This study was funded in part with Oregon State Lottery Funds through the Water/Wastewater Financing Program administered by the Infrastructure Finance Authority under the Oregon Business Development Department.
DIXONVILLE FEASIBILITY STUDY

FOR

CITY OF ROSEBURG, OREGON

November 2009

Expires 6/30/2012

This study was funded in part with Oregon State Lottery Funds through the Water/Wastewater Financing Program administered by the Infrastructure Finance Authority under the Oregon Business Development Department.

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09-1053.401
# TABLE OF CONTENTS

1. **INTRODUCTION**

   Authorization ................................................................. 1-1  
   Purpose ................................................................................ .. 1-1  
   Scope ................................................................................... 1-1

2. **PROJECT BACKGROUND**

   Background ........................................................................... 2-1  
   Study Area ............................................................................. 2-1  
   Water Demands and Sanitary Sewage Flows ......................... 2-2

3. **EXISTING WATER SYSTEM DESCRIPTION**

   General ................................................................................. 3-1  
   Background ........................................................................... 3-1  
   Existing City of Roseburg Water System ......................... 3-1  
     General ................................................................................ 3-1  
     Water Supply and Treatment ........................................ 3-1  
     Storage Reservoirs .......................................................... 3-2  
     Water Transmission Facilities to Dixonville Area ........ 3-2  
     Water Storage Facilities in Dixonville Area ................... 3-3  
     Water Pumping Facilities in Dixonville Area ................. 3-3

4. **EXISTING SEWER SYSTEM DESCRIPTION**

   General ................................................................................. 4-1  
   Existing Collection System Capacity .................................. 4-1  
   Capacity Assessment of Existing Sewage Collection System ... 4-1  
   Capacity Assessment of Existing Wastewater Treatment Plant... 4-2  
   Summary .............................................................................. 4-2

5. **PROPOSED WATER SUPPLY ALTERNATIVES**

   General ................................................................................. 5-1  
   City Water Treatment Plant Capacity Review ..................... 5-1  
   Analysis of Existing Transmission System to Eastern City Limits... 5-1  
   Analysis of Transmission System – City Limits to Boyer Reservoir ... 5-2  
   Analysis of Boyer Reservoir .............................................. 5-2  
   Analysis of Transmission System – Boyer Reservoir to Dixonville Pump Station No. 2 ................. 5-2
Analysis of Dixonville Pump Station No. 2 ......................................................... 5-3
Analysis of Transmission System – Dixonville Pump Station No. 2 to Proposed Industrial Site ....................................................................................... 5-3
Analysis of Water Storage Needs – Proposed Industrial Site .............................. 5-3
  General ...................................................................................................... 5-3
  Fire Storage ............................................................................................... 5-3
  Emergency Storage ................................................................................... 5-4
  Equalization Storage ................................................................................. 5-4
  Water Storage Summary ........................................................................... 5-4
  Reservoir Siting ........................................................................................ 5-5
Project Cost Estimates ................................................................................... 5-5
Summary .............................................................................................................. 5-5

6. PROPOSED WASTEWATER DISPOSAL ALTERNATIVES

  General ................................................................................................................. 6-1
  Proposed Connecting Sewer Facilities to RUSA ................................................. 6-1
  Evaluation of Wastewater Discharge to RUSA ................................................... 6-1
  Alternatives to Wastewater Discharge to RUSA ................................................. 6-2
  Summary .............................................................................................................. 6-3

7. SUMMARY AND CONCLUSIONS

  Summary and Conclusions for Water Supply ...................................................... 7-1
  Summary and Conclusions for Wastewater Disposal........................................... 7-1

LIST OF TABLES

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-1</td>
<td>Main Reservoir Complex Summary .........................................</td>
<td>3-2</td>
</tr>
<tr>
<td>5-1</td>
<td>Water Storage Summary ................................................................</td>
<td>5-4</td>
</tr>
<tr>
<td>5-2</td>
<td>Water System Improvements Project Cost Estimate ....................</td>
<td>5-6</td>
</tr>
</tbody>
</table>

APPENDICES

Appendix A  Figure 1 - Proposed Water System Improvements
Appendix B  Figure 2 - Proposed Gravity Sewer Main
Appendix C  Figure 1, Roseburg Urban Sanitary Authority, Comprehensive Master Plan, Surcharged Pipes, 5-Year Storm Flows, Existing Land Use
SECTION 1
INTRODUCTION

Authorization

In June 2009, the firm of Murray, Smith & Associates, Inc. was authorized by the City of Roseburg to prepare this Dixonville Feasibility Study. This study was funded in part with Oregon State Lottery Funds through the Water/Wastewater Financing Program administered by the Infrastructure Finance Authority under the Oregon Business Development Department.

Purpose

The purpose of this study is to develop a plan for providing water and sanitary sewer service to the proposed Dixonville industrial development site. Water service is to be provided from the City of Roseburg water system and sanitary sewer service is to be provided by the Roseburg Urban Sanitary Authority (RUSA).

Scope

The scope of work for this study includes the following work tasks:

- **Information Compilation and Review** – Compile and review existing maps, drawings, data, plans, studies, reports, public records and other pertinent items related to City of Roseburg water system and the sanitary sewer system which is owned and operated by the Roseburg Urban Sanitary Authority (RUSA).

- **Identify Site and Site Characteristics** – Review the proposed Dixonville industrial site and its characteristics including the site area, topography, site access, and existing utilities.

- **Document Prospective Industrial Site Water Demands and Sewage Flows** – Document the prospective development options for the site as determined by the City of Roseburg and the Umpqua Economic Development Partnership. Estimate water demands including fire flow requirements and emergency water storage needs. Estimate sanitary sewage flows from the site.

- **Determine Existing Water System Capacity** – Review and document the capacity of the City’s water system to provide up to a 1 million gallons per day (mgd) of water supply to the proposed site.
• **Determine Existing Wastewater System Capacity** – Review and document the capacity of RUSA’s wastewater collection, transmission, treatment and disposal system to accept up to 1 mgd of additional sewage flow from the proposed industrial site.

• **Identify and Evaluate Water Supply Alternatives** – Identify alternatives to providing the desired water flows to the prospective site from the City of Roseburg’s water system. Recommend the preferred alternative and prepare project cost estimates.

• **Identify and Evaluate Wastewater Disposal Alternatives** – Identify alternatives to convey and dispose of wastewater through the RUSA system from the prospective site. Recommend the preferred alternative and prepare project cost estimates.

• **Prepare Report** – Prepare a report that describes and illustrates the results of this feasibility study.
SECTION 2
PROJECT BACKGROUND

Background

Dixonville is an unincorporated community located along the Rogue-Umpqua Scenic Byway in Douglas County approximately 6 miles east of the City of Roseburg on Highway 138. This area was served by the Dixonville Water Association until 2007 when the utility was purchased by the City of Roseburg. The area is not served by a sewer utility at this time. All sanitary sewage that is generated in the area is disposed of using on-site disposal systems.

The Umpqua Economic Development Partnership (UEDP) was founded in 2001 to promote the creation of jobs in Douglas County by recruiting businesses, primarily in the industrial and manufacturing sectors, to relocate to the region and to encourage the expansion and retention of existing businesses. The Partnership includes both public and private entities, including the City of Roseburg, the Roseburg Area Chamber of Commerce, the Douglas County Industrial Development Board, the CCD Business Development Corporation, the Cow Creek Band of Umpqua Tribe of Indians, Mercy Medical Center, Avista Utilities, Douglas Fast Network, Pacific Power, and Umpqua Bank.

Study Area

The UEDP is assisting the owner of the subject site, a large industrial property at 2320 Buckhorn Road in Dixonville, to recruit a company to purchase or lease the land, bringing jobs and revenue to the local economy. The 142 acre site, 87 of which are represented to be developable, was once the location of the Dixonville Roseburg Forest Products mill from 1955 through 2003. The property contains an existing 43,000 square foot building and has an on-site well and septic disposal system. The existing log pond adjacent to the property, which is still owned by Roseburg Forest Products, is currently being converted into a mitigation wetland. Zoning of the site is M-3 for heavy industrial, general manufacturing and warehouse distribution. Pacific Power facilities consisting of a major substation and power transmission lines are in close proximity to the site. It is estimated by others that up to 50 megawatts (MW) of power could be provided to the site, thereby making this a very desirable industrial location. Several parties have been interested in the site, including the State of Oregon for a new mental hospital and renewable energy and clean technology companies. Water and sewer service can be extended from the City of Roseburg and the Roseburg Urban Sanitary Authority (RUSA) under the provisions of Oregon Revised Statutes (ORS) 179.719 which is commonly known as the “Mill Bill.” The statute relates to the provision of extension of utilities service to abandoned or diminished mill sites outside of urban growth boundaries. See Figure 1 in Appendix A and Figure 2 in Appendix B for the industrial site location.
Water Demands and Sanitary Sewage Flows

The water demands for a prospective industry can vary widely depending upon the type of industry or business. For the purposes of this study, it was established with the City that a constant water demand of 1 million gallons per day (mgd) would be a reasonable amount for a wide range of industries. This amount will need to be supplied to the site from the City of Roseburg water system.

Similar to water demands, sanitary sewage generation can vary widely by industry or business type. For the purposes of this study, it was established with the City that a constant sanitary sewage flow of 1 mgd will be generated from the site and will need to be disposed of to the Roseburg Urban Sanitary Authority (RUSA) system or other acceptable alternative.
SECTION 3
EXISTING WATER SYSTEM DESCRIPTION

General

This section describes and inventories the City of Roseburg’s water service area and water distribution system facilities. As this study focuses on providing public water service to a particular site in the Dixonville area, all water facilities summarized herein are pertinent to providing water service to this industrial site. The City’s most recent Water System Master Plan document provides additional detailed information on the entire water system.

Background

The City of Roseburg’s water system was purchased from the Oregon Water Corporation in December 1977. At the time of this purchase, the system served the City, the Three Pines Water Association and the Dixonville Water Association. In 1984, the Three Pines Water Association was dissolved and incorporated into the Roseburg water system. The City purchased the Dixonville Water Association in 2007 and continues to supply water to the Dixonville area through facilities on the eastern limits the City.

The City provides potable water to approximately 29,000 people through approximately 10,500 service connections in the City’s current water service area, which includes customers within the City’s Urban Growth Boundary and the former Dixonville Water Association. At the time of purchase in 2007, the Dixonville Water Association served approximately 400 customers and had a contract limit of 200,000 gpd with the City. Currently there is no contract limit on supply to the Dixonville system.

Existing City of Roseburg Water System

General

The following section is a description of the relevant facilities that supply water to the Dixonville area. Figure 1 illustrates the City’s water system from Reservoir Hill to the proposed industrial site.

Water Supply and Treatment

The City of Roseburg water system is supplied treated water from the Winchester Water Treatment Plant, which is located approximately 5 miles north of the City in the Winchester area. The treatment plant occupies a site on the south bank of the North Umpqua River directly downstream of the Winchester Dam. The City’s three primary rights on the North Umpqua River total 31.0 cubic feet per second (cfs) or approximately 20.0 million gallons per day (mgd).
Two of the water rights totaling 25 cfs (16.1 mgd) are in the form of certificates with priority dates of June 1, 1950 and May 21, 1957, respectively. These two rights are not subject to instream water right restrictions. The third right in the amount of 6 cfs (3.8 mgd) is in permit status and has a priority date of February 22, 1979, which is junior to the 1974 instream rights. Because of this restriction, this permit is considered to be 90 to 95 percent reliable during the summer and early fall period. The use of 1 mgd of treated water from the City’s water rights and water treatment capacity would consume approximately 2.7 years of the City’s treated water supply capacity under normal system growth.

The treatment plant has a nominal peak capacity of 12 million gallons per day (mgd). The highest maximum daily demand in recent years occurred in the year 2003 when the demand was 10.62 mgd. A preliminary design report including a financing plan was prepared in July 2009. This report provides a plan for expansion of the plant to 18 mgd capacity by the end of the year 2012. The City is considering proceeding with the expansion program. The treated water is pumped from the plant to the main reservoir complex on Reservoir Hill through two transmission mains ranging in size from 20-inches to 30-inches in diameter.

**Storage Reservoirs**

The City has 13 storage facilities currently in service located throughout the water service area. Water supply to the easterly section of the City and including the Dixonville area is provided from the main reservoir complex. The complex is located on a hill in central Roseburg known locally as Reservoir Hill. The total capacity of the active storage facilities at the complex is 5.6 million gallons (mg). These reservoirs supply the main gravity pressure zone. A summary of these storage facilities is presented in Table 3-1.

<table>
<thead>
<tr>
<th>Reservoir Name</th>
<th>Capacity (MG)</th>
<th>Overflow Elevation (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reservoir No. 5</td>
<td>0.8</td>
<td>710.0</td>
</tr>
<tr>
<td>Reservoir No. 6</td>
<td>0.8</td>
<td>710.0</td>
</tr>
<tr>
<td>Reservoir No. 7</td>
<td>4.0</td>
<td>710.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5.6</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Water Transmission Facilities to Dixonville Area**

Water is supplied to the easterly section of the City from the main reservoir complex through transmission facilities located on or at NE Stephens Street and NE Diamond Lake Blvd. (North Umpqua Highway 138). The 18-inch diameter ductile iron transmission main on NE
Diamond Lake Blvd. ends in the vicinity of the intersection of North Umpqua Highway and NE Douglas Avenue. At this location, there is a connection to an 8-inch main which is the most westerly extent of the Dixonville system. The 8-inch asbestos cement main proceeds easterly along the North Umpqua Highway and then onto Buckhorn Road to a booster pump station, Dixonville Pump Station No. 2. From this station, a 6-inch asbestos cement main continues easterly along Buckhorn Road to its intersection with Hatfield Road and Dixonville Road. At that point, the Dixonville distribution system branches north and south with 6-inch and smaller diameter mains.

**Water Storage Facilities in Dixonville Area**

The reservoir in the Dixonville service area that is relevant to this study is the Boyer Reservoir, which is located south of Highway 138 off of Buckhorn Road. The reservoir is an above ground circular, welded steel tank constructed in 1966. The reservoir was recoated in 2000. The reservoir has a capacity of approximately 0.5 mg at an overflow elevation of approximately 704 feet with the bottom elevation at approximately 672.1 feet. Supply to the reservoir is provided through the City’s main gravity pressure zone. It can also be supplied through the Dixonville Pump Station No. 1 which boosts the City’s distribution system pressure during very high demand periods.

The Boyer Reservoir has a single inlet/outlet pipe. During low demand periods, the reservoir may overflow since the overflow elevation is lower than the reservoirs at the City’s main reservoir complex. There are no automatic facilities in place to control overflow. City staff is understood to operate distribution system valves manually to limit or eliminate overflows during low demand periods.

**Water Pumping Facilities in Dixonville Area**

Dixonville Pump Station No. 1 is located on NE Douglas Street east of the intersection of NE Douglas Street and NE Lombardy Drive at 3314 NE Douglas Avenue. This station boosts distribution system pressure when required to serve the Dixonville service area. The pump station is of wood frame construction with a metal roof deck on a concrete foundation. The station houses three pumps, a 3 hp pump with a nominal capacity of approximately 100 gpm, a 5 hp pump with a nominal capacity of approximately 150 gpm and a 10 hp pump with a nominal capacity of approximately 300 gpm. This pump station typically operates only during the summer months when the hydraulic grade in the City’s main pressure zone is inadequate to fill the Boyer Reservoir. This station is operated automatically from the level of the Boyer Reservoir. An isolation valve is located on the existing 18-inch main on NE Diamond Lake Blvd. directly east of NE Pomona Street. This valve is manually closed when the pump station is operational to isolate the system east of the pump station from the City’s main pressure zone. When demands fall, the transmission system isolation valve is opened and the station is not operated.
The Dixonville Pump Station No. 2 is located approximately 600 feet west of NE Hatfield Drive on Buckhorn road. The station was recently upgraded. The station can supply approximately 300 gpm (0.43 mgd) peak hourly flow under normal operating conditions. Under fire flow conditions, the station can supply up to approximately 630 gpm (0.91 mgd) but at substantially reduced delivery pressures. The station was designed such that the packaged pumping system can be replaced with a larger packaged pumping system to accommodate additional pumping capacity if needed considering the potential for industrial development in the area. The station capacity expansion would need to be accompanied by upgrading of the supply capacity to the station and upgrading of the Dixonville area distribution system leaving the station.
SECTION 4
EXISTING SEWER SYSTEM DESCRIPTION

General

Sanitary sewer service is provided in the Roseburg area by the Roseburg Urban Sanitary Authority (RUSA). RUSA is responsible for the collection, transmission, treatment and disposal of wastewater for approximately 29,000 people within the Roseburg Urban Growth Boundary (UGB). The RUSA sewage collection system is comprised of 7 lift stations and approximately 145 miles of pipeline, including gravity sewers, force mains and siphons. Figures 2 in Appendix B illustrates the existing relevant RUSA facilities. RUSA provides sanitary sewage collection service to the easterly City limits. A 12-inch sewer main extends to Buckhorn Road at Highway 138. Sanitary sewer disposal in the Dixonville area is currently provided by individual on-site treatment and disposal systems.

Existing Collection System Capacity

Collection system computer modeling results were obtained from RUSA’s 2004 Wastewater Collection System Master Plan for the main interceptor and trunk system that extends easterly from the wastewater treatment plant to Buckhorn Road and Highway 138. See Figure 1 in Appendix C. This modeling was performed for a 5-year storm with existing land use. The figure illustrates the gravity capacity and the modeled 5-year peak flow for each segment of the interceptor and trunk system that would provide service to the Dixonville industrial site. Major segments of that system, illustrated in red, do not have sufficient capacity to carry flows during the 5-year storm with existing land use without surcharging in those pipeline segments. The system has been planned to serve only the area within the City’s Urban Growth Boundary and not easterly of its present service area.

Capacity Assessment of Existing Sewage Collection System

The existing RUSA trunk and interceptor system does not have capacity to accommodate the addition of 1 mgd (1.55 cubic feet per second (cfs)) of sewage flow. The addition of this flow at Buckhorn Road and Highway 138 would exacerbate the capacity problems in the pipeline segments which currently lack capacity and would cause additional pipeline segments to have inadequate capacity. This analysis is based upon current land use and without consideration of future land use and the resultant increased flows.

RUSA’s 2004 Collection System Master Plan provides for a staged improvement plan to address the capacity deficiencies in the collection system. These improvements have been planned for the City’s Urban Growth Boundary with no provisions for serving outside areas or flows from areas such as the Dixonville industrial site. RUSA would need to update its system planning to accommodate this additional flow and then construct the recommended improvements resulting from the revised planning. Very substantial costs will be incurred to accomplish this system upgrading. Substantially all of the interceptor and trunk system between Buckhorn Road and Highway 138 and RUSA’s wastewater treatment plant would
need to be upgraded to provide for ultimate flows in the service area plus the addition of the Dixonville industrial site flow.

**Capacity Assessment of Existing Wastewater Treatment Plant**

The RUSA wastewater treatment plant currently experiences a wet season peak inflow rate of approximately 30 mgd. Per conversations with RUSA staff, it is understood that the treatment plant has a design capacity of 24 mgd, thus the treatment plant’s maximum capacity is already exceeded during existing wet season conditions. The addition of 1 mgd of flow from the Dixonville site would cause the treatment plant capacity to be further exceeded by that amount of flow.

The current RUSA Master Plan anticipates a peak flow rate of 34 mgd by 2020, and 42 mgd at build-out conditions. In order to accommodate the additional 1 mgd of flow from the Dixonville industrial site, the wastewater treatment and disposal element of the Master Plan would need to be updated so that capacity improvements would include provisions for the additional industrial flow rate and flow composition.

**Summary**

The RUSA sewage collection, transmission and treatment system has substantial capacity deficiencies at current development levels within its system. Very substantial improvements to RUSA’s sewage collection, transmission and treatment systems would be required to correct existing deficiencies and provide for additional flows from the proposed Dixonville industrial site. Flows from outside the RUSA service area, the Roseburg Urban Growth Boundary, including those from the proposed Dixonville industrial site are not provided for in any of RUSA’s current planning.
SECTION 5  
PROPOSED WATER SUPPLY ALTERNATIVES  

General  

This section identifies alternatives to serve the proposed industrial site with a water supply from the City, evaluates those alternatives, and recommends a preferred alternative. A project cost estimate for the preferred alternative is presented.  

The existing water system facilities in the Dixonville service area do not have adequate capacity to provide the water demands that are assumed for the proposed industrial site. Furthermore, the facilities in the area cannot provide for fire storage or emergency storage that is assumed would be needed to service the industrial site. Substantial improvements to the City’s water supply system are needed to properly serve the industrial site.  

It is reported that groundwater resources in the area of the proposed industrial site are very limited and therefore groundwater is not considered to be a feasible alternative for water supply to the industrial site from the City of Roseburg. Figure 1 in Appendix A illustrates the proposed water system improvements which are described below.  

City Water Treatment Plant Capacity Review  

The proposed industrial site is assumed in this analysis to have a water demand of a continuous 1 mgd. The highest maximum daily demand in recent years at the Winchester Water Treatment Plant has been 10.6 mgd. The plant therefore has approximately 1.4 mgd of remaining capacity. The City has water rights in place on the North Umpqua River to support the additional water production that would be required for this additional demand. Presently, there is sufficient water supply capacity to serve the assumed water demand for this industrial site.  

Analysis of Existing Transmission System to Eastern City Limits  

A model of the existing City of Roseburg water system, which was created and calibrated by Murray, Smith & Associates, Inc. as part of the water system Master Plan update, was utilized to assess the capacity of the City’s existing system at NE Douglas Avenue to accommodate the additional 1 mgd of water demand for the industrial site. The model with the additional 1 mgd of demand was tested under ultimate maximum daily demand conditions. The modeling determined that the existing 18-inch diameter water transmission system has sufficient capacity for the added 1 mgd demand from the proposed industrial site.
Analysis of Transmission System – City Limits to Boyer Reservoir

As noted in Section 3, the City’s 18-inch transmission main on NE Diamond Lake Blvd. ends at NE Douglas Avenue. The 8-inch main that proceeds easterly from that point to the Boyer Reservoir is inadequate under current peak demand conditions and is certainly inadequate to serve the added water demand of the proposed industrial site. In order to correct this current deficiency and to also provide for the added demand from the industrial site, it is recommended that the water system be upgraded from NE Douglas Avenue to the Boyer Reservoir.

The recommended improvements are as follows:

- Construct a 6,800 foot long extension of the City’s 18-inch transmission main from NE Douglas Avenue to the Boyer Reservoir. The existing 8-inch asbestos cement main can remain or be abandoned.

Analysis of Boyer Reservoir

As noted in Section 3, the Boyer Reservoir has deficiencies in the inlet/outlet piping and water level control at the reservoir. The existing reservoir has sufficient capacity (0.5 mg) to continue to be utilized and the reservoir structure is in good condition. The recommended improvements are as follows:

- Construct a new 18-inch inlet with an altitude valve to prevent overflow
- Construct a new 18-inch outlet pipe

As an alternative to the altitude valve, the reservoir could be modified to raise the shell height and overflow to match that of the main reservoirs. For the purposes of this report, the altitude valve alternative is incorporated into the cost estimates.

Analysis of Transmission System – Boyer Reservoir to Dixonville Pump Station No. 2

The 8-inch main that proceeds easterly from the Boyer Reservoir to the Dixonville Pump Station No. 2 has inadequate capacity for the additional water demand of the proposed industrial site. In order to correct this deficiency and to also provide for the added demand from the industrial site, it is recommended that the water system be upgraded from the Boyer Reservoir to the Dixonville Pump Station No. 2. The recommended improvements are as follows:

- Construct a 9,300 foot long 12-inch diameter transmission main from the Boyer Reservoir to the Dixonville Pump Station No. 2. The existing 8-inch asbestos cement main can remain or be abandoned where the new main is paralleling it.
Analysis of Dixonville Pump Station No. 2

As noted in Section 3, the existing Dixonville Pump Station No. 2, which was recently upgraded, has provisions for substantially increasing its capacity. With the addition of a 1 mgd (700 gpm) demand at the proposed industrial site, the total required peak hourly capacity in the station would need to be approximately 1,000 gpm (300 gpm peak hour for the Dixonville service area plus 700 gpm for the industrial site). This capacity can be achieved by installing a new three-pump packaged pumping unit consisting of three pumps of approximately 25 HP each. The existing three-pump packaged pumping unit would be removed. The station electrical power and yard piping would need to be upgraded. Other miscellaneous improvements would also be required at the station.

Analysis of Transmission System – Dixonville Pump Station No. 2 to Proposed Industrial Site

The 6-inch main that proceeds easterly from the Dixonville Pump Station No. 2 has inadequate capacity for the additional pumping capacity from the station. In order to correct this deficiency, it is recommended that the Dixonville area water system be upgraded from the Dixonville Pump Station No. 2 to the proposed industrial site. The recommended improvements are as follows:

- Construct an 8,900 foot long 10-inch diameter transmission main from the Dixonville Pump Station No. 2 along Buckhorn Road to the proposed industrial site reservoir. The existing 6-inch asbestos cement main along a portion of this route can remain or be abandoned.

Analysis of Water Storage Needs – Proposed Industrial Site

General

The existing reservoirs in the Dixonville service area are very small and do not have nearly the volume needed to support a 1 mgd water supply to the industrial site. Water supply to the proposed industrial site could be provided directly without benefit of storage facilities; however such a supply would be interruptible and it is doubtful that such a condition would be acceptable to an industrial user. It is therefore proposed that new storage be provided on the City’s system at the site for fire, emergency and operational storage.

Fire Storage

Fire storage is recommended to meet the fire flow demand of the new industrial site. The fire storage volume is determined by multiplying the recommended fire flow rate by the expected duration of that flow. The amount of water recommended for fire suppression purposes is typically associated with the building type or land use of a specific location. The Dixonville industrial site is zoned M-3 Heavy Industrial. The City of Roseburg Water System Master
Plan requires that heavy industrial sites provide a fire suppression flow rate of 3,000 gallons per minute (gpm) for a duration of 3 hours. This results in a minimum fire storage requirement of 540,000 gallons.

**Emergency Storage**

Emergency storage is often provided to supply water from storage during emergencies such as pipeline failures, equipment failures, power outages or natural disasters. The amount of emergency storage provided can be highly variable depending upon an assessment of risk and the desired degree of system reliability. Assuming that most water system outages due to system maintenance, pipe breaks, pump station outages and the like can be repaired by the City staff within 24 hours, it is recommended that emergency storage equal the industrial demand for one day, or 1 million gallons.

**Equalization Storage**

The required industrial flow rate of 1 mgd is assumed to be the maximum daily demand (MDD) of the site. It is assumed that this flow rate is relatively constant throughout the day for industrial process usage and has a negligible diurnal fluctuation due to human consumption and irrigation. Therefore, storage for flow equalization is deemed not to be necessary.

**Water Storage Summary**

Table 5-1 is a summary of the recommended water storage requirements for the industrial site. It is recommended that a 1.6 million gallon reservoir be constructed in the vicinity of the industrial site.

<table>
<thead>
<tr>
<th>Storage Type</th>
<th>Volume (MG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Storage</td>
<td>0.54</td>
</tr>
<tr>
<td>Emergency Storage</td>
<td>1.0</td>
</tr>
<tr>
<td>Equalization Storage</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1.54</strong></td>
</tr>
<tr>
<td><strong>Recommended</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Reservoir Volume</strong></td>
<td><strong>1.6</strong></td>
</tr>
</tbody>
</table>
**Reservoir Siting**

A preliminary reservoir siting analysis was conducted as part of this study. The proposed reservoir site on Figure 1 was chosen based on existing topography and the location’s proximity to the industrial site. This site selection did not account for existing land use restrictions, easements required, site geotechnical characteristics and other factors. Further detailed engineering analysis is needed to determine a final site for the proposed reservoir.

The developable portion of the Dixonville industrial site has elevations ranging from approximately 640 feet to 730 feet. Assuming a minimum system pressure of 50 psi applied to the highest point on the site, the reservoir overflow elevation can be preliminarily established at 845 feet. This elevation is consistent with the existing discharge pressure from Dixonville Pump Station No. 2. A reasonable reservoir height of 35 feet would place the reservoir floor elevation at approximately 810 feet. Consistent with the City’s prior practices and standards, the reservoir is assumed be of welded steel construction. The reservoir would be supplied from the Dixonville Pump Station No. 2 through a 10-inch diameter main. A reservoir outlet size at 16-inches in diameter to provide capacity for fire flow plus industrial water demands would serve the industrial site.

**Project Cost Estimates**

Estimates of project cost have been developed for the recommended work. For construction work, the estimated costs are based upon recent experience with construction costs for similar work in the region. It is assumed that construction work will be completed by private contractors. Construction cost estimates represent opinions of cost only, acknowledging that final costs of projects will vary depending on actual labor and material costs, market conditions for construction, regulatory factors, final project scope, project schedules, and other factors.

The estimated project costs for construction presented in this report include provisions for estimated construction costs plus allowances for construction contingencies, engineering, administration, permitting and approvals, and other project-related costs. An indexing method to adjust present estimates into the future is useful. The Engineering News Record (ENR) Construction Cost Index (CCI) is a commonly used index for this purpose. For purposes of cost estimate updating, the August 2009 ENR CCI for Seattle, Washington, the closest construction market index, is 8652. Table 5-2 presents the estimated costs for the recommended water system improvements to serve the proposed Dixonville industrial site.

**Summary**

The City of Roseburg can provide 1 mgd of water supply to the proposed Dixonville industrial site with substantial improvements to the City’s existing water system which includes the Dixonville portion of the system.
<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>QTY.</th>
<th>UNIT</th>
<th>UNIT COST</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Mobilization, Bonds &amp; Insurance</td>
<td>1</td>
<td>LS</td>
<td>$273,300</td>
<td></td>
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<td>B 18&quot; Transmission Main Extension - NE Douglas Ave. to Boyer Reservoir</td>
<td>6800</td>
<td>LF</td>
<td>$216</td>
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<td>C Boyer Reservoir Modifications</td>
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<tr>
<td>a) New 18&quot; inlet &amp; altitude valve</td>
<td>1</td>
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<td>b) New 18&quot; outlet &amp; drain</td>
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<td>D 12&quot; Transmission Main - Boyer Reservoir to Dixonville Pump Station No. 2</td>
<td>9300</td>
<td>LF</td>
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<td>G Proposed Industrial Site Reservoir (1.6 MG)</td>
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<td><strong>INDIRECT COSTS</strong></td>
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<tr>
<td>Engineering, Legal, Admin., Permits &amp; Approvals</td>
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<td>$688,716</td>
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<tr>
<td>Construction Engineering</td>
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<tr>
<td>Environmental Mitigation</td>
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<td>Easements and Right of Way Acquisition</td>
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<td><strong>TOTAL INDIRECT COSTS</strong></td>
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<td><strong>TOTAL ESTIMATED PROJECT COST</strong></td>
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* ENR-Seattle Construction Cost Index of 8652 (August 2009)

**Notes:**
- LS - Lump sum
- EA - EA
- LF - Linear foot

### TABLE 5-2

<table>
<thead>
<tr>
<th>CITY OF ROSEBURG</th>
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<tbody>
<tr>
<td><strong>DIXONVILLE FEASIBILITY STUDY</strong></td>
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<tr>
<td><strong>WATER SYSTEM IMPROVEMENTS</strong></td>
</tr>
<tr>
<td><strong>PLANNING LEVEL PROJECT COST ESTIMATE</strong></td>
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</table>

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>QTY.</th>
<th>UNIT</th>
<th>UNIT COST</th>
<th>TOTAL</th>
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SECTION 6
PROPOSED WASTEWATER DISPOSAL ALTERNATIVES

General

In this section, an evaluation is conducted of the potential for disposal of wastewater to the RUSA system and potential alternatives to that approach are identified and discussed.

Proposed Connecting Sewer Facilities to RUSA

In order to connect the proposed Dixonville industrial site to the RUSA system, a 15-inch diameter gravity sewer main is proposed. This sewer main would be routed southerly and westerly from the site along the North Fork of Deer Creek to its confluence with the main stem of Deer Creek. The main would then proceed westerly along Deer Creek to the point of connection to the RUSA system at Buckhorn Road and Highway 138. The length of the main would be approximately 18,000 feet. The estimated conceptual level project cost of this main would be approximately $4,000,000. Figure 2 in Appendix B illustrates the routing and point of connection of this main to the RUSA system.

Evaluation of Wastewater Discharge to RUSA

Figure 1 in Appendix C is from the RUSA Comprehensive Master Plan which illustrates the surcharged sewer system pipes during a 5-year storm condition with existing land use assumed. A surcharged condition indicates that the pipeline segment does not have adequate capacity under normal gravity flow conditions to handle the peak sewage flow. The figure indicates approximately half of the 6.5 mile long system located between the assumed point of discharge of sewage flow from the proposed Dixonville industrial site to the RUSA wastewater treatment plant has inadequate capacity under 5-year peak flow conditions with existing land use. The additional flow from the Dixonville site cannot be accommodated by the RUSA system without further additional surcharging and possible system overflows. Substantial portions of the existing system would need to be upgraded to provide capacity for the additional flow from the Dixonville site.

Not all of the costs of the capacity improvements needed in the RUSA collection system between the point of connection of the Dixonville flow and the wastewater treatment plant can be attributed to or allocated to the Dixonville site. The Dixonville site would be only a partial contributor to the deficient capacities. For the purposes of this study, a reasonable allocation of costs to the Dixonville site is proposed. It is assumed that the RUSA system upgrading between the point of connection at Buckhorn Road and Highway 138 westerly to the point of transition of the existing sewer from 18-inch diameter to 24-inch diameter in the vicinity of Fulton Street and Leser Avenue would be directly attributable to the additional flow from the Dixonville site. Any system improvements between this point and the wastewater treatment plant, including any upgrading and expansion of RUSA’s wastewater treatment and disposal facilities is assumed to not be directly attributable to the Dixonville
site but would be assumed to be a general obligation of RUSA and all of its customers with financing through the rate and system development charge (SDC) structure.

A review of Figure 1 in Appendix C indicates that in the existing sewer system segment between Buckhorn Road and Fulton Street and Leser Avenue, there is approximately 5,500 feet of existing sewer pipe ranging in size from 12-inches to 18-inches in diameter that has deficient capacity under current land use conditions with a 5-year storm. This length would need to be upgraded to accommodate the Dixonville site flows. Assuming an average size of new sewer of 18-inches over this length, the estimated project cost to upgrade the system would be approximately $1.5 million.

The estimated direct cost burden to the Dixonville site for connecting to the RUSA system is therefore estimated to be approximately $5.5 million considering the new connecting sewer and a reasonable assumed cost for upgrading RUSA’s existing sewage collection system. The time required to upgrade the RUSA system to accommodate the additional Dixonville site flow would likely be substantial since RUSA would need time to update its planning, plan and implement a financing program, and then design and construct the needed system improvements.

The direct cost burden on the proposed Dixonville industrial site for extending a gravity main to the RUSA system as well as contributing to the upgrading of the RUSA system would very likely be insupportable by an industrial occupant. The alternative of sewage discharge from the proposed Dixonville industrial site to the RUSA system is not considered practical or economical.

**Alternatives to Wastewater Discharge to RUSA**

The alternative to discharge of wastewater to RUSA would be the on-site treatment and disposal and/or recycling and reuse of wastewater. It is anticipated this would be the least cost approach for any industrial development. Conceptually, there would be two waste streams – domestic waste and industrial waste. Domestic waste would be treated and then could be disposed of in a number of ways including subsurface disposal, land application or disposal to a nearby waterway such as North Fork of Deer Creek. Industrial waste, depending upon its type, could be treated and reused or recycled or disposed of to a nearby waterway. Disposal of domestic and industrial wastes to a waterway would require treatment to very high discharge standards. Regardless, the above-described alternatives for domestic and industrial wastewater are anticipated to be substantially less costly to an industry than discharge and disposal to the RUSA system. These alternatives could likely be implemented substantially faster than the alternative of discharge to RUSA.

The disposal of wastewater to the Deer Creek system could be advantageous in that the City could potentially apply for and obtain a water right in the amount of the discharge and withdraw the water downstream for non-potable uses such as irrigation.
Summary

The alternative of discharge of wastewater to the RUSA system is not considered to be economical or practical with respect to implementation. The alternative approach of on-site treatment and disposal and/or recycling and reuse of domestic and industrial wastewater is considered to be the most economical approach for an industrial entity occupying the site. This approach is recommended.
SECTION 7
SUMMARY AND CONCLUSIONS

Summary and Conclusions for Water Supply

This study has evaluated the capacity of the City of Roseburg’s water supply and distribution system to supply the proposed Dixonville industrial site with 1 million gallons per day of water. The existing water treatment plant, water transmission system and water storage system has adequate excess capacity to supply the site with this amount of water. The existing water system from the vicinity of NE Douglas Avenue and Highway 138 (North Umpqua Highway) east to the industrial site in Dixonville does not have sufficient capacity to provide the desired supply. Substantial improvements to the water system from NE Douglas Ave. to the industrial site are recommended. These improvements consist of pipeline improvements, pumping station improvements and a new water storage reservoir above the proposed industrial site. The estimated project cost of the recommended improvements is approximately $8.4 million. The groundwater resources in the area are very limited and therefore groundwater is not considered to be a feasible alternative to water supply to the industrial site from the City of Roseburg.

Summary and Conclusions for Wastewater Disposal

This study evaluated the capacity of the Roseburg Urban Sanitary Authority’s (RUSA’s) wastewater collection and transmission system to transmit 1 million gallons per day of sewage from the proposed Dixonville industrial site to the RUSA wastewater treatment plant. The existing trunk and interceptor system that would accept and convey the flow to the wastewater treatment plant has substantial capacity deficiencies under current conditions, and, with the additional flow from the industrial site, much of the approximately 6.5 mile length of the trunk and interceptor system would need to be upgraded. The system was not planned for flows outside of the RUSA service area which is the Roseburg Urban Growth Boundary. RUSA’s planning would need to be updated to provide for the additional flows from the industrial site and very substantial and costly system upgrades would be required.

RUSA’s wastewater treatment plant, which has a design capacity of 24 mgd, experiences peak flows of approximately 30 mgd during wet season conditions. In order to accommodate the additional 1 mgd of flow from the Dixonville industrial site, the wastewater treatment and disposal element of the RUSA Master Plan would need to be updated so that capacity improvements would include provisions for the additional industrial flow rate and flow composition.

In order to convey wastewater flows from the industrial site to the most easterly existing RUSA sewer, a 3.4 mile long gravity sewer would need to be constructed. Considering the cost of constructing a connecting pipeline to the RUSA system, the very substantial cost burden that would likely be imposed on the industrial site occupant for upgrading at least portions of the RUSA wastewater conveyance system, and the likely lengthy time for
planning, design and construction of upgrading to RUSA’s facilities, the discharge of wastewater to RUSA is not considered to be economical or practical considering the implementation challenges.

On-site treatment and disposal and/or recycling and reuse of wastewater at the industrial site is considered to be the least cost approach for any industrial occupant of the site. The details of this approach would be highly specific to the type of industry and its wastewater quantity and characteristics and the level of employment at the site.
Legend

Sanitary Collection System Pipe

Model Pipe

Surcharged Pipe

Figure 1
Roseburg Urban Sanitary Authority Comprehensive Master Plan

Surcharged Pipes
5-year Storm Flows, Existing Land Use