STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
4601 N Monroe Street • Spokane, WA 99205-1295 • 509-329-3400

July 11, 2019

The Honorable Raymond Gravelle
City of Soap Lake
239 Second Avenue SE
PO Box 1270
Soap Lake, WA 98851

RE: City of Soap Lake - Permit No. ST0005282
General Sewer Plan Amendment No. 1

Dear Mayor Gravelle:

The Department of Ecology (Ecology) APPROVES the General Sewer Plan Amendment No. 1 for the City of Soap Lake dated June 2018. This approval is in accordance with RCW 90.48.110 and Chapter 173-240 WAC.

The City of Soap Lake (Soap Lake) must notify this office immediately of any proposed changes or revisions to the approved documents. Soap Lake must provide changes or revisions in the form of addenda, technical appendices, or supplemental reports to the original approved package of documents to Ecology for review and approval. Additionally, Soap Lake must maintain copies of the approved engineering report, plans and specifications, operations and maintenance manual, permit, and Discharge Monitoring Reports (DMRs) on-site at your facility.

Ecology's review and approval of these documents only assures compliance and consistency with the appropriate rules, regulations, guidelines, planning and design criteria, terms of any loan agreement, and/or other similar documents and is not a quality control check. Soap Lake should not consider this approval as satisfying other applicable federal, state or local statutes, ordinances or regulations.

Please contact Kim Prisock at (509) 329-3450 if you have any questions or need additional information.

Sincerely,

Adriane P. Borgias
Water Quality Section Manager
Eastern Regional Office

APB:red
cc: Kim Prisock, P.E., Ecology/Eastern Region
Cynthia Wall, Ecology/Eastern Region
Darrin Fronsman, Soap Lake Public Works Supervisor
Robert Scott, P.E., Gray & Osborne, Inc.
Nancy Wetch, P.E., Gray &Osborne, Inc.

Gray & Osborne, Inc.
CONSULTING ENGINEERS

MEMORANDUM

TO:	David Dunnell, P.E.
FROM:	Robert Scott, P.E.
SUBJECT:	General Sewer Plan Amendment No. 1
G&O PROJECT NO.:	18023
DATE:	July 12, 2018

The purpose of this engineering memorandum (General Sewer Plan Amendment No. 1) (Amendment) is to provide an update to the Capital Improvement Program located in the *General Sewer Plan* (2016, Gray & Osborne) (Plan). This Amendment will serve as a Preliminary Engineering Report (PER) for purposes of applying for funding through the Rural Development program.

Subsequent to completing the General Sewer Plan in 2016, the City submitted funding applications to the Department of Ecology and Department of Commerce to obtain financing for the design and construction of the Phase I Sewer Improvements project, which will begin construction in the summer of 2018. The City chose to prioritize the Phase I sewer mains because they are located under roads that the City has identified as a priority in its Six-Year Transportation Improvement Plan. The remaining projects identified in the Plan are shown in Table 1.

TABLE 1

2016 General Sewer Plan Capital Improvements

Project	2016 Cost
Phase I Sewer Improvements (1)	$862,000
20-Year Sewer Improvements	$747,000
Video Evaluation of Collection System	$200,000
Additional Sewer Main Replacement	$4,200,000
Wastewater Treatment Facility Upgrades, Phase II	$1,534,000
Sewer Jet Truck	$100,000
Total:	**$7,643,000**

(1) Scheduled for construction in summer 2018.

This Amendment is intended to define the scope of the "Additional Sewer Main Replacement" project from Table 1. The City performed a sewer video investigation in 2015 of a portion of the City's collection system, and 19 percent of the pipe from that investigation was determined to be in "poor" condition. Extrapolating those results, it was assumed that 19 percent of the entire collection system is in "poor" condition, which would be equal to approximately 12,000 feet of sewer pipe. A cost of $4,200,000 was estimated for replacement of this pipe. The City will

pursue this project, along with the "20-Year Sewer Improvements" project from Table 1, collectively as the Sewer Replacement – Phase II project. The 2015 sewer video investigation also identified that approximately 39 percent of the collection system is in "fair" condition, or approximately 24,600 feet of pipe, and its replacement will be completed as Sewer Replacement – Phase III.

Table 1 also identifies a "Video Evaluation of Collection System" project. The City recognizes that the 2015 video investigation did not provide the comprehensive system wide analysis necessary to scope the replacement of 12,000 feet of "poor" condition sewer pipe, and therefore the remaining collection system will need to be investigated. This investigation will be the first step in designing the Sewer Replacement - Phase II project, and the results of that investigation will be used to assign pipe replacement to the Phase II or Phase III projects based upon the condition of the pipe.

For planning purposes, this Amendment has extrapolated the results of the 2015 sewer video investigation to provide a more accurate estimate of where the "poor" and "fair" condition pipe is located within the collection system, and what the pipe size of the replacement will be. This approach has been taken into account for citywide differences in construction costs such as rock excavation, and to provide a means of summarizing costs in a manageable way. To assign approximate locations to the pipe replacement projects, the following steps were taken:

1. The City was divided into five areas based upon where 2015 video investigations had taken place

2. The total length of pipe within each area was determined.

3. The 2015 video investigation was extrapolated to determine an approximate pipe condition for each area of the City. This condition consists of a percentage of each area that is in "poor" condition and a percentage that is in "fair" condition. Engineering judgment was used to adjust these percentages, as unadjusted values would result in pipe replacement being limited to areas north of Main Avenue, as this is where video investigation had previously occurred.

4. Previously completed sewer pipe replacement projects and the "20-Year Sewer Improvements" project identified in the Plan were removed from the pipe inventory, and the remaining pipe in each area was multiplied by the area condition assessment percentages to identify the quantity of "poor" and "fair" pipe in each area.

Figure 1 shows the five areas of the City, Figure 2 shows which pipes have been replaced since 2008, and Figure 3 shows the results of the condition assessment in the Plan.

Table 2 summarizes the length of pipe in each area that is estimated to be of each condition category, with the exception of pipe that has been replaced in the past ten years or is scheduled for replacement in a project identified in the Plan. Table 3 identifies the length and diameter of pipe in each area based upon the existing collection system mapping contained in the Plan.

SOAP LAKE

WARD ST
WOODLAND ST
SCENIC DR
4TH AVE NE
3RD AVE NE
2ND AVE NE
1ST AVE NE
MAIN AVE
2ND AVE SE
3RD AVE SE
4TH AVE SE
4TH PL
5TH AVE SE
6TH AVE SE
7TH AVE SE
8TH AVE SE
3RD AVE NW
5TH ST
1ST AVE NW
MAIN ST W
MAPLE ST
JUNIPER ST
HEMLOCK ST
GINKGO ST
FIR ST
EVERGREEN ST
DOGWOOD ST
CHERRY ST
BIRCH ST
ASH ST
DIVISION ST N
DIVISION ST S
ASTER ST
BUTTERCUP ST
CANNA ST N
CANNA ST S
ELDER ST N
ELDER ST S
FERN ST N
FERN ST S
GLADIOLA ST N
GLADIOLA ST S
EAST LAKE AVE
2ND PL SE
3RD PL SE
LAKEMORE DR
SR 28

1
2
3
4
5

LS
F

LEGEND

CITY LIMITS
UGA
COLLECTION SYSTEM AREA
MANHOLE
6" SEWER MAIN
8" SEWER MAIN
10" SEWER MAIN
12" SEWER MAIN
FORCE MAIN

1"=600'

CITY OF SOAP LAKE

GENERAL SEWER PLAN AMENDMENT NO. 1

FIGURE 1

COLLECTION SYSTEM AREAS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\Soap Lake\18023 NEPA and GSP Amendment\FIGURES\Fig 1.dwg, 6/4/2018 10:08 AM, ALLAN COVELL

SOAP LAKE

LAKE SHORE DR

3RD AVE NW

5TH ST

MAIN ST W

MAPLE ST

JUNIPER ST

HEMLOCK ST

GINKGO ST

FIR ST

EVERGREEN ST

DOGWOOD ST

CHERRY ST

BIRCH ST

ASH ST

DIVISION ST N

DIVISION ST S

LIFT STATION NO. 2

LS

1ST AVE NE

MAIN AVE

2ND AVE SE

2ND AVE SW

3RD AVE SE

4TH AVE SE

4TH PL

5TH AVE SE

6TH AVE SE

7TH AVE SE

8TH AVE SE

WASTEWATER TREATMENT FACILITY

LIFT STATION NO. 1

LS

CANNA ST N

SR 17

4TH AVE NE

3RD AVE NE

2ND AVE NE

1ST AVE NE

ELDER ST N

FERN ST N

GLADIOLA ST N

EASTLAKE AVE

WARD ST

WOODLAND ST

SCENIC DR

CITY HALL

ASTER ST S

BUTTERCUP ST S

CANNA ST S

SR 17

ELDER ST S

FERN ST S

GLADIOLA ST S

2ND PL SE

3RD PL SE

SR 28

LAKEMORE DR

1" = 600'

LEGEND

2015 GSP PROJECT

RECENT PROJECT

CITY OF SOAP LAKE

GENERAL SEWER PLAN AMENDMENT NO. 1

FIGURE 2

KNOWN PIPE REPLACEMENT

Gray & Osborne, Inc.
CONSULTING ENGINEERS

SOAP LAKE

LAKE SHORE DR

3RD AVE NW

5TH ST

LIFT STATION NO. 2

LS

LIFT STATION NO. 1

LS

MAIN ST W

MAIN AVE

1ST AVE NE

MAPLE ST

JUNIPER ST

HEMLOCK ST

GINKGO ST

FIR ST

EVERGREEN ST

DOGWOOD ST

CHERRY ST

BIRCH ST

ASH ST

DIVISION ST N

DIVISION ST S

2ND AVE SE

2ND AVE SW

3RD AVE SE

4TH AVE SE

4TH PL

5TH AVE SE

6TH AVE SE

7TH AVE SE

8TH AVE SE

ASTER ST S

BUTTERCUP ST S

2ND PL SE

3RD PL SE

CITY HALL

CANNA ST N

CANNA ST S

SR 17

SR 17

SR 17

SR 28

ELDER ST N

ELDER ST S

FERN ST N

FERN ST S

GLADIOLA ST N

GLADIOLA ST S

EASTLAKE AVE

WARD ST

WOODLAND ST

SCENIC DR

4TH AVE NE

3RD AVE NE

2ND AVE NE

1ST AVE NE

LAKEMORE DR

WASTEWATER TREATMENT FACILITY

F

1" = 600'

LEGEND

- CITY LIMITS
- UGA
- GOOD CONDITION
- FAIR CONDITION
- POOR CONDITION
- NOT EVALUATED
- FORCEMAIN
- MANHOLE

CITY OF SOAP LAKE

GENERAL SEWER PLAN AMENDMENT NO. 1

FIGURE 3

SEWER VIDEO RESULTS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

Tables 4 and 5 combine this information to identify the length and diameter of pipe in each area that would be included in a project to replace the "poor" and "fair" sewer mains, respectively.

TABLE 2

Pipe Condition by Area

Area	Length of Pipe (ft)			Total
	Poor	Fair	Good	
1	3,510	7,180	4,580	**15,270**
2	1,040	3,960	4,430	**9,430**
3	2,210	8,730	4,840	**15,780**
4	940	1,410	4,370	**6,720**
5	4,300	3,320	2,150	**9,770**
Total	**12,000**	**24,600**	**20,400**	**56,970**

TABLE 3

Pipe Diameter by Area

Area	Length of Pipe (ft)				Total
	6-Inch	8-Inch	10-Inch	12-Inch	
1	0	14,510	0	760	**15,270**
2	2,120	5,910	790	610	**9,430**
3	9,150	5,760	0	870	**15,780**
4	4,730	0	1,990	0	**6,720**
5	7,150	2,620	0	0	**9,770**
Total	**23,150**	**28,800**	**2,780**	**2,240**	**56,970**

TABLE 4

"Poor" Condition Pipe by Area (1)

Area	Length of Pipe (ft)				Total
	6-Inch	8-Inch	10-Inch	12-Inch	
1	0	3,340	0	170	**3,510**
2	230	650	90	70	**1,040**
3	1,280	810	0	120	**2,210**
4	660	0	280	0	**940**
5	3,150	1,150	0	0	**4,300**
Total	**5,320**	**5,950**	**370**	**360**	**12,000**

(1) To be completed in the Sewer Replacement – Phase II project.

TABLE 5

"Fair" Condition Pipe by Area [(1)]

Area	Length of Pipe (ft)				Total
	6-Inch	8-Inch	10-Inch	12-Inch	
1	0	6,820	0	360	**7,180**
2	890	2,480	330	260	**3,960**
3	5,060	3,190	0	480	**8,730**
4	990	0	420	0	**1,410**
5	2,430	890	0	0	**3,320**
Total	**9,370**	**13,380**	**750**	**1,100**	**24,600**

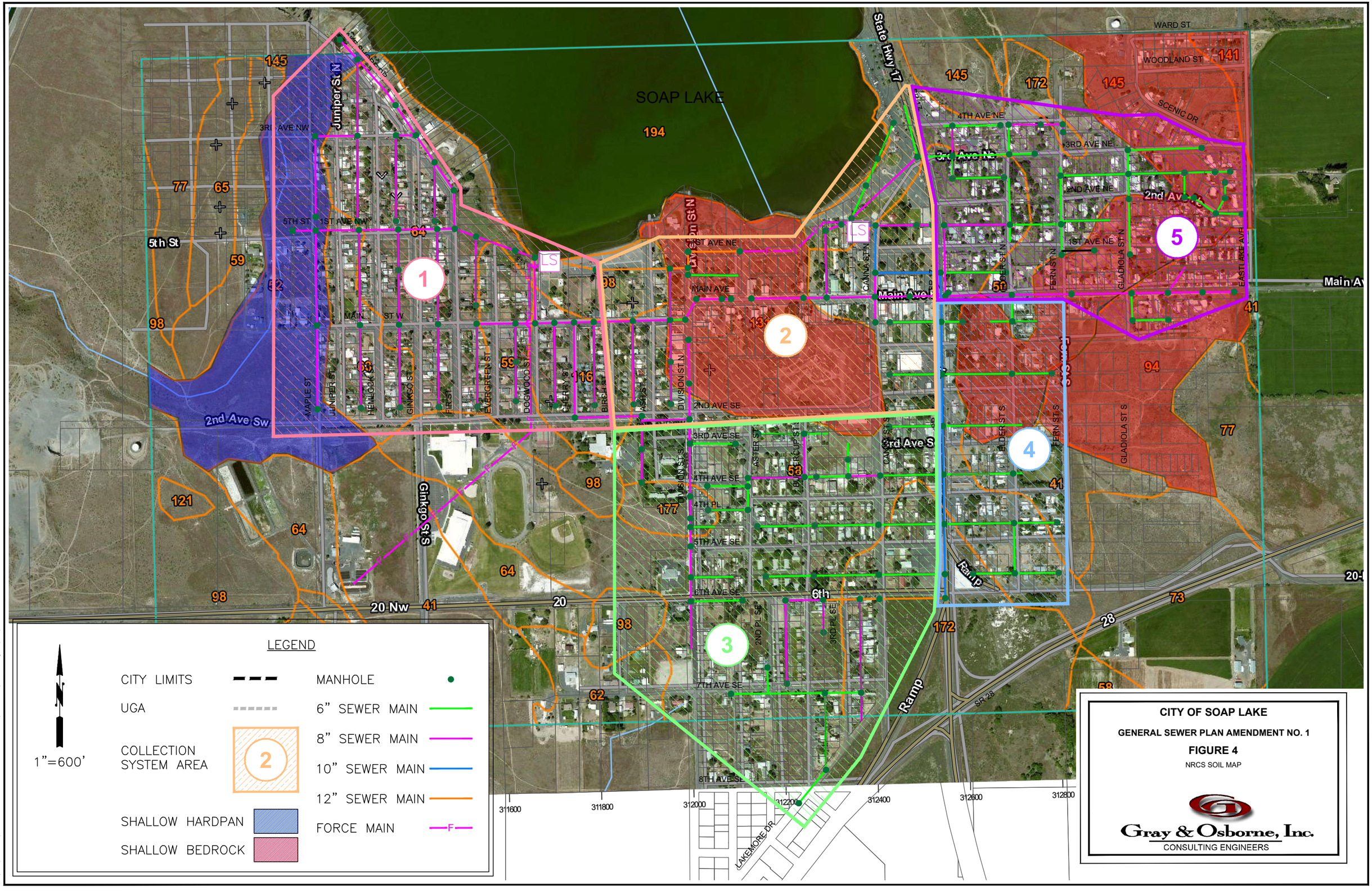
(1) To be completed in the Sewer Replacement – Phase III project.

Cost estimates for these sewer main replacement projects are located in Appendix A. These cost estimates are used to develop the Phase II and Phase III projects that are presented in the following tables. The City will replace 6-inch sewer pipe with 8-inch, per *Criteria for Sewage Works Design* (Ecology, 2008) Section C1-4.1, which requires the minimum diameter of new sewers to be 8-inch, except under special conditions. The cost estimates include main line replacement, replacement of manholes, replacement and connection of side sewers to the edge of right-of-way, rock excavation where it is anticipated, bypass pumping, pavement repair (6-foot width), traffic control, construction contingency, design and construction engineering, City administrative costs, inflation to the year 2020, and cultural monitoring. It is assumed that dewatering costs will be minimal due to the relatively shallow sewers and deep groundwater throughout the City.

Previous projects in Soap Lake have revealed significant issues with rock excavation. To better account for this in the cost estimate, an NRCS Soil Report for the City of Soap Lake has been used to identify the approximate location where shallow bedrock and hardpan are located. The NRCS information is located in Appendix B. Figure 4 consists of the NRCS Soil Map with the collection system areas identified, as well as identification of which soil classifications contain shallow bedrock and hardpan.

The cost estimates assume traditional open cut methods for construction. To date, the use of trenchless technologies in Soap Lake has been limited. The design for the current Phase I project included only a minor amount of pipe bursting. Trenchless has not been seen as favorable due to issues with alignment and the existing bedrock and hardpan. To be conservative and ensure that the City has sufficient funds for the project trenchless technologies have not been factored into the project. After video inspection, it may also be determined that trenchless methods of rehabilitation may be acceptable in some locations.

The General Sewer Plan did not address the condition of the force mains for Lift Station No. 1 and Lift Station No. 2. Based upon discussions with City staff, it is likely that the existing force mains were replaced with the 1977 upgrades to the lift stations. It is unknown whether the force mains require replacement as part of any sewer replacement project, at this time replacement is planned as part of the Phase III project. A cost estimate is included in Appendix A for



LEGEND

CITY LIMITS

UGA

COLLECTION SYSTEM AREA

SHALLOW HARDPAN

SHALLOW BEDROCK

MANHOLE

6" SEWER MAIN

8" SEWER MAIN

10" SEWER MAIN

12" SEWER MAIN

FORCE MAIN

1"=600'

CITY OF SOAP LAKE

GENERAL SEWER PLAN AMENDMENT NO. 1

FIGURE 4

NRCS SOIL MAP

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\Soap Lake\18023 NEPA and GSP Amendment\FIGURES\FIG 4.dwg, 5/15/2018 8:24 AM, ALLAN COVELL

replacement of each force main. These estimates include pipe replacement, rock excavation where it is anticipated, pavement repair (6-foot width), traffic control, construction contingency, design and construction engineering, City administrative costs, inflation to the year 2020 and cultural monitoring. It is assumed that dewatering costs will be minimal due to the relatively shallow force main depth and deep groundwater throughout the City. It is also assumed that if the City were to replace the force main for Lift Station No. 2, it would route the new pipe along 2nd Ave. SW in lieu of crossing through the school district property. This would simplify construction and allow for easier maintenance in the future.

Capital Improvement Summary

The Phase II sewer improvements cost estimate is summarized in Table 6. This phase includes the sewer video investigation, replacement of all "poor" condition sewers, and the 20-year projects identified in the General Sewer Plan.

TABLE 6

Sewer Replacement – Phase II Cost Estimate

Project	Cost Estimate
Sewer Video Investigation(1)	$200,000
Poor Condition Sewers Area 1	$1,146,500
Poor Condition Sewers Area 2	$388,500
Poor Condition Sewers Area 3	$736,500
Poor Condition Sewers Area 4	$355,500
Poor Condition Sewers Area 5	$1,495,500
20-year Sewer Improvements(2)	$889,500
Total Phase II Project Costs	**$5,212,000**

(1) As identified in the 2016 General Sewer Plan

(2) As identified in the 2016 General Sewer Plan, costs were updated as a part of this Amendment.

The Phase III cost estimate is summarized in Table 7. This phase includes the replacement of all "fair" condition sewers, and the force mains associated with Lift Station No. 1 and No. 2.

TABLE 7

Sewer Replacement – Phase III Cost Estimate

Project	Cost Estimate
Fair Condition Sewers Area 1	$2,328,500
Fair Condition Sewers Area 2	$1,378,500
Fair Condition Sewers Area 3	$2,795,500
Fair Condition Sewers Area 4	$513,500
Fair Condition Sewers Area 5	$1,159,500
Lift Station No. 1 Force Main	$250,300
Lift Station No. 2 Force Main	$935,300
Total Phase III Project Costs	**$9,361,100**

The updated Capital Improvement Plan for the collection system is identified in Table 8

TABLE 8

Capital Improvement Plan

Improvement	Estimated Cost	2018	2019	2020	2021	2022-2035
Sewer Replacement – Phase II (1)	$5,212,000		X			
Sewer Replacement – Phase III (2)	$9,361,100					X
Wastewater Treatment Facility Upgrades, Phase II (3)	$1,534,000					X
Sewer Jet Truck (3)	$100,000					X
Total	**$16,207,100**					

(1) As described in Table 6.
(2) As described in Table 7.
(3) Cost estimates for the Wastewater Treatment Facility Upgrades Phase II and Sewer Jet Truck were not updated as a part of this Amendment.

Rural Development Funding

As previously stated the intent of this amendment is to update the cost estimates as a basis for a Rural Development funding application. Table 9 below includes all costs associated with Phase II as described in Table 6. In Table 9, these costs are broke out into the various RD funding budget line items including Engineering Design, Engineering Inspection, Construction, Contingency and Administration and Legal Fees. Interim financing has been added to the cost estimate in Table 9, interim financing is required by RD when the loan exceeds $500,000. It is estimated to be 5% of the project cost.

TABLE 9

Rural Development Funding Request, Sewer Replacement - Phase II

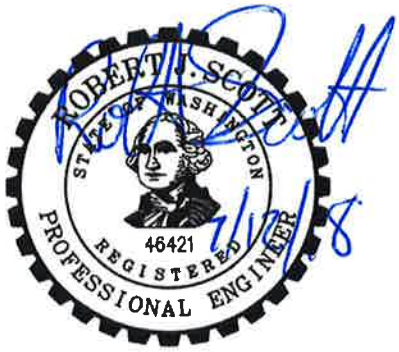
Funding Request Component	Amount
Engineering Design [1]	$649,600
Engineering Inspection [2]	$781,400
Construction	$3,588,000
Contingency	$189,000
Interim Financing [3]	$261,000
Admin and Legal Fees	$4,000
Total Project Cost (RD Application)	**$5,473,000**

(1) Includes design of Phase II Sewer Improvements project and citywide sewer video investigation.

(2) Includes construction administration services (Engineering Inspection) of Phase II Sewer Improvements project and cultural resource monitoring services.

(3) Interim Financing is assumed to be equal to approximately 5 percent of the project cost.

Sincerely,



APPENDIX A

COST ESTIMATES

CITY OF SOAP LAKE
SEWER COLLECTION AREA 1 - "POOR" CONDITION PIPE REPLACEMENT
TOTAL ESTIMATED PROJECT COST
(May 2018 ENR National Construction Index #11068)

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1 LS	$55,000	$55,000
2	Project Temporary Traffic Control	1 LS	$7,500	$7,500
3	Trench Excavation Safety Systems	1 LS	$3,750	$3,750
4	Temporary Water Pollution/Erosion Control	1 LS	$1,000	$1,000
5	SPCC Plan	1 LS	$500	$500
6	Side Sewer Connections	35 EA	$1,000	$35,000
7	6" PVC Side Sewer Pipe	1,050 LF	$55	$57,750
8	Temporary Bypass Pumping	1 LS	$7,500	$7,500
9	Foundation Material	360 CY	$30	$10,800
10	Bank Run Gravel for Trench Backfill	440 CY	$25	$11,000
11	8" PVC Gravity Sewer Pipe	3,340 LF	$65	$217,100
12	10" PVC Gravity Sewer Pipe	0 LF	$70	$0
13	12" PVC Gravity Sewer Pipe	170 LF	$75	$12,750
14	Rock Excavation	80 CY	$100	$8,000
15	48" Manhole	12 EA	$5,500	$64,350
16	HMA Pavement Repair	2,340 SY	$50	$117,000
17	Minor Changes	1 CALC	$15,000	$15,000
			Subtotal:	$624,000
			Washington State Sales Tax (7.9%):	$49,000
			Construction Subtotal:	$673,000
			Construction Contingency (25%):	$169,000
			Construction Total:	$842,000
			Inflation (3%)	$25,000
			Construction Total , Year 2020	$867,000
			Design and Construction Engineering:	$253,000
			Cultural Monitoring:	$26,000
			City Administrative Costs:	$500
			Total Estimated Project Cost:	**$1,146,500**

CITY OF SOAP LAKE
SEWER COLLECTION AREA 2 - "POOR" CONDITION PIPE REPLACEMENT
TOTAL ESTIMATED PROJECT COST
(May 2018 ENR National Construction Index #11068)

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1 LS	$18,000	$18,000
2	Project Temporary Traffic Control	1 LS	$3,000	$3,000
3	Trench Excavation Safety Systems	1 LS	$3,000	$3,000
4	Temporary Water Pollution/Erosion Control	1 LS	$1,000	$1,000
5	SPCC Plan	1 LS	$500	$500
6	Side Sewer Connections	10 EA	$1,000	$10,000
7	6" PVC Side Sewer Pipe	300 LF	$55	$16,500
8	Temporary Bypass Pumping	1 LS	$3,000	$3,000
9	Foundation Material	110 CY	$30	$3,300
10	Bank Run Gravel for Trench Backfill	130 CY	$25	$3,250
11	8" PVC Gravity Sewer Pipe	880 LF	$65	$57,200
12	10" PVC Gravity Sewer Pipe	90 LF	$70	$6,300
13	12" PVC Gravity Sewer Pipe	70 LF	$75	$5,250
14	Rock Excavation	120 CY	$100	$12,000
15	48" Manhole	3 EA	$5,500	$19,067
16	HMA Pavement Repair	690 SY	$50	$34,500
17	Minor Changes	1 CALC	$15,000	$15,000
			Subtotal:	$211,000
			Washington State Sales Tax (7.9%):	$17,000
			Construction Subtotal:	$228,000
			Construction Contingency (25%):	$57,000
			Construction Total:	$285,000
			Inflation (3%)	$9,000
			Construction Total , Year 2020	$294,000
			Design and Construction Engineering:	$86,000
			Cultural Monitoring:	$8,000
			City Administrative Costs:	$500
			Total Estimated Project Cost:	**$388,500**

CITY OF SOAP LAKE
SEWER COLLECTION AREA 3 - "POOR" CONDITION PIPE REPLACEMENT
TOTAL ESTIMATED PROJECT COST
(May 2018 ENR National Construction Index #11068)

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1 LS	$35,000	$35,000
2	Project Temporary Traffic Control	1 LS	$5,000	$5,000
3	Trench Excavation Safety Systems	1 LS	$5,000	$5,000
4	Temporary Water Pollution/Erosion Control	1 LS	$1,000	$1,000
5	SPCC Plan	1 LS	$500	$500
6	Side Sewer Connections	22 EA	$1,000	$22,000
7	6" PVC Side Sewer Pipe	660 LF	$55	$36,300
8	Temporary Bypass Pumping	1 LS	$5,000	$5,000
9	Foundation Material	230 CY	$30	$6,900
10	Bank Run Gravel for Trench Backfill	280 CY	$25	$7,000
11	8" PVC Gravity Sewer Pipe	2,090 LF	$65	$135,850
12	10" PVC Gravity Sewer Pipe	0 LF	$70	$0
13	12" PVC Gravity Sewer Pipe	120 LF	$75	$9,000
14	Rock Excavation	0 LF	$0	$0
15	48" Manhole	7 EA	$5,500	$40,517
16	HMA Pavement Repair	1,470 SY	$50	$73,500
17	Minor Changes	1 CALC	$15,000	$15,000
			Subtotal:	$398,000
			Washington State Sales Tax (7.9%):	$31,000
			Construction Subtotal:	$429,000
			Construction Contingency (25%):	$108,000
			Construction Total:	$537,000
			Inflation (3%)	$16,000
			Construction Total , Year 2020	$553,000
			Design and Construction Engineering:	$166,000
			Cultural Monitoring:	$17,000
			City Administrative Costs:	$500
			Total Estimated Project Cost:	**$736,500**

CITY OF SOAP LAKE
SEWER COLLECTION AREA 4 - "POOR" CONDITION PIPE REPLACEMENT
TOTAL ESTIMATED PROJECT COST
(May 2018 ENR National Construction Index #11068)

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1 LS	$16,000	$16,000
2	Project Temporary Traffic Control	1 LS	$3,000	$3,000
3	Trench Excavation Safety Systems	1 LS	$3,000	$3,000
4	Temporary Water Pollution/Erosion Control	1 LS	$1,000	$1,000
5	SPCC Plan	1 LS	$500	$500
6	Side Sewer Connections	9 EA	$1,000	$9,000
7	6" PVC Side Sewer Pipe	270 LF	$55	$14,850
8	Temporary Bypass Pumping	1 LS	$3,000	$3,000
9	Foundation Material	100 CY	$30	$3,000
10	Bank Run Gravel for Trench Backfill	120 CY	$25	$3,000
11	8" PVC Gravity Sewer Pipe	660 LF	$65	$42,900
12	10" PVC Gravity Sewer Pipe	280 LF	$70	$19,600
13	12" PVC Gravity Sewer Pipe	0 LF	$75	$0
14	Rock Excavation	100 CY	$100	$10,000
15	48" Manhole	3 EA	$5,500	$17,233
16	HMA Pavement Repair	630 SY	$50	$31,500
17	Minor Changes	1 CALC	$15,000	$15,000
			Subtotal:	$193,000
			Washington State Sales Tax (7.9%):	$15,000
			Construction Subtotal:	$208,000
			Construction Contingency (25%):	$52,000
			Construction Total:	$260,000
			Inflation (3%)	$8,000
			Construction Total , Year 2020	$268,000
			Design and Construction Engineering:	$80,000
			Cultural Monitoring:	$7,000
			City Administrative Costs:	$500
			Total Estimated Project Cost:	**$355,500**

CITY OF SOAP LAKE
SEWER COLLECTION AREA 5 - "POOR" CONDITION PIPE REPLACEMENT
TOTAL ESTIMATED PROJECT COST
(May 2018 ENR National Construction Index #11068)

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1 LS	$72,000	$72,000
2	Project Temporary Traffic Control	1 LS	$10,000	$10,000
3	Trench Excavation Safety Systems	1 LS	$10,000	$10,000
4	Temporary Water Pollution/Erosion Control	1 LS	$1,000	$1,000
5	SPCC Plan	1 LS	$500	$500
6	Side Sewer Connections	43 EA	$1,000	$43,000
7	6" PVC Side Sewer Pipe	1,290 LF	$55	$70,950
8	Temporary Bypass Pumping	1 LS	$10,000	$10,000
9	Foundation Material	430 CY	$30	$12,900
10	Bank Run Gravel for Trench Backfill	540 CY	$25	$13,500
11	8" PVC Gravity Sewer Pipe	4,300 LF	$65	$279,500
12	10" PVC Gravity Sewer Pipe	0 LF	$70	$0
13	12" PVC Gravity Sewer Pipe	0 LF	$75	$0
14	Rock Excavation	480 CY	$100	$48,000
15	48" Manhole	14 EA	$5,500	$78,833
16	HMA Pavement Repair	2,870 SY	$50	$143,500
17	Minor Changes	1 CALC	$15,000	$15,000
			Subtotal:	$809,000
			Washington State Sales Tax (7.9%):	$64,000
			Construction Subtotal:	$873,000
			Construction Contingency (25%):	$219,000
			Construction Total:	$1,092,000
			Inflation (3%)	$33,000
			Construction Total , Year 2020	$1,125,000
			Design and Construction Engineering:	$338,000
			Cultural Monitoring:	$32,000
			City Administrative Costs:	$500
			Total Estimated Project Cost:	**$1,495,500**

CITY OF SOAP LAKE
SEWER COLLECTION AREA 1 - "FAIR" CONDITION PIPE REPLACEMENT
TOTAL ESTIMATED PROJECT COST
(May 2018 ENR National Construction Index #11068)

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1 LS	$113,000	$113,000
2	Project Temporary Traffic Control	1 LS	$15,000	$15,000
3	Trench Excavation Safety Systems	1 LS	$7,500	$7,500
4	Temporary Water Pollution/Erosion Control	1 LS	$1,000	$1,000
5	SPCC Plan	1 LS	$500	$500
6	Side Sewer Connections	72 EA	$1,000	$72,000
7	6" PVC Side Sewer Pipe	2,160 LF	$55	$118,800
8	Temporary Bypass Pumping	1 LS	$15,000	$15,000
9	Foundation Material	720 CY	$30	$21,600
10	Bank Run Gravel for Trench Backfill	900 CY	$25	$22,500
11	8" PVC Gravity Sewer Pipe	6,820 LF	$65	$443,300
12	10" PVC Gravity Sewer Pipe	0 LF	$70	$0
13	12" PVC Gravity Sewer Pipe	360 LF	$75	$27,000
14	Rock Excavation	160 CY	$100	$16,000
15	48" Manhole	24 EA	$5,500	$131,633
16	HMA Pavement Repair	4,790 SY	$50	$239,500
17	Minor Changes	1 CALC	$15,000	$15,000
			Subtotal:	$1,259,000
			Washington State Sales Tax (7.9%):	$99,000
			Construction Subtotal:	$1,358,000
			Construction Contingency (25%):	$340,000
			Construction Total:	$1,698,000
			Inflation (3%)	$51,000
			Construction Total , Year 2020	$1,749,000
			Design and Construction Engineering:	$525,000
			Culutural Monitoring:	$54,000
			City Administrative Costs:	$500
			Total Estimated Project Cost:	**$2,328,500**

CITY OF SOAP LAKE
SEWER COLLECTION AREA 2 - "FAIR" CONDITION PIPE REPLACEMENT
TOTAL ESTIMATED PROJECT COST
(May 2018 ENR National Construction Index #11068)

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1 LS	$66,000	$66,000
2	Project Temporary Traffic Control	1 LS	$7,500	$7,500
3	Trench Excavation Safety Systems	1 LS	$7,500	$7,500
4	Temporary Water Pollution/Erosion Control	1 LS	$1,000	$1,000
5	SPCC Plan	1 LS	$500	$500
6	Side Sewer Connections	40 EA	$1,000	$40,000
7	6" PVC Side Sewer Pipe	1,200 LF	$55	$66,000
8	Temporary Bypass Pumping	1 LS	$7,500	$7,500
9	Foundation Material	400 CY	$30	$12,000
10	Bank Run Gravel for Trench Backfill	500 CY	$25	$12,500
11	8" PVC Gravity Sewer Pipe	3,370 LF	$65	$219,050
12	10" PVC Gravity Sewer Pipe	330 LF	$70	$23,100
13	12" PVC Gravity Sewer Pipe	260 LF	$75	$19,500
14	Rock Excavation	440 CY	$100	$44,000
15	48" Manhole	13 EA	$5,500	$72,600
16	HMA Pavement Repair	2,640 SY	$50	$132,000
17	Minor Changes	1 CALC	$15,000	$15,000
			Subtotal:	$746,000
			Washington State Sales Tax (7.9%):	$59,000
			Construction Subtotal:	$805,000
			Construction Contingency (25%):	$202,000
			Construction Total:	$1,007,000
			Inflation (3%)	$30,000
			Construction Total , Year 2020	$1,037,000
			Design and Construction Engineering:	$311,000
			Cultural Monitoring:	$30,000
			City Administrative Costs:	$500
			Total Estimated Project Cost:	**$1,378,500**

CITY OF SOAP LAKE
SEWER COLLECTION AREA 3 - "FAIR" CONDITION PIPE REPLACEMENT
TOTAL ESTIMATED PROJECT COST
(May 2018 ENR National Construction Index #11068)

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1 LS	$137,000	$137,000
2	Project Temporary Traffic Control	1 LS	$20,000	$20,000
3	Trench Excavation Safety Systems	1 LS	$20,000	$20,000
4	Temporary Water Pollution/Erosion Control	1 LS	$1,000	$1,000
5	SPCC Plan	1 LS	$500	$500
6	Side Sewer Connections	87 EA	$1,000	$87,000
7	6" PVC Side Sewer Pipe	2,610 LF	$55	$143,550
8	Temporary Bypass Pumping	1 LS	$20,000	$20,000
9	Foundation Material	880 CY	$30	$26,400
10	Bank Run Gravel for Trench Backfill	1,100 CY	$25	$27,500
11	8" PVC Gravity Sewer Pipe	8,250 LF	$65	$536,250
12	10" PVC Gravity Sewer Pipe	0 LF	$70	$0
13	12" PVC Gravity Sewer Pipe	480 LF	$75	$36,000
14	Rock Excavation	0 LF	$0	$0
15	48" Manhole	29 EA	$5,500	$160,050
16	HMA Pavement Repair	5,820 SY	$50	$291,000
17	Minor Changes	1 CALC	$15,000	$15,000
			Subtotal:	$1,521,000
			Washington State Sales Tax (7.9%):	$120,000
			Construction Subtotal:	$1,641,000
			Construction Contingency (25%):	$411,000
			Construction Total:	$2,052,000
			Inflation (3%)	$62,000
			Construction Total , Year 2020	$2,114,000
			Design and Construction Engineering:	$616,000
			Cultural Monitoring:	$65,000
			City Administrative Costs:	$500
			Total Estimated Project Cost:	**$2,795,500**

CITY OF SOAP LAKE
SEWER COLLECTION AREA 4 - "FAIR" CONDITION PIPE REPLACEMENT
TOTAL ESTIMATED PROJECT COST
(May 2018 ENR National Construction Index #11068)

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1 LS	$24,000	$24,000
2	Project Temporary Traffic Control	1 LS	$3,000	$3,000
3	Trench Excavation Safety Systems	1 LS	$3,000	$3,000
4	Temporary Water Pollution/Erosion Control	1 LS	$1,000	$1,000
5	SPCC Plan	1 LS	$500	$500
6	Side Sewer Connections	14 EA	$1,000	$14,000
7	6" PVC Side Sewer Pipe	420 LF	$55	$23,100
8	Temporary Bypass Pumping	1 LS	$3,000	$3,000
9	Foundation Material	150 CY	$30	$4,500
10	Bank Run Gravel for Trench Backfill	180 CY	$25	$4,500
11	8" PVC Gravity Sewer Pipe	990 LF	$65	$64,350
12	10" PVC Gravity Sewer Pipe	420 LF	$70	$29,400
13	12" PVC Gravity Sewer Pipe	0 LF	$75	$0
14	Rock Excavation	160 CY	$100	$16,000
15	48" Manhole	5 EA	$5,500	$25,850
16	HMA Pavement Repair	940 SY	$50	$47,000
17	Minor Changes	1 CALC	$15,000	$15,000
			Subtotal:	$278,000
			Washington State Sales Tax (7.9%):	$22,000
			Construction Subtotal:	$300,000
			Construction Contingency (25%):	$75,000
			Construction Total:	$375,000
			Inflation (3%)	$11,000
			Construction Total , Year 2020	$386,000
			Design and Construction Engineering:	$116,000
			Cultural Monitoring:	$11,000
			City Administrative Costs:	$500
			Total Estimated Project Cost:	**$513,500**

CITY OF SOAP LAKE
SEWER COLLECTION AREA 5 - "FAIR" CONDITION PIPE REPLACEMENT
TOTAL ESTIMATED PROJECT COST
(May 2018 ENR National Construction Index #11068)

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1 LS	$56,000	$56,000
2	Project Temporary Traffic Control	1 LS	$7,500	$7,500
3	Trench Excavation Safety Systems	1 LS	$7,500	$7,500
4	Temporary Water Pollution/Erosion Control	1 LS	$1,000	$1,000
5	SPCC Plan	1 LS	$500	$500
6	Side Sewer Connections	33 EA	$1,000	$33,000
7	6" PVC Side Sewer Pipe	990 LF	$55	$54,450
8	Temporary Bypass Pumping	1 LS	$7,500	$7,500
9	Foundation Material	340 CY	$30	$10,200
10	Bank Run Gravel for Trench Backfill	420 CY	$25	$10,500
11	8" PVC Gravity Sewer Pipe	3,320 LF	$65	$215,800
12	10" PVC Gravity Sewer Pipe	0 LF	$70	$0
13	12" PVC Gravity Sewer Pipe	0 LF	$75	$0
14	Rock Excavation	370 CY	$100	$37,000
15	48" Manhole	11 EA	$5,500	$60,867
16	HMA Pavement Repair	2,210 SY	$50	$110,500
17	Minor Changes	1 CALC	$15,000	$15,000
			Subtotal:	$627,000
			Washington State Sales Tax (7.9%):	$50,000
			Construction Subtotal:	$677,000
			Construction Contingency (25%):	$170,000
			Construction Total:	$847,000
			Inflation (3%)	$25,000
			Construction Total , Year 2020	$872,000
			Design and Construction Engineering:	$262,000
			Cultural Monitoring:	$25,000
			City Administrative Costs:	$500
			Total Estimated Project Cost:	**$1,159,500**

CITY OF SOAP LAKE
LIFT STATION NO. 1 FORCE MAIN REPLACEMENT
TOTAL ESTIMATED PROJECT COST
(May 2018 ENR National Construction Index #11068)

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1 LS	$9,000	$9,000
2	Project Temporary Traffic Control	1 LS	$3,000	$3,000
3	Trench Excavation Safety Systems	1 LS	$5,000	$5,000
4	Temporary Water Pollution/Erosion Control	1 LS	$1,000	$1,000
5	SPCC Plan	1 LS	$500	$500
6	Temporary Bypass Pumping	1 LS	$5,000	$5,000
7	Foundation Material	80 CY	$30	$2,400
8	Bank Run Gravel for Trench Backfill	100 CY	$25	$2,500
9	6" PVC Force Main	800 LF	$65	$52,000
10	Rock Excavation	180 CY	$125	$22,500
11	Surfacing Restoration	900 SY	$25	$22,500
12	Minor Changes	1 CALC	$10,000	$10,000
			Subtotal:	$135,000
			Washington State Sales Tax (7.9%):	$11,000
			Construction Subtotal:	$146,000
			Construction Contingency (25%):	$37,000
			Construction Total:	$183,000
			Inflation (3%)	$5,000
			Construction Total , Year 2020	$188,000
			Design and Construction Engineering:	$56,000
			Cultural Monitoring:	$6,000
			City Administrative Costs:	$300
			Total Estimated Project Cost:	**$250,300**

CITY OF SOAP LAKE
LIFT STATION NO. 1 FORCE MAIN REPLACEMENT
TOTAL ESTIMATED PROJECT COST
(May 2018 ENR National Construction Index #11068)

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1 LS	$33,000	$33,000
2	Project Temporary Traffic Control	1 LS	$10,000	$10,000
3	Trench Excavation Safety Systems	1 LS	$20,000	$20,000
4	Temporary Water Pollution/Erosion Control	1 LS	$1,000	$1,000
5	SPCC Plan	1 LS	$500	$500
6	Temporary Bypass Pumping	1 LS	$20,000	$20,000
7	Foundation Material	340 CY	$30	$10,200
8	Bank Run Gravel for Trench Backfill	430 CY	$25	$10,750
9	10" PVC Force Main	3,400 LF	$75	$255,000
10	HMA Pavement Repair	1,000 SY	$75	$75,000
11	Surfacing Restoration	2,110 SY	$25	$52,750
12	Minor Changes	1 CALC	$15,000	$15,000
			Subtotal:	$503,000
			Washington State Sales Tax (7.9%):	$40,000
			Construction Subtotal:	$543,000
			Construction Contingency (25%):	$136,000
			Construction Total:	$679,000
			Inflation (3%)	$20,000
			Construction Total , Year 2020	$699,000
			Design and Construction Engineering:	$210,000
			Cultural Monitoring:	$26,000
			City Administrative Costs:	$300
			Total Estimated Project Cost:	**$935,300**

APPENDIX B

NRCS SOIL REPORT

United States Department of Agriculture

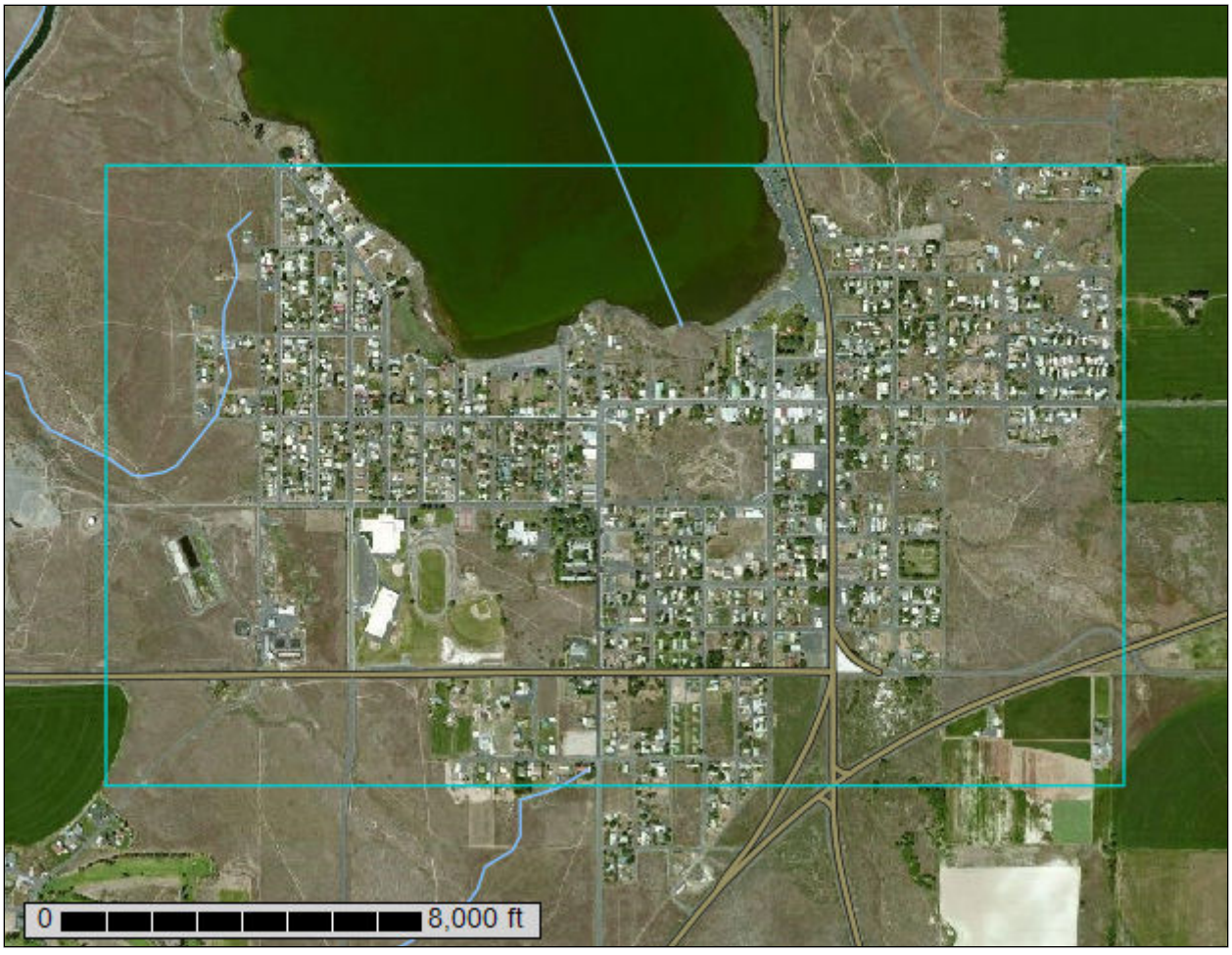
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Grant County, Washington

City of Soap Lake - Sewer Replacement



June 7, 2017

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:8,550 if printed on B landscape (17" x 11") sheet.

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Survey Areas
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grant County, Washington
Survey Area Data: Version 10, Sep 8, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Grant County, Washington (WA025)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
26	Burbank loamy fine sand, 0 to 5 percent slopes	4.2	0.5%
41	Ephrata fine sandy loam, 2 to 5 percent slopes	54.7	6.3%
50	Finley gravelly fine sandy loam, 0 to 15 percent slopes	40.5	4.7%
52	Finley-Taunton complex, 0 to 5 percent slopes	45.6	5.2%
58	Kennewick fine sandy loam, 0 to 2 percent slopes	163.3	18.7%
59	Kennewick fine sandy loam, 2 to 5 percent slopes	23.8	2.7%
62	Kennewick silt loam, 0 to 2 percent slopes	11.1	1.3%
63	Kennewick silt loam, 2 to 5 percent slopes	18.6	2.1%
64	Kennewick silt loam, 5 to 10 percent slopes	72.0	8.3%
65	Kennewick silt loam, 10 to 25 percent slopes	11.1	1.3%
73	Malaga gravelly sandy loam, 0 to 5 percent slopes	39.3	4.5%
77	Malaga stony sandy loam, 0 to 15 percent slopes	27.2	3.1%
94	Prosser-Starbuck very fine sandy loams, 0 to 15 percent slopes	33.7	3.9%
98	Quincy loamy fine sand, 0 to 15 percent slopes	55.0	6.3%
116	Royal very fine sandy loam, 2 to 5 percent slopes	15.0	1.7%
121	Sagehill very fine sandy loam, 0 to 2 percent slopes	1.7	0.2%
131	Schawana complex, 0 to 15 percent slopes	42.3	4.9%
141	Starbuck very fine sandy loam, 0 to 15 percent slopes	3.7	0.4%
145	Starbuck-Prosser complex, 0 to 25 percent slopes	61.1	7.0%
172	Umapine silt loam	46.7	5.4%
177	Warden silt loam, 0 to 2 percent slopes	13.0	1.5%
194	Water	87.3	10.0%

Grant County, Washington (WA025)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Totals for Area of Interest		870.7	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Grant County, Washington

26—Burbank loamy fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 29l9
Elevation: 300 to 1,300 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 160 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Burbank and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Burbank

Setting

Landform: Outwash terraces
Parent material: Eolian sands over gravelly glacial outwash

Typical profile

H1 - 0 to 4 inches: loamy fine sand
H2 - 4 to 23 inches: gravelly loamy fine sand
H3 - 23 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: SANDS 6-10 PZ (R007XY502WA)
Hydric soil rating: No

41—Ephrata fine sandy loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 29lv
Elevation: 500 to 1,400 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 150 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Ephrata and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ephrata

Setting

Landform: Terraces
Parent material: Gravelly glacial outwash mixed with loess in the upper part

Typical profile

H1 - 0 to 9 inches: fine sandy loam
H2 - 9 to 23 inches: gravelly fine sandy loam
H3 - 23 to 60 inches: extremely gravelly coarse sand

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Hydric soil rating: No

50—Finley gravelly fine sandy loam, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 29m5
Elevation: 300 to 1,800 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 135 to 180 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Finley and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Finley

Setting

Landform: Alluvial fans
Parent material: Gravelly alluvium

Typical profile

H1 - 0 to 8 inches: gravelly fine sandy loam
H2 - 8 to 23 inches: very gravelly sandy loam
H3 - 23 to 60 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: SANDY 6-10 PZ (R007XY501WA)
Hydric soil rating: No

52—Finley-Taunton complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 29m7
Elevation: 200 to 2,200 feet
Mean annual precipitation: 6 to 12 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 135 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Finley and similar soils: 40 percent
Taunton and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Finley

Setting

Landform: Alluvial fans
Parent material: Gravelly alluvium

Typical profile

H1 - 0 to 8 inches: very fine sandy loam
H2 - 8 to 23 inches: very gravelly sandy loam
H3 - 23 to 60 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: SANDY 6-10 PZ (R007XY501WA)
Hydric soil rating: No

Description of Taunton

Setting

Landform: Alluvial fans

Parent material: Alluvium and loess

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 19 inches: silt loam
H3 - 19 to 27 inches: gravelly silt loam
H4 - 27 to 37 inches: cemented material
H5 - 37 to 60 inches: stratified indurated to extremely gravelly sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Hydric soil rating: No

58—Kennewick fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 29mf
Elevation: 300 to 1,500 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 130 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Kennewick and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kennewick

Setting

Landform: Terraces
Parent material: Lacustrine deposits

Typical profile

H1 - 0 to 9 inches: fine sandy loam

H2 - 9 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: CALCAREOUS LOAM 6-10 PZ (R007XY701WA)
Hydric soil rating: No

59—Kennewick fine sandy loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 29mg
Elevation: 300 to 1,500 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 130 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Kennewick and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kennewick

Setting

Landform: Terraces
Parent material: Lacustrine deposits

Typical profile

H1 - 0 to 9 inches: fine sandy loam
H2 - 9 to 60 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: CALCAREOUS LOAM 6-10 PZ (R007XY701WA)
Hydric soil rating: No

62—Kennewick silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 29ml
Elevation: 300 to 1,500 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 130 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Kennewick and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kennewick

Setting

Landform: Terraces
Parent material: Lacustrine deposits

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C
Ecological site: CALCAREOUS LOAM 6-10 PZ (R007XY701WA)
Hydric soil rating: No

63—Kennewick silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 29mm
Elevation: 300 to 1,500 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 130 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Kennewick and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kennewick

Setting

Landform: Terraces
Parent material: Lacustrine deposits

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 60 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: CALCAREOUS LOAM 6-10 PZ (R007XY701WA)
Hydric soil rating: No

64—Kennewick silt loam, 5 to 10 percent slopes

Map Unit Setting

National map unit symbol: 29mn
Elevation: 300 to 1,500 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 130 to 210 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Kennewick and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kennewick

Setting

Landform: Terraces
Parent material: Lacustrine deposits

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 60 inches: silt loam

Properties and qualities

Slope: 5 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: CALCAREOUS LOAM 6-10 PZ (R007XY701WA)
Hydric soil rating: No

65—Kennewick silt loam, 10 to 25 percent slopes

Map Unit Setting

National map unit symbol: 29mp
Elevation: 300 to 1,500 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 130 to 210 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Kennewick and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kennewick

Setting

Landform: Terraces
Parent material: Lacustrine deposits

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 60 inches: silt loam

Properties and qualities

Slope: 10 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: CALCAREOUS LOAM 6-10 PZ (R007XY701WA)
Hydric soil rating: No

73—Malaga gravelly sandy loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 29mz
Elevation: 500 to 1,300 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 135 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

Malaga and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Malaga

Setting

Landform: Terraces
Parent material: Glacial outwash

Typical profile

H1 - 0 to 6 inches: gravelly sandy loam
H2 - 6 to 11 inches: gravelly sandy loam
H3 - 11 to 18 inches: very gravelly sandy loam
H4 - 18 to 60 inches: extremely gravelly coarse sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: 15 to 28 inches to strongly contrasting textural stratification
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: LOAMY 6-10 PZ (R007XY102WA)
Hydric soil rating: No

77—Malaga stony sandy loam, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 29n3
Elevation: 500 to 1,300 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 180 to 195 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Malaga and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Malaga

Setting

Landform: Terraces
Parent material: Glacial outwash

Typical profile

H1 - 0 to 6 inches: stony sandy loam
H2 - 6 to 11 inches: gravelly sandy loam
H3 - 11 to 18 inches: very gravelly sandy loam
H4 - 18 to 60 inches: extremely gravelly coarse sand

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: 15 to 28 inches to strongly contrasting textural stratification
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: STONY 6-10 PZ (R007XY202WA)
Hydric soil rating: No

94—Prosser-Starbuck very fine sandy loams, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 29nq
Elevation: 300 to 2,700 feet
Mean annual precipitation: 6 to 12 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 115 to 210 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Prosser and similar soils: 45 percent
Starbuck and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Prosser

Setting

Landform: Structural benches, hillslopes
Parent material: Loess

Typical profile

H1 - 0 to 5 inches: very fine sandy loam
H2 - 5 to 26 inches: very fine sandy loam
H3 - 26 to 30 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: LOAMY 6-10 PZ (R007XY102WA)
Hydric soil rating: No

Description of Starbuck

Setting

Landform: Hillslopes, structural benches
Landform position (two-dimensional): Summit
Parent material: Loess and residuum weathered from basalt

Typical profile

H1 - 0 to 8 inches: very fine sandy loam
H2 - 8 to 15 inches: fine sandy loam
H3 - 15 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: 12 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): 6s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: STONY 6-10 PZ (R007XY202WA)
Hydric soil rating: No

98—Quincy loamy fine sand, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 29nv
Elevation: 200 to 4,500 feet
Mean annual precipitation: 6 to 12 inches
Mean annual air temperature: 46 to 54 degrees F
Frost-free period: 100 to 200 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Quincy and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Quincy

Setting

Landform: Dunes, terraces
Parent material: Eolian sands

Typical profile

H1 - 0 to 9 inches: loamy fine sand
H2 - 9 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups
Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: SANDS 6-10 PZ (R007XY502WA)
Hydric soil rating: No

116—Royal very fine sandy loam, 2 to 5 percent slopes

Map Unit Setting
National map unit symbol: 29hf
Elevation: 400 to 1,000 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 150 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Royal and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Royal

Setting
Landform: Hills, terraces
Landform position (two-dimensional): Footslope
Parent material: Sandy alluvium

Typical profile
H1 - 0 to 10 inches: very fine sandy loam
H2 - 10 to 16 inches: very fine sandy loam
H3 - 16 to 60 inches: stratified fine sand to very fine sandy loam

Properties and qualities
Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups
Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: SANDY 6-10 PZ (R007XY501WA)
Hydric soil rating: No

121—Sagehill very fine sandy loam, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: 29hm
Elevation: 400 to 3,000 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 135 to 190 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Sagehill and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sagehill

Setting
Landform: Terraces
Parent material: Loess over lacustrine deposits

Typical profile
H1 - 0 to 8 inches: very fine sandy loam
H2 - 8 to 19 inches: very fine sandy loam
H3 - 19 to 60 inches: stratified fine sandy loam to silt loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.4 inches)

Interpretive groups
Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: B
Hydric soil rating: No

131—Schawana complex, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 29hz
Elevation: 500 to 2,300 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Schawana and similar soils: 40 percent
Schawana and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Schawana

Setting

Landform: Structural benches, hillslopes
Parent material: Eolian deposits over residuum weathered from basalt

Typical profile

H1 - 0 to 3 inches: loamy fine sand
H2 - 3 to 12 inches: very fine sandy loam
H3 - 12 to 16 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: VERY SHALLOW 6-10 PZ (R007XY301WA)
Hydric soil rating: No

Description of Schawana

Setting

Landform: Structural benches, hillslopes
Parent material: Eolian deposits over residuum weathered from basalt

Typical profile

H1 - 0 to 3 inches: cobbly loamy fine sand
H2 - 3 to 12 inches: gravelly very fine sandy loam
H3 - 12 to 16 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: VERY SHALLOW 6-10 PZ (R007XY301WA)
Hydric soil rating: No

141—Starbuck very fine sandy loam, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 29jb
Elevation: 400 to 2,700 feet
Mean annual precipitation: 6 to 12 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 115 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Starbuck and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Starbuck

Setting

Landform: Structural benches, hillslopes
Landform position (two-dimensional): Summit
Parent material: Loess and residuum weathered from basalt

Typical profile

H1 - 0 to 8 inches: very fine sandy loam
H2 - 8 to 15 inches: silt loam
H3 - 15 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 15 percent

Depth to restrictive feature: 12 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification (irrigated): 6s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: STONY 6-10 PZ (R007XY202WA)
Hydric soil rating: No

145—Starbuck-Prosser complex, 0 to 25 percent slopes

Map Unit Setting
National map unit symbol: 29jg
Elevation: 300 to 2,900 feet
Mean annual precipitation: 6 to 12 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 115 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition
Starbuck and similar soils: 50 percent
Prosser and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Starbuck

Setting
Landform: Hillslopes, structural benches
Landform position (two-dimensional): Summit
Parent material: Loess and residuum weathered from basalt

Typical profile
H1 - 0 to 5 inches: stony very fine sandy loam
H2 - 5 to 15 inches: gravelly fine sandy loam
H3 - 15 to 19 inches: unweathered bedrock

Properties and qualities
Slope: 0 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water storage in profile: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: STONY 6-10 PZ (R007XY202WA)
Hydric soil rating: No

Description of Prosser

Setting

Landform: Hillslopes
Parent material: Loess

Typical profile

H1 - 0 to 5 inches: very fine sandy loam
H2 - 5 to 26 inches: very fine sandy loam
H3 - 26 to 30 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: LOAMY 6-10 PZ (R007XY102WA)
Hydric soil rating: No

172—Umapine silt loam

Map Unit Setting

National map unit symbol: 29kf
Elevation: 250 to 3,500 feet
Mean annual precipitation: 6 to 12 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 110 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

Umapine and similar soils: 95 percent

Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Umapine

Setting
Landform: Basin floors, alluvial flats
Parent material: Silty alluvium

Typical profile
H1 - 0 to 9 inches: silt loam
H2 - 9 to 60 inches: silt loam

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 42 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: High (about 11.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: ALKALI BOTTOM 6-10 PZ (R007XY401WA)
Hydric soil rating: No

Minor Components

Kittitas
Percent of map unit: 2 percent
Landform: Basin floors
Hydric soil rating: Yes

177—Warden silt loam, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: 29kl
Elevation: 600 to 1,300 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 135 to 200 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Warden and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Warden

Setting

Landform: Terraces
Parent material: Loess over lacustrine deposits

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 26 inches: silt loam
H3 - 26 to 60 inches: stratified very fine sandy loam to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 2c
Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: B
Hydric soil rating: No

194—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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APPENDIX C

SEPA

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals: [help]

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background [help]

1. Name of proposed project, if applicable: **Sewer Replacement Project**

2. Name of applicant: **City of Soap Lake**

3. Address and phone number of applicant and contact person:

Mayor Raymond Gravelle
239 Second Ave. SE
PO Box 1270
Soap Lake, WA 98851
(509) 246-1211

4. Date checklist prepared: **May 29, 2018**

5. Agency requesting checklist: **City of Soap Lake**

6. Proposed timing or schedule (including phasing, if applicable): **The General Sewer Plan Amendment provides a schedule of capital improvements. The first task to be completed is a complete video investigation of the City's collection system, which will assist the City in identifying and prioritizing the replacement of approximately 12,000 feet of sewer main throughout the City, in addition to sewer mains identified in the General Sewer Plan. Deteriorating sewer mains that do not require immediate replacement will be prioritized for an additional future work phase. A detailed time schedule is listed in the Plan.**

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. **Yes. This project is estimated to include 12,000 feet of sewer main replacement, and an additional 24,600 feet of sewer main replacement is estimated to occur in the future.**

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. **A NEPA report has been prepared for this project. The City anticipates completing water system improvements with this project, and that scope of that work is included in the NEPA report.**

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. **None.**

10. List any government approvals or permits that will be needed for your proposal, if known. **It is likely that one or more projects may occur within the vicinity of a wetland and/or shoreline. The extent of this permitting will be unknown until the City completes its sewer video investigation and determines which sewer mains will be replaced.**

The City anticipates that this project will be completed with USDA RD funding, and will be required to obtain various approvals throughout the design and construction phases to meet their requirements.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.) **The proposed project includes improvements to the City's sewer collection**

system as described in the *General Sewer Plan* (2016) and *General Sewer Plan Amendment* (2018). These improvements will address sewers that have been identified as being in "poor" or "fair" condition. These improvements include the construction of approximately 14,000 feet of 8-inch, 10-inch, and 12-inch diameter gravity sewers and associated manholes. The City will perform a complete video investigation of the collection system during the design phase to identify which sewers will be replaced.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. **The sewer replacement projects are located within City right-of-way under roadways and alleys. The location of these projects will be further refined during the design phase, after a video investigation of the entire collection system has taken place. These improvements are expected to be located throughout the City of Soap Lake in Sections 13, 24, and 25 of Township 22N, Range 26E W.M. and Sections 18,19, and 30 of Township 22N, Range 27E W.M. in Grant County, Washington.**

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site:

(circle one): Flat, rolling, hilly, steep slopes, mountainous, other _____

b. What is the steepest slope on the site (approximate percent slope)?
Generally, the site is less than 5% percent slope.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. **According to the Natural Resource Conservation Service Soils map for the area, soils are typically fine sandy loam, silty loam, and fine sand. No prime farmland is within the project site.**

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. **The City is not aware of any indications of or history of unstable soils in the immediate vicinity.**

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill. **Trenching will be required for sewer main replaced with new pipe via open-trench replacement. Where feasible and cost effective, the City will utilize trenchless technologies. Soil removed for excavation will be used for backfill as appropriate or taken off site. Bank run gravel will be used where native material is not suitable as backfill. Total quantities will vary by project.**

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. **Erosion of cleared areas or of stockpiled materials may occur during periods of wet weather through construction, although these periods will be minimal due to the arid climate in central Washington. However, temporary erosion control mitigation will be contractually mandated, installed, and maintained throughout the construction process to mitigate soils erosion off-site.**

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? **It is not anticipated that any new impervious areas will be installed due to this project.**

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: **The Contractor will employ Department of Ecology's best management practices to minimize the effects of erosion.**

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. **Exhaust emissions from construction equipment will occur during construction. Dust may be emitted during excavation and backfill operations. The Contractor will be required to mitigate the presence of any dust at all times by moistening exposed soil with water. The completed project will not result in new air emissions.**

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. **No off-site sources of emissions or odor will affect the proposal.**

c. Proposed measures to reduce or control emissions or other impacts to air, if any: **The Contractor will use best management practices and follow the requirements of the Contract documents in order to prevent emissions and impacts to the air.**

3. **Water**

a. Surface Water:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. **Yes, Soap Lake is in the vicinity of the proposed projects.**

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. **It is anticipated that a portion of the sewer work will be within 200 feet of Soap Lake. However, the City will not know the exact location of the projects until a citywide sewer video investigation occurs.**

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. **None.**

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. **No.**

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. **No.**

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. **No.**

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. **Yes, surface disposal of wastewater via rapid infiltration basins is the means through which the treated wastewater is returned to waters of the State at the City's wastewater treatment facility. The facility is permitted for a maximum daily discharge of 420,000 gallons per day. This will not change as a result of the project.**

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. **Yes, surface disposal of wastewater via rapid infiltration basins is the means through which the treated wastewater is returned to waters of the State at the City's wastewater treatment facility. The facility is permitted for a maximum daily discharge of 420,000 gallons per day. This will not change as a result of the project.**

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe. **Stormwater runoff will occur from gravel and paved surfaces and building roofs. Stormwater is anticipated to infiltrate on site.**

2) Could waste materials enter ground or surface waters? If so, generally describe. **No.**

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe. **No.**

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any: **None necessary.**

4. **Plants**

a. Check the types of vegetation found on the site:

____deciduous tree: alder, maple, aspen, other
__x_evergreen tree: fir, cedar, pine, other **shrubs**
__x_**grass**
____pasture
____crop or grain
____ Orchards, vineyards or other permanent crops.
____ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
____water plants: water lily, eelgrass, milfoil, other
____other types of vegetation

b. What kind and amount of vegetation will be removed or altered?
Where appropriate, native vegetation along road shoulders may need to be temporarily removed along existing right-of-ways. Areas that will not have an impervious surface will be hydroseeded for erosion control.

c. List threatened and endangered species known to be on or near the site.
According to the U.S. Fish and Wildlife Service Endangered and Threatened Species list for Grant County and the Washington Department of Fish and Wildlife Priority and Habitat Species maps, Showy stickseed (Hackelia venusta) and Ute ladies'-tresses (Spirarzthes diluvialis) are potentially located in Soap Lake.

Per the U.S. Fish and Wildlife Service Recovery Plan for Showy stickseed, the only known population of Showy stickseed is in the lower slopes of Tumwater Canyon in Chelan County, and therefore is not expected to be present near the project site.

Ute ladies'-tresses have a very limited population in Washington state. They have been discovered in Grant County but require very specific conditions to grow in. The species is endemic to moist soils in mesic or wet meadows near springs, lakes, or perennial streams, and the WWTF site does not experience the elevated groundwater table typical of growth. Furthermore, the project site already consists of predominantly impervious surfaces, the disturbance of native species is not anticipated. Finally, the elevation range of known Ute ladies-tresses occurrences is typically 4,300 to 7,000 feet. As such, it is assumed that Ute ladies'-tresses are not present in the project area.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: **None.**

e. List all noxious weeds and invasive species known to be on or near the site. **The projects are located in City right-of-way and will not impact plant life.**

5. **Animals**

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

Examples include:

birds: hawk, heron, eagle, **songbirds**, other:
mammals: deer, bear, elk, beaver, other:

fish: bass, salmon, trout, herring, shellfish, other _____

b. List any threatened and endangered species known to be on or near the site. [help]
According to the U.S. Fish and Wildlife Service Endangered and Threatened Species list for Grant County and the Washington Department of Fish and Wildlife Priority and Habitat Species maps, the following endangered or threatened species are potentially located in Soap Lake:

- **Pygmy rabbits (Brachylagus idahoensis) (likely not present)**
- **Gray wolf (Cam's lupus) (not at site)**
- **Northern spotted owl (Strix occidentalis caurina) (not at site)**
- **Marbled murrelet (Brachyramphus marmoratus) (not at site)**
- **Bull trout (Salvelinus confluentus) (not at site)**
- **Grizzly bear (Ursus arctos horribilis) (not at site)**

It is unlikely that pygmy rabbits are present. The project site is not included in the recovery area for pygmy rabbits, as pygmy rabbits rely heavily upon sagebrush and tall grasses for cover and do not remain in the open.

The gray wolf is found in remote parts of Western Washington with a specific designation of being west of Highway 97 and 17. The gray wolf requires large tracts of wilderness and would not be located within the residential population of Soap Lake. It is assumed that gray wolves are not present in the project area.

The northern spotted owl inhabits old growth forests and landscapes. The project site does not include old growth forests, therefore it is assumed that the northern spotted owls are not present in the project area.

Marbled murrelets use forests that primarily include typical old growth forests and mature forests with an old growth component. Due to the lack of large forested areas in the vicinity of Soap Lake, it is assumed that marbled murrelets are not present in the project area.

The project site will have no impact on surface water, therefore there will be no impact to bull trout.

Grizzly bears require large, uninterrupted tracts of land and have a propensity to avoid human contact. There are only an estimated 20 grizzly bears in Washington State and their range is limited to extreme northeastern and northwestern corners of the state. For this reason, it is assumed that grizzly bears are not present in the project area.

c. Is the site part of a migration route? If so, explain. **No.**

d. Proposed measures to preserve or enhance wildlife, if any: **None.**

e. List any invasive animal species known to be on or near the site. **None are known.**

6. **Energy and Natural Resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. **The gravity sewers will not require energy. The lift stations and the wastewater treatment facility (WWTF) operate on electricity. The WWTF also has a backup diesel generator.**

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. **No.**

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any: **The collection system and WWTF use gravity flow to the greatest extent possible to limit pumping requirements.**

7. **Environmental Health**

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe. **The collection system and WWTF transport and treat raw wastewater.**

1) Describe any known or possible contamination at the site from present or past uses. **None known.**

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity. **None known.**

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project. **The only hazardous materials associated with the proposed project would be fuels, lubricants, and coolants used in construction equipment.**

4) Describe special emergency services that might be required. **None.**

5) Proposed measures to reduce or control environmental health hazards, if any: **Replacement of the collection system will decrease exfiltration of sewage and provide improved treatment of the wastewater.**

b. Noise [help]

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? **Noise generated by automobile traffic throughout the City.**

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. **There would be short-term heavy equipment use during construction. Construction activities would be limited to normal daytime working hours. No noise would be created on a long-term basis.**

3) Proposed measures to reduce or control noise impacts, if any: **Construction will be limited to daytime working hours.**

8. **Land and Shoreline Use** [help]

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe. **Most of the collection system is located underneath public roadways and will not affect adjacent properties other than possible temporary detours for construction.**

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use? **No.**

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how: **No.**

c. Describe any structures on the site. **There are buildings located throughout the City, but nothing that is noteworthy for planning purposes.**

d. Will any structures be demolished? If so, what? **It is not anticipated that any structures will be demolished.**

e. What is the current zoning classification of the site? **Zoning classifications are shown in Figure 2-4 of the General Sewer Plan. Collection system upgrades are primarily located along residential and commercial zoning.**

f. What is the current comprehensive plan designation of the site? **The collection system is located underneath public roadways and alleys. The City will take into account the condition of the streets while planning collection system improvements.**

g. If applicable, what is the current shoreline master program designation of the site? **N/A.**

h. Has any part of the site been classified as a critical area by the city or county? If so, specify. **No.**

i. Approximately how many people would reside or work in the completed project? **The collection system operates by gravity, and the two lift stations operate automatically based upon wastewater level in the wetwells. Periodic maintenance may require 1 or 2 employees for a few hours at a time.**

j. Approximately how many people would the completed project displace? **None.**

k. Proposed measures to avoid or reduce displacement impacts, if any: **N/A**

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: **N/A**

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any: **N/A**

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. **None.**

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. **None.**

c. Proposed measures to reduce or control housing impacts, if any: **N/A**

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? **N/A.**

b. What views in the immediate vicinity would be altered or obstructed? **None.**

c. Proposed measures to reduce or control aesthetic impacts, if any: **None.**

11. **Light and Glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur? **None.**

b. Could light or glare from the finished project be a safety hazard or interfere with views? **No.**

c. What existing off-site sources of light or glare may affect your proposal? **None.**

d. Proposed measures to reduce or control light and glare impacts, if any: **None.**

12. **Recreation**

a. What designated and informal recreational opportunities are in the immediate vicinity?

City public parks and Soap Lake are in the near vicinity.

b. Would the proposed project displace any existing recreational uses? If so, describe. **No.**

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: **None.**

13. **Historic and cultural preservation** [help]

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe. **The Department of Archaeology and Historic Preservation WISAARD does not indicate any structures within the City.**

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. **None known.**

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc. **The Department of Archaeology and Historic Preservation WISAARD does not indicate any structures within the vicinity of the project location. Previously completed projects in the City have not indicated that cultural and historic resources will be on or near the project site. In addition, the majority of the proposed work is in previously disturbed areas. The City anticipates having cultural monitoring on site during the project.**

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required. **None.**

14. **Transportation** [help]

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any. **Most of the collection system is located underneath City streets. Several figures in the General Sewer Plan Amendment show these streets.**

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop? **The Grant Transit Authority travels through Soap Lake daily during weekdays and stops at the fire station. The proposal will not affect mass transit.**

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? **Parking will not be added or eliminated.**

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). **No.**

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. **No.**

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates? **None.**

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe. **No.**

h. Proposed measures to reduce or control transportation impacts, if any: **None.**

15. **Public Services**

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. **No.**

b. Proposed measures to reduce or control direct impacts on public services, if any. **None.**

16. **Utilities**

a. Underline utilities currently available at the site:
electricity, natural gas, **water**, **refuse service**, **telephone**, **sanitary sewer**, septic system, other _____

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. **Utilities altered by the project include the sanitary sewer collection system. This utility will require construction equipment which can provide excavation and install pipeline and other appurtenances. The City of Soap Lake provides the sanitary sewer services.**

C. Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Name of signee Robert Scott

Position and Agency/Organization Consulting Engineer, Gray & Osborne

Date Submitted: 6/3/18

D. supplemental sheet for nonproject actions [help]

(**IT IS NOT NECESSARY** to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?
The WWTF discharges effluent via rapid infiltration basins. The facility is permitted for a maximum daily discharge of 420,000 gallons per day. This will not change as a result of the project.

Proposed measures to avoid or reduce such increases are: **Replacement of the collection system will reduce infiltration and inflow and reduce the amount of wastewater treated at the WWTF.**

2. How would the proposal be likely to affect plants, animals, fish, or marine life?
It is unlikely that the proposal will affect plants, animals, fish, or marine life because most of the areas identified have been previously disturbed and are within City right-of-way.

Proposed measures to protect or conserve plants, animals, fish, or marine life are: **None.**

3. How would the proposal be likely to deplete energy or natural resources?
Replacement of sewer mains is expected to reduce infiltration and inflow, which will reduce sewer flows and energy spent pumping raw wastewater through the lift stations and treating it at the WWTF.

Proposed measures to protect or conserve energy and natural resources are: **N/A**

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?
The proposal is not likely to affect any of these areas.

Proposed measures to protect such resources or to avoid or reduce impacts are:
N/A.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?
The proposal is not likely to affect land and shoreline use.

Proposed measures to avoid or reduce shoreline and land use impacts are:

N/A

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

It is not likely to increase demands on transportation or public services and utilities.

Proposed measures to reduce or respond to such demand(s) are:

N/A.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

It is not anticipated that the proposal will conflict with local, state, or federal laws requiring protection of the environment.

APPENDIX D

SHORT LIVED ASSETS

USDA RURAL DEVELOPMENT
ESTIMATED SCHEDULE OF SHORT-LIVED ASSETS

Owner:	City of Soap Lake									
System:	Wastewater Utility									
		2 to 5 year period			6 to 10 year period			11 to 15 year period		
Water System Assets		quantities	unit price	total	quantities	unit price	total	quantities	unit price	total
Items 1	Collection System Pipes	0	$ -	$ -	0	$ -	$ -	500	$ 150	$ 75,000
Items 2	Misc. Tools	10	$ 100	$ 1,000	0	$ -	$ -	0	$ -	$ -
Items 3	Radios	4	$ 80	$ 320	0	$ -	$ -	0	$ -	$ -
Items 4	Office Equipment	1	$ 5,000	$ 5,000	0	$ -	$ -	0	$ -	$ -
Items 5	Vehicles	0	$ -	$ -	1	$ 20,000	$ 20,000	0	$ -	$ -
Items 6	WWTF - Telemetry Software	0	$ -	$ -	1	$ 10,000	$ 10,000	0	$ -	$ -
Items 7	WWTF - NPW Water Pump	0	$ -	$ -	0		$ -	3	$ 3,500	$ 10,500
Items 8	WWTF - Fine Screen Replacement Parts	0	$ -	$ -	0		$ -	1	$ 5,000	$ 5,000
Items 9	WWTF - Floating Digester Rotor Rebuild	0	$ -	$ -	0	$ -	$ -	2	$ 25,000	$ 50,000
Items 10	WWTF - RAS Pump Station Pump Replacement	0	$ -	$ -	0	$ -	$ -	1	$ 10,000	$ 10,000
Items 11	WWTF - Oxidation Ditch Rotor Rebuild	0	$ -	$ -	0	$ -	$ -	2	$ 25,000	$ 50,000
Items 12	WWTF - Flow Meter Replacement/Recalibration	0	$ -	$ -	4	$ 2,500	$ 10,000	0	$ -	$ -
Items 13	WWTF - Transfer Pump Replacment	0	$ -	$ -	0	$ -	$ -	1	$ 5,000	$ 5,000
Items 14	WWTF - Effluent Pump Replacement	0	$ -	$ -	0	$ -	$ -	2	$ 10,000	$ 20,000
Items 15	Lift Station No. 1 Pump Replacement	0	$ -	$ -	0	$ -	$ -	1	$ 12,000	$ 12,000
Items 16	Lift Station No. 2 Pump Replacement	0	$ -	$ -	0	$ -	$ -	1	$ 12,000	$ 12,000
		subtotal		$ 6,320	subtotal		$ 40,000	subtotal		$ 249,500
User Note: This schedule is used as an estimating tool only. It is of the simplist format, and does not include inflation, depreciation, or other factors.										
	The estimated item costs should be based on current replacement costs (material, sales tax, engineer's $, contractor's $, but not typical labor of owner).									