

REQUEST FOR PROPOSALS

ENGINEERING CONSULTANT SERVICES

Terrebonne Wastewater System Feasibility Study - 2020

PROPOSALS DUE: February 6, 2020 2:00 PM PST



**ROAD
DEPARTMENT**

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**DESCHUTES COUNTY, OREGON
ROAD DEPARTMENT**

REQUEST FOR PROPOSALS

ENGINEERING CONSULTANT SERVICES

TERREBONNE WASTEWATER FEASIBILITY STUDY - 2020

Deschutes County Road Department is requesting proposals for services from a qualified team of professionals to provide engineering and related services for the Terrebonne Wastewater System Feasibility Study – 2020 project.

RFP packets are available on the Deschutes County website at: <https://www.deschutes.org/rfps>. Consultants intending to submit proposals must register online when retrieving the RFP packet.

The consultant selection process will be carried out according to ORS 279C.110 and Deschutes County Code. **Submittals are due by 2:00 PM on February 6, 2020.**

Inquiries pertaining to the RFP shall be directed to Chris Doty, Road Department Director, in writing at chris.doty@deschutes.org.

PUBLISHED:

DAILY JOURNAL OF COMMERCE: December 18, 2019

BEND BULLETIN: December 18, 2019

SECTION 1: STATEMENT OF PROJECT

Introduction

Terrebonne is a small rural community located at the northern edge of Deschutes County. The community is served by a water district (Terrebonne Domestic Water District) but does not have a community wastewater system or utility.

With the exception of two small, private systems serving two relatively new residential subdivisions, properties rely upon on-site wastewater systems (septic/drainfield/drill-hole or sandfilter systems). Some properties pipe effluent offsite for drainfield disposal on adjacent or nearby properties.

Wastewater system feasibility has previously been explored in Terrebonne, most recently in 1999 (HGE Inc.) and prior to that in 1982 (Century West). Although a community wastewater system was deemed feasible in the 1999 study, the system was not pursued for a variety of reasons.

According to staff within the Environmental Soils Division (of CDD), the number of malfunctioning septic systems appears to be increasing. Within the last 5 years (2015-2019), 33 repair permits have been issued – whereas 20 repair permits were issued from 2010 to 2015. The biggest concern is that commercial properties will experience catastrophic failures that cannot be repaired or replaced per state regulations.

Recently, several property owners have approached the County regarding concerns associated with failing septic systems and have asked the County to explore the feasibility of a community wastewater system.

Deschutes County is not a wastewater utility provider or candidate provider for any systems within the Terrebonne area. However, as the jurisdictional planning entity, the County is willing to explore wastewater system viability to better understand the emerging wastewater problems in the community and help coordinate or facilitate potential creation of a solution. To that end, the County seeks proposals from a qualified engineering firm to refine and explore the following scope items:

PHASE ONE:

1. Develop a communications strategy and plan to initiate the feasibility study within the community and obtain input from stakeholders.
 - a. The communication plan/strategy should involve public input and check-ins at logical phases throughout the process.
 - b. Key stakeholders also include the four primary funding agencies (Oregon DEQ, Business Oregon, USDA, and Rural Community Assistance Corporation), who should be consulted at the onset of the process.
2. Establish a Terrebonne wastewater advisory committee comprised of the residents, businesses, and stakeholders to:
 - a. Provide input on public involvement strategies, and assist in conducting public outreach such as community open houses/forums.
 - b. Review and gain an understanding of existing conditions, including prior Terrebonne feasibility studies and DEQ regulations (Task 3 below).
 - c. Review and provide comments on the draft wastewater feasibility study options (Tasks 4 and 5 below).
 - d. Review and provide comments on the draft wastewater feasibility implementation strategies, including governance options for ownership and operation (Tasks 6 and 7 below).
 - e. Recommend a preferred option to address the future of wastewater treatment in the community.
3. Research existing and available septic system data and quantify the functionality of the existing systems, including, but not limited to the average age of existing systems, lifecycles, and commercial/residential occupancy. The purpose of this research is to identify the extent of the

problem to inform the Terrebonne community of the potential need for a community solution and the timing of the solution.

- a. Estimate the remaining life or viability of the existing systems in use within the community.
 - b. Evaluate repair options (if any) and costs for existing system types in use.
4. Review and/or update the 1999 HGE Wastewater Feasibility Study.
 - a. Provide validation or alternative recommendation associated with the study's collection and treatment/disposal recommendation(s).
 - b. Updated construction costs.
 - c. Updated operation and maintenance costs.
 - d. Updated funding options available for capital construction (grants, loans, etc.).
 - e. Updated rate calculations and rate modelling.
 - f. Identify potential phasing options for construction and implementation of the proposed system.
 5. Identify other municipal wastewater collection and treatment systems that have emerged with the potential to serve Terrebonne.
 - a. Provide estimates for items 3 b-f, above.
 6. Evaluate the potential for smaller, individual systems to serve clusters of development based on a variety of factors, such as: geography, type of use, availability of disposal area, remaining life expectancy of existing systems, etc.
 - a. Provide a level of detail necessary to compare and contrast with the recommendations of items 3 and 4.
 - b. Provide individual estimates or analysis for:
 - i. Construction cost.
 - ii. Operation and maintenance costs.
 - iii. Capital funding options (grants, loans, etc.).
 - iv. Estimate rate calculations.
 - v. Identify potential phasing options for construction and implementation of the proposed system.
 - vi. Describe how operating agreements would work for small, cluster systems.
 7. Provide a summary of governance options for ownership and operation of a wastewater system in Terrebonne.
 - a. Provide a list of pros/cons for each option.
 - b. Provide a recommendation.

PHASE TWO:

8. Provide a Wastewater Planning Document (Preliminary Engineering Report) per the requirements and recommendations of the Water Facility Planning Guide (2018), published by the Oregon DEQ, Business Oregon, USDA, and Rural Community Assistance Corporation.
 - a. <https://www.rd.usda.gov/files/OR-Guide-PreparingWastewaterPlanningDocuments-07.2018.pdf>

SECTION 2: PROPOSAL PREPARATION, SCHEDULE, CRITERIA AND REVIEW

There will be no mandatory pre-proposal meeting. All questions shall be made in writing via email to Chris Doty, Public Works Director (chris.doty@deschutes.org) by **2:00 p.m. (PST) February 6, 2020**. Faxed requests for information will not be accepted. Responses to questions will be made in writing as soon as practical, and no later than **January 30, 2020**.

Consultants intending to submit a proposal **must register on-line** when retrieving the RFP packet for this project at: <https://www.deschutes.org/rfps>.

Proposals must be received by the Deschutes County Road Department office no later than **2:00 pm (PST), February 6, 2020**. **Proposals received after the deadline will not be considered.**

The County anticipates the following schedule for the project:

RFP Advertisement:	December 19, 2019
Proposal Due Date:	February 6, 2020 (2:00 PM)
RFP Review completed:	February 20, 2020
County Commission approval of contract:	March 4, 2020
Notice to proceed:	March 4, 2020

The Proposal will be judged on the completeness and quality of content. Only those consultants who supply complete information as required in the Evaluation Criteria below will be considered for evaluation. Deschutes County reserves the right to reject any or all proposals. It is understood that all statements will become part of the public file on this matter, without obligation to Deschutes County. The County is not liable for any cost incurred by the consultant in the preparation or presentation of their proposal.

Evaluation Criteria:

The Proposal submitted shall respond to the following criteria in the order as listed below:

	ITEM	MAXIMUM PAGE ALLOWANCE	SCORE
A	Introductory Letter	1	0
B	Project Team	3	35
C	Firm's Capabilities	1	15
D	Project Understanding and Approach (Scope)	4	40
E	Communication and Availability	1	5
F	Supportive information (references, resumes, licenses, etc.)	6	5

Criteria Explanation:

A. Introductory Letter: A statement in the introductory letter shall specifically stipulate that all terms and conditions contained in the RFP are accepted by the consultant. The letter shall also name the person(s) authorized to represent the consultant in any negotiations and sign any contract which may result.

B. Project Team: This criterion relates to the project principal, the project manager, key staff and sub consultants. The basic issue is how well the team's qualifications and experience relate to this specific project. Elements to be considered:

- Extent of principal's involvement
- Key member experience on similar projects
- Team experience on similar projects
- Unique qualifications of key members
- Qualifications and relevant individual experience
- Qualifications and relevant sub-consultant experience
- Comprehensive team expertise to cover all phases of the project
- Project manager's expertise with similar projects and with interdisciplinary teams
- Approximate number of people to be assigned to the project
- Organizational Chart (Project Team) may be included under supportive information
- Familiarity with appropriate state, federal, and local laws and regulations
- Project Manager or Principal must be a licensed Professional Engineer in Oregon.

C. Firm Capabilities: This criterion relates to the firm's capabilities and resources in relation to the project. Elements to be considered:

- Resources available to perform the work for the duration of the project (Include Capacity Chart, i.e., Can the firm accommodate the work?)
- Other on-going projects
- Similar projects (by type and location) performed within the last five years that best characterize work quality and cost control
- Similar projects completed for other government agencies (references will be contacted by Deschutes County)
- The firm's experience with Deschutes County
- Internal procedures and/or policies associated or related to work quality and cost control
- Management and organization capabilities

D. Project Understanding and Approach: This criterion relates to the basic or preliminary understanding of the project, and the methodology and course of action used to meet the goals and objectives of the project. The basic issue is whether the firm has a clear and concise understanding of the project (based on existing information) and the major issues to address and whether a project approach has been formulated. Elements to be considered:

- The firm's basic understanding of the project as demonstrated within their proposal.
- Provision of a clear and concise explanation of work required.
- A typical project schedule that shows major tasks and approvals required to complete the job on schedule.
- **The County's budget for this Project will not exceed \$100,000. The consultant shall comment on the adequacy of this budget to achieve the desired deliverables.**
- **A draft, line item scope of work for consultant services (not including hourly or cost estimates within the body of the proposal) should be included.**
- The consultant may propose an alternative approach to Phase One in its entirety or elements therein.

E. Communication and Availability: This criterion relates to the consultant's accessibility, availability, and interaction with the Deschutes County staff. Elements to be considered:

- Ability to establish and maintain functional and productive working relationships.
- Accessibility for interaction with Deschutes County staff.
- Effectiveness of presentation skills.
- Community engagement skills.

F. Supportive Information: Supportive material may include graphs, charts, photographs, resumes, references, etc., and is totally discretionary, but, as outlined in the Evaluation Criteria, it will be scored. Elements to be considered:

- Quality and relevancy of material provided

NOTE: All proposals submitted in response to this RFP shall become the property of Deschutes County and may be utilized in any manner and for any purpose by Deschutes County. ***Be advised that proposals and all documents submitted in response to this RFP are subject to public disclosure as required by applicable state and/or federal laws.*** If you intend to submit any information with your proposal which you believe is confidential, proprietary or otherwise protected from public disclosure (trade secret, etc.), you must separately bind and clearly identify all such material. The cover page of the separate binding must be red, and the header or footer for each page must provide as follows: "Not Subject to Public Disclosure." Where authorized by law, and at its sole discretion, Deschutes County will endeavor to resist disclosure of properly identified portions of the proposals.

SECTION 3: EVALUATION

A RFP evaluation committee will be appointed to evaluate the submitted proposals. Consultants will be evaluated on their response to the evaluation criteria.

SECTION 4: SELECTION

The proposals will require up to 21 calendar days for evaluation. The top ranked firms may, at the County's discretion, be required to make a presentation in support of their proposal to the evaluation committee. The interview will serve to assist the County in selecting the successful firm and will serve as a tool to refine scoring of the RFP to produce a final ranking. Contract negotiations will follow the selection of the top firm. An initial scope and fee proposal will be required to be submitted within 14 calendar days of notification. The consultant selection process will be carried out under Oregon Revised Statutes, Chapter 279C.110.

SECTION 5: CONTRACT REQUIREMENTS AND ADMINISTRATION

The successful consultant will be required to enter into a County Services Contract (see attached) with Deschutes County. The successful consultant must also submit documents addressing tax law, professional liability insurance, workers compensation, and overhead expense as part of the contract, as well as an Oregon tax account number.

If the County and the top ranked consultant are not able to negotiate a contract, the County will initiate negotiation with the second place consultant, and so on.

Any reference or general condition of employment of consultant that seeks to have State of Oregon indemnify and hold harmless the consultant, its sub-consultants, agents and employees from and against all claims, damages, losses and expenses, direct and indirect, or consequential damages arising out of, or resulting from the performance of work by consultant, or the work of others, is limited to the extent permitted by Oregon Constitution, Article XI, Section 7, and the Oregon Tort Claims Act ORS 30.300 inclusive.

SECTION 6: SUBMISSION

Submit the Proposal in pdf format (10 MB maximum file size) as an email attachment to chris.doty@deschutes.org no later than **2:00 pm, February 6, 2020**. Enter "**RFP: Terrebonne Wastewater System Feasibility Study, 2020**" as the email subject line.

Direct all other questions or inquiries to:

Chris Doty, Public Works Director
541.322.7105
chris.doty@deschutes.org

Attachments:

Vicinity Map – (Including vacant and sewer lands)
Terrebonne Sewer Feasibility Memo to BOCC, dated August 19, 2019
Wastewater Feasibility Study, HGE Inc., September 1999
Deschutes County Consultant Contract Template



**Deschutes County
Community Development Department**

Planning Building Safety Environmental Soils Code Enforcement
P.O. Box 6005 117 NW Lafayette Ave., Bend, OR 97703

Telephone: 541-388-6575
www.deschutes.org/cd

MEMORANDUM

TO: Board of County Commissioners

FROM: Nick Lelack, AICP, Director
Chris Doty, PE, Road Dept. Director
Todd Cleveland, Environmental Health Supervisor

DATE: August 19, 2019

SUBJECT: 1999 Terrebonne Sewer Feasibility Study, Existing Conditions, Public Engagement

The purposes of this memorandum are to summarize the:

- 1999 Terrebonne Sewer Feasibility Study (attached);
- Reasons, if known, the study was not implemented;
- Vacant lands and current issues; and
- Options to engage the public to determine community support to initiate a new or updated study.

1999 Terrebonne Sewer Feasibility Study Basic Findings & Staff Perspectives

Please see the attached memorandum from Chris Doty, Road Dept. Director.

Reasons the Study was not Implemented

Based on conversations with CDD's former Environmental Health Director and others, there was overwhelming community opposition primarily due to the costs and lack of risk to the water system.

Existing Conditions: Vacant Lands, Septic System Failures/Repairs & Future Concerns

The attached map and matrix below summarize vacant lands and existing private sewer systems in Terrebonne as of June 2019. Many of the vacant properties appear to be too small to install an on-site septic system, especially with required reserve space for future repairs and/or replacements.

The vacant lands map also shows the boundaries of two private sewer districts for Terrebonne Estates and Angus Acres. These sewer districts were required to develop residential lots in areas not suitable for septic systems per Oregon Administrative Rules regulating septic systems.

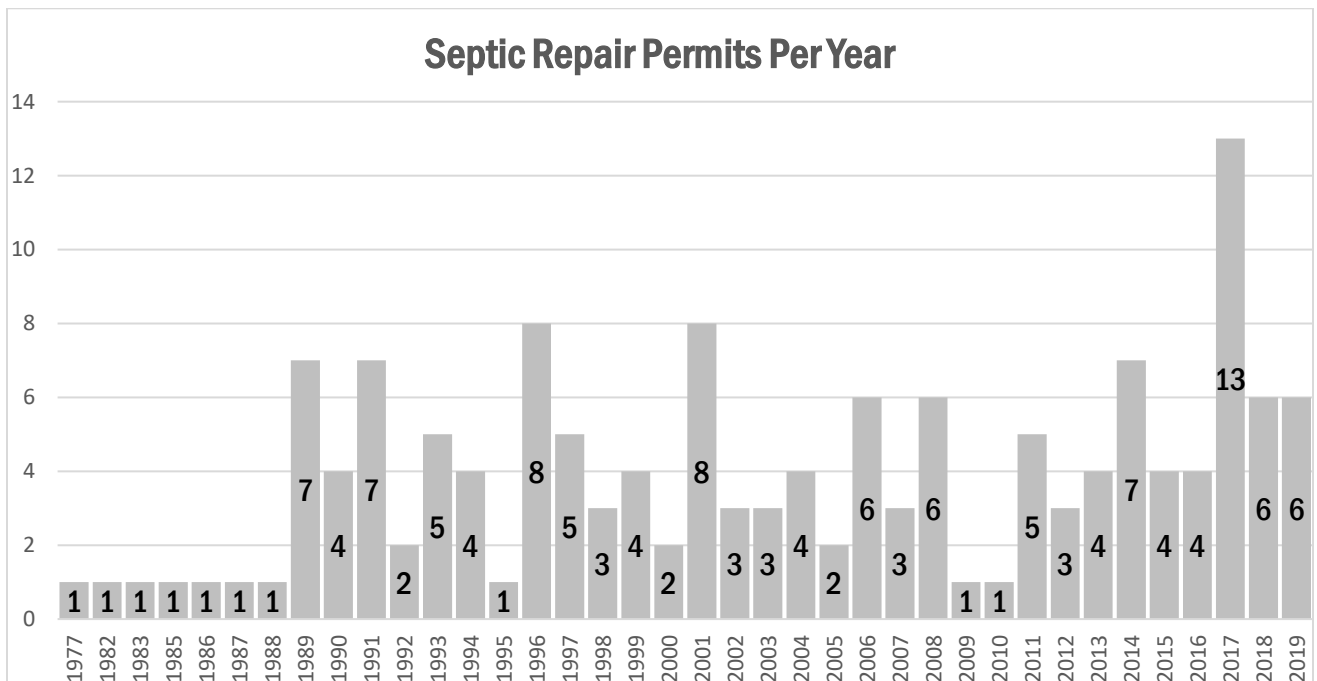
Table 1: Land Use Inventory

Terrebonne Land Use Inventory				
Zone	Residential Units	Commercial / Industrial Developments	Undeveloped Parcels	Total Number of Parcels
TEC (Commercial)	16	18	18	49
TECR (Commerical Rural)	3	9	10	18
TER (Residential)	556	5	160	686
TER5 (Residential 5-Acre)	40	1	1	40
Total	615	33	189	793

Table 2 below provides the Community Development Department Environmental Soils Division’s number of septic system major repairs per year from 1997 through the first seven months of 2019. The table does not include repairs of larger on-site wastewater systems permitted by the Department of Environmental Quality (DEQ).

According to Division staff, the number of malfunctioning systems appears to be increasing requiring repairs as well as inquiries from residents and businesses regarding malfunctioning systems, development limitations, and overall aging systems that will require future repairs, if possible, and/or replacements, if possible. The biggest concern is that commercial properties will experience catastrophic failures of systems that cannot be repaired or replaced.

Table 2: Septic System Repairs



Public Engagement Options

Options to gauge Terrebonne community interest in updating the Sewer Feasibility Study include, but are not limited to, the following – which may be conducted by the County, Terrebonne residents/businesses, and/or other organizations:

1. Conduct stakeholder interviews and focus groups with selected residents and groups (i.e., businesses, home owner associations); and/or
2. Hire a firm to conduct a survey of residents and businesses; and/or
3. Hold a town hall to briefly present basic information and invite public input; and/or
4. All of the above;
5. Some of the above; or
6. Other.

If the Board supports any of these options, staff will:

- Prepare a scope, schedule, and budget/resources (staff time, budget) necessary to perform the tasks and prepare a report of the community input findings; and/or
- Contact Terrebonne residents/businesses and/or other organizations who might perform one or more of these public engagement and reporting tasks.

Project No. 9942

**WASTEWATER FEASIBILITY
STUDY**

SEPTEMBER 1999

For:

**TERREBONNE
DOMESTIC WATER
DISTRICT**

This Wastewater Facilities Plan is being financed with a grant from the U.S. Department of Housing and Urban Development through the Oregon Community Development Block Grant program, administered by the Economic Development Department of the State of Oregon.

Project No. 9942

WASTEWATER FEASIBILITY STUDY

Draft Report

Prepared for:

TERREBONNE DOMESTIC WATER DISTRICT
1110 C Avenue
P O Box 31
Terrebonne, Oregon 97760

September 1999
(Revised November 1999)

Prepared by:

HGE INC., ARCHITECTS, ENGINEERS, SURVEYORS & PLANNERS
375 Park Avenue/Coos Bay, Oregon 97420
(541) 269-1166 Fax: (541) 269-1833

Grant funding for this project was provided through the Central Oregon Rural Investment Fund grant program, funded by a grant from the Oregon State Lottery and administered by the Oregon Economic Development Department.

ACKNOWLEDGMENTS

HGE Inc., Architects, Engineers, Surveyors & Planners would like to acknowledge and thank the following persons for their assistance in the completion of this wastewater feasibility study.

Terrebonne Domestic Water District

Bill Tittle	Chairman
Sharon Struck	Board Member
M.R. "Buzz" Foley	Board Member
Kim Tittle	Board Member
William Clark	Board Member
Doug McLaughlin	District Manager

Deschutes County

Susan Mayea	Senior Management Analyst
-------------	---------------------------

HGE Inc., Architects, Engineers, Surveyors & Planners

Richard Nored, PE	Project Manager
William Pavlich, PE	Project Engineer
Rick Stanley	Graphics
William Barlow	Graphics
Carolyn Wixey	Clerical

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SECTION 1
INTRODUCTION



SECTION 1 INTRODUCTION

1.1 PURPOSE

The purpose of this wastewater feasibility study is to provide the community of Terrebonne and Deschutes County with an evaluation of wastewater system needs and solutions and to discuss the feasibility of constructing a wastewater system in Terrebonne.

1.2 BACKGROUND

Terrebonne is located in northeastern Deschutes County, approximately 6 miles north of Redmond and 22 miles north of Bend. Current (1999) population is conservatively estimated at 871 persons (see section 3.3.2). Development in Terrebonne is currently served exclusively by on-site wastewater systems (septic tanks with drainfields or drill holes, or sand filters). The area is characterized by shallow soils over bedrock. Most of the developed lots do not have an adequate reserve area for installation of an adequate septic system repair. Many of the lots are unbuildable because of limited lot size or inadequate soil/geological conditions. The Deschutes County Sanitation reports a septic system repair rate of over twice that of the rest of Deschutes County. Apparently, many residents have to use water carefully so as not to overload their on-site systems and cause them to fail. Both the County Sanitarian and DEQ agree that for Terrebonne, a community sewer is the only sound, long-term solution.

A wastewater facilities plan for Terrebonne was completed in 1982 by Century West Engineering Corporation. The study advocated the continued use of disposal wells (drill holes) and noted that "there is absolute assurance that continued use of existing waste disposal wells will not eventually cause contamination of the underlying aquifer" The study further notes that "regular monitoring done by community water districts in the area will provide a basis for determining whether water quality is being degraded over time". Conclusions of the 1982 study are no longer tenable in the current regulatory environment.

This study represents an effort on the part of Terrebonne and Deschutes County to further evaluate the feasibility of constructing a community wastewater system in Terrebonne.

1.3 SCOPE

The scope of work for this wastewater feasibility study includes the following key elements:

- Population, EDU, and land use considerations for current (1999) and future (design year 2024) conditions.

- Evaluation and determination of current and projected future hydraulic and organic loadings.
- Evaluate applicability of various wastewater collection and transmission system types and develop project options.
- Evaluate potential treatment system and develop treatment options.
- Develop opinions of probable costs and determine revenue requirements and sewer rates to cover debt service and operations, maintenance, and replacement costs.
- Evaluate feasibility of selected projects based on possible funding scenarios.

1.4 AUTHORIZATION

In May, 1999 the Terrebonne Domestic Water District contracted with HGE to prepare this wastewater feasibility study.

1.5 BASIS FOR OPINIONS OF PROBABLE COST

1.5.1 General

Opinions of probable cost presented in this study include four components, each of which is discussed separately in this section. It must be recognized that opinions of probable cost are preliminary and based on the level of planning presented in this study. As specific improvements proceed forward it may be necessary to update the costs as more information becomes available.

1.5.2 Construction Cost

Opinions of probable costs in this plan are based on preliminary layouts of the proposed improvements, actual construction bidding results for similar work, published cost guides, and the author's construction cost experience within the state of Oregon.

Future changes in the cost of labor, equipment, and materials may justify comparable changes in the opinions of probable cost presented herein. For this reason, it is common engineering practice to relate the costs to a particular index that varies in proportion to long term changes in the national economy. The Engineering News Record (ENR) Construction Cost Index is most commonly used. It is based on a value of 100 for the year 1913.

All costs in this study are based on the August 1999, ENR Construction Cost Index value of 6091. Opinions of probable costs should be updated at the actual time of completing funding applications, and prior to a general obligation bond election. When the community secures financing, a "reserve factor" should be added at that time for an estimated increase in cost due to inflation. Since 1980, construction costs have increased an average of 3.3 percent each year.

Opinions of probable costs can be prepared at any future day by comparing the future ENR Construction Cost Index with the index value of 6091; however, this approach is generally only considered valid for a 2 or 3 year period since construction techniques and materials change with time. If time has elapsed in excess of 2 or 3 years, opinions of probable cost should be updated by an engineer.

1.5.3 Contingencies

In recognizing that opinions of probable cost are based on very preliminary design, allowances must be made for variations in final quantities, bidding market conditions, adverse construction conditions, unanticipated specialized investigations, and other difficulties that cannot be foreseen at this time. A contingency factor of 10 percent of the construction cost has been added for new facilities.

1.5.4 Engineering, Construction Observation, and Construction Management

Engineering, construction observation, and construction management costs have been assumed at 20 percent of the construction cost. This includes costs for the engineering company to conduct preliminary surveys, perform detailed design analyses, prepare construction drawings, prepare construction specifications, advertise for construction bids, conduct construction stakeout surveys, provide partial construction observation during construction, administer construction related activities such as change orders, and to prepare record drawings for the project.

1.5.5 Legal and Administrative

An allowance of 5 percent of the projected construction cost has been added for legal and administration. This allowance is intended to include internal project planning and budgeting, grant administration, liaison, interest on interim financing, legal services, review fees, legal advertising, and other related expenses associated with the project.

1.5.6 Opinion of Probable Cost Summary

Opinions of probable costs presented in this study include a combined allowance of 35 percent for contingencies, engineering, legal and administrative costs.

1.6 PREVIOUS STUDIES AND OTHER DOCUMENTS

The following documents were reviewed and/or used in the completion of this study:

Century West Engineering Corporation, *Terrebonne Wastewater Facilities Plan*, August 1982.

KCM, Inc., *City of Redmond, Advanced Wastewater Facilities Plan*, February 1994.

HGE Inc., Architects, Engineers, Surveyors & Planners, *Terrebonne Domestic Water District, Water System Master Plan*, February 1995.

Deschutes County, Oregon, *Ordinance No 97-001 (amendment to Deschutes County Comprehensive Plan)* June 3, 1997.

**SECTION 2
SUMMARY**



SECTION 2 SUMMARY

2.1 PLANNING AREA

The planning area for this Wastewater Feasibility Study consists primarily of the area within the existing Terrebonne Domestic Water District boundaries. Areas outside the District boundaries are also considered, as needed, to address treatment and disposal issues.

2.2 POPULATION AND EDU SUMMARY

Population and equivalent dwelling units (EDUs) are summarized below:

Population

Year 1999: 871 persons
 Year 2024: 1,615 persons- forecast based on 2.5% average annual growth rate (AAGR)

Ultimate Buildout: 3,080 persons

EDUs

Year 1999: 377
 Year 2024: 699

2.3 WASTEWATER CHARACTERISTICS

2.3.1 Design Flows

Design flows for both current and projected future conditions are summarized in Table 2.1. Future average daily flow is based on 2.5% AAGR.

Table 2.1 Current (1999) and Future (2024) Design Flows.

Year	Average Daily Flow			Peak Instantaneous Flow ³		
	(gpd)	(gpcd) ¹	(gpd/EDU) ²	(gpd)	(gpcd) ¹	(gpd/EDU) ²
1999	65,000	75	172	300,000	344	796
2024	121,000	75	173	532,000	369	761

¹ Population: 1999: 871 persons; 2024: 1,615 persons

² EDUs: 1999: 377 EDUs; 2024: 699 EDUs

³ Computed flow based on EDU total and equation in Section 4.2.3

2.3.2 Design Influent Loadings

Wastewater loads consisting of biochemical oxygen demand (BOD₅) and total suspended solids (TSS), are dependent on population and commercial/industrial customers. Therefore, it can be assumed that future loadings will increase with area growth. Standard unit design loadings and peak factors will be used in determining design loadings. Since a STEP collection system is recommended, the wastewater will be partially treated in septic tanks prior to being discharged to the system. Septic tank effluent has a BOD₅ strength approximately 50% less than raw wastewater and a TSS concentration approximately 75% less than raw wastewater. Design values for Terrebonne reflect these modifications. Table 2.2 summarizes BOD₅ and TSS loadings for Terrebonne. The peaking factors are typical of small Oregon communities.

Table 2.2 Influent BOD₅ and TSS Design Loading Computation

a. Influent BOD₅

Parameter	Current (1999) Loading (ppd) ^{1,3}	Future (2024) Loading (ppd) ^{2,3}
Average Load	96	178
Monthly Maximum Load	161	299
Weekly Maximum load	222	412
Daily Maximum Load	270	501

b. Influent TSS

Parameter	Current (1999) Loading (ppd) ^{1,3}	Future (2024) Loading (ppd) ^{2,3}
Average Load	54	101
Monthly Maximum Load	94	174
Weekly Maximum load	126	234
Daily Maximum Load	152	283

¹ Based on current population: 871.

² Based on year 2024 projected population of 1,615 persons.

³ Loadings for septic tank effluent.

2.4 COLLECTION AND TRANSMISSION SYSTEM

2.4.1 Collection System

Collection system types considered included: conventional gravity system, septic tank effluent gravity (STEG) system, grinder pump (GP) system, septic tank effluent pump (STEP) system, vacuum system, and hybrid systems. Design constraints (topography, relatively low density development, and shallow soils over bedrock) largely limit the selection to a STEP system with potential for limited STEG service. For planning purposes a STEP only system is considered. Two alternative layouts (Figure 5.1 and Figure 5.2) are presented and differ primarily in the location of the main pump station that will convey all District wastewater to the treatment facility. Collection system alternative #2 locates the pump station off Highway 97 at the south end of Terrebonne.

2.4.2 Transmission System

Treatment alternatives include construction of a facultative lagoon with integrated winter holding or use of the Redmond wastewater treatment plant (WWTP). Transmission alternatives (Figure 5.3) considered include three potential routes (alternatives 1A, 1B, and 1C) to the Redmond WWTP and two potential routes (alternatives 2A and 2B) to the proposed facultative lagoon.

2.4.3 Private Property Improvements

Private property improvements include: a new building sewer, a new septic tank and effluent pump, a service lateral from the effluent pump to the service lateral constructed as part of the public system, and the abandonment of existing on-site facilities (septic tanks, drill holes, etc.). For purposes of this study, a cost allowance of \$4,000 per EDU is used.

2.4.4 Collection and Transmission Cost Summary

Table 2.3 presents an opinion of probable cost summary for collection, private property improvements, and transmission components of the overall collection and transmission system.

Table 2.3 Collection and Transmission Cost Summary

Description	Collection System Alternative ¹				
	#1	#1	#2	#1	#1
	Transmission Alternative ²				
	1A	1B	1C	2A	2B
Collection System	\$2,947,800	\$2,947,800	\$2,964,400	\$2,947,800	\$2,947,800
Private property improvements	\$1,508,000	\$1,508,000	\$1,508,000	\$1,508,000	\$1,508,000
Transmission	\$1,416,000	\$1,436,400	\$1,231,200	\$51,300- \$769,500	\$51,300- \$769,500
TOTAL³	\$5,871,800	\$5,892,200	\$5,703,600	\$4,507,100- \$5,225,300	\$4,507,100- \$5,225,300

¹ See Section 2.4.1 for description.

² See Section 2.4.2 for description.

³ Includes: Construction, contingencies, engineering, legal, administrative costs. Total cost equals approximately 1.35 times the construction subtotal.

2.5 WASTEWATER TREATMENT AND DISPOSAL

Wastewater treatment and disposal alternatives considered include: treatment and discharge to the Deschutes River, connection to the Redmond WWTP, and winter holding/summer irrigation with treatment provided by facultative lagoon, aerated lagoon, or a mechanical plant. Options were reduced to two: construct a facultative lagoon with integrated holding, or connect to the Redmond WWTP.

The facultative lagoon option requires a lagoon/irrigation site of approximately 80 acres. Potential sites exist west of Terrebonne. An opinion of probable cost for the facultative lagoon is approximately \$1,831,000 for construction alone. Total cost including construction, contingencies, engineering, legal, administration, and land acquisition is \$2,666,000.

In addition to the transmission facilities, connecting to Redmond will also require construction of an aeration/equalization basin to pretreat the septic flows from Terrebonne. An opinion of probable cost for this item including construction, engineering, legal, and administrative costs is \$405,000.

2.6 FEASIBILITY ANALYSIS

2.6.1 Project Option Cost Summary and Comparison

A general project cost comparison for the five project options is presented in Table 2.4. Overall project costs range from approximately \$5,059,000 to \$6,384,000 exclusive of the estimated \$1,508,000 in private property improvements (septic tanks, STEP pumps, building sewers, etc.). Annual costs, including O,M,&R and service fees, are also tabulated and range from approximately \$519,000 to \$594,000. This cost comparison suggests the three options that involve connecting to Redmond as the most economical to construct initially. Note that in this computation there are no allowances for grants. Also, the cost of the lagoon option, if a lagoon is located near Terrebonne, is within the accuracy of this feasibility study, nearly the same as the "Redmond" option.

Table 2.4 Project Option Cost Comparison

Description	Collection System Alternatives ¹				
	#1	#1	#2	#1	#1
	Transmission Alternatives ²				
	1A	1B	1C	2A	2B
	Treatment Description ³				
	Redmond	Redmond	Redmond	Lagoon	Lagoon
Collection and Transmission Total Costs ⁴	\$4,363,800	\$4,384,200	\$4,195,600	\$2,999,100- \$3,717,300	\$2,999,100- \$3,717,300
Treatment Disposal Total Cost	\$405,000	\$405,000	\$405,000	\$2,666,245	\$2,666,245
Redmond Treatment Connection Fee (SDC) (\$1215/EDU for 377 EDUs)	\$458,055	\$458,055	\$458,055	\$0	\$0
Total Project Cost	\$5,226,855	\$5,247,255	\$5,058,655	\$5,665,345- \$6,383,545	\$5,665,345- \$6,383,545
Preliminary Annual Project Debt Service (25 year term, 4.75% interest, 10% reserve) Computation ⁵	\$397,783	\$399,335	\$384,982	\$431,153- \$485,811	\$431,153- \$485,811
Annual O,M,&R	\$45,600	\$45,600	\$45,600	\$107,700	\$107,700
Annual Redmond Service Fee (\$19.60/EDU, 377 EDUs, 12 months)	\$88,670	\$88,670	\$88,670	\$0	\$0
Annual Cost Total	\$532,053	\$533,605	\$519,252	\$538,853- \$593,511	\$538,853- \$593,511

¹See Section 2.4.1 for description.

²See Section 2.4.2 for description.

³See Section 2.5 for description.

⁴Does not include \$1,508,000 in private property improvement (septic tank, STEP pump, etc.). See Section 2.4.3 for description.

⁵General budget computation - assumes RD loan with no grant funding.

2.6.2 Project Option Funding and Rate Analysis

A project option funding and rate analysis is presented in summary form in Table 2.5. Table 2.5 notes the total project cost from Table 2.4. A minimum sewer rate of \$40 per month per EDU is used and the entire table is based on the current (1999) EDU total of 377. O,M,&R and Redmond Service fee costs are deducted from the \$40 rate. The result is the monthly revenue per EDU available for debt service. Because of the relatively high service fee (\$19.60 per EDU per month) for connecting to Redmond, the "Redmond" options have significantly less rate revenue available for debt service than the lagoon options (\$10.32 per EDU per month versus \$16.19 per EDU per month respectively). This limits the RD loan to \$613,476 for the "Redmond" options versus \$962,420 for the lagoon options. RD matching grants have generally been limited by the amount of debt the community can service. In theory, the "Redmond" options may result in a lower grant award than the lagoon options. However the issue is largely moot since the magnitude of the grant dollars renders all the project options very difficult to finance in their present form.

Table 2.5 **Project Option Funding and Rate Analysis**
(Based on 377 EDUs)

Description	Collection System Alternatives ¹				
	#1	#1	#2	#1	#1
	Transmission Alternatives ²				
	1A	1B	1C	2A	2B
	Treatment Description ³				
	Redmond	Redmond	Redmond	Lagoon	Lagoon
Total Project Cost	\$5,226,855	\$5,247,255	\$5,058,655	\$5,665,345- \$6,383,545	\$5,665,345- \$6,383,545
O,M,&R Cost Per EDU per month	\$10.08	\$10.08	\$10.08	\$23.81	\$23.81
Redmond Service Fee per EDU	\$19.60	\$19.60	\$19.60	\$0	\$0
O,M,&R and Redmond Service Fee Total (Per EDU)	\$29.68	\$29.68	\$29.68	\$23.81	\$23.81
Assumed minimum sewer rate (for feasibility analysis) (per EDU)	\$40	\$40	\$40	\$40	\$40
Sewer rate revenue available for debt service (per EDU)	\$10.32	\$10.32	\$10.32	\$16.19	\$16.19
RD loan (based on rate revenue available for debt service, 3.25% interest, 25 yr term, general obligation bond)	\$789,978	\$789,978	\$789,978	\$1,240,365	\$1,240,365
Required grant to fund balance of project cost assuming \$40 sewer rate per EDU per month	\$3,986,490	\$4,006,890	\$3,818,290	\$4,424,980- \$5,143,180	\$4,424,980- \$5,143,180
Required grant as percentage of total project cost	76.3%	76.4%	75.5%	78.1% 80.6%	78.1% 80.6%

Potential grant funding sources include:

- Oregon Community Development Block Grant (OCDBG)

\$750,000 (grant only).

- Rural Development (RD)
Generally 50% maximum grant with matching RD loan.
- Water/Wastewater Program (W/WW) \$500,000 grant with matching loan.
- Special Public Works Fund (SPWF) \$500,000 grant with matching loan.

Assuming the District can qualify for all the above noted programs, there is a potential for \$4,100,000 in grant dollars with a requirement to borrow at least \$1,565,000. Debt service on \$1,565,000 is computed below:

RD loan (3.25%, 25 yr term):	\$1,565,000
Annual RD payment:	\$92,492
SPWF and W/WW (5.14%, 20 yr term):	\$1,000,000
Annual SPWF, W/WW payment:	\$81,198
Total annual debt service:	\$173,690
EDU'S:	377
Monthly revenue per EDU required for debt service:	\$38.39

The computation shows that Terrebonne would need 96% of the \$ 40 per EDU rate revenue just for debt service, unless Rural Development would increase the level of grants for Terrebonne. However, negotiations with Redmond could develop more favorable SDC rates for existing users and the potential for reduced O, M & Ro costs as a bulk user. The potential also exists that higher than normal grant opportunities may be available for Terrebonne. We recommend that the District pursue negotiations with Redmond and schedule a "one-stop" meeting to evaluate project feasibility.

DEQ has expressed concern with proposed developments in Terrebonne as well as the continued use of on-site wastewater systems in the area. DEQ's position is that any new developments that manage to get constructed will be required to connect to a public sewer when one is constructed. The new prison in Madras may place considerable development pressure on Terrebonne according to local and County personnel. It may be possible, given the need for housing of prison workers and families (we understand that up to 1700 jobs are associated with the prison), and DEQ's concerns, to provide future capacity in the Terrebonne system to accommodate potential growth. Generally, funding agencies focus on existing EDU's when determining how much debt service the community can bear. Concerns with potential development is that it is unoccupied and therefore not counted in the EDU computation. However, since Redmond SDC's and usage fees would apply to the growth, this could be used as an offset for minimizing initial connection and operational costs.

O, M, & R cost and the "Redmond" service fee cost would be paid by the 377 current EDU's which are actually connected at this time. Table 2.5 shows this figure at \$ 29.68 per EDU per month. To construct a system and realize rates in the \$ 40.00 range, these figures would need to

be substantially reduced or additional grant monies would be required. It may also be possible to reduce the initial O, M, & R cost since this is a new system and it could be operated by Terrebonne Water District Staff for initial maintenance and billing requirements. Then, as growth occurs within the District, additional maintenance staff could be retained.

The projected \$ 29.68 O, M, & R estimate assumes that Redmond would apply the standard Redmond service fee (\$19.60) per month to Terrebonne. Such fees are always subject to negotiation. Redmond's \$ 19.60 charge includes O, M, & R as well as debt service on their entire collection and treatment system. Since Terrebonne's connection would be direct to the Redmond WWTP, Terrebonne should not need to pay for costs attributable to the collection and treatment system. These would probably include costs associated with extra personnel, debt service, maintenance and pump station electrical costs. Administrative costs should also be lower since it is anticipated that Terrebonne would be treated by Redmond as a single customer and Terrebonne would bill its own customers individually.

A grant determination should be available through a "one-stop" meeting, and the ultimate cost for connection to the City of Redmond facility will be dependent on further negotiations with their representatives.

If Redmond negotiations are possible, and if grant monies are available for system installation, funding for this sewer system project is feasible. These hurdles will necessarily be in addition to the proposed debt service fees of an estimated \$ 38 per month.

2.7 CONCLUSIONS

Based on the analysis provided in Section 2.6, a wastewater system for Terrebonne may be feasible. The feasibility is rather tenuous as it depends on securing maximum grant participation, and a significantly reduced cost from Redmond to interconnect with their facilities for wastewater treatment and disposal purposes. These hurdles are in addition to securing community support for the proposed system and the needed sewer rates to construct, operate and maintain the system, and the estimated \$ 4,000 per EDU cost for private property improvements (septic tanks, STEP pumps, etc.)

SECTION 3
STUDY AREA CHARACTERISTICS



SECTION 3

STUDY AREA

CHARACTERISTICS

3.1 PLANNING AREA

The planning area for this Wastewater Feasibility Study consists primarily of the area within the existing Terrebonne Domestic Water District boundaries. Areas outside the District boundaries are also considered, as needed, to address treatment and disposal issues. Appendix 3.1 shows the location of Terrebonne with respect to other communities in Deschutes County. Appendix 3.1 also includes a map showing both the Terrebonne Domestic Water District boundary and the Terrebonne Rural Community boundary that includes the water district.

3.2 PHYSICAL ENVIRONMENT

3.2.1 Landscape and Topography

Most of the Community lies on top of a relatively flat ridge bordered on the west, east, and part of the north, with a steep rimrock that drops to more gently sloped areas below. On the ridgetops, elevations generally range from 2860 ft. to 2880 ft. Lowest elevation of the existing Water District is approximately 2750 ft. A portion of the Redmond Quadrangle, 7.5 minute series USGS map is shown in Appendix 3.2.

3.2.2 Climate

Terrebonne's climate is semi-arid with an average annual rainfall of approximately 10.11 inches per year (Source: Oregon Climatology Service). Mean annual temperature is 47.7° F with temperature extremes ranging from near 0°F in winter to over 100°F in summer. (Data source: 1982 Facilities Plan)

3.2.3 Soils

Soils in the planning area include the (Soil Conservation Service) Deschutes Series, Madras Series, and scabland or rough stony land. Much of the most densely developed parts of the community are on the scablands. Soils are of minimal depth - on the order of 6" to bedrock. While soil depths are greater in the Deschutes and Madras series soils, at 20-40 inches to bedrock, they can also be classified as shallow. A copy of the soils map and Soil Conservation Service descriptions included in the 1982 Facilities Plan is included in Appendix 3.3.

3.2.4 Water Resources

Dominant water resources in the area are the Deschutes River to the west (approximately 3.5 miles) and the Crooked River to the east (approximately 1.5 miles). The planning area is also cut by several irrigation ditches.

Several aquifers underlie the Community. The upper aquifer is approximately 175 feet and flows in a northerly direction. Ground water provides all of the community water supply requirements.

3.2.5 Agricultural Lands, Flood Plains, and Wetlands

Terrebonne is surrounded by agricultural land, most of which is in pasture or hay. According to the 1982 Facilities Plan, the planning area does not include flood hazard or wetland areas.

3.2.6 Endangered Species

A biological assessment for recent water system improvements in Terrebonne was prepared February 17, 1997. A copy of the Study is included in Appendix 3.4. The 1982 Facilities Plan noted no known endangered species living in the study area.

3.2.7 Public Health Hazards

Septic system facilities are common in the planning area. Some system failures have resulted in ponding of partially treated wastewater. Many still utilize drill holes for wastewater disposal. According to the County Sanitarian, many of the systems are marginal at best with frequent and reoccurring problems. The County's public health concerns are described in Appendix 3.5.

3.3 SOCIOECONOMIC ENVIRONMENT

3.3.1 General

Demands on the proposed wastewater system within the study area are dependent on population, land use patterns, economic growth and seasonal variations.

3.3.2 Population

Current (1999) Population. Review of 1999 Terrebonne Domestic Water System billing records indicate 313 active residential water connections plus 26 additional multifamily units resulting in a total of 339 active dwelling units. Residential density was estimated at 2.57 residents per dwelling for the Terrebonne Rural Service Center in 1995. Assuming this density is still applicable, the resulting current 1999 population of the planning area is **871 persons**. District staff have noted an influx of younger couples with children replacing retirees and Terrebonne elementary school is the fastest growing in the Redmond school district (Source: Deschutes County Ordinance No. 97-007, Exhibit B).

Given these observations, actual population may be significantly higher. Nevertheless, the figure of 871 persons will be used in this feasibility study.

Future Population Growth. The 1995 Water System Master Plan used an average annual growth rate (AAGR) of 2.5%. The Deschutes County coordinated population forecast for non-urban

County areas (includes Terrebonne) is 2.55 % AAGR for the period 1995 - 2020. The 2.5 % AAGR figure will be used in this feasibility study even though it is very likely that it will be exceeded within the design period. Most of the funding agencies needed to implement a new sewer system have balked at allowing for growth in excess of the coordinated forecast regardless of the magnitude or certainty of future growth. The population forecast for the year 2024, based on a current estimated population of 871 and a 2.5% AAGR, is **1,615 persons**.

Ultimate Buildout Population. The 1995 Water System Master Plan estimated the ultimate buildout population at 3,080 persons. This assumes the presence of a wastewater system and rezoning.

3.3.3 Land Use

Current Land Use. In 1997, Terrebonne was reclassified from a “rural service center” to a “rural community”. The County defines a rural community as:

“An unincorporated community which consists primarily of residential uses but also has at least two other land uses that provide commercial, industrial, or public uses (including but not limited to schools, churches, grange halls, post offices) to the community, the surrounding rural area, or to persons traveling through the area.” (Source: Deschutes County Ordinance No. 97-001, Exhibit B)

Terrebonne has several churches, an elementary school, and numerous small businesses along Highway 97. Nevertheless, Terrebonne is primarily residential. Residential water usage accounts for approximately 88% of annual metered water sales. Existing land use is further discussed in Appendix 3.6.

Future Land Use. The Deschutes County Comprehensive Plan envisions present land use characteristics to continue into the future with the notable exceptions of a commercial expansion area allowing good pedestrian access (and to discourage strip-commercial development) and higher density residential development that will be possible when a sewer system is constructed. Future development that is currently in various stages of planning includes three large residential developments: 60 units, 80 units, and 300 units. Advent of a new prison facility in Madras with 1700 new jobs is likely to fuel development interest in Terrebonne. Provision of adequate and approveable sanitary facilities is a major hurdle that all of the proposed developments must overcome.

3.3.4 Equivalent Dwelling Units (EDU's)

Overview. In the past, population has been used as the primary factor for sizing public facilities. The use of equivalent dwelling units, or EDU's, is another method of forecasting current and future needs of the District. In addition to year-round residents, the wastewater facilities must also serve the needs of part-time residents, businesses, and tourists. These uses can change or vary at different rates than the service population. For small communities such as Terrebonne, it is convenient and, with no evidence to the contrary, practical to assume that overall community

growth and composition (the mix of residential, commercial, and other customers) will be more or less even and proportional within the design period. The primary purpose of the EDU determination is to convert all the existing customer water usage to equivalent residential usage. Doing so provides a basis upon which funding and regulatory agencies can compare usage per EDU with other communities to determine both if the usage is reasonable and the proposed improvements are reasonably sized and eligible for any particular funding program. In addition, funding agencies use the total current EDUs in conjunction with user rates as an indication of what the community can afford to pay for capital improvements. The assumption is that each EDU results in the equivalent of one residential billing. Multiplying the number of EDUs by the average residential billing yields the total anticipated revenue for the system.

Current (1999) EDUs. Metered water use for the period May 1998 to April 1999 was tabulated for each Terrebonne Domestic Water District account. Inactive accounts, and the few irrigation only account, were omitted. The results are summarized in Table 3.1.

Water usage during the non-irrigation period is reflective of probable wastewater generation. EDUs computed on probable wastewater generation (or non-irrigation period water usage) are slightly less (377 EDUs) than when computed on the average annual water usage basis (384.5 EDUs). The slightly lower figure of 377 EDUs will be used in this study as a conservative estimate of current (1999) EDUs.

Table 3.1 Metered Water Usage (May 1998 - April 1999)

Customer Category	Number of Accounts	Annual Avg. Daily Usage (gpd)	Non-irrigation Period Avg. Daily Usage (gpd) ¹	EDUs based on Annual Avg. Daily Usage	EDUs based on Non-irrigation Period Avg. Daily Usage ¹
Residential	313	75,735	51,821	339 ²	339 ²
Commercial	18	7,711	3,883	34.5 ³	25.4 ⁴
Institutional ⁵	9	2,465	1,923	11 ³	12.6 ⁴
Total	340	85,911	57,627	384.5	377

¹ Non-irrigation period: November to April.

² 313 accounts plus 26 additional multifamily units. Residential EDU total is independent of actual water usage - by definition.

³ Annual EDUs based on 223.4 gpd/edu.

⁴ Non-irrigation period EDUs based on 152.9 gpd/EDU.

⁵ Institutional customers include: post office, school, 2 halls, and 5 churches.

Future (2024) EDUs. For purposes of this feasibility study, **future (year2024) EDUs** are forecasted to be **699** based on 377 current EDUs and an average annual growth rate of 2.5%. This does not include any special considerations of the three large developments with a potential of 440 new EDUs. Generally, the funding agencies that can provide significant grant dollars have balked at funding projects that are significantly oversized to accommodate anticipated residential growth. They argue that growth should generate systems development charge (SDC) revenue that can then be used to expand the system. Nevertheless, it may be possible, to work with the funding agencies and the developers to reach some kind of compromise arrangement. This possibility is discussed in Section 7.

SECTION 4
WASTEWATER CHARACTERISTICS



SECTION 4

WASTEWATER CHARACTERISTICS

4.1 GENERAL

Wastewater characteristics for general planning purposes include flow parameters, BOD₅, and TSS loadings. Based on considerations discussed in Section 5, flow parameters and loadings are for septic tank effluent.

4.2 WASTEWATER FLOWS

4.2.1 Current (1999) Average Daily Lows

Current (1999) average daily flows are considered, for planning purposes, to be equivalent to the current metered water usage during the non-irrigation season. Wastewater flows through the year are (probably) fairly even, with increased commercial use in summer being balanced by decreased water use at the school during summer recess. Metered records for individual residential accounts suggest very few part-time residents. Table 3.1 indicates an average daily non-irrigation period (November to April) usage of 57,627 gpd. Conversations with District staff and the County Sanitarian indicate that some people are currently using less water than they would like to in order to not overload their septic systems. For planning purposes, a **current (1999) average daily flow of 65,000 gpd** will be used to provide an allowance for the anticipated increased water consumption.

4.2.2 Inflow and Infiltration

Inflow and infiltration (I/I) refer to extraneous water (rainfall and/or groundwater) entering the collection system through defects in the system. Precipitation in Terrebonne is minimal and most of the community is elevated well above the surrounding plain. Groundwater is generally not present in the pipe zone. With new building sewers and septic tanks, and a septic tank effluent pump (STEP) collection system, the potential for I/I is negligible and, therefore, no additional allowance has been made for I/I.

4.2.3 Wastewater Flow Peaking Factors

For purposes of this feasibility study, the two most important flow parameters are the average daily flow (ADF) and the peak instantaneous flow (PIF). As previously noted, the community is composed primarily of full-time residents, and, with a STEP collection system, I/I is not anticipated to be a problem. Significant weekly or monthly peaking of flows is therefore not anticipated. Some peaking will invariably occur; however, it will not be as marked as would be the case in communities with many part-time residents, significant and seasonal commercial development, and/or high I/I potential. The peak instantaneous flow parameter is an estimate of

the short term peak flow that can occur as a result of normal diurnal flow variations. Assuming a STEP collection system is used, the PIF can be computed using the equation¹:

$$Q = 0.5N + 20$$

Where N = number of EDUs
and Q = design flow (gpm)

For Terrebonne, this computes to 208.5 gpm (300,240 gpd) for the current (1999) EDU total of 377.

¹ Source: Alternative Wastewater Collection Systems, EPA 1991.

4.2.4 Design Flows

Design flows for both current and projected future conditions are summarized in Table 4.1. Future average daily flow is based on 2.5% AAGR.

Table 4.1 Current (1999) and Future (2024) Design Flows.

Year	Average Daily Flow			Peak Instantaneous Flow ³		
	(gpd)	(gpcd) ¹	(gpd/EDU) ²	(gpd)	(gpcd) ¹	(gpd/EDU) ²
1999	65,000	75	172	300,000	344	796
2024	121,000	75	173	532,000	329	761

¹ Population: 1999: 871 persons; 2024: 1,615 persons

² EDUs: 1999: 377 EDUs; 2024: 699 EDUs

³ Computed flow based on EDU total and equation in Section 4.2.3

4.3 DESIGN WASTEWATER INFLUENT LOADINGS

Wastewater loads consisting of biochemical oxygen demand (BOD₅) and total suspended solids (TSS), are dependent on population and commercial/industrial customers. Therefore, it can be assumed that future loadings will increase with area growth. Standard unit design loadings and peak factors will be used in determining design loadings.

Metcalf & Eddy suggest 0.18 ppcd BOD₅ and 0.20 ppcd TSS, and Ten State Standards recommends minimum loading rate of 0.17 ppcd BOD₅ and 0.20 ppcd TSS, without garbage grinders. Households with garbage grinders add to the strength of the wastewater and Ten State Standards recommend average loadings be increased to 0.22 ppcd BOD₅ and 0.25 ppcd TSS in these cases. 0.22 ppcd BOD₅ and 0.25 ppcd TSS will be used for determining average design loadings for Terrebonne. Since a STEP collection system is recommended, the wastewater will be partially treated in septic tanks prior to being discharged to the system. Septic tank effluent has a BOD₅ strength approximately 50% less than raw wastewater and a TSS concentration

approximately 75% less than raw wastewater¹. Design values for Terrebonne reflect these modifications. Table 4.2 summarizes BOD₅ and TSS loadings for Terrebonne. The peaking factors are typical of small Oregon communities.

Table 4.2 Influent BOD₅ and TSS Design Loading Computation

a. Influent BOD₅

Parameter	Unit Loading (ppcd)	Peaking Factor	Percent Reduction for Septic Tank Effluent	Current (1999) Loading (ppd) ^{1,3}	Future (2024) Loading (ppd) ^{2,3}
Average Load	0.22	1	50	96	178
Monthly Maximum Load	0.37	1.7	50	161	299
Weekly Maximum load	0.51	2.3	50	222	412
Daily Maximum Load	0.62	2.8	50	270	501

b. Influent TSS

Parameter	Unit Loading (ppcd)	Peaking Factor	Percent Reduction for Septic Tank Effluent	Current (1999) Loading (ppd) ^{1,3}	Future (2024) Loading (ppd) ^{2,3}
Average Load	0.25	1	75	54	101
Monthly Maximum Load	0.43	1.7	75	94	174
Weekly Maximum load	0.58	2.3	75	126	234
Daily Maximum Load	0.70	2.8	75	152	283

¹ Based on current population: 871.

² Based on year 2024 projected population of 1,615 persons.

³ Loadings for septic tank effluent.

¹ Wastewater Treatment/Disposal for Small Communities, EPA 1992.

SECTION 5
COLLECTION AND TRANSMISSION SYSTEM

SECTION 5 COLLECTION AND TRANSMISSION SYSTEM

5.1 COLLECTION SYSTEM TYPES

There are several types of wastewater collection systems - with key distinctions being the type of wastewater (raw sewage versus septic tank effluent) and the means of conveyance (gravity flow or mechanically assisted flow). Brief descriptions of the most common systems are discussed separately below:

Conventional Gravity System. This is the oldest and most prevalent type of system. The system involves gravity collection and conveyances of raw wastewater. Pipelines may be deep to overcome topography or pump stations may be needed to “lift” the wastewater and thereby overcome any barrier to practical gravity flow. This system is generally most economical in situations that: have relatively dense development, topography that favors shallower burial depths and minimizes the need for pump stations and easily excavated soils (minimal rock and high groundwater). Conventional systems generally have the longest life and lowest O&M requirements of the various types of collection systems. However, in cases of poor design, poor construction, detective materials, settlement, poor tapping of new service laterals, or “modifications” or “improvements” to accommodate stormwater, this type of system can be one of the most problematic and expensive.

Septic Tank Effluent Gravity (STEG) System. This system basically replaces the drainfield, in a conventional on-site septic tank and drainfield, with a community collection system. Septic tank effluent is conveyed from an on-site tank, via a small diameter gravity service line to the larger gravity collection system. Septic tank effluent has fewer solids; consequently, the lines can be smaller in diameter, and pipe grades can be less than with the conventional gravity sewers. This type of system is generally appropriate where connection spacing is sufficiently distant so as to offset the added cost of the septic tank. Because it is a gravity system, it is also constrained by topography. Burial depths are generally less than with a conventional gravity system; therefore, it is less influenced by depth of groundwater or rock. Any venting or pumping requires odor control considerations, and pumping must take into account the corrosive nature of septic tank effluent.

Grinder Pump (GP) System. This system utilizes an on-site sump and pump with a grinder attached. Raw wastewater from the sump passes through the grinder and is pumped to a (low) pressure collection system. Since the solids have been ground, smaller pipe diameters can be used (compared with a conventional gravity system). The wastewater is not septic (as in the STEG system) so there is no special odor or corrosion concerns. Because of the high solids concentrations, adequate pipe velocities must be maintained to avoid solids deposition. This system is generally most economical in areas with relatively distant spacing between connections, and physical or topographical features such as high groundwater, rock, or areas requiring numerous pump stations for conventional systems. Systems costs are generally comparable to STEP systems

(see below); however, O&M costs are , generally, somewhat higher. GP systems have not been as popular as STEP systems in Oregon.

Septic Tank Effluent Pump (STEP) System. This system is similar to the STEG system where the community collection system replaces the on-site drainfield. STEP systems utilize a pump located in the septic tank to pump septic tank effluent under pressure to the collection system which, in a STEP only system, is also pressurized. This is generally most economical in areas with relatively distant spacing between connections, and physical or topographical features such as high groundwater, rock, or areas requiring numerous pump stations for conventional systems. STEP systems are probably the most popular (in Oregon) of the various alternatives to conventional gravity service.

Vacuum System. In this system, raw wastewater is collected in a sump fitted with a vacuum valve that typically serves two to four customers. As the sump fills, the valve opens, and flow is induced into the community collection system that is kept under vacuum conditions. Because flow velocities are up to 15 fps, smaller pipe Diameters can be used. The systems are best suited to relatively flat areas in order to minimize the number of vacuum stations required. The system is also well suited to areas where burial depths are constrained by high groundwater or rock. There are relatively few communities using this system; however, recent innovations in the technology will undoubtedly make it a more attractive option for many communities.

Hybrid Systems. These systems involve the combination of any two or more of the systems discussed above. Generally, it is advisable to combine systems based on the type of wastewater handled: raw wastewater or septic tank effluent. Natural combinations are STEP and STEG or conventional and GP. The rationale for a hybrid system is to install the type of system that is appropriate and economical for any given area within the community.

5.2 DESIGN CONSTRAINTS

Terrebonne is characterized by very shallow bedrock. Most of the community is reported to average approximately 6 inches of soil over the bedrock. Lower elevations have more soil, 20-40 inches according to the SCS soil series descriptions. Isolated areas have deeper soils. It is anticipated, for planning purposes, that all pipeline work will include rock excavation.

The community is fairly spread out, reflecting both the presence of larger lots and the considerable number of lots that are currently unbuildable because of the inability of the lot to accommodate a legal on-site wastewater system.

Topographic constraints include a relatively large and flat area, on top of the ridge, that includes most of the community. Rimrock borders much of this area with parts of the service area located at lower elevations surrounding the rimrock.

Other constraints of note include Highway 97 and the railroad cuts through the eastmost part of the Terrebonne Domestic Water District. There are relatively few widely spaced dwellings east of the railroad.

5.3 DISCUSSION

The shallow depth to bedrock eliminates consideration of a conventional gravity system and also places severe limitations on the large-scale applicability of STEG system. While the relatively flat area on top of the ridge would be suitable for a vacuum system, the isolated lower areas, and the elevation differences of approximately 130 feet in the service area, argue against a vacuum system as an economic alternative. STEP and GP systems are well suited for the physical and topographical constraints present as well as the relatively low density of existing community development. The need for a boring under the railroad the relatively few and widely spaced dwellings east of the railroad argue against extending service to this area.

5.4 RECOMMENDED COLLECTION SYSTEM

For general planning purposes, a STEP system is recommended. During design, when more detailed topographical information is developed and existing buildings are mapped, it should be possible to eliminate some of the STEP pumps. The final result will be a hybrid STEP/STEG system. To provide a conservative opinion of probable cost, a STEP only system is presented here.

A GP system would probably be comparable in construction cost and could be considered further during preliminary design if a treatment system is located fairly close to Terrebonne. It is more likely that a treatment facility would be located a few miles away or, in the case of pumping to Redmond, a distance of 5 miles away. Force main retention times could exceed one day - depending on the route taken - and would result in septic flows and possible problems with solids deposition. Since septic tank effluent does not need to flow as rapidly as raw wastewater to keep solids suspended, the main pump station for a STEP system could utilize smaller pumps and lower flowrates than the main pump station for a GP system. Lower flowrates result in lower pipeline headlosses which in turn result in lower operational costs.

Layout of the proposed STEP system is shown in Figure 5.1 and Figure 5.2. Alternative #1 (Figure 5.1) shows routing to deliver all flows to a pump station located somewhere along NW 19th Street. 8 inch diameter lines are located to facilitate growth to the north where growth is most likely to occur and the three large planned developments (Section 3.3.3) are located. The area west of 5th Street has good potential for STEG service. Depending on the location of the treatment facility, the forcemain from the pump station could run either north or south along NW 19th Street. Alternative #2 (Figure 5.2) is similar to Alternative #1 except the pump station has been relocated to highway 97. Alternative #2 is only recommended if a transmission main to the Redmond WWTP is constructed along Highway 97. Alternative #2 has less potential for conversion of part of the system to STEG. It would also require higher head STEP pumps for lower elevations on the west side of Terrebonne.

Opinions of probable cost for the Alternative #1 and Alternative #2 are shown in Table 5.1 and Table 5.2 respectively.

**Table 5.1 STEP Collection System - Alternative #1
Opinion of Probable Cost¹**

Description	Unit	Unit Cost	Quantity	Extension
Mains				
2" and 4" Pressure Mains	LF	\$40	29,000	\$1,160,000
8" Pressure Main	LF	\$43	7,500	\$322,500
10" Pressure Main	LF	\$45	2,700	\$121,500
Service Line Allowance (50LF/EDU)	LF	\$20	18,850	\$377,000
Pump Station				
Sitework and Excavation	LS	\$20,000	1	\$20,000
Building	SF	\$100	200	\$20,000
Building Slab (concrete)	CY	\$550	10	\$5,500
Wetwell	LS	\$10,000	1	\$10,000
Pumps	EA	\$20,000	2	\$40,000
Miscellaneous Plumbing	LS	\$20,000	1	\$20,000
Controls and Electrical	LS	\$50,000	1	\$50,000
Construction Subtotal				\$2,146,500
Construction Contingencies				\$214,700
Engineering and Construction Observation				\$429,300
Legal and Administrative				\$107,300
Land and Easement Acquisition				\$50,000
Total				\$2,947,800

¹Does not include: new building sewers, septic tanks, septic tank effluent pumps, and abandonment of existing on-site facilities.

Table 5.2 STEP Collection System - Alternative #2

Opinion of Probable Cost¹

Description	Unit	Unit Cost	Quantity	Extension
Mains				
2" and 4" Pressure Mains	LF	\$40	28,200	\$1,128,000
8" Pressure Main	LF	\$43	10,100	\$434,300
10" Pressure Main	LF	\$45	1,200	\$54,000
Service Line Allowance (50LF/EDU)	LF	\$20	18,850	\$377,000
Pump Station				
Sitework and Excavation	LS	\$20,000	1	\$20,000
Building	SF	\$100	200	\$20,000
Building Slab (concrete)	CY	\$550	10	\$5,500
Wetwell	LS	\$10,000	1	\$10,000
Pumps	EA	\$20,000	2	\$40,000
Miscellaneous Plumbing	LS	\$20,000	1	\$20,000
Controls and Electrical	LS	\$50,000	1	\$50,000
Construction Subtotal				\$2,158,800
Construction Contingencies				\$215,900
Engineering and Construction Observation				\$431,800
Legal and Administrative				\$107,900
Land and Easement Acquisition				\$50,000
Total				\$2,964,400

¹Does not include: new building sewers, septic tanks, septic tank effluent pumps, and abandonment of existing on-site facilities.

In addition to the public collection system, there are on-site, private property improvements consisting of: a new building sewer, a new septic tank and effluent pump, a service lateral from the effluent pump to the service lateral constructed as part of the public system, and the abandonment of existing on-site facilities (septic tanks, drill holes, etc.). For purposes of this feasibility study, a cost allowance of \$4,000 per EDU is used. Multiplied by 377 EDUs, the private property improvements construction total is \$1,508,000.

5.5 TRANSMISSION ALTERNATIVES

Treatment alternatives (Section 6) include construction of a facultative lagoon with integrated winter holding or use of the Redmond wastewater treatment plant. Transmission alternatives for these two treatment alternatives are shown in Figure 5.3. Table 5.3 provides a summary description of the five transmission alternatives.

Table 5.3 Transmission Main Alternatives - Misc. Data
(See figure 5.3 for Alternative locations)

Item	Alternates				
	1A	1B	1C	2A	2B
Approx. Pump Station Elevation (ft.)	2750	2750	2860	2750	2750
Approx. Treatment Elevation (ft.)	2880	2880	2880	2760	2760
Force main length (LF)	27,600	28,000	24,000	1,000- 15,000	1,000- 15,000
Static head (ft.)	130	130	20	10	10
Dynamic head (ft.) (8" main, 2.0 fps)	52	52	45	2-28	2-28
Total head (ft.)	182	182	65	12-38	12-38
Total head (psi)	79	79	28	5-16	5-16
Force main detention (Gallons)	72,064	73,108	62,664	2,611- 39,165	2,611- 39,165
Force main detention (hrs.) @ 65,000 gpd	26.6	27.0	23.1	1.0-14.5	1.0-14.5
Force main detention (hrs.) @ 121,000 gpd	14.3	14.5	12.4	0.5-7.8	0.5-7.8

An opinion of probable cost for the five alternatives is provided in Table 5.4. Transmission alternatives are discussed further in Section 6 in conjunction with the treatment alternatives.

Table 5.4 Transmission Alternatives
Opinions of Probable Cost.

Description	Alternatives				
	1A	1B	1C	2A	2B
8" Force main (\$38/LF): 27,600 LF 28,000 LF 24,000 LF 1,000-15,000 LF	\$1,048,800	\$1,064,000	\$912,000	\$38,000- \$570,000	\$38,000- \$570,000
Construction Subtotal	\$1,048,800	\$1,064,000	\$912,000	\$38,000- \$570,000	\$38,000- \$570,000
Contingencies	\$104,900	\$106,400	\$91,200	\$3,800- \$57,000	\$3,800- \$57,000
Engineering and Construction	\$209,800	\$212,800	\$182,400	\$7,600- \$114,000	\$7,600- \$114,000
Observation Legal and Admin.	\$52,500	\$53,200	\$45,600	\$1,900- \$28,500	\$1,900- \$28,500
TOTAL	\$1,416,000	\$1,436,400	\$1,231,200	\$51,300- \$769,500	\$51,300- \$769,500

5.6 COLLECTION AND TRANSMISSION COST SUMMARY

Table 5.5 presents an opinion of probable cost summary for collection, private property improvements, and transmission components of the overall collection and transmission system.

Table 5.5 Collection and Transmission Cost Summary

Description	Collection System Alternative ¹				
	#1	#1	#2	#1	#1
	Transmission Alternative ²				
	1A	1B	1C	2A	2B
Collection System	\$2,947,800	\$2,947,800	\$2,964,400	\$2,947,800	\$2,947,800
Private property improvements	\$1,508,000	\$1,508,000	\$1,508,000	\$1,508,000	\$1,508,000
Transmission	\$1,416,000	\$1,436,400	\$1,231,200	\$51,300- \$769,500	\$51,300- \$769,500
TOTAL ³	\$5,871,800	\$5,892,200	\$5,703,600	\$4,507,100- \$5,225,300	\$4,507,100- \$5,225,300

¹ See Section 5.4.

² See Section 5.5.

³ Includes: Construction, contingencies, engineering, legal, administrative costs.

SECTION 6
WASTEWATER TREATMENT AND DISPOSAL

SECTION 6

WASTEWATER TREATMENT AND DISPOSAL

6.1 TREATMENT AND DISPOSAL SYSTEM ALTERNATIVES- PRELIMINARY DISCUSSION

Options considered in this feasibility include discharge to the Deschutes River, mechanical treatment and disposal at the Redmond Wastewater Treatment Facility, and winter holding/summer irrigation.

6.1.1 Discharge to Deschutes River

The "City of Redmond, Oregon Advanced Wastewater Facility Plan, February 1994" prepared by KCM, notes the environmental sensitivity of the Deschutes River and that discharged wastewater effluent would not be permitted to have any detrimental impact on water quality in the Deschutes. This level of treatment is not feasible for a small community with limited financial resources. No further consideration will be given to this option.

6.1.2 Connect to Redmond WWTP

Preliminary discussion with Redmond indicate the City is open to the possibility of allowing Terrebonne to connect to the existing WWTP. Advantages to Terrebonne in connecting to Redmond include: no responsibility on Terrebonne's part for meeting discharge water quality requirements, effluent disposal, or sludge handling and disposal requirements. Disadvantages include: long pumping and transmission distance (approximately 5 miles), need for pretreatment at the WWTP site because of septic flows (pretreatment would consist of an aeration/equalization basins at the WWTP site), SDC costs of \$1215 per EDU, and monthly costs per EDU of \$19.60. In addition, Terrebonne would not have much, if any, say in any future fee increases. On the other hand, substantial growth in Terrebonne could be handled more easily through increased flows to Redmond than to expanding an alternate treatment and disposal system.

Location of the Redmond WWTP and various transmission main alternatives are shown in figure 5.3. Costs for connecting to Redmond, based on 377 EDUs, and not including transmission costs detailed in Section 5.5, are shown below:

- SDC cost of \$1215 per EDU for 377 EDUs, SDC cost equals \$458,055.
- Monthly service fee of \$19.60 per EDU. For 377 EDUs, Annual fee equals \$88,670. (Note this is a preliminary figure and could potentially be reduced through negotiation with the City of Redmond).

- Construction of aeration/equalization basin at Redmond WWTP to pretreat septic flows from Terrebonne and provide flow equalization. An opinion of probable cost for this item including construction, engineering, legal, and administrative costs is \$405,000. Cost of this item could be reduced significantly if it is incorporated into an overall expansion of the Redmond WWTP rather than constructed as a separate project.

6.1.3 Winter Holding and Summer Irrigation

This option requires a site with sufficient land to accommodate both storage of approximately 6 to 8 months of accumulated flow and the disposal (irrigation) of the total annual flow with allowances for rainfall accumulation and pond evaporation. Conventional treatment options compatible with winter holding and effluent irrigation include: facultative lagoon treatment, aerated lagoon treatment, and mechanical plants.

Facultative Lagoons. Water in the facultative lagoon naturally stratifies into zones with particular characteristics and treatment functions. The surface zone is aerobic, with oxygen levels that can exceed saturation during sunny days. Oxygen is generated by algae in the near surface zone and by surface reaeration. Aerobic bacteria utilize the oxygen to stabilize organic materials. The lowest layer is anaerobic. Larger solids settle and form a sludge layer where anaerobic bacteria thrive and decompose the accumulated solids. This middle layer is termed “facultative” and is characterized as partly aerobic and partly anaerobic. Facultative bacteria decompose organic wastes entering this zone. Multiple cells are typically used to achieve the desired level of treatment, minimize short circuiting, and facilitate maintenance. Treatment is “natural” and requires no mechanical equipment or chemicals.

Facultative lagoons are much larger than aerated lagoons for treatment; however, with winter holding, the treatment and holding functions can be integrated into a single 3-cell (minimum) lagoon. Maximum lagoon depths for treatment are 6 to 8 feet in the primary cell with greater depths permissible for the secondary cells. Effluent quality is adequate for irrigation of pasture and hay crops. O&M costs are minimal because of the lack of mechanical equipment.

Aerated Lagoon. Aerated lagoons utilize deeper (10-15 feet) water depths to better optimize oxygen transfer from air provided by mechanical equipment. The increased oxygen content allows for much smaller treatment cells than those required for a facultative lagoon; however, winter holding requirements significantly reduce this benefit since the holding requirement is the same regardless of the treatment process. Aerated lagoons can produce a higher quality of effluent than a facultative lagoon; but this is not necessary for the type of irrigation described in the previous paragraph. O&M costs are higher for an aerated lagoon because of the additional mechanical equipment and utility costs.

Mechanical Treatment Plant. A properly sized mechanical plant will provide excellent effluent quality and require much less area than either a facultative lagoon or an aerated lagoon for treatment. Winter holding requirements significantly reduce this benefit since the holding requirement is the same regardless of the treatment process. O&M costs are relatively high because of the level of mechanization, cost of utilities, and level of operator attention required.

Recommendations. Because of the shallow depth to rock in the vicinity of Terrebonne, any lagoon system will probably need to be constructed of imported fill. This consideration, plus the cost of mechanical equipment and operational costs, eliminates the aerated lagoon option. Since there are no special effluent requirements, and no stream discharge, the high capital cost and O&M cost associated with a mechanical plant does not warrant further consideration of a mechanical plant at this time¹. Of the winter holding/summer irrigation option treatment processes reviewed here, the facultative lagoon is the most promising and is recommended as an alternative to connecting with Redmond. The facultative lagoon is the most promising and is recommended as an alternative to connecting with Redmond. The facultative lagoon/holding and effluent irrigation option is discussed in detail in Section 6.2.

6.2 PROPOSED FACULTATIVE LAGOON

The facultative lagoon option is conceived as an integrated treatment and holding facility to minimize construction costs. Such facilities are quite common in the Midwest, where climatic and topographic conditions are similar to Terrebonne's and where winter holding is commonly practiced. Biosolids (sludge) accumulation in such facilities is generally not a concern and can typically be accommodated for periods well beyond the 20 year design life.

The proposed facility is presented schematically in Figure 6.1. A site plan is presented in Figure 6.2. The site plan is generic. After a site is selected and the appropriate soils work completed, the design can be modified as needed to optimize site utilization. A site appropriate design should be included in the predesign phase. Relative elevations of the dike top, pond bottoms, and water surface elevations are included on the site plan in lieu of a separate hydraulic profile. General features of the proposed facility include:

- 3-cell series operation with capabilities for bypassing and isolating any cell.
- Isolated cells can be drained.
- Flow recycle capabilities to enhance treatment (should that be desired) and to allow supplemental water to be added (during initial pond filling and for additional water to meet crop needs during years of lower rainfall and higher evaporation).

¹Engineers currently working with the developer of a 300 unit development in northeast Terrebonne are proposing to utilize a membrane mechanical plant with subsurface disposal. If they can prove to DEQ's satisfaction that the plant can consistently meet the stringent subsurface discharge requirements for nitrates and total nitrogen, then the mechanical option could be reconsidered.

- No headworks per se. Influent to the lagoon will be delivered to the destination cell under pressure from pump station. A flowmeter will be located on the influent pressure line. Grit accumulation in a facultative lagoon are not a concern. EPA's "Design Manual Number 36, Municipal Wastewater Stabilization Ponds, 1983," states that "pretreatment facilities should be kept to a minimum for pond systems." EPA's manual contains no design guidelines or recommendations for headworks facilities such as screening or grit removal.
- Each cell is separated from the adjacent cell by a level control structure that includes an adjustable weir.
- Duplex pumps, piping, and valving to allow simultaneous recycle and effluent irrigation with both pumps on. In simplex mode, either pump can be used for either effluent irrigation or recycle.
- A pressure filter, actually more of a screen, with mesh openings of approximately 0.06 inches, on the effluent line from the pumps. The filter is needed to ensure non-clog operation of the irrigation system. Actual screen sizing will be based on the requirements of the selected irrigation system.
- A supplemental water supply well is included in the design to provide water for the chlorinator, filter flushing, plant building, and supplemental irrigation water. Sizing of the well will depend on the availability and access of irrigation water rights associated with any land purchased for the lagoon/irrigation site. A construction budget of \$20,000 has been allocated for supplemental water with the understanding that a more detailed description of what this entails will be development after a site is selected.
- Chlorine contact will be effected in an oversize transmission line. Sizing will vary according to length between the chlorine injection point and the first irrigation head with the intent of providing 30 minutes contact at the peak irrigation flowrate. The long pressure main will ensure thorough mixing of the chlorinated effluent.
- Irrigation equipment and setup will depend on the final site selected and sizing. Sizing could vary depending on whether or not the site can accommodate the full year 2024 design flow and whether or not water will be used by adjacent (or nearby) property owners. A construction budget of \$100,000 has been allocated for irrigation equipment and piping with the understanding that a more detailed description of what this entails will be developed after a site is selected.

General design parameters are summarized below.

Design Parameters

Average Daily Flow (1999): 0.065 mgd
Average Daily Flow (2024): 0.121 mgd
Average Daily BOD₅ (1999): 96 ppd
Average Daily BOD₅ (2024): 178 ppd
Anticipated BOD₅ Removal: 80-95 %
Liquid Depth: 2 ft. minimum, 8 ft. maximum
Freeboard: 3 ft.
Dike Top Width: 3:1 slopes (inside and outside)
Dike Top Width: 10 ft.
Liner: 60 mil HDPE
Cell No. 1 (primary)
Bottom Dimension: 325' x 726'
Area: 5.42 Ac.

2 Foot Minimum Depth

Water surface dimension: 337' x 738'
Water surface area: 5.71 Ac.
Surface loading rate (1999): 16.8 ppd BOD₅/Ac.
Surface loading rate (2024): 31.2 ppd BOD₅/Ac.
Volume: 11.1 Ac-ft.
Average retention (1999): 56 days
Average retention (2024): 30 days

6 Foot Depth

Water surface dimension: 361' x 762'
Water surface area: 6.32 Ac.
Surface loading rate (1999): 15.2 ppd BOD₅/Ac.
Surface loading rate (2024): 28.2 ppd BOD₅/Ac.
Volume: 35.2 Ac-ft.
Average retention (1999): 176 days
Average retention (2024): 95 days

8 Foot Maximum Depth

Water surface dimension: 373' x 774'
Water surface area: 6.63 Ac.
Surface loading rate (1999): 14.5 ppd BOD₅/Ac.
Surface loading rate (2024): 26.9 ppd BOD₅/Ac.
Volume: 48.2 Ac-ft.
Average retention (1999): 242 days
Average retention (2024): 130 days

Cell No. 2 and Cell No. 3 (secondaries)

(Cells are identical-data provided below applies to one cell)

Bottom

Dimension: 325' x 325'
Area: 2.42 Ac.

2 Foot Minimum Depth

Water surface dimension: 337' x 337'
Water surface area: 2.61 Ac.
Volume: 5.0 Ac-ft.
Average retention (1999): 25 days
Average retention (2024): 14 days

6 Foot Depth

Water surface dimension: 361' x 361'
Water surface area: 2.99 Ac.
Volume: 16.2 Ac-ft.
Average retention (1999): 81 days
Average retention (2024): 44 days

8 Foot Depth

Water surface dimension: 373' x 373'
Water surface area: 3.19 Ac.
Volume: 22.5 Ac-ft.
Average retention (1999): 113 days
Average retention (2024): 60 days

Lagoon Totals

Site Acreage: 20 Ac.

2 Foot Minimum Depth

Water surface area: 10.93 Ac.
Volume: 21.1 Ac-ft.
Average retention (1999): 106 days
Average retention (2024): 58 days

6 Foot Depth

Water surface area: 12.30 Ac.
Volume: 67.6 Ac-ft.
Average retention (1999): 338 days
Average retention (2024): 183 days

8 Foot Maximum Depth

Water surface area: 13.01 Ac.
Volume: 93.2 Ac-ft.
Average retention (1999): 468 days
Average retention (2024): 250 days, 8.2 months
Average retention (2024)
(Vol. @ 8' minus vol. @ 2'): 192 days, 6.3 months

6.2.1 Effluent Irrigation

Irrigation Crop Requirements. Effluent, in general, can only be spray irrigated when there is a deficiency of water, i.e., when the amount of water consumed by vegetation and lost to evaporation exceeds precipitation. Also, the potential nutrient uptake of the crop must exceed the nitrate content of the treated effluent.

The Department of Bioresource Engineering, Oregon State University published "Oregon Crop Water Use and Irrigation Requirements," in June 1992. Included in the publication are growing seasons for selected crop by region, and the net irrigation requirements for different recurrence intervals.

Initially, alfalfa hay and pasture grass have been assumed as the crops for estimating irrigation requirements. Only hydraulic conditions have been evaluated, since hydraulics is generally the controlling factor rather than nutrient loading. Detailed soils work in conjunction with an effluent reuse plan will need to be conducted at the selected irrigation site to better determine crop suitability and needs. A hydrogeological investigation may not be required since the lagoons are to be lined and irrigation will not exceed the agronomic rate.

Net irrigation requirements in Region 16 (Madras- Redmond) for alfalfa hay and pasture grass for a 5 out of 10 year event (average conditions) are listed below:

Alfalfa Hay

Month	Net Irr (inches)	Percent of Seasonal Requirement
April	1.85	7.59
May	3.58	14.69
June	4.37	17.93
July	6.26	25.69
August	5.00	20.52
September	3.31	13.58
Total	24.37	100

Pasture Grass

Month	Net Irr (inches)	Percent of Seasonal Requirement
April	1.81	6.60
May	3.86	14.07
June	4.72	17.20
July	6.65	24.23
August	5.28	19.24
September	3.58	13.05
October	1.54	5.61
Total	27.44	100

Monthly Precipitation and Evaporation Data. Average monthly precipitation and evaporation data for the Madras area was provided by the Oregon Climatology Service, Oregon State University (OSU). Field data was collected at the Madras Experiment Station. Average monthly values are listed below.

Month	Precipitation (inches)	Evaporation (inches)
January	1.39	
February	.89	
March	.76	
April	.63	5.26
May	.94	7.25
June	.92	8.70
July	.29	1.017
August	.46	9.06
September	.48	6.15
October	.63	3.29
November	1.32	1.80
December	1.40	
Total	10.11	51.67

Note that average annual evaporation exceeds precipitation by 41.56 inches (3.5 feet).

Restrictions on Land Use. Regulations pertaining to the use of reclaimed water (treated effluent) from sewage treatment plants are stated in OAR Chapter 340, Division 55. Usage restrictions depend on the level of treatment and disinfection provided.

Facultative lagoon treatment (without effluent polishing) would generally be classified as Level I category. Size of the required buffer strip around the irrigation site is considered to be site specific, but typically would be a minimum of 70 feet. The primary reason for more restrictions with lagoon treatment is that pathogenic organisms may be shielded from the disinfectant due to algae or other solids within the effluent. It should be noted that lightly loaded facultative lagoons, as proposed for Terrebonne, naturally achieve a very high removal of pathogens.

Land Requirements. Detailed water balances were computed (Appendix 6.1) to estimate land requirements for either pasture grass or alfalfa irrigation. Acres to be irrigated reflect a 25% reduction due to typical inefficiencies in irrigation works utilizing overhead spray irrigation. Preliminary land requirements for irrigation of the selected crops are summarized below. Actual land requirements are greater because of buffer strip requirements (approximately 13 acres) and any allowances for future expansion and the approximate 20 acres required for the lagoon site.

Crop	Land Requirements (Acres)*	
	1999	2024
Alfalfa	13	35
Pasture Grass	11	31

* Acreage does not include buffer strip.

Overall land requirements total 68 acres; however, it would be prudent to acquire more to allow for additional irrigation area during years with higher rainfall and/or lower evaporation. An 80 acre site is recommended for this feasibility study.

Location of the lagoon and effluent irrigation site will be somewhere in the shaded region delineated on Figure 5.3. The smaller parcels within this region would be unsuitable because of the limited utility and the proximity of residences. The most likely locations would be immediately west of Terrebonne on a large parcel or parcels of irrigated farmland. The shaded region farthest from Terrebonne (Figure 5.3) is BLM land. From the roadside, this area appears to be fairly rough and rocky; though smoother areas are reported farther away from the roads. Such an area could be difficult and costly to utilize. The ideal site is the farmland immediately west of Terrebonne. This also minimize forcemain construction costs and pumping costs.

Site acquisition can be a slow and complicated process. Funding agencies generally have specific requirements that must be met. Typical requirements include appraisals and owner notification of rights. Generally, a funding agency will not allow the District to acquire land at higher than its appraised value. This limits the District in its ability to negotiate for an otherwise more desirable site.

6.2.2 Opinion of Probable Cost

An opinion of probable cost for the proposed facultative lagoon and effluent disposal system is presented in Table 6.1. Total project cost (including contingencies, engineering, legal, administration, and land acquisition) in Table 6.1 is \$2,666,245.

Table 6.1

Proposed Facultative Lagoon and Effluent Disposal
Preliminary Opinion of Probable Cost

Description	Quantity	Unit	Unit Cost (\$)	Extension (\$)
Mobilization	1	LS	\$75,000	\$75,000
Dike construction	77,500	CY	\$5	\$387,500
HDPE Liner (60 mil), Mat, and Anchors	670,000	SF	\$0.80	\$536,000
Inlet Structure	1	EA	\$20,000	\$20,000
Outlet Structure	1	EA	\$20,000	\$20,000
Transfer Structures	2	EA	\$35,000	\$70,000
Transfer Piping	1	LS	\$60,000	\$60,000
Staff Gauges	3	EA	\$1,300	\$3,900
¾" -0 Road Surface Course (6")	850	CY	\$17	\$14,450
Building (office, lab, restroom, pumps, chlorine room)	1,200	SF	\$120	\$144,000
	1	LS	\$50,000	\$50,000
Chlorine Equip.	2	EA	\$15,000	\$30,000
Pumps	1	EA	\$20,000	\$20,000
Effluent (fine screen) Filter	2	EA	\$8,000	\$16,000
Flowmeters	1	LS	\$25,000	\$25,000
Misc. Site Piping and Plumbing	1	LS	\$30,000	\$30,000
Controls and Electrical	1	LS	\$30,000	\$30,000
Alarm Telemetry	1	LS	\$10,000	\$10,000
Lab Equipment	1	LS	\$5,000	\$5,000
Office Equipment	1	LS	\$75,000	\$75,000
Chlorine Contact Line	1	LS	\$100,000	\$100,000
Irrigation Equip. and Piping	1	LS	\$20,000	\$20,000
Supplemental Water Well	2,000	LF	\$20	\$40,000
Electrical to Site (allowance)	300	CY	\$21	\$6,300
Access Road and Parking (gravel allowance)	1	LS	\$6,000	\$6,000
Seeding (outside dike slopes)	4,000	LF	\$6	\$24,000
Fencing	12	EA	\$200	\$2,400
Signs	4	EA	\$2,500	\$10,000
Monitoring Wells				
Construction Subtotal				\$1,830,550
Construction Contingencies				\$183,055
Engineering and Construction Observation				\$366,110
Legal and Administrative				\$91,530
Hydrogeologic Characterization and Effluent Reuse Plan				\$30,000
WPCF Permit Application				\$5,000
Land Acquisition	80	AC	\$2,000	\$160,000
TOTAL				\$2,666,245

6.3 O&M REQUIREMENTS

Some of the operation and maintenance associated with a wastewater treatment system include:

- a) energy costs
- b) treatment facility
- c) laboratory analysis
- d) permit fees
- e) maintenance
 - daily inspection
 - general upkeep and maintenance
 - cleaning as needed
 - emergency repairs
 - painting
- f) education and operator certification
- g) administration
- h) equipment replacement/depreciation fund

The proposed facultative lagoon will not require substantial attention. Effluent irrigation will require extra labor; however, this is commonly contracted out to a farmer for all, or share, in the harvested crop. The estimated annual O&M costs are presented in Section 7 for both the facultative lagoon option and the connection to Redmond WWTP option.

Table 6.10 Proposed Facultative Lagoon and Effluent Disposal
Preliminary Opinion of Probable Cost

Description	Quantity	Unit	Unit Cost (\$)	Extension (\$)
Mobilization	1	LS	\$75,000	\$75,000
Dike construction	77,500	CY	\$5	\$387,500
HDPE Liner (60 mil), Mat, and Anchors	670,000	SF	\$0.80	\$536,000
Inlet Structure	1	EA	\$20,000	\$20,000
Outlet Structure	1	EA	\$20,000	\$20,000
Transfer Structures	2	EA	\$35,000	\$70,000
Transfer Piping	1	LS	\$60,000	\$60,000
Staff Gauges	3	EA	\$1,300	\$3,900
¾"-0 Road Surface Course (6")	850	CY	\$17	\$14,450
Building (office, lab, restroom, pumps, chlorine room)	1,200	SF	\$120	\$144,000
Chlorine Equip.	1	LS	\$50,000	\$50,000
Pumps	2	EA	\$15,000	\$30,000
Effluent (fine screen) Filter	1	EA	\$20,000	\$20,000
Flowmeters	2	EA	\$8,000	\$16,000
Misc. Site Piping and Plumbing	1	LS	\$25,000	\$25,000
Controls and Electrical	1	LS	\$30,000	\$30,000
Alarm Telemetry	1	LS	\$30,000	\$30,000
Lab Equipment	1	LS	\$10,000	\$10,000
Office Equipment	1	LS	\$5,000	\$5,000
Chlorine Contact Line	1	LS	\$75,000	\$75,000
Irrigation Equip. and Piping	1	LS	\$100,000	\$100,000
Supplemental Water Well	1	LS	\$20,000	\$20,000
Electrical to Site (allowance)	2,000	LF	\$20	\$40,000
Access Road and Parking (gravel allowance)	300	CY	\$21	\$6,300
Seeding (outside dike slopes)	1	LS	\$6,000	\$6,000
Fencing	4,000	LF	\$6	\$24,000
Signs	12	EA	\$200	\$2,400
Monitoring Wells	4	EA	\$2,500	\$10,000
Construction Subtotal				\$1,830,550
Construction Contingencies				\$183,055
Engineering and construction Observation				\$366,110
Legal and Administrative				\$91,530
Hydrogeologic characterization and Effluent Reuse Plan				\$30,000
WPCF Permit Application				\$5,000
Land Acquisition	80	AC	\$2,000	\$160,000
TOTAL				\$2,666,245

SECTION 7
FEASIBILITY ANALYSIS

SECTION 7 FEASIBILITY ANALYSIS

7.1 OPERATION, MAINTENANCE, AND REPLACEMENT (O,M,&R) COST SUMMARY

O,M,&R costs for both the facultative lagoon options and the connection to Redmond WWTP options are summarized in Table 7.1. Replacement cost computations are included in Appendix 7.1. O,M,&R costs are for Terrebonne only and do not include monthly service fees required by Redmond that, in part, pay for O,M,&R at the Redmond WWTP.

Table 7.1 O,M,&R Cost Summary

Item	Facultative Lagoon Project Options	Connection to Redmond WWTP Project Options
Payroll Expenses	\$30,000	\$15,000
Office	\$3,000	\$3,000
Insurance	\$3,000	\$3,000
Vehicle Expenses	\$2,000	\$2,000
Education	\$1,000	\$1,000
License and Fees	\$1,000	\$1,000
Materials and Utilities	\$30,000	\$15,000
Replacement	\$37,700	\$5,600
Total	\$107,700	\$45,600

7.2 PROJECT OPTION COST SUMMARY AND COMPARISON

A general project cost comparison for the five project options is presented in Table 7.2. Overall project costs range from approximately \$5,059,000 to \$6,384,000 exclusive of the estimated \$1,508,000 in private property improvements (septic tanks, STEP pumps, building sewers, etc.). Annual costs, including O,M,&R and service fees, are also tabulated and range from approximately \$519,000 to \$594,000. This cost comparison suggests the three options that involve connecting to Redmond as the most economical to construct initially. Note that in this computation there are no allowances for grants. Also, the cost of the lagoon option, if a lagoon is located near Terrebonne, is within the accuracy of this feasibility study, nearly the same as the "Redmond" option.

Table 7.2 Project Option Cost Comparison

Description	Collection System Alternatives ¹				
	#1	#1	#2	#1	#1
	Transmission Alternatives ²				
	1A	1B	1C	2A	2B
	Treatment Description ³				
	Redmond	Redmond	Redmond	Lagoon	Lagoon
Collection and Transmission Total Costs ⁴	\$4,363,800	\$4,384,200	\$4,195,600	\$2,999,100-\$3,717,300	\$2,999,100-\$3,717,300
Treatment Disposal Total Cost	\$405,000	\$405,000	\$405,000	\$2,666,245	\$2,666,245
Redmond Treatment Connection Fee (SDC) (\$1215/EDU for 377 EDUs)	\$458,055	\$458,055	\$458,055	\$0	\$0
Total Project Cost	\$5,226,855	\$5,247,255	\$5,058,655	\$5,665,345-\$6,383,545	\$5,665,345-\$6,383,545
Preliminary Annual Project Debt Service (25 year term, 4.75% interest, 10% reserve) Computation ⁵	\$397,783	\$399,335	\$384,982	\$431,153-\$485,811	\$431,153-\$485,811
Annual O,M,&R	\$45,600	\$45,600	\$45,600	\$107,700	\$107,700
Annual Redmond Service Fee (\$19.60/EDU, 377 EDUs, 12 months)	\$88,670	\$88,670	\$88,670	\$0	\$0
Annual Cost Total	\$532,053	\$533,605	\$519,252	\$538,853-\$593,511	\$538,853-\$593,511

¹See Section 5.4 for description.

²See Section 5.5 for description.

³See Section 6 for description.

⁴Does not include \$1,508,000 in private property improvement (septic tank, STEP pump, etc.). See Section 5.4 for description.

⁵General budget computation - assumes RD loan with no grant funding.

7.3 PROJECT OPTION FUNDING AND RATE ANALYSIS

A project option funding and rate analysis is presented in summary form in Table 7.3. Table 7.3 notes the total project cost from Table 7.2. A minimum sewer rate of \$40 per month per EDU is used and the entire table is based on the current (1999) EDU total of 377. O,M,&R and Redmond Service fee costs are deducted from the \$40 rate. The result is the monthly revenue per EDU available for debt service. Because of the relatively high service fee (\$19.60 per EDU per month) for connecting to Redmond, the "Redmond" options have significantly less rate revenue available for debt service than the lagoon options (\$10.32 per EDU per month versus \$16.19 per EDU per month respectively; however, this is subject to final negotiations with the City of Redmond and could be significantly reduced in cost). This limits the RD loan to \$613,476 for the "Redmond" options versus \$962,420 for the lagoon options. RD matching grants have generally been limited by the amount of debt the community can service. In theory, the "Redmond" options may result in a lower grant award than the lagoon options.

Table 7.3 **Project Option Funding and Rate Analysis**
(Based on 377 EDUs)

Description	Collection System Alternatives ¹				
	#1	#1	#2	#1	#1
	Transmission Alternatives ²				
	1A	1B	1C	2A	2B
	Treatment Description ³				
	Redmond	Redmond	Redmond	Lagoon	Lagoon
Total Project Cost	\$5,226,855	\$5,247,255	\$5,058,655	\$5,665,345- \$6,383,545	\$5,665,345- \$6,383,545
O,M,&R Cost Per EDU per month	\$10.08	\$10.08	\$10.08	\$23.81	\$23.81
Redmond Service Fee per EDU	\$19.60	\$19.60	\$19.60	\$0	\$0
O,M,&R and Redmond Service Fee Total (Per EDU)	\$29.68	\$29.68	\$29.68	\$23.81	\$23.81
Assumed minimum sewer rate (for feasibility analysis) (per EDU)	\$40	\$40	\$40	\$40	\$40
Sewer rate revenue available for debt service (per EDU)	\$10.32	\$10.32	\$10.32	\$16.19	\$16.19
RD loan (based on rate revenue available for debt service, 3.25% interest, 25 yr term, general obligation bond)	\$789,978	\$789,978	\$789,978	\$1,240,365	\$1,240,365
Required grant to fund balance of project cost assuming \$40 sewer rate per EDU per month	\$3,986,490	\$4,006,890	\$3,818,290	\$4,424,980- \$5,143,180	\$4,424,980- \$5,143,180
Required grant as percentage of total project cost	76.3%	76.4%	75.5%	78.1% 80.6%	78.1% 80.6%

Potential grant funding sources include:

- Oregon Community Development Block Grant (OCDBG)
\$750,000 (grant only).
- Rural Development (RD)
Generally 50% maximum grant with matching RD loan.
- Water/Wastewater Program (W/WW) \$500,000 grant with matching loan.
- Special Public Works Fund (SPWF) \$500,000 grant with matching loan.

Assuming the District can qualify for all the above noted programs, there is a potential for \$4,100,000 in grant dollars with a requirement to borrow at least \$1,565,000. Debt service on \$1,565,000 is computed below:

Description	Collection System Alternatives ¹				
	#1	#1	#2	#1	#1
	Transmission Alternatives ²				
	1A	1B	1C	2A	2B
	Treatment Description ³				
	Redmond	Redmond	Redmond	Lagoon	Lagoon
Total Project Cost	\$5,226,855	\$5,247,255	\$5,058,655	\$5,665,345- \$6,383,545	\$5,665,345- \$6,383,545
O,M,&R Cost Per EDU per month	\$10.08	\$10.08	\$10.08	\$23.81	\$23.81
Redmond Service Fee per EDU	\$19.60	\$19.60	\$19.60	\$0	\$0
O,M,&R and Redmond Service Fee Total (Per EDU)	\$29.68	\$29.68	\$29.68	\$23.81	\$23.81
Assumed minimum sewer rate (for feasibility analysis) (per EDU)	\$40	\$40	\$40	\$40	\$40
Sewer rate revenue available for debt service (per EDU)	\$10.32	\$10.32	\$10.32	\$16.19	\$16.19
RD loan (based on rate revenue available for debt service, 3.25% interest, 25 yr term, general obligation bond)	\$789,978	\$789,978	\$789,978	\$1,240,365	\$1,240,365
Required grant to fund balance of project cost assuming \$40 sewer rate per EDU per month	\$3,986,490	\$4,006,890	\$3,818,290	\$4,424,980- \$5,143,180	\$4,424,980- \$5,143,180
Required grant as percentage of total project cost	76.3%	76.4%	75.5%	78.1% 80.6%	78.1% 80.6%

Potential grant funding sources include:

- Oregon Community Development Block Grant (OCDBG)
\$750,000 (grant only).
- Rural Development (RD)
Generally 50% maximum grant with matching RD loan.
- Water/Wastewater Program (W/WW) \$500,000 grant with matching loan.
- Special Public Works Fund (SPWF) \$500,000 grant with matching loan.

Assuming the District can qualify for all the above noted programs, there is a potential for \$4,100,000 in grant dollars with a requirement to borrow at least \$1,565,000. Debt service on \$1,565,000 is computed below:

RD loan (3.25%, 25 yr term):	\$1,565,000
Annual RD payment:	\$92,492
SPWF and W/WW (5.14%, 20 yr term):	\$1,000,000
Annual SPWF, W/WW payment:	\$81,198
Total annual debt service:	\$173,690
EDU'S:	377
Monthly revenue per EDU required for debt service:	\$38.39

The computation shows that Terrebonne would need 96% of the \$ 40 per EDU rate revenue just for debt service, unless Rural Development would increase the level of grants for Terrebonne. However, negotiations with Redmond could develop more favorable SDC rates for existing users and the potential for reduced O, M & R costs as a bulk user. The potential also exists that higher than normal grant opportunities may be available for Terrebonne. We recommend that the District pursue negotiations with Redmond and schedule a "one-stop" meeting to evaluate project feasibility.

DEQ has expressed concern with proposed developments in Terrebonne as well as the continued use of on-site wastewater systems in the area. DEQ's position is that any new developments that manage to get constructed will be required to connect to a public sewer when one is constructed. The new prison in Madras may place considerable development pressure on Terrebonne according to local and County personnel. It may be possible, given the need for housing of prison workers and families (we understand that up to 1700 jobs are associated with the prison), and DEQ's concerns, to provide future capacity in the Terrebonne system to accommodate potential growth. Generally, funding agencies focus on existing EDU's when determining how much debt service the community can bear. Concerns with potential development is that it is unoccupied and therefore not counted in the EDU computation. However, since Redmond SDC's and usage fees would apply to the growth, this could be used as an offset for minimizing initial connection and operational costs.

O, M, & R cost and the "Redmond" service fee cost would be paid by the 377 current EDU's which are actually connected at this time. Table 7.3 shows this figure at \$ 29.68 per EDU per month. To construct a system and realize rates in the \$ 40.00 range, these figures would need to be substantially reduced or additional grant monies would be required. It may also be possible to reduce the initial O, M, & R cost since this is a new system and it could be operated by Terrebonne Water District Staff for initial maintenance and billing requirements. Then, as growth occurs within the District, additional maintenance staff could be retained.

The projected \$ 29.68 O, M, & R estimate assumes that Redmond would apply the standard Redmond service fee (\$19.60) per month to Terrebonne. Such fees are always subject to negotiation. Redmond's \$ 19.60 charge includes O, M, & R as well as debt service on their entire collection and treatment system. Since Terrebonne's connection would be direct to the Redmond WWTP, Terrebonne should not need to pay for costs attributable to the collection and treatment system. These would probably include costs associated with extra personnel, debt service, maintenance and pump station electrical costs. Administrative costs should also be lower since it is anticipated that Terrebonne would be treated by Redmond as a single customer and

Terrebonne would bill its own customers individually.

A grant determination should be available through a "one-stop" meeting, and the ultimate cost for connection to the City of Redmond facility will be dependent on further negotiations with their representatives.

If Redmond negotiations are possible, and if grant monies are available for system installation, funding for this sewer system project is feasible. These hurdles will necessarily be in addition to the proposed debt service fees of an estimated \$ 38 per month.

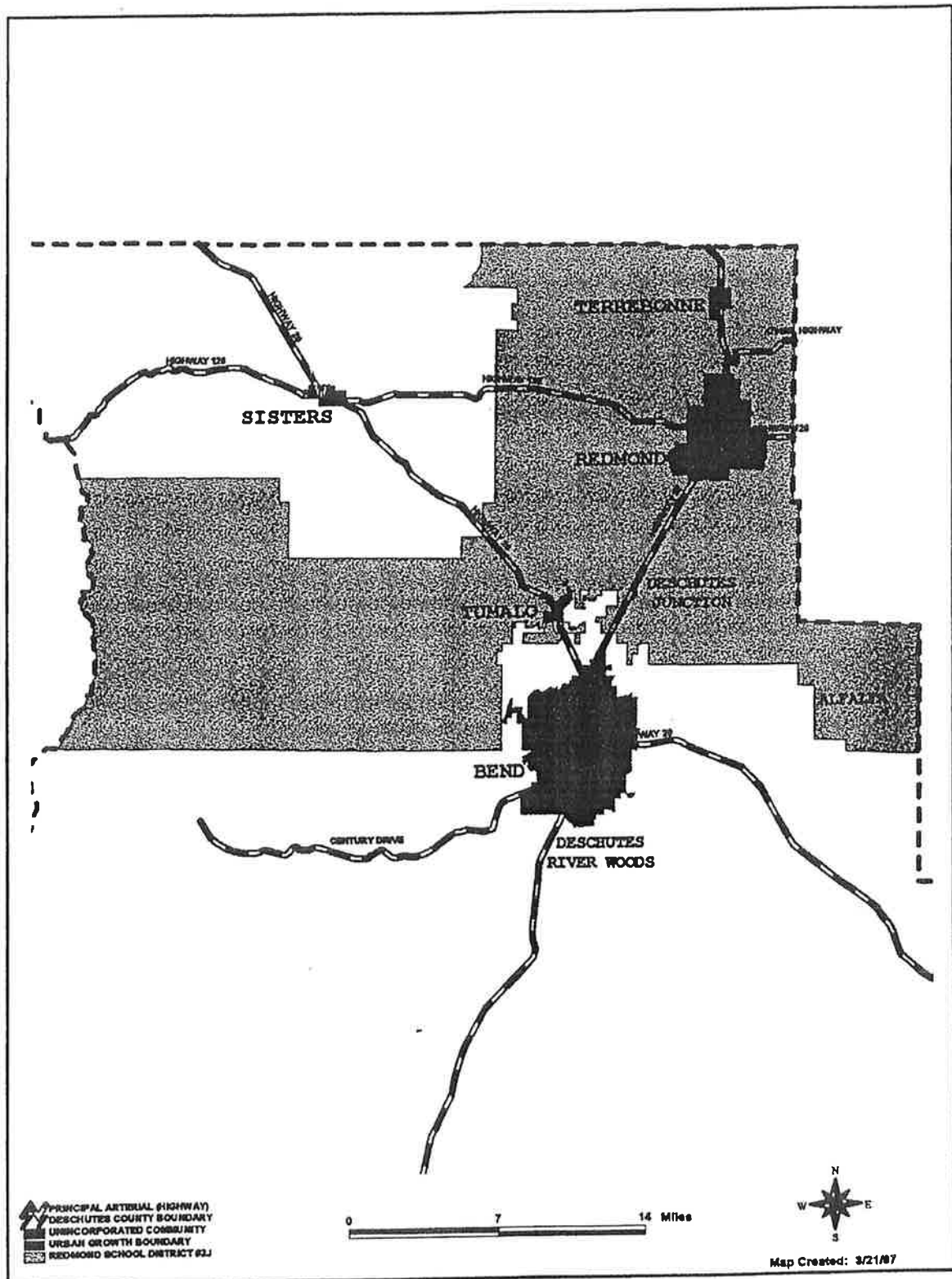
7.4 CONCLUSIONS

Based on the analysis provided in Section 7.3, a wastewater system for Terrebonne may be feasible. The feasibility is rather tenuous as it depends on securing maximum grant participation, and a significantly reduced cost from Redmond to interconnect with their facilities for wastewater treatment and disposal purposes. These hurdles are in addition to securing community support for the proposed system and the needed sewer rates to construct, operate and maintain the system, and the estimated \$ 4,000 per EDU cost for private property improvements (septic tanks, STEP pumps, etc.)

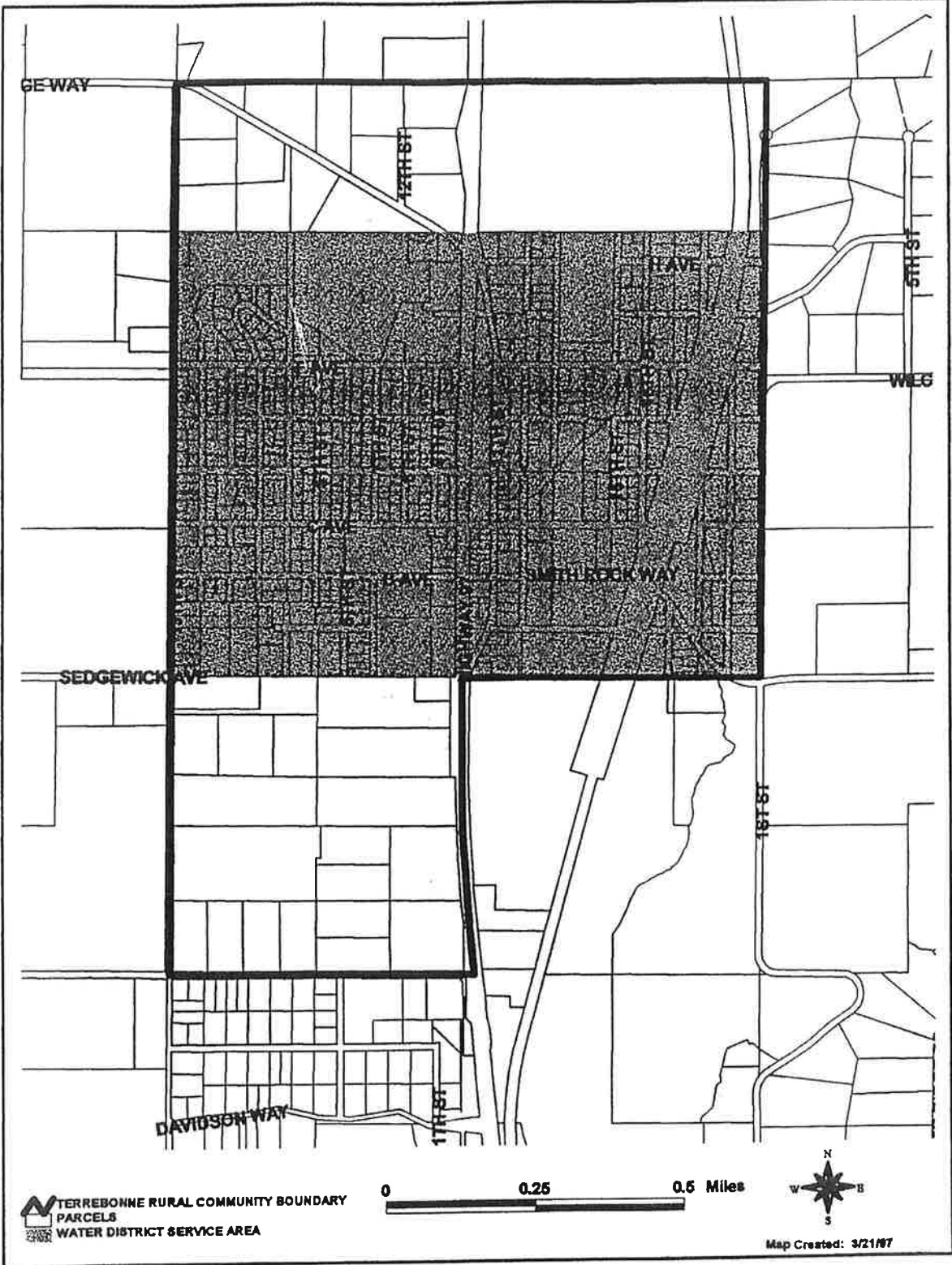
APPENDIX 3.1

**Location Map showing Terrebonne
and other Deschutes County
Communities. (Source: Deschutes County
Ordinance No. 97-001)**
**Terrebonne Domestic Water District
Map. (Source: Deschutes County
Ordinance No. 97-001)**

Map C3: Redmond School District #2J



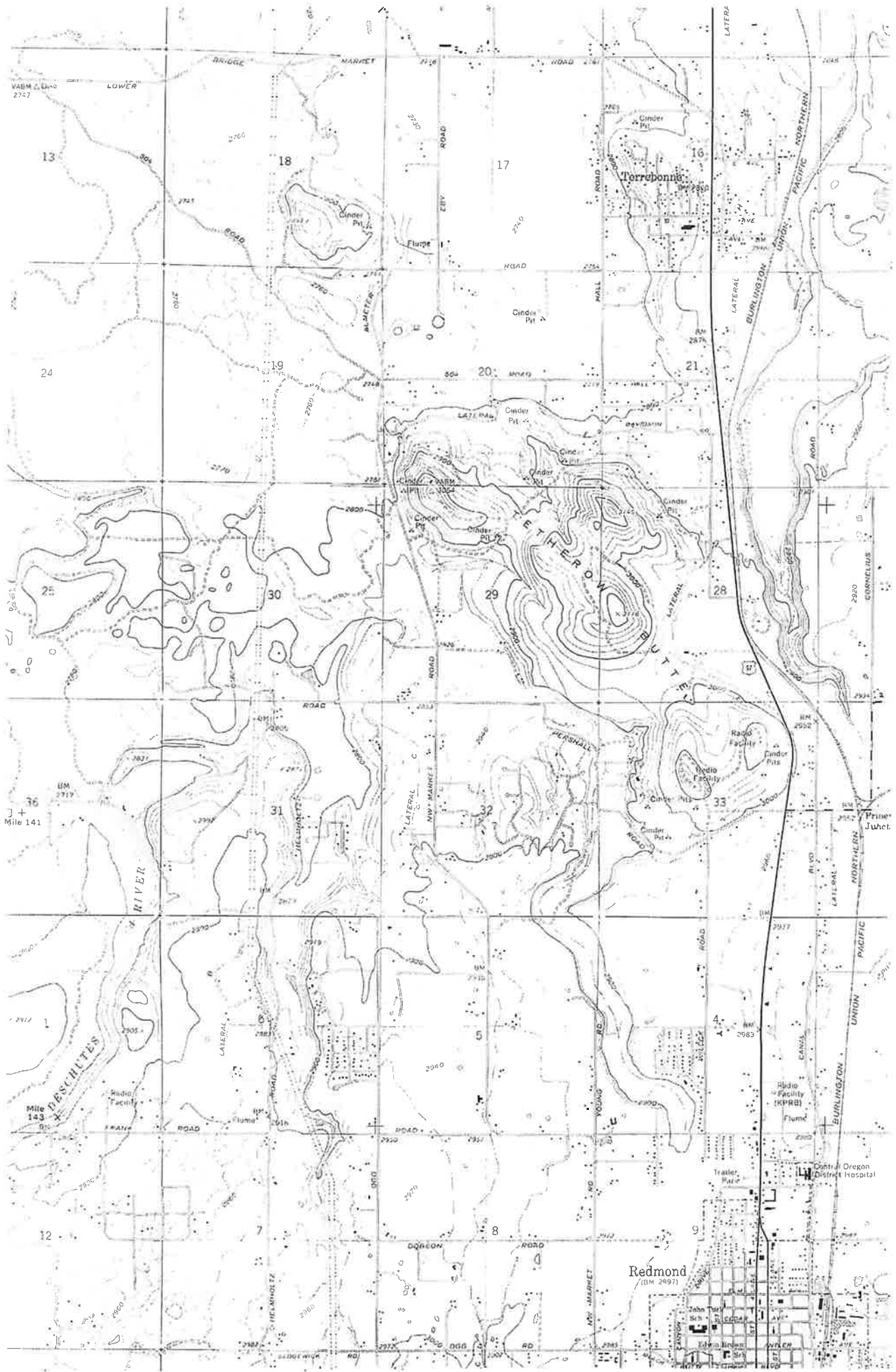
Map C1: Terrebonne Domestic Water District



APPENDIX 3.2

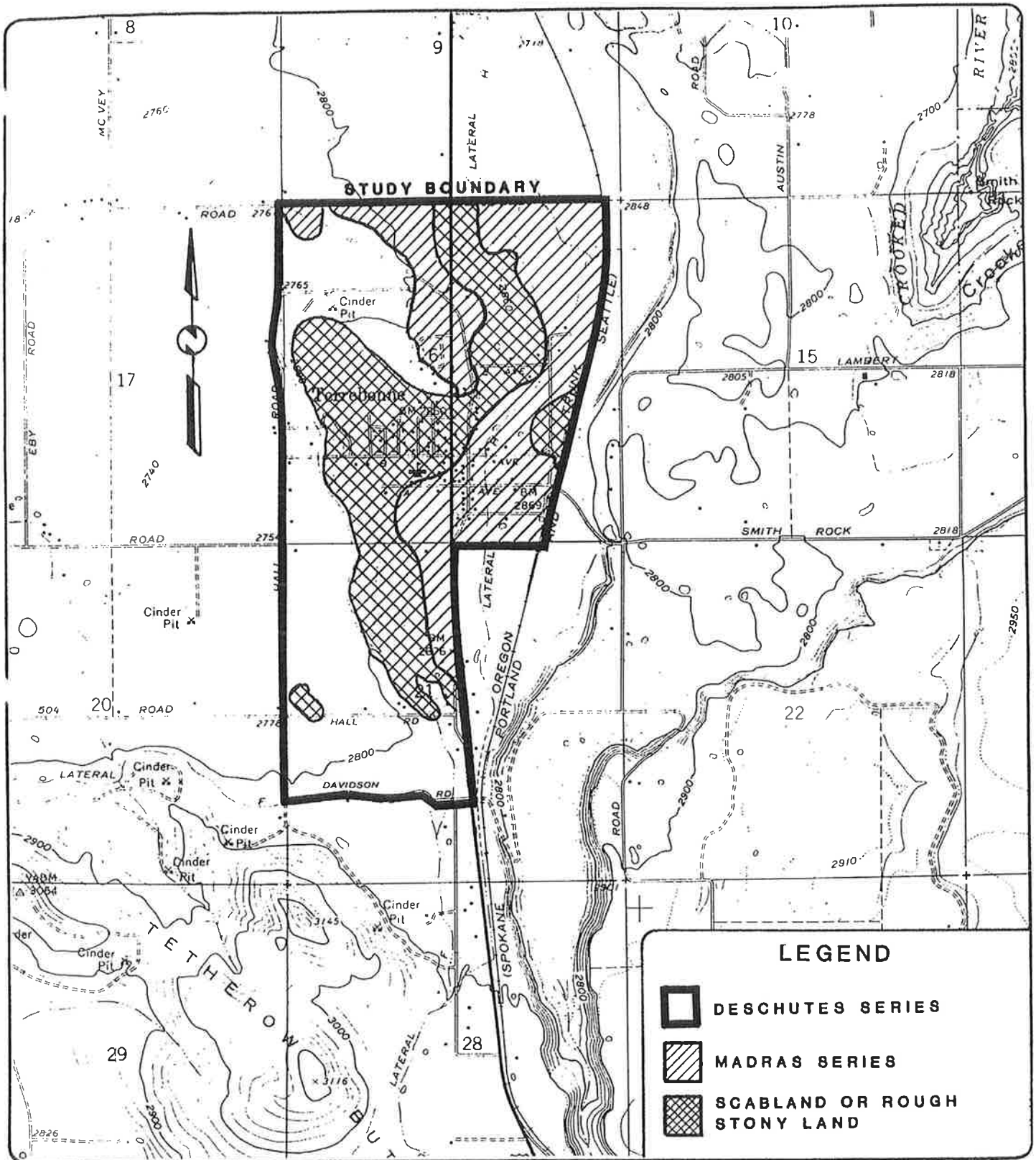


**Portion of USGS Map
(Redmond Quadrangle, 7.5 minute)**



APPENDIX 3.3

**Soil Conservation Service Soil
Type Map and Soil
Descriptions (Source: Century West
Engineering Corporation, *Terbonne
Wastewater Facilities Plan*, August 1982.)**



TERREBONNE
 FACILITIES PLAN
 DESCHUTES COUNTY,
 OREGON

FIGURE 3-11
 SOIL CONSERVATION
 SERVICE
 SOIL TYPE DESIGNATIONS



DATE: 1/73 A-D-G Madras SERIES SOILS:

1. Madras sandy loam, 0 to 3 percent slopes
2. Madras sandy loam, 3 to 7 percent slopes
3. Madras sandy loam, 7 to 12 percent slopes
4. Madras loam, 0 to 3 percent slopes
5. Madras loam, 3 to 7 percent slopes
6. Madras loam, 7 to 12 percent slopes
7. Madras soils, 12 to 40 percent slopes

The Madras series consists of well drained sandy loam or loam over clay loam soils formed in colluvium. These upland soils have 0 to 40 percent slopes. Elevations range from 2000 to 3300 feet. Vegetation includes bluebunch wheatgrass, big sagebrush, gray rabbitbrush and juniper. Average annual precipitation is 9 to 12 inches; mean annual air temperature is 46° to 50° F. The average frost-free period (32° F.) is 50 to 80 days and 28° F. is 100 to 130 days.

Typically, the surface layer is light brownish-gray loam about 11 inches thick. The subsoil is pale brown or brown clay loam about 9 inches thick. Depth to hardpan is 20 to 30 inches and depth to bedrock is 25 to 40 inches.

Permeability is moderately slow. Available water capacity is 3 to 6 inches. Water-supplying capacity is 7 to 9 inches. Effective rooting depth is 20 to 30 inches. Runoff is slow on units 1, 2, 3, 4, 5, 6 and medium on unit 7. The water erosion hazard is slight on units 1, 2, 3, 4, 5, 6 and moderate on unit 7.

Madras soils are used for dryfarm small grains, hay, pasture, irrigated crops, range and wildlife. These soils occur in central Oregon (B6)(B10).

The Madras series is a member of the fine-loamy, mixed mesic family of Xerollic Durargids.

ESTIMATED SOIL PROPERTIES

DEPTH FROM SURFACE (in.)	CLASSIFICATION			COARSE FRACT. OVER 3 IN.	% OF MATERIAL PASSING SIEVE				LIQUID LIMIT	PLASTICITY INDEX	PERMEABILITY (in/hr)	AVAIL. WATER CAP. (in/in)	SOIL REACTION (pH)	SHRINK SWELL POTENTIAL
	USDA TEXTURE	UNIFIED	AASHO		#4	#10	#40	#200						
0-11	sandy loam	SM	A-2,A-4	0	95-100	95-100	55-70	30-40	Nonplastic		2.0-6.0	.11-.13	6.1-7.3	low
0-11	loam	SM,ML	A-4	0	80-100	65-100	55-95	40-75	25-30	0-5	.6-2.0	.13-.18	6.1-7.3	low
11-20	clay loam	SC,CL	A-6	0-20	65-100	55-100	50-100	40-80	25-40	11-15	.2-.6	.14-.19	6.6-8.4	moderate
20-25	hardpan													
25	tuffaceous		sandstone											
DEPTH (in.)	CONDUCTIVITY (mmhos/cm)	CORROSIVITY		EROSION FACTORS		WIND EROD. GROUPS	FLOODING			HIGH WATER TABLE			HYDRO-LOGIC GROUP	
		STEEL	CONCRETE	K	T		FREQUENCY	DURATION	MONTHS	DEPTH (ft.)	KIND	MONTHS		
0-11	.1-.2	low	low	.20	2	3	None	-	-	>6	-	-	C	
0-11	.1-.2	low	low	.20	2	5	CEMENTED PAN	BEDROCK						
11-20	.3-.4	mod.	low	.28	-	-	DEPTH (in.)	HARDNESS	DEPTH (in.)	HARDNESS	FROST ACTION		REMARKS	
							20-30	Rippable	25-40	Rippable	-			
SANITARY FACILITIES AND COMMUNITY DEVELOPMENT							SOURCE MATERIAL AND WATER MANAGEMENT							
USE	SOIL	RATING	RESTRICTIVE FEATURES				USE	SOIL	RATING	RESTRICTIVE FEATURES				
SEPTIC TANK ABSORPTION FIELDS	1,2,3,4,5,6,7	Severe	Cemented pan, percolates slowly Slope, cemented pan				ROADFILL	1,2,3,4,5,6,7	Poor	Area not reclaimable				
SEWAGE LAGOONS	1,2,4,5,3,6,7	Severe	Cemented pan Slope, cemented pan				SAND	1,2,3,4,5,6,7	Unsuited	Excessive fines				
SANITARY LANDFILL (TRENCH)	1,2,3,4,5,6,7	Severe	Cemented pan Slope, cemented pan				GRAVEL	1,2,3,4,5,6,7	Unsuited	Excessive fines				
SANITARY LANDFILL (AREA)	1,2,4,5,3,6,7	Slight Moderate Severe	Slope Slope				TOPSOIL	1,2,3,4,5,6,7	Poor	Area not reclaimable Slope, area not reclaimable				
DAILY COVER FOR LANDFILL	1,2,4,5,3,6,7	Fair Fair Poor	Thin layer Thin layer, slope Slope				POND RESERVOIR AREA	1,2,3,4,5,6,7	Severe	Cemented pan Slope, cemented pan				
SHALLOW EXCAVATIONS	1,2,3,4,5,6,7	Severe	Cemented pan Slope, cemented pan				EMBANKMENTS DIKES AND LEVEES	1,2,3,4,5,6,7	Moderate	Piping, low strength				
DWELLINGS WITHOUT BASEMENTS	1,2,4,5,3,6,7	Moderate Moderate Severe	Cemented pan Slope, cemented pan Slope				DRAINAGE	1,2,3,4,5,6,7	-	Not needed				
DWELLINGS WITH BASEMENTS	1,2,4,5,3,6,7	Severe Severe Severe	Cemented pan Slope, cemented pan Slope				IRRIGATION	1,2,4,5,3,6,7	Fair Fair Poor	Rooting depth Rooting depth, slope Slope				
SMALL COMMERCIAL BUILDINGS	1,4,2,5,3,6,7	Moderate Moderate Severe	Cemented pan Slope, cemented pan Slope				TERRACES AND DIVERSIONS	1,2,3,4,5,6,7	Moderate Severe	Rooting depth, erodes easily Slope				
LOCAL ROADS AND STREETS	1,2,4,5,3,6,7	Moderate Moderate Severe	Shrink-swell, low strength Slope, shrink-swell, low strength Slope				GRASSED WATERWAYS	1,2,3,4,5,6,7	Moderate Severe	Rooting depth Slope				

RECREATION

USE	SOIL	RATING	RESTRICTIVE FEATURES	USE	SOIL	RATING	RESTRICTIVE FEATURES
CAMP AREAS	1,2,4,5	Moderate	Percolates slowly Slope, percolates slowly Slope	PLAYGROUNDS	1,4	Moderate	Cemented pan percolates slowly Slope, percolates slowly Slope
	3,6	Moderate			2,5	Moderate	
	7	Severe			3,6,7	Severe	
PICNIC AREAS	1,2,4,5	Slight	Slope	PATHS AND TRAILS	1,2,3,4, 5,6	Slight	Slope
	3,6	Moderate			7	Moderate	
	7	Severe					

CAPABILITY AND PREDICTED YIELDS - CROPS AND PASTURE (HIGH LEVEL MANAGEMENT)

SOIL	CAPABILITY		Potatoes (Tons)		Alfalfa (Tons)		Pasture (AUM)		Winter Wheat (Bu)						REMARKS
	NIRR	IRR	NIRR	IRR	NIRR	IRR	NIRR	IRR	NIRR	IRR	NIRR	IRR	NIRR	IRR	
1,4	Ive	IIa	-	18	-	4	1	16	20	50					
2,5	Ive	IIIe	-	18	-	4	1	16	20	50					
3,6	Ive	IVe	-	16	-	4	1	16	20	40					
7	VIIa	-	Not applicable												

WOODLAND SUITABILITY

SOIL	POTENTIAL PRODUCTIVITY		WOOD SUIT. GROUP	MANAGEMENT PROBLEMS					NATIVE SPECIES	
	SPECIES	SITE INDEX		EROSION HAZARD	EQUIPMENT LIMIT.	SEEDLING MORTALITY	WINDTHROW HAZARD	PLANT COMPET.		
1,2,3,4,5,6,7	None									

WINDBREAKS

SOILS	SPECIES	HT. AGE 20	PERFORMANCE	SPECIES	HT. AGE 20	PERFORMANCE	SPECIES	HT. AGE 20	PERFORMANCE
1,2,3,4,5,6,7	None								

WILDLIFE HABITAT SUITABILITY

SOIL	POTENTIAL FOR HABITAT ELEMENTS							POTENTIAL AS HABITAT FOR:					
	GRAIN & SEED	GRASS & LEGUME	WILD HERB.	HARDWD TREES	CONIFER PLANTS	SHRUBS	WETLAND PLANTS	SHALLOW WATER	OPENLAND WILDLIFE	WOODLAND WILDLIFE	WETLAND WILDLIFE	RANGELAND WILDLIFE	
1,4 (Irr)	Good	Fair	Fair	Good	Fair	Fair	V.poor	Fair	Good	Good	Poor	-	
2,3,5,6 (Irr)	Good	Fair	Fair	Good	Fair	Fair	V.poor	V.poor	Good	Good	V.poor	-	
1,2,3,4,5,6 (NIrr)	Fair	Fair	Fair	-	Poor	Poor	V.poor	V.poor	Fair	-	V.poor	Fair	
7 (NIrr)	V.poor	V.poor	Fair	-	Poor	Poor	V.poor	V.poor	Poor	-	V.poor	Fair	

RANGELAND

RANGE SITE NAME	SOIL	KEY SPECIES AND % COVER	POTENTIAL YIELDS		NORMAL SEASON		
			TOTAL lb/Ac	USABLE Ac/AUM	GROWING	GRAZING	
Arid Rolling Hills	1,2,3,4,5,6	bluebunch whtg Thurbers ndlg	70	700	2-2.8	3/1 - 6/15	4/1 - 12/1
Droughty South	7	bluebunch whtg Thurbers ndlg	70	700	2-2.5	2/15 - 6/15	3/15 - 12/1

FOOTNOTES

DATE: 1/73 A-D-G DESCHUTES SERIES SOILS:

1. Deschutes sandy loam, 0 to 3 percent slopes
2. Deschutes sandy loam, 3 to 7 percent slopes
3. Deschutes sandy loam, 7 to 12 percent slopes
4. Deschutes sandy loam, 12 to 20 percent slopes

The Deschutes series consist of well drained sandy loam soils formed in mixed loamy materials and volcanic ash. These upland soils have 0 to 20 percent slopes. Elevations range from 2000 to 3800 feet. Vegetation includes bluebunch wheatgrass, sagebrush, rabbitbrush, juniper, and forbs. Average annual precipitation is 8 to 12 inches; average annual air temperature is 47° to 50° F. The average frost-free period (32° F.) is 50 to 80 days and 28° F. is 110 to 140 days.

Typically, the surface layer is light brownish-gray (dry) sandy loam about 3 inches thick. The subsoil is brown (dry) sandy loam about 29 inches thick. Depth to basalt bedrock is 20 to 40 inches.

Permeability is moderately rapid. Available water capacity is 2.5 to 7 inches. Water-supplying capacity is 3 to 6 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow on units 1 and 2 and medium on units 3 and 4. The water erosion hazard is slight on units 1 and 2 and moderate on units 3 and 4. The wind erosion hazard is moderate.

Deschutes soils are used for irrigated crops, range, and wildlife habitat. These soils occur in central Oregon (R6). (Classification: Xerollic Camborthids, coarse-loamy, mixed, mesic family.)

ESTIMATED SOIL PROPERTIES

DEPTH FROM SURFACE (in.)	CLASSIFICATION			COARSE FRACT. OVER 3 IN.	% OF MATERIAL PASSING SIEVE				LIQUID LIMIT	PLAS-TICITY INDEX	PERMEA-BILITY (in/hr)	AVAIL. WATER CAP. (in/in)	SOIL REAC-TION (pH)	SHRINK SWELL POTEN-TIAL
	USDA TEXTURE	UNI-1/ FIED	1/ AASHO		#4	#10	#40	#200						
0-32	sandy loam	SM	A-2, A-4	5-15	75-90	70-95	40-85	20-45	nonplastic		2.0-6.0	.12-.17	6.6-7.3	low
32	basalt bedrock													
DEPTH (in.)	CONDUCTIVITY (mmhos/cm)	CORROSIIVITY		EROSION FACTORS K T	WIND EROD. GROUPS	FLOODING			HIGH WATER TABLE			HYDRO-LOGIC GROUP		
		STEEL	CONCRETE			FREQUENCY	DURATION	MONTHS	DEPTH (ft.)	KIND	MONTHS			
0-32	.4 - .5	high	low	.17 2	3	none	-	-	> 6	-	-	-	C	
						CEMENTED PAN	BEDROCK		FROST ACTION		REMARKS			
						DEPTH (in.)	HARDNESS	DEPTH (in.)	HARDNESS					
						-	-	20-40	hard	moderate				
SANITARY FACILITIES AND COMMUNITY DEVELOPMENT						SOURCE MATERIAL AND WATER MANAGEMENT								
USE	SOIL	RATING	RESTRICTIVE FEATURES			USE	SOIL	RATING	RESTRICTIVE FEATURES					
SEPTIC TANK ABSORPTION FIELDS	1,2,3 4	Severe Severe	Depth to rock Slope, depth to rock			ROADFILL	1,2,3,4	Poor	Borrow area damage					
SEWAGE LAGOONS	1,2 3,4	Severe Severe	Depth to rock, seepage Slope, depth to rock, seepage			SAND	1,2,3,4	Poor	Excessive fines					
SANITARY LANDFILL (TRENCH)	1,2,3,4	Severe	Depth to rock, seepage			GRAVEL	1,2,3,4	Unsuited	Excessive fines					
SANITARY LANDFILL (AREA)	1,2,3 4	Severe Severe	Seepage Seepage, slope			TOPSOIL	1,2 3 4	Good Fair Poor	Slope Slope					
DAILY COVER FOR LANDFILL	1,2 3 4	Fair Fair Poor	Depth to rock Depth to rock, slope Slope			POND RESERVOIR AREA	1,2,3 4	Severe Severe	Seepage Seepage, slope					
SHALLOW EXCAVATIONS	1,2,3 4	Severe Severe	Depth to rock Depth to rock, slope			EMBANKMENTS DIKES AND LEVEES	1,2,3,4	Moderate	Piping, low strength					
DWELLINGS WITHOUT BASEMENTS	1,2 3 4	Moderate Moderate Severe	Depth to rock Depth to rock, slope Slope			DRAINAGE	1,2,3,4	-	Not needed					
DWELLINGS WITH BASEMENTS	1,2,3 4	Severe Severe	Depth to rock Depth to rock, slope			IRRIGATION	1,2,3 4	Fair Poor	Rooting depth Slope					
SMALL COMMERCIAL BUILDINGS	1 2 3,4	Moderate Moderate Severe	Depth to rock Depth to rock, slope Slope			TERRACES AND DIVERSIONS	1,2,3,4	-	Not needed					
LOCAL ROADS AND STREETS	1,2 3 4	Moderate Moderate Severe	Depth, low strength Depth to rock, slope, low strength Slope			GRASSED WATERWAYS	1,2,3,4	-	Not needed					

RECREATION

USE	SOIL	RATING	RESTRICTIVE FEATURES	USE	SOIL	RATING	RESTRICTIVE FEATURES
CAMP AREAS	1,2	Slight	-	PLAYGROUNDS	1	Moderate	Depth to rock
	3	Moderate	Slope		2	Moderate	Depth to rock, slope
	4	Severe	Slope		3,4	Severe	Slope
PICNIC AREAS	1,2	Slight	-	PATHS AND TRAILS	1,2,3	Slight	-
	3	Moderate	Slope		4	Moderate	Slope
	4	Severe	Slope				

CAPABILITY AND PREDICTED YIELDS - CROPS AND PASTURE (HIGH LEVEL MANAGEMENT)

SOIL	CAPABILITY		Potatoes (Tons)		Alfalfa Hay (Tons)		Pasture (AUM)		Wheat (Bu)						REMARKS
	NIRR	IRR	NIRR	IRR	NIRR	IRR	NIRR	IRR	NIRR	IRR	NIRR	IRR	NIRR	IRR	
1	VIe	IIe	-	17	-	5	-	15	-	90					
2	VIe	IIIe	-	17	-	5	-	15	-	90					
3	VIe	IVe	-	15	-	5	-	15	-	80					
4	VIe	IVe	-	15	-	5	-	15	-	80					

WOODLAND SUITABILITY

SOIL	POTENTIAL PRODUCTIVITY		WOOD SUIT. GROUP	MANAGEMENT PROBLEMS					NATIVE SPECIES	
	SPECIES	SITE INDEX		EROSION HAZARD	EQUIPMENT LIMIT.	SEEDLING MORTALITY	WINDTHROW HAZARD	PLANT COMPET.		
1,2,3,4	None									

WINDBREAKS

SOILS	SPECIES	HT. AGE 20	PERFORMANCE	SPECIES	HT. AGE 20	PERFORMANCE	SPECIES	HT. AGE 20	PERFORMANCE
1,2,3,4	None								

WILDLIFE HABITAT SUITABILITY

SOIL	POTENTIAL FOR HABITAT ELEMENTS							POTENTIAL AS HABITAT FOR:					
	GRAIN & SEED	GRASS & LEGUME	WILD HERB.	HARDWD TREES	CONIFER PLANTS	SHRUBS	WETLAND PLANTS	SHALLOW WATER	OPENLAND WILDLIFE	WOODLAND WILDLIFE	WETLAND WILDLIFE	RANGELAND WILDLIFE	
(IRR) 1,2	Fair	Good	Fair	Poor	Fair	Fair	V.poor	V.poor	Fair	Fair	V.poor	-	
3,4	Fair	Fair	Fair	Poor	Fair	Fair	V.poor	V.poor	Fair	Fair	V.poor	-	
(DRYLAND) 1,2,3,4	Poor	Fair	Fair	-	Fair	Fair	V.poor	V.poor	Poor	Fair	V.poor	Fair	

RANGELAND

RANGE SITE NAME	SOIL	KEY SPECIES AND % COVER	POTENTIAL YIELDS		NORMAL SEASON	
			TOTAL lb/Ac	USABLE Ac/AUM	GROWING	GRAZING
Juniper Sand Hills	1,2,3,4	Idaho fescue bluebunch whtg needlegrasses		5-7	3/15 - 6/15	4/15 - 12/1

FOOTNOTES

1/ Based on engineering test data in Soil Survey Prineville Area, Oregon issued February 1966.

APPENDIX 3.4



Recent Biological Assessment for Selected areas in Terrebonne

**BIOLOGICAL
ASSESSMENT FOR
WATER SYSTEM
IMPROVEMENTS
FOR
TERREBONE, OREGON**

17 FEBRUARY, 1997

**J. MARK PERKINS
&
JOSHUA R. PETERSON
2217 E. EMERSON AVENUE
SALT LAKE CITY, UT 84108
1-801-588-7909
E-MAIL=batsrus1@sisna.com**

At the request of HGE Inc. and Doug McLaughlin, of the Terrebone, OR Water District we conducted a biological assessment of the proposed water system improvements. The project consists of the siting of a proposed storage and pump station and two priority levels in distribution improvements (please see attached map). US Fish and Wildlife provided a list of flora and fauna of concern in regards to habitat or presence on the proposed project site (Table 1).

On the 7 February, we surveyed the proposed project for habitat or presence of any species in Table 1. We divided the project into two portions: the pipeline and the reservoir site. We discuss both of them below.

PIPELINE: the pipeline route is situated along roadside for all but one 600' portion. The roadsides to be excavated are paved, graveled or packed dirt. This area contained no habitat for any of the species in Table 1. The 600' portion of the pipeline which is not located in the shoulder crosses under farm land that is dominated by agricultural grasses.

RESERVOIR SITE: The lot proposed for the reservoir and pump station had paved road on two sides (W,S), a fire station lot on one side (N), and school property (E). The east edge of the site borders school property that is highly disturbed. Past dumping of large rocks has obliterated any native habitat in that area. The rest of the lot was dominated by young (<8" dbh, <10' tall) junipers (*Juniperus occidentalis*) and at least three species of exotic grasses (one of which was cheat grass).

There is no standing water to attract drinking or foraging bats, Black terns, caddisflies, trout, or Oregon spotted frogs. The open areas do not contain roosts for the larger avian raptors (Peregrine falcon, Bald eagle and Feruginous hawk). In addition, the urbanization of the area precludes use by Western burrowing owls and Feruginous hawks. Critical habitat components for Pygmy rabbits and Northern sagebrush lizards are absent on the reservoir site (sagebrush, rabbit brush, and other Steppe ecosystem native plants).

It is our opinion that the proposed water system improvements will have little or no effect on any listed and candidate species, or species of concern.

Table 1. Federally listed and proposed endangered and threatened species and species of concern in the vicinity of Terrebone, OR, water system improvement project.

COMMON NAMES	SCIENTIFIC NAMES
LISTED SPECIES	
<u>Birds</u>	
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Peregrine Falcon	<i>Falco peregrinus</i>
CANDIDATE SPECIES	
<u>Amphibians and Reptiles</u>	
Oregon Spotted Frog	<i>Rana pretiosa</i>
SPECIES OF CONCERN	
<u>Plants</u>	
Estes' artemisia	<i>Artemisia ludoviciana estesii</i>
Peck's milk-vetch	<i>Astrolagus peckii</i>
<u>Invertebrates</u>	
Deschutes ochrotrichian micro-caddisfly	<i>Orchrotrichia phenosa</i>
<u>Fish</u>	
Interior redband trout	<i>Oncorhynchus mykiss gibbsi</i>
<u>Amphibians and Reptiles</u>	
Northern sagebrush lizard	<i>Sceloporus graciosus graciosus</i>
<u>Birds</u>	
Western burrowing owl	<i>Athene cunicularia hypugea</i>
Feruginous hawk	<i>Buteo regalis</i>
Black tern	<i>Chidonias niger</i>
<u>Mammals</u>	
Pygmy Rabbit	<i>Brachylagus idahoensis</i>
Small-footed myotis	<i>Myotis ciliolabrum</i>
Long-eared myotis	<i>M. evotis</i>
Long-legged myotis	<i>M. volans</i>
Yuma myotis	<i>M. yumanensis</i>
Western big-eared bat	<i>Corynorhinus townsendii townsendii</i>
	<i>C. townsendii pallescens</i>

APPENDIX 3.5



Public Health Concerns



Community Development Department

117 NW Lafayette Avenue • Bend, Oregon • 97701-1925

(541) 388-6575

FAX 385-1764

Planning Division

Building Safety Division

Environmental Health Division

August 24, 1999

HGE, Inc.
ATTN: Bill Pavlick
375 Park Ave
Coos Bay OR 97420

Dear Mr. Pavlick:

Subject: Terrebonne Community Sewer

Dear Mr. Pavlick,

The City of Terrebonne is facing a dilemma to which all growing communities in Oregon using on-site sewage disposal must eventually find a solution. Terrebonne is using a technology (on-site sewage disposal) developed for rural density lots in an urban density lot setting.

A septic system, with proper maintenance, can be expected to adequately function for approximately 20 years where average household wastewater flows are generated. When it does fail, it must be repaired. The effectiveness of the repair is severely diminished when lot area is limited. Most of the developed lots in Terrebonne do not have a backup area in reserve to install an adequate septic repair.

On smaller lots people cannot build on their property, modify their existing homes or expand their businesses because of a lack of room to install a to code minimum standard septic system. We have also required installation of costly sand filters for repairs and for new development where lots were too small for conventional gravity systems.

In addition to the smaller lot sizes, Terrebonne has some geologic conditions that limit septic installation and affect the functioning of existing septic systems. Shallow soil to bedrock limits absorption of effluent and allows premature failure of the system. Volcanic activity has created large pockets of rapid draining cinder material, the underlying volcanic bedrock has cracks, crevices and voids that may allow sewage effluent to contaminate the groundwater.

In the past, a common method of disposing of sewage effluent in Central Oregon was the waste disposal well. Sewage from the dwelling comes out to a septic tank and then is plumbed to a waste disposal well. These wells were installed by well drillers into the bedrock

(some up to 300') to a crack, crevice or void that would take the effluent. This affords no treatment and is a very definite contamination risk to the groundwater. There are many older dwellings in Terrebonne using this method.

Enclosed are the statistics you requested on recent septic activity in Terrebonne. In the last 10 years 105 systems have been installed in Terrebonne, 48 of which were repairs. The rate of repair compared to alteration and new system installation in Terrebonne is 47%. This is over twice the repair rate compared to the rest of Deschutes County.

Many of these lots have chronic conditions that create repeat septic failures. The periodic presence of untreated sewage on the ground surface from failing drainfields is a health hazard and the residents should not tolerate this. Health hazards cannot be ignored or tolerated by the Environmental Health Division. Deschutes County does an excellent job of identifying and forcing repair of these failing systems. Nonetheless, this approach to sewage treatment and repair can only be considered a short-term solution. A community sewer system is the only sound, long-term solution.

If we can be of any further assistance, feel free to contact our office.

Sincerely
ENVIRONMENTAL HEALTH DIVISION

A handwritten signature in black ink, appearing to read "Roger W. Everett", with a stylized flourish at the end.

Roger W. Everett, Director

RWC:bgt

Enclosure

APPENDIX 3.6

**Existing Land Use
Information (Source: Deschutes
County Ordinance No. 97-001,
Exhibit "B")**

Exhibit "B"

B. Land Use Planning

1. Existing Land Uses

The predominant land use in Terrebonne is single-family residences, including a manufactured home park with 26 single-family units. Commercial land uses include supermarkets, a gas station, trucking companies, farm equipment sales and service, restaurants, a hardware store, a veterinarian and various other small-scale retail businesses located along Highway 97. There is a grange hall, a post office and an elementary school. There are also several churches. A significant recent development in Terrebonne is a large new supermarket.

Land bordering Terrebonne is zoned Exclusive Farm Use Terrebonne Subzone (EFU-TR), Multiple Use Agriculture (MUA-10 acre minimum lot size), and Rural Residential (RR-10 acre minimum lot size). The Deschutes County Comprehensive Plan designates EFU land for agriculture uses and MUA-10 and RR-10 land for rural residential uses. The EFU land around Terrebonne is employed in a range of small- to large-scale irrigated agricultural uses, while the MUA-10 and RR-10 land is parcelized and developed with rural residences and small-scale agricultural uses.

According to a county land use inventory conducted in 1994, the estimated maximum number of potential new lots in Terrebonne was 1,233, based on the availability of community water service. A land use inventory compiled in 1997 using the County Assessor's data base is shown in Table B1 below.

Table B1: Land Use Inventory - Terrebonne Rural Community

Assessors Property Class	Total Tax Lots	Developed Tax Lots	Vacant Tax Lots
Miscellaneous	19	0	19
Commercial	43	35	8
Tracts	445	319	126
Farm	16	8	8
Exempt	28	12	16
Total Tax Lots	551	374	177

Zoning District	Total Tax Lots	Developed Tax Lots	Vacant Tax Lots
TeC	50	41	9
TeCR	18	11	7
TeR	445	290	155
TeRS	38	32	6
Total Tax Lots	551	374	177

Source: Deschutes County Assessors Database, January 24, 1997 & Deschutes County PW GIS Parcel Basemap, November 15, 1996

Exhibit "B"

2. Comprehensive Plan Designations

The Deschutes County Comprehensive Plan for the Terrebonne Rural Community has the following five comprehensive plan designations (See Map B1 and Table B2 and B3 on the next two pages):

- 1) Residential. The land designated Residential on the Terrebonne comprehensive plan map includes the highest density area of Terrebonne, corresponding with the boundary of the old Hillman Plat. It is intended to accommodate higher density residential uses, served by community water.
- 2) Residential 5 Acre Minimum. The land designated Residential-5 Acre Minimum includes the larger parcels of land in Terrebonne located to the north and south of the Hillman Plat. The Residential-5 Acre Minimum designation is intended to maintain the rural character of the community by retaining large lots where community water is not available.
- 3) Commercial. The Commercial plan designation was created to accommodate existing non-conforming commercial uses on the east side of Highway 97 and to in-fill between commercial uses on both sides of 11th Street. The Commercial designation is intended to encourage development of a pedestrian-friendly commercial center on both sides of 11th Street and to discourage highway strip-commercial development.
- 4) Commercial Expansion Area. The Commercial Expansion Area designates the only area for future expansion of the Commercial plan designation and Commercial zoning district. The Commercial Expansion Area is intended for future expansion of the Terrebonne commercial center with a connected road network and good pedestrian access, directed away from the highway to discourage highway strip-commercial development.
- 5) Commercial - Rural. The Commercial-Rural plan designation was created to accommodate existing non-conforming, small-scale, low-impact truck and heavy equipment uses, not generally compatible with a pedestrian friendly commercial center. The businesses listed below in Table B3 were not required to go through a conditional use permit process or site plan review when the Commercial-Rural zone was applied to the properties. The business owners provided some specific information about the operating characteristics of each businesses on a questionnaire, recorded in county File No. TA-96-13 and in the county address file for each primary property. Applying the Commercial-Rural zone to these properties did not validate them as legal uses. The new zone gives the existing uses an opportunity that did not exist before to apply for and receive site plan and conditional use permit approval for a listed use. If these uses change or expand, they will be subject to site plan review, conditional use permit requirements and to the provisions of Title 18, chapter 18.66 of the Deschutes County Code.

Map B2: Terrebonne Rural Community Comprehensive Plan Map

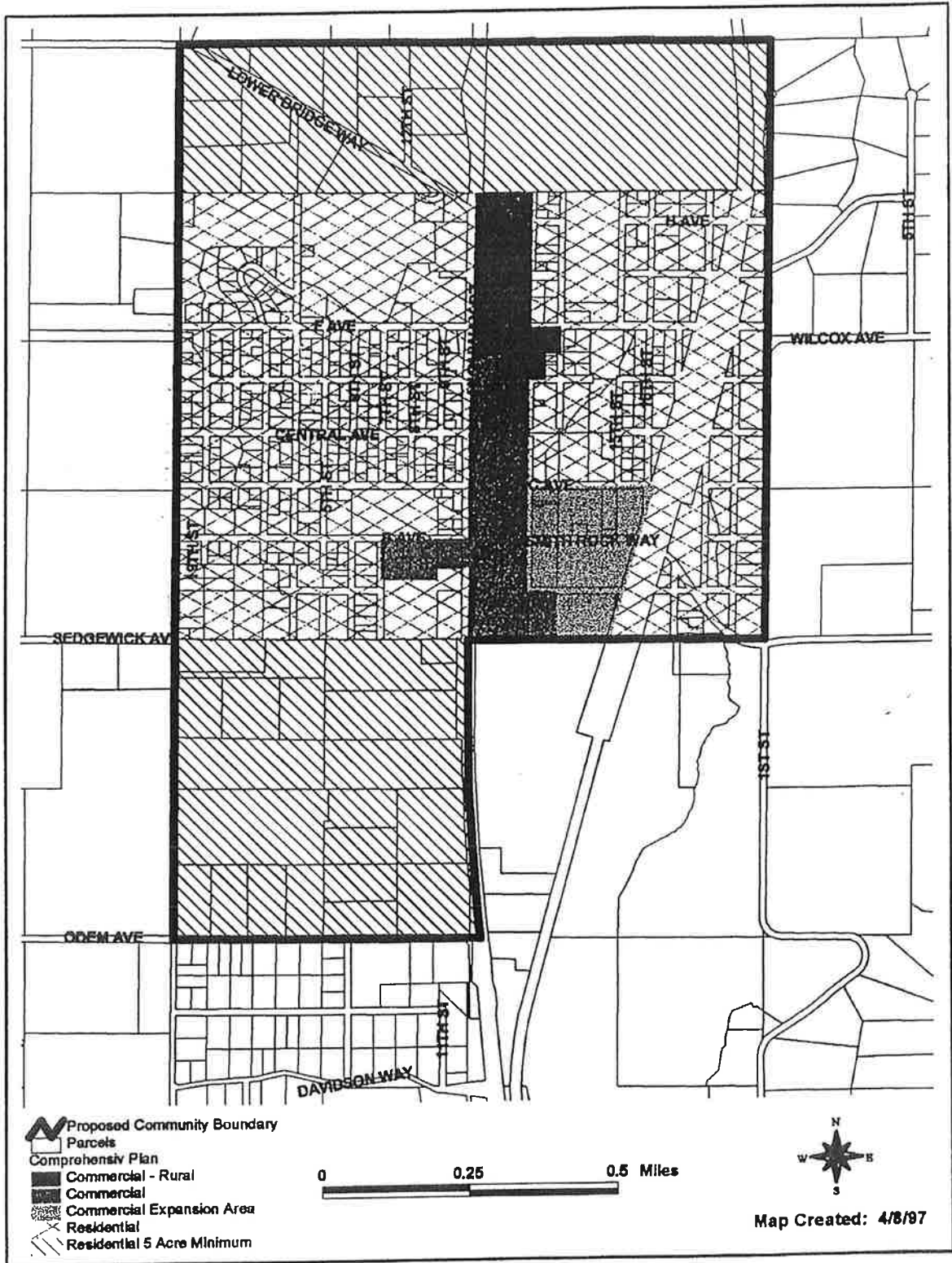


Exhibit "B"

Table B2: Terrebonne Comprehensive Plan Designations and Zoning Districts

Comprehensive Plan Designations	Corresponding Zoning Districts
Residential	Residential (TeR) District
Residential - 5 Acre Minimum	Residential-5 Acre Minimum (TeR5) District
Commercial	Commercial (TeC) District
Commercial Expansion Area	Residential (TeR) District
Commercial - Rural	Commercial-Rural (TeCR) District

Table B3: December 1996 - Businesses in the Commercial - Rural District

Company Name	Tax Map	Primary Property
C.B. Foss Trucking, Inc.	14-13-16AC 400 14-13-16DB 300	8805 11th Street Terrebonne OR
Central Oregon Truck Co.	14-13-16AC 500 14-13-16AC 502 14-13-16AC 202	8888 11th Street Terrebonne OR
Deschutes Valley Equipment	14-13-16DB 113 14-13-16DB 114	710 F Avenue Terrebonne OR
Riemenschneider R.L. Enterprises	14-13-16DB 100 14-13-16DB 106	736 F Avenue Terrebonne OR

Exhibit "B"

3. Land Use Policies

a. General Land Use Policies

- 1) Land use regulations shall conform to the requirements of OAR Chapter 660, Division 22 or its successor.
- 2) County plans and land use regulations shall ensure that new uses authorized within the Terrebonne Rural Community do not adversely affect agricultural uses in the surrounding Exclusive Farm Use (EFU) ones. Zoning regulations shall require any new structure on land contiguous to EFU-zoned land which is receiving special assessment for farm use to be set back 100 feet from the common property line.
- 3) All zoning districts in the Terrebonne community shall allow residential uses.
- 4) The county shall encourage the preservation of historical structures in the Terrebonne Rural Community, such as the Ladies Pioneer Club (1911), the Grange Hall (1925) and the Oregon Trunk Railroad Depot (1911).

b. Residential Area Policies

- 1) Areas designated residential on the comprehensive plan map shall be designated a corresponding residential district on the zoning map.
- 2) The county shall plan and zone for a diversity of housing types and densities suited to the capacity of the land to accommodate water and sewer facilities.
- 3) The land designated Residential-5 Acre Minimum is intended to maintain the rural character of the community by retaining large lots where community water and sewer are not available.
- 4) Lands designated Residential -5 Acre Minimum shall not be redesignated and rezoned to accommodate higher densities until public water is provided.
- 5) Livestock shall be permitted in both residential districts subject to use limitations.

c. Commercial Area Policies

- 1) Allow small-scale, low-impact commercial and industrial uses in conformance with the requirements of OAR Chapter 660, Division 22, and larger commercial uses, if such uses are intended to serve the community and the surrounding rural area or the travel needs of people passing through the area.
- 2) The commercial district shall limit the size of all industrial buildings and the type of industrial uses to assure that the industrial uses are small-scale, low-impact and do not dominate the character of the commercial district.
- 3) Design standards in the commercial districts should encourage new development that is compatible with the rural character of the community.
- 4) Where there is a choice to use a road other than Highway 97 for access, access shall not be taken from Highway 97.

Exhibit "B"

- 5) Approval standards for conditional uses in the Commercial-Rural District shall take into account the impact of proposed uses on the nearby residential and commercial uses and on the capacity of the transportation and other public facilities and services to serve the proposed use.
- 6) The land designated Commercial-Rural shall not be considered for expansion into the surrounding land designated Residential or Commercial, except at next periodic review.
- 7) Stand-alone residential uses or residences in conjunction with uses listed in the commercial districts shall be allowed, but they are not intended to predominate or set the development standards for other uses in the area.
- 8) Land divisions or replatting for residential purposes shall not be allowed in the commercial districts.
- 9) Livestock shall not be permitted in the commercial districts.

c) Commercial Expansion Area Policies:

- 1) The Commercial or Commercial Rural plan designations shall not expand on the west side of Highway 97.
- 2) The area designated Commercial shall only expand to the designated Commercial Expansion Area on the Terrebonne comprehensive plan map (See Map B1). No expansion of the Commercial Expansion Area shall be considered until next periodic review.
- 3) Rezoning the Commercial Expansion Area from Residential District to Commercial District shall be allowed only if no land currently zoned Commercial District can reasonably accommodate the proposed use.
- 4) Rezoning the Commercial Expansion Area from Residential District to Commercial District may be done without a Plan Amendment and shall be allowed only if the Terrebonne Domestic Water District facilities provide, or will provide, adequate water quantity and pressure for commercial or domestic use to serve the area being rezoned; and the road rights of way serving the area being rezoned have been, or will be, improved to applicable county right of way standards for the Terrebonne Rural Community. An applicant for a zone change must be able to demonstrate that:
 - Road right of way improvements and public water facilities to the property are in place or will be in place when the development occurs; or
 - Road right of way improvements and public water facilities to the property are under construction when a permit is issued; or
 - Road right of way improvements and public water facilities to the property have been included in a local government or special district budget.

These standards shall apply in place of the county standards for rezoning contained in Title 18, section 18.36.020 of the Deschutes County Code.

APPENDIX 6.1

Lagoon Water Balance Computations

Water Balance for Facultative Lagoon Treatment, Holding, and Irrigation (1999 Conditions)

Crop: alfalfa
 Crop Irrig. Req.: 17.28 in. per season
 Irrigated Acres: 12.80
 @75% efficiency

Mo.	Init. Vol. (Ac-ft)	Init. Depth (ft.)	Influent Flow (gpd)	Monthly Influent Flow (Ac-ft)	Rainfall (in.)	Rainfall (Ac-ft)	Evap. (in.)	Evap. (Ac-ft)	Irrigation Required (in.)	Irrigation Discharge (Ac-ft)*	Final Volume (Ac-ft)	Final Depth (ft.)
Oct.	21.8	2.00	65000	6.2	0.63	0.8	3.29	3.0	0.00	0.0	25.7	2.3
Nov.	25.7	2.34	65000	6.0	1.32	1.6	1.80	1.7	0.00	0.0	31.6	2.8
Dec.	31.6	2.84	65000	6.2	1.40	1.7	0.00	0.0	0.00	0.0	39.5	3.5
Jan.	39.5	3.50	65000	6.2	1.39	1.7	0.00	0.0	0.00	0.0	47.4	4.2
Feb.	47.4	4.17	65000	5.6	0.89	1.1	0.00	0.0	0.00	0.0	54.1	4.7
Mar.	54.1	4.74	65000	6.2	0.76	0.9	0.00	0.0	0.00	0.0	61.2	5.3
Apr.	61.2	5.34	65000	6.0	0.63	0.8	5.26	5.4	1.85	2.6	59.9	5.2
May	59.9	5.23	65000	6.2	0.94	1.1	7.25	7.4	3.58	5.1	54.7	4.8
June	54.7	4.79	65000	6.0	0.92	1.1	8.70	8.8	4.37	6.2	46.8	4.1
July	46.8	4.12	65000	6.2	0.29	0.4	10.17	10.1	6.26	8.9	34.4	3.1
Aug.	34.4	3.07	65000	6.2	0.46	0.6	9.06	8.6	5.00	7.1	25.4	2.3
Sept.	25.4	2.31	65000	6.0	0.48	0.6	6.15	5.7	3.31	4.7	21.5	2.0
Total				72.8	10.11	12.4	51.68	50.8	24.37	34.7		

* Irrigation discharge to meet water requirements 5 years out of 10 years.

Water Balance for Facultative Lagoon Treatment, Holding, and Irrigation (1999 Conditions)

Crop: pasture
 Crop Irrig. Req.: 27.44 in. per season
 Irrigated Acres: 11.20
 @75% efficiency

Mo.	Init. Vol. (Ac-ft)	Init. Depth (ft.)	Influent Flow (gpd)	Monthly Influent Flow (Ac-ft)	Rainfall (in.)	Rainfall (Ac-ft)	Evap. (in.)	Evap. (Ac-ft)	Irrigation Required (in.)	Irrigation Discharge (Ac-ft)*	Final Volume (Ac-ft)	Final Depth (ft.)
Oct.	21.8	2.00	65000	6.2	0.63	0.8	3.29	3.0	1.54	1.9	23.8	2.8
Nov.	23.8	2.79	65000	6.0	1.32	1.6	1.80	1.7	0.00	0.0	29.7	2.7
Dec.	29.7	2.67	65000	6.2	1.40	1.7	0.00	0.0	0.00	0.0	37.6	3.3
Jan.	37.6	3.34	65000	6.2	1.39	1.7	0.00	0.0	0.00	0.0	45.5	4.0
Feb.	45.5	4.01	65000	5.6	0.89	1.1	0.00	0.0	0.00	0.0	52.2	4.6
Mar.	52.2	4.57	65000	6.2	0.76	0.9	0.00	0.0	0.00	0.0	59.3	5.2
Apr.	59.3	5.17	65000	6.0	0.63	0.8	5.26	5.4	1.81	2.3	58.4	5.1
May	58.4	5.10	65000	6.2	0.94	1.1	7.25	7.4	3.86	4.8	53.5	4.7
June	53.5	4.68	65000	6.0	0.92	1.1	8.70	8.8	4.72	5.9	46.0	4.0
July	46.0	4.05	65000	6.2	0.29	0.4	10.17	10.0	6.65	8.3	34.2	3.1
Aug.	34.2	3.05	65000	6.2	0.46	0.6	9.06	8.6	5.28	6.6	25.7	2.3
Sept.	25.7	2.33	65000	6.0	0.48	0.6	6.15	5.7	3.58	4.5	22.1	2.0
Total				72.8	10.11	12.4	51.68	50.7	27.44	34.1		

* Irrigation discharge to meet water requirements 5 years out of 10 years.

Water Balance for Facultative Lagoon Treatment, Holding, and Irrigation (2024 Conditions)

Crop: alfalfa
 Crop Irrig. Req.: 17.28 in. per season
 Irrigated Acres: 35.00
 @75% efficiency

Mo.	Init. Vol. (Ac-ft)	Init. Depth (ft.)	Influent Flow (gpd)	Monthly Influent Flow (Ac-ft)	Rainfall (in.)	Rainfall (Ac-ft)	Evap. (in.)	Evap. (Ac-ft)	Irrigation Required (in.)	Irrigation Discharge (Ac-ft)*	Final Volume (Ac-ft)	Final Depth (ft.)
Oct.	21.8	2.00	121000	11.5	0.63	0.8	3.29	3.0	0.00	0.0	31.1	2.8
Nov.	31.1	2.79	121000	11.1	1.32	1.6	1.80	1.7	0.00	0.0	42.1	3.7
Dec.	42.1	3.72	121000	11.5	1.40	1.7	0.00	0.0	0.00	0.0	55.3	4.8
Jan.	55.3	4.84	121000	11.5	1.39	1.7	0.00	0.0	0.00	0.0	68.5	6.0
Feb.	68.5	5.96	121000	10.4	0.89	1.1	0.00	0.0	0.00	0.0	80.0	6.9
Mar.	80.0	6.93	121000	11.5	0.76	0.9	0.00	0.0	0.00	0.0	92.5	8.0
Apr.	92.5	7.98	121000	11.1	0.63	0.8	5.26	5.9	1.85	7.2	91.3	7.9
May	91.3	7.88	121000	11.5	0.94	1.1	7.25	8.1	3.58	13.9	81.9	7.1
June	81.9	7.09	121000	11.1	0.92	1.1	8.70	9.5	4.37	17.0	67.7	5.9
July	67.7	5.89	121000	11.5	0.29	0.4	10.17	10.7	6.26	24.3	44.6	3.9
Aug.	44.6	3.93	121000	11.5	0.46	0.6	9.06	8.9	5.00	19.4	28.3	2.6
Sept.	28.3	2.55	121000	11.1	0.48	0.6	6.15	5.8	3.31	12.9	21.4	2.0
Total				135.5	10.11	12.4	51.68	53.5	24.37	94.8		

* Irrigation discharge to meet water requirements 5 years out of 10 years.

Water Balance for Facultative Lagoon Treatment, Holding, and Irrigation (2024 Conditions)

Crop: pasture grass
 Crop Irrig. Req.: 27.44 in. per season
 Irrigated Acres: 31.00
 @75% efficiency

Mo.	Init. Vol. (Ac-ft)	Init. Depth (ft.)	Influent Flow (gpd)	Influent Flow (Ac-ft)	Monthly			Evap. (Ac-ft)	Irrigation Required (in.)	Irrigation Discharge (Ac-ft)*	Final Volume (Ac-ft)	Final Depth (ft.)
					Rainfall (in.)	Rainfall (Ac-ft)	Evap. (in.)					
Oct.	21.8	2.00	121000	11.5	0.63	0.8	3.29	3.0	1.54	5.3	25.7	2.3
Nov.	25.7	2.34	121000	11.1	1.32	1.6	1.80	1.7	0.00	0.0	36.8	3.3
Dec.	36.8	3.27	121000	11.5	1.40	1.7	0.00	0.0	0.00	0.0	50.0	4.4
Jan.	50.0	4.39	121000	11.5	1.39	1.7	0.00	0.0	0.00	0.0	63.3	5.5
Feb.	63.3	5.51	121000	10.4	0.89	1.1	0.00	0.0	0.00	0.0	74.7	6.5
Mar.	74.7	6.48	121000	11.5	0.76	0.9	0.00	0.0	0.00	0.0	87.2	7.5
Apr.	87.2	7.53	121000	11.1	0.63	0.8	5.26	5.8	1.81	6.2	87.1	7.5
May	87.1	7.52	121000	11.5	0.94	1.1	7.25	8.0	3.86	13.3	78.4	6.8
June	78.4	6.79	121000	11.1	0.92	1.1	8.70	9.4	4.72	16.3	65.0	5.7
July	65.0	5.66	121000	11.5	0.29	0.4	10.17	10.6	6.65	22.9	43.4	3.8
Aug.	43.4	3.83	121000	11.5	0.46	0.6	9.06	8.9	5.28	18.2	28.4	2.6
Sept.	28.4	2.56	121000	11.1	0.48	0.6	6.15	5.8	3.58	12.3	22.0	2.0
Total				135.5	10.11	12.4	51.68	53.1	27.44	94.5		

* Irrigation discharge to meet water requirements 5 years out of 10 years.

APPENDIX 7.1



Replacement Cost Computations

TERREBONNE WASTEWATER PROJECT

Project no. 9942

August 30, 1999

Replacement Costs and Revenue Requirements

Item	Replacement Cost (1999 dollars)			
	5th year	10th year	15th year	20th year
<i>Collection System Pump Stations</i>				
Pumps		\$40,000		\$40,000
Controls		\$15,000		\$15,000
Misc.		\$15,000		\$15,000
<i>Treatment, Holding, and Effluent Disposal</i>				
Screening	\$5,000	\$5,000	\$5,000	\$5,000
Flowmeters				\$16,000
HDPE liner				\$536,000
Pumps		\$30,000		\$30,000
Building		\$10,000		\$30,000
Chlorine equipment		\$20,000		\$50,000
Lab equipment		\$2,000		\$10,000
Controls and telemetry				\$60,000
Irrigation equipment				\$100,000
Misc.	\$10,000	\$10,000	\$10,000	\$50,000
Total Revenue Required	\$15,000	\$147,000	\$15,000	\$957,000
Total Revenue Required per Replacement Cycle				
5 year cycle	\$15,000	\$15,000	\$15,000	\$15,000
10 year cycle		\$132,000		\$132,000
20 year cycle				\$810,000
Total	\$15,000	\$147,000	\$15,000	\$957,000

Annual Replacement Revenue Required per Cycle (@5% accrued interest)

5 year cycle	\$2,715
10 year cycle	\$10,495
20 year cycle	\$24,496
Total Annual Replacement Revenue Required	\$37,706

Total Monthly Rate Increase (per EDU) Required (based on 377 EDUs) to Fund Each Replacement Cycle

5 year cycle	\$0.60
10 year cycle	\$2.32
20 year cycle	\$5.41
Total Monthly Rate Increase Required to Fully Fund Replacement Cost	\$8.33

TERREBONNE WASTEWATER PROJECT

Project no. 9942

August 30, 1999

Replacement Costs and Revenue Requirements

Item	Replacement Cost (1999 dollars)			
	5th year	10th year	15th year	20th year
<i>Collection System Pump Stations</i>				
Pumps		\$40,000		\$40,000
Controls		\$15,000		\$15,000
Misc.		\$15,000		\$15,000
<i>Treatment at Redmond WWTP</i>				
Assume replacement costs included in monthly fees paid to Redmond.				
Total Revenue Required	\$0	\$70,000	\$0	\$70,000
Total Revenue Required per Replacement Cycle				
5 year cycle	\$0	\$0	\$0	\$0
10 year cycle		\$70,000		\$70,000
20 year cycle				\$0
Total	\$0	\$70,000	\$0	\$70,000

**Annual Replacement Revenue Required per
Cycle (@5% accrued interest)**

5 year cycle	\$0
10 year cycle	\$5,565
20 year cycle	\$0
Total Annual Replacement Revenue Required	\$5,565

**Total Monthly Rate Increase (per EDU)
Required (based on 377 EDUs) to
Fund Each Replacement Cycle**

5 year cycle	\$0.00
10 year cycle	\$1.23
20 year cycle	\$0.00
Total Monthly Rate Increase Required to Fully Fund Replacement Cost	\$1.23

REVIEWED

LEGAL COUNSEL

For Recording Stamp Only

**DESCHUTES COUNTY SERVICES CONTRACT
CONTRACT NO. 20__ -**

This Contract is between DESCHUTES COUNTY, a political subdivision of the State of Oregon, acting by and through the _____ Department (County) and _____ (Contractor). The parties agree as follows:

Effective Date and Termination Date. The effective date of this Contract shall be _____ or the date on which each party has signed this Contract, whichever is later. Unless extended or terminated earlier in accordance with its terms, this Contract shall terminate when County accepts Contractor's completed performance, or on _____, _____, whichever date occurs last. Contract termination shall not extinguish or prejudice County's right to enforce this Contract with respect to any default by Contractor that has not been cured.

Statement of Work. Contractor shall perform the work described in Exhibit 1.

Payment for Work. County agrees to pay Contractor in accordance with Exhibit 1.

Contract Documents. This Contract includes Page 1-9 and Exhibits 1, 2, 3, 4, 5 and 6.

CONTRACTOR DATA AND SIGNATURE

Contractor Address:

Federal Tax ID# or Social Security #: _____

Is Contractor a nonresident alien? Yes No

Business Designation (check one): Sole Proprietorship Partnership
 Corporation-for profit Corporation-non-profit Other, describe

A Federal tax ID number or Social Security number is required to be provided by the Contractor and shall be used for the administration of state, federal and local tax laws. Payment information shall be reported to the Internal Revenue Service under the name and Federal tax ID number or, if none, the Social Security number provided above.

I have read this Contract including the attached Exhibits. I understand this Contract and agree to be bound by its terms. NOTE: Contractor shall also sign Exhibits 3 and 4 and, if applicable, Exhibit 6.

Signature

Title

Name (please print)

Date

DESCHUTES COUNTY SIGNATURE

Contracts with a maximum consideration of not greater than \$25,000 are not valid and not binding on the County until signed by the appropriate Deschutes County Department Head. Additionally, Contracts with a maximum consideration greater than \$25,000 but less than \$150,000 are not valid and not binding on the County until signed by the County Administrator or the Board of County Commissioners.

Dated this _____ of _____, 20__

Dated this _____ of _____, 20__

DESCHUTES COUNTY DIRECTOR OF _____

COUNTY ADMINISTRATOR

(Insert name)

STANDARD TERMS AND CONDITIONS

1. **Time is of the Essence.** Contractor agrees that time is of the essence in the performance of this Contract.
2. **Compensation.** Payment for all work performed under this Contract shall be made in the amounts and manner set forth in Exhibit 1.
 - a. Payments shall be made to Contractor following County's review and approval of billings and deliverables submitted by Contractor.
 - b. All Contractor billings are subject to the maximum compensation amount of this contract.
 - c. Contractor shall not submit billings for, and County shall not pay, any amount in excess of the maximum compensation amount of this Contract, including any reimbursable expenses, (See Exhibit 5).
 - 1) If the maximum compensation amount is increased by amendment to this Contract, the amendment shall be signed by both parties and fully executed before Contractor performs work subject to the amendment.
 - 2) No payment shall be made for any services performed before the beginning date or after the expiration date of this contract.
 - d. Unless otherwise specifically provided in Exhibit 5, Contractor shall submit monthly invoices for work performed. The invoices shall describe all work performed with particularity and by whom it was performed and shall itemize and explain all expenses for which reimbursement is claimed.
 - e. The invoices also shall include the total amount invoiced to date by Contractor prior to the current invoice.
 - g. Prior to approval or payment of any billing, County may require and Contractor shall provide any information which County deems necessary to verify work has been properly performed in accordance with the Contract.
3. **Delegation, Subcontracts and Assignment.** Contractor shall not delegate or subcontract any of the work required by this Contract or assign or transfer any of its interest in this Contract, without the prior written consent of County.
 - a. Any delegation, subcontract, assignment, or transfer without prior written consent of County shall constitute a material breach of this contract.
 - b. Any such assignment or transfer, if approved, is subject to such conditions and provisions as the County may deem necessary.
 - c. No approval by the County of any assignment or transfer of interest shall be deemed to create any obligation of the County to increase rates of payment or maximum Contract consideration.
 - d. Prior written approval shall not be required for the purchase by the Contractor of articles, supplies and services which are incidental to the provision of services under this Contract that are necessary for the performance of the work.
 - e. Any subcontracts that the County may authorize shall contain all requirements of this contract, and unless otherwise specified by the County the Contractor shall be responsible for the performance of the subcontractor.
4. **No Third Party Beneficiaries.**
 - a. County and Contractor are the only parties to this Contract and are the only parties entitled to enforce its terms.
 - b. Nothing in this Contract gives or provides any benefit or right, whether directly, indirectly, or otherwise, to third persons unless such third persons are individually identified by name in this Contract and expressly described as intended beneficiaries of this Contract.
5. **Successors in Interest.** The provisions of this Contract shall be binding upon and inure to the benefit of the parties and their successors and approved assigns, if any.
6. **Early Termination.** This Contract may be terminated as follows:
 - a. Mutual Consent. County and Contractor, by mutual written agreement, may terminate this Contract at any time.
 - b. Party's Convenience. County or Contractor may terminate this Contract for any reason upon 30 calendar days written notice to the other party.
 - c. For Cause. County may also terminate this Contract effective upon delivery of written notice to the Contractor, or at such later date as may be established by the County, under any of the following conditions:

- 1) If funding from state or other sources is not obtained and continued at levels sufficient to allow for the purchase of the indicated quantity of services as required in this Contract.
 - 2) If state laws, regulations or guidelines are modified, changed or interpreted in such a way that the services are no longer allowable or appropriate for purchase under this Contract or are no longer eligible for the funding proposed for payments authorized by this Contract.
 - 3) In the event sufficient funds shall not be appropriated for the payment of consideration required to be paid under this Contract, and if County has no funds legally available for consideration from other sources.
 - 4) If any license or certificate required by law or regulation to be held by the Contractor to provide the services required by this Contract is for any reason denied, revoked, suspended, not renewed or changed in such a way that the Contractor no longer meets requirements for such license or certificate.
- d. Contractor Default or Breach. The County, by written notice to the Contractor, may immediately terminate the whole or any part of this Contract under any of the following conditions:
- 1) If the Contractor fails to provide services called for by this Contract within the time specified or any extension thereof.
 - 2) If the Contractor fails to perform any of the other requirements of this Contract or fails to pursue the work so as to endanger performance of this Contract in accordance with its terms, and after receipt of written notice from the County specifying such failure, the Contractor fails to correct such failure within 10 calendar days or such other period as the County may in writing authorize.
 - 3) Contractor institutes or has instituted against it insolvency, receivership or bankruptcy proceedings, makes an assignment for the benefit of creditors, or ceases doing business on a regular basis.
- e. County Default or Breach.
- 1) Contractor may terminate this Contract in the event of a breach of this Contract by the County. Prior to such termination, the Contractor shall give to the County written notice of the breach and intent to terminate.
 - 2) If the County has not entirely cured the breach within 10 calendar days of the date of the notice, then the Contractor may terminate this Contract at any time thereafter by giving written notice of termination.

7. Payment on Early Termination. Upon termination pursuant to paragraph 6, payment shall be made as follows:

- a. If terminated under subparagraphs 6 a. through c. of this Contract, the County shall pay Contractor for work performed prior to the termination date if such work was performed in accordance with the Contract. Provided however, County shall not pay Contractor for any obligations or liabilities incurred by Contractor after Contractor receives written notice of termination.
- b. If this Contract is terminated under subparagraph 6 d. of this Contract, County obligations shall be limited to payment for services provided in accordance with this Contract prior to the date of termination, less any damages suffered by the County.
- c. If terminated under subparagraph 6 e of this Contract by the Contractor due to a breach by the County, then the County shall pay the Contractor for work performed prior to the termination date if such work was performed in accordance with the Contract. Specifically:
 - 1) with respect to services compensable on an hourly basis and authorized expenses actually incurred, County shall pay the amount due plus any interest within the limits set forth under ORS 293.462, less the amount of any claims County has against Contractor; and
 - 2) with respect to deliverable-based Work, the sum designated for completing the deliverable multiplied by the percentage of Work completed and accepted by County, less previous amounts paid and any claim(s) that County has against Contractor.
 - 3) County's payment to Contractor under this subparagraph 7(c) is subject to the limitations set forth in paragraph 8 of this Contract, below.

8. Remedies. In the event of breach of this Contract the parties shall have the following remedies:

- a. Termination under subparagraphs 6 a. through c. of this Contract shall be without prejudice to any obligations or liabilities of either party already reasonably incurred prior to such termination.
 - 1) Contractor may not incur obligations or liabilities after Contractor receives written notice of termination.
 - 2) Additionally, neither party shall be liable for any indirect, incidental, or consequential damages under this Contract or for any damages of any sort arising solely from the termination of this Contract in accordance with its terms.

- b. If terminated under subparagraph 6 d. of this Contract by the County due to a breach by the Contractor, County may pursue any remedies available at law or in equity.
 - 1) Such remedies may include, but are not limited to, termination of this contract, return of all or a portion of this Contract amount, payment of interest earned on this Contract amount, and declaration of ineligibility for the receipt of future contract awards.
 - 2) Additionally, County may complete the work either by itself, by agreement with another Contractor, or by a combination thereof. If the cost of completing the work exceeds the remaining unpaid balance of the total compensation provided under this Contract, then the Contractor shall be liable to the County for the amount of the reasonable excess.
- c. If amounts previously paid to Contractor exceed the amount due to Contractor under this Contract, Contractor shall repay any excess to County upon demand.
- d. Neither County nor Contractor shall be held responsible for delay or default caused by fire, civil unrest, labor unrest, riot, acts of God, or war where such cause was beyond reasonable control of County or Contractor, respectively; however, Contractor shall make all reasonable efforts to remove or eliminate such a cause of delay or default and shall, upon the cessation of the cause, diligently pursue performance of its obligations under this Contract. For any delay in performance as a result of the events described in this subparagraph, Contractor shall be entitled to additional reasonable time for performance that shall be set forth in an amendment to this Contract.
- e. The passage of this Contract expiration date shall not extinguish or prejudice the County's or Contractor's right to enforce this Contract with respect to any default or defect in performance that has not been cured.
- f. County's remedies are cumulative to the extent the remedies are not inconsistent, and County may pursue any remedy or remedies singly, collectively, successively or in any order whatsoever.

9. Contractor's Tender upon Termination. Upon receiving a notice of termination of this Contract, Contractor shall immediately cease all activities under this Contract unless County expressly directs otherwise in such notice of termination.

- a. Upon termination of this Contract, Contractor shall deliver to County all documents, information, works-in-progress and other property that are or would be deliverables had this Contract been completed.
- b. Upon County's request, Contractor shall surrender to anyone County designates, all documents, research, objects or other tangible things needed to complete the work.

10. Work Standard.

- a. Contractor shall be solely responsible for and shall have control over the means, methods, techniques, sequences and procedures of performing the work, subject to the plans and specifications under this Contract and shall be solely responsible for the errors and omissions of its employees, subcontractors and agents.
- b. For goods and services to be provided under this contract, Contractor agrees to:
 - 1) perform the work in a good, workmanlike, and timely manner using the schedule, materials, plans and specifications approved by County;
 - 2) comply with all applicable legal requirements;
 - 3) comply with all programs, directives, and instructions of County relating to safety, storage of equipment or materials;
 - 4) take all precautions necessary to protect the safety of all persons at or near County or Contractor's facilities, including employees of Contractor, County and any other contractors or subcontractors and to protect the work and all other property against damage.

11. Drugs and Alcohol. Contractor shall adhere to and enforce a zero tolerance policy for the use of alcohol and the unlawful selling, possession or use of controlled substances while performing work under this Contract.

12. Insurance. Contractor shall provide insurance in accordance with Exhibit 2 attached hereto and incorporated by reference herein.

13. Expense Reimbursement. If the consideration under this Contract provides for the reimbursement of Contractor for expenses, in addition to Exhibit 5, Exhibit 1 shall state that Contractor is or is not entitled to reimbursement for such expenses.

- a. County shall only reimburse Contractor for expenses reasonably and necessarily incurred in the performance of this contract.

- b. Expenses reimbursed shall be at the actual cost incurred; including any taxes paid, and shall not include any mark-up unless the mark-up on expenses is specifically agreed to in this Contract.
- c. The cost of any subcontracted work approved in this Contract shall not be marked up.
- d. Contractor shall not bill County for any time expended to complete the documents necessary for reimbursement of expenses or for payment under this contract.
- e. The limitations applicable to reimbursable expenses are set forth in Exhibit "5", attached hereto and by reference incorporated herein.

14. Criminal Background Investigations. Contractor understands that Contractor and Contractor's employees and agents are subject to periodic criminal background investigations by County and, if such investigations disclose criminal activity not disclosed by Contractor, such non-disclosure shall constitute a material breach of this Contract and County may terminate this Contract effective upon delivery of written notice to the Contractor, or at such later date as may be established by the County.

15. Confidentiality. As applicable, Contractor shall maintain confidentiality of information obtained pursuant to this Contract as follows:

- a. Contractor shall not use, release or disclose any information concerning any employee, client, applicant or person doing business with the County for any purpose not directly connected with the administration of County's or the Contractor's responsibilities under this Contract except upon written consent of the County, and if applicable, the employee, client, applicant or person.
- b. The Contractor shall ensure that its agents, employees, officers and subcontractors with access to County and Contractor records understand and comply with this confidentiality provision.
- c. Contractor shall treat all information as to personal facts and circumstances obtained on Medicaid eligible individuals as privileged communication, shall hold such information confidential, and shall not disclose such information without the written consent of the individual, his or her attorney, the responsible parent of a minor child, or the child's guardian, except as required by other terms of this Contract.
- d. Nothing prohibits the disclosure of information in summaries, statistical information, or other form that does not identify particular individuals.
- e. Contractor shall at all times comply with all of the transaction, security and privacy provisions of the Health Insurance Portability and Accountability Act ("HIPAA") and all other state and federal laws and regulations related to the privacy and/or security of personally identifiable health information.
- f. Contractor shall cooperate with County in the adoption of policies and procedures for maintaining the privacy and security of personally identifiable health records and for conducting transactions pursuant to the requirements of HIPAA and other applicable state and federal laws and regulations..
- g. This Contract may be amended in writing in the future to incorporate additional requirements related to compliance with HIPAA or other applicable state or federal laws and/or regulations..

If Contractor receives or transmits protected health information, Contractor shall enter into a Business Associate Agreement with County, which, if attached hereto, shall become a part of this Contract. To the extent any provision of the Business Associate Agreement is inconsistent with a provision of this paragraph 15, the Business Associate Agreement shall govern.

16. Reports. Contractor shall provide County with periodic reports at the frequency and with the information prescribed by County. Further, at any time, County has the right to demand adequate assurances that the services provided by Contractor shall be in accordance with the Contract. Such assurances provided by Contractor shall be supported by documentation in Contractor's possession from third parties.

17. Access to Records. Contractor shall maintain fiscal records and all other records pertinent to this Contract.

- a. All fiscal records shall be maintained pursuant to generally accepted accounting standards, and other records shall be maintained to the extent necessary to clearly reflect actions taken.
 - 1) All records shall be retained and kept accessible for at least three years following the final payment made under this Contract or all pending matters are closed, whichever is later.
 - 2) If an audit, litigation or other action involving this Contract is started before the end of the three year period, the records shall be retained until all issues arising out of the action are resolved or until the end of the three year period, whichever is later.
- b. County and its authorized representatives shall have the right to directly access all of Contractor's books, documents, papers and records related to this Contract for the purpose of conducting audits and examinations and making copies, excerpts and transcripts.

- 1) These records also include licensed software and any records in electronic form, including but not limited to computer hard drives, tape backups and other such storage devices. County shall reimburse Contractor for Contractor's reasonable cost of preparing copies.
- 2) At Contractor's expense, the County, the Secretary of State's Office of the State of Oregon, the Federal Government, and their duly authorized representatives, shall have license to enter upon Contractor's premises to access and inspect the books, documents, papers, computer software, electronic files and any other records of the Contractor which are directly pertinent to this Contract.
- 3) If Contractor's dwelling is Contractor's place of business, Contractor may, at Contractor's expense, make the above records available at a location acceptable to the County.

18. Ownership of Work. All work of Contractor that results from this Contract (the "Work Product") is the exclusive property of County.

- a. County and Contractor intend that such Work Product be deemed "work made for hire" of which County shall be deemed author.
- b. If, for any reason, the Work Product is not deemed "work made for hire," Contractor hereby irrevocably assigns to County all of its right, title, and interest in and to any and all of the Work Product, whether arising from copyright, patent, trademark, trade secret, or any other state or federal intellectual property law or doctrine.
- c. Contractor shall execute such further documents and instruments as County may reasonably request in order to fully vest such rights in County.
- d. Contractor forever waives any and all rights relating to Work Product, including without limitation, any and all rights arising under 17 USC § 106A or any other rights of identification of authorship or rights of approval, restriction or limitation on use or subsequent modifications.
- e. County shall have no rights in any pre-existing work product of Contractor provided to County by Contractor in the performance of this Contract except an irrevocable, non-exclusive, perpetual, royalty-free license to copy, use and re-use any such work product. .
- f. If this Contract is terminated prior to completion, and County is not in default, County, in addition to any other rights provided by this Contract, may require Contractor to transfer and deliver all partially completed work products, reports or documentation that Contractor has specifically developed or specifically acquired for the performance of this Contract.
- g. In the event that Work Product is deemed Contractor's Intellectual Property and not "work made for hire," Contractor hereby grants to County an irrevocable, non-exclusive, perpetual, royalty-free license to use, reproduce, prepare derivative works based upon, distribute copies of, perform and display the Contractor Intellectual Property, and to authorize others to do the same on County's behalf.
- h. In the event that Work Product is Third Party Intellectual Property, Contractor shall secure on the County's behalf and in the name of the County, an irrevocable, non-exclusive, perpetual, royalty-free license to use, reproduce, prepare derivative works based upon, distribute copies of, perform and display the Third Party Intellectual Property, and to authorize others to do the same on County's behalf.

19. County Code Provisions. Except as otherwise specifically provided, the provisions of Deschutes County Code, Section 2.37.150 are incorporated herein by reference. Such code section may be found at the following URL address: <https://weblink.deschutes.org/public/DocView.aspx?id=78735&searchid=818e81ed-6663-4f5b-9782-9b5523b345fc>.. To the extent any provision of DCC 2.37.150 is inconsistent with a provision of this Contract, DCC 2.37.150 shall govern.

20. Partnership. County is not, by virtue of this contract, a partner or joint venturer with Contractor in connection with activities carried out under this contract, and shall have no obligation with respect to Contractor's debts, taxes, or any other liabilities of each and every nature.

21. Indemnity and Hold Harmless.

- a. To the fullest extent authorized by law Contractor shall defend, save, hold harmless and indemnify the County and its current and former officers, departments, employees and agents from and against any and all claims, suits, actions, losses, damages, liabilities costs and expenses of any nature, and by whomever brought, resulting from, arising out of or relating to the activities of Contractor or its current or former officers, employees, contractors, or agents, including without limitation any claim that any work, work product or other tangible or intangible items delivered to County by Contractor may be the subject of protection under any state or federal intellectual property law or doctrine, or that the County's use thereof infringes any patent, copyright, trade secret, trademark, trade dress, mask work utility design or other proprietary right of any third party.

- b. Contractor shall have control of the defense and settlement of any claim that is subject to subparagraph a of this paragraph; however neither Contractor nor any attorney engaged by Contractor shall defend the claim in the name of Deschutes County or any department or agency thereof, nor purport to act as legal representative of the County or any of its departments or agencies without first receiving from the County's Legal Counsel, in a form and manner determined appropriate by the County's Legal Counsel, authority to act as legal counsel for the County, nor shall Contractor settle any claim on behalf of the County without the approval of the County's Legal Counsel.
- c. To the extent permitted by Article XI, Section 10, of the Oregon Constitution and the Oregon Tort Claims Act, ORS 30.260 through 30.300, County shall defend, save, hold harmless and indemnify Contractor and its officers, employees and agents from and against all claims, suits, actions, losses, damages, liabilities costs and expenses of any nature resulting from or arising out of, or relating to the activities of County or its officers, employees or agents under this Contract.

22. Waiver.

- a. County's delay in exercising, or failure to exercise, any right, power, or privilege under this Contract shall not operate as a waiver thereof, nor shall any single or partial exercise of any right, power, or privilege under this Contract preclude any other or further exercise thereof or the exercise of any other such right, power, or privilege.
- b. The remedies provided herein are cumulative and not exclusive of any remedies provided by law.

23. Governing Law. This Contract shall be governed by and construed in accordance with the laws of the State of Oregon without regard to principles of conflicts of law.

- a. Any claim, action, suit or proceeding (collectively, "Claim") between County and Contractor that arises from or relates to this Contract shall be brought and conducted solely and exclusively within the Circuit Court of Deschutes County for the State of Oregon; provided, however, if a Claim shall be brought in federal forum, then it shall be brought and conducted solely and exclusively within the United States District Court for the District of Oregon.
- b. CONTRACTOR, BY EXECUTION OF THIS CONTRACT, HEREBY CONSENTS TO THE IN PERSONAM JURISDICTION OF SAID COURTS. The parties agree that the UN Convention on International Sales of Goods shall not apply.

24. Severability. If any term or provision of this Contract is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if this Contract did not contain the particular term or provision held invalid, unless doing so would materially frustrate the parties' intent in entering into this Contract

25. Counterparts. This Contract may be executed in several counterparts, all of which when taken together shall constitute one agreement binding on all parties, notwithstanding that all parties are not signatories to the same counterpart. Each copy of this Contract so executed shall constitute an original.

26. Notice. Except as otherwise expressly provided in this Contract, any communications between the parties hereto or notices to be given hereunder shall be given in writing, to Contractor or County at the address or number set forth below or to such other addresses or numbers as either party may hereafter indicate in writing. Delivery may be by personal delivery, facsimile, or mailing the same, postage prepaid.

- a. Any communication or notice by personal delivery shall be deemed delivered when actually given to the designated person or representative.
- b. Any communication or notice sent by facsimile shall be deemed delivered when the transmitting machine generates receipt of the transmission. To be effective against County, such facsimile transmission shall be confirmed by telephone notice to the County Administrator.
- c. Any communication or notice mailed shall be deemed delivered five (5) days after mailing. Any notice under this Contract shall be mailed by first class postage or delivered as follows:

To Contractor:

*

Fax No.

To County:

(Insert Name)
 County Administrator
 1300 NW Wall Street, Suite 200
 Bend, Oregon 97701
 Fax No. 541-385-3202

27. Merger Clause. This Contract and the attached exhibits constitute the entire agreement between the parties.

- a. All understandings and agreements between the parties and representations by either party concerning this Contract are contained in this Contract.
- b. No waiver, consent, modification or change in the terms of this Contract shall bind either party unless in writing signed by both parties.
- c. Any written waiver, consent, modification or change shall be effective only in the specific instance and for the specific purpose given.

28. Identity Theft Protection. Contractor and subcontractors shall comply with the Oregon Consumer Identity Theft Protection Act (ORS 646A.600 et seq.).

29. Survival. All rights and obligations shall cease upon termination or expiration of this Contract, except for the rights and obligations set forth in Sections 4, 5, 8, 9, 15, 17, 18, 20-27, 28 and 30.

30. Representations and Warranties.

- a. **Contractor's Representations and Warranties.** Contractor represents and warrants to County that:
 - 1) Contractor has the power and authority to enter into and perform this Contract;
 - 2) This Contract, when executed and delivered, shall be a valid and binding obligation of Contractor enforceable in accordance with its terms;
 - 3) Contractor has the skill and knowledge possessed by well-informed members of its industry, trade or profession and Contractor will apply that skill and knowledge with care and diligence to perform the Work in a professional manner and in accordance with standards prevalent in Contractor's industry, trade or profession in the state of Oregon;
 - 4) Contractor shall, at all times during the term of this Contract, be qualified, professionally competent, and duly licensed to perform the Work;
 - 5) Contractor prepared its proposal related to this Contract, if any, independently from all other proposers, and without collusion, fraud, or other dishonesty; and
 - 6) Contractor's making and performance of this Contract do not and will not violate any provision of any applicable law, rule or regulation or order of any court, regulatory commission, board or other administrative agency.
 - 7) Contractor's making and performance of this Contract do not and will not violate any provision of any other contract, agreement to which Contractor is a party, nor materially impair any legal obligation of Contractor to any person or entity.
- b. **Warranties Cumulative.** The warranties set forth in this paragraph are in addition to, and not in lieu of, any other warranties provided, whether express or implied at law.

31. Amendment.

a. This Contract may be unilaterally modified by County to accommodate a change in available funds, so long as such modification does not impose an unreasonable hardship upon Contractor or reduce Contractor's compensation for work Contractor actually performs or Contractor's authorized expenses actually incurred. With respect to deliverable-based Work, Contractor's compensation shall not be deemed reduced by a modification of this contract, so long as Contractor is paid the sum designated for performing the Work originally contemplated by this Contract multiplied by the percentage of such originally contemplated Work that Contractor performs under the modified Contract.

b. With the exception of subparagraph 31(a), above, this Contract (including any exhibits) may only be amended upon written agreement by both parties, and shall not be effective until both parties have executed such written agreement. Any alleged or claimed amendment that is not performed in compliance with this paragraph 31 shall be void and of no effect.

32. Representation and Covenant.

a. Contractor represents and warrants that Contractor has complied with the tax laws of this state, and where applicable, the laws of Deschutes County, including but not limited to ORS 305.620 and ORS chapters 316, 317 and 318.

b. Contractor covenants to continue to comply with the tax laws of this state, and where applicable, the laws of Deschutes County, during the term of this contract.

c. Contractor acknowledges that failure by Contractor to comply with the tax laws of this state, and where applicable, the laws of Deschutes County, at any time before Contractor has executed the contract or during the term of the contract is and will be deemed a default for which Deschutes County may terminate the contract and seek damages and/or other relief available under the terms of the contract or under applicable law.

EXHIBIT 1
DESCHUTES COUNTY SERVICES CONTRACT
Contract No. 20__ -
STATEMENT OF WORK, COMPENSATION
PAYMENT TERMS and SCHEDULE

1. Contractor shall perform the following work:

- a.
- b.

2. County Services. County shall provide Contractor, at county's expense, with material and services described as follows:

- a.
- b.

3. Consideration.

- a. County shall pay Contractor on a fee-for-service basis at the rate of _____.
- b. Contractor shall be entitled to reimbursement for expenses as set forth in Exhibit 5
 YES NO [Check one]

4. The maximum compensation.

- a. The maximum compensation under this contract, including allowable expenses, is \$_____.
- b. Contractor shall not submit invoices for, and County shall not pay for any amount in excess of the maximum compensation amount set forth above.
 - 1) If this maximum compensation amount is increased by amendment of this contract, the amendment shall be fully effective before contractor performs work subject to the amendment.
 - 2) Contractor shall notify County in writing of the impending expiration of this Contract thirty (30) calendar days prior to the expiration date.

5. Schedule of Performance or Delivery.

- a. County's obligation to pay depends upon Contractor's delivery or performance in accordance with the following schedule:
- b. County will only pay for completed work that conforms to this schedule.

**EXHIBIT 2
 DESCHUTES COUNTY SERVICES CONTRACT
 Contract No. 20__ -
INSURANCE REQUIREMENTS**

Contractor shall at all times maintain in force at Contractor's expense, each insurance noted below. Insurance coverage must apply on a primary or non-contributory basis. All insurance policies, except Professional Liability, shall be written on an occurrence basis and be in effect for the term of this contract. Policies written on a "claims made" basis must be approved and authorized by Deschutes County.

Contractor Name _____

Workers Compensation insurance in compliance with ORS 656.017, requiring Contractor and all subcontractors to provide workers' compensation coverage for all subject workers, or provide certification of exempt status. Worker's Compensation Insurance to cover claims made under Worker's Compensation, disability benefit or any other employee benefit laws, including statutory limits in any state of operation with Coverage B Employer's Liability coverage all at the statutory limits. In the absence of statutory limits the limits of said Employer's Liability coverage shall be not less than \$1,000,000 each accident, disease and each employee. This insurance must be endorsed with a waiver of subrogation endorsement, waiving the insured's right of subrogation against County.

Professional Liability insurance with an occurrence combined single limit of not less than:

Per Occurrence limit	Annual Aggregate limit
<input type="checkbox"/> \$1,000,000	<input type="checkbox"/> \$2,000,000
<input type="checkbox"/> \$2,000,000	<input type="checkbox"/> \$3,000,000
<input type="checkbox"/> \$3,000,000	<input type="checkbox"/> \$5,000,000

Professional Liability insurance covers damages caused by error, omission, or negligent acts related to professional services provided under this Contract. The policy must provide extended reporting period coverage, sometimes referred to as "tail coverage" for claims made within two years after the contract work is completed or the facts underlying County's claim could reasonably have been discovered, whichever is later.

Required by County Not required by County (one box must be checked)

Commercial General Liability insurance with a combined single limit of not less than:

<u>Per Single Claimant and Incident</u>	<u>All Claimants Arising from Single Incident</u>
<input type="checkbox"/> \$1,000,000	<input type="checkbox"/> \$2,000,000
<input type="checkbox"/> \$2,000,000	<input type="checkbox"/> \$3,000,000
<input type="checkbox"/> \$3,000,000	<input type="checkbox"/> \$5,000,000

Commercial General Liability insurance includes coverage for personal injury, bodily injury, advertising injury, property damage, premises, operations, products, completed operations and contractual liability. The insurance coverages provided for herein must be endorsed as primary and non-contributory to any insurance or self insurance of County, its officers, employees or agents. Each such policy obtained by Contractor shall provide that the insurer shall defend any suit against the named insured and the additional insureds, their officers, agents, or employees, even if such suit is frivolous or fraudulent. Such insurance shall provide County with the right, but not the obligation, to engage its own attorney for the purpose of defending any legal action against County, its officers, agents, or employees, and that Contractor shall indemnify County for costs and expenses, including reasonable attorneys' fees, incurred or arising out of the defense of such action.

The policy shall be endorsed to name ***Deschutes County, its officers, agents, employees and volunteers as an additional insured***. The additional insured endorsement shall not include declarations that reduce any per occurrence or aggregate insurance limit. The Contractor shall provide additional coverage based on any outstanding claim(s) made against policy limits to ensure that minimum insurance limits required by the County are maintained. Construction contracts may include aggregate limits that apply on a "per location" or "per project" basis. The additional insurance protection shall extend equal protection to County as to Contractor or subcontractors and shall not be limited to vicarious liability only or any similar limitation. To the extent any aspect

of this Paragraph shall be deemed unenforceable, then the additional insurance protection to County shall be narrowed to the maximum amount of protection allowed by law.

Required by County Not required by County (One box must be checked)

Automobile Liability insurance with a combined single limit of not less than:

Per Occurrence

- \$500,000
- \$1,000,000
- \$2,000,000

Automobile Liability insurance includes coverage for bodily injury and property damage resulting from operation of a motor vehicle. Commercial Automobile Liability Insurance shall provide coverage for *any* motor vehicle (symbol 1 on some insurance certificates) driven by or on behalf of Contractor during the course of providing services under this contract. Commercial Automobile Liability is required for contractors that own business vehicles registered to the business. Examples include: plumbers, electricians or construction contractors. An Example of an acceptable personal automobile policy is a contractor who is a sole proprietor that does not own vehicles registered to the business.

Required by County Not required by County (one box must be checked)

Additional Requirements. Contractor shall pay all deductibles and self-insured retentions. A cross-liability clause or separation of insured's condition must be included in all commercial general liability policies required by this Contract. Contractor's coverage will be primary in the event of loss.

Certificate of Insurance Required. Contractor shall furnish a current Certificate of Insurance to the County with the signed Contract. Contractor shall notify the County in writing at least 30 days in advance of any cancellation, termination, material change, or reduction of limits of the insurance coverage. The Certificate shall also state the deductible or, if applicable, the self-insured retention level. Contractor shall be responsible for any deductible or self-insured retention. If requested, complete copies of insurance policies shall be provided to the County. Any violation by Contractor of this Certificate of Insurance provision shall, at the election of County, constitute a material breach of the Contract.

Risk Management review

Date

EXHIBIT 3
DESCHUTES COUNTY SERVICES CONTRACT
Contract No. 20__ -
CERTIFICATION STATEMENT FOR CORPORATION
OR INDEPENDENT CONTRACTOR

NOTE: Contractor Shall Complete A or B in addition to C below:

A. CONTRACTOR IS A CORPORATION, LIMITED LIABILITY COMPANY OR A PARTNERSHIP.

I certify under penalty of perjury that Contractor is a [check one]:

Corporation Limited Liability Company Partnership authorized to do business in the State of Oregon.

Signature

Title

Date

B. CONTRACTOR IS A SOLE PROPRIETOR WORKING AS AN INDEPENDENT CONTRACTOR.

Contractor certifies under penalty of perjury that the following statements are true:

1. If Contractor performed labor or services as an independent Contractor last year, Contractor filed federal and state income tax returns last year in the name of the business (or filed a Schedule C in the name of the business as part of a personal income tax return), **and**
2. Contractor represents to the public that the labor or services Contractor provides are provided by an independently established business registered with the State of Oregon, **and**
3. All of the statements checked below are true.

NOTE: Check all that apply. You shall check at least three (3) - to establish that you are an Independent Contractor.

___ A. The labor or services I perform are primarily carried out at a location that is separate from my residence or primarily carried out in a specific portion of my residence that is set aside as the location of the business.

___ B. I bear the risk of loss related to the business or provision of services as shown by factors such as: (a) fixed-price agreements; (b) correcting defective work; (c) warranties over the services or (d) indemnification agreements, liability insurance, performance bonds or professional liability insurance.

___ C. I have made significant investment in the business through means such as: (a) purchasing necessary tools or equipment; (b) paying for the premises or facilities where services are provided; or (c) paying for licenses, certificates or specialized training.

___ D. I have the authority to hire other persons to provide or to assist in providing the services and if necessary to fire such persons.

___ E. Each year I perform labor or services for at least two different persons or entities or I routinely engage in business advertising, solicitation or other marketing efforts reasonably calculated to obtain new contracts to provide similar services.

Contractor Signature

Date

C. Representation and Warranties.

Contractor certifies under penalty of perjury that the following statements are true to the best of Contractor's knowledge:

1. Contractor has the power and authority to enter into and perform this contract;
2. This contract, when executed and delivered, shall be a valid and binding obligation of Contractor enforceable in accordance with its terms;
3. The services under this contract shall be performed in a good and workmanlike manner and in accordance with the highest professional standards; and
4. Contractor shall, at all times during the term of this contract, be qualified, professionally competent, and duly licensed to perform the services.
5. To the best of Contractor's knowledge, Contractor is not in violation of any tax laws described in ORS 305.380(4),
6. Contractor understands that Contractor is responsible for any federal or state taxes applicable to any consideration and payments paid to Contractor under this contract; and
7. Contractor has not discriminated against minority, women or small business enterprises in obtaining any required subcontracts.

Contractor Signature

Date

EXHIBIT 4
DESCHUTES COUNTY SERVICES CONTRACT
Contract No. 20__ -
Workers' Compensation Exemption Certificate

(To be used only when Contractor claims to be exempt from Workers' Compensation coverage requirements)

Contractor is exempt from the requirement to obtain workers' compensation insurance under ORS Chapter 656 for the following reason (check the appropriate box):

SOLE PROPRIETOR

- Contractor is a sole proprietor, and
- Contractor has no employees, and
- Contractor shall not hire employees to perform this contract.

CORPORATION - FOR PROFIT

- Contractor's business is incorporated, and
- All employees of the corporation are officers and directors and have a substantial ownership interest* in the corporation, and
- The officers and directors shall perform all work. Contractor shall not hire other employees to perform this contract.

CORPORATION - NONPROFIT

- Contractor's business is incorporated as a nonprofit corporation, and
- Contractor has no employees; all work is performed by volunteers, and
- Contractor shall not hire employees to perform this contract.

PARTNERSHIP

- Contractor is a partnership, and
- Contractor has no employees, and
- All work shall be performed by the partners; Contractor shall not hire employees to perform this contract, and
- Contractor is not engaged in work performed in direct connection with the construction, alteration, repair, improvement, moving or demolition of an improvement to real property or appurtenances thereto.

LIMITED LIABILITY COMPANY

- Contractor is a limited liability company, and
- Contractor has no employees, and
- All work shall be performed by the members; Contractor shall not hire employees to perform this contract, and
- If Contractor has more than one member, Contractor is not engaged in work performed in direct connection with the construction, alteration, repair, improvement, moving or demolition of an improvement to real property or appurtenances thereto.

*NOTE: Under OAR 436-050-050 a shareholder has a "substantial ownership" interest if the shareholder owns 10% of the corporation or, if less than 10% is owned, the shareholder has ownership that is at least equal to or greater than the average percentage of ownership of all shareholders.

**NOTE: Under certain circumstances partnerships and limited liability companies can claim an exemption even when performing construction work. The requirements for this exemption are complicated. Consult with County Counsel before an exemption request is accepted from a contractor who shall perform construction work.

Contractor Printed Name

Contractor Signature

Contractor Title

Date

EXHIBIT 5
DESCHUTES COUNTY SERVICES CONTRACT
Contract No. 20__ - ____
Expense Reimbursement

1. **Travel and Other Expenses.** (When travel and other expenses are reimbursed.)
 - a. It is the policy of the County that travel expenses shall be allowed only when the travel is essential to the normal discharge of County responsibilities.
 - 1) All travel shall be conducted in the most efficient and cost effective manner resulting in the best value to the County.
 - 2) Travel expenses shall be reimbursed for official County business only.
 - 3) County shall not reimburse Contractor for any item that is not otherwise available for reimbursement to an employee of Deschutes County per Deschutes County Finance Policy F-1, "REIMBURSEMENT FOR MISCELLANEOUS EXPENSES AND EXPENSES INCURRED WHILE TRAVELING ON COUNTY BUSINESS," dated 11/8/06.
 - 4) County may approve a form other than the County Employee Reimbursement Form for Contractor to submit an itemized description of travel expenses for payment.
 - 5) Personal expenses shall not be authorized at any time.
 - 6) All expenses are included in the total maximum contract amount.
 - b. Travel expenses shall be reimbursed only in accordance with rates approved by the County and only when the reimbursement of expenses is specifically provided for in Exhibit 1, paragraph 3 of this contract.
 - c. The current approved rates for reimbursement of travel expenses are set forth in the above described policy.
 - d. County shall not reimburse for any expenses related to alcohol consumption or entertainment.
 - e. Except where noted, detailed receipts for all expenses shall be provided.
 - f. Charge slips for gross amounts are not acceptable.
 - g. County shall not reimburse Contractor for any item that is not otherwise available for reimbursement to an employee of Deschutes County.
2. **Approved reimbursements:**
 - a. Mileage. Contractor shall be entitled to mileage for travel in a private automobile while Contractor is acting within the course and scope of Contractor's duties under this Contract and driving over the most direct and usually traveled route to and from Bend, Oregon.
 - 1) Reimbursement for mileage shall be equal to but not exceed those set by the United States General Services Administration ("GSA") and are subject to change accordingly.
 - 2) To qualify for mileage reimbursement, Contractor shall hold a valid, current driver's license for the class of vehicle to be driven and carry personal automobile liability insurance in amounts not less than those required by this contract.
 - 3) No mileage reimbursement shall be paid for the use of motorcycles or mopeds.
 - b. Meals.
 - 1) Any reimbursement for meals shall be for actual cost of meals incurred by Contractor while acting within the course and scope of Contractor's duties under this contract.
 - 2) For purposes of calculating individual meals where the Contractor is entitled only to a partial day reimbursement, the following maximum allocation of the meal expenses applies:
 - a) Breakfast, \$10;
 - b) Lunch, \$12;
 - c) Dinner, \$22.
 - 3) Except in the event of necessary overnight travel as provided below, partial day meal expenses shall be reimbursed as follows and only while Contractor is acting within the course and scope of Contractor's duties under this contract:
 - a) Breakfast expenses are reimbursable if Contractor is required to travel more than two (2) hours: before the start of Contractor's regular workday (i.e. 8:00 a.m.).
 - b) Lunch expenses are reimbursable only if Contractor is required to travel overnight and begins the journey before 11:00 am or ends the journey after 11:00 a.m.
 - c) Dinner expenses are reimbursable only if Contractor is required to travel more than two (2) hours after Contractor's regular workday (i.e. 5:00 p.m.).

4) Breakfast and dinner expenses are reimbursable during Contractor's necessary overnight travel while acting within the course and scope of Contractor's duties under this contract, shall not exceed those set by the GSA, and are subject to change accordingly.

c. Lodging.

1) County shall reimburse Contractor for Contractor's actual cost of lodging necessary to provide service to the County and shall not exceed the maximum lodge rate set by the GSA for Bend, Oregon.

2) Reimbursement rates for lodging are not considered "per diem" and receipts are required for reimbursement.

d County shall not reimburse Contractor in excess of the lowest fair for any airline ticket or vehicle rental charges.

3. Exceptions. Contractor shall obtain separate written approval of the County Administrator for any exceptions to the expense items listed above prior to incurring any expense for which reimbursement shall be sought.

Exhibit 6
DESCHUTES COUNTY SERVICES CONTRACT
Contract No. 20__-
Compliance with provisions, requirements of funding source and
Federal and State laws, statutes, rules, regulations, executive orders and policies.

Conflicts of Interest

Contractor certifies under penalty of perjury that the following statements are true to the best of Contractor's knowledge:

1. If Contractor is currently performing work for the County, State of Oregon or federal government, Contractor, by signature to this Contract, declares and certifies that Contractor's Work to be performed under this Contract creates no potential or actual conflict of interest as defined by ORS 244 and no rules or regulations of Contractor's employee agency (County State or Federal) would prohibit Contractor's Work under this Contract. Contractor is not an "officer," "employee," or "agent" of the County, as those terms are used in ORS 30.265.
2. No federally appropriated funds have been paid or shall be paid, by or on behalf of Contractor, to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.
 - a. If any funds other than federally appropriated funds have been paid or shall be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, Contractor agrees to complete and submit Standard Form-LLL "Disclosure Form to Report Lobbying," in accordance with its instructions.
 - 1) Standard Form-LLL and instructions are located in 45 CFR Part 93 Appendix B.
 - 2) If instructions require filing the form with the applicable federal entity, Contractor shall then as a material condition of this Contract also file a copy of the Standard Form-LLL with the Department.
 - 3) This filing shall occur at the same time as the filing in accordance with the instructions.
 - b. Contractor understands this certification is a material representation of fact upon which the County and the Department has relied in entering into this Contract. Contractor further understands that submission of this certification is a prerequisite, imposed by 31 USC 1352 for entering into this Contract.
 - c. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.
 - d. Contractor shall include the language of this certification in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.
 - e. Contractor is solely responsible for all liability arising from a failure by Contractor to comply with the terms of this certification.
 - f. Contractor promises to indemnify County for any damages suffered by County as a result of Contractor's failure to comply with the terms of this certification.
3. Contractor understands that, if this Contract involves federally appropriated funds, this certification is a material representation of facts upon which reliance was placed when this Contract was made or entered into, submission of this certification is a prerequisite for make or entering into this Contract imposed by Section 1352, Title 31, U.S. Code and that any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each failure.

Contractor Signature

Date