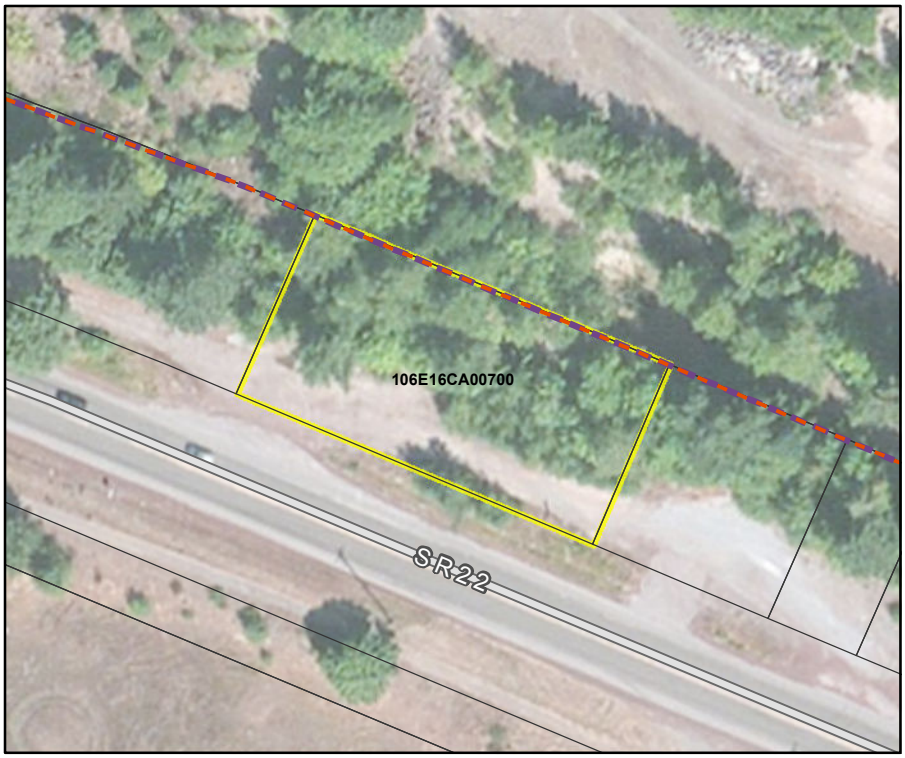


Tax Lot ID	106E16CA00400	**Typology**	Small Commercial
Acreage	0.35	**Status**	Undeveloped
Avg % Slope	10.66	**UGB**	Idahna
Property Class	Commercial Vacant	**City Limit**	Idanha
Zoning	Commercial	**Storefront Appeal**	N/A
Land Value	$36,000	**Business Type**	N/A
Improvement Value	$0	**Tourism**	No
Total Value	$36,000	**Site Configuration**	Fair
Utilization Ratio	0.00%	**Distance to I5 (mi)**	46.89
Brownfield	Non-Suspect	**Field Notes**	Flat, lots of trees

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop20_111 N Santiam Hwy (1).mxd
Print Date: 11/29/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 21
111 North Santiam Highway (2) Idanha, Oregon



BASELINE SCORE

0

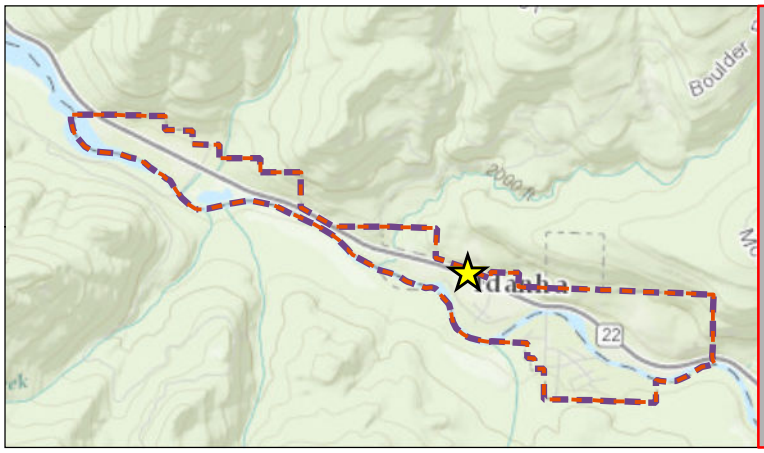
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



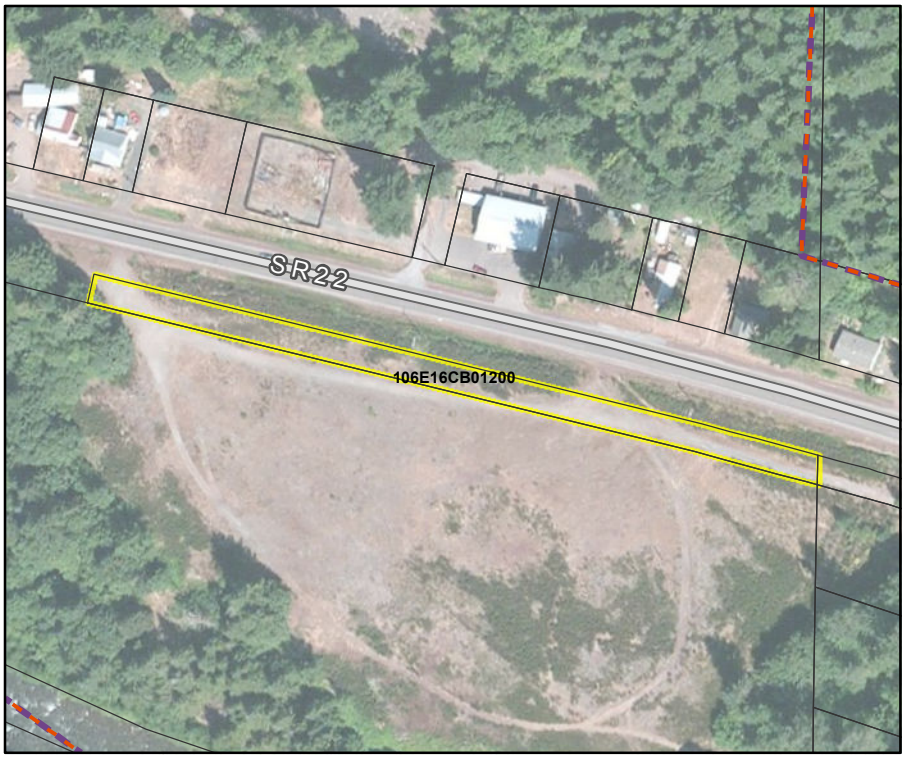
NO PHOTO AVAILABLE

Tax Lot ID	106E16CA00700	**Typology**	Small Commercial
Acreage	0.47	**Status**	Undeveloped
Avg % Slope	10.38	**UGB**	Idahna
Property Class	Commercial Vacant	**City Limit**	Idanha
Zoning	Commercial	**Storefront Appeal**	N/A
Land Value	$48,000	**Business Type**	N/A
Improvement Value	$0	**Tourism**	No
Total Value	$48,000	**Site Configuration**	Fair
Utilization Ratio	0.00%	**Distance to I5 (mi)**	46.83
Brownfield	Non-Suspect	**Field Notes**	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop21_111 N Santiam Hwy (2).mxd
Print Date: 11/29/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 22
401 North Santiam Highway Idanha, Oregon



BASELINE SCORE

0

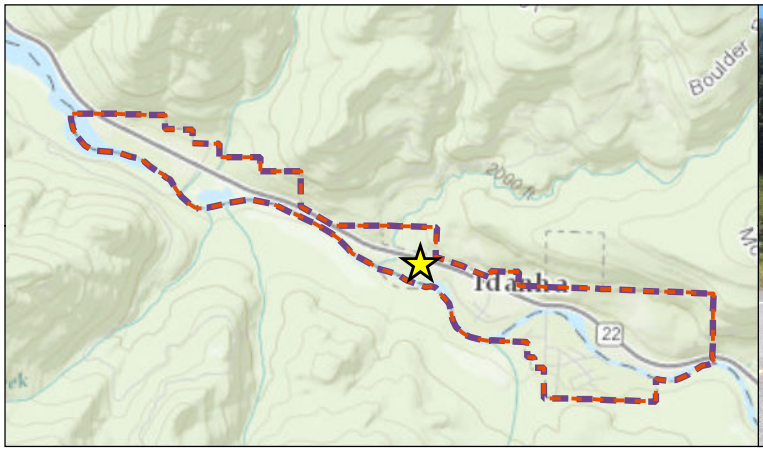
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 100 200
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	106E16CB01200	**Typology**	Small Commercial
Acreage	0.54	**Status**	Undeveloped
Avg % Slope	4.37	**UGB**	Idahna
Property Class	Commercial Vacant	**City Limit**	Idanha
Zoning	Commercial	**Storefront Appeal**	N/A
Land Value	$22,760	**Business Type**	None
Improvement Value	$0	**Tourism**	No
Total Value	$22,760	**Site Configuration**	Poor
Utilization Ratio	0.00%	**Distance to I5 (mi)**	46.56
Brownfield	Non-Suspect	**Field Notes**	Long narrow road front parcel

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

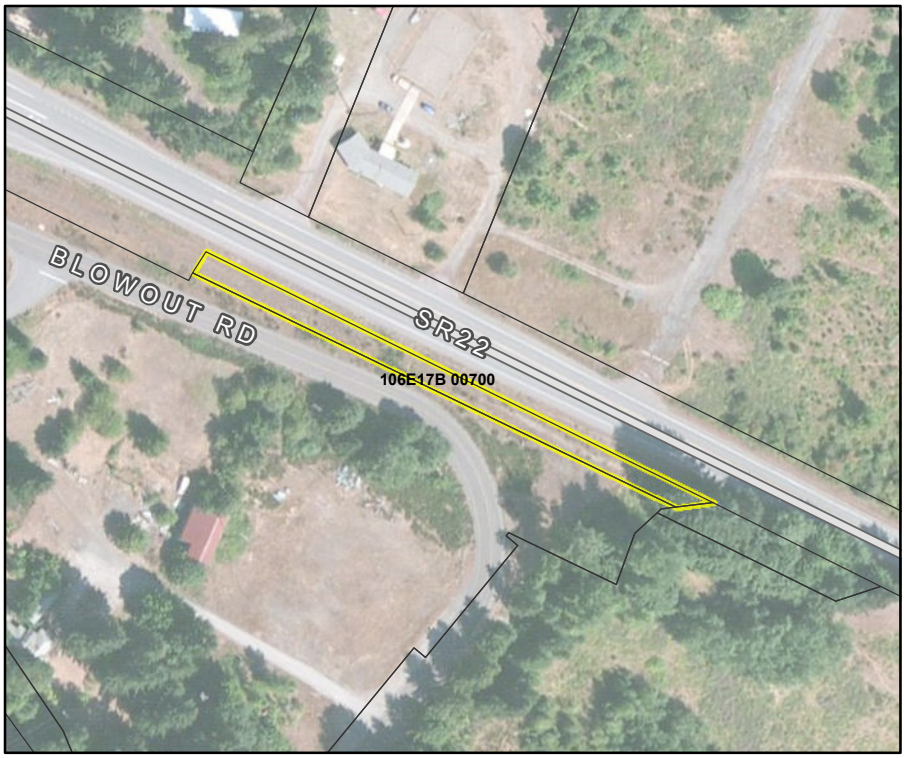
Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop22_401 N Santiam Hwy.mxd
Print Date: 11/29/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 23
Blowout Road

Idanha, Oregon

BASELINE SCORE
0

Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

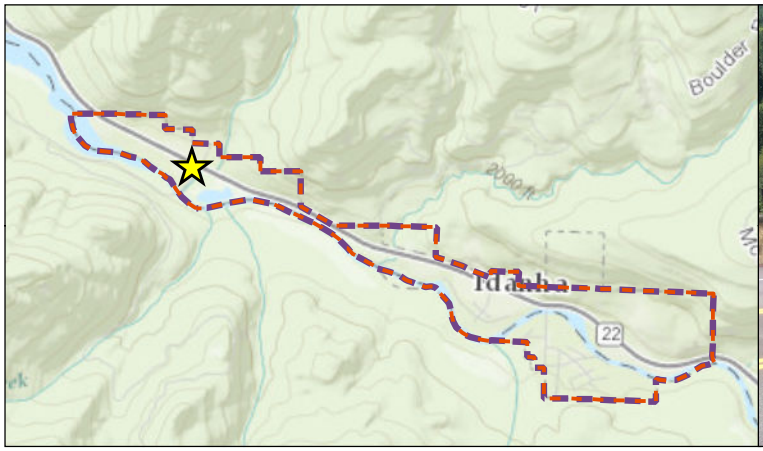


Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 100 200
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	106E17B 00700	**Typology**	Small Commercial
Acreage	0.31	**Status**	Undeveloped
Avg % Slope	0.69	**UGB**	Idahna
Property Class	State	**City Limit**	Idanha
Zoning	Commercial	**Storefront Appeal**	N/A
Land Value	$16,990	**Business Type**	None
Improvement Value	$0	**Tourism**	No
Total Value	$16,990	**Site Configuration**	Poor
Utilization Ratio	0.00%	**Distance to I5 (mi)**	45.46
Brownfield	Non-Suspect	**Field Notes**	Long and narrow parcel

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop23_Blowout Rd.mxd
Print Date: 11/29/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 24
1324 Main Street

Lyons, Oregon

BASELINE SCORE
0

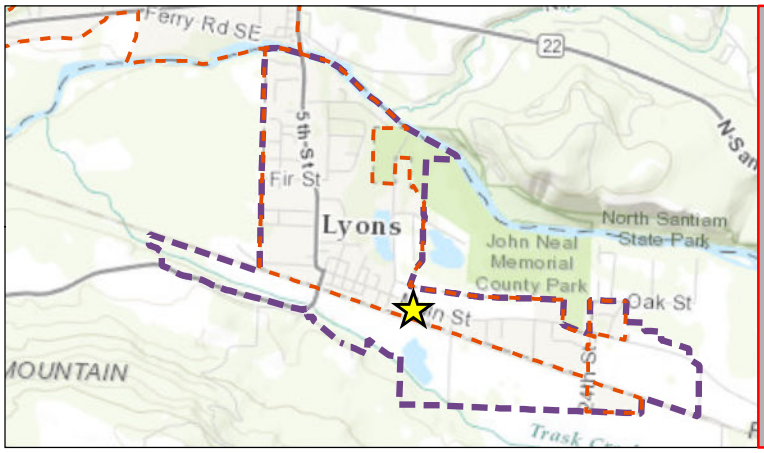
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



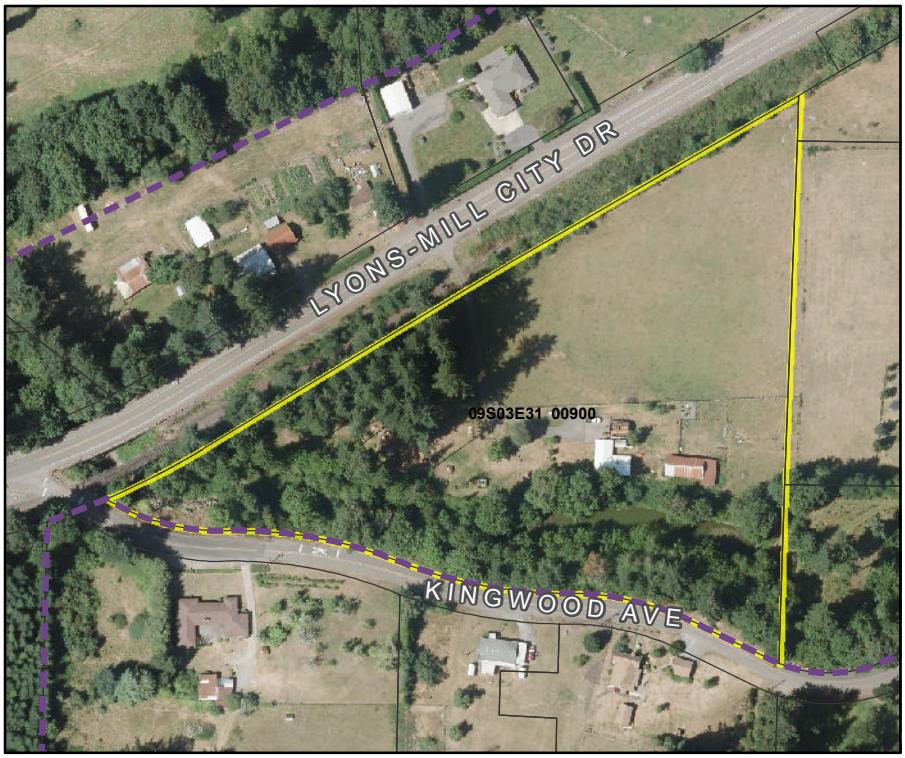
NO PHOTO AVAILABLE

Tax Lot ID	09S02E19DB02100	**Typology**	Small Commercial
Acreage	0.29	**Status**	Undeveloped
Avg % Slope	0.00	**UGB**	Lyons
Property Class	Commercial Vacant	**City Limit**	Lyons
Zoning	Commercial	**Storefront Appeal**	N/A
Land Value	$57,970	**Business Type**	N/A
Improvement Value	$0	**Tourism**	No
Total Value	$57,970	**Site Configuration**	Good
Utilization Ratio	0.00%	**Distance to I5 (mi)**	21.18
Brownfield	Non-Suspect	**Field Notes**	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop24_1324 Main St_Lyons.mxd
Print Date: 11/30/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 25
48210 Lyons Mill City Drive Mill City, Oregon



BASELINE SCORE

0

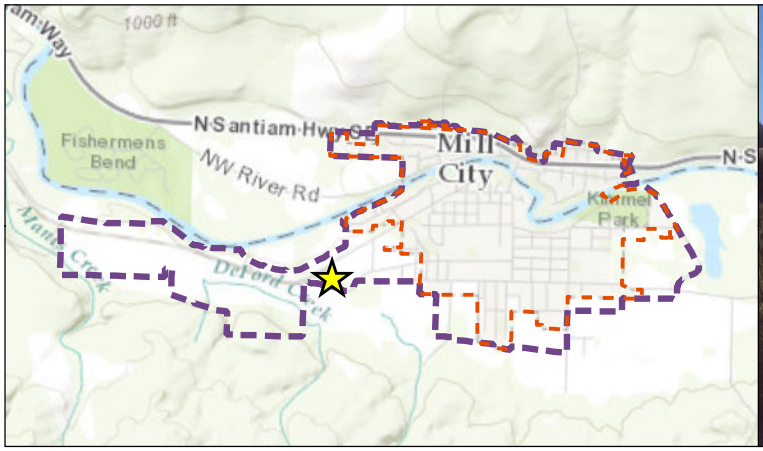
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 125 250
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	09S03E31 00900	**Typology**	Large Industrial
Acreage	7.21	**Status**	Vacant
Avg % Slope	0.95	**UGB**	Mill City
Property Class	TRACT IMPROVED	**City Limit**	N/A
Zoning	Industrial	**Storefront Appeal**	N/A
Land Value	$118,430	**Business Type**	None
Improvement Value	$56,420	**Tourism**	No
Total Value	$174,850	**Site Configuration**	Good
Utilization Ratio	47.64%	**Distance to I5 (mi)**	26.83
Brownfield	Non-Suspect	**Field Notes**	Unknown business activity/appears to be farm

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop25_48210 Lyons Mill City Dr_Mill City.mxd
Print Date: 11/30/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 26
47601 East Lyons Mill City Drive

Lyons, Oregon

BASELINE SCORE

0

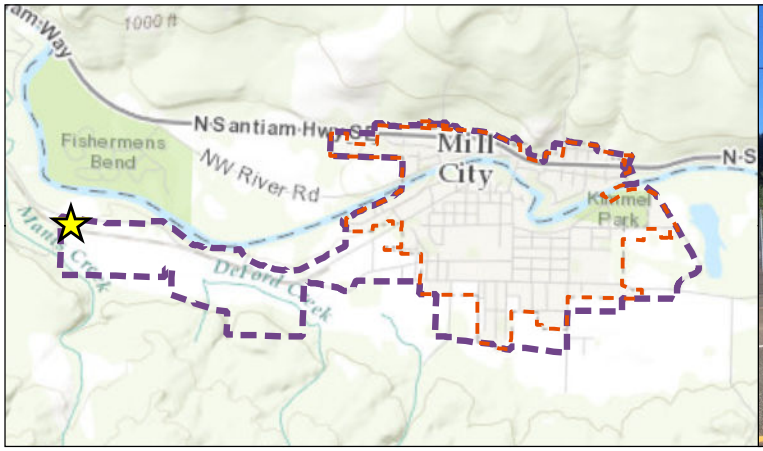
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 75 150
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



Tax Lot ID	09S02E36 01305	**Typology**	Small Industrial
Acreage	2.29	**Status**	Undeveloped
Avg % Slope	1.69	**UGB**	Mill City
Property Class	VACANT TRACT	**City Limit**	N/A
Zoning	Industrial	**Storefront Appeal**	N/A
Land Value	$59,670	**Business Type**	None
Improvement Value	$0	**Tourism**	No
Total Value	$59,670	**Site Configuration**	Good
Utilization Ratio	0.00%	**Distance to I5 (mi)**	25.71
Brownfield	Non-Suspect	**Field Notes**	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheetsv2\Prop26_47601 East Lyons Mill City Dr_Lyons.mxd
Print Date: 11/30/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 27
44711 Oregon 226 Lyons, Oregon

BASELINE SCORE
0

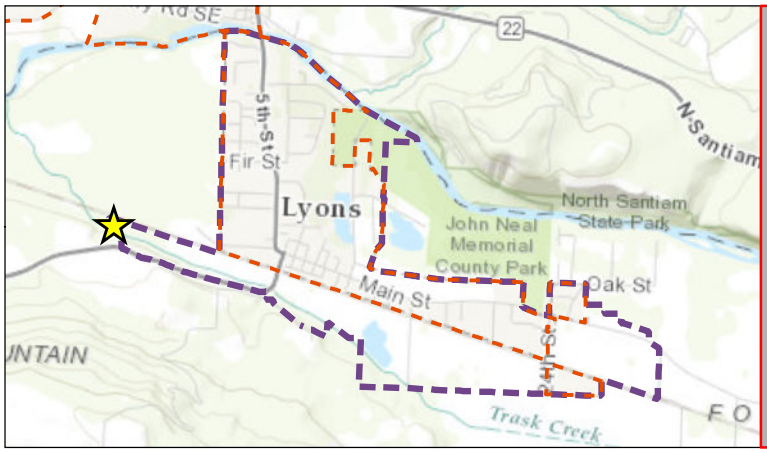
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 75 150
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



NO PHOTO AVAILABLE

Tax Lot ID	09S01E24 01101	**Typology**	Small Industrial
Acreage	1.27	**Status**	Undeveloped
Avg % Slope	1.51	**UGB**	Lyons
Property Class	Industrial Vacant	**City Limit**	N/A
Zoning	Industrial	**Storefront Appeal**	N/A
Land Value	$740	**Business Type**	Timber Industry
Improvement Value	$0	**Tourism**	No
Total Value	$740	**Site Configuration**	Poor
Utilization Ratio	0.00%	**Distance to I5 (mi)**	19.99
Brownfield	Non-Suspect	**Field Notes**	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop27_44711 Oregon 226_Lyons.mxd
Print Date: 11/30/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 28
1400 Douglas

Lyons, Oregon

BASELINE SCORE

0

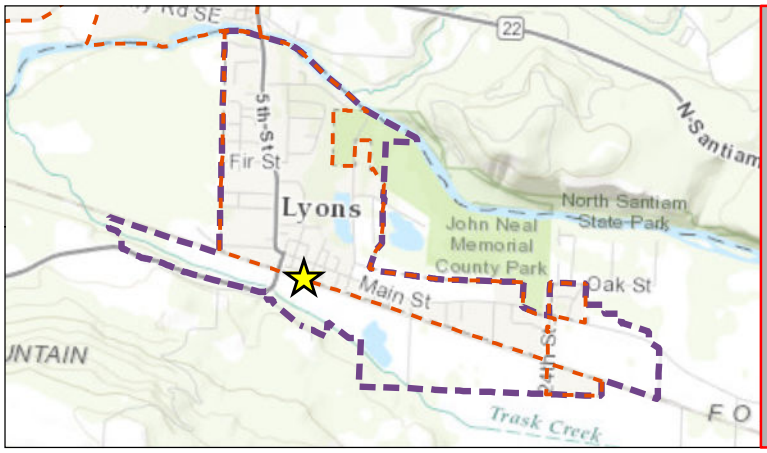
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 125 250
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



NO PHOTO AVAILABLE

Tax Lot ID	09S02E19C 00100
Acreage	3.90
Avg % Slope	0.77
Property Class	County Resp. Industrial, Land & B
Zoning	Industrial
Land Value	$0
Improvement Value	$0
Total Value	$0
Utilization Ratio	0.00%
Brownfield	Non-Suspect

Typology	Small Industrial
Status	Undeveloped
UGB	Lyons
City Limit	Lyons
Storefront Appeal	N/A
Business Type	Timber Industry
Tourism	No
Site Configuration	Good
Distance to I5 (mi)	20.77
Field Notes	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop28_1400 Douglas_Lyons.mxd
Print Date: 11/30/2016
Approved By: sotto
Produced By: GIS_Admin1
Project: 0612.01

Property 29
40070 Southwest 11th Avenue Mill City, Oregon

BASELINE SCORE

0

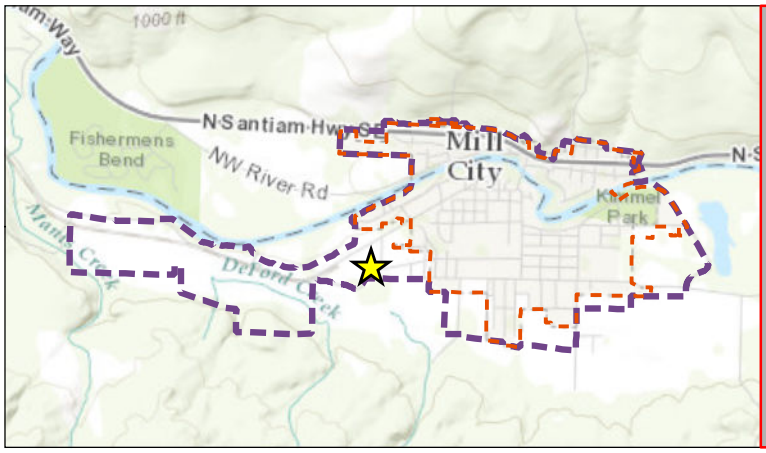
Baseline score generated from ranked variables. A higher score indicates the property is considered more desirable for development. Maximum value = 5.

Legend

- Identified Developable Parcel
- City Limits
- Urban Growth Boundary
- Tax Lot

0 50 100
Feet

Source: Aerial photograph and site location basemap obtained from Esri ArcGIS Online. Parcel boundaries and streets obtained from Marion and Linn Counties.



NO PHOTO AVAILABLE

Tax Lot ID	09S03E31BA00600
Acreage	2.65
Avg % Slope	1.86
Property Class	Tract with MFG Structure
Zoning	Industrial
Land Value	$89,920
Improvement Value	$380
Total Value	$90,300
Utilization Ratio	0.42%
Brownfield	Non-Suspect

Typology	Small Industrial
Status	Undeveloped
UGB	Mill City
City Limit	N/A
Storefront Appeal	N/A
Business Type	N/A
Tourism	No
Site Configuration	Good
Distance to I5 (mi)	26.97
Field Notes	N/A

Land values per County assessor, 2016. I5 distance indicative and does not reflect driving distance.

Path: X:\0612.03 Business Oregon\Projects\Property Cutsheets\v2\Prop29_40070 SW 11th Ave_Mill City.mxd
Print Date: 11/30/2016
Approved By: sotto
Produced By: jschane
Project: 0612.01

APPENDIX D

STAKEHOLDER INTERVIEWS

MEETING NOTES

Meeting Topic:	Study Area Stakeholder Interviews
Meeting Date & Time:	June 6, 2016
Project No.:	0612.03.01
Project Name:	North Santiam Canyon Regional Land Inventory
Meeting Location:	various
Recorded By:	Grant Herbert
Attendees:	Grant Herbert, MFA Peter Olsen, Keller

1. **City Representatives:**

Idanha: Mayor Yohe—2.5 years to go

Detroit: Debbie Ruyle, Sandy Franz (City Councilors), Bob Bruce, Christine Pavoni (city recorder)

Lyons: Richard, Darrell Ritchie (Public Works), Micki Valentine (city recorder)

Not present: Troy Donahue (mayor), Mike (Council)

Mill City: Thorin Thacker (mayor), Stacie Cook (city recorder), Russ Foltz (Public Works)

Gates: Jerry Marr (mayor), Gary Crumb, Greg Benthin (Public Works), Traci Archer (city recorder)

2. **What issues are your community's top priorities for economic and business development?**

Idanha:

No farming in the area; ice plant is only business. Green Veneer property (old mill) is a property of concern.

Detroit:

Business community growth very important.

Lyons:

N/A.

Mill City:

a. Want a more sustainable economy.
b. River is the lifeblood.

Gates:

a. Jobs
a. Community services

3. What types of industries and/or employers (businesses) are you seeking to attract to your community?

Idanha:

a. Would like an industrial employer for jobs, 12+ people. Housing is available for workers.
b. Possibly B&B, tourism. Camping, Pacific Crest Trail.
c. Mushrooms a possibility—morels, etc.

Detroit:

a. Tourism, hotel rooms "Outdoor Recreation Location."
b. Laundromat.
c. Restaurants, breweries and similar services to attract tourists/provide fun amenities.
d. Gas station (city has a Tesla Supercharger electric car charger unit).

Lyons:

Services: groceries, gas, barber/haircut, banks, healthcare

Mill City:

a. Tourism the goal—not much industrial land available.
b. Happy to adjust zoning for AirBnB, B&B, etc. Lack of lodging in the city, promoting small scale.
c. Jobs for kids—Subway, etc.
d. Support services for recreation, dinner spots (plenty of lunch places), brew pubs, 24-hour fitness.

Gates:

a. Restaurants, stores
b. Truck stop?

4. What types of industries are growing in the region?

Idanha:

None.

Detroit:

Tourism (kayak rental)

Lyons:

a. Wood products main employer. Freres' lumber (300–400 people). Will remain a strong company for some time. BUT outside the city limits (within UGB)—no taxes. Also, Conifer Canyon.

b. New bakery and car repair businesses in town.

Mill City:

Seven new businesses recently—online school, storage units, dollar general, chicken restaurant, Subway, catering business. Burger restaurant expanding. NRG Kayak.

5. What do you see are the greatest opportunities and constraints to growth and development in your community?

Idanha:

a. Need improved water distribution, roads, infrastructure, Internet expansion, cell coverage, electrical supply (power issues in winter), phone lines are bad, repair service slow. Radio service stops in Mill City.

b. Governance was a problem, now getting much better, gaining trust and producing something for the community.

Detroit:

a. Lack of sewer is a big problem for businesses, not being able to put in bathrooms, has affected potential businesses already. (Businesses currently using portable toilets)

b. Proposal for a bikeway from Estacada to Detroit—could be a big boost.

c. Lake levels have a big impact on tourism activity.

d. Skiing is important.

e. Business seasonality an issue.

f. Internet is good (fibre stops at Detroit).

g. Phone is good.

h. Only place for development is downtown.

i. Extending the season would be required—e.g., snowmobiling?

Lyons:

a. Urban development limit from septic requirements: 0.5 acre min. Average residential is 0.75 acres. Business currently use portable toilets.

b. Commercial/industrial unlikely due to septic requirements.

c. Commercial/industrial limited to a strip in downtown + along Main Street + Clipfell Lane + Front Street.

d. Main street mainly full.

e. Marijuana interests have approached city.

f. Trails—Canyon Journeys Trail Plan identified opportunities.

g. Lack of rental properties is a big problem.

Mill City:

a. Has a wastewater system and excellent water system.

b. But—experiencing more maintenance issues (new reservoir/old distribution for water, reverse for sewer).

c. Rails to Trails program to drive tourism.

d. Lack of worker rentals available.

e. No serviceable industrial land.

f. Lot size/lack of services has lost them small industrial opportunities in past.

Gates:

a. Power issues
b. No industrial users
c. Lack of sewer
d. No worker accommodation, no rentals, tight housing market—1 motel—6 rooms
e. No gas station
f. Fibre optic available
g. Is off the highway, no main street
h. ODOT issues getting signage on highway

6. What are the high-priority public improvements you are focused on making to your community?

Idanha:

N/A.

Detroit:

Community center improvements—big enough for events

Lyons:

a. Mehama community center
b. Street improvements (ODOT, fibre upgrade)

Mill City:

a. Cultural Arts Center.

b. Community Center.
c. Has museum, park facilities, further park developments planned.
d. Skatepark development.
e. Bridge refurbishment as part of Rails to Trails.
f. Highway 22 improvements.
g. Façade grants (Highway 22 area improvements).
h. New public works building planned.
i. Park development for boaters.
j. Improved signage to bring people into the city.

Gates:

a. Roads.
b. Public access to river (cliff is a problem). Parcel by bridge/fire station a possibility.
c. Facilities such as basketball court (currently 20' x 20').

7. What issues are most important to the citizens of your community?

Idanha:

a. Aging population.

b. No nearby school—nearest is Mill City K-12.

c. Medical—nearest is Stayton.

d. Public safety, volunteer fire dept shared with Detroit, lots of mental health/disability callouts. No ambulance, no police—Sheriff's dept + neighborhood watch.

Detroit:

a. Lack of medical, car repair, general services.

b. Want to keep the small-town feel and quietness; vacationers also like this.

c. Age of permanent residents a factor.

d. Transportation CART bus goes to Gates only. Highly dependent on cars—issue for aging population. May affect tourists getting here.

Lyons:

a. Jobs.
b. Activities for the kids to do.
c. CARTS public bus reducing service.
d. Affordability—nobody wants to pay more.
e. New developments unlikely to be interested, as have new system in place.

Mill City:

a. Cost—raising rates is not popular.

b. Nobody represents communities on both sides of the river; Linn Co. less involved than Marion Co.

Gates:

Resistance to property tax increases. No upfront money.

8. Are there properties you are aware of that are most suitable for redevelopment? What barriers do they face to redeveloping?

Idanha:

Green Veneer property, no barriers

Detroit:

a. Lakeside hotel (beautiful property, sewer issues)
b. Hardware store site

Lyons:

Old gas station on corner near city hall

Mill City:

a. Highway 22 property available
b. Old deer horn apartment site
c. Old Texaco (USTs removed 90s)—highly neglected at present

Gates:

Large property on Clark(?) Street available.

9. Data Availability

Idanha:

a. Zoning from COG.
b. Maps of wastewater, etc., from 1995—no additions since. Keller to scan paper maps and documents.
c. No electronic data that they are aware of.
d. No transportation plan.
e. First American Title made maps in 2015—zoning, parcels, looks like county/COG data.
f. City limit is Pacific Pride—commercial fueling only.
g. No aerials available (Linn County has none, either).
h. 1.7 million gallons/month of missing water—Feb 2016.
i. HBH Consulting doing work—Keller to contact.

Detroit:

a. Willamette COG for zoning.
b. Water management plan pdf.

c. Christine will try to request utilities data.
d. Forest service/COE for imagery?

Lyons:

a. Predominantly Linn County
b. Cascades West Council of Government
c. 1980 comp plan the latest

Mill City:

a. Not part of any Council of Government
b. Marion County + Linn County
c. Have an economic study (Dave Kinney)

Gates:

a. Tracey to email water meter addresses to MFA
b. Keller have some data as well

10. General Feel

Idanha:

a. Mixed feelings about putting sewer in community 50/50. Confident that could sway the vote to pro with education. Property value increase could be desirable. Currently paying $50-55/month water.
b. Mostly owner-occupied.
c. Improving relationships between Detroit and Idanha.

Detroit:

a. Mostly vacation homeowners, nice homes, expensive septic systems in place.
b. May be opposition, esp related to cost; residential less likely to be interested in sewer scheme.
c. Residents tend to be older, Social Security/fixed income. These are the voting community.
d. Water charged at base rate + consumption—something similar would work.

Lyons:

a. UGB contains a small part of Mehama.
b. Perception that resident income will not support new businesses.
c. Residents commute to jobs.
d. Grade school k-8 in Lyons, from 260 kids in 90s to 190 now.
e. Happy to be bedroom community.
f. Not a tourist town.

Mill City:

a. Very proactive.
b. A lot of planning for housing, etc.
c. Some fear of other cities connecting to Mill City wastewater—need to reassure public it can handle it, impact on employment for city + costs.
d. City not likely to want to give up sewer ownership easily.
e. Retirement and bedroom community.
f. Home sales have picked up—mostly people moving in.
g. Recreation is the selling point.

Gates:

a. Bedroom community—most people commute to Stayton/Mill City/Salem.
b. Mostly retired.
c. Handful of vacation homes.
d. City not really united, not really interested, resistance to extra costs. Not really asking for extra facilities, barely want to pay for what there is.
e. No real identity as a community, want to stay rural.
f. Bicycle path to tie communities together could be good.

11. Resources

Idanha:

Hill Family—Hills and Son trucking, Kevin Hills in Detroit, for community knowledge

Detroit:

N/A.

Lyons:

Bill Grimes (water district)—35 years.

Mill City:

N/A.

Gates:

N/A.


MARKET
Country Store
OPEN
ICED
• LATTES
• MOCHAS
ICE CREAM
ESPRESSO
Hand Made TRUFFLES

Appendix C:
Flow Tables
(PSU population based)

Total Combined Projected Flows

	Detroit Total Projected Flows (gpd)				
Year	2018	2023	2028	2033	2038
Population	216	227	237	248	259
ADWF	31,100	34,800	38,300	42,000	46,900
MMDWF10	54,500	59,600	64,500	69,700	76,400
AADF	40,800	45,000	49,000	53,300	58,900
AWWF	50,400	55,200	59,800	64,600	70,900
MMWWF5	65,300	71,300	77,000	83,000	90,800
PWkF	75,200	82,000	88,400	95,300	104,000
PDAF5	110,800	120,600	130,100	140,100	152,800
PIF5	152,600	165,700	178,200	191,400	208,000

	Gates Total Projected Flows (gpd)				
Year	2018	2023	2028	2033	2038
Population	493	502	509	515	521
ADWF	38,400	39,600	40,600	41,600	42,800
MMDWF10	56,000	57,700	58,900	60,200	61,800
AADF	45,100	46,500	47,500	48,700	50,100
AWWF	51,800	53,400	54,500	55,700	57,300
MMWWF5	67,200	69,100	70,600	72,100	74,000
PWkF	77,500	79,600	81,300	83,000	85,200
PDAF5	114,100	117,300	119,700	122,200	125,300
PIF5	157,400	161,600	164,900	168,200	172,300

	Idanha Total Projected Flows (gpd)				
Year	2018	2023	2028	2033	2038
Population	143	148	153	161	169
ADWF	12,400	13,200	14,200	15,300	16,700
MMDWF10	28,900	30,400	32,100	34,100	36,600
AADF	19,600	20,700	21,900	23,500	25,300
AWWF	26,800	28,100	29,700	31,600	33,900
MMWWF5	34,700	36,400	38,400	40,800	43,700
PWkF	40,000	41,900	44,200	46,900	50,200
PDAF5	58,900	61,700	65,000	69,100	73,900
PIF5	81,200	85,000	89,300	94,900	101,300

	Lyons & Mehama Total Projected Flows (gpd)				
Year	2018	2023	2028	2033	2038
Population	1186	1222	1261	1306	1353
ADWF	133,600	141,200	148,800	157,200	167,700
MMDWF10	156,500	165,400	174,200	184,000	196,300
AADF	139,200	147,200	155,000	163,800	174,800
AWWF	144,800	153,100	161,300	170,500	182,000
MMWWF5	187,700	198,100	208,400	219,900	234,100
PWkF	216,400	228,100	239,700	252,800	268,900
PDAF5	318,600	335,800	352,900	372,000	395,600
PIF5	439,400	462,100	484,800	510,300	541,300

	Mill City Total Projected Flows (gpd)				
Year	2018	2023	2028	2033	2038
Population	1925	2049	2180	2320	2468
ADWF	88,800	98,000	107,100	116,900	129,000
MMDWF10	96,300	106,500	116,700	127,500	141,000
AADF	95,200	104,900	114,600	125,000	137,900
AWWF	101,700	112,000	122,400	133,400	147,000
MMWWF5	103,600	114,800	125,900	137,800	152,600
PWkF	142,900	157,000	171,200	186,400	205,000
PDAF5	175,800	194,300	212,800	232,600	257,100
PIF5	242,300	266,900	291,500	317,800	350,200

	Total Projected Flows (gpd)				
Year	2018	2023	2028	2033	2038
Population	3964	4148	4341	4550	4771
ADWF	304,300	326,800	349,000	373,000	403,100
MMDWF10	392,200	419,600	446,400	475,500	512,100
AADF	339,900	364,300	388,000	414,300	447,000
AWWF	375,500	401,800	427,700	455,800	491,100
MMWWF5	458,500	489,700	520,300	553,600	595,200
PWkF	552,000	588,600	624,800	664,400	713,300
PDAF5	778,200	829,700	880,500	936,000	1,004,700
PIF5	1,072,900	1,141,300	1,208,700	1,282,600	1,373,100

Appendix D:
Cost Estimate Details

Comparative Capital and 20-Yr O&M Costs

Alternative 1	
Item	**Cost**
Idanha	
Treatment	$ 7,050,000
Detroit	
Treatment	$ 8,160,000
Gates	
Treatment	$ 7,880,000
Disposal Land Purchase	$ 450,000
Mill City	
Treatment	$ 9,850,000
Disposal Land Purchase	$ 750,000
Lyons Mehema	
Treatment	$ 10,970,000
Disposal Land Purchase	$ 750,000
Tree and Stump Removal	$ 562,500
Comparative Cost (ROUNDED):	**$ 46,500,000**

Alternative 2	
Item	**Cost**
Idanha-Detroit	
Treatment	$ 9,850,000
Gates	
Treatment	$ 7,880,000
Disposal Land Purchase	$ 450,000
Mill City	
Treatment	$ 9,850,000
Disposal Land Purchase	$ 750,000
Lyons Mehema	
Treatment	$ 10,970,000
Disposal Land Purchase	$ 750,000
Tree and Stump Removal	$ 562,500
Comparative Cost (ROUNDED):	**$ 41,100,000**

Alternative 3	
Item	**Cost**
Idanha-Detroit	
Treatment	$ 9,850,000
Mill City-Gates	
FM Mill City-Gates	$ 4,407,000
Treatment	$ 10,970,000
Disposal Land Purchase	$ 1,200,000
Lyons Mehema	
Treatment	$ 10,970,000
Disposal Land Purchase	$ 750,000
Tree and Stump Removal	$ 562,500
Comparative Cost (ROUNDED):	**$ 38,800,000**

Alternative 4	
Item	**Cost**
Idanha-Detroit	
Treatment	$ 9,850,000
Lyons Mehema-Mill City-Gates	
FM Gates-Mill City-Lyons Mehema	$ 13,044,000
Treatment	$ 15,530,000
Disposal Land Purchase	$ 1,550,000
Tree and Stump Removal	$ 1,162,500
Comparative Cost (ROUNDED):	**$ 41,200,000**

Total Capital Costs

Alternative 1

Item	Cost
Idanha	
Collection	$ 5,200,000
Treatment	$ 4,690,000
Disposal	$ 1,700,000
Detroit	
Collection	$ 13,300,000
Treatment	$ 5,010,000
Disposal	$ 3,400,000
Gates	
Collection	$ 11,700,000
Treatment	$ 5,010,000
Diosposal	$ 2,800,000
Mill City	
Treatment	$ 6,100,000
Disposal	$ 4,700,000
Lyons Mehema	
Collection	$ 24,600,000
Treatment	$ 6,190,000
Disposal	$ 7,400,000
Alternative 1 Total Cost (ROUNDED):	**$ 101,800,000**

Alternative 2

Item	Cost
Idanha-Detroit	
Collection	$ 18,500,000
Treatment	$ 6,100,000
Dispoal	$ 5,100,000
Gates	
Collection	$ 11,700,000
Treatment	$ 5,010,000
Disposal	$ 2,800,000
Mill City	
Treatment	$ 6,100,000
Disposal	$ 4,700,000
Lyons Mehema	
Collection	$ 24,600,000
Treatment	$ 6,190,000
Disposal	$ 7,400,000
Alternative 2 Total Cost (ROUNDED):	**$ 98,200,000**

Alternative 3

Item	Cost
Idanha-Detroit	
Collection	$ 18,500,000
Treatment	$ 6,100,000
Disposal	$ 5,100,000
Mill City-Gates	
Collection	$ 11,700,000
FM Mill City-Gates	$ 4,000,000
Treatment	$ 6,190,000
Disposal	$ 7,500,000
Lyons Mehema	
Collection	$ 24,600,000
Treatment	$ 6,190,000
Disposal	$ 7,400,000
Alternative 3 Total Cost (ROUNDED):	**$ 97,300,000**

Alternative 4

Item	Cost
Idanha-Detroit	
Collection	$ 18,500,000
Treatment	$ 6,100,000
Disposal	$ 5,100,000
Lyons Mehema-Mill City-Gates	
Collection	$ 36,300,000
FM Gates-Mill City-Lyons Mehema	$ 12,300,000
Treatment	$ 7,390,000
Disposal	$ 14,500,000
Alternative 4 Total Cost (ROUNDED):	**$ 100,200,000**

Alternative 1 Treatment Capital Costs

Item	Unit	Unit Price	Estimated Quantity	Total Cost
Lyons-Mehama Treatment Facility (0.235 MGD MM, 0.396 MGD Peak Day, 0.542 MGD Peak Inst.)				
Headworks Building	LS	$290,000	1	$290,000
Influent Pump Station	LS	$150,000	1	$150,000
Mechanical Piping	LS	$79,000	1	$79,000
Control Building	LS	$600,000	1	$600,000
Concrete SBR Tank	EA	$107,000	2	$214,000
Concrete Sludge Holding Tank	EA	$58,000	1	$58,000
SBR Equipment	LS	$562,000	1	$562,000
Filter	LS	$569,000	1	$569,000
UV Equipment	LS	$301,000	1	$301,000
Effluent Pump Station	LS	$225,000	1	$225,000
Electrical (including backup generator)	LS	$458,000	1	$458,000
			Subtotal	*$3,506,000*
Idanha Treatment Facility (0.0437 MGD MM, 0.0739 MGD Peak Day, 0.102 MGD Peak Inst.)				
Headworks Building	LS	$290,000	1	$290,000
Influent Pump Station	LS	$130,000	1	$130,000
Mechanical Piping	LS	$15,000	1	$15,000
Control Building	LS	$510,000	1	$510,000
Concrete SBR Tank	EA	$35,000	2	$70,000
Concrete Sludge Holding Tank	EA	$30,000	1	$30,000
SBR Equipment	LS	$453,000	1	$453,000
Filter	LS	$351,000	1	$351,000
UV Equipment	LS	$256,000	1	$256,000
Effluent Pump Station	LS	$200,000	1	$200,000
Electrical (including backup generator)	LS	$346,000	1	$346,000
			Subtotal	*$2,651,000*
Detroit Treatment Facility (0.0908 MGD MM, 0.1528 MGD Peak Day, 0.208 MGD Peak Inst.)				
Headworks Building	LS	$290,000	1	$290,000
Influent Pump Station	LS	$140,000	1	$140,000
Mechanical Piping	LS	$31,000	1	$31,000
Control Building	LS	$510,000	1	$510,000
Concrete SBR Tank	EA	$73,000	2	$146,000
Concrete Sludge Holding Tank	EA	$32,000	1	$32,000
SBR Equipment	LS	$498,000	1	$498,000
Filter	LS	$351,000	1	$351,000
UV Equipment	LS	$256,000	1	$256,000
Effluent Pump Station	LS	$215,000	1	$215,000
Electrical (including backup generator)	LS	$371,000	1	$371,000
			Subtotal	*$2,840,000*
Gates Treatment Facility (0.074 MGD MM, 0.126 MGD Peak Day, 0.173 MGD Peak Inst.)				
Headworks Building	LS	$290,000	1	$290,000
Influent Pump Station	LS	$140,000	1	$140,000
Mechanical Piping	LS	$31,000	1	$31,000
Control Building	LS	$510,000	1	$510,000
Concrete SBR Tank	EA	$73,000	2	$146,000
Concrete Sludge Holding Tank	EA	$32,000	1	$32,000
SBR Equipment	LS	$498,000	1	$498,000
Filter	LS	$351,000	1	$351,000
UV Equipment	LS	$256,000	1	$256,000
Effluent Pump Station	LS	$215,000	1	$215,000
Electrical (including backup generator)	LS	$371,000	1	$371,000
			Subtotal	*$2,840,000*
Mill City Treatment Facility (0.153 MGD MM, 0.258 MGD Peak Day, 0.351 MGD Peak Inst.)				
Headworks Building	LS	$290,000	1	$290,000
Influent Pump Station	LS	$150,000	1	$150,000
Mechanical Piping	LS	$79,000	1	$79,000
Control Building	LS	$600,000	1	$600,000
Concrete SBR Tank	EA	$107,000	2	$214,000
Concrete Sludge Holding Tank	EA	$58,000	1	$58,000
SBR Equipment	LS	$562,000	1	$562,000
Filter	LS	$569,000	1	$569,000
UV Equipment	LS	$256,000	1	$256,000
Effluent Pump Station	LS	$225,000	1	$225,000
Electrical (including backup generator)	LS	$451,000	1	$451,000
			Subtotal	*$3,454,000*
Total Direct Cost				**$15,291,000**
Contractor Overhead, Profit, and Mobilization	LS	15%		$2,294,000
			Subtotal	$17,585,000
Contingency	LS	40%		$7,034,000
			Subtotal	$24,619,000
Soft Costs (Engineering, CMS, etc.)	LS	25%		$6,155,000
			Total Construction Cost (rounded)	**$30,774,000**

Alternative 2 Treatment Capital Costs

Item	Unit	Unit Price	Estimated Quantity	Total Cost
Lyons-Mehama Treatment Facility (0.235 MGD MM, 0.396 MGD Peak Day, 0.542 MGD Peak Inst.)				
Headworks Building	LS	$290,000	1	$290,000
Influent Pump Station	LS	$150,000	1	$150,000
Mechanical Piping	LS	$79,000	1	$79,000
Control Building	LS	$600,000	1	$600,000
Concrete SBR Tank	EA	$107,000	2	$214,000
Concrete Sludge Holding Tank	EA	$58,000	1	$58,000
SBR Equipment	LS	$562,000	1	$562,000
Filter	LS	$569,000	1	$569,000
UV Equipment	LS	$301,000	1	$301,000
Effluent Pump Station	LS	$225,000	1	$225,000
Electrical (including backup generator)	LS	$458,000	1	$458,000
			Subtotal	*$3,506,000*
Idanha-Detroit Treatment Facility (0.1345 MGD MM, 0.2267 MGD Peak Day, 0.31 MGD Peak Inst.)				
Headworks Building	LS	$290,000	1	$290,000
Influent Pump Station	LS	$150,000	1	$150,000
Mechanical Piping	LS	$79,000	1	$79,000
Control Building	LS	$600,000	1	$600,000
Concrete SBR Tank	EA	$107,000	2	$214,000
Concrete Sludge Holding Tank	EA	$58,000	1	$58,000
SBR Equipment	LS	$562,000	1	$562,000
Filter	LS	$569,000	1	$569,000
UV Equipment	LS	$256,000	1	$256,000
Effluent Pump Station	LS	$225,000	1	$225,000
Electrical (including backup generator)	LS	$451,000	1	$451,000
			Subtotal	*$3,454,000*
Gates Treatment Facility (0.074 MGD MM, 0.126 MGD Peak Day, 0.173 MGD Peak Inst.)				
Headworks Building	LS	$290,000	1	$290,000
Influent Pump Station	LS	$140,000	1	$140,000
Mechanical Piping	LS	$31,000	1	$31,000
Control Building	LS	$510,000	1	$510,000
Concrete SBR Tank	EA	$73,000	2	$146,000
Concrete Sludge Holding Tank	EA	$32,000	1	$32,000
SBR Equipment	LS	$498,000	1	$498,000
Filter	LS	$351,000	1	$351,000
UV Equipment	LS	$256,000	1	$256,000
Effluent Pump Station	LS	$215,000	1	$215,000
Electrical (including backup generator)	LS	$371,000	1	$371,000
			Subtotal	*$2,840,000*
Mill City Treatment Facility (0.153 MGD MM, 0.258 MGD Peak Day, 0.351 MGD Peak Inst.)				
Headworks Building	LS	$290,000	1	$290,000
Influent Pump Station	LS	$150,000	1	$150,000
Mechanical Piping	LS	$79,000	1	$79,000
Control Building	LS	$600,000	1	$600,000
Concrete SBR Tank	EA	$107,000	2	$214,000
Concrete Sludge Holding Tank	EA	$58,000	1	$58,000
SBR Equipment	LS	$562,000	1	$562,000
Filter	LS	$569,000	1	$569,000
UV Equipment	LS	$256,000	1	$256,000
Effluent Pump Station	LS	$225,000	1	$225,000
Electrical (including backup generator)	LS	$451,000	1	$451,000
			Subtotal	*$3,454,000*
Total Direct Cost				**$13,254,000**
Contractor Overhead, Profit, and Mobilization	LS	15%		$1,988,000
			Subtotal	$15,242,000
Contingency	LS	40%		$6,097,000
			Subtotal	$21,339,000
Soft Costs (Engineering, CMS, etc.)	LS	25%		$5,335,000
			Total Construction Cost (rounded)	**$26,674,000**

Alternative 3 Treatment Capital Costs

Item	Unit	Unit Price	Estimated Quantity	Total Cost
Lyons-Mehama Treatment Facility (0.235 MGD MM, 0.396 MGD Peak Day, 0.542 MGD Peak Inst.)				
Headworks Building	LS	$290,000	1	$290,000
Influent Pump Station	LS	$150,000	1	$150,000
Mechanical Piping	LS	$79,000	1	$79,000
Control Building	LS	$600,000	1	$600,000
Concrete SBR Tank	EA	$107,000	2	$214,000
Concrete Sludge Holding Tank	EA	$58,000	1	$58,000
SBR Equipment	LS	$562,000	1	$562,000
Filter	LS	$569,000	1	$569,000
UV Equipment	LS	$301,000	1	$301,000
Effluent Pump Station	LS	$225,000	1	$225,000
Electrical (including backup generator)	LS	$458,000	1	$458,000
			Subtotal	*$3,506,000*
Idanha-Detroit Treatment Facility (0.1345 MGD MM, 0.2267 MGD Peak Day, 0.31 MGD Peak Inst.)				
Headworks Building	LS	$290,000	1	$290,000
Influent Pump Station	LS	$150,000	1	$150,000
Mechanical Piping	LS	$79,000	1	$79,000
Control Building	LS	$600,000	1	$600,000
Concrete SBR Tank	EA	$107,000	2	$214,000
Concrete Sludge Holding Tank	EA	$58,000	1	$58,000
SBR Equipment	LS	$562,000	1	$562,000
Filter	LS	$569,000	1	$569,000
UV Equipment	LS	$256,000	1	$256,000
Effluent Pump Station	LS	$225,000	1	$225,000
Electrical (including backup generator)	LS	$451,000	1	$451,000
			Subtotal	*$3,454,000*
Gates-Mill City Treatment Facility (0.227 MGD MM, 0.384 MGD Peak Day, 0.524 MGD Peak Inst.)				
Headworks Building	LS	$290,000	1	$290,000
Influent Pump Station	LS	$150,000	1	$150,000
Mechanical Piping	LS	$79,000	1	$79,000
Control Building	LS	$600,000	1	$600,000
Concrete SBR Tank	EA	$107,000	2	$214,000
Concrete Sludge Holding Tank	EA	$58,000	1	$58,000
SBR Equipment	LS	$562,000	1	$562,000
Filter	LS	$569,000	1	$569,000
UV Equipment	LS	$301,000	1	$301,000
Effluent Pump Station	LS	$225,000	1	$225,000
Electrical (including backup generator)	LS	$458,000	1	$458,000
			Subtotal	*$3,506,000*
Total Direct Cost				**$10,466,000**
Contractor Overhead, Profit, and Mobilization	LS	15%		$1,570,000
			Subtotal	$12,036,000
Contingency	LS	40%		$4,814,000
			Subtotal	$16,850,000
Soft Costs (Engineering, CMS, etc.)	LS	25%		$4,213,000
Total Construction Cost (rounded)				**$21,063,000**

Alternative 4 Treatment Capital Costs

Item	Unit	Unit Price	Estimated Quantity	Total Cost
Lyons-Mehama-Gates-Mill City Treatment Facility (0.462 MGD MM, 0.78 MGD Peak Day, 1.066 MGD Peak Inst.)				
Headworks Building	LS	$290,000	1	$290,000
Influent Pump Station	LS	$170,000	1	$170,000
Mechanical Piping	LS	$154,000	1	$154,000
Control Building	LS	$655,000	1	$655,000
Concrete SBR Tank	EA	$142,000	2	$284,000
Concrete Sludge Holding Tank	EA	$111,000	1	$111,000
SBR Equipment	LS	$616,000	1	$616,000
Filter	LS	$677,000	1	$677,000
UV Equipment	LS	$429,000	1	$429,000
Effluent Pump Station	LS	$250,000	1	$250,000
Electrical (including backup generator)	LS	$546,000	1	$546,000
			Subtotal	*$4,182,000*
Idanha-Detroit Treatment Facility (0.1345 MGD MM, 0.2267 MGD Peak Day, 0.31 MGD Peak Inst.)				
Headworks Building	LS	$290,000	1	$290,000
Influent Pump Station	LS	$150,000	1	$150,000
Mechanical Piping	LS	$79,000	1	$79,000
Control Building	LS	$600,000	1	$600,000
Concrete SBR Tank	EA	$107,000	2	$214,000
Concrete Sludge Holding Tank	EA	$58,000	1	$58,000
SBR Equipment	LS	$562,000	1	$562,000
Filter	LS	$569,000	1	$569,000
UV Equipment	LS	$256,000	1	$256,000
Effluent Pump Station	LS	$225,000	1	$225,000
Electrical (including backup generator)	LS	$451,000	1	$451,000
			Subtotal	*$3,454,000*
Total Direct Cost				**$7,636,000**
Contractor Overhead, Profit, and Mobilization	LS	15%		$1,145,000
			Subtotal	$8,781,000
Contingency	LS	40%		$3,512,000
			Subtotal	$12,293,000
Soft Costs (Engineering, CMS, etc.)	LS	25%		$3,073,000
			Total Construction Cost (rounded)	**$15,366,000**

Idanha Collection Capital Cost

ITEM	UNIT	UNIT PRICE	EST. QTY	EXT. COST	Notes
Gravity Collection					
8-inch Pipe - Excavation, Backfill	LF	$ 60	19,000	$ 1,140,000	GIS
Manholes - 48"	EA	$ 5,500	70	$ 385,000	1 per 300 ft
Boulder Excavation	LF	$ 20	3,800	$ 76,000	20% of total LF
HWY Repair	LF	$ 65	1,300	$ 84,500	10% of Hwy (13000 trunkline)
Lean Concrete Trench Backfill Under ODOT Roadways	LF	$ 50	1,300	$ 65,000	10% of Hwy (13000 trunkline)
Gravel Repair	LF	$ 8	11,400	$ 91,200	60% of total
Miscellaneous Surface Repair	LF	$ 5	2,150	$ 10,750	Remainder
Half Lane Pavement Repair	LF	$ 30	2,850	$ 85,500	15% of total
Connect Services - Gravity	LF	$ 3,000	90	$ 270,000	Oregon Drinking water program
Existing Utility Protection	LF	$ 2	15,000	$ 30,000	75% Total LF
Traffic Control - Without Flagging	LF	$ 2	17,700	$ 35,400	Total LF less Hwy
Traffic Control - With Flagging	LF	$ 6	1,300	$ 7,800	Hwy Repair LF
Gravity Collection Construction Cost Subtotal (ROUNDED):				**$ 2,290,000**	
Force Mains					
4-inch Pipe - Excavation, Backfill	LF	$ 65	2,000	$ 130,000	GIS
Lift Station - < 300 gpm	LS	$ 200,000	2	$ 400,000	Church St
Miscellaneous Surface Repair	LF	$ 5	1,000	$ 5,000	50% 4" LF
Half Lane Pavement Repair	LF	$ 30	500	$ 15,000	25% 4" LF (remainig 25% hanging on bridge)
Existing Utility Protection	LF	$ 2	500	$ 1,000	25% Total LF
Traffic Control - Without Flagging	LF	$ 2	2,000	$ 4,000	Total LF
Force Main Construction Cost Subtotal (ROUNDED):				**$ 560,000**	
Mobilization - Percent of Item Cost Sum	%	10%	-	$ 285,000	
Contingency - % of construction costs	%	30%	-	$ 941,000	
Construction Cost Subtotal (ROUNDED):				**$ 4,080,000**	
Engineering and CMS - % of construction costs	%	25%	-	$ 1,020,000	
Easement	LF	$ 15	800	$ 12,000	Estimated from GIS taxlots
Project Cost Total (ROUNDED):				**$ 5,200,000**	

Idanha Disposal Capital Cost

ITEM	UNIT	UNIT PRICE	EST. QTY	EXT. COST	Notes
Disposal					
4-inch Pipe Disposal Trenches and Ancillaries	LF	$ 10	77,300	$ 773,000	Disposal Calcs
Mobilization - Percent of Item Cost Sum	%	10%	-	$ 78,000	
Contingency - % of construction costs	%	30%	-	$ 256,000	
Construction Cost Subtotal (ROUNDED):				**$ 1,110,000**	
Engineering and CMS - % of construction costs	%	25%	-	$ 277,500	
Land Purchase-Idanha	AC	$ 15,000	18	$ 270,000	Disposal Calcs
Tree and Stump Removal	AC	$ 7,500	3.5	$ 26,250	
Project Cost Total (ROUNDED):				**$ 1,700,000**	

Detroit Collection Capital Cost

ITEM	UNIT	UNIT PRICE	EST. QTY	EXT. COST	Notes
Gravity Collection					
8-inch Pipe - Excavation, Backfill	LF	$ 60	35,000	$ 2,100,000	GIS
10-inch Pipe - Excavation, Backfill	LF	$ 65	1,000	$ 65,000	GIS
Manholes - 48"	EA	$ 5,500	120	$ 660,000	1 per 300 ft
Boulder Excavation	LF	$ 20	7,200	$ 144,000	20% of total LF
HWY Repair	LF	$ 65	300	$ 19,500	GIS (10% of 3000 Hwy 22 line)
Lean Concrete Trench Backfill Under ODOT Roadways	LF	$ 50	300	$ 15,000	GIS (10% of 3000 Hwy 22 line)
Gravel Repair	LF	$ 8	11,000	$ 88,000	25% of 8" LF less Hwy repair
Miscellaneous Surface Repair	LF	$ 5	5,700	$ 28,500	Remainder
Half Lane Pavement Repair	LF	$ 30	19,000	$ 570,000	75% total LF less Gravel and hwy
Connect Services - Gravity	LF	$ 3,000	372	$ 1,116,000	Oregon Drinking water program less pressure connections
Connect Services - Pressure	LF	$ 6,000	17	$ 102,000	
Individual Grinder Pump	EA	$ 9,500	17	$ 161,500	Google Earth
Existing Utility Protection	LF	$ 2	27,000	$ 54,000	75% Total LF
Traffic Control - Without Flagging	LF	$ 2	35,700	$ 71,400	Total LF less Hwy
Traffic Control - With Flagging	LF	$ 6	300	$ 1,800	Hwy Repair
Gravity Collection Construction Cost Subtotal (ROUNDED):				**$ 5,200,000**	
Force Mains					
4-inch Pipe - Excavation, Backfill	LF	$ 65	1,000	$ 65,000	GIS
6-inch Pipe - Excavation, Backfill	LF	$ 70	16,000	$ 1,120,000	GIS
Lift Station - < 300 gpm	LS	$ 200,000	1	$ 200,000	
Lift Station - > 300 gpm	LS	$ 300,000	1	$ 300,000	
HWY Repair	LF	$ 65	1,400	$ 91,000	GIS (10% of 14000 Hwy 22 line)
Miscellaneous Surface Repair	LF	$ 5	3,900	$ 19,500	25% of total LF less hwy
Half Lane Pavement Repair	LF	$ 30	11,700	$ 351,000	75% of total less HWY
Existing Utility Protection	LF	$ 2	5,000	$ 10,000	25% Total LF
Traffic Control - Without Flagging	LF	$ 2	15,600	$ 31,200	Total LF less Hwy
Traffic Control - With Flagging	LF	$ 6	1,400	$ 8,400	Hwy Repair
Force Main Construction Cost Subtotal (ROUNDED):				**$ 2,200,000**	
Mobilization - Percent of Item Cost Sum	%	10%	-	$ 740,000	
Contingency - % of construction costs	%	30%	-	$ 2,442,000	
Construction Cost Subtotal (ROUNDED):				**$ 10,590,000**	
Engineering and CMS - % of construction costs	%	25%	-	$ 2,647,500	
Easement	LF	$ 15	1,200	$ 18,000	Estimated from GIS taxlots
Project Cost Total (ROUNDED):				**$ 13,300,000**	

Detroit Disposal Capital Cost

ITEM	UNIT	UNIT PRICE	EST. QTY	EXT. COST	Notes
Disposal					
4-inch Pipe Disposal Trenches and Ancillaries	LF	$ 10	157,000	$ 1,570,000	Disposal Calcs
Mobilization - Percent of Item Cost Sum	%	10%	-	$ 157,000	
Contingency - % of construction costs	%	30%	-	$ 519,000	
Construction Cost Subtotal (ROUNDED):				**$ 2,250,000**	
Engineering and CMS - % of construction costs	%	25%	-	$ 562,500	
Land Purchase-Idanha	AC	$ 15,000	36	$ 540,000	Disposal Calcs
Project Cost Total (ROUNDED):				**$ 3,400,000**	

Gates Collection Capital Cost

ITEM	UNIT	UNIT PRICE	EST. QTY	EXT. COST	Notes
Gravity Collection					
8-inch Pipe - Excavation, Backfill	LF	$ 60	36,000	$ 2,160,000	GIS
Manholes - 48"	EA	$ 5,500	120	$ 660,000	1 per 300 LF
Gravel Repair	LF	$ 8	2,000	$ 16,000	5% of total LF
Miscellaneous Surface Repair	LF	$ 5	14,000	$ 70,000	40% of total LF less gravel
Half Lane Pavement Repair	LF	$ 30	20,000	$ 600,000	60% of total LF less gravel
Connect Services - Gravity	LF	$ 3,000	227	$ 681,000	Oregon Drinking water program
Connect Services - Pressure	LF	$ 6,000	12	$ 72,000	Google Earth
Individual Grinder Pump	EA	$ 9,500	12	$ 114,000	Google Earth
Existing Utility Protection	LF	$ 2	27,000	$ 54,000	75% Total LF
Traffic Control - Without Flagging	LF	$ 2	36,000	$ 72,000	Total LF
Gravity Collection Construction Cost Subtotal (ROUNDED):				**$ 4,500,000**	
Force Mains					
4-inch Pipe - Excavation, Backfill	LF	$ 65	13,000	$ 845,000	GIS
Lift Station - < 300 gpm	LS	$ 200,000	4	$ 800,000	
Miscellaneous Surface Repair	LF	$ 5	3,300	$ 16,500	25% 4" LF
Half Lane Pavement Repair	LF	$ 30	9,800	$ 294,000	75% 4" LF
Existing Utility Protection	LF	$ 2	9,800	$ 19,600	75% Total LF
Traffic Control - Without Flagging	LF	$ 2	13,000	$ 26,000	Total LF
Force Main Construction Cost Subtotal (ROUNDED):				**$ 2,010,000**	
Mobilization - Percent of Item Cost Sum	%	10%	-	$ 651,000	
Contingency - % of construction costs	%	30%	-	$ 2,149,000	
Construction Cost Subtotal (ROUNDED):				**$ 9,310,000**	
Engineering and CMS - % of construction costs	%	25%	-	$ 2,327,500	
Easement	LF	$ 15	1,300	$ 19,500	Estimated from GIS taxlots
Project Cost Total (ROUNDED):				**$ 11,700,000**	

Gates Disposal Capital Cost

ITEM	UNIT	UNIT PRICE	EST. QTY	EXT. COST	Notes
Disposal					
4-inch Pipe Disposal Trenches and Ancillaries	LF	$ 10	131,000	$ 1,310,000	Disposal Calcs
Mobilization - Percent of Item Cost Sum	%	10%	-	$ 131,000	
Contingency - % of construction costs	%	30%	-	$ 433,000	
Construction Cost Subtotal (ROUNDED):				**$ 1,880,000**	
Engineering and CMS - % of construction costs	%	25%	-	$ 470,000	
Land Purchase-Gates	AC	$ 15,000	30	$ 450,000	Disposal Calcs
Project Cost Total (ROUNDED):				**$ 2,800,000**	

Mill City Disposal Capital Cost

ITEM	UNIT	UNIT PRICE	EST. QTY	EXT. COST	Notes
Disposal					
4-inch Pipe Disposal Trenches and Ancillaries	LF	$ 10	220,000	$ 2,200,000	Disposal Calcs
Mobilization - Percent of Item Cost Sum	%	10%	-	$ 220,000	
Contingency - % of construction costs	%	30%	-	$ 730,000	
Construction Cost Subtotal (ROUNDED):				**$ 3,150,000**	
Engineering and CMS - % of construction costs	%	25%	-	$ 787,500	
Land Purchase-Mill City	AC	$ 15,000	50	$ 750,000	Disposal Calcs
Project Cost Total (ROUNDED):				**$ 4,700,000**	

Lyons Mehema Collection Capital Cost

ITEM	UNIT	UNIT PRICE	EST. QTY	EXT. COST	Notes
Gravity Collection					
8-inch Pipe - Excavation, Backfill	LF	$ 60	74,000	$ 4,440,000	GIS
10-inch Pipe - Excavation, Backfill	LF	$ 65	5,200	$ 338,000	GIS
12-inch Pipe - Excavation, Backfill	LF	$ 70	900	$ 63,000	GIS
Manholes - 48"	EA	$ 5,500	270	$ 1,485,000	1 per 300 ft
Gravel Repair	LF	$ 8	4,100	$ 32,800	5% of total LF
Miscellaneous Surface Repair	LF	$ 5	19,000	$ 95,000	25% total LF less Gravel
Half Lane Pavement Repair	LF	$ 30	57,000	$ 1,710,000	75% total LF less Gravel
Connect Services - Gravity	LF	$ 3,000	828	$ 2,484,000	Oregon Drinking water program less pressure connectins
Connect Services - Pressure	LF	$ 6,000	10	$ 60,000	
Individual Grinder Pump	EA	$ 9,500	10	$ 95,000	Google Earth
Existing Utility Protection	LF	$ 2	61,000	$ 122,000	75% Total LF
Traffic Control - Without Flagging	LF	$ 2	80,100	$ 160,200	Total LF
Gravity Collection Construction Cost Subtotal (ROUNDED):				**$ 11,090,000**	
Force Mains					
4-inch Pipe - Excavation, Backfill	LF	$ 65	10,000	$ 650,000	GIS
6-inch Pipe - Excavation, Backfill	LF	$ 70	5,000	$ 350,000	GIS
Lift Station - < 300 gpm	LS	$ 200,000	3	$ 600,000	
Lift Station - > 300 gpm	LS	$ 300,000	2	$ 600,000	
Miscellaneous Surface Repair	LF	$ 5	4,000	$ 20,000	25% of total
Half Lane Pavement Repair	LF	$ 30	11,000	$ 330,000	75% of total
Existing Utility Protection	LF	$ 2	14,000	$ 28,000	75% Total LF
Traffic Control - Without Flagging	LF	$ 2	15,000	$ 30,000	Total LF less Hwy
Force Main Construction Cost Subtotal (ROUNDED):				**$ 2,610,000**	
Mobilization - Percent of Item Cost Sum	%	10%	-	$ 1,370,000	
Contingency - % of construction costs	%	30%	-	$ 4,521,000	
Construction Cost Subtotal (ROUNDED):				**$ 19,600,000**	
Engineering and CMS - % of construction costs	%	25%	-	$ 4,900,000	
Easement	LF	$ 15	3,700	$ 55,500	Estimated from GIS taxlots
Project Cost Total (ROUNDED):				**$ 24,600,000**	

Lyons Mehema Disposal Capital Cost

ITEM	UNIT	UNIT PRICE	EST. QTY	EXT. COST	Notes
Disposal					
4-inch Pipe Disposal Trenches and Ancillaries	LF	$ 10	333,000	$ 3,330,000	Disposal Calcs
Mobilization - Percent of Item Cost Sum	%	10%	-	$ 333,000	
Contingency - % of construction costs	%	30%	-	$ 1,099,000	
Construction Cost Subtotal (ROUNDED):				**$ 4,770,000**	
Engineering and CMS - % of construction costs	%	25%	-	$ 1,192,500	
Easement	LF	$ 15	3,700	$ 55,500	Estimated from GIS taxlots
Land Purchase-Lyons Mehema	AC	$ 10,000	75	$ 750,000	Disposal Calcs
Tree and Stump Removal	AC	$ 7,500	75	$ 562,500	200 Acres of trees total
Project Cost Total (ROUNDED):				**$ 7,400,000**	

Life Cycle Costs

Alternative 1	
20 Year Life-Cycle Item	**Cost**
Idanha	
Collection	$ 1,030,000
Treatment	$ 2,360,000
Disposal	$ 590,000
Detroit	
Collection	$ 2,600,000
Treatment	$ 3,150,000
Disposal	$ 1,200,000
Gates	
Collection	$ 2,350,000
Treatment	$ 2,870,000
Diosposal	$ 1,000,000
Mill City	
Treatment	$ 3,750,000
Disposal	$ 1,670,000
Lyons Mehema	
Collection	$ 4,820,000
Treatment	$ 4,780,000
Disposal	$ 2,530,000
20 Year Life-Cycle Cost (ROUNDED):	**$ 34,700,000**

Alternative 2	
20 Year Life Cycle Item	**Cost**
Idanha-Detroit	
Collection	$ 3,630,000
Treatment	$ 3,750,000
Dispoal	$ 1,790,000
Gates	
Collection	$ 2,600,000
Treatment	$ 2,870,000
Disposal	$ 1,000,000
Mill City	
Treatment	$ 3,750,000
Disposal	$ 1,670,000
Lyons Mehema	
Collection	$ 4,820,000
Treatment	$ 4,780,000
Disposal	$ 2,530,000
20 Year Life-Cycle Cost (ROUNDED):	**$ 33,200,000**

Alternative 3	
20 Year Life Cycle Item	**Cost**
Idanha-Detroit	
Collection	$ 3,630,000
Treatment	$ 3,750,000
Disposal	$ 1,790,000
Mill City-Gates	
Collection	$ 6,350,000
FM Mill City-Gates	$ 407,000
Treatment	$ 4,780,000
Disposal	$ 2,670,000
Lyons Mehema	
Collection	$ 4,820,000
Treatment	$ 4,780,000
Disposal	$ 2,530,000
20 Year Life-Cycle Cost (ROUNDED):	**$ 35,600,000**

Alternative 4	
20 Year Life Cycle Item	**Cost**
Idanha-Detroit	
Collection	$ 3,630,000
Treatment	$ 3,750,000
Disposal	$ 1,790,000
Lyons Mehema-Mill City-Gates	
Collection	$ 11,170,000
FM Gates-Mill City-Lyons Mehema	$ 744,000
Treatment	$ 8,140,000
Disposal	$ 5,200,000
20 Year Life-Cycle Cost (ROUNDED):	**$ 34,500,000**

Alternative 1 Annualized 20-Yr Treatment Life Cycle Costs

Lyons-Mehama Treatment Facility (0.235 MGD MM, 0.396 MGD Peak Day, 0.542 MGD Peak Inst.)					
O&M	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Comments**
Inf Screen/Pump Stations/Grit Power Costs	20	YR	$ 6,663	$ 133,260	Assuming one (1) 3 HP inf pump, one (1) 2 HP screen, one (1) 2 HP vortex, and one (1) 5 HP eff pump operating continuously
Pumps and Headworks Worker Costs	20	208	$ 60	$ 250,000	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pumps and Headworks Equipment Costs	1	1	$ 94,000	$ 94,000	6 Motors replaced twice ($7K each motor) plus screen brushes ($10K)
SBR and Sludge Power Costs	20	YR	$ 14,911	$ 298,212	From Aqua plus 20%
SBR and Sludge Worker Costs	20	832	$ 60	$ 998,000	16 hours troubleshooting/maintenance/observation per week (52 weeks)
SBR and Sludge Equipment Costs	1	1	$ 120,766	$ 121,000	From Aqua plus assume 30% of equipment is replaced
Biosolids Removal	20	52	$ 3,000	$ 3,120,000	Assume one truck biosolids truck to Salem every week (from Aqua design and avg. digested sludge flow over 20 years).
Filter and UV Power Costs	20	YR	$ 9,505	$ 190,093	From Aqua and Wedeco
Filter and UV Worker Costs	20	104	$ 60	$ 125,000	2 hours troubleshooting/maintenance/observation per week (52 weeks)
Filter and UV Equipment Costs	1	1	$ 55,000	$ 55,000	3 Motors replaced twice ($5K each motor), cloth replaced twice ($5K each), lamps
			Annual O&M	**$ 270,000**	

Idanha Treatment Facility (0.0437 MGD MM, 0.0739 MGD Peak Day, 0.102 MGD Peak Inst.)					
O&M	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Comments**
Inf Screen/Pump Stations/Grit Power Costs	20	YR	$ 4,997	$ 99,945	Assuming one (1) 2 HP inf pump, one (1) 2 HP screen, one (1) 2 HP vortex, and one (1) 3 HP eff pump operating continuously
Pumps and Headworks Worker Costs	20	208	$ 60	$ 250,000	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pumps and Headworks Equipment Costs	1	1	$ 70,000	$ 70,000	6 Motors replaced twice ($5K each motor) plus screen brushes ($10K)
SBR and Sludge Power Costs	20	YR	$ 8,507	$ 170,149	From Aqua plus 20%
SBR and Sludge Worker Costs	20	832	$ 60	$ 998,000	16 hours troubleshooting/maintenance/observation per week (52 weeks)
SBR and Sludge Equipment Costs	1	1	$ 99,620	$ 100,000	From Aqua plus assume 30% of equipment is replaced
Biosolids Removal	20	10.4	$ 3,000	$ 624,000	Assume one truck biosolids truck to Salem every 5 weeks (from Aqua design and avg. digested sludge flow over 20 years).
Filter and UV Power Costs	20	YR	$ 7,718	$ 154,352	From Aqua and Wedeco
Filter and UV Worker Costs	20	104	$ 60	$ 125,000	2 hours troubleshooting/maintenance/observation per week (52 weeks)
Filter and UV Equipment Costs	1	1	$ 55,000	$ 55,000	3 Motors replaced twice ($5K each motor), cloth replaced twice ($5K each), lamps
			Annual O&M	**$ 133,000**	

Detroit Treatment Facility (0.0908 MGD MM, 0.1528 MGD Peak Day, 0.208 MGD Peak Inst.)					
O&M	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Comments**
Inf Screen/Pump Stations/Grit Power Costs	20	YR	$ 4,997	$ 99,945	Assuming one (1) 2 HP inf pump, one (1) 2 HP screen, one (1) 2 HP vortex, and one (1) 3 HP eff pump operating continuously
Pumps and Headworks Worker Costs	20	208	$ 60	$ 250,000	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pumps and Headworks Equipment Costs	1	1	$ 70,000	$ 70,000	6 Motors replaced twice ($5K each motor) plus screen brushes ($10K)
SBR and Sludge Power Costs	20	YR	$ 6,475	$ 129,493	From Aqua plus 20%
SBR and Sludge Worker Costs	20	832	$ 60	$ 998,000	16 hours troubleshooting/maintenance/observation per week (52 weeks)
SBR and Sludge Equipment Costs	1	1	$ 108,325	$ 108,000	From Aqua plus assume 30% of equipment is replaced
Biosolids Removal	20	26	$ 3,000	$ 1,560,000	Assume one truck biosolids truck to Salem every 2 weeks (from Aqua design and avg. digested sludge flow over 20 years).
Filter and UV Power Costs	20	YR	$ 7,718	$ 154,352	From Aqua and Wedeco
Filter and UV Worker Costs	20	104	$ 60	$ 125,000	2 hours troubleshooting/maintenance/observation per week (52 weeks)
Filter and UV Equipment Costs	1	1	$ 55,000	$ 55,000	3 Motors replaced twice ($5K each motor), cloth replaced twice ($5K each), lamps
			Annual O&M	**$ 178,000**	

Gates Treatment Facility (0.074 MGD MM, 0.126 MGD Peak Day, 0.173 MGD Peak Inst.)					
O&M	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Comments**
Inf Screen/Pump Stations/Grit Power Costs	20	YR	$ 4,997	$ 99,945	Assuming one (1) 2 HP inf pump, one (1) 2 HP screen, one (1) 2 HP vortex, and one (1) 3 HP eff pump operating continuously
Pumps and Headworks Worker Costs	20	208	$ 60	$ 250,000	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pumps and Headworks Equipment Costs	1	1	$ 70,000	$ 70,000	6 Motors replaced twice ($5K each motor) plus screen brushes ($10K)
SBR and Sludge Power Costs	20	YR	$ 5,665	$ 113,307	From Aqua plus 5%
SBR and Sludge Worker Costs	20	832	$ 60	$ 998,000	16 hours troubleshooting/maintenance/observation per week (52 weeks)
SBR and Sludge Equipment Costs	1	1	$ 108,325	$ 108,000	From Aqua plus assume 30% of equipment is replaced
Biosolids Removal	20	20.8	$ 3,000	$ 1,248,000	Assume one truck biosolids truck to Salem every 2.5 weeks (from Aqua design and avg. digested sludge flow over 20 years).
Filter and UV Power Costs	20	YR	$ 7,718	$ 154,352	From Aqua and Wedeco
Filter and UV Worker Costs	20	104	$ 60	$ 125,000	2 hours troubleshooting/maintenance/observation per week (52 weeks)
Filter and UV Equipment Costs	1	1	$ 55,000	$ 55,000	3 Motors replaced twice ($5K each motor), cloth replaced twice ($5K each), lamps
			Annual O&M	**$ 162,000**	

Mill City Treatment Facility (0.153 MGD MM, 0.258 MGD Peak Day, 0.351 MGD Peak Inst.)					
O&M	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Comments**
Inf Screen/Pump Stations/Grit Power Costs	20	YR	$ 6,663	$ 133,260	Assuming one (1) 3 HP inf pump, one (1) 2 HP screen, one (1) 2 HP vortex, and one (1) 5 HP eff pump operating continuously
Pumps and Headworks Worker Costs	20	208	$ 60	$ 250,000	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pumps and Headworks Equipment Costs	1	1	$ 94,000	$ 94,000	6 Motors replaced twice ($7K each motor) plus screen brushes ($10K)
SBR and Sludge Power Costs	20	YR	$ 11,183	$ 223,659	From Aqua minus 10%
SBR and Sludge Worker Costs	20	832	$ 60	$ 998,000	16 hours troubleshooting/maintenance/observation per week (52 weeks)
SBR and Sludge Equipment Costs	1	1	$ 120,766	$ 121,000	From Aqua plus assume 30% of equipment is replaced
Biosolids Removal	20	34.7	$ 3,000	$ 2,080,000	Assume one truck biosolids truck to Salem every 1.5 weeks (from Aqua design and avg. digested sludge flow over 20 years).
Filter and UV Power Costs	20	YR	$ 7,718	$ 154,352	From Aqua and Wedeco
Filter and UV Worker Costs	20	104	$ 60	$ 125,000	2 hours troubleshooting/maintenance/observation per week (52 weeks)
Filter and UV Equipment Costs	1	1	$ 55,000	$ 55,000	3 Motors replaced twice ($5K each motor), cloth replaced twice ($5K each), lamps
			Annual O&M	**$ 212,000**	

Alternative 2 Annualized 20-Yr Treatment Life Cycle Costs

Lyons-Mehama Treatment Facility (0.235 MGD MM, 0.396 MGD Peak Day, 0.542 MGD Peak Inst.)					
O&M	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Comments**
Inf Screen/Pump Stations/Grit Power Costs	20	YR	$ 6,663	$ 133,260	Assuming one (1) 3 HP inf pump, one (1) 2 HP screen, one (1) 2 HP vortex, and one (1) 5 HP eff pump operating continuously
Pumps and Headworks Worker Costs	20	208	$ 60	$ 250,000	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pumps and Headworks Equipment Costs	1	1	$ 94,000	$ 94,000	6 Motors replaced twice ($7K each motor) plus screen brushes ($10K)
SBR and Sludge Power Costs	20	YR	$ 14,911	$ 298,212	From Aqua plus 20%
SBR and Sludge Worker Costs	20	832	$ 60	$ 998,000	16 hours troubleshooting/maintenance/observation per week (52 weeks)
SBR and Sludge Equipment Costs	1	1	$ 120,766	$ 121,000	From Aqua plus assume 30% of equipment is replaced
Biosolids Removal	20	52	$ 3,000	$ 3,120,000	Assume one truck biosolids truck to Salem every week (from Aqua design and avg. digested sludge flow over 20 years).
Filter and UV Power Costs	20	YR	$ 9,505	$ 190,093	From Aqua and Wedeco
Filter and UV Worker Costs	20	104	$ 60	$ 125,000	2 hours troubleshooting/maintenance/observation per week (52 weeks)
Filter and UV Equipment Costs	1	1	$ 55,000	$ 55,000	3 Motors replaced twice ($5K each motor), cloth replaced twice ($5K each), lamps
			Annual O&M	$ 270,000	

Idanha-Detroit Treatment Facility (0.1345 MGD MM, 0.2267 MGD Peak Day, 0.31 MGD Peak Inst.)					
O&M	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Comments**
Inf Screen/Pump Stations/Grit Power Costs	20	YR	$ 6,663	$ 133,260	Assuming one (1) 3 HP inf pump, one (1) 2 HP screen, one (1) 2 HP vortex, and one (1) 5 HP eff pump operating continuously
Pumps and Headworks Worker Costs	20	208	$ 60	$ 250,000	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pumps and Headworks Equipment Costs	1	1	$ 94,000	$ 94,000	6 Motors replaced twice ($7K each motor) plus screen brushes ($10K)
SBR and Sludge Power Costs	20	YR	$ 11,183	$ 223,659	From Aqua minus 10%
SBR and Sludge Worker Costs	20	832	$ 60	$ 998,000	16 hours troubleshooting/maintenance/observation per week (52 weeks)
SBR and Sludge Equipment Costs	1	1	$ 120,766	$ 121,000	From Aqua plus assume 30% of equipment is replaced
Biosolids Removal	20	35	$ 3,000	$ 2,080,000	Assume one truck biosolids truck to Salem every 1.5 weeks (from Aqua design and avg. digested sludge flow over 20 years).
Filter and UV Power Costs	20	YR	$ 7,718	$ 154,352	From Aqua and Wedeco
Filter and UV Worker Costs	20	104	$ 60	$ 125,000	2 hours troubleshooting/maintenance/observation per week (52 weeks)
Filter and UV Equipment Costs	1	1	$ 55,000	$ 55,000	3 Motors replaced twice ($5K each motor), cloth replaced twice ($5K each), lamps
			Annual O&M	$ 212,000	

Gates Treatment Facility (0.074 MGD MM, 0.126 MGD Peak Day, 0.173 MGD Peak Inst.)					
O&M	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Comments**
Inf Screen/Pump Stations/Grit Power Costs	20	YR	$ 4,997	$ 99,945	Assuming one (1) 2 HP inf pump, one (1) 2 HP screen, one (1) 2 HP vortex, and one (1) 3 HP eff pump operating continuously
Pumps and Headworks Worker Costs	20	208	$ 60	$ 250,000	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pumps and Headworks Equipment Costs	1	1	$ 70,000	$ 70,000	6 Motors replaced twice ($5K each motor) plus screen brushes ($10K)
SBR and Sludge Power Costs	20	YR	$ 5,665	$ 113,307	From Aqua plus 5%
SBR and Sludge Worker Costs	20	832	$ 60	$ 998,000	16 hours troubleshooting/maintenance/observation per week (52 weeks)
SBR and Sludge Equipment Costs	1	1	$ 108,325	$ 108,000	From Aqua plus assume 30% of equipment is replaced
Biosolids Removal	20	20.8	$ 3,000	$ 1,248,000	Assume one truck biosolids truck to Salem every 2.5 weeks (from Aqua design and avg. digested sludge flow over 20 years).
Filter and UV Power Costs	20	YR	$ 7,718	$ 154,352	From Aqua and Wedeco
Filter and UV Worker Costs	20	104	$ 60	$ 125,000	2 hours troubleshooting/maintenance/observation per week (52 weeks)
Filter and UV Equipment Costs	1	1	$ 55,000	$ 55,000	3 Motors replaced twice ($5K each motor), cloth replaced twice ($5K each), lamps
			Annual O&M	$ 162,000	

Mill City Treatment Facility (0.153 MGD MM, 0.258 MGD Peak Day, 0.351 MGD Peak Inst.)					
O&M	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Comments**
Inf Screen/Pump Stations/Grit Power Costs	20	YR	$ 6,663	$ 133,260	Assuming one (1) 3 HP inf pump, one (1) 2 HP screen, one (1) 2 HP vortex, and one (1) 5 HP eff pump operating continuously
Pumps and Headworks Worker Costs	20	208	$ 60	$ 250,000	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pumps and Headworks Equipment Costs	1	1	$ 94,000	$ 94,000	6 Motors replaced twice ($7K each motor) plus screen brushes ($10K)
SBR and Sludge Power Costs	20	YR	$ 11,183	$ 223,659	From Aqua minus 10%
SBR and Sludge Worker Costs	20	832	$ 60	$ 998,000	16 hours troubleshooting/maintenance/observation per week (52 weeks)
SBR and Sludge Equipment Costs	1	1	$ 120,766	$ 121,000	From Aqua plus assume 30% of equipment is replaced
Biosolids Removal	20	35	$ 3,000	$ 2,080,000	Assume one truck biosolids truck to Salem every 1.5 weeks (from Aqua design and avg. digested sludge flow over 20 years).
Filter and UV Power Costs	20	YR	$ 7,718	$ 154,352	From Aqua and Wedeco
Filter and UV Worker Costs	20	104	$ 60	$ 125,000	2 hours troubleshooting/maintenance/observation per week (52 weeks)
Filter and UV Equipment Costs	1	1	$ 55,000	$ 55,000	3 Motors replaced twice ($5K each motor), cloth replaced twice ($5K each), lamps
			Annual O&M	$ 212,000	

Alternative 3 Annualized 20-Yr Treatment Life Cycle Costs

Lyons-Mehama Treatment Facility (0.235 MGD MM, 0.396 MGD Peak Day, 0.542 MGD Peak Inst.)					
O&M	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Comments**
Inf Screen/Pump Stations/Grit Power Costs	20	YR	$ 6,663	$ 133,260	Assuming one (1) 3 HP inf pump, one (1) 2 HP screen, one (1) 2 HP vortex, and one (1) 5 HP eff pump operating continuously
Pumps and Headworks Worker Costs	20	208	$ 60	$ 250,000	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pumps and Headworks Equipment Costs	1	1	$ 94,000	$ 94,000	6 Motors replaced twice ($7K each motor) plus screen brushes ($10K)
SBR and Sludge Power Costs	20	YR	$ 14,911	$ 298,212	From Aqua plus 20%
SBR and Sludge Worker Costs	20	832	$ 60	$ 998,000	16 hours troubleshooting/maintenance/observation per week (52 weeks)
SBR and Sludge Equipment Costs	1	1	$ 120,766	$ 121,000	From Aqua plus assume 30% of equipment is replaced
Biosolids Removal	20	52	$ 3,000	$ 3,120,000	Assume one truck biosolids truck to Salem every week (from Aqua design and avg. digested sludge flow over 20 years).
Filter and UV Power Costs	20	YR	$ 9,505	$ 190,093	From Aqua and Wedeco
Filter and UV Worker Costs	20	104	$ 60	$ 125,000	2 hours troubleshooting/maintenance/observation per week (52 weeks)
Filter and UV Equipment Costs	1	1	$ 55,000	$ 55,000	3 Motors replaced twice ($5K each motor), cloth replaced twice ($5K each), lamps
			Annual O&M	$ 270,000	

Idanha-Detroit Treatment Facility (0.1345 MGD MM, 0.2267 MGD Peak Day, 0.31 MGD Peak Inst.)					
O&M	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Comments**
Inf Screen/Pump Stations/Grit Power Costs	20	YR	$ 6,663	$ 133,260	Assuming one (1) 3 HP inf pump, one (1) 2 HP screen, one (1) 2 HP vortex, and one (1) 5 HP eff pump operating continuously
Pumps and Headworks Worker Costs	20	208	$ 60	$ 250,000	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pumps and Headworks Equipment Costs	1	1	$ 94,000	$ 94,000	6 Motors replaced twice ($7K each motor) plus screen brushes ($10K)
SBR and Sludge Power Costs	20	YR	$ 11,183	$ 223,659	From Aqua minus 10%
SBR and Sludge Worker Costs	20	832	$ 60	$ 998,000	16 hours troubleshooting/maintenance/observation per week (52 weeks)
SBR and Sludge Equipment Costs	1	1	$ 120,766	$ 121,000	From Aqua plus assume 30% of equipment is replaced
Biosolids Removal	20	34.66667	$ 3,000	$ 2,080,000	Assume one truck biosolids truck to Salem every 1.5 weeks (from Aqua design and avg. digested sludge flow over 20 years).
Filter and UV Power Costs	20	YR	$ 7,718	$ 154,352	From Aqua and Wedeco
Filter and UV Worker Costs	20	104	$ 60	$ 125,000	2 hours troubleshooting/maintenance/observation per week (52 weeks)
Filter and UV Equipment Costs	1	1	$ 55,000	$ 55,000	3 Motors replaced twice ($5K each motor), cloth replaced twice ($5K each), lamps
			Annual O&M	$ 212,000	

Gates-Mill City Treatment Facility (0.227 MGD MM, 0.384 MGD Peak Day, 0.524 MGD Peak Inst.)					
O&M	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Comments**
Inf Screen/Pump Stations/Grit Power Costs	20	YR	$ 6,663	$ 133,260	Assuming one (1) 3 HP inf pump, one (1) 2 HP screen, one (1) 2 HP vortex, and one (1) 5 HP eff pump operating continuously
Pumps and Headworks Worker Costs	20	208	$ 60	$ 250,000	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pumps and Headworks Equipment Costs	1	1	$ 94,000	$ 94,000	6 Motors replaced twice ($7K each motor) plus screen brushes ($10K)
SBR and Sludge Power Costs	20	YR	$ 14,911	$ 298,212	From Aqua plus 20%
SBR and Sludge Worker Costs	20	832	$ 60	$ 998,000	16 hours troubleshooting/maintenance/observation per week (52 weeks)
SBR and Sludge Equipment Costs	1	1	$ 120,766	$ 121,000	From Aqua plus assume 30% of equipment is replaced
Biosolids Removal	20	52	$ 3,000	$ 3,120,000	Assume one truck biosolids truck to Salem every week (from Aqua design and avg. digested sludge flow over 20 years).
Filter and UV Power Costs	20	YR	$ 9,505	$ 190,093	From Aqua and Wedeco
Filter and UV Worker Costs	20	104	$ 60	$ 125,000	2 hours troubleshooting/maintenance/observation per week (52 weeks)
Filter and UV Equipment Costs	1	1	$ 55,000	$ 55,000	3 Motors replaced twice ($5K each motor), cloth replaced twice ($5K each), lamps
			Annual O&M	$ 270,000	

Alternative 4 Annualized 20-Yr Treatment Life Cycle Costs

Lyons-Mehama-Gates-Mill City Treatment Facility (0.462 MGD MM, 0.78 MGD Peak Day, 1.066 MGD Peak Inst.)					
O&M	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Comments**
Inf Screen/Pump Stations/Grit Power Costs	20	YR	$ 16,102	$ 322,044	Assuming one (1) 10 HP inf pump, one (1) 2 HP screen, one (1) 2 HP vortex, and one (1) 15 HP eff pump operating continuously
Pumps and Headworks Worker Costs	20	208	$ 60	$ 250,000	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pumps and Headworks Equipment Costs	1	1	$ 130,000	$ 130,000	6 Motors replaced twice ($10K each motor) plus screen brushes ($10K)
SBR and Sludge Power Costs	20	YR	$ 28,336	$ 566,715	From Aqua plus 20%
SBR and Sludge Worker Costs	20	832	$ 60	$ 998,000	16 hours troubleshooting/maintenance/observation per week (52 weeks)
SBR and Sludge Equipment Costs	1	1	$ 131,222	$ 131,000	From Aqua plus assume 30% of equipment is replaced
Biosolids Removal	20	104	$ 3,000	$ 6,240,000	Assume two biosolids trucks to Salem every week (from Aqua design and avg. digested sludge flow over 20 years).
Filter and UV Power Costs	20	YR	$ 18,738	$ 374,754	From Aqua and Wedeco
Filter and UV Worker Costs	20	104	$ 60	$ 125,000	2 hours troubleshooting/maintenance/observation per week (52 weeks)
Filter and UV Equipment Costs	1	1	$ 55,000	$ 55,000	3 Motors replaced twice ($5K each motor), cloth replaced twice ($5K each), lamps
			Annual O&M	$ 460,000	

Idanha-Detroit Treatment Facility (0.1345 MGD MM, 0.2267 MGD Peak Day, 0.31 MGD Peak Inst.)					
O&M	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Comments**
Inf Screen/Pump Stations/Grit Power Costs	20	YR	$ 6,663	$ 133,260	Assuming one (1) 3 HP inf pump, one (1) 2 HP screen, one (1) 2 HP vortex, and one (1) 5 HP eff pump operating continuously
Pumps and Headworks Worker Costs	20	208	$ 60	$ 250,000	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pumps and Headworks Equipment Costs	1	1	$ 94,000	$ 94,000	6 Motors replaced twice ($7K each motor) plus screen brushes ($10K)
SBR and Sludge Power Costs	20	YR	$ 11,183	$ 223,659	From Aqua minus 10%
SBR and Sludge Worker Costs	20	832	$ 60	$ 998,000	16 hours troubleshooting/maintenance/observation per week (52 weeks)
SBR and Sludge Equipment Costs	1	1	$ 120,766	$ 121,000	From Aqua plus assume 30% of equipment is replaced
Biosolids Removal	20	34.6666667	$ 3,000	$ 2,080,000	Assume one truck biosolids truck to Salem every 1.5 weeks (from Aqua design and avg. digested sludge flow over 20 years).
Filter and UV Power Costs	20	YR	$ 7,718	$ 154,352	From Aqua and Wedeco
Filter and UV Worker Costs	20	104	$ 60	$ 125,000	2 hours troubleshooting/maintenance/observation per week (52 weeks)
Filter and UV Equipment Costs	1	1	$ 55,000	$ 55,000	3 Motors replaced twice ($5K each motor), cloth replaced twice ($5K each), lamps
			Annual O&M	$ 212,000	

Disposal Life Cycle Costs

Drain Pipe Replacement	
Replacement Cycle (yrs)	35
Cost per Foot to Replace	$ 15
Annual Pipeline Replacement Budget	$ 0.43

*fittings are incidental to this replacement budget

Community	Total LF	Estimated Annual Life Cycle Cost	20-Year Life Cycle Cost
Idanha	77,300	$ 33,129	$590,000
Detroit	157,000	$ 67,286	$1,200,000
Gates	131,000	$ 56,143	$1,000,000
Mill City	220,000	$ 94,286	$1,670,000
Lyons Mehema	333,000	$ 142,714	$2,530,000

Collection Life Cycle Costs

Pipeline Replacement	
Replacement Cycle (yrs)	75
Cost per Foot to Replace	$ 180
Annual Pipeline Replacement Budget	$ 2.40

*fittings are incidental to this replacement budget

Manholes Replacement	
Typical Life (yrs)	50
Cost /manhole	$ 3,500
Annual Manhole Replacement Budget	$ 70.00

Laterals/Cleanouts Replacement	
Typical life (years)	50
Typical cost/cleanout	$ 1,500
Annual Lateral/Cleanout Replacement Budget	$ 30.00

Community	Services	Manholes	Total LF	Estimated Annual Life Cycle Cost	20-Year Life Cycle Cost
Idanha	90	70	21,000	$ 58,000	$1,030,000
Detroit	372	120	53,000	$ 146,760	$2,600,000
Gates	227	120	49,000	$ 132,810	$2,350,000
Lyons Mehema	828	270	95,100	$ 271,980	$4,820,000

Gates to Mill City to Lyons Force Main Cost Estimate & Life Cycle Details

ITEM	UNIT	UNIT PRICE	EST. QTY	EXT. COST	Notes
Force Main Gates-Mill City-Lyons					
4-inch Pipe - Excavation, Backfill	LF	$ 65	20,000	$ 1,300,000	GIS
6-inch Pipe - Excavation, Backfill	LF	$ 70	50,000	$ 3,500,000	GIS
Transfer Lift Station	LS	$ 550,000	2	$ 1,100,000	
Miscellaneous Surface Repair	LF	$ 5	52,000	$ 260,000	75% of total
Half Lane Pavement Repair	LF	$ 30	18,000	$ 540,000	25% of total
Existing Utility Protection	LF	$ 2	18,000	$ 36,000	25% Total LF
Traffic Control - Without Flagging	LF	$ 2	70,000	$ 140,000	Total LF
Force Main Construction Cost Subtotal (ROUNDED):				**$ 6,880,000**	
Mobilization - Percent of Item Cost Sum	%	10%	-	$ 688,000	
Contingency - % of construction costs	%	30%	-	$ 2,271,000	
Construction Cost Subtotal (ROUNDED):				**$ 9,840,000**	
Engineering and CMS - % of construction costs	%	25%	-	$ 2,460,000	
Project Cost Total (ROUNDED):				**$ 12,300,000**	

Annual O&M (Mill City-Lyons)					
Flow	364	gpm	PIF5 for 2038, Gates and Mill City		
static	-185	ft			
dynamic	505	ft			
TDH	320	ft			
Horsepower	58.8	hp			
Kilowatt-hour	43.8	KWH			
	126657	KW/yr			
	$ 10,766	$/yr			
	Quantitiy	Unit	Unit Price	Amount	Comments
Pump Station Power Costs	20	20	$ 10,766	$ 215,316	Assuming two (2) 40hp pump operating for 1/3 of the time of 163,000 AADF
Pump Station Worker Costs	20	208	$ 60	$ 249,600	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pump Station Equipment Costs	1	1	$ 15,000	$ 90,000	3 pumps replaced twice ($15K each pump/motor)
			Annual O&M	**$ 28,000**	
			20-year O&M	**$ 496,000**	

Annual O&M (Gates-Mill City)					
Flow	120	gpm	PIF5 for 2038, Gates		
static	-175	ft			
dynamic	190	ft			
TDH	15	ft			
Horsepower	0.9	hp			
Kilowatt-hour	0.7	KWH			
	1960	KW/yr			
	$ 167	$/yr			
	Quantitiy	Unit	Unit Price	Amount	Comments
Pump Station Power Costs	20	20	$ 167	$ 3,332	Assuming two (2) 2hp pump operating for 1/3 of the time of 47,500 AADF
Pump Station Worker Costs	20	208	$ 60	$ 249,600	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pump Station Equipment Costs	1	1	$ 3,000	$ 18,000	3 pumps replaced twice ($3K each pump/motor)
			Annual O&M	**$ 14,000**	
			20-year O&M	**$ 248,000**	

Mill City to Gates Force Main Cost Estimate & Life Cycle Details

ITEM	UNIT	UNIT PRICE	EST. QTY	EXT. COST	Notes
Force Main					
6-inch Pipe - Excavation, Backfill	LF	$ 70	20,000	$ 1,400,000	GIS
Transfer Lift Station	LS	$ 550,000	1	$ 550,000	
Miscellaneous Surface Repair	LF	$ 5	16,000	$ 80,000	80% of total
Half Lane Pavement Repair	LF	$ 30	4,000	$ 120,000	20% of total
Existing Utility Protection	LF	$ 2	5,000	$ 10,000	25% Total LF
Traffic Control - Without Flagging	LF	$ 2	20,000	$ 40,000	Total LF
Force Main Construction Cost Subtotal (ROUNDED):				**$ 2,200,000**	
Mobilization - Percent of Item Cost Sum	%	10%	-	$ 220,000	
Contingency - % of construction costs	%	30%	-	$ 726,000	
Construction Cost Subtotal (ROUNDED):				**$ 3,150,000**	
Engineering and CMS - % of construction costs	%	25%	-	$ 787,500	
Project Cost Total (ROUNDED):				**$ 4,000,000**	

Annual O&M			
Flow	244	gpm	PIF5 for 2038
static	205	ft	
dynamic	100	ft	
TDH	305	ft	
Horsepower	37.5	hp	
Kilowatt-hour	28.0	KWH	
	80864	KW/yr	
	$ 6,873	$/yr	

	Quantitiy	Unit	Unit Price	Amount	Comments
Pump Station Power Costs	20	20	$ 6,873	$ 137,468	Assuming (2) 25hp pump operating for 1/3 of the time of 115,000 AADF
Pump Station Worker Costs	20	208	$ 60	$ 249,600	4 hours troubleshooting/maintenance/observation per week for both (52 weeks)
Pump Station Equipment Costs	1	1	$ 10,000	$ 60,000	3 pumps replaced twice ($10K each pump/motor)
			Annual O&M	**$ 23,000**	
			20-year O&M	**$ 407,000**	

Appendix E:
MWMC Agreement

RESTATED AND AMENDED AGREEMENT

METROPOLITAN WASTEWATER MANAGEMENT COMMISSION

THIS RESTATED AND AMENDED AGREEMENT was entered into the 5th day of July, 2005 by the City of SPRINGFIELD and the City of EUGENE, municipal corporations of the State of Oregon, and LANE COUNTY, a political subdivision of the State of Oregon, herein referred to as Governing Bodies. The original Agreement dated February 9, 1977, was previously amended January 4, 1978, February 16, 1982, July 19, 1991and April 3, 1998 which amendments have been incorporated herein.

RECITALS:

1. The Governing Bodies have adopted the plan of land use development known as the Eugene/Springfield Metropolitan Area General Plan and have designated in the plan an Urban Growth Boundary within which urban services may be provided. The Urban Growth Boundary includes the two Cities (urban lands) and certain unincorporated areas surrounding the Cities which lies entirely within the County (urbanizable land).

2. The area within the Urban Growth Boundary, as now or hereafter designated, is a metropolitan area because of its urban character and the close interrelationship between the two Cities and all parts of the area.

3. The urban character of the area makes high quality sewage treatment necessary.

4. Federal funding policy requires sewage treatment and disposal within the Urban Growth Boundary to be provided on a unified, metropolitan basis.

5. In order to plan for sewerage on a unified basis within the Urban Growth Boundary, the Cities and the County entered into an agreement January 8, 1974, establishing the Metropolitan Sewer Advisory Commission.

6. The Cities have the authority under their charters to provide for all aspects of sewerage, are providing it presently for parties within their respective boundaries, and are concerned that it be provided adequately in their environs so as to prevent health hazards.

7. The County, while not presently providing sewerage, has the authority under its charter to do so, has extensive duties under state laws regarding public sanitation, and is concerned about hazards to public health that arise from inadequate sewerage in the area.

8. Under their Charters and the Oregon Revised Statutes, the Cities and County may cooperate in providing sewerage and may enter into contracts to carry on that function jointly or by transferring the function to one of the governmental units.

9. The Cities and the County are determined to provide sewerage on a unified basis within the Urban Growth Boundary.

10. In the parties' opinions, it is not convenient or desirable for any one of them singly to assume or be granted the responsibility for providing sewerage within the Urban Growth Boundary. The parties do believe that a separate commission should be established for that purpose.

11. The parties adopt this Agreement in compliance with ORS 190.010 and 190.085 to create an intergovernmental entity with the powers described in ORS 190.080.

DEFINITIONS:

1. Bonds. Bonds, notes, loans and other borrowings of the Commission that assist the Commission in carrying out the Facilities Plan.

2. CIP. The list of capital improvement projects that is included in the Commission's annual budget and approved annually by the Governing Bodies.

3. Facilities Plan. The Commission's 2004 Facilities Plan as periodically updated pursuant to Section 3.n of this Agreement.

4. Financial Plan. The Commission's 2003 Financial Plan as periodically updated pursuant to Section 3.f of this Agreement.

5. Local Sewerage Facilities. All other publicly owned sewerage facilities within the Urban Growth Boundary.

6. Metro Plan. The Eugene/Springfield Metropolitan Area General Plan as amended from time-to-time.

7. Regional Sewerage Facilities. That part of the sewerage system, as defined in Appendix "A" of this Agreement, as it may subsequently be modified with the concurrence of the Governing Bodies. The Commission has responsibility for the Regional Sewerage Facilities.

8. Sewage: The contents of a sewer.

9. Sewer. A conduit to carry off water and wastewater.

10. Sewerage. All or part of a system used for the collection, transmission, treatment and disposal of sewage.

11. Urban Growth Boundary. The Urban Growth Boundary is the projected geographic area within which a full range of urban services will need to be extended or provided to accommodate urban development as set forth in the Metro Plan.

AGREEMENTS:

1. Commission: The Metropolitan Wastewater Management Commission, herein referred to as Commission, is hereby established as an intergovernmental entity pursuant to ORS 190.010, 190.080 and 190.085 to function under the authority of this

Agreement. The Commission replaced the Metropolitan Sewer Advisory Commission effective February 9, 1977.

2. General Function: The Commission shall construct, operate and maintain the Regional Sewerage Facilities. The Commission shall finance these facilities in accordance with the Commission's Financial Plan. The Commission shall have all the powers allowed to an intergovernmental entity under ORS Chapter 190, as it may be amended from time to time, and any other statute that grants powers to such intergovernmental entities for purposes of carrying out the Specific Functions set forth in Section 3 of this Agreement.

3. Specific Functions: The specific functions of the Commission shall be to:

a. Construct, maintain and operate the Regional Sewerage Facilities.

b. Facilitate the completion of the process of transferring ownership to the Commission of the Existing Sewerage Facilities as defined in Appendix "A" Section VI. The transfer of ownership process shall proceed in a timely manner as determined by the mutual agreement of the Commission and the Cities of Eugene and Springfield. The transfer of ownership process shall include consideration of the following factors:

1. Original source of funds for acquisitions, construction, maintenance, equipment replacement, and major rehabilitation; and

2. Achieving equity among regional sewer users within the Urban Growth Boundary.

c. Salvage abandoned sewerage facilities.

d. Implement the Financial Plan and annual budget for the regional sewerage facilities.

e. Recommend to the Governing bodies a schedule of sewer user charges and system development charges for regional sewer services. The Commission's recommendation shall separately set forth:

1. The rates and amounts that the Commission reasonably determines are necessary to meet Bond covenants, and to achieve and maintain an unenhanced credit rating of A for the Commission's Bonds from at least one nationally recognized rating agency; and

2. Such additional rates and amounts that the Commission determines are appropriate to adequately fund the actions necessary to perform the Commission's functions under this Agreement.

f. Update the Financial Plan, as necessary from time to time, so as to provide guidance for the generation of revenue sufficient for the Commission to fulfill its functions under the Agreement. Any update of the Financial Plan shall be designed to promote the following objectives:

1. Establishing revenue adequacy to provide for long-term health and stability of the regional sewerage facilities through a program of monthly sewer user charges, and system development charges that are imposed uniformly throughout the service area to achieve full cost recovery;

2. Fully funding the needs for equipment replacement and major rehabilitation to address the long-term preservation of the Regional Sewerage Facilities capital assets;

3. Fully funding a program of capital improvements to address capacity, regulatory and efficiency/effectiveness needs;

4. Ensuring equity between newly connected and previously connected users for their total contributions toward the Regional Sewerage Facilities;

5. Ensuring equity between various classes of users based on the volume, strength and flow rate characteristics of their discharges together with any other relevant factors identified bv the Commission;

6. Ensuring efficient and cost-effective financial administration of the Regional Sewerage Facilities; and

7. Complying with applicable laws and regulations including those governing the establishment of user charges and the establishment of system development charges pursuant to ORS 223.297 et seq.

g. Establish billing and collection systems, if necessary, in locations where such systems are not provided by others.

h. Contract with the Governing Bodies as appropriate for operation and maintenance of the Regional Sewerage Facilities, administrative services for the Commission and for other services as necessary.

i. Contract for consultant services.

j. Provide service only to the Governing Bodies.

k. Comply with state and federal standards.

l. Adopt minimum uniform standards for pretreatment requirements for industrial and other wastes as necessary.

m. Adopt minimum standards for construction and maintenance of local sewage collection systems.

n. Improve the Regional Sewerage Facilities pursuant to the Commission's Facilities Plan. Changes in the Facilities Plan made by the Commission that result from what are described as the Partial or Comprehensive updates scheduled for 2010, 2015,

2020 and 2025 in the 20-Year Project List, will be submitted to the Governing Bodies for review and approval. The scheduled updates shall be submitted at least 6 months in advance of the anticipated approval date and shall be accompanied by an estimate of the effect the update may have on sewer user charges and system development charges. All other changes to the Facilities Plan may be made by the Commission without referral to the Governing Bodies unless the Commission estimates that they will increase either sewer user charges or system development charges by 5% or more. In that event, the proposed change to the Facilities Plan shall be submitted to the Governing Bodies for review and approval in accordance with the above procedure for scheduled updates except that the proposed change shall be submitted at least 90 days in advance of the anticipated approval date.

o. Take any action necessary or convenient to perform the above functions or other duties as specified elsewhere in this Agreement. No powers or duties related to local annexation or growth policies are granted to the Commission.

p. Issue Bonds as provided in ORS 190.080 or as otherwise allowed under state law, and enter into covenants regarding the operation of the Regional Sewerage Facilities and the imposition of sewer user charges and system development charges that are intended to secure favorable interest rates and other terms for the Bonds.

4. Membership: The Commission shall consist of seven (7) voting members:

a. Each Governing Body shall appoint to the Commission one (1) elected official of that Governing Body.

b. The City Council of Eugene, shall appoint two (2) additional members to the Commission. The City Council of Springfield and the Lane County Commissioners shall each appoint one additional member to the Commission.

c. Members of the Commission shall serve for the term set by the Commission in its bylaws and at the pleasure of the Governing Body appointing that member.

d. A quorum of the Commission shall be five (5) members providing at least one member appointed by each Governing Body is present. Decisions of the Commission shall require a majority vote of the entire membership unless otherwise provided in this Agreement.

5. Bylaws: The Commission shall adopt a set of bylaws governing its conduct. The bylaws shall:

a. Establish times and places of meetings.

b. Establish a central office for the Commission which shall have a mailing address, a telephone and a complete set of records of the Commission, be the main place where information about the Commission can be obtained, and be under the charge of the designated agent of the Commission.

c. Prescribe officers of the Commission, including president and other officers to be elected by the Commission from among its members. The president shall see that meetings of the Commission are conducted in accordance with the bylaws.

6. Meetings: Meetings of the Commission shall be held regularly at times and places designated in the bylaws.

7. Functions of Governing Bodies: The Governing Bodies shall continue to perform the following functions:

a. Billing and collection of sewer user charges and system development charges. User charges will be billed and collected monthly. System development charges will be billed and collected by Eugene and Springfield in accordance with state law.

b. Provide local sewage collection (sewers beyond those specified in Appendix "A".)

c. Provide customer contact.

d. Establish local annexation and growth policies.

8. Obligations of Governing Bodies: The Governing Bodies shall assume the following obligations:

a. Each month remit to the Commission all revenues that are collected by the Governing Body on behalf of the Commission. Efforts to collect delinquent accounts will be consistent with the policies and practices for the collection of delinquent accounts for other utility charges due to the Eugene Water and Electric Board for such revenues collected by Eugene and the Springfield Utility Board for such revenues collected by Springfield. If Lane County collects revenue on behalf of the Commission, Lane County will use delinquent account collection policies and practices that are similar to those used by the Eugene Water and Electric Board and the Springfield Utility Board.

b. Adopt, as a minimum, the Commission's standards for construction and maintenance of sewage collection systems and for pretreatment requirements for industrial and other wastes.

c. Adopt sewer user charges and system development charges and impose those charges on behalf of the Commission at the rates and in the amounts recommended by the Commission pursuant to Section 3.e.1. Any objection to the rates or amounts of such sewer user charges or system development charges recommended by the Commission pursuant to Section 3.e.1 shall be resolved pursuant to the third paragraph of Section 16 of this Agreement. If the Commission recommends additional rates and amounts pursuant to Section 3.e.2, those additional sewer user charges and system development charges shall only be adopted if they are approved by the Governing Bodies.

d. Provide the Commission with regular periodic reports of revenues and expenses related to Regional Sewerage Facilities.

e. Establish service area boundaries and provide for adjustment thereto as necessary to ensure that service is provided only to areas within the city limits of Eugene and Springfield (City Limits); to users currently being served or to whom contractual service commitments have been made who are outside the City Limits; and to any other areas outside the City Limits to which service may be extended in conformity with the Growth Management provisions in Chapter II of the Metro Plan and the Public Facilities and Services Element provisions in Chapter III of the Metro Plan, as amended.

f. The Governing Bodies will make commitments necessary to assist the Commission in obtaining favorable interest rates and other terms for Bonds approved by the Governing Bodies under ORS 190.080(1).

9. Commission's Liabilities: The Governing Bodies shall be obligated to impose, collect and remit to the Commission sewer user charges and system development charges and to comply with the obligations specifically imposed on the Governing Bodies by this Agreement. Except as provided in the preceding sentence, the Governing Bodies shall not be liable for the debts, liabilities or obligations of the Commission.

10. Grants and Bonds: The Commission shall apply for grants and issue Bonds to achieve the objectives of this Agreement and to carry out an adequate program of sewerage within the Urban Growth Boundary.

11. Contracts: The Commission may enter into contracts for technical assistance and for construction of facilities to achieve the objectives of this Agreement and to provide necessary sewerage in the area.

12. Hearings: The Commission may conduct hearings on complaints from any rate payer who is aggrieved by rules of the Commission, by sewerage rules, regulations, policies, or practices of the Governing Bodies, or by any aspect of the sewerage operations of the Governing Bodies. "Rate payer" means any person or entity responsible for the payment of any charge or fee imposed on behalf of the Commission. The Commission shall provide in its bylaws for advance notice and for conduct of the hearings. After the hearing, the Commission shall submit to the Governing Bodies and to the complainant its findings and recommendations regarding the complaint.

13. Annual Budget and Capital Improvement Program: The Commission shall prepare an annual and any necessary supplemental budgets and CIP in accordance with its bylaws. The Commission may make expenditures or incur obligations only within limits set by the budget and CIP. Except for expenditures that the Commission reasonably determines are necessary to meet Bond covenants and achieve and maintain an unenhanced credit rating of A for the Commission's Bonds from at least one nationally recognized rating agency, the Commission shall not make any expenditures until the Commission's budget and CIP have been ratified by the Governing Bodies. The Commission shall deliver its recommended budget and CIP, together with its estimate of the rates and amounts that are necessary to fund the recommended budget and CIP, to the Governing Bodies by May 1 of each year. If one of the Governing Bodies objects to

the recommended budget, CIP or the rates necessary to fund them, the Governing Body shall make every reasonable attempt to use the reconsideration and mediation process set forth in Section 16 in sufficient time to assure that the Commission has an approved budget by July 1.

14. Recommendations: Upon recommendation of the Commission, the Governing Bodies shall:

a. Establish sewerage policies.

b. Provide the personnel and services necessary for the operation and maintenance of the regional sewerage system at the expense of the Commission.

c. Adopt a system of sewer user charges and system development charges as required by Section 8.c of this Agreement.

d. Levy and collect the charges.

e. Apportion funds that the Governing Body receives for sewerage between the Governing Body and the Commission in direct proportion to the total charges that are imposed by the Governing Body for sewerage on behalf of the Commission and the Governing Body.

15. Modification and Termination: This Agreement shall continue until modified by unanimous consent of the Governing Bodies. A Governing Body may terminate its participation in the Agreement by providing one year's advance notice of termination to the other Governing Bodies. If the parties are unable to agree on the division of assets and liabilities between the parties, the dispute shall be referred to a board of arbitration for its decision concerning the division. The board shall have five members: a judge of the Circuit Court of Lane County to be selected by the chief judge of the Court, a representative of the State Department of Environmental Quality to be selected by the director of the Department, and one representative who has not served on the Commission from each Governing Body to be selected by the respective Governing Bodies. Notwithstanding the preceding language in this Section, a Governing Body that is obligated to collect revenue on behalf of the Commission may not terminate its participation in this Agreement unless all Bonds have been paid or defeased.

16. Reconsideration and Mediation: If one or more of the Governing Bodies objects to any action proposed or taken by the Commission, including any action taken to update or implement the Financial Plan or the Facilities Plan, the Governing Body objecting to the action shall request that the Commission reconsider such action by delivering a written request therefor to the Commission. The Commission shall put such action on its agenda for reconsideration at any Commission meeting within 45 days after receipt of the request for reconsideration. Except as provided below, if a Governing Body objects to the Commission's action after reconsideration by the Commission, the Governing Body may refer the matter to the General Membership of the Metropolitan Policy Committee (MPC) for mediation in accordance with any procedure adopted by MPC.

If a resolution of the matter has not been reached previously, MPC shall, within 45 days after referral of the matter to MPC, make a written recommendation for resolution of the matter to the Governing Bodies for their consideration. MPC's recommendation shall be advisory only and shall not be binding on the Governing Bodies. Except as provided below, the Commission's action shall take effect only after all Governing Bodies are in agreement.

If the action objected to is the Commission's determination of rates and amounts pursuant to Section 3.e.1, the recourse of an objecting Governing Body is limited to submitting the matter to the Commission for reconsideration within 30 days after the Commission's recommendation is made. The Commission's decision on reconsideration of those rates and amounts shall be final.

IN WITNESS WHEREOF, the undersigned, by authority of their respective Governing Bodies, have executed the within Agreement.

DATE: 7/6/05

CITY OF SPRINGFIELD, a Municipal Corporation of the State of Oregon

By: _____
Title: City Manager

DATE: 6/20/05

CITY OF EUGENE, a Municipal Corporation of the State of Oregon

By: _____
Title: City Manager

DATE: 6/3/05

LANE COUNTY, a Political Subdivision Of the State of Oregon

By: _____
Title: County Administration

REVIEWED & APPROVED.
AS TO FORM
DATE: 6/28/05
OFFICE OF CITY ATTORNEY

APPROVED AS TO FORM
Date 6/3/05 lane county
OFFICE OF LEGAL COUNSEL

APPENDIX "A"

EUGENE-SPRINGFIELD REGIONAL SEWERAGE FACILITIES DEFINITION

I. Background.

This Appendix defines the regional sewerage facilities necessary to provide for the shared wastewater transportation, treatment and disposal needs of the Eugene-Springfield metropolitan area.

Service shall be provided only within the Urban Growth Boundary. Facilities shall be designed and constructed to that end, but may be constructed either inside or outside the Urban Growth Boundary.

The Regional Sewerage Facilities shall be integrated with the Eugene and Springfield local collection and transportation systems. The combination of regional and local sewerage facilities, including associated real property comprises the entire sewerage system for the Eugene-Springfield metropolitan area. The Regional Sewerage Facilities consist of permanent facilities and temporarily shared facilities. Permanent Regional Facilities generally support the transportation, treatment, re-use, and disposal of wastewater and biosolids generated in areas served by Eugene and Springfield. Temporary Regional Facilities are those which do not meet the definition for Permanent Regional Facilities (Section II.A below), and were funded, in part, by Federal construction grant funds. Effective July 1, 2005, the Temporary Regional Facilities will be owned and operated by the municipality which has planning authority for the area in which they are located. The ownership interest in such facilities will remain subject to the security interest of the Federal Government until it expires by its terms on December 31, 2006.

II. Regional Sewerage Facilities.

The Regional Sewerage Facilities include the following:

A. Permanent Regional Facilities.

1. The Eugene-Springfield Regional Water Pollution Control Facilities (WPCF) that are located at: 410 River Avenue, Eugene, Oregon,and the wet weather control facility located immediately southwest of the intersection of Walnut and Aspen Streets, Springfield, Oregon.

2. The Eugene-Springfield Regional Biosolids Management Facilities (BMF) that are located at 29689 Awbrey Lane, Eugene, Oregon.

3. The Seasonal Industrial Waste Facilities (SIWF) that are located at 91199 Prairie Road, Junction City, Oregon.

4. The Biocycle Farm Facilities (BFF) that are located at 29689 Awbrey Lane adjacent to BMF.

5. All sewers, regardless of size or type which, as of the Effective Date, are required to transport wastewater to the WPCF, BMF, BFF or SIWF from the points at which wastewater flows are combined from areas served by Eugene and Springfield together with:

a. The entire "East Bank Interceptor".

b. The Glenwood River Crossing and the portions of the Glenwood collection system that convey combined wastewater flows from Eugene and Springfield service areas.

6. Major pump stations, pressure mains and other facilities associated with the Regional Sewerage Facilities described in Sections II.A 1-5 above, including, but not limited to:.

a. The Willakenzie Pump Station – located at 3050 Goodpasture Lakes Loop, Eugene.

b. The Old Springfield plant Pump Station – located at Aspen & Walnut, Springfield.

c. The Glenwood Pump Station – located at 3580 Franklin Blvd., Eugene.

d. The Irvington Pump Station – located at 1248 Irvington Drive, Eugene.

e. The pressure main from the WPCF to the BMF.

f. The pressure main from the BMF to the Irvington Pump Station.

g. The pressure main from its current point of origin approximately 250 feet north of Eighth Avenue on Mill Street in Eugene to the SIWF.

h. The pressure main from the WPCF to the BFF.

7. All other sewerage facilities that are not Temporary Regional Facilities and which, before or after the Effective Date, have been or are acquired or constructed and maintained by the Metropolitan Wastewater Management Commission for the purposes of conveying, treating, reusing or disposing wastewater or wastewater treatment byproducts for sewer users within the Urban Growth Boundary.

B. Temporary Regional Sewerage Facilities.

The pump stations, pressure mains and gravity sewers, together with other facilities directly related thereto consisting of:

1. The Beverly Park -- Don Street relief interceptor, Springfield.

2. The Terry Street Pump Station – located at 5190 Barger Drive, Eugene.

3. The West Irwin Pump Station – located at 2525 West Irwin Way, Eugene.

4. The Filmore Pump Station – located at 1405 E. Briarcliff Lane, Eugene.

III. Conveyance of Ownership of Temporary Regional Facilities.

Promptly after the Effective Date, the Temporary Regional Facilities shall be transferred to the local jurisdiction in which they are located.

IV. Effective Date.

The definition of regional sewerage facilities set forth herein shall be effective on July 1, 2005.

V. No Change Without Redesignation.

Permanent Regional Sewerage Facilities shall remain regional sewerage facilities notwithstanding any change in their function or purpose unless and until MWMC, in coordination with the affected Governing Body, redesignates them, in whole or part, as nonregional sewerage facilities. The need therefor shall be reviewed by MWMC annually in conjunction with the preparation of the MWMC budget.

VI. Original Definition of Existing Sewer Facilities.

A. The existing sewage treatment facilities owned by the Cities of Eugene and Springfield.

B. The existing gravity sewers, pump stations, pressure mains and other appurtenances owned by the Cities of Eugene and Springfield, from the points at which the sewer lines first become 24 inches or larger in diameter to the existing treatment facilities described in Section VI A above.