# Table of Contents

1.0  **Phase 1 – Existing Conditions and Foundational Activities** .......................................................... 1  
  1.1 Introduction ..................................................................................................................................... 1  
  1.1.1 Need .......................................................................................................................................... 1  
  1.1.2 Study Objective ......................................................................................................................... 2  
  1.2 Define all Current Users ................................................................................................................. 2  
  1.3 Current Rate Structure of Existing Users ..................................................................................... 3  
  1.3.1 Fleming Middle School & North Valley Industrial Park .......................................................... 3  
  1.3.2 North Valley High School & Manzanita Rest Area .................................................................. 4  
  1.4 Existing Holding Tanks and Associated Costs ............................................................................... 4  
  1.5 Actual Operating Costs ................................................................................................................... 6  
  1.6 Past Rate Agreements ..................................................................................................................... 6  
  1.7 Budget Shortfall .............................................................................................................................. 7  
  1.8 Recommended Maintenance/Upgrades ........................................................................................... 7  
  1.8.1 Fleming Middle School Collection and WWTP ....................................................................... 7  
  1.8.2 North Valley High School Collection and WWTP ................................................................... 7  
  1.8.3 North Valley Industrial Park ..................................................................................................... 7  
  1.8.4 Manzanita Rest Area ................................................................................................................. 8  
  1.9 Job Descriptions/Duties and Salaries .............................................................................................. 8  
  
2.0  **Phase 2 – Business, Legal, and Organizational** ............................................................................ 10  
  2.1 Organizational Structures ............................................................................................................ 10  
  2.1.1 Sanitary Authority ....................................................................................................................... 10  
  2.1.2 Sanitary District .......................................................................................................................... 11  
  2.1.3 County Service District ............................................................................................................. 11  
  2.1.4 Intergovernmental Agreement .................................................................................................... 12  
  2.1.5 Private Sector Partnership ......................................................................................................... 13  
  2.2 District Expansion Process ............................................................................................................ 14
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0</td>
<td>Phase 3 – Planning for a Future Expanded System</td>
<td>15</td>
</tr>
<tr>
<td>3.1.1</td>
<td>Existing System Review</td>
<td>15</td>
</tr>
<tr>
<td>3.2</td>
<td>Potential User Census</td>
<td>15</td>
</tr>
<tr>
<td>3.3</td>
<td>Collection System Alternatives</td>
<td>17</td>
</tr>
<tr>
<td>3.3.1</td>
<td>Gravity Collection Systems</td>
<td>17</td>
</tr>
<tr>
<td>3.3.2</td>
<td>Pressure Collection Systems</td>
<td>17</td>
</tr>
<tr>
<td>3.4</td>
<td>Alternative Solutions for Treatment</td>
<td>19</td>
</tr>
<tr>
<td>3.4.1</td>
<td>Centralized Wastewater Systems</td>
<td>19</td>
</tr>
<tr>
<td>3.4.2</td>
<td>Decentralized/Cluster Wastewater Systems</td>
<td>20</td>
</tr>
<tr>
<td>3.5</td>
<td>Discharge Alternatives and Requirements</td>
<td>22</td>
</tr>
<tr>
<td>3.5.1</td>
<td>Surface Water Discharge of Effluent</td>
<td>22</td>
</tr>
<tr>
<td>3.5.2</td>
<td>Subsurface Discharge of Effluent</td>
<td>24</td>
</tr>
<tr>
<td>3.5.3</td>
<td>Land Application of Effluent</td>
<td>24</td>
</tr>
<tr>
<td>3.6</td>
<td>Cost Comparisons for New System Equipment</td>
<td>24</td>
</tr>
<tr>
<td>3.6.1</td>
<td>Centralized Wastewater Systems</td>
<td>25</td>
</tr>
<tr>
<td>3.6.2</td>
<td>Decentralized/Cluster Wastewater Systems</td>
<td>26</td>
</tr>
<tr>
<td>3.7</td>
<td>New System Staffing Issues</td>
<td>28</td>
</tr>
<tr>
<td>3.7.1</td>
<td>Centralized Wastewater System</td>
<td>28</td>
</tr>
<tr>
<td>3.7.2</td>
<td>Decentralized Effluent Sewer System</td>
<td>28</td>
</tr>
<tr>
<td>3.8</td>
<td>Centralized vs. Decentralized Evaluation and Recommendation</td>
<td>29</td>
</tr>
<tr>
<td>3.9</td>
<td>Process to Integrate Existing Districts and new Systems</td>
<td>30</td>
</tr>
<tr>
<td>3.10</td>
<td>Funding Plan</td>
<td>31</td>
</tr>
<tr>
<td>3.11</td>
<td>Growth Plan</td>
<td>32</td>
</tr>
</tbody>
</table>
List of Tables and Figures

Table 1.2-1 – Existing System Users ..............................................................................................................2

Figure 1 – Current North Valley Sewer District system user chart .................................................................3

Table 1.3.1-1 – FMS/Josephine County Rate Structure based on July-Sept 2013 3RSD Invoice ....................4

Table 1.3.2-1 – Current Rate Structure ...........................................................................................................4

Figure 1.4-1 – Known Existing Holding Tank Locations .................................................................................5

Table 1.5-1 – Operating Costs for the Fleming MS WWTP .............................................................................6

Figure 2.1.3.3 – Unofficial sanitary district boundaries courtesy of Josephine County .................................12

Table 3.2 – Anticipated Wastewater flows ....................................................................................................16

Figure 3.3.2.2 - STEP system diagram for typical user .................................................................................18

Figure 3.3.2.3 - Grinder pump diagram for typical user ..................................................................................19

Figure 3.4.2.1 – Orenco AdvanTex modular packed bed filters ......................................................................21

Figure 3.4.2.2 - MBR Treatment Process ......................................................................................................22

Table 3.6.1.1 – Gravity wastewater system and conventional treatment cost ..............................................25

Table 3.6.1.2 – STEP system and conventional treatment cost ......................................................................25

Table 3.6.2.21 – Orenco™ treatment system cost estimate ..............................................................................27

Table 3.6.2.2 – Membrane Bioreactor (MBR) treatment system estimate .....................................................28

Table 3.8 – Alternative evaluation ................................................................................................................30
1.0 Phase 1 – Existing Conditions and Foundational Activities

1.1 Introduction

The unincorporated community of Merlin, in southwestern Oregon, includes significant areas of residential, recreational, commercial, institutional, and industrial properties. Development opportunities of many of those properties are limited due to inadequate wastewater infrastructure. Currently, the majority of the area residents and businesses utilize septic systems or holding tanks. The Oregon Department of Environmental Quality has not yet identified the groundwater in the area as a health hazard; however, there is concern over long term contamination due to the high number of septic fields in the area.

The Three Rivers School District has three schools in the northeast Merlin area. The Fleming Middle School (FMS) and the Manzanita Elementary School (MES) are on adjoining campuses, while the North Valley High School (NVHS) sits approximately three quarters of a mile north of the other two on a separate campus. Both campus areas include small wastewater treatment facilities. The NVHS facility is an aerated lagoon treatment system which land applies finished effluent during the dry season. The FMS facility is an activated sludge package plant which land applies during the summer and discharges to a small, local creek during the wet season.

The NVHS treatment plant treats wastewater from the High School as well as the sewer generated at the I-5 Manzanita Rest Area, which is just west of the school. The FMS treatment plant treats wastewater from the middle school and the adjoining Manzanita Elementary School, and also accepts wastewater from the North Valley Industrial Park (NVIP). The North Valley Industrial Park encompasses 77 acres and is served by a small gravity sewer collection system which drains the sewage flow into a lift station that, in turn, pumps the wastewater to the Fleming Middle School treatment plant.

1.1.1 Need

Other than the relatively small areas described above, no other regional sewer service is available for current or prospective users. Southern Oregon Regional Economic Development, Inc. (SOREDI) has identified this area as a potential economic growth area if infrastructure can be made available.

Josephine County owns and operates the North Valley Industrial Park sewer collection system and pump station. Although the County charges the Industrial Park users for sewer service, the rate has historically been insufficient to cover treatment and maintenance costs. The County is currently working to pass a new rate schedule for the NVIP users which will narrow the gap between costs and revenue. However, it is likely that it will not be enough to be cost/revenue neutral.

The Three Rivers School District has operated both plants for many years, and while they currently generate revenue from the rest area and the NVIP, the plants are still a financial, logistical, and liability burden to the District, requiring the District to subsidize the operations.

These three entities comprise the key parties involved or impacted by discussions regarding a regional solution to the wastewater utility. SOREDI issued a Request for Qualifications, which was answered by and awarded to Civil West Engineering, to complete this Feasibility Study and Business Plan.
1.1.2 Study Objective

The agreement with Civil West Engineering is split into three phases. The first phase (Phase 1) will define the current system, users, rate structures and costs. More particularly, Phase 1 will address the following objectives:

a) Define all current users. Tabulate by type: industrial, commercial, institutional, and residential.

b) Define current rate structure of all existing users.

c) Define the number of existing holding tanks and the cost of pumping and service.

d) Define actual operating costs of existing system through budget and accounting examination.

e) Define what the rates should be related to past agreements and related historical data.

f) Define the funding shortfall under current rate structure.

g) Identify and recommend maintenance and/or upgrades needed to maintain and/or improve existing system and costs thereof.

h) Identify the job descriptions/duties and salaries of possible Project Manager, District Manager and other needed staff for the current system.

1.2 Define all Current Users

Currently the users of the existing wastewater system are very limited for a number of reasons. Table 1.2-1 identifies the current users and Figure 1, graphically represents the disbursement by user category.

Table 1.2-1 – Existing System Users

<table>
<thead>
<tr>
<th>User</th>
<th>Units</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three Rivers School District</td>
<td>3 (NVHS, FMS, MES)</td>
<td>Institutional</td>
</tr>
<tr>
<td>North Valley Industrial Park</td>
<td>~25 (~18 currently occupied)</td>
<td>Industrial</td>
</tr>
<tr>
<td>Oregon Travel Experience</td>
<td>1 (Manzanita Rest Area)</td>
<td>Commercial</td>
</tr>
</tbody>
</table>

In additional to the users identified above, there are approximately a half dozen parcels in the NVIP which are currently vacant but could be connected to the local wastewater collection system.
Figure 1 – Current North Valley Sewer District system user chart

1.3 Current Rate Structure of Existing Users

Both existing Wastewater Treatment Plants (WWTP) serve different users. The rate charged to these users by the school district also varies. Therefore, the Fleming Middle School (FMS) WWTP and the North Valley High School (NVHS) WWTP will be addressed separately.

1.3.1 Fleming Middle School & North Valley Industrial Park

The Three Rivers School District (3RSD) charges Josephine County based on the product of the percentage of total flow and the total treatment cost plus a nominal monthly flat rate. For instance, in the quarter ending Sept. 2013 the metered flow from the NVIP lift station into the FMS treatment plant measured 1,326,504 gallons. The total flow treated at the treatment plant during that period was 1,799,000 gallons. The portion of the flow attributable to the NVIP was then calculated to be 73.74% (1,326,504/1,799,000). The stated treatment cost was $15,314.01 for the period, meaning that NVIP’s share of that cost was $11,291.88. In addition to the proportional share of treatment cost, the 3RSD also charges the county for any maintenance performed on the NVIP collection system and lift station. That amount, on the above referenced invoice for the third quarter of 2013, was $564.59, which resulted in the quarterly invoice to the County of $11,856.48.

On a per gallon basis, for the identified quarter, the 3RSD ended up charging the County $0.009 (0.9 cents) per gallon.

The County currently charges the NVIP a monthly rate per user based on the service size and historic fixture unit count. This has resulted in exceedingly low sewer rates, averaging just over $21 per month. This rate, divided by the sewer generated in the quarter identified above, results in a charge of less than 0.1 cent per gallon. This represents less than 10% of what the School District is charging the County.

The rate schedule that the County is currently proposing to use will invoice the NVIP users based on water consumption. The NVIP’s water is provided by the City of Grants Pass. The county will use this water meter data to calculate sewer billing. The proposed billing rate is $13.19 plus $2.69 per Equivalent Dwelling Unit (EDU). For the purposes of the calculation, an EDU equates to a water use of 748 gallons.
Based on this billing rate, the county would have invoiced an approximate total of $12,185 during the same third quarter period (July-Sept.) identified above.

Based on the proposed billing method charge of $12,185, and a wastewater flow rate of 1,326,504 gallons, the cost per gallon that the County will be charging the NVIP users would be $0.009 (0.9 cents) per gallon.

A summary of the current rate structure can be found in Table 1.3.1-1 below.

**Table 1.3.1-1 – FMS/Josephine County Rate Structure based on July-Sept 2013 3RSD Invoice**

<table>
<thead>
<tr>
<th>Invoice</th>
<th>Base Rate</th>
<th>Price per gallon (excluding base rate)</th>
<th>Price per gallon (including base rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RSD to Josephine County</td>
<td>$188.20/month</td>
<td>$0.008513</td>
<td>$0.008938</td>
</tr>
<tr>
<td>County to NVIP (Current)</td>
<td>$21.33/month average</td>
<td>$0.00</td>
<td>$0.00072 per sewer gal</td>
</tr>
<tr>
<td>County to NVIP (Proposed)</td>
<td>$13.19/month</td>
<td>$0.0036 per water gal ~$0.0086 per sewer gal</td>
<td>$0.0038 per water gal ~$0.0092 per sewer gal</td>
</tr>
</tbody>
</table>

### 1.3.2 North Valley High School & Manzanita Rest Area

The 3RSD charges Oregon Travel Experience (OTE) for wastewater generated at the Manzanita Rest Area and treated at the North Valley High School WWTP. The initial agreement (originally between the State of Oregon DOT and the Josephine County School District) agreed to a base charge of $75/month and a per gallon charge of $0.001. Over the years the agreement has been modified to increase the per gallon charge to $0.01 per gallon. A summary that includes the North Valley High School WWTP rate structure is in the following Table 1.3.2-1.

**Table 1.3.2-1 – Current Rate Structure**

<table>
<thead>
<tr>
<th>Invoice</th>
<th>Base Rate</th>
<th>Price per gallon (excluding base rate)</th>
<th>Price per gallon (including base rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NVHS WWTP to Manzanita</td>
<td>$75/month</td>
<td>$0.01</td>
<td>~$0.0104</td>
</tr>
</tbody>
</table>

### 1.4 Existing Holding Tanks and Associated Costs

The map on the following page (Figure 1.4-1) locates the existing holding tanks that are throughout the northeast Merlin area. Maintenance and pumping of these holding tanks are the responsibility of the owner. The sewage that is associated with these tanks does not get treated at the Fleming WWTP or the North Valley WWTP. On an as needed basis, the property owners hire a pumper truck to come and pump the sewage out of the holding tanks.
The charges associated with this process are incurred by the property owners. The cost is charged by a local septic service company to the property owners. Pumping charges can vary based on the company, the mileage traveled for dumping, the size of tank and many other items. Currently, local septic service in the area of Merlin costs about $300 for a 1,000 gallon tank and $430 for a 1,500 gallon tank. These costs include the dump fees that are charged by the group accepting the sewage and the pumping of the actual holding tank. Incidentally, the charges are the same for pumping septic tanks as for pumping holding tanks.

1.5 Actual Operating Costs

In determining operation costs for each of the treatment plants, detailed information related to the Fleming MS WWTP for the last two calendar years, 2012 and 2013 was provided by the 3RSD. The information is summarized in the following table, Table 1.5-1. In the table below the payroll expenses include operator and additional temporary help as needed. It can be seen that the majority of expenses for the FMS WWTP come from the cost of the operator and additional personnel as needed.

<table>
<thead>
<tr>
<th>Year</th>
<th>Payroll</th>
<th>Chemical Costs</th>
<th>Equip. Repairs</th>
<th>Elec.</th>
<th>Lab Costs</th>
<th>Misc.</th>
<th>Pumping</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>$47,857</td>
<td>$5,082</td>
<td>$4,871</td>
<td>$9,553</td>
<td>$2,297</td>
<td>$2,621</td>
<td>$7,620</td>
<td>$79,902</td>
</tr>
<tr>
<td>2013</td>
<td>$49,084</td>
<td>$3,867</td>
<td>$691</td>
<td>$10,097</td>
<td>$2,908</td>
<td>$3,648</td>
<td>$8,741</td>
<td>$79,036</td>
</tr>
</tbody>
</table>

As has been discussed, the NVHS WWTP treats the Manzanita Rest Area and the high school wastewater. Actual operating costs were not available at the time of this update. Therefore, some assumptions were made based on data provided by the 3RSD and from industry standards. It was determined that one-third of the payroll costs can be attributed to the NVHS WWTP. This results in approximately $24,542 per year in payroll going to the operating of the NVHS WWTP.

Based on data included in the 2001 Wastewater Facilities Plan and recent billing data from the District to OTE, the average daily flow at the NVHS WWTP is approximately equal to the flow at the Fleming Middle School WWTP. Assuming that chemical, electrical, lab and other miscellaneous costs are similar, the total operating costs for the High School WWTP are assumed to be approximately $54,494.

1.6 Past Rate Agreements

After reviewing the data obtained from various associated groups the only historical agreement that was discussed was between the State of Oregon DOT and the Josephine County School District regarding the rest area. In this agreement, the initial monthly base rate was $75 and the consumption rate was $0.001/gallon of effluent. Today the base rate is still the same but the consumption rate has been increased to approximately $0.01/gallon of effluent. The agreement is now between Oregon Travel Experience (OTE) and the Three Rivers School District.

A formal agreement between the school district and the County has not been obtained at the time of this update.

The rate that the County charges to the NVIP has historically been based on service line size and fixture unit counts. This method resulted in consistent sewer rates regardless of water usage.
As noted in Section 1.3.1, a rate adjustment will likely take place soon which will include a base rate of $13.19 and a consumption rate of $2.69/unit (1 unit = 748 gallons of water).

1.7 **Budget Shortfall**

The biggest budget shortfall comes between the Three Rivers School District (3RSD) and Josephine County. For the same billing cycle mentioned above, July-Sept. 2013, the 3RSD billed the County a total amount of $11,856.48. This was discussed above in the rate structure briefly. Where the shortfall comes in is when the County turns around and bills the North Valley Industrial Park (NVIP). Using the proposed billing structure, the NVIP would be billed $9,602 for the exact same billing cycle. This results in approximately $2,254 that the County has to subsidize the NVIP for wastewater treatment.

This budget shortfall has taken into account the most recent rate increase that the County has implemented. This shortfall will continue to compound until billing rates and structure are brought more in line with current costs of sewage treatment. The rate structures of all the entities involved should also become more uniform and consistent.

1.8 **Recommended Maintenance/Upgrades**

The existing wastewater collection and treatment systems can be divided into four entities which will each be addressed separately below.

1.8.1 **Fleming Middle School Collection and WWTP**

While the FMS WWTP technically has two treatment units, only TU#2 is operational. TU#2 has a design capacity of 20,000 gpd. Peak flows at FMS WWTP often exceed 20,000 gpd. To address this inadequate capacity, flows can be held in the surge basin temporarily, but additional treatment will be needed if flows increase. TU#2 equipment is in poor condition and is not recommended to be used for future expansion. The electrical room for the treatment plant is overcrowded and outdated. The concrete in the chlorine room shows signs of significant deterioration.

Based on a recent third party review of the system (Michael Bollweg, Southern Oregon Water Technology, LLC) “The Fleming STP is on the edge of complete failure”. Significant upgrades are necessary to bring the plant back to reliable working order, and even more improvements would be necessary to increase the capacity to treat future flow quantities.

1.8.2 **North Valley High School Collection and WWTP**

The NVHS WWTP is designed for a maximum daily flow of 21,125 gallons and does not have any permitted discharge other than land application. Although influent is unmetered, it is assumed that peak daily flows exceed this quantity. Large aerated lagoons, however, are better able to handle peak flows than smaller package units. Because of this, no significant upgrades are recommended to the NVHS WWTP. To better facilitate future planning and invoicing, it is recommended to install influent flow meters for both the rest area and the high school itself.

1.8.3 **North Valley Industrial Park**

The NVIP consists of approximately 5,000 l.f. of gravity sewer pipe which is 30 years old. Although still relatively new in terms of sewer pipes, inflow and infiltration (I/I) is likely a contributor to peak flows. Because the County is charged based on the percentage of total flow, this may lead to excessive charges. Recent maintenance/repair work identified and corrected many major I/I contributors, but others are likely
present. Smoke testing of the system could identify leaking pipe areas and unknown or inappropriate connections.

The lift station is also 30 years old and, while the pumps are in good condition, the controls and emergency backup systems are insufficient to meet today’s criteria. A 2011 study was prepared by Parametrix to estimate costs of upgrading the lift station. Based on our review of the small set of improvement plans prepared by Parametrix, the costs they estimated were low by 10 to 15 percent. Also, by increasing their unit costs by the industry standard ENR index for the 2001 to 2014 period, the total project cost estimate increases from $155,000 to approximately $185,000. A portion of the project was to install a flow meter vault. It is our understanding that a meter has recently been installed at the school side of the force main, which would make a new meter redundant.

### 1.8.4 Manzanita Rest Area

The Manzanita Rest Area was connected to the North Valley High School WWTP in 1983. Prior to the connection the rest area had a small treatment facility located on the west side of the interstate. Similar to the NVIP, the pipes are approximately 30 years old and may have significant I/I problems. The pipe connecting the rest area to the NVHS system is approximately 1,400 l.f. No significant upgrades are recommended at this time.

### 1.9 Job Descriptions/Duties and Salaries

Currently the school district employs two staff in order to maintain the existing WWTP’s. This consists of a full-time operator (Ken Bennefield) and an, as needed, part time assistant operator (Robert Horban). The cost to the school district of paying these employees is approximately $73,000/year. These expenses include salary and benefits (as required).

In order to move toward the idea of creating a self-sustaining sewer district a plan must be made that includes job descriptions/duties and the costs that go along with those. The Harbor Sanitary District (HSD) is located near the City of Brookings. The HSD is a great model of what the possible sewer district in the North Valley area could look like. The HSD is currently in the process of reviewing and modifying the current job descriptions and requirements. At the time of this update the current job titles were as follows:

- District Manager
- Lead Certified Wastewater Collections System Operator
- Wastewater Collections Operator Trainee/Maintenance 1
- Wastewater Collections Maintenance 1
- Office Assistant

The maintenance staff report to the Lead Operator, which in turn, reports to the District Manager. The Office Assistant also reports to the District Manager.

The District Manager is directly responsible for all the operations of the District. She/he will be given direction by the Board of Directors. They will also be responsible for all personnel actions, District financing and accounting. Wages can vary for this position depending on experience and other factors. The current hourly wage for the District Manager at HSD is $30.57.

The Office Assistant should be responsible to assist the District Manager and Maintenance Department with all day-to-day operations. Typical duties should include; answering phones, accepting payments,
mail processing and general upkeep of the office. Wages can vary for this position depending on experience and other factors. The current hourly wage the Office Assistant at HSD is $11.95.

The Lead Operator is responsible for maintenance and operations of the entire collection system, from sewer lines to valves and floats. A large portion of this position is to keep the maintenance department in line with Oregon OSHA and safety rules. Wages can vary for this position depending on experience and other factors. The current hourly wage for the Lead Operator at HSD is $19.00. Since HSD transfers their sewage to the City of Brookings, the Lead Operator does not need to be licensed as a treatment operator. A likely rate for a treatment and collection operator is $23.00 per hour.

The remaining positions would be Maintenance/Assistant Operator which would help to maintain the collection system. Assistant Operators would assist in reporting readings, checking gauges and other items throughout the system. Wages can vary for this position depending on experience and other factors. The current hourly wage for assistant operators at HSD is $13.60.

According to the State of Oregon Employment Department each of the hourly wages listed above have a range. Typically, the range is around +/-$10.00/hour. As mentioned previously, this range depends on experience in the field, education and other factors.

Along with the hourly wage, benefits will also have to be taken into consideration. Comparing once again to the HSD, we found that contributing to a retirement plan (approx. 8% at HSD) and paying full medical, dental and vision insurance for the employee is common. In order to obtain an overall hourly compensation number per employee these benefits can be added as a percentage. Recent Bureau of Labor Statistics show that a multiplier of 35-40% of the hourly wage should be added to obtain the overall compensation value per employee position.

Multipliers will vary according to the market at the time of employment. Some of the above mentioned positions don’t need to be full time positions as well. This will also affect the benefit package for the proposed district. Each of the above wages are simply a starting point for planning purposes. Some of those wages may be at the lower end of the pay scale and should be adjusted as needed on a regular basis.
2.0 Phase 2 – Business, Legal, and Organizational

In this phase, we will explore and summarize the legal, administrative, and practical issues that will be faced in navigating the process of forming a district (or other entity), and expanding the scope of services to include additional customers and other entities.

2.1 Organizational Structures

Various organizational options exist for forming a separate and self-operating district/sanitary entity. Each of these options should be taken into consideration and evaluated based on what will benefit the current wastewater system in the short term while planning for the long term. The following sections will outline these options and present the information needed to make a good decision that will benefit the residents in the area.

2.1.1 Sanitary Authority

Creating a sanitary authority is one option for maintaining the wastewater facilities in the Merlin/North Valley Sewer Districts. This option is based on creating a separate, free-standing, governing body that has the authority to finance, build, and operate a public system for years to come. The details of the formation of this authority can be found under the Oregon Revised Statutes (ORS) 2013, 450.705 to 450.989.

In establishing an authority, the boundaries may include both incorporated and unincorporated areas. There are also provisions that will allow the dissolution of existing districts upon formation of the authority. The initiation of creating a sanitary authority can be done by counties, cities or districts. The criteria that should be followed when doing this is in ORS 450.785 and 450.787.

This section is intended to be a summary of the mentioned statutes broken into specific criteria related to the initiation of a new sanitary authority.

Board and Elections (ORS 450.790-.804)

When forming a sanitary authority a new board would need to be organized which includes five elected members, a chairperson appointed by the board and a manager appointed by the board. The chairperson shall be appointed from the five elected members. The terms of the five elected board members would be determined at the first meeting after the election.

Powers (ORS 450.806-.837)

Along with appointing a chairperson, the board also appoints a “professionally qualified person” as the manager of the authority. The duration and compensation of the manager is up to the discretion of the board. The manager will then serve as the administrator and supervisor of the functions and operations of the authority. The board is also permitted to adopt and enforce ordinances for sanitary purposes. The general powers of the authority range from using a common seal, employing necessary employees or assistants and converting all residents or property owners to a type of central or decentralized sewage disposal system.
Finances (ORS 450.840-.977)

Once the sanitary authority is established, the cost/maintenance of the sewage system will be “borne by the area directly benefited by the system.” The area directly benefiting from system improvements will be determined by the board. Improvements or maintenance of the system will also be prioritized and decided by the board.

The financing of improvements and/or maintenance will be determined at the discretion of the board. This translates to the idea that sewer service charges, tax levies or tax liens may be implemented in order to finance the recommended projects.

2.1.2 Sanitary District

Per ORS 450.005 - Definitions, “District means a sanitary district formed in one or more counties and outside the corporate limits of any city pursuant to ORS450.005 (Definitions for ORS 450.005 to 450.245) to 450.245(Application of ORS 450.005 to 450.245 to districts organized under former laws) or pursuant to any law which those sections supersede.” The key difference between an Authority and a District is that a District cannot overlap city limits, whereas an Authority can. In the case of the Merlin/North valley area, there are no incorporated areas, so a District is likely all that is necessary.

There is an active sanitary district in the Merlin area, the Merlin/North Valley Sanitary District (NVSD). The NVSD is a voluntary district and has an active District Board which holds regular meetings. It currently encompasses only the Paradise Ranch Resort and Clearwater Technologies. An “unofficial” map of the area can be found in Figure 2.1.3 below.

The details of a sanitary district can be found in ORS 450.005 through 450.580. The structure, policies and procedures of a sanitary district are similar in most ways to the sanitary authority above.

The size of a district board can be either three or five members. This is different from the authority board which is five members. At the first regular meeting of each year a president is chosen from the current board members and a secretary is appointed. Similar to an authority, the financing of improvements or maintenance to the system is at the discretion of the board. Therefore, sewer service charges, tax levies or tax liens may be implemented in order to finance the recommended projects.

2.1.3 County Service District

A county service district is one that utilizes the existing system of county administration in governing and running the service district. The county acts as the board, and all improvements or maintenance are organized and directed through the county commissioners (i.e. “county court”). The details and process of this formation are found in ORS 451.410 to 451.610.

There is currently the North Valley General Service District (NVGSD) which encompasses the NVIP and much of the property along the north side of Merlin Rd. west almost to Carton Way.

The major benefit of this type of system is that the governing body is already in place and can be utilized. Therefore, another level of bureaucracy is avoided. The powers and financing for improvements or maintenance of the sewer system will come through similar channels as the sanitary authority above.

The downside to using a County Service District is that the County would have to agree to take on the responsibility of the system, which would come at a price and a loss of autonomy and flexibility.
2.1.4 Intergovernmental Agreement

The intergovernmental agreement (IGA) is between two or more governmental bodies. These governmental bodies could include the City of Grants Pass, Josephine County, etc. This joint agreement is detailed in ORS 454.165. Typical IGA’s are:

1. Owner/Customer Agreement
2. Cooperative Agreement

As the name illustrates, in the owner/customer agreement, one entity is the “owner” and the other(s) is the “customer”. In this situation the customer is allocated a portion of the facilities capacity. The owner then charges the customer based on specific flows and loads.

A Cooperative Agreement is a situation where there is a “co-owner” arrangement between the parties involved. The success of this agreement is directly related to setting distinct divisional duties for each entity involved.

The IGA is not an ideal candidate for Merlin area because Merlin is unincorporated and has no governing body other than the county.
2.1.5 Private Sector Partnership

The private sector partnership is an option that is considered by public facilities at times. A private sector partnership can be used in conjunction with any of the previously discussed organizational structures. If used correctly, these partnerships allow for increased efficiency, reduced cost of providing services and can expedite procurement and construction processes. They can also provide for the capital required for construction. Conversely, they can also decrease efficiency and increase costs.

The following are options of private sector partnership:

1. Contract Operations
2. Turnkey Arrangement
3. Design/Build/Operate

In each of these options a private company’s role can vary significantly. Options can be mixed and matched or can be kept separate from each other entirely.

**Contract Operations**
By using the contract operations option, the operation and maintenance of the facilities are turned over to a private entity. This arrangement allows the local government/district to maintain ownership of the facilities, control over capital investment, rate setting capabilities and other items that aren’t related to the day-to-day operations. During this process, the local government/district also monitors performance and maintains interaction with the public. This will allow the local government/district to keep facilities in compliance with required state and national standards.

An example of a contract operations agreement is the US Forest Service, Tiller Ranger District. The district offices are located in the small town of Tiller between Canyonville and Trail on Hwy 227. There is a very small treatment plant which doesn’t require a full time operator, so they contract out to Environmental Contracting Services, Inc., out of Roseburg, to operate the system.

**Turnkey Arrangement**
Implementing the turnkey arrangement is an option that will allow a private investor/vendor to build a complete facility according to requested specifications. At the conclusion of the facility, it is turned over to the public entity. This will allow a facility to be completed much quicker and sometimes in a more efficient manner. Upon completion, the public entity will step in and operate and maintain the facility.

An example of a turnkey arrangement would be if Orenco, or a similar vendor, agreed to build the treatment plant(s). A payment structure would be arranged to reimburse the vendor for the construction and installation of the equipment. Operation of the plant after construction would be by the district.

**Design/Build/Operate**
The final option is essentially an extension of the turnkey arrangement, except that the private entity also operates and maintains the facility after completion.

An example of a design/build/operate would be similar to the turnkey example, except that operation of the system would be contracted out to the vendor.
Each of these partnerships has positive and negative aspects. Typically, the more responsibility that is given to the private party, the higher the costs will be. A design/build/operate partnership may be a convenient route for the district to pursue until there is enough infrastructure to warrant a full time operator.

2.2 District Expansion Process

There are opportunities to expand the current sanitary district in the Merlin/North Valley Area. Some of target properties include the Rendata Industrial Park and the Grants Pass Airport complex. There are also other various properties that would be available for inclusion in the districts with the appropriate expansion methods. The opportunity for expansion could also include one of the existing districts absorbing the other and creating a larger sanitary district to serve the residents and entities in the area better. For example, the NVSD could absorb, or annex, the property currently in the NVGSD.

The district expansion process is referred to in ORS 450.215 to 450.242. The following multiple scenarios are meant to be basic examples and information regarding the expansion of the above mentioned districts. This expansion process will also be discussed in more detail in Phase 3 as the recommended method of future system expansion is explained in more detail.

The annexation process is done through a petition to the County. Additional details can be found in the above mentioned ORS sections. A copy of the petition is attached as appendix A at the end of this report.

It should be noted that when annexing additional properties that a plan of division of properties and obligations should be created. This may be simple and straightforward by just having the district take over all obligations that the existing property or district were under at the time of annexation. It would be best to be very detailed about this division due to some of the debts that could be incurred when annexing properties. Within 30 days of annexation, the secretary of the responsible district should file a written report with the Environmental Quality Commission that should include, the name of the district, date of the order of annexation and furnish an update district boundary map.
3.0 Phase 3 – Planning for a Future Expanded System

3.1 Existing System Review

The only wastewater collection and treatment facilities within the Merlin/North Valley area (other than individual septic tanks and perhaps a few private packed bed filters) are owned and operated by the Three Rivers School District (3RSD). The 3RSD has two separate treatment facilities, Fleming MS and North Valley HS.

Based on a recent Facility Assessment of the Fleming WWTP, prepared by Mike Bollweg (Southern Oregon Water Technology, LLC), the treatment plant “is on the edge of complete failure”. Continuing to utilize the plant will require significant capital improvements ranging from $325,000 to $1.25 million based on estimates from plant operators. Completing these improvements will not significantly increase the capacity of the plant. The improvements will simply allow the facility to operate more efficiently and meet permit levels more reliably. If the school district intends to join the sewer district and “get out of the sewer business”, then it seems prudent to utilize this money to facilitate the sewer district recommended path forward.

The aerated lagoon treatment plant at the North Valley High School has more capacity for future flows, but it relies solely on irrigation discharge, which limits the available discharge flow. The school district may opt to have the proposed sewer district take over operation of the NVHS plant or revise the plant to meet proposed district standards.

3.2 Potential User Census

The current users are described in Section 1 of this study. The majority (over 80%) of current users are institutional and industrial. The potential users that could be added to the District include additional institutional and industrial users, along with residential and commercial users. A few examples of these are as follows:

Existing Users:

(1) North Valley High School (Three River School District)
(2) Manzanita Rest Area (Oregon Travel Experience)
(3) Fleming Middle School & Manzanita Elementary School (Three Rivers School District)
(4) North Valley Industrial Park

New Users:

(1) Rendata Industrial Park (Industrial)
(2) Clearwater Technologies
(3) Paradise Ranch Resort (Mostly residential)
(4) Grants Pass Airport Complex (Public/Commercial)
(5) Merlin Industrial Park
(6) Existing Residences (residential)
The Rendata Industrial Park is a master planned project with a total of 175 acres of industrial and residential properties. The area is currently served by septic tanks, however the density of the proposed land precludes septic tank use and will require a local wastewater collection system. Development of the Rendata Industrial Park is currently stunted due to the lack of wastewater services in the area.

Clearwater Technologies treats septic sludge into a usable biosolid. As a result of the treatment process, Clearwater generates a liquid waste stream which would be eligible to be treated by the District. Clearwater is located near the low point of Merlin (near corner of Merlin Rd and Pleasant Valley Rd).

Paradise Ranch is a planned unit development (PUD) that includes a golf course resort, 200 single-family residential units, and up to 150 overnight accommodations. Currently the few structures already in the area are served by septic tanks. Given the density of the proposed development, septic tanks are not viable. The golf course would be a prime location for irrigation use of treated effluent, although it would have to meet appropriate treatment levels to do so.

The County-owned Grants Pass Airport may also be included as a future user which could include all the users in the complex. The airport also presents a unique opportunity because of the vast areas of empty land, the Runway Clear Zone, which would be prime irrigation or subsurface discharge property.

The Merlin Industrial Park is an area north of the Pleasant Valley Rd. and Merlin Rd intersection, but south of Louse Creek. This area has current industrial users on septic systems. Density and use could be increased if wastewater service were provided.

In addition to the above mentioned known potential users, many of the local residential areas may opt to join the district. This is likely to be a financial decision and will be up to the homeowners to make the decision.

Table 2 below represents approximate wastewater flows from existing and new users.

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<tr>
<th>Potential Users</th>
<th>Average Daily Flow</th>
<th>Peak Flow</th>
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</thead>
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<td>North Valley High School</td>
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</tr>
<tr>
<td>Manzanita Rest Area</td>
<td>4,400</td>
<td>9,300</td>
</tr>
<tr>
<td>Flemming Middle &amp; Manzanita Elementary Schools</td>
<td>13,000</td>
<td>28,000</td>
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<td>15,500</td>
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<td>Rendata Industrial Park *</td>
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</tr>
<tr>
<td>Clearwater Technologies *</td>
<td>24,000</td>
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<td>255,942</td>
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<tr>
<td>Grants Pass Airport *</td>
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<td>57,248</td>
</tr>
</tbody>
</table>

* Indicates flow data as estimated in EGR & Associates 2008 Wastewater Collection, Treatment and Disposal System Engineering Report for the Paradise Ranch Resort
3.3 Collection System Alternatives

Wastewater collection systems rely on either gravity or pressure to convey the sewage from the user to the treatment facility. Gravity collection systems are, by far, the most common systems in municipal applications because they require no additional energy to convey wastewater to the treatment facility. Pressure systems are becoming more and more prevalent in small communities due to the lower installation costs of the pipe.

3.3.1 Gravity Collection Systems

Gravity pipes are typically at least 8 inches in diameter and have a continuous slope. Gravity collection pipes are typically installed at a depth of between 5 and 10 feet, but because they must have a continuous slope, and depending on the terrain, can be significantly deeper. Manholes are also required at each horizontal or vertical change in pipe alignment. Once installed, the operation and maintenance costs of gravity collection systems are relatively small because there are no energy requirements to convey the flow.

Gravity collection systems often have to be supplemented with lift stations (pump stations) depending on the terrain and relative location of the treatment facility. In small scale installations, this can add relatively substantial capital and operation costs.

3.3.2 Pressure Collection Systems

Pressure systems operate by having a lower pressure at the treatment plant than at the user. This can be accomplished either by installing pumps (STEP or grinder) at the user connection, or by providing a vacuum at the treatment end. The treatment plant does not necessarily have to be at the low point in the system and can usually be smaller because Inflow and Infiltration (I/I) is drastically reduced.

3.3.2.1 Vacuum Wastewater Collection System

Vacuum wastewater collection systems have the distinct advantage of having all of the power requirements at a central location. Since the vacuum system would be located adjacent to the treatment plant, the electrical requirements at the user connection point are zero. Disadvantages of a vacuum system include a relatively large cost for the vacuum unit and that the pressure main still needs to have a controlled slope (although not to the extent that a gravity system does). The large cost of the vacuum unit though is enough to make the vacuum system not viable for this application.

3.3.2.2 Septic Tank Effluent Pump (STEP) Collection System

Septic tank effluent pumps (STEP) systems require a standard septic system fitted with a solids filter and an effluent pump. This ensures that only the liquid stream from the septic tanks are pumped. Existing septic systems can be easily retrofitted with the filter and pump. Basically, instead of the septic tank draining to a drain field, the effluent is pumped into a low pressure collection system and conveyed to a treatment facility. STEP systems can be installed in a centralized or decentralized treatment scenario.

Advantages of STEP systems include:

- Only the liquid stream is collected, removing the need for solids screening at the treatment plant.
- Simple to modify existing septic tanks.
- Pressure mains are small and shallow, minimizing installation costs.
Disadvantages of STEP systems include:

- Requires a septic tank.
- Septic tanks still need to have solids removed every few years.
- Requires electrical connection to power septic tank pump.

Figure 3.3.2.2 - STEP system diagram for typical user

3.3.2.3 Grinder Pump Pressure Collection System

Grinder pump systems are similar to STEP systems in that the wastewater is pumped from the user to the treatment plant, however with grinder pumps, a septic tank is not required. A small vault is installed at each connection which includes a holding tank and one or two solids handling grinder pumps. The pumps grind the solids into a slurry and pump it to the treatment plant. Because solids are sent to the treatment plant, the treatment plant needs to include a fine screen to remove the inorganic solids.

Advantages of grinder pump system include:

- No septic tank is needed, therefore no septic tank solids to remove.
- Small footprint of grinder pump vault.
- Pressure mains are small and shallow, minimizing installation costs.

Disadvantages of grinder pump systems include:

- Requires additional treatment plant equipment (fine screen).
- Grinder pumps use more energy to grind solids, as compared to effluent pumps (STEP).
- Requires electrical connection to pump vault.
3.4 Alternative Solutions for Treatment

Earlier studies outline a number of solutions to improving/creating a wastewater system in the Merlin/North Valley area. These alternatives will be included in order to present a well-rounded list of options. There are new alternatives that will also be included that may be better options for the area. This section will outline each of these options.

3.4.1 Centralized Wastewater Systems

Centralized wastewater systems have been the focus of past studies and are, by far, the most common type of installed and operated systems which serve similar sized communities and needs. They typically begin with a small system and grow as development occurs. To start with a complete system, as is needed in the Merlin area, the initial cost per user will be relatively high.

3.4.1.1 Centralized Gravity Wastewater System

A gravity system in the Merlin/North Valley area would consist of a conventional gravity collection system throughout the District directing the wastewater to a centrally located wastewater treatment plant.

The treatment plant would have to be located, more or less, at the lowest spot in the district. This location, along Jumpoff Joe Creek, is troublesome, not only due to lack of property, but also because discharging the effluent in the creek will mean that the discharge permit limits will be stricter (see section
3.5. Most municipal wastewater treatment plants which discharge into a body of water and are typically allowed a regulated mixing zone (RMZ) to dilute the treated effluent. In the case of Jumpoff Joe Creek, the quantity of flow is very low in the summer (in some cases even subsurface). Therefore, the effluent from the treatment facility would have to meet water quality standards without the benefit of any mixing, which requires more processing, meaning higher costs.

A gravity collection system consists of various sized sewer pipes, lift stations, force mains and manholes. The concerns of this type of system would be mainly related to capital cost. This option is initially very expensive to install and get running, due to the majority of the system being new construction. This expense is placed directly on the current customers of the District, and can get very expensive for each customer in a District with a small population base.

A very preliminary cost estimate for this option is included in Table 3.6.1.1.

### 3.4.1.2 Centralized STEP/Grinder Pump Pressure Pipe System

A centralized STEP or grinder pump system will still have similar discharge concerns as the centralized gravity system. Although the treatment plant can be located at a more desirable location, there are no local bodies of water which will allow a conventional surface water discharge. A single subsurface discharge or irrigation discharge will require a significant parcel of land. The airport Runway Clear Zone (RCZ) would be a logical choice for discharge. This would need local (County) and Federal (FAA) approvals and would require a maintenance agreement between the sanitary district and the airport for maintenance of the system.

A very preliminary cost estimate for this option based on the Merlin/North Valley Wastewater Facilities Plan (June 2001, Dyer Partnership) is included in Table 3.6.1.2.

### 3.4.2 Decentralized/Cluster Wastewater Systems

The alternative to a central wastewater system is to create a decentralized system that can be built in clusters and each cluster can be expanded as users or demands increase. A decentralized system is one that would utilize a standardized method of small-scale treatment and discharge. Examples of this type of system would include Orenco Advantex treatment units. These units treat the waste stream biologically to produce a treated effluent which may be discharged subsurface, similar to a conventional drain field. Also available are small scale Membrane Bioreactors (MBR’s). MBR’s will likely produce the best quality effluent, but likely require the more operator attention and capital cost. The selection and recommendation of one of these alternatives will depend on regulatory requirements, as well as cost.

Decentralized systems will also be a benefit to areas that may experience only incremental growth. Due to the modular set-up of these treatment systems, expansion can continue to be added as needed. This will then minimize current users from being required to fund improvements and maintenance for future users.

Two different treatment methods are evaluated below, however other treatment processes exist and should be evaluated in a wastewater facilities plan.

#### 3.4.2.1 Orenco™/Packed Bed Filter Treatment System

The Orenco treatment system uses modular packed bed filters to treat liquid stream wastewater. The Orenco treatment system is a type of packed bed recirculating filter. Standard Orenco installations include each customer having a watertight underground tank that collects the wastewater from the
property. This tank acts as a septic tank and allows for the solids to go through a passive, natural treatment that would need to be pumped every 5-10 years. The liquids would then be transferred onto the AdvanTex treatment system.

Alternative arrangements would include not having the septic tanks but instead using a small headworks unit to remove solids from the waste stream, as discussed in section 3.3.2.3. The option to have septic tanks included will likely be based on a case by case assessment. If existing users already have septic tanks installed or if there are multiple small users, including the tanks in the system is likely a less expensive solution. For large users (schools, etc.) the use of septic tanks may not be feasible and a small headworks before the treatment units will be needed.

This treatment can be very beneficial because it can provide higher quality treatment than a typical septic system can, thus reducing the number and size of the drain fields. This treatment system works best when “clusters” or “pods” are created as small treatment systems throughout the District. As certain areas of the District expand and grow, the treatment system for those areas can also be expanded by adding additional treatment pods. This allows for the flexibility of treatment capacity to increase as flows and revenues increase.

A preliminary cost estimate for a standard Orenco option is included in Table 3.6.2.1.

![Figure 3.4.2.1 – Orenco AdvanTex modular packed bed filters](image)

### 3.4.2.2 Membrane Bioreactors Treatment System

Membrane Bioreactors (MBR’s) are a combination of conventional activated sludge processes with membrane filtration. The activated sludge is separated from the liquid as it passes through the membranes and is retained in the biological reactor. Many MBR’s will come pre-assembled from the manufacturer in shipping container style pods, and can be sized in relation to the application and expected flow volume. This allows for future expansion on an as needed basis instead of everything up front.
Sludge that builds up in the treatment units will have to be pumped and trucked off-site periodically, presumably to Clearwater Technologies in downtown Merlin. In general, this treatment system will produce a very high quality effluent which may even be suitable for athletic field irrigation. Costs of MBRs are typically higher than the other treatment methods identified, however, with the possible irrigation use as a benefit, MBRs may be competitive.

MBRs, similar to the Orenco/PBF option, will treat only the liquid stream of the wastewater. They can either run after a septic tank, or will need a headworks to remove solids.

A preliminary cost estimate for a standard MBR option is included in Table 3.6.2.2.

### 3.5 Discharge Alternatives and Requirements

There are three primary discharge methods available to be permitted by the Oregon Department of Environmental Quality. These are surface water discharges, land application discharges and subsurface discharges.

#### 3.5.1 Surface Water Discharge of Effluent

The Clean Water Act (CWA) as delegated to the State of Oregon and enforced through Oregon Revised Statues (ORS 468B.050), requires permits for all discharges of wastewater to waters of the state. A wastewater treatment plant discharging to a surface water would need to operate the wastewater system under the jurisdiction of the Oregon Department of Environmental Quality (DEQ), with a National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit. NPDES permits are generally renewed every 5 years, at which time any changes or updates to the rules will be included in the renewed permit.
OAR 340-041-0007 (Statewide Narrative Criteria) includes minimum design criteria for treatment and control of wastes. Generally, wastewater from a municipal wastewater treatment system must be treated and controlled in facilities designed in accordance with the following minimum criteria:

- In designing wastewater treatment facilities, average conditions and a normal range of variability are generally used in establishing design criteria. A facility, once completed and placed in operation, should operate at or near the design limit most of the time but may operate below the design criteria limit at times due to variables which are unpredictable or uncontrollable. This is particularly true for biological treatment facilities. The actual operating limits are intended to be established by permit pursuant to ORS 468.740 and recognize that the actual performance level may at times be less than the design criteria.
- Effluent BOD concentrations in mg/l, divided by the dilution factor (ratio of receiving stream flow to effluent flow) may not exceed one unless otherwise approved by the Commission;
- Sewage wastes must be disinfected, after treatment, equivalent to thorough mixing with sufficient chlorine to provide a residual of at least 1 part per million after 60 minutes of contact time unless otherwise specifically authorized by permit;
- Positive protection must be provided to prevent bypassing raw or inadequately treated sewage to public waters unless otherwise approved by the Department where elimination of inflow and infiltration would be necessary but not presently practicable; and
- More stringent waste treatment and control requirements may be imposed where special conditions make such action appropriate.

The NPDES permit may allow the District to discharge treated wastewater to Jump-off Joe Creek, or an intermittent creek feeding Jump-off Joe Creek (e.g. Louse Creek & Harris Creek) under the prescribed effluent limitations and other requirements. These effluent limits are developed to protect the beneficial uses for the Rogue Basin (Oregon Administrative Rules 340-41-00271).

OAR 340-041-0275 (Water Quality Standards and Policies for the Rogue Basin) includes minimum design criteria for treatment and control of wastes. These are as follows:

1) pH (hydrogen ion concentration). pH values may not fall outside the following ranges:
   a) Marine waters: 7.0-8.5;
   b) Estuarine and fresh waters (except Cascade lakes): 6.5-8.5;
   c) Cascade lakes above 3,000 feet altitude: pH values may not fall outside the range of 6.0 to 8.5.
2) Total Dissolved Solids. Guide concentrations listed below may not be exceeded unless otherwise specifically authorized by DEQ upon such conditions as it may deem necessary to carry out the general intent of this plan and to protect the beneficial uses set forth in OAR 340-041-0271: 500.0 mg/l.
3) Minimum Design Criteria for Treatment and Control of Sewage Wastes:
   a) During periods of low stream flows (approximately May 1 to October 31): Treatment resulting in monthly average effluent concentrations not to exceed 10 mg/l of BOD and 10 mg/l of SS or equivalent control;
   b) During the period of high stream flows (approximately November 1 to April 30): A minimum of secondary treatment or equivalent control and unless otherwise specifically authorized by the Department, operation of all waste treatment and control facilities at maximum practicable efficiency and effectiveness so as to minimize waste discharges to public waters.
In addition to the treatment level dictated by the Water Quality Standards, there are also other criteria based on OAR 340-041-0004, which describes the Environmental Quality Commission (EQC) Antidegradation Policy for Surface Waters. The Rouge Basin, according to OAR 340-041, Figure 0271B, has a Salmon and Steelhead Spawning Use Designation. Because of this, temperature criteria may be applicable to the discharge.

There are also Technology Based Effluent Limitations. The EPA has established secondary treatment standards for domestic wastewater treatment facilities. The standards are found in 40 CFR part 133. Secondary treatment is generally defined as monthly average concentration limits of 30 mg/l for BOD5 (or 25 mg/l for CBOD) and 30 mg/l for TSS. Actual permit limits may be more stringent based on treatment methodology used. Treatment systems which are able to treat to better levels, will have lower limits on the permit.

3.5.2 Subsurface Discharge of Effluent

All wastewater treatment systems operating in Oregon must have an environmental permit issued by DEQ. For facilities that do not discharge to surface “waters of the state”, a state Water Pollution Control Facilities (WPCF) permit is used. This discharge method is governed by the Oregon Revised Statutes (ORS) 468B.150 and 160. It requires that all groundwater be protected for both existing and future beneficial uses so that the state may continue to provide for whatever beneficial uses the natural water quality allows. A subsurface drain field serving a “Non-residential onsite sewage system with a design flow of 2,500 gallons per day or designed to serve 20 or more people a day…” will be considered an Underground Injection Control (UIC) system and will be permitted as such.

The required size of the drain field is based both on the capacity of the soil to absorb the water and the nutrient loading of the treated effluent. The more nutrients that are removed from the effluent in a treatment facility, the smaller the drain field can be. Subsurface discharges do not require disinfection.

Likely permit limits would include 20 mg/l BOD5 and 20 mg/l TSS based on review of other WPCF permits issued in the Merlin area.

WPCF permitted discharges are not required by DEQ to have a licensed operator. The local collection system will likely be a Level I system based on the population served. If no operator is required for the treatment system, then a Level I collections operator is all that would be required for the wastewater system.

3.5.3 Land Application of Effluent

Similar to a subsurface discharge, land application of treated effluent also requires a WPCF permit issued by DEQ. Land application requires effluent to be disinfected prior to discharge. The required size of the irrigation field is dependent on the percolation rate of the soil. Permits for irrigation may contain seasonal restrictions allowing irrigation only during the summer months. This requires that the treatment plant(s) have adequate effluent storage to last through the wet season.

3.6 Cost Comparisons for New System Equipment

In preparing for future planning or expansion the estimated costs are typically much of the driving force for the stakeholders. The cost of the options described in previous sections are significantly different in many ways. The following sections will provide very preliminary cost estimates.
3.6.1 Centralized Wastewater Systems

Costs associated with a centralized wastewater system are split between the collection system and the treatment plant. Because centralized systems need a vast collection array of pipes, in both a pressure system and a gravity system, much of the total costs are attributed to the collection system.

3.6.1.1 Gravity Wastewater System and Conventional Treatment

The Merlin/North Valley Wastewater Facilities Plan (June 2001, Dyer Partnership) references the Merlin and North Valley Regional Problem Solving Agreement (May 1999, KCM) which describes a gravity collection/treatment system. By using this data and applying the current ENR Index, the estimated cost to build a gravity collection system and centralized activated sludge treatment plant for the Merlin/North Valley area is shown below (Table 3.6.1.1).

Table 3.6.1.1 – Gravity wastewater system and conventional treatment cost

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<thead>
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<th>Estimate Year</th>
<th>Capital Cost</th>
<th>ENR Index</th>
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* = Data obtained from 1999 KCM study
** - ENR index for May 2014

Based on data in the Wastewater Facilities Plan for an appropriately sized treatment plant, the cost of the plant is approximately 20% of the total costs, the remaining 80% is to install the gravity collection system.

3.6.1.2 Centralized STEP Pressure Pipe System

The Merlin/North Valley Wastewater Facilities Plan (June 2001, Dyer Partnership) also provides cost data for a centralized STEP collection/treatment system. By using this data and applying the current ENR Index, the estimated cost to build this system for the Merlin/North Valley area is shown below (Table 3.6.1.2).

Table 3.6.1.2 – STEP system and conventional treatment cost

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<td>$14,555,930*</td>
<td>6343</td>
<td>--</td>
</tr>
<tr>
<td>2014</td>
<td>$22,479,698</td>
<td>9795.92**</td>
<td>54.4</td>
</tr>
</tbody>
</table>

* = Data obtained from 2001 WWFP, Dyer Partnership
** - ENR index for May 2014

For the centralized STEP system analyzed in the above referenced Facilities Plan, approximately 30 percent of the overall project cost was for treatment, approximately 40 percent was for collection system, and approximately 30 percent was for the individual septic tank and STEP installations.
A centralized grinder pump application would have a similar capital cost, although slightly more of the cost would be associated with the treatment plant and slightly less for the individual pump installations.

### 3.6.2 Decentralized/Cluster Wastewater Systems

Decentralized, or “Clustered”, wastewater systems will include a local collection and treatment system centered around pods of development. For simplification of operation, it is recommended that each cluster use similar technologies and processes to collect, treat, and discharge the wastewater as much as possible. Some clusters will be slightly different based on existing infrastructure or terrain. Both treatment systems evaluated above (Packed Bed Filters [Orenco], and MBRs) are designed to treat the liquid wastewater stream only. Both units will require either an upstream headworks screen, or the use of individual septic tanks with effluent pumps (STEP).

Cluster collection systems may vary as this example shows; The North Valley Industrial Park has an existing gravity collection system. It would be far less expensive to install a fine screen upstream of a treatment system than it would be to install a STEP system with new tanks and pressure pipes. The same holds true for the existing schools. Conversely, neither the Rendata Industrial Park nor the Paradise Ranch Resort have existing infrastructure, and therefore, it may be less costly to install a STEP collection system than to install a new gravity collection system. In this case, a fine screen would not be used because the septic tanks would collect the solids. Another option is to install grinder pumps into a pressurized system and still use screens upstream of treatment.

Each cluster will have to be evaluated to determine the best collection system, however the treatment of the wastewater would be by a standardized process. The following cost estimates represent a grinder pump installation with 20 connections and a total of 2500 linear feet of collection system piping. This is intended to be representative of an early phase of the Rendata Industrial Park.

### 3.6.2.1 Orenco™/Packed Bed Filter Treatment System

Membrane Bioreactors Treatment System

Table 3.6.2.2 is a basic cost estimate for the MBR treatment system described above. This estimate illustrates the cost of set-up for a system that is able to treat 20,000 gpd. This also includes the cost of a drain field. Final design of the drain field will vary based on soil conditions and the amount of flow that goes through the system. This estimate is based on previous cost estimates for similar projects that may fluctuate as planning/design continue to move forward. These are preliminary planning numbers. Further research and design will need to be completed to determine final capital costs.

Table 3.6.2.21 is a basic cost estimate for the Orenco treatment system described above. This estimate illustrates the capital cost of installation for a system that is able to treat 20,000 gpd. This alternative uses four pods that have a maximum flow of 5,000 gpd per pod and assumes a fine screen will be used with grinder pumps. This also includes the installation cost of a drain field. The size of the drain field will depend on soil conditions and the quantity of flow that is discharged. For the estimate below a flow rate of 0.33 gpd per s.f. was used to size the drain field based on the recommendations in the 2008 EGR Engineering Report.

This estimate is based on costs for similar projects and may fluctuate as planning/design continue to move forward. These are preliminary planning numbers, further research and design will need to be completed to determine final capital costs.
3.6.2.2 Membrane Bioreactors Treatment System

Table 3.6.2.2 is a basic cost estimate for the MBR treatment system described above. This estimate illustrates the cost of set-up for a system that is able to treat 20,000 gpd. This also includes the cost of a drain field. Final design of the drain field will vary based on soil conditions and the amount of flow that goes through the system. This estimate is based on previous cost estimates for similar projects that may fluctuate as planning/design continue to move forward. These are preliminary planning numbers. Further research and design will need to be completed to determine final capital costs.

Table 3.6.2.21 – Orenco™ treatment system cost estimate

<table>
<thead>
<tr>
<th>No.</th>
<th>Item Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Unit Cost</th>
<th>Item Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization, Overhead, Bonds (10%)</td>
<td>ls</td>
<td>1</td>
<td>$70,000</td>
<td>$70,000</td>
</tr>
<tr>
<td>2</td>
<td>Grinder Pump &amp; Installation</td>
<td>ea</td>
<td>20</td>
<td>$2,000</td>
<td>$40,000</td>
</tr>
<tr>
<td>3</td>
<td>Pressure collection piping</td>
<td>lf</td>
<td>2,500</td>
<td>$20</td>
<td>$50,000</td>
</tr>
<tr>
<td>4</td>
<td>Fine Screen</td>
<td>ls</td>
<td>2</td>
<td>$35,000</td>
<td>$70,000</td>
</tr>
<tr>
<td>5</td>
<td>AX-MAX Treatment Pod (Q_peak = 5,000 gpd)</td>
<td>ea</td>
<td>4</td>
<td>$70,000</td>
<td>$280,000</td>
</tr>
<tr>
<td>6</td>
<td>AX-MAX Controls</td>
<td>ea</td>
<td>1</td>
<td>$40,000</td>
<td>$40,000</td>
</tr>
<tr>
<td>7</td>
<td>AX-MAX Pod &amp; Control Installation</td>
<td>ea</td>
<td>1</td>
<td>$40,000</td>
<td>$40,000</td>
</tr>
<tr>
<td>8</td>
<td>Drain Field (1 sf/0.33 gpd)</td>
<td>sf</td>
<td>60,000</td>
<td>$6</td>
<td>$360,000</td>
</tr>
<tr>
<td>9</td>
<td>Electrical Service</td>
<td>ls</td>
<td>1</td>
<td>$10,000</td>
<td>$10,000</td>
</tr>
<tr>
<td></td>
<td>Initial Capital Cost</td>
<td></td>
<td></td>
<td></td>
<td>$960,000</td>
</tr>
<tr>
<td></td>
<td>Contingency (30%)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Engineering (20%)</td>
<td></td>
<td></td>
<td></td>
<td>$192,000</td>
</tr>
<tr>
<td></td>
<td>Project Management and Legal (5%)</td>
<td></td>
<td></td>
<td></td>
<td>$48,000</td>
</tr>
<tr>
<td></td>
<td>Subtotal: Contingency + Engineering</td>
<td></td>
<td></td>
<td></td>
<td>$528,000</td>
</tr>
<tr>
<td></td>
<td>Total Project Budget Estimate</td>
<td></td>
<td></td>
<td></td>
<td>$1,488,000</td>
</tr>
</tbody>
</table>
Table 3.6.2.2 – Membrane Bioreactor (MBR) treatment system estimate

<table>
<thead>
<tr>
<th>No.</th>
<th>Item Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Unit Cost</th>
<th>Item Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization, Overhead, Bonds (10%)</td>
<td>ls</td>
<td>1</td>
<td>$100,550</td>
<td>$100,550</td>
</tr>
<tr>
<td>2</td>
<td>Grinder Pump &amp; Installation</td>
<td>ea</td>
<td>20</td>
<td>$2,000</td>
<td>$40,000</td>
</tr>
<tr>
<td>3</td>
<td>Pressure collection piping</td>
<td>lf</td>
<td>2500</td>
<td>$20</td>
<td>$50,000</td>
</tr>
<tr>
<td>4</td>
<td>Site Work</td>
<td>ls</td>
<td>1</td>
<td>$8,000</td>
<td>$8,000</td>
</tr>
<tr>
<td>5</td>
<td>MBR Treatment Equipment</td>
<td>ls</td>
<td>1</td>
<td>$415,000</td>
<td>$415,000</td>
</tr>
<tr>
<td>6</td>
<td>MBR Equipment Installation</td>
<td>ls</td>
<td>1</td>
<td>$40,000</td>
<td>$40,000</td>
</tr>
<tr>
<td>7</td>
<td>Fine Screen</td>
<td>ls</td>
<td>2</td>
<td>$35,000</td>
<td>$70,000</td>
</tr>
<tr>
<td>8</td>
<td>SCADA System</td>
<td>ls</td>
<td>1</td>
<td>$12,500</td>
<td>$12,500</td>
</tr>
<tr>
<td>9</td>
<td>Drain Field (1 sf/0.33 gpd)</td>
<td>ls</td>
<td>60,000</td>
<td>$6</td>
<td>$360,000</td>
</tr>
<tr>
<td>10</td>
<td>Electrical Service</td>
<td>ls</td>
<td>1</td>
<td>$10,000</td>
<td>$10,000</td>
</tr>
</tbody>
</table>

Initial Capital Cost $1,106,050

Contingency (30%) $331,815.00

Engineering (20%) $221,210.00

Project Management and Legal (5%) $55,302.50

Subtotal: Contingency + Engineering $608,327.50

Total Budget Estimate $1,714,377.50

3.7 New System Staffing Issues

A large expense of a new sanitary entity is the personnel that will be involved in operating the facilities and equipment. With the various scenarios listed above the staffing options could vary significantly, but all will require some basic positions. For the purposes of this study the minimum staff required for each scenario will be covered.

All proposed systems will require a full time manager/administrator to facilitate billing and financial obligations. This position will likely have an annual cost (salary and benefits) to the district of $60,000.

3.7.1 Centralized Wastewater System

Because of the substantial infrastructure, centralized treatment systems will likely require a level II collection system operator. Based on the type of treatment and expected flows a level II treatment system operator is also likely to be required, although at the beginning a level I operator may adequate because of smaller flows. These can be, and likely would be, the same person. An operator with a level II collection and treatment license will likely cost (salary and benefits) approximately $75,000 per year.

To maintain the collection system and treatment system an assistant operator will be required. An assistant operator will likely cost (salary and benefits) approximately $40,000 per year.

3.7.2 Decentralized Effluent Sewer System

With a decentralized system, which utilizes numerous irrigation discharges, a level I collection operator would likely be required and a level I treatment operator. Again, these would likely be the same person. An operator with a level I collection and treatment license will likely cost approximately $65,000 per year. A decentralized system will likely not require a full-time assistant. More likely, the district will
need someone to take over for the operator during vacations or education time. This can either be a part
time employee, or the district can “rent”, or sub-contract, an operator from one of the various service
providers.

3.8 Centralized vs. Decentralized Evaluation and Recommendation

Based on the alternatives discussions in Sections 3.3 (Collection), 3.4 (Treatment), and 3.5 (Discharge)
and 3.5(Cost Comparisons), Table 3.8 below summarizes the different alternatives. The costs shown in
the table for the decentralized systems assume that overhead costs (district manager and system operator)
are split between four separate facilities.

The Merlin/North Valley area is unique in the level of development without a central wastewater system.
In order for additional development to occur, it is imperative that a solution to the wastewater concern be
addressed. As demonstrated in the table below, centralized systems (gravity or pressure) are extremely
expensive. By the nature of the system, these costs are split between the relatively few early users.
Decentralized systems have much lower capital costs because they are designed only for the projected
users and can be phased to match the rate of development needs.

It is therefore recommended that the concerned parties (SOREDI, 3RSD, NVSD, Josephine County)
move forward toward planning, obtaining funding, designing, and building a decentralized wastewater
system in the Merlin/North Valley area.
likely cost the district approximately $100,000. This planning process can likely be funded through a

for most funding assistance programs. A new Facilities Plan detailing the decentralized systems will

To proceed with the recommended action, the next step will be to prepare a new Wastewater Facilities

allows for autonomous operation with a low overhead cost.

Civil West Engineering Services, Inc.

3.9 Process to Integrate Existing Districts and new Systems

The North Valley Sewer District appears best suited to become the lead district moving forward. It has

continued to have monthly meetings to meet district ordinance requirements. Using this organization

allows for autonomous operation with a low overhead cost.

To proceed with the recommended action, the next step will be to prepare a new Wastewater Facilities

Plan. This document will provide more detailed alternatives and costs and will be required to be eligible for most funding assistance programs. A new Facilities Plan detailing the decentralized systems will likely cost the district approximately $100,000. This planning process can likely be funded through a
planning grant from IFA or a DEQ planning loan, which has a low interest rate and can be rolled over and included in many of the construction funding assistance programs.

Coordination with DEQ during the wastewater facilities plan (WWFP) process will help direct the following step. In standard (centralized) systems, a pre-design report would typically be required after a facilities plan to identify the design data, and focus the planning effort and to vet out any specific requirements for the specific plan. For a decentralized system, it is currently unclear if this step will be required for each individual cluster, or if one document can address a standard system. Typical pre-design reports will cost the district approximately $150,000, however this may vary significantly depending on how DEQ treats the decentralized system. If it is treated as one project, with multiple facets, or if it is treated as multiple projects will require different paths forward.

After a pre-design report is prepared, final design can take place on each cluster. Typically this cost is approximately 20% of the capital costs, however due to the modular nature of the proposed systems, this may be reduced somewhat. For conservative budgeting however, it should be planned that each cluster will incur approximately $200,000 in engineering costs.

### 3.10 Funding Plan

Significant capital will be required to design and build the cluster systems. This capital should be recouped through usage and connection fees. To promote growth and user connections, it is not recommended to require users to pay for system construction up front. In order to facilitate growth, the district should seek funding assistance. There are numerous state and federal loan/grant funding programs which are able to assist the district.

Probably the best suited for this scenario is the State of Oregon Infrastructure Finance Authority (IFA). They have several programs which provide loans, and even some grants, to projects which create development and jobs. These programs include:

- **IFA Special Public Works Fund**
  - The Special Public Works Fund (SPWF) provides funds for publically owned facilities that support economic and community development in Oregon. Funds are available to public entities for:
    - planning;
    - designing;
    - purchasing;
    - improving and constructing publically owned facilities;
    - replacing publically owned essential community facilities; and
    - emergency projects as a result of a disaster.

- **IFA Water/Wastewater Financing Program**
  - The Water/Wastewater Financing Program (W/W) loan program funds the design and construction of public infrastructure needed to ensure compliance with the safe Drinking Water Act or the Clean Water Act.
  - The proposed project must be owned and operated by a public entity as listed above. Allowable funded project activities may include:
    - reasonable costs for construction improvement or expansion of drinking water system, wastewater system or stormwater system;
- water source, treatment, storage and distribution;
- wastewater collection, treatment and disposal facilities;
- stormwater system;
- purchase of rights of way and easements necessary for construction;
- design and construction engineering; or
- planning/technical assistance for small communities.

○ To be eligible for funding:
  - a system must have received, or is likely to soon receive, a Notice of Non-Compliance by the appropriate regulatory agency or is for a facility plan or study required by a regulatory agency; and
  - a registered Professional Engineer will be responsible for the design and construction of the project.

The Oregon DEQ has planning loans which help bridge the gap of design through construction. These loans are often rolled into the overall funding package after completion of the project.

There are also loan packages which may be available from the U.S. Department of Agriculture (USDA) Rural Development, and the Rural Community Assistance Corporation (RCAC). Once the scope of the project(s) is identified and a cost is determined, the District can schedule a “one-stop” meeting, during which representatives of all the funding agencies will attend and determine alternate loan and/or grant packages. Some of the packages may require that Josephine County act as the “sponsor” to the district.

There are other, private, funding mechanisms available which can be reviewed in more detail if public funding assistance becomes cumbersome.

### 3.11 Growth Plan

As new users join the district there are two primary scenarios. Either the user is in an area already served by the district, in one of the decentralized clusters, or the user is in a new cluster area. For connections to existing systems, the new user will be responsible for the additional treatment needs based on expected flows. A possible arrangement is to either have the new user pay the up-front costs associated with the system expansion and then a monthly service fee, or have the up-front costs borne by the district (with loan or grant funding) and passed on to the user in the form of higher monthly fees.

For new users in new cluster areas, similar options to the district apply. The users will be able to either provide the capital required for the treatment in exchange for lower monthly rates or to finance the improvements through the district by paying higher monthly rates.

Each new cluster will require new engineering and planning. Each will likely have its own unique constraints and requirements.

The expected first phase of users would represent those properties which currently have troublesome sewer service. This includes the Fleming MS and the NVIP. These facilities will have to be evaluated to determine if the best scenario is a continued combined treatment or if it is less expensive to eliminate the pump station and force main and to have two separate units.

The next existing user which would benefit from joining the district is the North Valley High School. Joining the district would enable the school district to get out of the sewer business and would likely free
up additional property which could be used for other purposes. MBR treatment may result in effluent which could be applied to athletic fields, this reducing potable water consumption and costs.

The second phase of users would be those that could see immediate development upon completion. This includes the Rendata Industrial Park. This could be a phased (expandable) cluster to minimize upfront costs.

The third phase of growth would include future development. This would include Paradise Ranch and other properties which may benefit from the cluster treatment system.