Upper Valley North Sewer Study

Weber County – August 2023

SUNRISE ENGINEERING

WEBER COUNTY

Gary Myers, PE
Weber County Engineer
Engineering Department

Subject: Upper Valley Sewer Study

Gary,

Sunrise Engineering, Inc. (Sunrise) has completed the Upper Valley Sewer Study. The purpose of this document is to summarize the findings and information obtained throughout the process. Sunrise agreed to create the following study as seen in the contract between Sunrise and Weber County (Appendix A). Please review this study and sign this page documenting that you have read the document and approve of our concept and assumptions. If you have any questions or comments relative to the assumptions made and conclusions developed herein, please contact Sunrise.

Sincerely,
SUNRISE ENGINEERING, INC.

Jared Andersen, P.E.
Project Manager

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 Summary of Existing Studies and Research

Weber County has identified the need to evaluate the Upper Valley area regarding wastewater collection and treatment options given the continued development of the region and the potential environmental impacts untreated septic systems pose to the surrounding ecosystem and groundwater quality. The area in question is shown in **Figure 1-1**. Two documents Weber County asked Sunrise Engineering to review are the Huntsville Town Southern Ogden Valley Wastewater Collection and Treatment Capital Facilities Study (2011) and the UGS Special Study 165(2019). The following section summarizes the findings and observations from these studies as well as the following dissertation: Nutrient Contribution of the Shallow Unconfined Aquifer to Pineview Reservoir.

1.1. Huntsville Town Southern Ogden Valley Wastewater Collection and Treatment Capital Facilities Study (2011)

1.1.1. BACKGROUND

The study was completed in 2011 by Sunrise Engineering with the goal of evaluating the feasibility of constructing and operating collection and treatment facilities under current conditions and regulations for the town of Huntsville. Given that Huntsville lays just south of the study area in question we believe the findings regarding feasibility, demographics, and existing conditions to be useful and pertinent to the Upper Valley Study.

1.1.2. FINDINGS

The Treatment Alternative #3a (Regional Mechanical SBR/Fluidyne Plant) and Collection Alternative #2 (Conventional Gravity Collection) were selected as the best alternative for the Huntsville area. The selection was based on both monetary factors and non-monetary factors, evaluating a phased approach, a non-phased approach, environmental impacts, energy consumption requirements etc. With all these factors being considered, it was determined that a Regional Mechanical Plant was the best selected alternative.

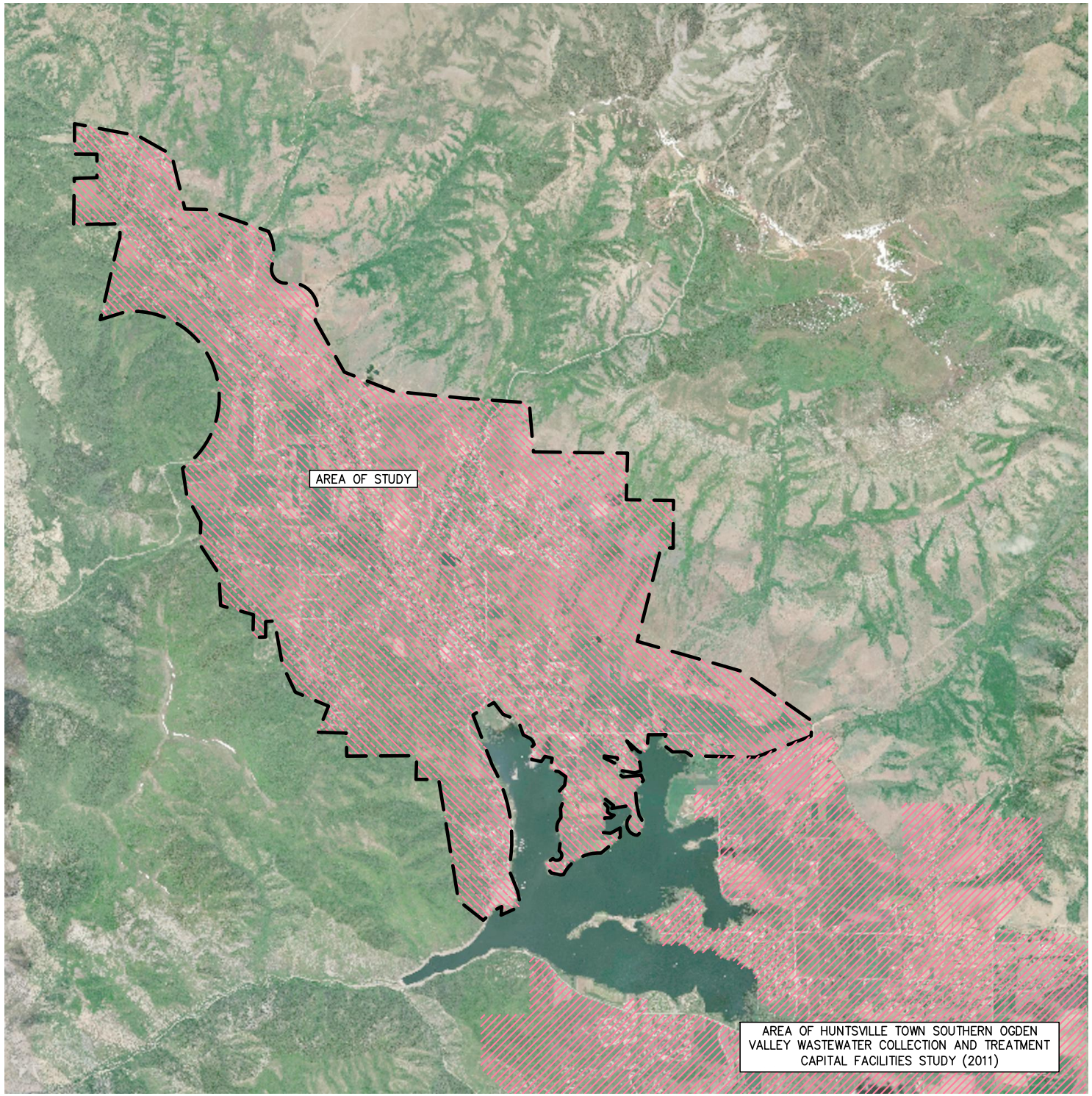
1.1.3. SUMMARY OF STUDY

This study was completed in March of 2011. The study included the justification and description of a selected plan. The study reviewed environmental aspects, geotechnical, infrastructure feasibility design, treatment facility feasibility design, electrical needs for the plant, and funding options to move forward.

1.2. USGS Special Study 165

1.2.1. BACKGROUND

As stated in the study, 'the primary goals of the study are to (1) characterize the hydrogeology of the Ogden Valley drainage basin as it pertains to the occurrence and flow of groundwater, with emphasis on



NORTH

SCALE

0 8000' 16000'

HORIZ: 1" = 8000'

EXISTING ZONING BOUNDARY

CONTRIBUTING BOUNDARY

PREVIOUS STUDY AREA (2011)

STUDY AREA

FIGURE 1

WEBER COUNTY

UPPER VALLEY SEWER STUDY

STUDY AREAS

SEI NO.	DESIGNED	DRAWN	CHECKED
08041	JA	CR	JA

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delineating the valley-fill aquifer thickness and determining the water-yielding characteristics of unconsolidated and fractured-rock aquifers in the study area: (2) understand the interaction between surface water and groundwater: (3)document current groundwater quality in the valley-fill aquifer; (4) develop a water budget for the drainage basin; (5) update septic-tank system density recommendations based on the water budget.'

1.2.2. FINDINGS

- Present-day Ambient nitrate concentration for the unconfined aquifer is 1.43 mg/L.
- Existing septic tank density is 11.2 acres per system.
- Adding 1539 to 1759 new homes with 3.0 people per household could bring nitrate to 2.43 mg/L.
- Likely scenario: 2.4 people per household could see an additional 3166 to 3441 conventional septic-tank systems while adding 1 mg/L nitrate to the groundwater.
- If 1998 lot size recommendations of 3 acres per lot are used nitrate concentrations could be mitigated.
- At maximum build-out, at least 10,000 dwelling units could occupy the valley-fill area.

1.2.3. SUMMARY OF STUDY

As stated in the study, 'Adding 1540 septic tanks to the valley (full-time residency) produces an average septic-tank density of 6.6 acres per system and adding 4860 septic tanks equates to an average density of 3.5 acres per system. Requiring new systems to use advanced nitrate removal technology is an approach managers could chose to meet desired water-quality degradation limits while keeping the current 3 acres per system lot size. We note that current average nitrate concentrations in the principal and shallow unconfined aquifers are markedly higher than those found in the 1998 assessment of the principal aquifer (Wallace and Lowe, 1998), and that degradation has nearly exceeded the 1 mg/L degradation target modeled in 1998. Furthermore, we stress that allowing a degradation of 1 mg/L to the mean nitrate concentration will increase the probability that nitrate concentration in individual wells may surpass the allowable safe drinking water standard.

While Ogden Valley is still only sparsely inhabited, development pressures and water management choices have resulted in some degradation of water resources. Water in the valley is plentiful due to high precipitation and moderate evapotranspiration. However, reliance on septic systems has contributed to locally high nitrate concentrations in both the principal aquifer and the shallow unconfined aquifer, potentially jeopardizing the Pristine water-quality classification. With some fraction of the Ogden City well field extraction being modern recharge, as shown by tritium and slightly elevated nitrate, the risk of contamination from surface sources is greater than is typical for wells in confined aquifers. Water resource managers should be vigilant in protecting the quality of Ogden Valley's groundwater resources as population and use grows.'

1.3. Dissertation: Nutrient Contribution of the Shallow Unconfined Aquifer to Pineview Reservoir

1.3.1. BACKGROUND

Thomas Nyanda Reuben, Doctor of Philosophy, Utah State University wrote this dissertation in 2013. The dissertation was approved by one Professor and six Doctorate Professors at Utah State University. The dissertation states, 'Pineview Reservoir, near Utah's populous Wasatch Front, could play an important role in modulating water supply as water demands and water uses change in response to increasing population densities. The reservoir's water quality may decline if nitrogen and phosphorus additions to the reservoir are not controlled. Most of the water flowing into the reservoir in summer and fall is contributed by the shallow ground water. The quantity and quality of the shallow ground water to Pineview Reservoir were studied from February 2010 through November 2011. The objectives were to: 1) increase understanding of nitrogen and phosphorus transport from ground water to the reservoir; 2) understand the differences in ground water flows and transport of nitrogen and phosphorus from different locations in a mountainous irrigated valley; and 3) estimate the nitrate contributions of cropland, lawns, and onsite wastewater to ground water. Large variations in nitrogen and phosphorus transport from different locations and land uses were observed. This information will help water managers, planners and water users to make informed decisions on how to protect or improve the reservoir's water quality.'

1.3.2. FINDINGS

- The report was conducted from February 2010 to November 2011
- Ground water in the Shallow water table aquifer that surrounds the reservoir contributes a large proportion of the reservoir's inflows
- "To our knowledge, there has not been any detailed studies on nutrient loading from the shallow unconfined aquifer to Pineview Reservoir."
- "In the United States, approximately 82-84% of total nitrogen and phosphorus loads to surface water bodies were contributed by nonpoint sources." (Carpenter et al. 1998)
- "3-20% of phosphorus applied to agricultural land is eroded or leached to surface water bodies." NRC 1993; (Isermann 1990)
- Lowe and Miner (1990) reported that groundwater from the unconfined aquifer in Ogden Valley made a significant contribution of nitrate-nitrogen to Pineview Reservoir due to septic systems and agriculture.
- The study showed that the annual leaching rates from the drain-fields and the lawns were, respectively, more than 2.6 and 1.1 fold higher than the croplands.

1.3.3. SUMMARY OF STUDY

'The study has also demonstrated the need for nutrient pollution control programs to incorporate best management practices for lawns especially in areas where lawns occupy a large fraction of the land. The impact of leaching from lawns in areas with smaller fractions of land occupied by lawns may be small due to the ground water dilution effect. Some of the best management practices that could be employed on the lawns and cropland include precision fertilizer and water applications and enhancement of the soil organic matter content to levels that would enhance the water holding capacities of coarse textured soils.

Drain-field leaching rates were higher than those from cropland but their combined nitrate + nitrite N leaching amount was superseded by the much larger area of cropland. The findings were not unexpected and they do not negate but emphasize the importance of proper management of wastewater discharge to ground water because the high leaching rates are a clear indicator of the threat that sewage effluent poses to ground water especially in areas with high septic system densities.

1.4. Summary of Reports

The Huntsville Town Southern Ogden Valley Wastewater Collection Study was completed in 2011. The study spoke well to how the sewer issues in the southern area of the valley could be addressed. Although the study did not equate to an actual project, the work put into the study could greatly benefit proposed sewer projects in the southern area of the valley.

The USGS Special Study 165 evaluated the entire water cycle of the Ogden Valley. The Study took a couple years to produce and goes into great detail explaining the surface a groundwater issues Ogden Valley is experiencing. The study expressed great concern for groundwater quality and how to address this issue.

The Dissertation: Nutrient Contribution of the Shallow Unconfined Aquifer to Pineview Reservoir explains the process in which nitrates contaminate groundwater.

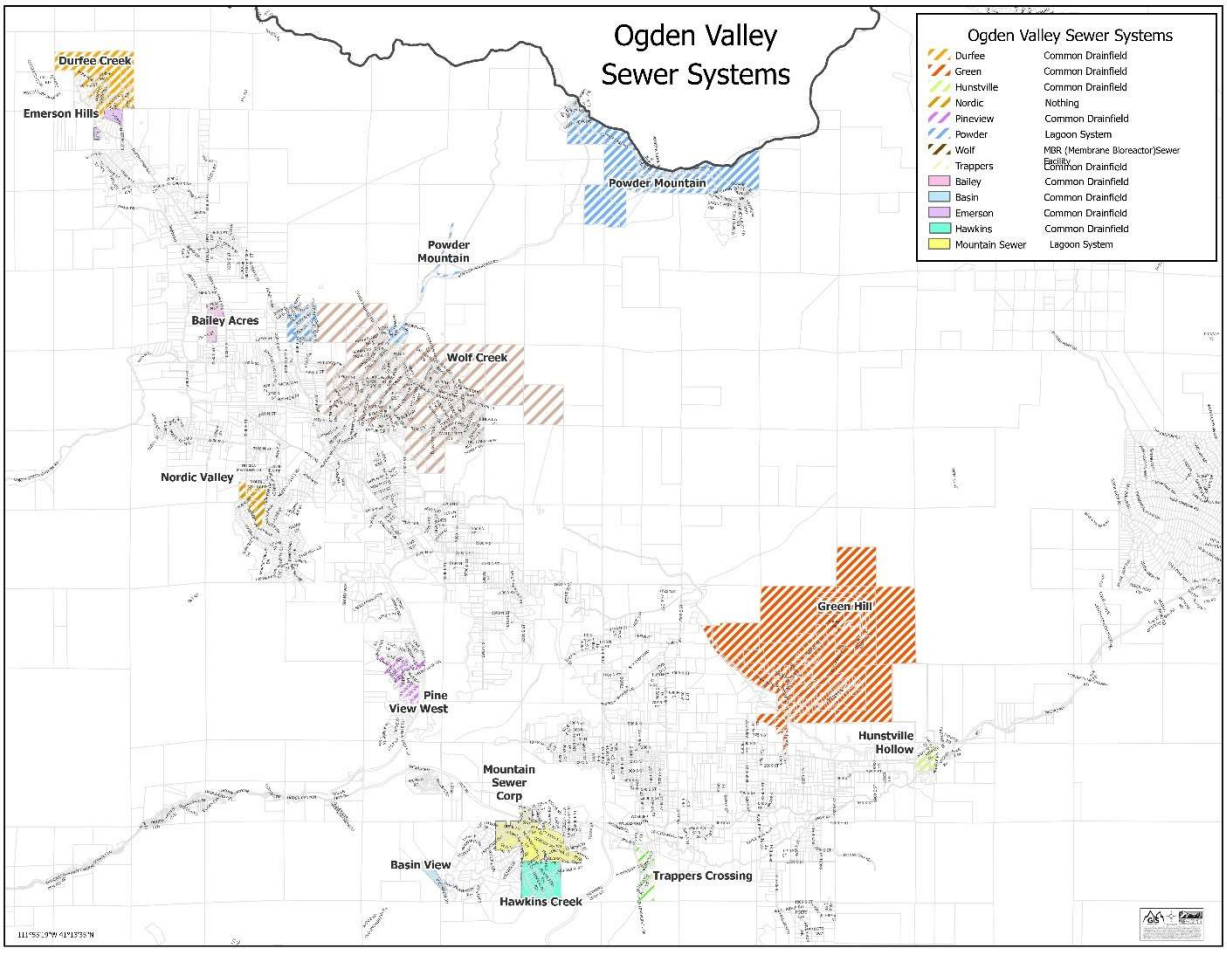
Similar to the Huntsville Town Southern Ogden Valley Wastewater Collection Study, the Weber County Upper Valley North Sewer Study will recommend design of sewer where the collection and treatment will help mitigate the nitrates produced through septic system leach fields. Septic systems and leach fields attribute to a portion of the nitrates and phosphates introduced to the ground water. The goal of the Weber County Upper Valley North Sewer Study is to show ways to mitigate the negative impacts septic systems and leach fields have on ground water quality by collection and treating the sewer before it enters into the ground water.

2.0 Background Information and Planning Area

2.1. EXISTING WASTEWATER SYSTEMS

This section will define the project area and planning region boundaries along with identifying key areas, stakeholders, and existing wastewater systems within the planning region. Section 4.0 will discuss the existing environmental conditions.

Weber County has published the following map showing the existing known wastewater disposal systems in the Ogden Valley. The systems in the north include Durfee Creek, Camp Utaba, Bailey Acres, Wolf Creek Water and Sewer Improvement District (WCWSID), Powder Mountain Water and Sewer Improvement District (PMWSID), Crimson Ridge/Pineview West/Radford Hills septic systems, and non-community septic tank systems.



The existing systems and non-community septic tank systems location will be evaluated and included in the feasibility design of the sewer infrastructure. This study will not include any evaluation within the WCWSID or PMWSID boundaries.

2.2. PLANNING REGION BOUNDARIES

The area of study is shown in Figure 1. The study refers to this area as the contributing boundary. The contributing boundary is an estimated area which can be developed. Outside the contributing boundary includes rural forest and open space areas zoned as F-40 or Open Space 'O', and areas with existing sewer treatment systems in place. The area inside the contributing boundary includes developed residential and commercial subdivisions, proposed development, Wolf Creek Water and Sewer Improvement District, and the evaporation ponds of Powder Mountain Water and Sewer Improvement District. The limit of valley fill shown in Figure 1 is an estimated developable boundary which will be defined better in Section 3.0. This boundary is also defined by existing slope and the ability to develop on that slope.

2.3. KEY AREAS AND STAKEHOLDERS

Key areas recognized as part of the evaluation include future urban development areas, existing sewer treatment districts, and existing communities. Near future developments include Osprey Ranch, Cobabe Ranch, Eagle Ridge, and Nordic Valley developments. Stakeholders include existing residents, Weber County, Utah State DEQ, property owners, existing sewer districts, any other local and state governing entities who have an interest in water quality.

2.4. EXISTING CONDITION OF RIVER SYSTEMS AND WATER WAYS

The North Fork Ogden River is the major river flowing through the Upper Valley North area. Wolf Creek , Cache Valley Creek, Sheep Creek, and Durfee Creek flow from the mountainous region East of North Fork and terminate into North Fork River. Cutler Creek, Cobble Creek, and Liberty Spring Creek originate West of the Ogden River North Fork and terminate into it.

3.0 Population Study and Wastewater Flows

Weber County has identified the need to evaluate the Upper Valley area regarding wastewater collection and treatment options given the continued development of the region and the potential environmental impacts untreated septic systems pose to the surrounding ecosystem and groundwater quality. The area in question lies south of North Fork Park and North of Pineview Reservoir. This memo will summarize our research and findings regarding the projected population growth in the upper valley area.

3.1. PROJECT ELEMENTS

This design memo will address existing and future population in Ogden valley using existing population data for the area. Our projected estimates for population growth increases are based on existing population growth trends. Wastewater flows are estimated based on existing population data and comparisons are made between the actual flow and design flow requirements of Utah DEQ. Projections for future wastewater demands are based on the projected population growth model discussed herein. Elements addressed in this memo are summarized below:

1- Evaluate existing populations and potential existing wastewater flows
2- Population growth model for upper valley area
3- Future Population Growth and wastewater demands for Ogden Valley

3.2. Existing populations and potential existing wastewater flows

Figures PP1 (ERU) – PP9 (ERU) in Appendix A represent accounting one ERU (Equivalent Residential Unit) for all existing residents within the area to be evaluated. The design of the sewer infrastructure will include potential existing connections along with proposed connections.

3.3. Population growth model

While estimated growth rates are susceptible to change, it is necessary to project a community's growth over the duration of the planning period in order to estimate the increased demands and loadings on the community's infrastructure. Required improvements and expansions can then be planned for in a responsible and systematic manner. The time frame estimation for this study is 20 years.

The population growth model is based on data collected from the Upper Valley Study Area. Targeted areas of interest include the populations of Eden, Liberty, Wolf Creek, Huntsville, and Ogden Valley. The Vacant Land Analysis spreadsheet containing population growth data for the area was used as the basis of our population growth model.

The Status Quo Buildout Scenario is based on a weighted average of the number of existing buildings divided by the total number of buildings for each population area and multiplied by the average yr/yr growth from the past 8 years.

$$Weighted\ Average = (Existing\ Dwellings) * \frac{avg\frac{yr}{yr}\ growth}{\Sigma\ Existing\ dwellings}$$

Table 3-1: Status Quo Buildout Scenario

	Status Quo Buildout Senario		
POPULATION:	**2012-2020 yr/yr growth**	**Existing dwellings**	**Weighted Avg.**
Eden	3.08%	228	0.31%
Huntsville	1.27%	241	0.14%
Liberty	3.02%	553	0.75%
Wolf Creek	1.94%	1219	1.05%
		Weighted Sum=	**2.25%**

The average growth is based on data from the American Community Survey (ACS) from 2012-2020 and is reflective of the total number of housing units which will be used to estimate our projected future sewer flows.

After finding the average year over year growth for the towns of Eden, Huntsville, Liberty, and Wolf Creek from 2012-2020; a weighted average was taken based on the relative number of existing dwellings of the communities to estimate the overall growth rate for the area.

The process for finding the weighted average is described by the following equation:

$$Weighted\ Average = (Existing\ Dwellings) * \frac{avg\frac{yr}{yr}\ growth}{\Sigma\ Existing\ dwellings}$$

The weighted averages were then summed yielding a growth rate of 2.25% we believe a 4% growth rate is more appropriate for the area because of the zoning requirements and the potential to build out and expand the area which will become more prevalent in the coming decades given that areas for future buildout in the Salt Lake and Lower Ogden Valleys are rapidly diminishing.

The 4% growth rate and the evaluation of potential existing resident connections provides a conservative estimate of flows for the area over the next 20 years.

3.4. Future Wastewater Demands

Based on the population projection outlined in Section 3.3 the estimated ERU in 20 years will be 2,831. The analysis included village centers discussed in the Weber County General Plan shown in **Figure 3-2**, proposed developments as shown in **Figure 3-3** and estimate growth using the existing zoning map shown in **Figure 3-4**. The analysis excluded non-developable areas of wetlands and floodplain shown in **Figure 3-5**.

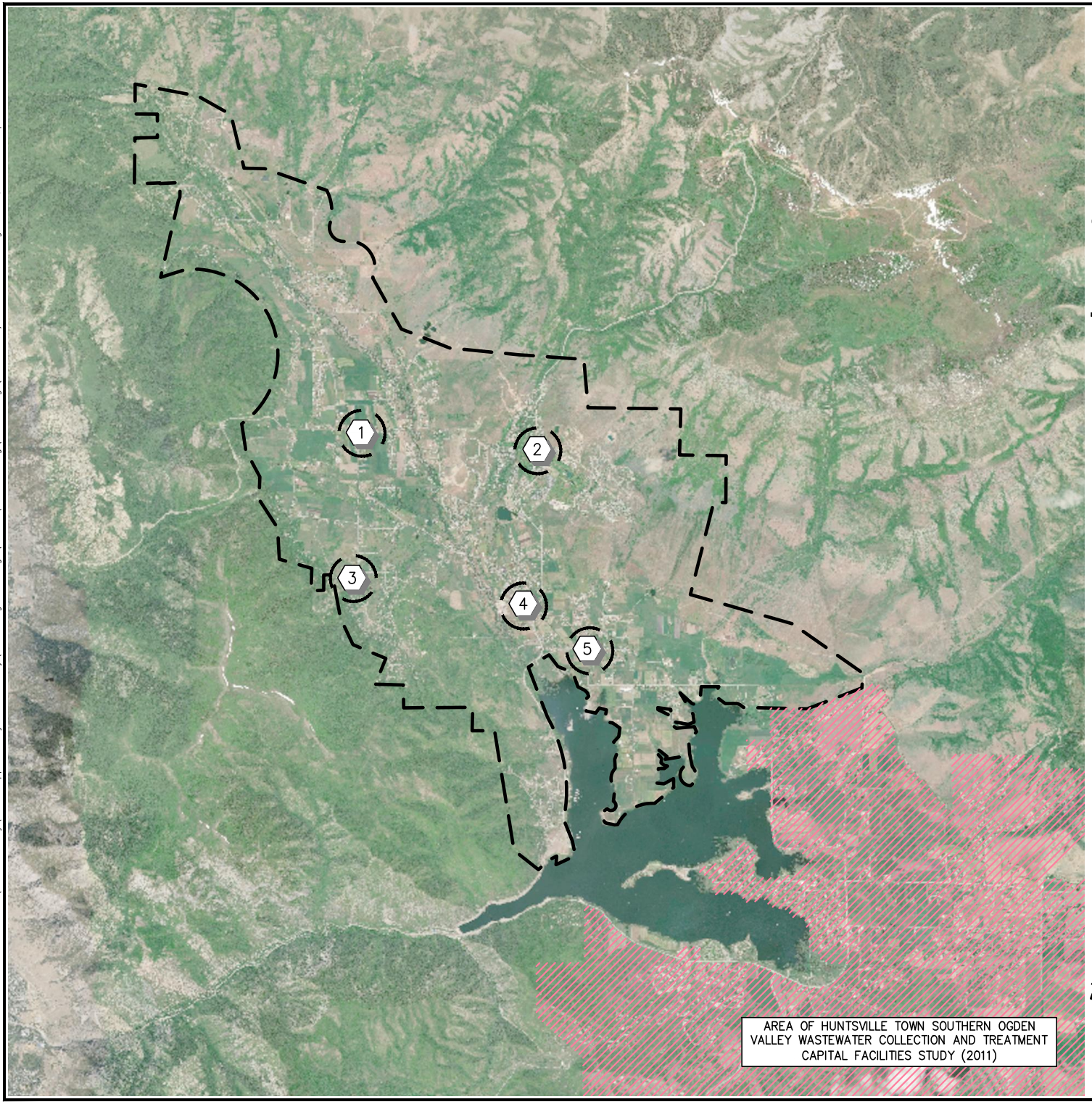
Table 3-2 processes this data and shows what size of line would be needed for the estimated data at each of the major intersections. The pipe size estimation can act as a foundation for future design along the designated alignments. Appendix A drawings PP1 (ERU) – PP9 (ERU) show the approximate line size and the surface flow which gives an estimation of the slope of the gravity sewer line. **Table 3-2** took an analysis of existing and proposed ERU in the area as shown in Appendix A drawings PP1 – PP9.

Table 3-2: Overall Estimated Sewer Design Analysis

Main Intersections	ERU EQUIVALANT (ALONG LINE)	ERU CUMULATIVE (BY END OF LINE SEGMENT)	ERU (20 years)	Peaking Factor	GPD/ERU AVERAGE DAILY	Anticipated PEAK FLOW (20 Years) (GPD)	Sewer Pipe Size
NORTH FORK TO 5950N	26	26	57	2.5	400	56,969	8
NORTH FORK @ 5950N TO BRIDGE CROSSING	175	201	440	2.5	400	440,416	8
E3300N @ E5100N	27	228	500	2.5	400	499,576	10
E3300N @ E 4800 N	42	270	592	2.5	400	591,603	10
E3300N @ BAILEY ACRES TIE IN	64	334	732	2.5	400	731,835	10
E4100N @ E3300N INTERSECTION	18	352	771	2.5	400	771,275	10
N3500E @ E4100N INTERSECTION	10	362	793	2.5	400	793,187	10
HWY 162 @ N3500E INTERSECTION	92	454	995	2.5	400	994,770	12
HWY 162 @ E3300N INTERSECTION	186	640	1402	2.5	400	1,402,319	15
HWY 162 @ E NORDIC VALLEY DRIVE	26	666	1459	2.5	400	1,459,288	15
HWY 162 @ BRIDGE CROSSING	6	672	1472	2.5	400	1,472,435	15
RIVER DRIVE START	55	55	121	2.5	400	120,512	8
RIVER DRIVE AT LATERAL TIE IN 1	57	112	245	2.5	400	245,406	8
RIVER DRIVE AT EDEN HILLS DRIVE	62	174	381	2.5	400	381,255	8
HWY 162 @ RIVER DRIVE	182	854	1871	2.5	400	1,871,219	15
HWY 162 @ E2725N	107	961	2105	2.5	400	2,105,253	18
EHWY 166 @ E2300N	94	94	206	2.5	400	205,966	8
E1900N @ N5700E	57	57	125	2.5	400	124,894	8
E1900N AT TERMINAL LIFT STATION	121	121	265	2.5	400	265,126	8
E2200N Start	-	215	471	2.5	400	471,091	10
LOWER HWY 158 @ E2200N	48	1292	2831	2.5	400	2,830,663	21
Force Main lift back to Wolf Creek	-	1292	2831	2.5	400	2,830,663	21
HWY158 @ 4 Way Stop		1019	2232	2.5	400	2,232,486	18
PENINSUAL LIFT STATION N5900E	24	24	53	2.5	400	52,587	8
Growth Rate=	**4%**						

3.5. Conclusions

This analysis is a high-level analysis intended to provide data for future detailed design. For the purpose of this study, a 4% growth rate is used for population projection. The rate is based on previous years of data collection. Table 3-2 can be used as a template for what growth could look like and associate pipe sizes.



NORTH

SCALE

0 8000' 16000'

HORIZ: 1" = 8000'

VILLAGE AREA CENTERS

VILLAGE AREAS

1. LIBERTY
2. WOLF CREEK
3. NORDIC VALLEY
4. 4 WAY STOP
5. EDEN

FIGURE 2

WEBER COUNTY

UPPER VALLEY SEWER STUDY

OVERVIEW

VILLAGE AREAS

SEI NO.	DESIGNED	DRAWN	CHECKED
08041	JA	CR	JA

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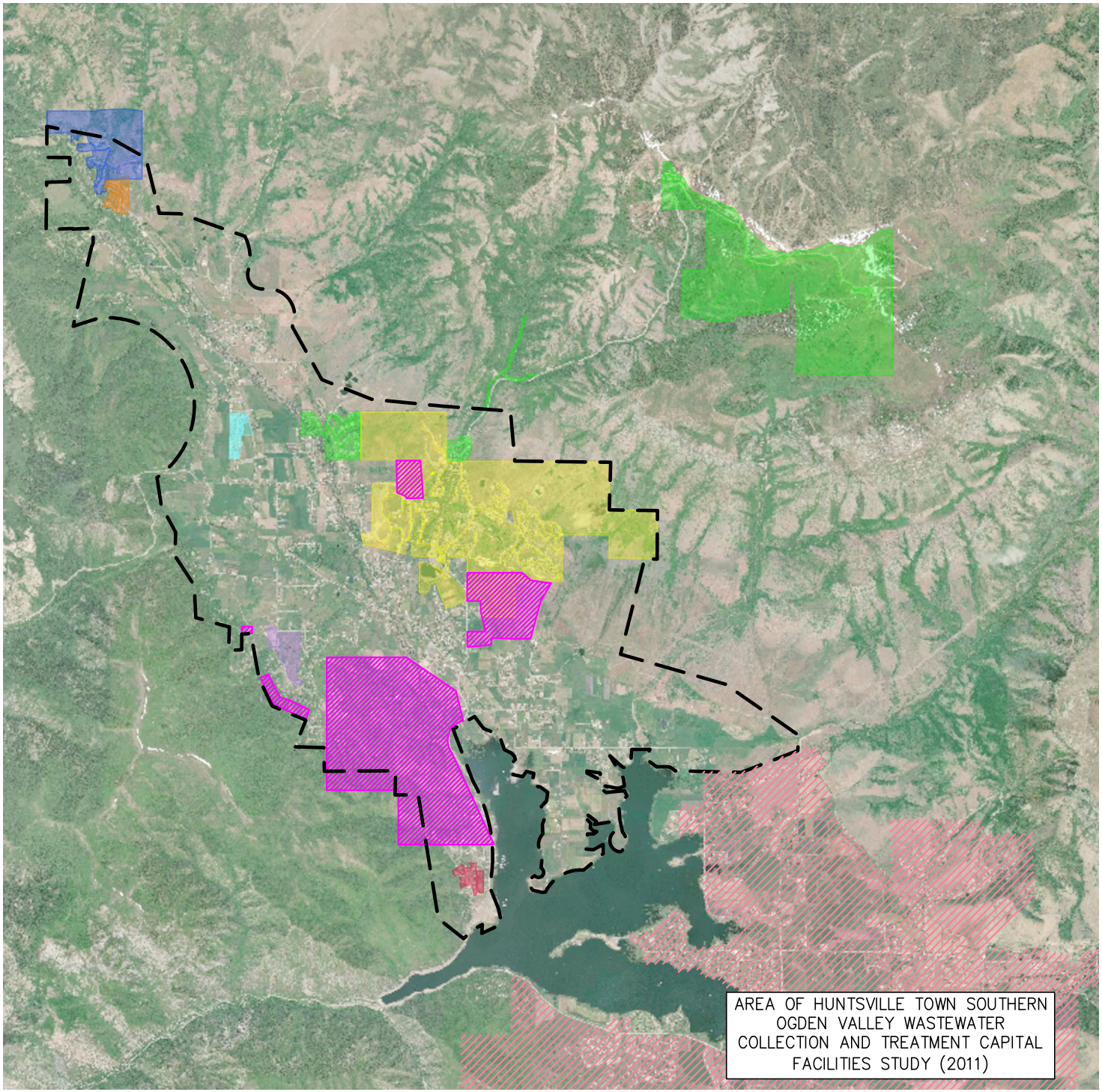

NORTH

SCALE

0 8000' 16000'

HORIZ: 1" = 8000'

- PINEVIEW WEST
- POWDER MOUNTAIN WATER AND SEWER IMPROVEMENT DISTRICT (PMWSID)
- DURFEE CREEK
- WOLF CREEK WATER AND SEWER IMPROVEMENT DISTRICT (WCWSID)
- NORDIC VALLEY
- EMERSON HILLS SEWER
- BAILEY ACRES SEWER
- CONTRIBUTING BOUNDARY
- PROPOSED DEVELOPMENTS

FIGURE 3

WEBER COUNTY

UPPER VALLEY SEWER STUDY

OVERVIEW

EXISTING SEWER DISTRICTS

SEI NO.	DESIGNED	DRAWN	CHECKED
08041	JA	CD	JA

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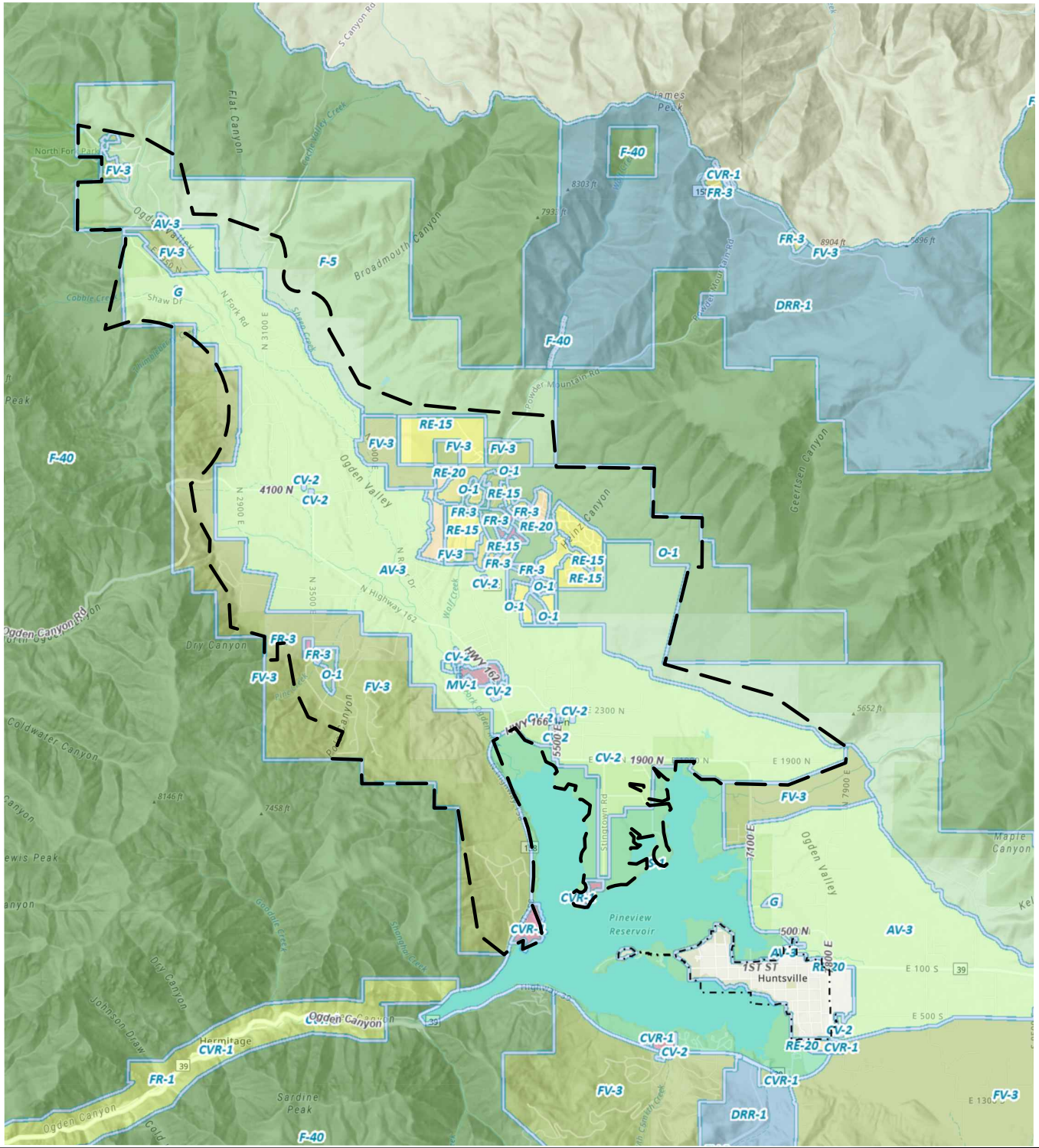

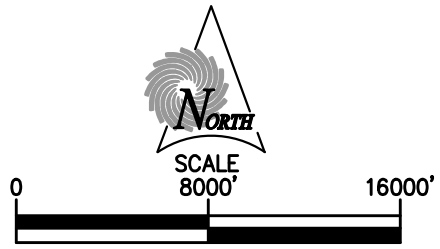

HORIZ: 1" = 8000'

NOTES:

- MAX BUILDOUT=33685 SINGLE FAMILY RESIDENCES (OR EQUIVALANT)

WEBER COUNTY SPECS:

MIN. LOT SIZES:

A-1=20,000 FT^2
A-2=20,000 FT^2
A-3=40,000 FT^2

M-1=10,000 FT^2
M-2=10,000 FT^2
M-3=20,000 FT^2

AV3=3 ACRES

CV-2=10,000 FT^2 (NO MIN SIZE)

DRR-1=RESORT

RE-15=15,000 FT^2
RE-20=20,000 FT^2

CONTRIBUTING BOUNDARY

FIGURE 4

WEBER COUNTY

UPPER VALLEY SEWER STUDY

OVERVIEW
ZONING MAP

SEI NO.	DESIGNED	DRAWN	CHECKED
08041	JA	CR	JA

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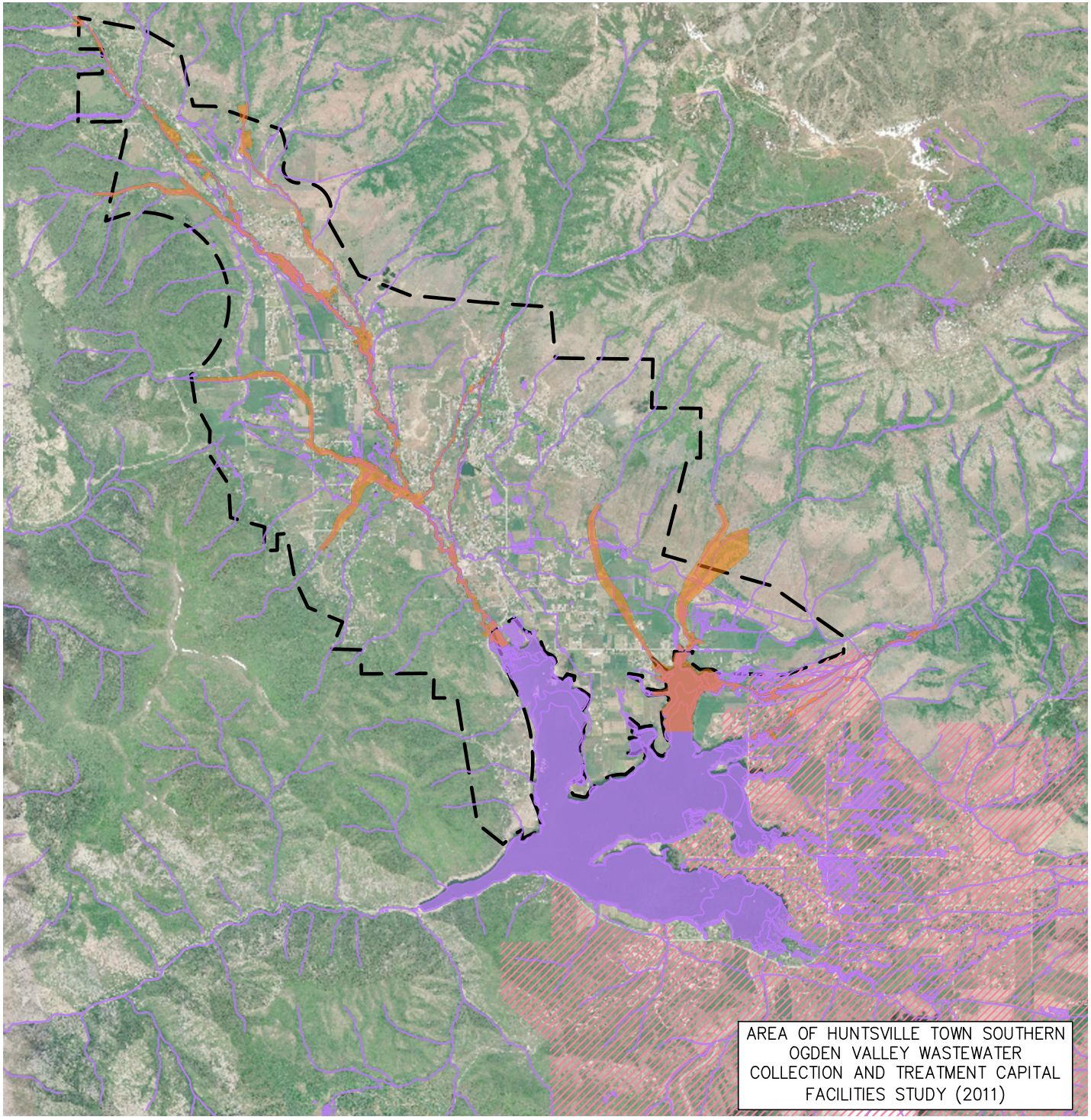

NORTH

SCALE

0 8000' 16000'

HORIZ: 1" = 8000'

EXISTING ZONING BOUNDARY

CONTRIBUTING BOUNDARY

100 YEAR FLOODPLAIN

WETLANDS

FIGURE 5

WEBER COUNTY

UPPER VALLEY SEWER STUDY

CIVIL SITE

FLOODPLAIN AND WETLAND DATA

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Based on the population projection, the anticipated number of ERU's would be 2831. The largest estimated size of gravity sewer line would be a 21" sewer line. The estimated peak flow in that line would be 2,830,663 gallons per day. This information can be used with any future design completed at the specified locations as a guide for design. This analysis gives a good basis of understanding for sewer design in the Northern Area of the Upper Valley. Section 5.0 will detail what areas were assessed and what areas were not assessed.

4.0 Environmental Study Background

This document summarizes the Phase 1 Environmental Study required to understand feasibility for wastewater treatment options in the Upper Valley North Area. Information regarding floodplains and wetlands, agricultural farmlands, fish and wildlife resources, threatened, endangered and candidate species, and water quality and quantity analysis is contained herein.

4.1. Environmental Information

Since this is a feasibility study and no specific project has been proposed, no response would be received for consultation with any state or federal agency is not appropriate. Therefore, the environmental information has been obtained from various sources as referenced in the following sections.

4.2. Floodplains

A floodplain is flat or nearly flat land adjacent to a stream or river that experiences occasional or periodic flooding. It includes the floodway, which consists of the stream channel and adjacent areas that carry flood flows, and the flood fringe, which are areas covered by the flood that do not experience a strong current. A 100-year flood is calculated to be the level of flood water expected to be equaled or exceeded every 100 years on average. The 100-year flood is more accurately referred to as the 1% flood, since it is a flood that has a 1% chance of being equaled or exceeded in any single year. Based on the expected flood water level, a predicted area of inundation can be mapped.

Floodplain areas for the study area were obtained from the Weber County GIS database and are shown in **Figure 3-5**.

4.3. Wetlands

Wetlands are defined as areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 Code of Federal Regulations [CFR] 328.3[b], 40 CFR 230.3). For a wetland to qualify as jurisdictional by the U.S. Army Corps of Engineers (ACOE) and therefore be subject to regulation under Section 404 of the Clean Water

Act, the site must support a prevalence of hydrophytic vegetation, hydric soils, and wetland hydrology. Other waters of the United States are sites that typically lack one or more of the three indicators.

Wetland areas for the study area were obtained from the Weber County GIS database and are shown in **Figure 3-5**.

4.4. Agricultural Farmlands

Soil data were collected from the U.S. Natural Resources Conservation Service (NRCS) website. A total of 36 soil types are present in the study area, as shown in **Figure 4-1**. The soil information is summarized in **Table 4-1**.

Figure 4-1

Table 4-1: Soil Data Summary

Soil Symbol	Description	Farmland Classification	Area (acres)	Percentage (%)
BfA	Brownlee loam, 0-3% slopes	Prime farmland if irrigated	1434	9.8%
BfB	Brownlee loam, 3-6% slopes	Prime farmland if irrigated	122	0.8%
Ct	Crooked Creek silty clay loam	Farmland of statewide importance	728	5.0%
CW	Cumulic Haploborolls, wet	Not prime farmland	112	0.8%
DeG	Durfee stony loam, 30-70% slopes	Not prime farmland	1255	8.6%
FAB	Fluvaquentic Haploborolls-Fluventic Haploxerrolls complex, 1-6% slopes	Not prime farmland	49	0.3%
FdG	Foxol-Durfee complex, 30-70% slopes	Not prime farmland	32	0.2%
GcG	Geertsen-Agassiz complex, 30-70% slopes	Not prime farmland	200	1.4%
GP	Gravel pits	Not prime farmland	2	0.0%
HbD	Hawkins silty clay, 6-15% slopes	Farmland of statewide importance	247	1.7%
KaB	Kahler gravelly loam, 3-6% slopes	Prime farmland if irrigated	317	2.2%
KaC	Kahler gravelly loam, 6-10% slopes	Prime farmland if irrigated	799	5.5%
LaD	Lamondi stony loam, 3-15% slopes	Not prime farmland	1200	8.2%
MbA	Manila loam, 0-3% slopes	Prime farmland if irrigated	265	1.8%
MbB	Manila loam, 3-6% slopes	Prime farmland if irrigated	115	0.8%
MbC	Manila loam, 6-10% slopes	Prime farmland if irrigated	216	1.5%
MbD	Manila loam, 10-15% slopes	Farmland of statewide importance	257	1.8%
MbE	Manila loam, 25-40% slopes	Not prime farmland	101	0.7%
NsA	Nicodemus gravelly loam, 0-3% slopes	Farmland of statewide importance	994	6.8%
NuG	Nordic gravelly loam, 30-60% slopes	Not prime farmland	157	1.1%
NVG	Nordic-Patio association, very steep slopes	Not prime farmland	388	2.7%
OaG	Ostler loam, 20-50% slopes	Not prime farmland	406	2.8%
PdG	Patio gravelly loam, 40-60% slopes	Not prime farmland	53	0.4%
PhA	Phoebe fine sandy loam, 0-3% slopes	Prime farmland if irrigated	113	0.8%
PoG	Poleline stony loam, 40-70% slopes	Not prime farmland	184	1.3%
PPG	Poleline-Patio association, very steep slopes	Not prime farmland	2	0.0%
SfG	Smarts loam, 40-60% slopes	Not prime farmland	590	4.0%
SnA	Steed cobbly loam, 0-3% slopes	Farmland of statewide importance	22	0.2%
SwA	Sunset loam, very gravelly substratum	Prime farmland if irrigated and drained	2	0.0%
TnA	Trojan loam, warm, 0-3% slopes	Prime farmland if irrigated	676	4.6%
TnD	Trojan loam, warm, 8-15% slopes	Farmland of statewide importance	339	2.3%
UbA	Utaba cobbly loam, warm	Farmland of statewide importance	81	0.6%
W	Water	Not prime farmland	22	0.1%
YaA	Yeates Hollow loam, 2-5% slopes	Prime farmland if irrigated	105	0.7%
YcD	Yeates Hollow very stony loam, 10-30% slopes	Not prime farmland	2883	19.7%
YdG	Yeates Hollow-Smarts complex, 30-70 slopes	Not prime farmland	140	1.0%
		Total Prime farmland, farmland of statewide importance and prime farmland if irrigated	**6833**	**46.8%**
		Total non-prime farmland	**7778**	**53.2%**

As shown in **Table 4-1**, the areas that have been classified by NRCS based on soil compositions and slopes as prime farmland, prime farmland if irrigated and farmland of statewide importance account for approximately 46.8% (or 6,833 acres). Any wastewater treatment facilities that will be on surface or may impact farming will need to avoid these areas. Sewer lines are generally buried several feet or more than 10 feet below grade and will not impact farmland.

4.5. Groundwater and Surface Water Quality

The study area is located in Ogden Valley. The available groundwater quality information is generally presented using total dissolved solids (TDS). According to Jordan and others (2019), water quality on TDS is generally very good throughout the Ogden Valley area. TDS concentrations in groundwater (springs and wells) range from 28 to 1366 mg/L and average 243 mg/L. TDS in surface water ranged from 76 to 238 mg/L and averaged 155 mg/L in four stream samples and one Pineview Reservoir sample collected in September 2016.

According to the Pineview Reservoir Recreational Monitoring 2021 project on the Utah Division of Water Quality (DWQ) website, the HABs (harmful algal blooms) warnings adversary for Pineview Reservoir remains in place due to the water samples collected from the reservoir contained a toxigenic cell density exceeding 100,000 cells/mL. The water quality in the reservoir is related to the groundwater discharge from the groundwater system in the valley. Septic systems in the area adversely impact the quality of groundwater and surface water in the valley.

4.6. Fish and Wildlife Protection

A search from the Utah Natural Heritage Program (UNHP) website administered by the Utah Division of Wildlife Resources (DWR) indicates that the fish and wildlife species of greatest conservation need listed in the Utah Wildlife Action Plan occurred within a ½ mile radius from the project area. These species are: Yuma Myotis (*Myotis ymanensis*), Desert Mountain Snail (*Oreohelix peripherica*), Little Brown Myotis (*Myotis lucifugus*), Flammulated Owl (*Psiloscops flammeolus*), Long-legged Myotis (*Myotis Volans*), Longe-eared Myotis (*Myotis evotis*), Greater Sage-grouse (*Centrocercus urophasianus*), Lyrate Mountainsnail (*Oreohelix haydeni*), bald eagle (*Haliaeetus leucocephalus*), Bonneville cutthroat trout (*Oncorhynchus clarkia utah*), gray wolf (*Canis lupus*), Lewis's Woodpecker (*Melanerpes lewis*) and Peregrine falcon (*Falco peregrinus*). These species may or may not be impacted by a sewer project, depending on the project location. At the present time, it is not possible to make an impact determination until a specific project is proposed and a biologic survey is performed.

4.7. Endangered Species Protection

An official list of Federally Listed Threatened (T), Endangered (E), or Candidate (C) Species that may potentially occur within the project area was obtained from the U.S. Fish and Wildlife Service (USFWS). Federally listed species are protected under the Endangered Species Act (ESA). According to the USFWS's official list (**Table 4-3**), three federally listed species may be present within the project area, as summarized in **Table 4-2**.

Table 4-2: Federally Listed Species

Group	Common Name	*Scientific Name*	Status
Mammals	Canada Lynx	*Lynx canadensis*	T
Birds	Yellow-billed Cuckoo	*Coccyzus americanus*	T
Insects	Monarch Butterfly	*Danaus plexippus*	C

These species may or may not be impacted by a sewer project, depending on the project location. At the present time, it is not possible to make an impact determination until a specific project is proposed and a biologic survey is performed.

4.8. Water Quality and Quantity analysis

Any alternative treatment process that involves surface discharge will treat water to the extent required by State and Federal Code prior to discharge. Each alternative treatment process will treat water to the extent that is required by State and Federal Code prior to discharging to a stream or body of water. Surface waters should not be significantly impacted by erosion, either during or after project construction.

4.9. References

Jordan, L., S.D. Smith, P.C. Inkenbrandt, M. Lowe, C.L. Hardwick, J. Wallace, S.M. Kirby, J.K. King, and E.E. Payne. 2019. Characterization of the Groundwater System in Ogden Valley, Weber County, Utah, with Emphasis on Groundwater-Surface-Water Interaction and The Groundwater Budget: Utah Geological Survey Special Study 165.

Table 4-3

USFWS Official List of Special Status Species

Scientific Name	Common Name	Where Listed	Region	ESA Listing Status	Group
Cynomys parvidens	Utah prairie dog	Wherever found	6	Threatened	Mammals
Lynx canadensis	Canada Lynx	Wherever Found in Contiguous U.S.	6	Threatened	Mammals
Strix occidentalis lucida	Mexican spotted owl	Wherever found	2	Threatened	Birds
Empidonax traillii extimus	Southwestern willow flycatcher	Wherever found	2	Endangered	Birds
Gopherus agassizii	Desert tortoise	Wherever found, except AZ south and east of Colorado R., and Mexico	8	Threatened	Reptiles
Gila cypha	Humpback chub	Wherever found	6	Threatened	Fishes
Ptychocheilus lucius	Colorado pikeminnow	Wherever found, except where listed as an experimental population	6	Endangered	Fishes
Oncorhynchus clarkii stomias	Greenback Cutthroat trout	Wherever found	6	Threatened	Fishes
Oncorhynchus clarkii henshawi	Lahontan cutthroat trout	Wherever found	8	Threatened	Fishes
Plagopterus argentissimus	Woundfin	Wherever found, except where listed as an experimental population	6	Endangered	Fishes
Gila elegans	Bonytail	Wherever found	6	Endangered	Fishes
Gila seminuda (=robusta)	Virgin River Chub	Wherever found	6	Endangered	Fishes
Lepidomeda mollispinis pratensis	Big Spring spinedace	Wherever found	8	Threatened	Fishes
Chasmistes liorus	June sucker	Wherever found	6	Threatened	Fishes
Xyrauchen texanus	Razorback sucker	Wherever found	6	Endangered	Fishes
Schoenocrambe suffrutescens	Shrubby reed-mustard	Wherever found	6	Endangered	Flowering Plants
Arctomecon humilis	Dwarf Bear-poppy	Wherever found	6	Endangered	Flowering Plants
Carex specuicola	Navajo sedge	Wherever found	2	Threatened	Flowering Plants
Cycladenia humilis var. jonesii	Jones Cycladenia	Wherever found	6	Threatened	Flowering Plants
Lepidium barnebyanum	Barneby ridge-cress	Wherever found	6	Endangered	Flowering Plants
Lesquerella tumulosa	Kodachrome bladderpod	Wherever found	6	Endangered	Flowering Plants
<a target=_blank" ref="noopener noref	Siler pincushion cactus	Wherever found	2	Threatened	Flowering Plants
Phacelia argillacea	Clay phacelia	Wherever found	6	Endangered	Flowering Plants
Ranunculus aestivalis (=acriformis)	Autumn Buttercup	Wherever found	6	Endangered	Flowering Plants
Sclerocactus wrightiae	Wright fishhook cactus	Wherever found	6	Endangered	Flowering Plants
Townsendia aprica	Last Chance townsendia	Wherever found	6	Threatened	Flowering Plants
Asclepias welshii	Welsh's milkweed	Wherever found	6	Threatened	Flowering Plants
Astragalus montii	Heliotrope milk-vetch	Wherever found	6	Threatened	Flowering Plants
Primula maguirei	Maguire primrose	Wherever found	6	Threatened	Flowering Plants
Astragalus holmgreniorum	Holmgren milk-vetch	Wherever found	6	Endangered	Flowering Plants
Pediocactus despainii	San Rafael cactus	Wherever found	6	Endangered	Flowering Plants
Pediocactus winkleri	Winkler cactus	Wherever found	6	Threatened	Flowering Plants
Schoenocrambe barnebyi	Barneby reed-mustard	Wherever found	6	Endangered	Flowering Plants
Spiranthes diluvialis	Ute ladies'-tresses	Wherever found	6	Threatened	Flowering Plants
Astragalus ampullarioides	Shivwits milk-vetch	Wherever found	6	Endangered	Flowering Plants
Schoenocrambe argillacea	Clay reed-mustard	Wherever found	6	Threatened	Flowering Plants
Gymnogyps californianus	California condor	U.S.A. (specific portions of Arizona, Nevada, and Utah)	8	Experimental Popula	Birds
Centrocercus minimus	Gunnison sage-grouse	Wherever found	6	Threatened	Birds
Pediocactus peeblesianus ssp. fickeisen	Fickeisen plains cactus	Wherever found	2	Endangered	Flowering Plants
Coccyzus americanus	Yellow-billed Cuckoo	Western U.S. DPS	2	Threatened	Birds
Mustela nigripes	Black-footed ferret	U.S.A. (WY and specified portions of AZ, CO, MT, SD, and UT, see 17.84(g)(9))	6	Experimental Popula	Mammals
Sclerocactus brevispinus	Pariette cactus	Wherever found	6	Threatened	Flowering Plants
Sphaeralcea gierischii	Gierisch mallow	Wherever found	2	Endangered	Flowering Plants
Sclerocactus wetlandicus	Uinta Basin hookless cactus	Wherever found	6	Threatened	Flowering Plants

5.0 Collection and Treatment Option Evaluation

This section summarizes the collection and treatment options evaluated as part of the upper valley study. Evaluations were based on discussions with technical experts, residents, existing sewer entities, and county representatives.

5.1. COLLECTION OPTIONS EVALUATED

The Upper Valley North Area consists mainly of a higher elevation in the northern area of the study to a lower elevation on the southern area of the study. The collector line for the purpose of this study will start at the intersection of 5950 North and North Fork Road, and end at the intersection of State Highway 158 and 2200 North. This section will address collection areas into the main collection line. The most cost-effective collection option for sewer is gravity sewer which does not include lift stations. There are some low areas heading south on North Fork Road which will be discussed.

Survey information used is from a surface created by Weber County with accuracy being within approximately 2 feet. For the purpose of this study, and cost, the surface provided by the County will be used for the purpose of evaluating surface elevation in this study. Surface elevations will provide potential flows of gravity sewer lines.

5.1.1. GRAVITY SEWER

The approximate elevation at the intersection of North Fork Road and 5950 North is 5346.00 as seen in . Due to the zoning and slope restrictions in this area, the collection option will start at this location. Using the future population evaluation described in Section 3.0, the estimated ERU's at this location are 101 as shown in sheet PP1 (Topo) in Appendix A. The slope of North Fork Road and surrounding contributing roads are show by the slope arrows throughout the Topo sheets in Appendix A. This Figure also shows spot elevations of surrounding roadways for reference.

The first low area heading south on North Fork Road is the crossing of North Fork Ogden River at approximately 5100 North. At this location the estimated ERU's are 778 before crossing the river and 882 ERU's after crossing the river, which would include the future development on Shaw Road (5100 North). This river crossing from top of bridge to river bottom is approximately 15 feet. The road also heads uphill a few feet head south before going downhill. To avoid a lift station at this location, the recommendation is to open cut the river at low flow and design a deep sewer in this location. The construction, operation and maintenance of a 20 foot deep sewer for approximately 400 feet would be more cost effective than the construction, operation and maintenance of a lift station. At this location North Fork Road and Avon Divide Road converge. For the purpose of this study, the remaining roadway heading south will be referred to Highway 162.

The next low area heading south is in Liberty where Highway 162 runs east along 4100 North, then heads south again. The estimate future ERU's at this location is 1,400. The recommendation at this

location would be to run the sewer south from the intersection of 3300 East and 4100 North to approximately 3300 East and 3900 North. At this location the recommended alignment would head east as shown on sheet PP2 (Topo) and intersect with Highway 162. Obtaining an easement at this location is estimated to be more cost effective than the construction, operation and maintenance of a lift station.

The last low area for this alignment will be at the North Fork Ogden River crossing on Highway 162 and approximately 3000 North. This location will need to be further evaluated to weigh the cost of obtaining easements for a gravity alignment shown in sheet PP2 (Topo) versus installation of a lift station.

Sheet PP3 (Topo) shows the surface grade of the Mountain View Estates and how future gravity sewer could flow. Sheet PP5 (Topo) shows the surface flows of Eden Acres, the 4 way and up to Gertsen Bay and 1900 North. This area would need to include a lift station at approximately 6200 East and 1900 North. This proposed lift station would lift the sewer collected in the area shown by the flow arrows. The study recommends not to address gravity sewer on 1900 North east of Gertsen Bay due to the minimum area of growth. The study also recommends not to address gravity sewer as shown in sheet PP7 (Topo) due to the high and low areas and minimum area of growth. Sheet PP8 (Topo) shows how future gravity sewer could flow in the contributing areas of River Drive. PP9 (Topo) shows elevation change along 5900 East (Stingtown Road). This area contains a small number of existing lots and small number future lots. The only way to integrate this area into the proposed sewer infrastructure would be to gravity sewer to the end of the road, and place a lift station there for a pressure line to the gravity line on 1900 North.

5.1.2. LIFT STATION

The initial phase of this study would include a lift station at the low area of the alignment at approximately Highway 158 and 2200 North. The approximate elevation at this location is 4915.00. Easements/property would need to be obtained for a structure and lift station around this location. The sewer would be lifted to a location further discussed in the study.

Possible future phase lift stations are shown in Appendix A sheets. The location of the possible lift stations are estimated low areas where sewer would need to be lifted.

5.2. TREATMENT OPTIONS EVALUATED

5.2.1. DISCHARGE OPTIONS

Discharge for treated sewer in the Upper Valley is considered Category 1. The definition of Category 1 is found in UAC 317-2-3.3.2. Surface discharge is not allowed by rule. The possible discharge options are drain field, evaporation, and reuse.

Drain field alternatives were discussed with the State Department of Environmental Quality (DEQ). Two in person meetings took place along with many calls and emails. DEQ did not approve any of the drain field alternatives presented.

Evaporation is currently use at a local District, this option is considered a last resort option. This option would include obtaining property big enough to have multiple evaporation ponds.

Reuse of treated effluent was discussed with multiple Districts and stakeholders. UAC 73-3c-302 defines how to apply to the state engineer for water reuse. A local District currently reuses treated effluent water.

The recommendation of this study is versus evaporation of treated effluent water, reuse would be the recommended option. Reuse of treated effluent water increases the value and use of the water.

5.2.2. TREATMENT LOCATION OPTIONS

There are three options for location regional treatment in the Upper Valley. The first option would be to create a new sewer district. The second option would be to work with the existing sewer districts in the area. There are two existing sewer districts in the Upper Valley, Powder Mountain Water and Sewer Improvement District (PMWSID) and Wolf Creek Water and Sewer Improvement District (WCWSID) Initial conversations for treatment options included conversations with WCWSID and PMWSID. Both Districts were receptive to meeting and discussing options.

The costs associated with a lift station, pressure line and connection to an existing District far outweigh the costs of construction for a new treatment facility. The following will discuss the options for both PMWSID and WCWSID.

POWDER MOUNTAIN WATER AND SEWER IMPROVEMENT DISTRICT

The following paraphrases the IFFP created for PMWSID in 2021 by Gilson Engineering. This plan can be found on the PMWSID website.

'PMWSID currently provides sanitary sewer containment in four (4) existing wastewater Lagoons. Currently only two (2) of the four (4) wastewater lagoons are active. The combined capacity of the existing Lagoons is approximately 19.24 million gallons. In order to make use of the full existing lagoon capacity several lagoon improvement projects will be required. Once developed ERCs exceed capacity of the Sewer Lagoons (621 ERC) and LUWDS (82 ERC) additional package treatment plant volume will be required. It is anticipated that sufficient package treatment plant volume to support 207 ERC (53,406 GPD) will be required. It is recommended to round up package treatment capacity to support 220 ERC (56,760 GPD).'

The existing lagoons are at an elevation of approximately 5350.00 +/-. The drawings seen in appendix A show the possibility of PMWSID treating some of the future development at an elevation of approximately 5350. If future development in the area is lower than this elevation, evaluation of lift stations and cost analysis would need to be included for best treatment option.

WOLF CREEK WATER AND SEWER IMPROVEMENT DISTRICT

The following paraphrases the IFFP created for WCWSID in 2022 by Gardner Engineering. This plan can be found on the WCWSID website.

'The existing WCWSID treatment plant is located at 4820 East Willow Brook Lane. The Membrane Bioreactor sewer facility was constructed in 2008 to replace a sewer lagoon system. The plant is designed to treat waste from 2,500 ERUs. The current plant capacity is sized to serve all planned development within the existing WCWSID boundary. The plant site includes 2 backup storage ponds that can be used if the plant is temporarily inoperable or flows exceed the plant's treatment capacity.

Once treated to appropriate water quality, the treated effluent exits the plant for disposal. Treated effluent is currently disposed of by either infiltration or land application. Infiltration occurs in rapid infiltration basins located adjacent to the treatment plant. Land application occurs during periods of high irrigation demand by pumping the treated effluent to a pond on the 9th Hole of the Wolf Creek Golf Course, then the treated effluent gets re-pumped into the secondary water system. Land application occurs only during the irrigation season. A redundant method of disposal by land application is being considered by the District: year-round storage of treated effluent for use during the irrigation season as a supplement to other sources of water for the secondary system. The reader is referred to the District's Secondary Water System IFFP for additional discussion of this method of treated effluent disposal.'

The existing treatment facility is at an elevation of approximately 5060.00 +/-. The existing facility is approximately 8,500 ft from the intersection of Highway 158 and 2200 North, or the low area of the evaluated system.

5.3. COLLECTION AND TREATMENT OPTIONS SUMMARY

Collection systems for sewer can include gravity sewer, and pressurized sewer. From a cost perspective, gravity sewer will always be the most efficient design. Detailed evaluation of cost for any pressurized sewer is recommended. Those costs need to include construction costs of lift stations and pressurized sewer line along with operation and maintenance of those facilities. This study recommends design of gravity sewer were feasible.

The study mentions cost of a new sewer district. The cost of a new facility could range from $40 Million to $60 Million. The estimated cost to upgrade an existing District is approximately $15 Million. The recommendation of this study is to work with the existing Districts for upgrades and treatment options. There are two existing Districts in the Upper Valley North area. The elevation of these treatment facilities is critical to assessing cost and recommended use. Detailed evaluation of design for lift stations and pressurized sewer line is recommended to determine which treatment facility to connect.

6.0 Community Involvement and Workshop Summary

The purpose of this memo is to discuss the results and feedback received as part of the public involvement meetings held throughout the project as well as meetings with the county, existing sewer district entities, stakeholders, Weber Basin Water Conservancy District (WBWCD), and the state Department of Environmental Quality (DEQ).

Public meetings were held November 22, 2021, at Snow Crest Jr. High School, December 9, 2021 at Snowcrest Jr. High, and the final meeting was held July 27, 2022 at Valley Elementary School. There were many meetings with Weber County, Wolf Creek Water and Sewer Improvement District, and Powder Mountain Water and Sewer Improvement District. Ultimately meetings were also held with Weber Basin Water Conservancy District, multiple Stakeholders, and DEQ. The following section will summarize these meetings.

6.1. Public Involvement meeting summary

The first two open house meetings were held at Snowcrest Junior High. The goal of the meetings was to introduce the scope of work to the public, and gather any public input pertaining to the scope of work. The initial meeting was not properly noticed, so we had a meeting two weeks later which was properly noticed.

Sunrise Engineering presented to the public the scope of work which included improving ground water quality through sewer management and evaluating treatment options including working with local Sewer Districts. The presentation reviewed Weber County General Plan which discusses village areas and existing zones in the northern area of the Upper Valley. The presentation reviewed previous study results. The presentation also discussed future growth and proposed areas which could be service by sewer.

There were a variety of comments from the public, most of which did not pertain to the study. There were comments from the public concerning funding of the project and what the estimated user fees might be. There were comments from the public regarding design and treatment options.

Th last open house was held in July 2022 at Valley Elementary School. The goal of this meeting was to update the public with findings, discussions, and outlook for the study. The main nine sections of the study were reviewed and discussed. The presentation reiterated the main objectives which were:

1. Improve ground water quality through sewer management.
2. Evaluate collection, treatment, and discharge options.
3. Work with Districts and Stakeholders
4. Implement Study

The village areas and population growth estimates were presented and are shown in **Figure 6-1** and **Figure 6-2** respectively. **Figure 6-2** are estimated flows from an estimated 7% growth rate. Preliminary

Options 1 and 2 were discussed as shown in **Figure 6-3** and **Figure 6-4** respectively. Option 2 was recommended.

Figure 6-1

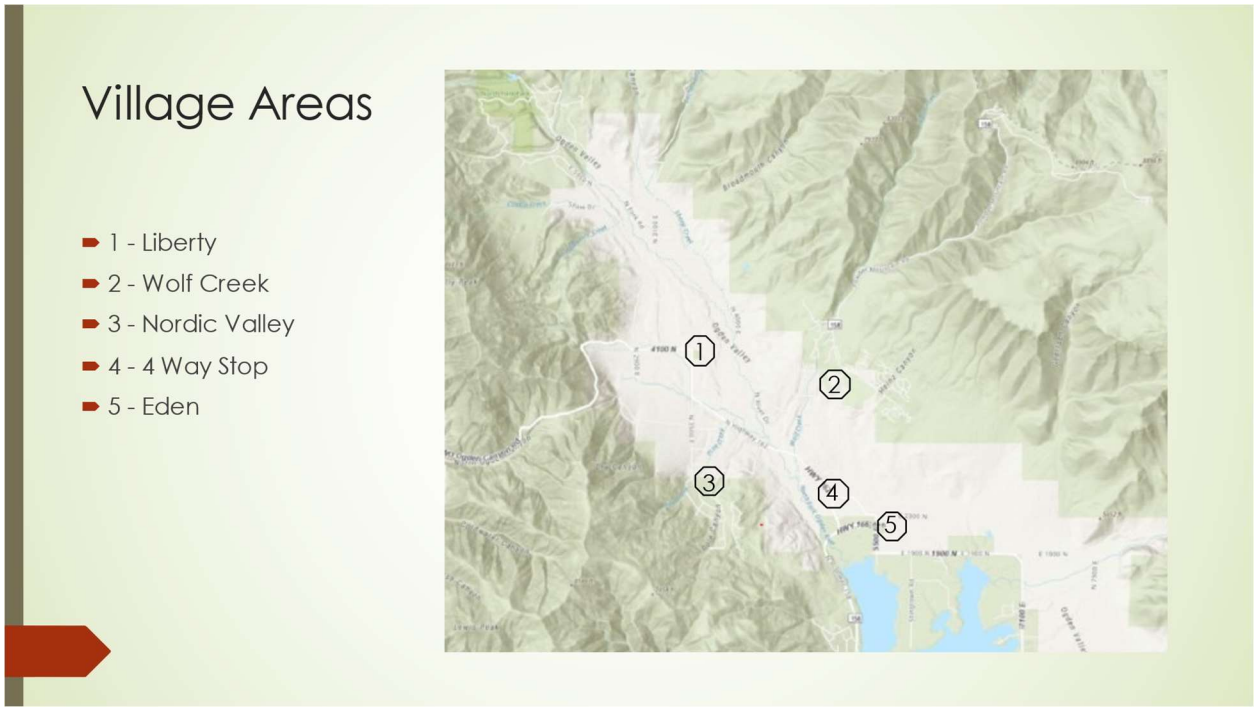


Figure 6-2

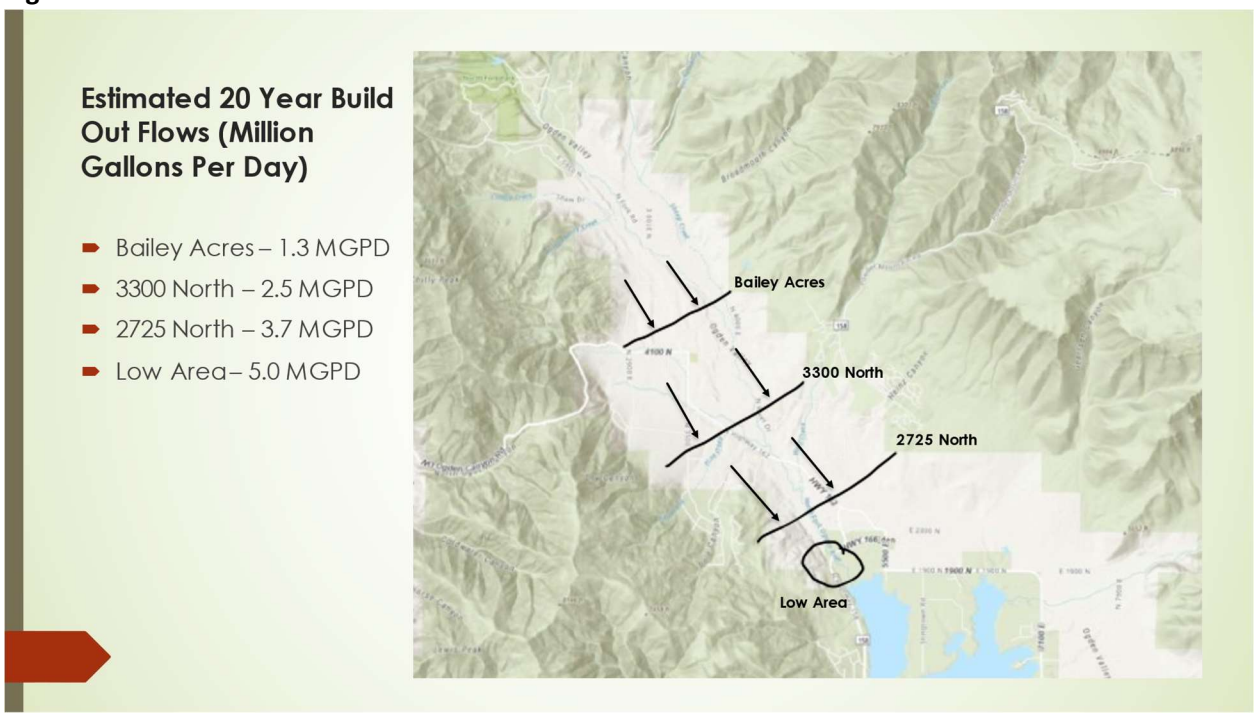


Figure 6-3

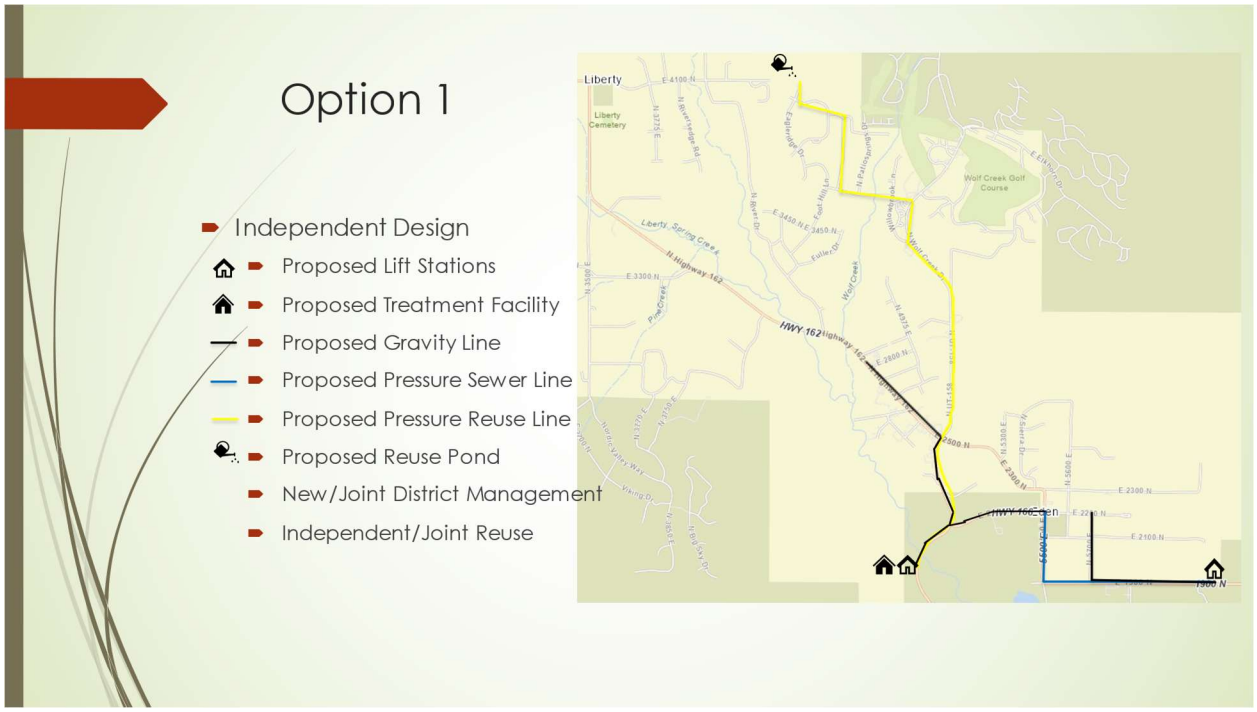
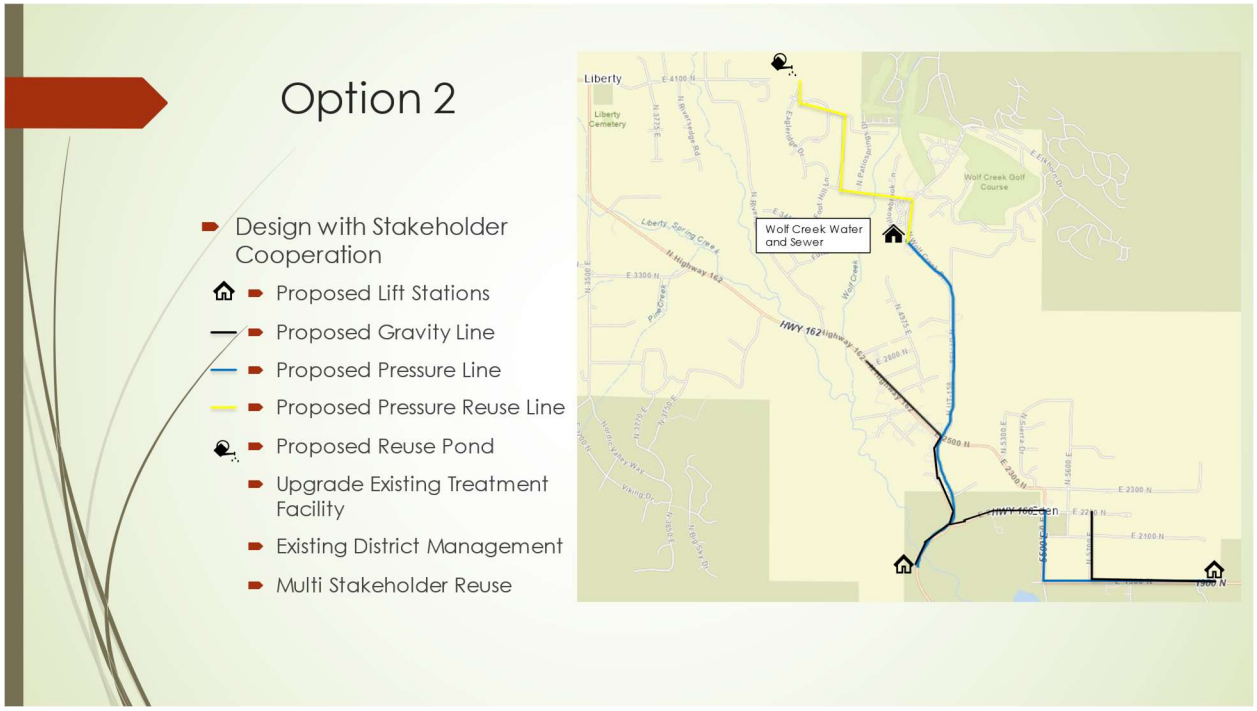


Figure 6-4



6.2. Meetings with Weber County

Meetings with Weber County started before the first public meeting. There were multiple meetings with County Staff and County Officials discussing the report, findings and progress. Throughout the process the County expressed concerns about communication with the public. The County also expressed the need of transparency with the public.

A website link was created to allow the public to ask questions or make comments at any time. This link remained active throughout the project. This link was provided through social media and email to multiple residents in the Upper Valley area including local newspapers and interest groups.

6.3. Meetings with Existing Districts, Stakeholders, Weber and the DEQ

Wolf Creek Water and Sewer Improvement District and Powder Mountain Water and Sewer Improvement District are the two existing sewer districts in the Upper Valley area. Stakeholder meetings mainly included future potential parcels being developed and Weber Basin Water Conservancy District.

Wolf Creek Water and Sewer Improvement District had concerns with future potential land development and how the coordination efforts were taking place. There was expressed concern with treatment options and connection potential. There was interest with the District to serve potential future development outside District boundaries.

Powder Mountain Water and Sewer Improvement District also expresses interest in potential connection to future developments in the north area of the valley.

Stakeholder meetings included meeting multiple developers in the norther area of the Upper Valley. Coordination with those stakeholders was key to implementing this study.

6.4. Comments and Responses

Implementation of the study has already begun. There were multiple meetings with Stakeholders and Districts which resulted in a stakeholder agreement with an existing District. There have been funding opportunities for both Sewer Districts in the Upper Valley. The information in this study can be used as a guide for future designers and managers.

7.0 Recommendations and Implementation Plan

This section summarizes the proposed solution to sewer infrastructure and management for the Upper Valley north area. The recommendations are based on the analysis and discussions from the previous sections. The recommendations are a result of previous study recommendations, public input, location of future growth, collection and treatment evaluations, and community/stakeholder meetings.

7.1. Recommended Collection and Treatment Plan

Section 5.0 discussed in detail collection and treatment options in the north area of the Upper Valley. The recommendation for sewer design collection will always be gravity sewer. Gravity sewer line on average is approximately $20 per linear foot cheaper to install than pressure sewer line. Lift Stations will need to be installed when pressure lines are installed. Lift Station costs are much higher than the cost for manholes installed for a gravity sewer system. It is more expensive to install, operate and maintain a lift station and pressure line system. Detailed evaluation of costs are included in evaluating whether additional lift stations are warranted in the design.

This study recommends one main lift station in the area of Highway 158 and 2200 North as presented in **Figure 6-4**. Estimated size of gravity lines and flows can be found in **Table 3-3** of the report and PP1 (ERU) – PP9 (ERU) drawings in Appendix A. This study recommends working on an agreement with Wolf Creek Water and Sewer Improvement District (WCWSID). The agreement would address costs and fees for existing users and futures users, area of service and construction costs. The agreement would address location of the gravity lines feeding the lift station, manholes needed for the gravity line, the location of the lift station, and the location of pressure lines. The size of the pressure lines from the location of the lift station to WCWSID will be determined at the time of the design of the lift station. Flows coming into the lift station and distance/elevation to lift the sewer will determine the size of the pressure line. The study recommends an initial Phase I of construction which would include the commercial area around the intersection of Highway 158 and Highway 162 up to Snowcrest Junior High. Connections from the Junior High and local commercial/retail buildings could help support the cost of the infrastructure through impact fees and user fees. Collecting the sewer for this area and treating the sewer will greatly improve groundwater quality.

Section 5.0 discussed the two treatment facilities within the area of the study. The location and elevation of the treatment facilities are major factors in determining a recommendation. The recommendation of the collection system is a lift station near highway 158 and 2200 North. The closest treatment facility to this location is WCWSID. Phase I recommendation would be to work with WCWSID to negotiate a treatment option. Some of the negotiations might include funding, out of district service, impact fee, flow requirements and infrastructure/equipment requirements.

Future growth could include PMWSID treatment facility. A careful cost evaluation would help determine which areas could benefit connecting to PMWSID treatment facility.

The final option for treatment would be a new treatment facility. A new treatment facility is estimated at $40 Million to $60 Million for construction costs alone. Operation and maintenance costs for a new facility would need to be estimated and included in the overall cost. A new treatment facility is not recommended.

7.2. Cost

Construction costs are very volatile. Costs discussed in this report are for reference. The following costs in **Table 7-1** can be considered for future evaluation.

Table 7-1 : Cost Estimate

ITEM	UNIT COST RANGE
Lift Station	
Lift Station (100K - 500K GPD)	$500k - $1Mil
Lift Station (500K - 1Mil GPD)	$1Mil - $1.5Mil
Lift Station (1Mil - 2Mil GPD)	$1.5 Mil - $2.5Mil
Pressure Line	
6" HDPE	$120/L.F. - $140/L.F.
8" HDPE	$140/L.F. - $160/L.F.
10" HDPE	$160/L.F. - $180/L.F.
12" HDPE	$180/L.F. - $200/L.F.
Gravity Line	
8" PVC	$120/L.F. - $140/L.F.
10" PVC	$140/L.F. - $160/L.F.
12" PVC	$160/L.F. - $180/L.F.
15" PVC	$180/L.F. - $200/L.F.
18" PVC	$200/L.F. - $250/L.F.
21" PVC	$250/L.F. - $300/L.F.
Manholes	
4 Foot Manhole	$5,500 - $6,500
5 Foot Manhole	$6,500 - $7,500

Cost estimations for Option 1 and Option 2 as mentioned on page 22 are as follows:

Option 1	QTY	Unit	Unit Cost	Cost
Lift Station	2	EA	$1,000,000	$2,000,000
Treatment Facility	1	LS	$60,000,000	$60,000,000
Gravity Sewer Line	17,200	LF	$180	$3,096,000
Gravity Sewer Manhole	45	EA	$6,500	$292,500
Pressure Reuse Line	18,000	LF	$160	$2,880,000
Pressure Sewer Line	7,200	LF	$160	$1,152,000
Reuse Pond	1	LS	$2,000,000	$2,000,000
			Total	$71,420,500
			Contigency (15%)	$10,713,075.00
			Option 1 Total	**$82,133,575**

Option 2				
Lift Station	2	EA	$1,000,000	$2,000,000
Gravity Sewer Line	17,200	LF	$180	$3,096,000
Gravity Sewer Manhole	45	EA	$6,500	$292,500
Pressure Reuse Line	8,000	LF	$160	$1,280,000
Pressure Sewer Line	17,200	LF	$160	$2,752,000
Reuse Pond	1	LS	$2,000,000	$2,000,000
			Total	$11,420,500
			Contigency (15%)	$1,713,075.00
			Option 2 Total	**$13,133,575**

This is a high-level cost estimate and should be used as reference only. This cost estimate includes lifting sewer from the approximate location shown in Eden on Option 1 and Option 2. A more detailed estimate with survey and design will provide a more accurate estimate.

7.3. Implementation of Plan

7.3.1. FUNDING

Section 8.0 summarizes funding options, financing, and user rate study. Each of these options can help cover costs for construction, operation, and maintenance. Open communication with all involved stakeholders is critical to implementing a funding plan.

One example is during the preparation of this study there has been an agreement created between a local sewer district and stakeholders. Another example is there has also been an appropriation of ARPA (American Rescue Plan Act) dollars by Weber County to both PMWSID and WCWSID. Continued cooperation and partnership is essential for progress with improving ground water quality through sewer management.

7.3.2. DESIGN

Section 5.0 discusses the overall design recommendation. The design evaluation is a high-level evaluation. Standard design practices were used in the assessment. This study can be used as a resource for future sewer design in the Upper Valley North area.

This study recommends an initial phase of design. The initial phase would include a main lift station near the location of Highway 158 and 2200 North. The sewer would be pressurized to WCWSID and treated at that location. Continued negotiations with the District is critical to eventually forming an agreement. The existing treatment facility would need to be upgraded for more capacity. The recommendation of this initial phase could include effluent sewer from Snowcrest Junior High along with the commercial and retail businesses surround the intersection of Highway 162 and Highway 158 (four way stop). Future phases could include existing residents using septic systems and future developments. Future phases could also include pressurized sewer to be treated at the PMWSID facility where feasible.

7.3.3. STAKEHOLDER COORDINATION

There have been multiple studies completed in the Upper Valley addressing ground water quality. The intent of this study is to discuss possible design of sewer infrastructure and executing the design by coordinating with local stakeholders. Progress will happen when stakeholders involved work together for a solution.

8.0 Funding Options, Financing, and User Rate Study

This section summarizes the findings and recommendations pertaining to the financing, funding options, and user rate study. This section is a guide for Weber County in pursuing additional funding opportunities.

8.1. PROJECT FUNDING OPPORTUNITIES

8.1.1. APPROPRIATION OF STATE FUNDS

The State Legislature has recently allocated grant funding through multiple offices including Governor's Office of Economic Opportunity and Utah Governor's Office of Planning and Budget. There needs to be constant communication with state offices similar and including these offices to understand what dollars qualify for projects discussed in this report.

8.1.2. AMERICA RESCUE PLAN ACT (ARPA)

After the American Rescue Plan Act was signed into law by President Biden on March 11, 2021, it guaranteed direct relief to cities, towns, and villages in the United States (Sec. 9901: Coronavirus State and Local Fiscal Recovery Funds). The U.S. Department of the Treasury is responsible for overseeing this unprecedented program.

"The American Rescue Plan will deliver $350 billion for eligible state, local, territorial, and Tribal governments to respond to the COVID-19 emergency and bring back jobs." – U.S. Department of the Treasury

ARPA funding is available to fund the following projects and expenditures: Support public health expenditures; Address negative economic impacts caused by the public health emergency; replace lost public sector revenue; provide premium pay for essential workers; invest in water, sewer, and broadband infrastructure. – U.S. Department of the Treasury

Infrastructure investments with ARPA funding are further clarified; "Invest in water, sewer, and broadband infrastructure, making necessary investments to improve access to clean drinking water, support vital wastewater and stormwater infrastructure, and to expand access to broadband internet" - U.S. Department of the Treasury.

8.2. AGENCY FUNDING

8.2.1. DEQ-DIVISION OF WATER QUALITY FSRF AND SRF

Advantages

- Low-interest loans (typically 2-4%, 30 years) and hardship grants
- Funding applications accepted several times annually (June and December for construction projects)
- Non-federal, not subject to federal requirements (SSRF)

Disadvantages

- MAGI requirements for lower interest rates and principal forgiveness
- Federal funding, project subject to federal requirements (FSRF)
- Less grant available (typically 20-30%)

8.2.2. DEQ-DIVISION OF DRINKING WATER FSRF AND SRF

Advantages

- Low-interest loans (typically 2-4%, 30 years) and hardship grants
- Funding applications accepted several times annually
- Non-federal (SSRF), not subject to federal requirements

Disadvantages

- MAGI requirements for lower interest rates and principal forgiveness
- Federal funding (FSRF), project subject to federal requirements (NEPA, AIS, BABA, Davis-Bacon Act)
- Less grant available (typically 20-30%)

8.2.3. UTAH DIVISION OF WATER RESOURCES

Advantages

- Low interest loan, usually between 0-3% depending on the nature of the project. Metering and joint projects with irrigation companies typically result in more favorable interest rate.

- Funding up to 85% of total project cost
- 25-year payback period (have gone 30 years)
- Usually have plenty of funds available
- Non-federal, not subject to federal requirements
- Funding applications accepted several times annually
- Local representative available for support

Disadvantages

- Do not offer any grant options
- MAGI requirements for lower interest rates

8.2.4. BUREAU OF RECLAMATION – WATERSMART GRANTS

Advantages

- Grants up to 2 million dollars

Disadvantages

- Very competitive
- Limited monies available per each funding opportunity announcement (FOA)
- FOA occurs only one time annually
- Application is quite involved
- 50% match required
- Federal funding, project subject to federal requirements (NEPA, AIS, BABA, Davis-Bacon Act)

8.2.5. UTAH COMMUNITY IMPACT BOARD

Advantages

- Low interest loans, typically 2.5% but have discretion to go lower
- Non-federal, not subject to federal requirements
- 30-year payback period (10 years for road improvements)
- Have plenty of funding available for loan
- 3 funding cycles annually
- Supported by local AOG
- Non-federal, not subject to federal requirements

Disadvantages

- Grant money less likely for non-mineral producing counties. However, the trend has been favorable

8.2.6. USDA-RD

Advantages

- Low-interest loans (typically 2-4%, 40 years depending on MHI) and grants up to as much as 45-75% depending on circumstances, but usually around 25-30% if eligible
- No set schedule for funding applications

Disadvantages

- PER and ER need to be complete before making application but can be rolled into project funding.
- Federal funding, project subject to federal requirements (NEPA, AIS, BABA, Davis-Bacon Act)
- Eligibility based on population (<10,000)

8.2.7. CDBG (COMMUNITY DEVELOPMENT BLOCK GRANT)

Advantages

- Grant funds

Disadvantages

- Very competitive
- Must qualify based on local income and if not, a community wide survey is required
- Limited monies available per each funding cycle
- Funding cycle only one time annually
- Application is fairly involved
- Applicant cash needed for higher score
- Federal funding, project subject to federal requirements (NEPA, AIS, BABA, Davis-Bacon Act)

8.3. OPEN MARKET/PUBLIC FINANCE OPTIONS

Advantages and disadvantages vary based on local circumstances and current market environment but could still be an option worth exploring for some communities and projects.

8.4. POTENTIAL USER RATES AND IMPACT FEES

An impact fee is a fee charged to new connections added to an existing system. The purpose of an impact fee is to proportionally allocate to new development the cost of new public facilities. This fee is necessary in cases where the existing system cannot accommodate growth, and improvements, called capital improvement projects, must be made. In order to provide funding for those capital improvement projects, impact fees are charged to new developments. If capital improvement projects also improve existing users' level of service, this must be factored into calculating a fair impact fee. Only improvements directly resulting from future growth may be considered in calculating a reasonable impact fee.

Additionally, if user service fees are used to help pay for capital improvement projects, a new user may end up paying twice, in a sense, for the same project. This can happen if a new development pays an impact fee and user service fees in the same time frame. So, a credit must be calculated to ensure that new developments are not being overcharged.

9.0 SEWER STUDY SUMMARY

There were four objectives presented to Weber County and the Upper Valley North area residents. The four objectives were:

1.0 Improve ground water quality through sewer management.

2.0 Evaluate collection, treatment, and discharge options.

3.0 Work with Districts and Stakeholders

4.0 Implement Study

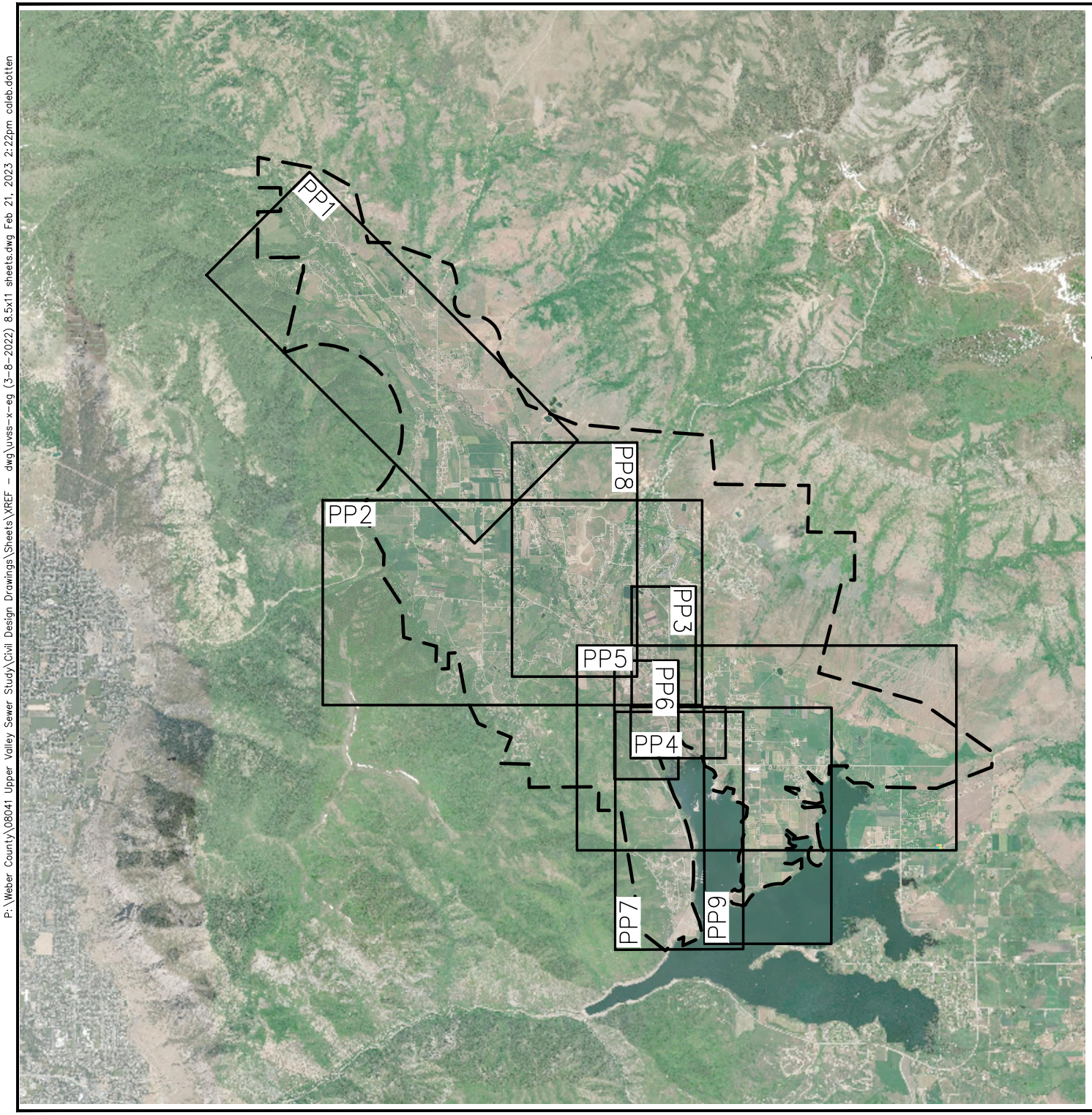
There are currently hundreds of existing septic systems in the Upper Valley North area. Ground water quality is affected by septic systems. Collecting sewer through sewer lines and treating the collected sewer greatly improves ground water quality. The elevation of the ground in the study area drops approximately 300 feet. The natural slope of the ground is ideal for gravity sewer collection. This study recommends managing sewer using these methods as much as possible.

Section 3 and Section 5 of this study detail the evaluation of collection, treatment, and discharge options. A conservative growth rate of 4% was used to determine sewer pipe sizes. This rate could increase or decrease. The evaluation is a high level but should greatly benefit any future studies in the area. Providing existing ERU counts, location of high and low surface elevations, and potential location for lift stations will benefit future sewer management and design.

The recommendation of this study is to work with existing Districts for treatment options. Working with existing Districts is more cost effective than creating a new District and treatment facility. A new treatment facility is estimated at $40 Million to $60 Million. State law and Utah Department of Environmental Quality currently allows for evaporation or reuse of discharge of treated sewer in the Upper Valley. One existing District has and evaporation option, while the other existing district has a reuse option.

Reiterating what was mentioned earlier in the study, there have been multiple studies completed in the Upper Valley addressing ground water quality. The intent of this study is to discuss possible design of sewer infrastructure and execute the design by coordinating with local stakeholders. Progress will happen when stakeholders involved work together for a solution. There have been multiple agreements produced between stakeholders which address reuse and treatment options as a result of this study.

APPENDIX A



NORTH

SCALE

0 8000' 16000'

HORIZ: 1" = 8000'

PROPOSED SEWER LINE
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY

APPENDIX A
WEBER COUNTY
UPPER VALLEY SEWER STUDY

OVERVIEW
KEY MAP

SEI NO.	DESIGNED	DRAWN	CHECKED
08041	JA	CR	JA

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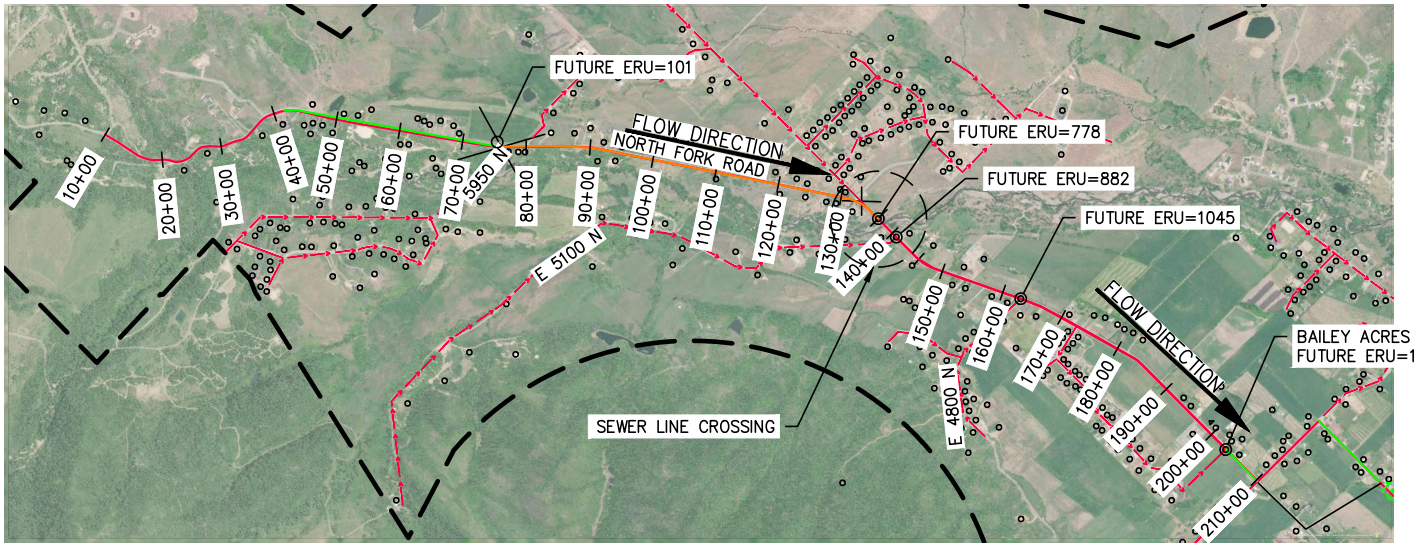
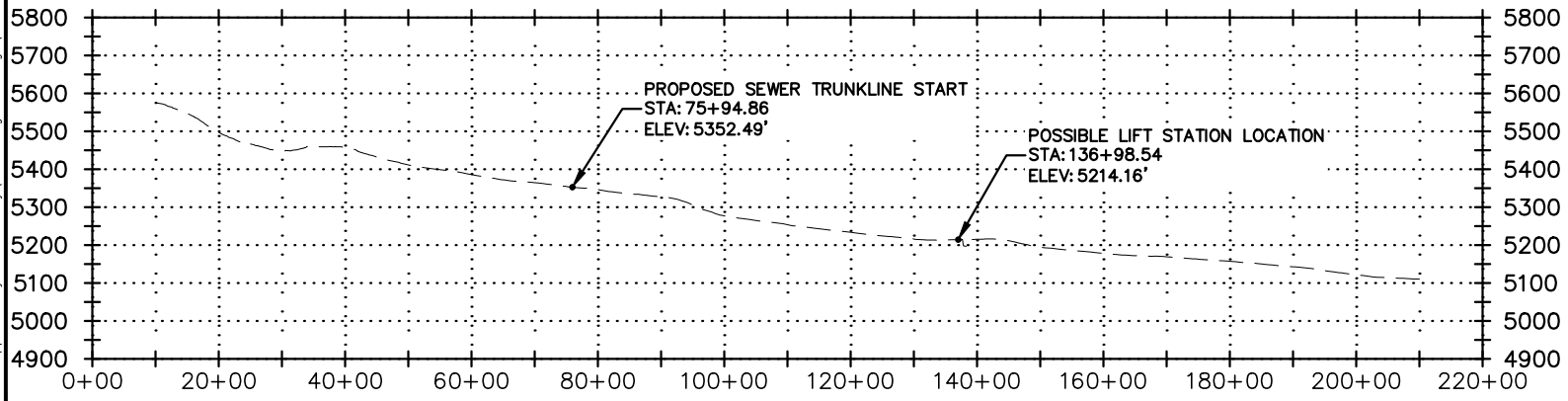




NORTH

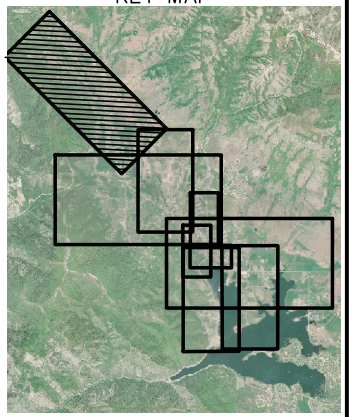
SCALE

0 3000' 6000'

HORIZ: 1" = 3000'
VERT: 1" = 500'

CONTRIBUTING BOUNDARY

KEY MAP



SEWER LINE SPECS
L=20,088'
1 LIFT STATIONS REQUIRED
51 MANHOLES REQUIRED

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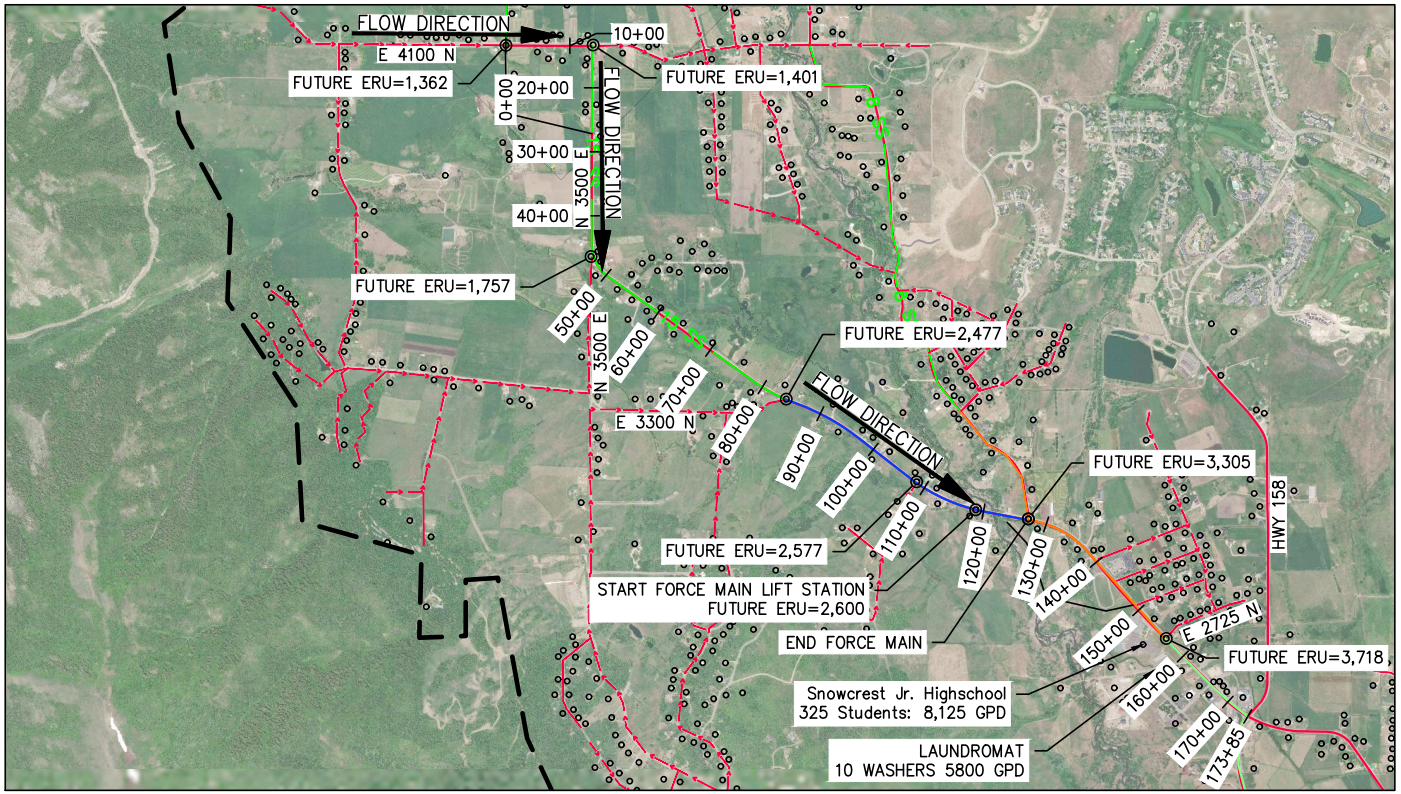
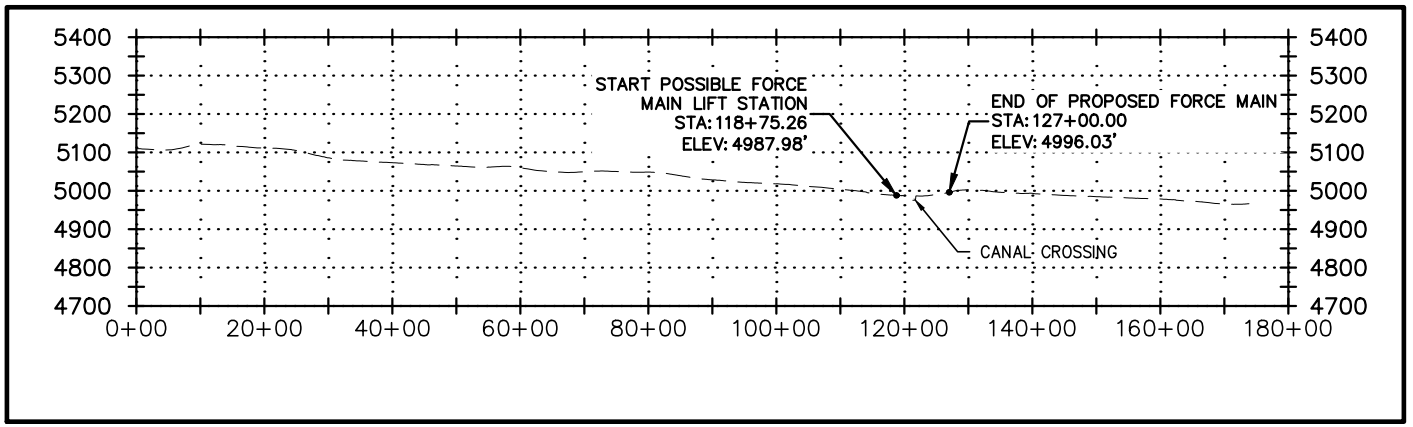
WEBER COUNTY		
UPPER VALLEY SEWER STUDY		
RESIDENCES, FLOWS, AND DIRECTIONS NORTH FORK ROAD		
SEI NO. 08041	DESIGNED JA	DRAWN CR
CHECKED JA	PP1 (ERU)	





NORTH

SCALE

0 3000' 6000'

HORIZ: 1" = 3000'
VERT: 1" = 500'

CONTRIBUTING BOUNDARY

KEY MAP

SEWER LINE SPECS
L=19,993'
1 LIFT STATIONS REQUIRED
52 MANHOLES REQUIRED

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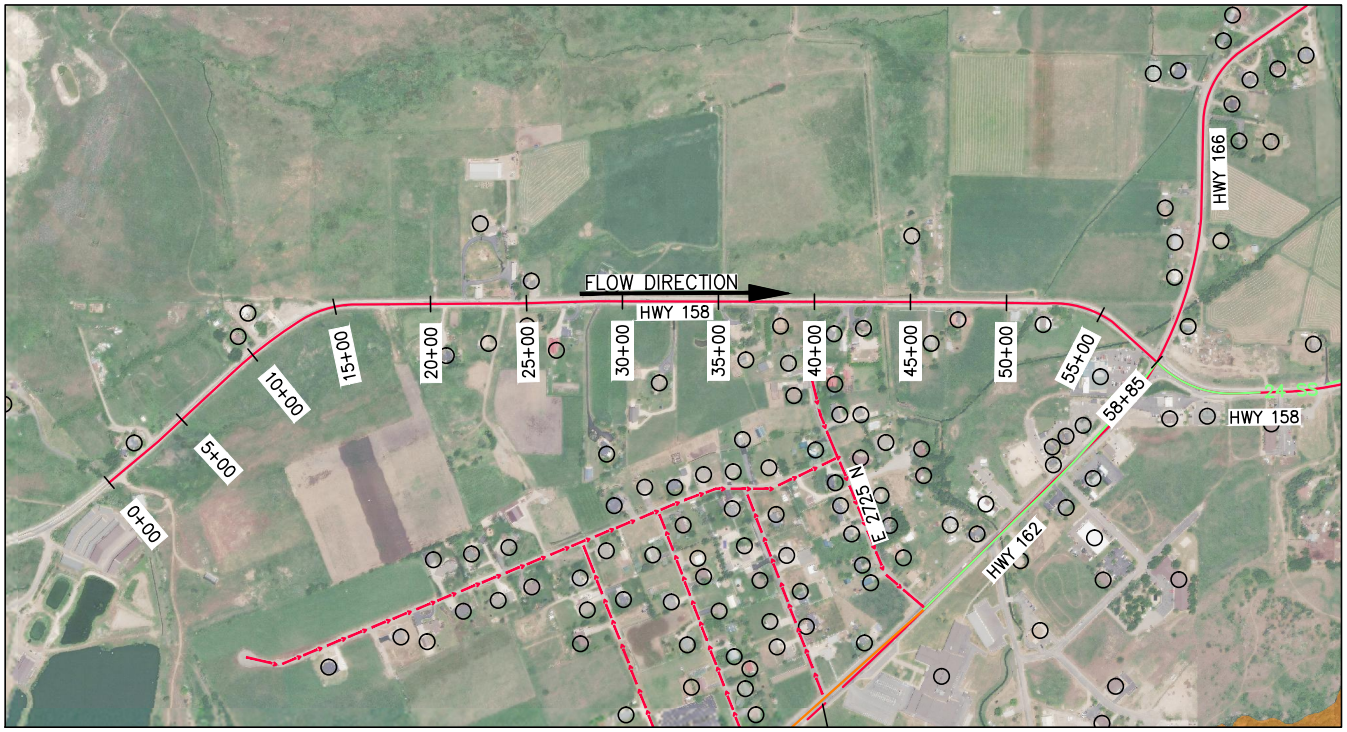
WEBER COUNTY

UPPER VALLEY SEWER STUDY

RESIDENCES, FLOWS, AND DIRECTIONS
4100N AND HWY 162 TO 4-WAY

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED	PP2 (ERU)	
JA		



NORTH

SCALE

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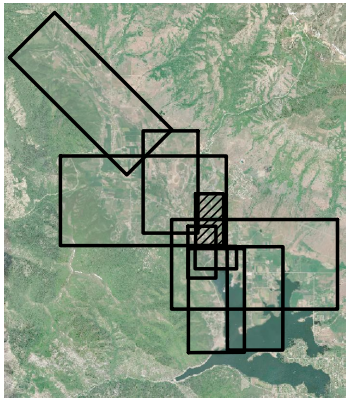
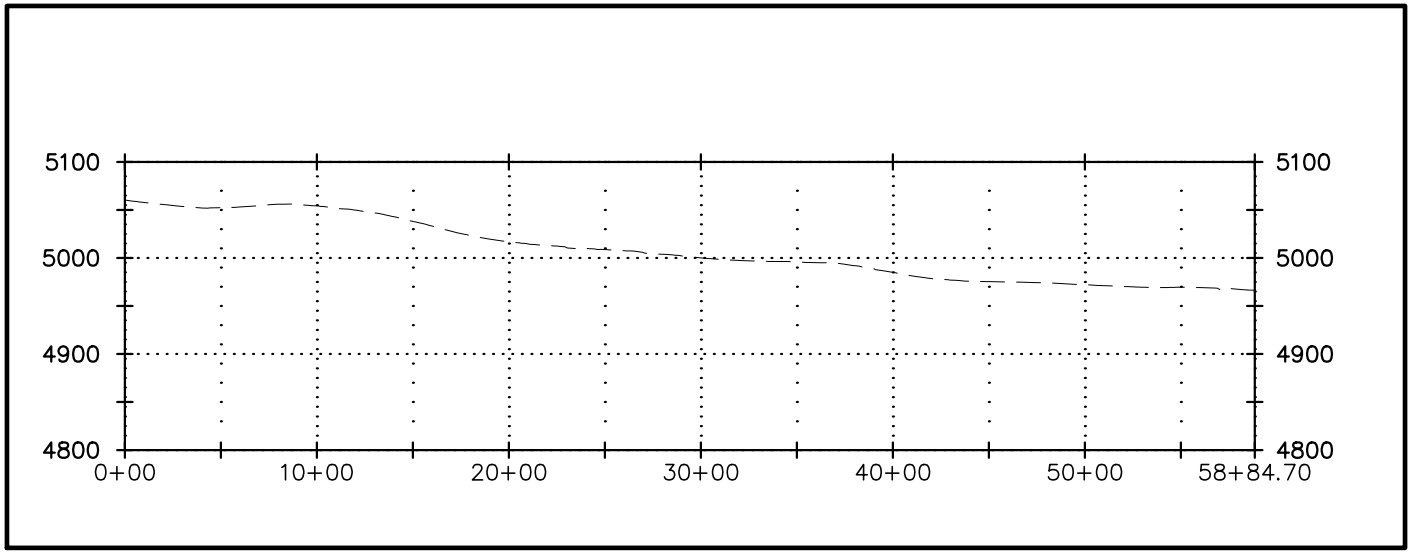
HORIZ: 1" = 1000'
VERT: 1" = 200'

CONTRIBUTING BOUNDARY

KEY MAP





SEWER LINE SPECS
L=5,885'
NO LIFT STATIONS REQUIRED
15 MANHOLES REQUIRED

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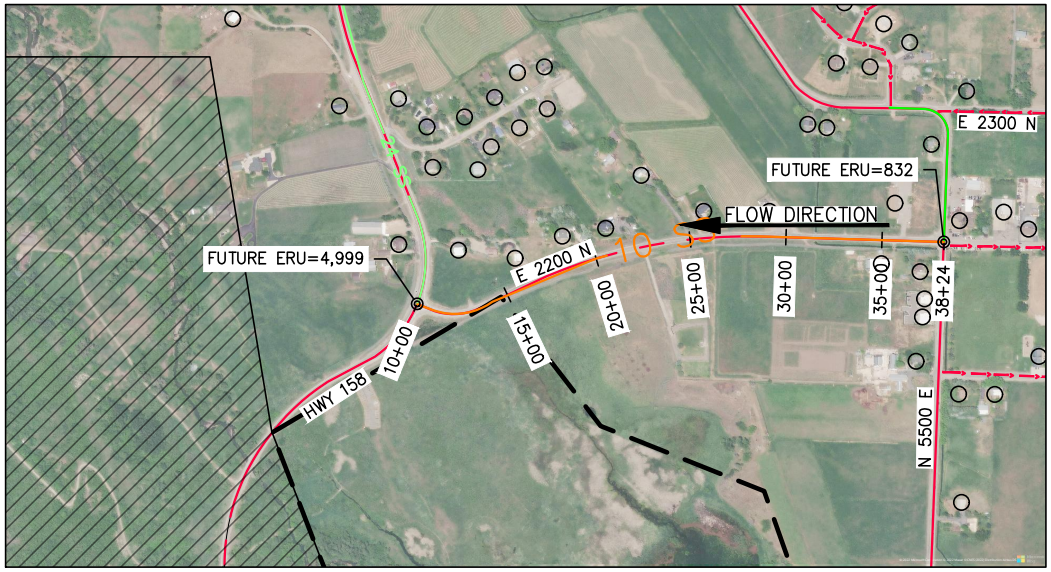
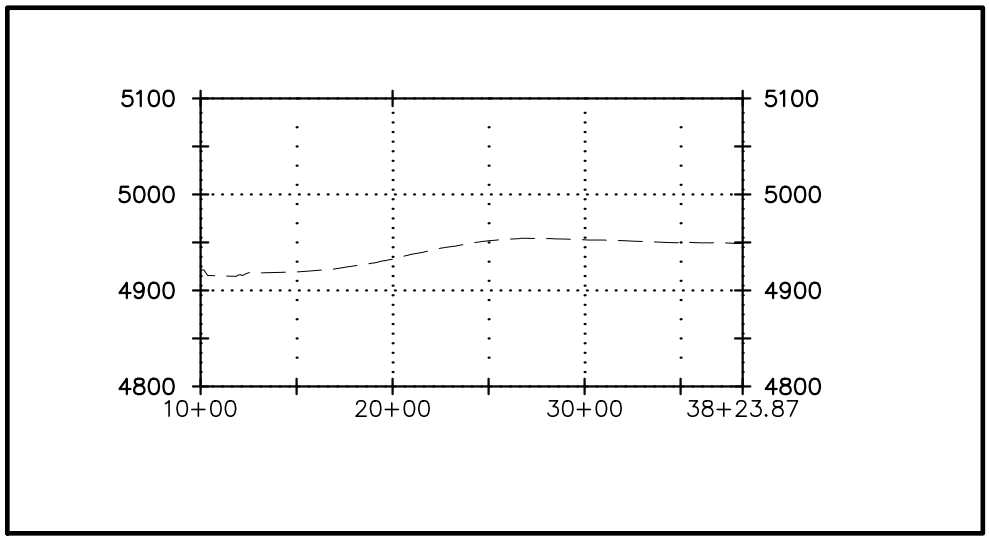
UPPER VALLEY SEWER STUDY

RESIDENCES, FLOWS, AND DIRECTIONS
HWY 158

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED JA	PP3 (ERU)	





SCALE

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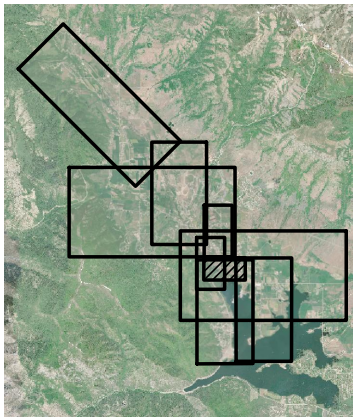
HORIZ: 1" = 1000'
VERT: 1" = 200'

CONTRIBUTING BOUNDARY

KEY MAP



SEWER LINE SPECS
L=2824'
0 LIFT STATIONS REQUIRED
9 MANHOLES REQUIRED

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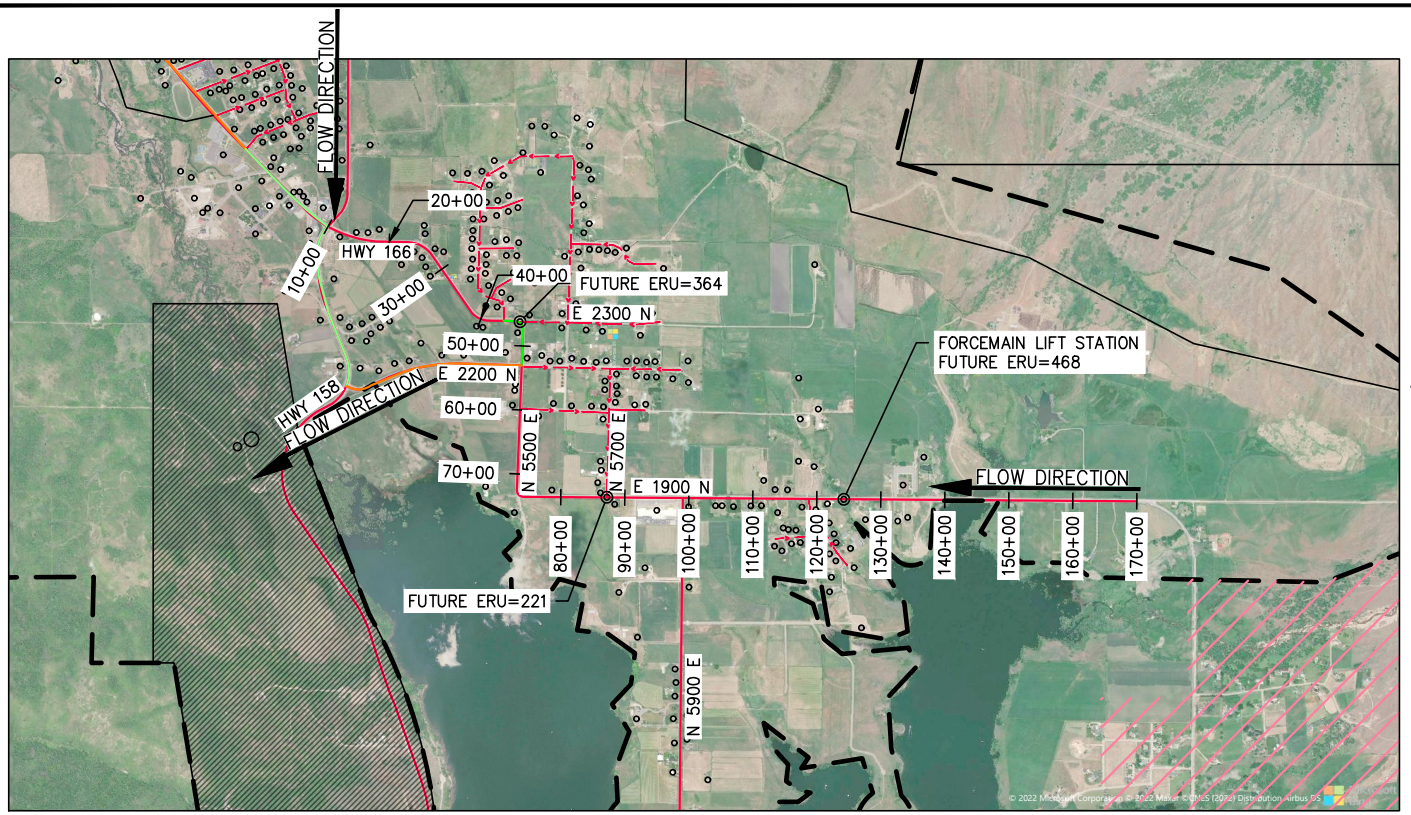
WEBER COUNTY		
UPPER VALLEY SEWER STUDY		
RESIDENCES, FLOWS, AND DIRECTIONS 2200N		
SEI NO. 08041	DESIGNED JA	DRAWN CR
CHECKED JA	PP4 (ERU)	



NORTH

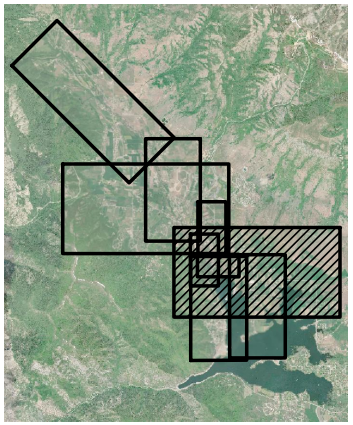
SCALE

0 3000' 6000'

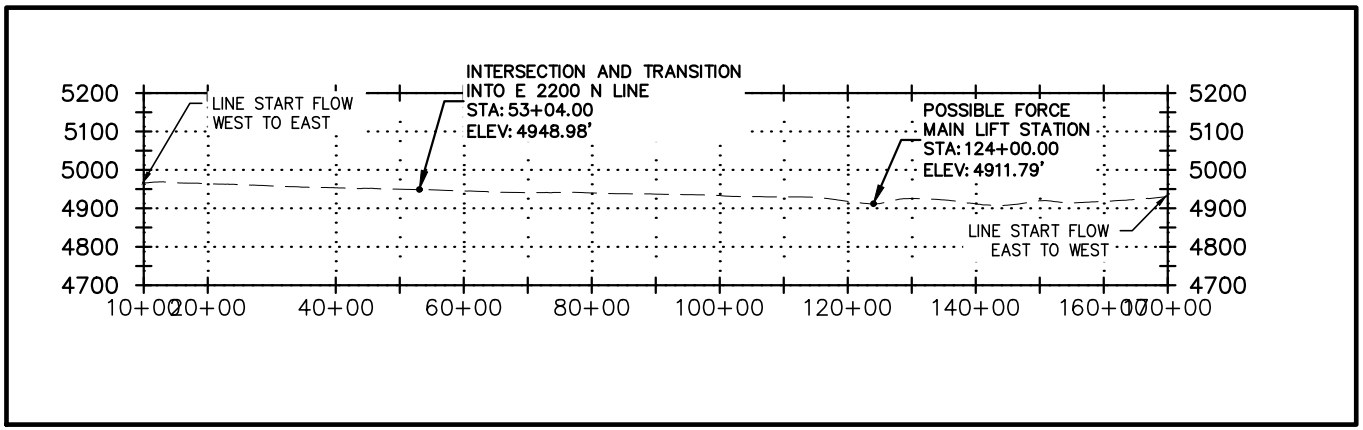
HORIZ: 1" = 3000'
VERT: 1" = 500'

CONTRIBUTING BOUNDARY
EXISTING ZONING BOUNDARIES
PROPOSED SEWER LINE

KEY MAP



SEWER LINE SPECS
L=16,107'
1 LIFT STATION REQUIRED
42 MANHOLES REQUIRED



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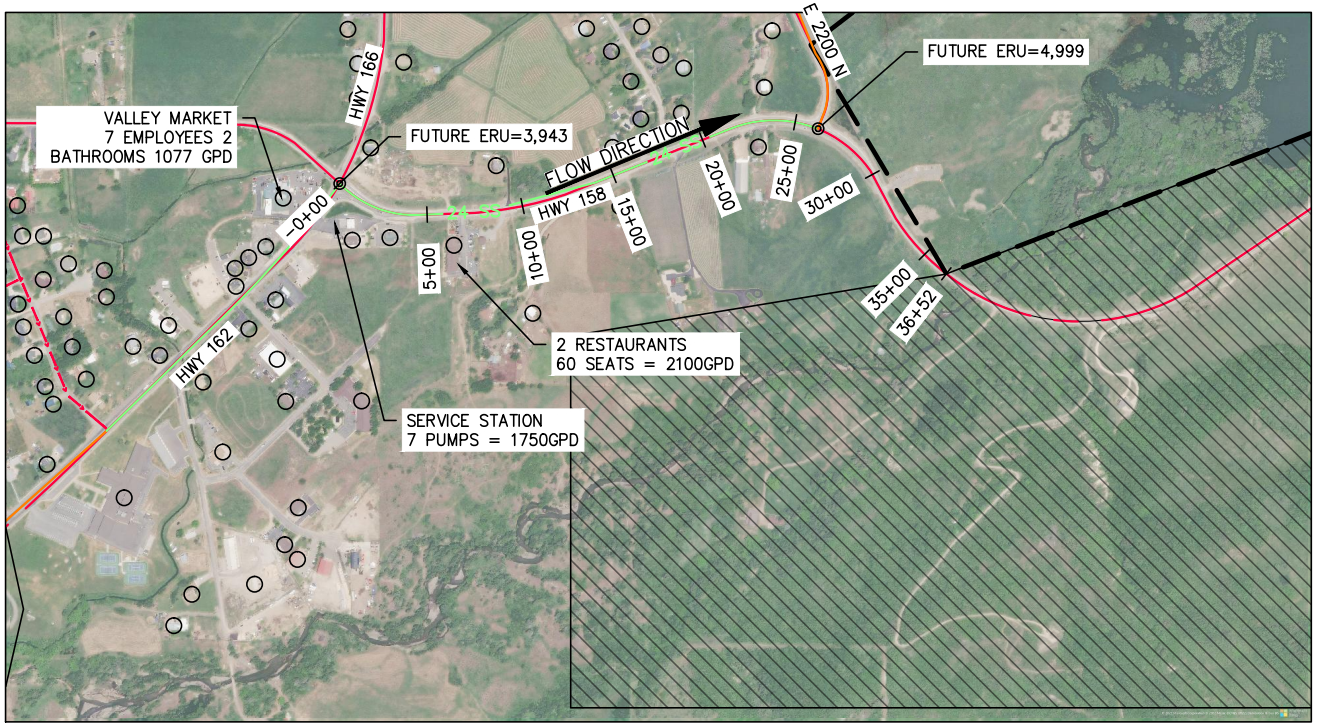
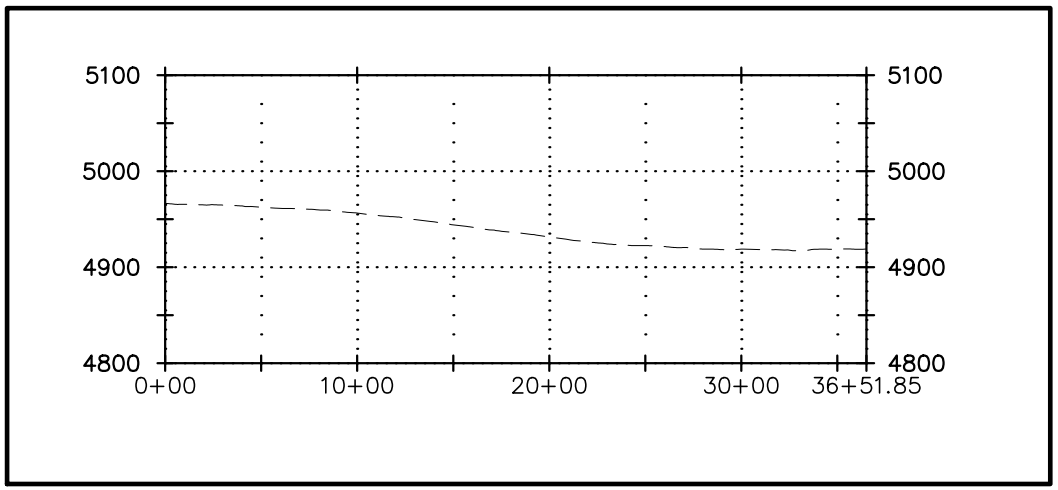
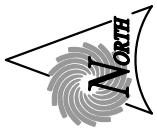
WEBER COUNTY		
UPPER VALLEY SEWER STUDY		
RESIDENCES, FLOWS, AND DIRECTIONS 1900N TO 4 WAY		
SEI NO. 08041	DESIGNED JA	DRAWN CR
CHECKED JA	PP5 (ERU)	







SCALE

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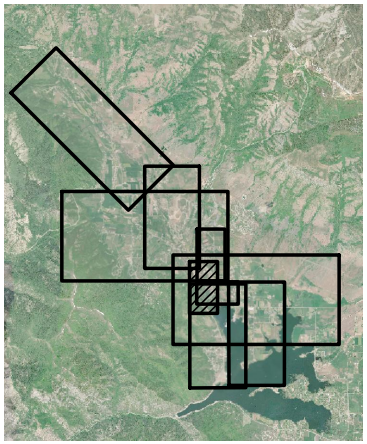
HORIZ: 1" = 1000'
VERT: 1" = 200'

CONTRIBUTING BOUNDARY
PROPOSED SEWER LINE

KEY MAP



SEWER LINE SPECS
L=3,652'
NO LIFT STATIONS REQUIRED
11 MANHOLES REQUIRED

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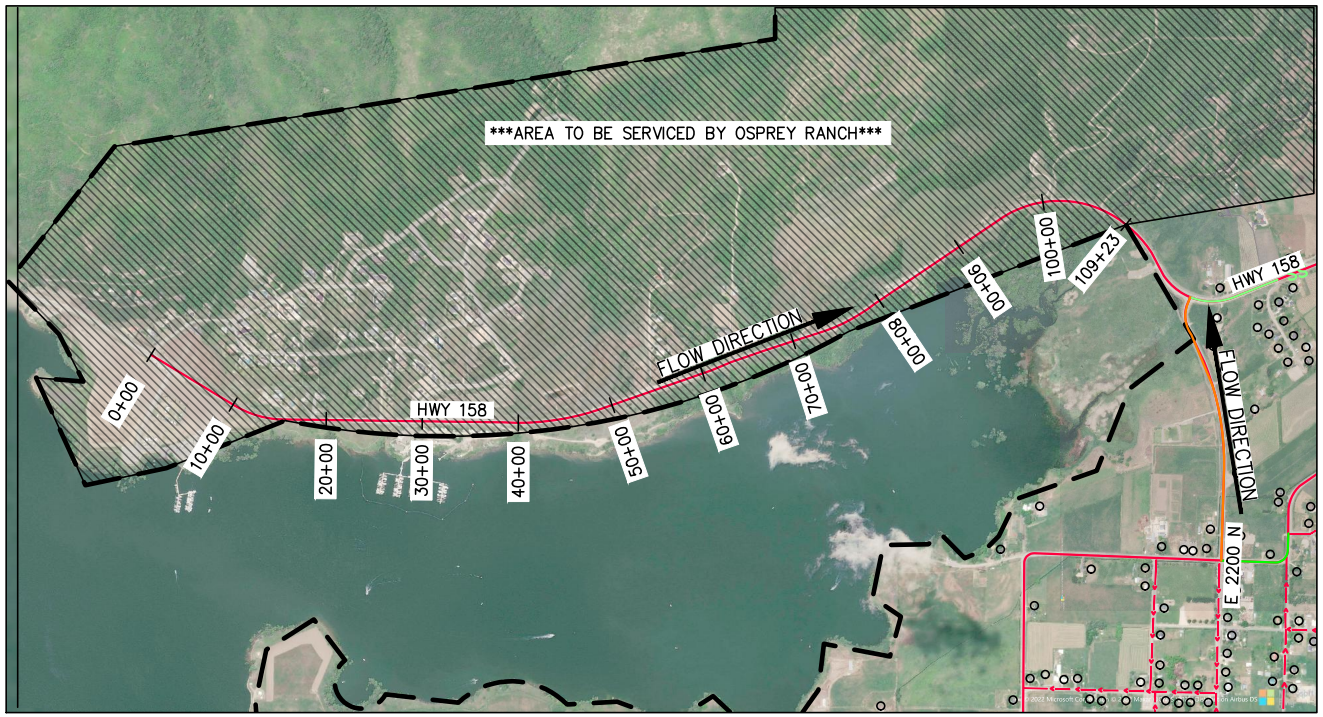
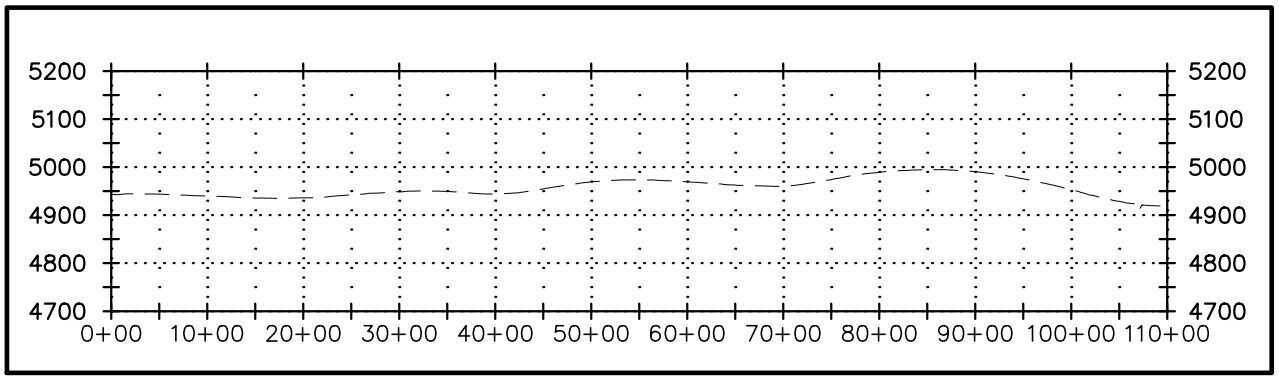
WEBER COUNTY

UPPER VALLEY SEWER STUDY

RESIDENCES, FLOWS, AND DIRECTIONS
4 WAY TO TREATMENT AREA

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED	PP6 (ERU)	
JA		





NORTH

SCALE

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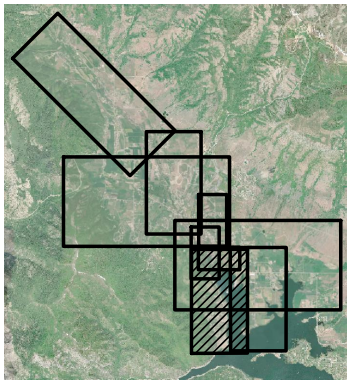
HORIZ: 1" = 2000'
VERT: 1" = 400'

CONTRIBUTING BOUNDARY
PROPOSED SEWER LINE

KEY MAP



SEWER LINE SPECS
L=10,923'
5 LIFT STATIONS REQUIRED
29 MANHOLES REQUIRED

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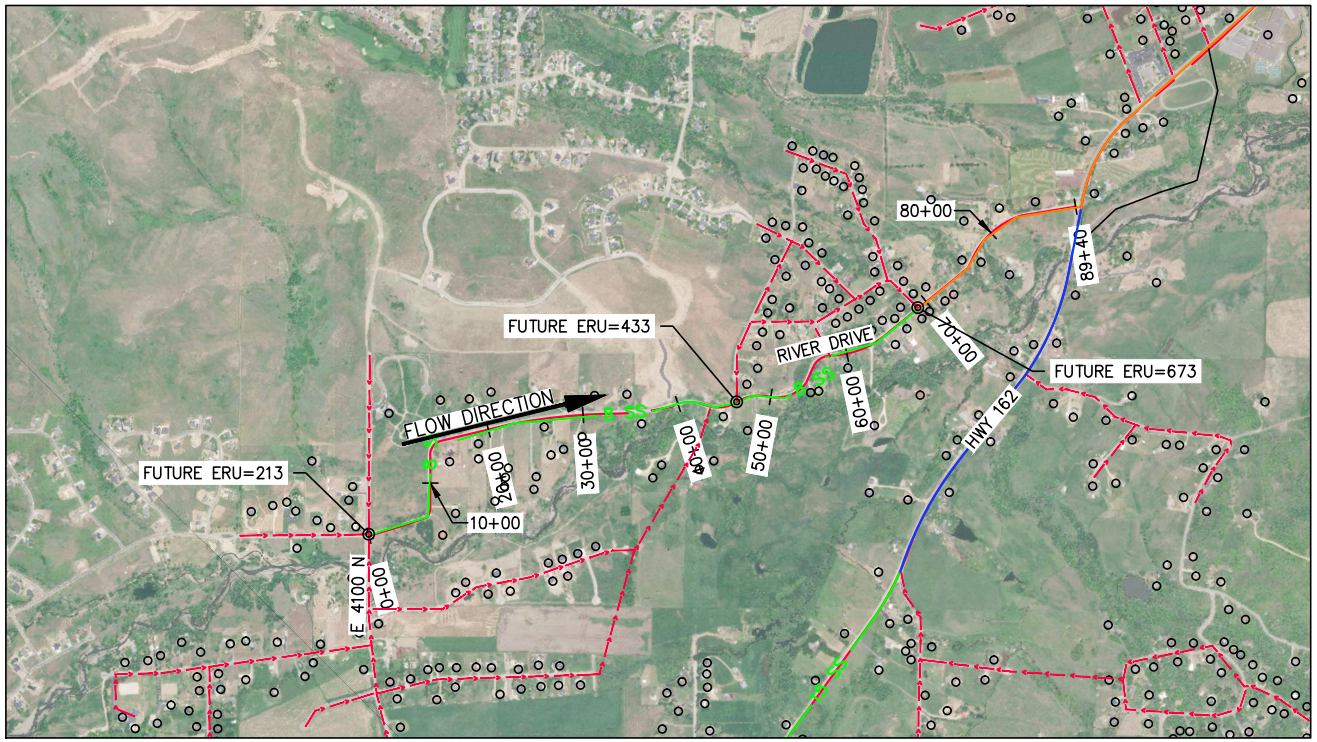
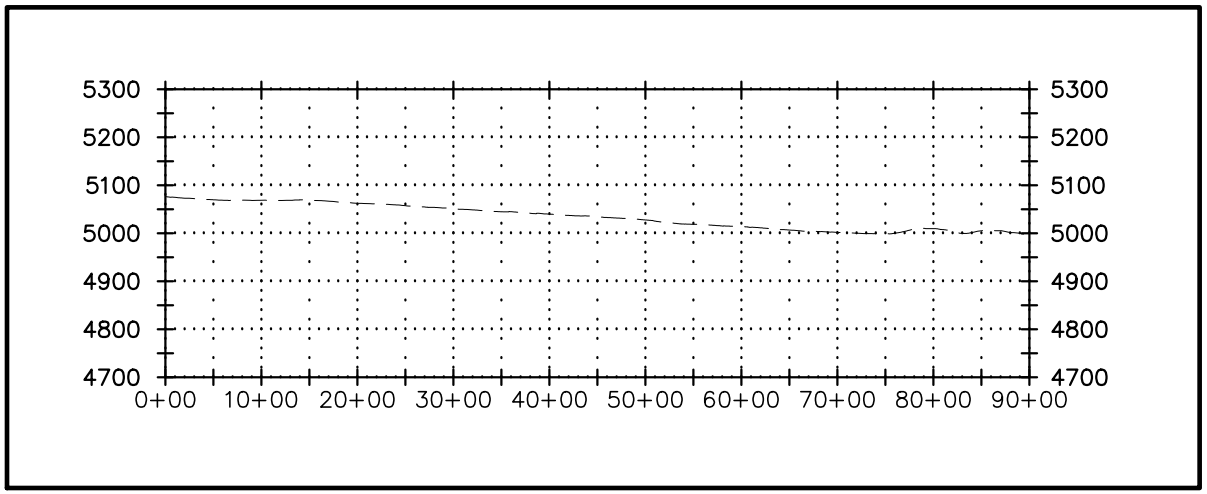
WEBER COUNTY

UPPER VALLEY SEWER STUDY

RESIDENCES, FLOWS, AND DIRECTIONS
158 TO TREATMENT AREA

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED JA	PP7 (ERU)	





NORTH

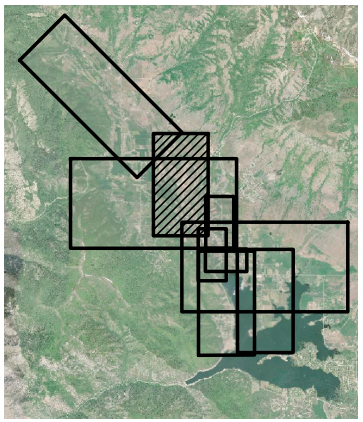
SCALE

0 2000' 4000'

HORIZ: 1" = 2000'
VERT: 1" = 400'

CONTRIBUTING BOUNDARY
PROPOSED SEWER LINE

KEY MAP



SEWER LINE SPECS
L=8,940'
NO LIFT STATIONS REQUIRED
24 MANHOLES REQUIRED

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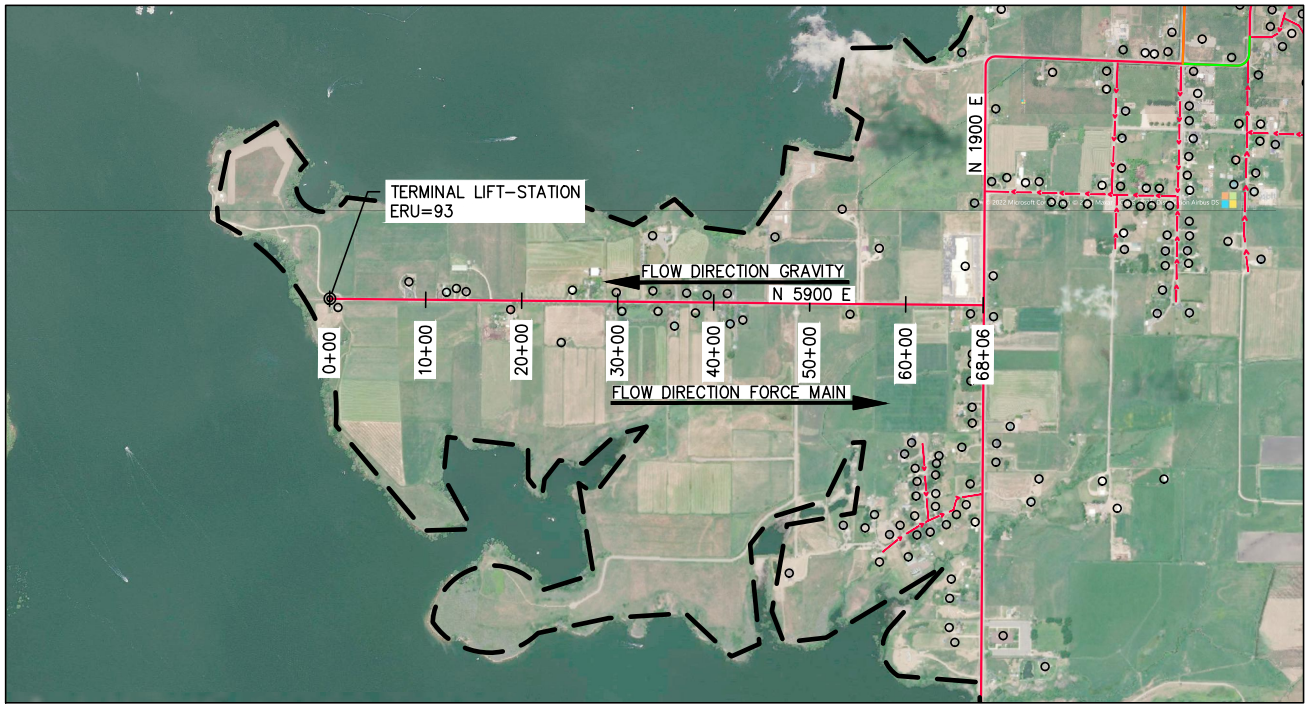
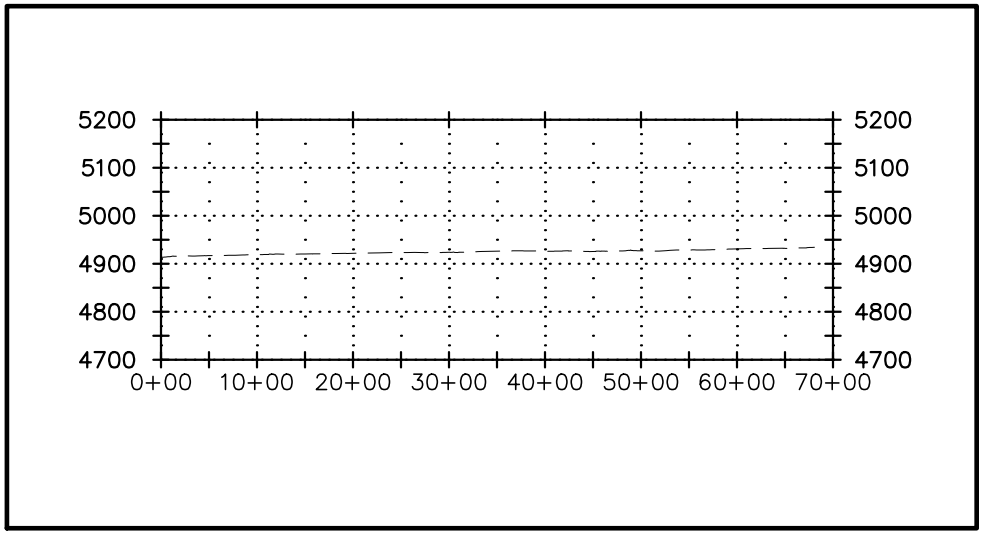
WEBER COUNTY
UPPER VALLEY SEWER STUDY

RESIDENCES, FLOWS, AND DIRECTIONS
RIVER DRIVE

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED JA	PP8 (ERU)	





NORTH

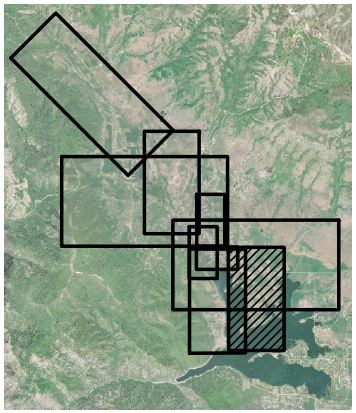
SCALE

0 2000' 4000'

HORIZ: 1" = 2000'
VERT: 1" = 400'

EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY
PROPOSED SEWER LINE

KEY MAP



SEWER LINE SPECS
L=8,940'
NO LIFT STATIONS REQUIRED
24 MANHOLES REQUIRED

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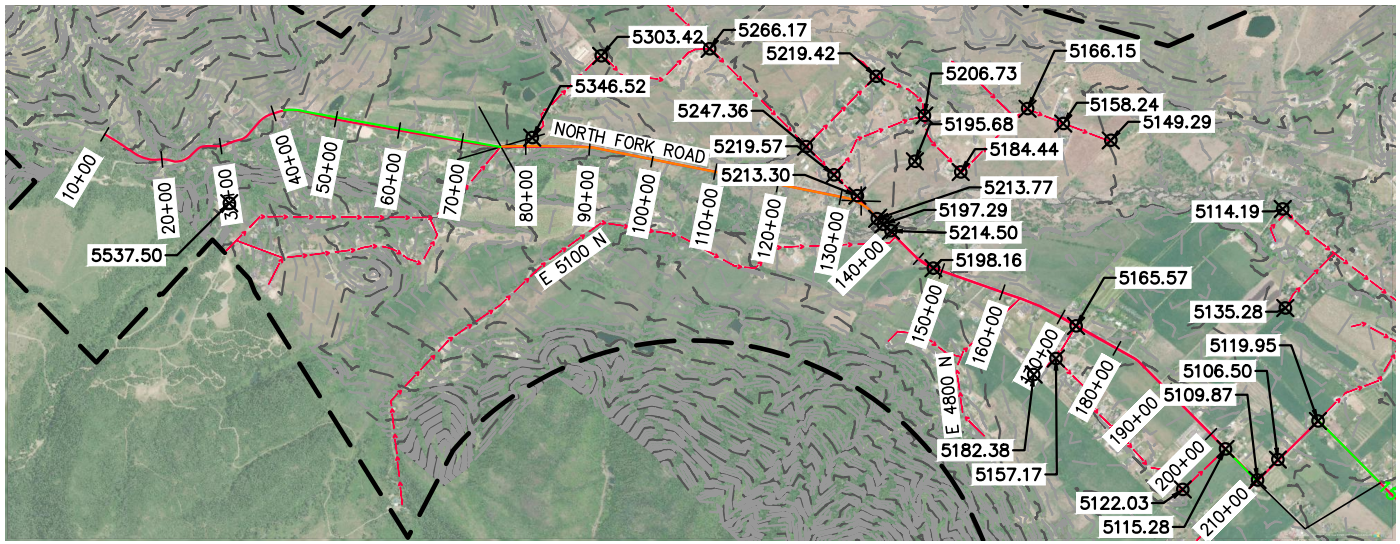
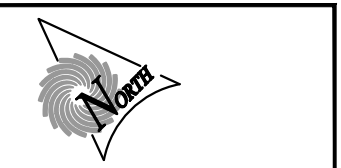
WEBER COUNTY

UPPER VALLEY SEWER STUDY

RESIDENCES, FLOWS, AND DIRECTIONS
PENINSULA

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED	PP9 (ERU)	
JA		

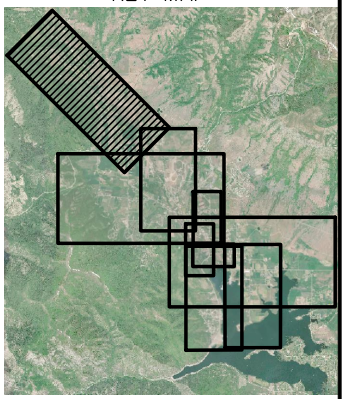


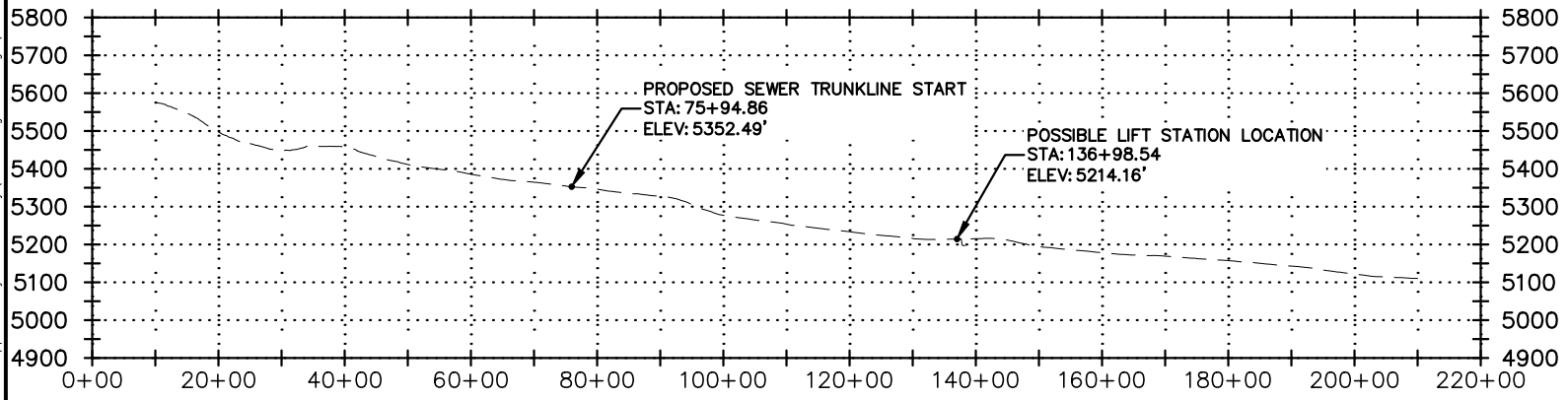


HORIZ: 1" = 3000'
VERT: 1" = 500'

5615.58 APPROXIMATE ELEVATION
PROPOSED SEWER LINE
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY
MAJOR CONTOUR (50' INTERVAL)
MINOR CONTOUR (10' INTERVAL)
SLOPE DIRECTION

KEY MAP





SEWER LINE SPECS
L=20,088'
1 LIFT STATIONS REQUIRED
51 MANHOLES REQUIRED

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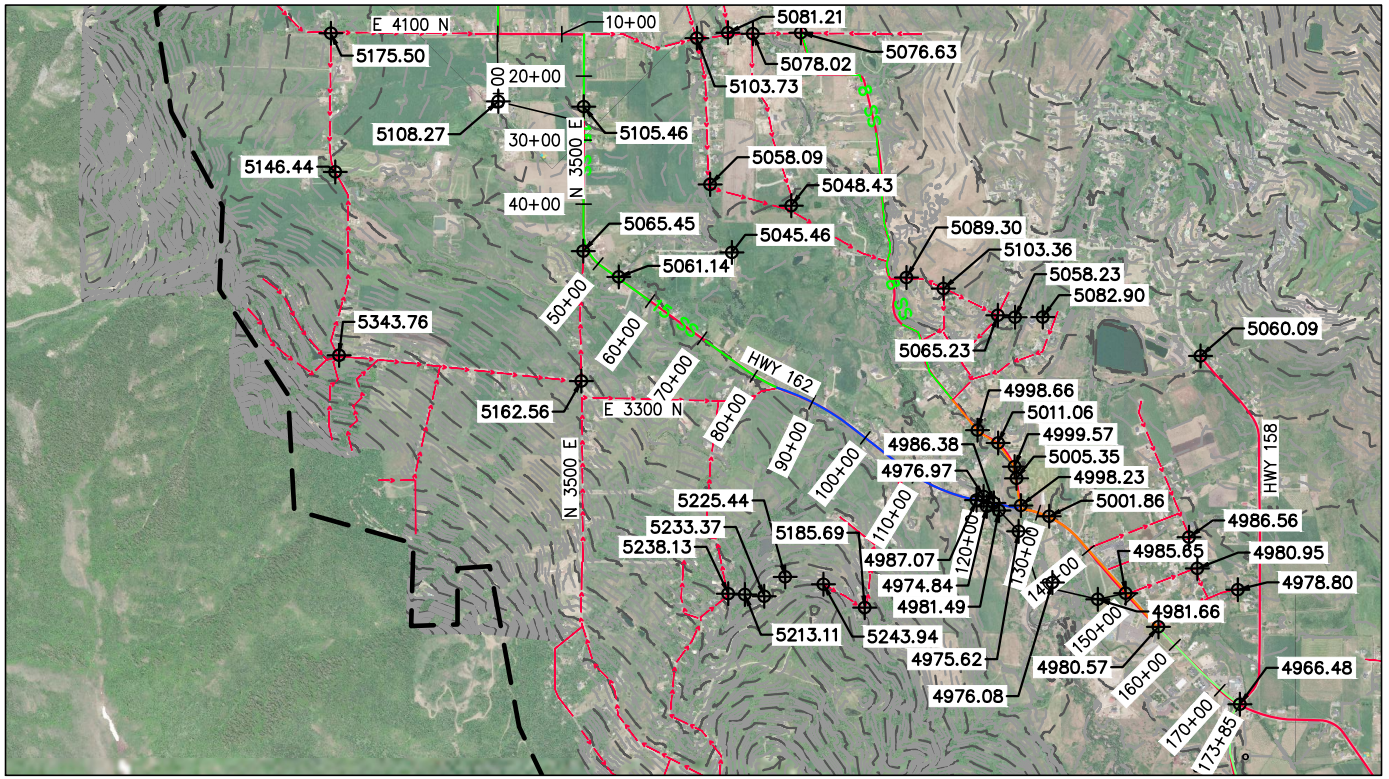
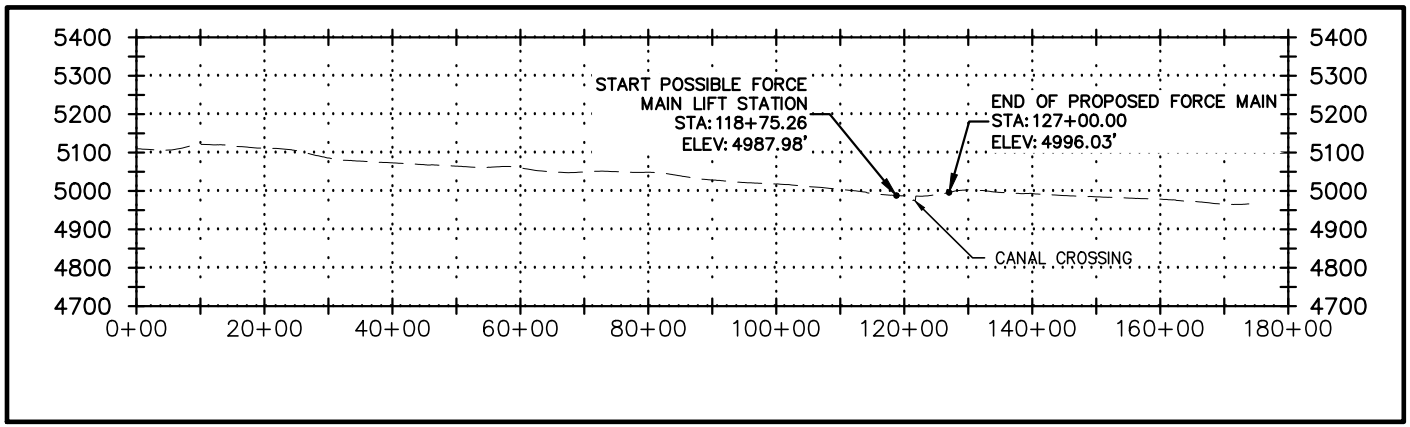
WEBER COUNTY		
UPPER VALLEY SEWER STUDY		
OVERVIEW NORTH FORK ROAD		
SEI NO. 08041	DESIGNED JA	DRAWN CR
CHECKED JA	PP1 (TOPO)	





NORTH

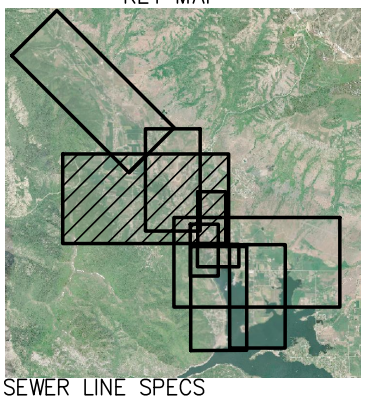
SCALE

0 3000' 6000'

HORIZ: 1" = 3000'
VERT: 1" = 500'

5615.58 APPROXIMATE ELEVATION
PROPOSED SEWER LINE ALIGNMENT
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY
MAJOR CONTOUR (50' INTERVAL)
MINOR CONTOUR (10' INTERVAL)
SLOPE DIRECTION

KEY MAP



SEWER LINE SPECS
L=19,993'
1 LIFT STATIONS REQUIRED
52 MANHOLES REQUIRED

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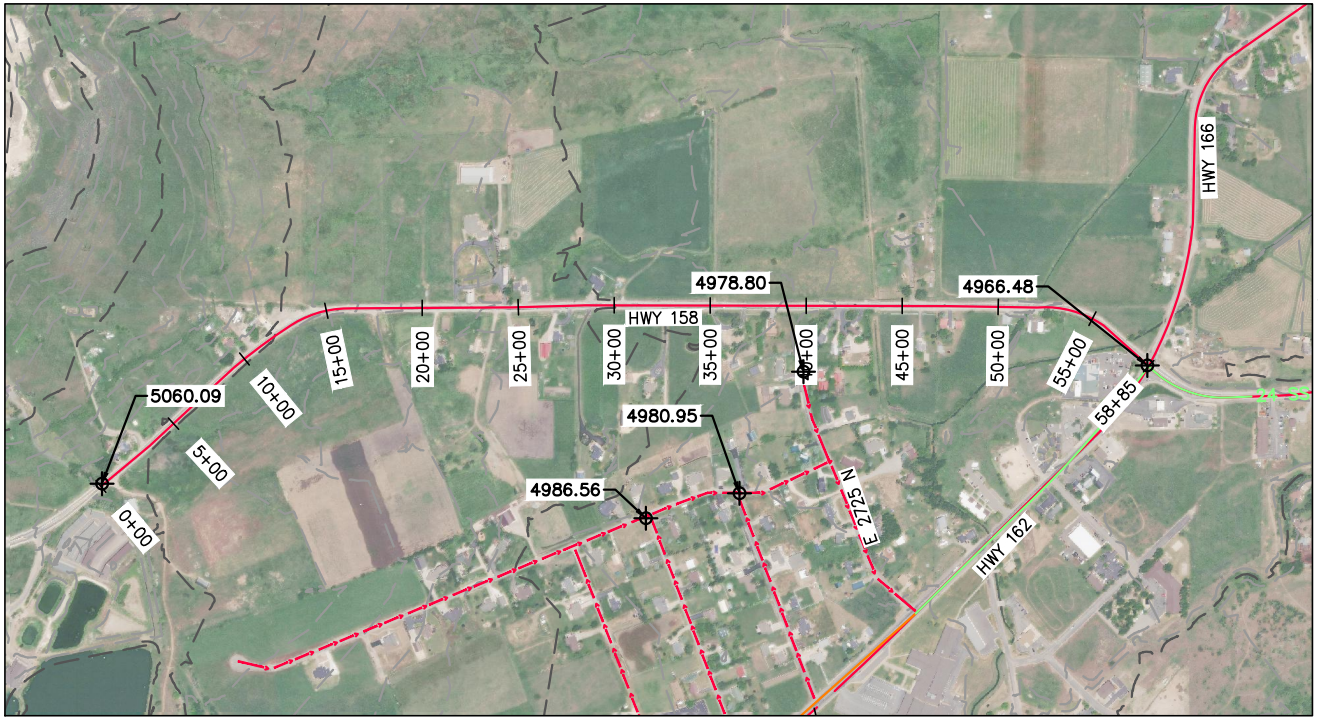
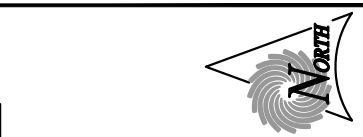
WEBER COUNTY

UPPER VALLEY SEWER STUDY

OVERVIEW
4100N AND HWY 162 TO 4-WAY

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED	PP2 (TOPO)	
JA		



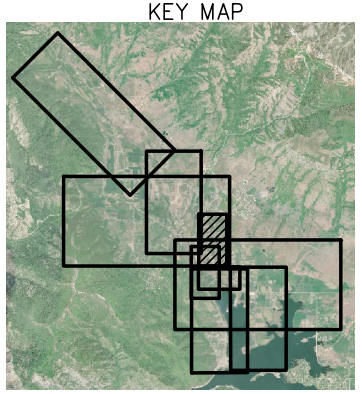


SCALE
0 1000' 2000'

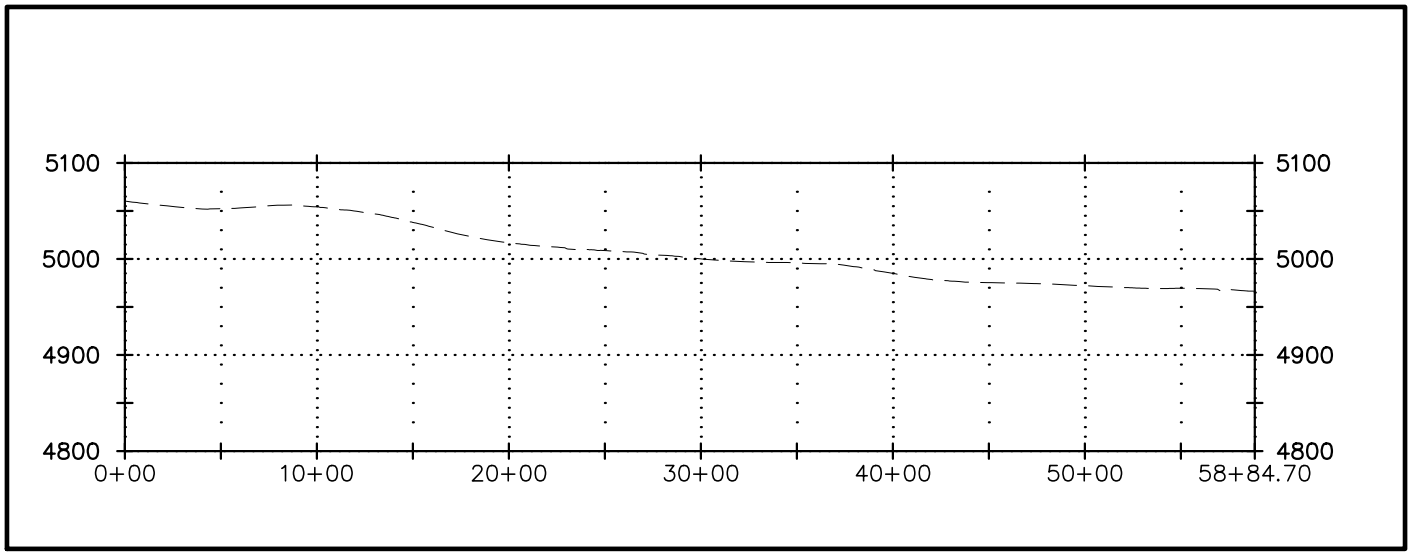
HORIZ: 1" = 1000'
VERT: 1" = 200'

5615.58 APPROXIMATE ELEVATION
PROPOSED SEWER LINE ALIGNMENT
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY
MAJOR CONTOUR (50' INTERVAL)
MINOR CONTOUR (10' INTERVAL)
SLOPE DIRECTION

KEY MAP



SEWER LINE SPECS
L=5,885'
NO LIFT STATIONS REQUIRED
15 MANHOLES REQUIRED



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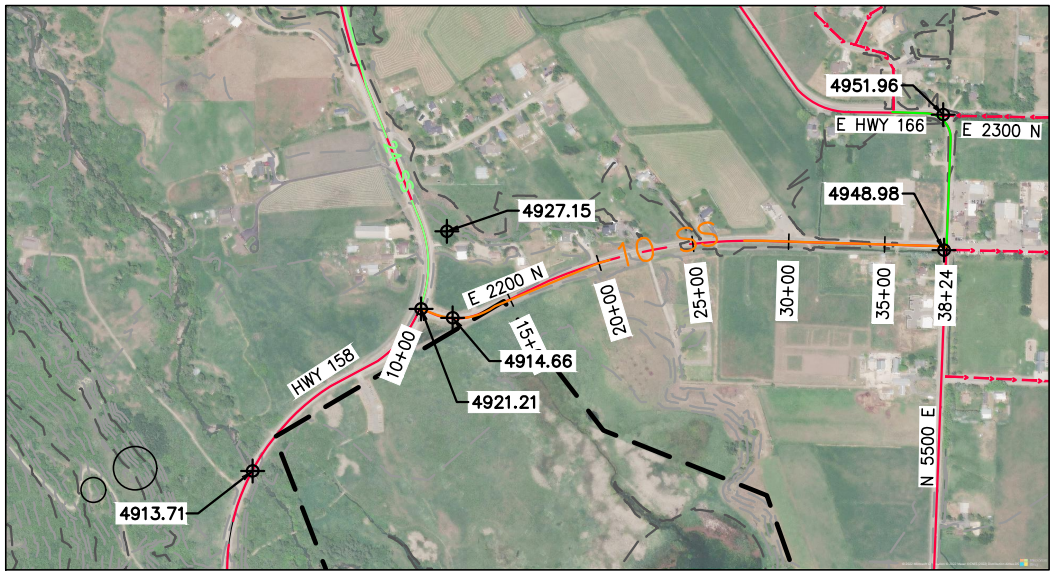
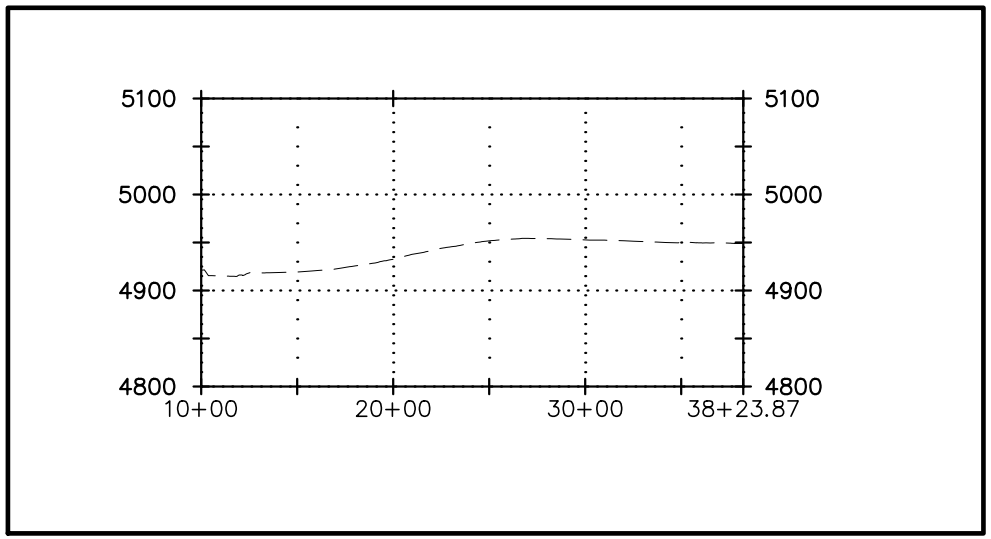
WEBER COUNTY		
UPPER VALLEY SEWER STUDY		
OVERVIEW HWY 158		
SEI NO. 08041	DESIGNED JA	DRAWN CR
CHECKED JA	PP3 (TOPO)	

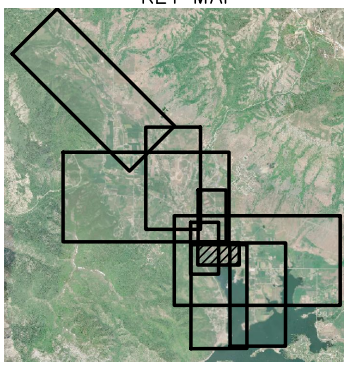




HORIZ: 1" = 1000'
VERT: 1" = 200'

5615.58 APPROXIMATE ELEVATION
PROPOSED SEWER LINE ALIGNMENT
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY
MAJOR CONTOUR (50' INTERVAL)
MINOR CONTOUR (10' INTERVAL)
SLOPE DIRECTION

KEY MAP



SEWER LINE SPECS
L=2824'
0 LIFT STATIONS REQUIRED
9 MANHOLES REQUIRED

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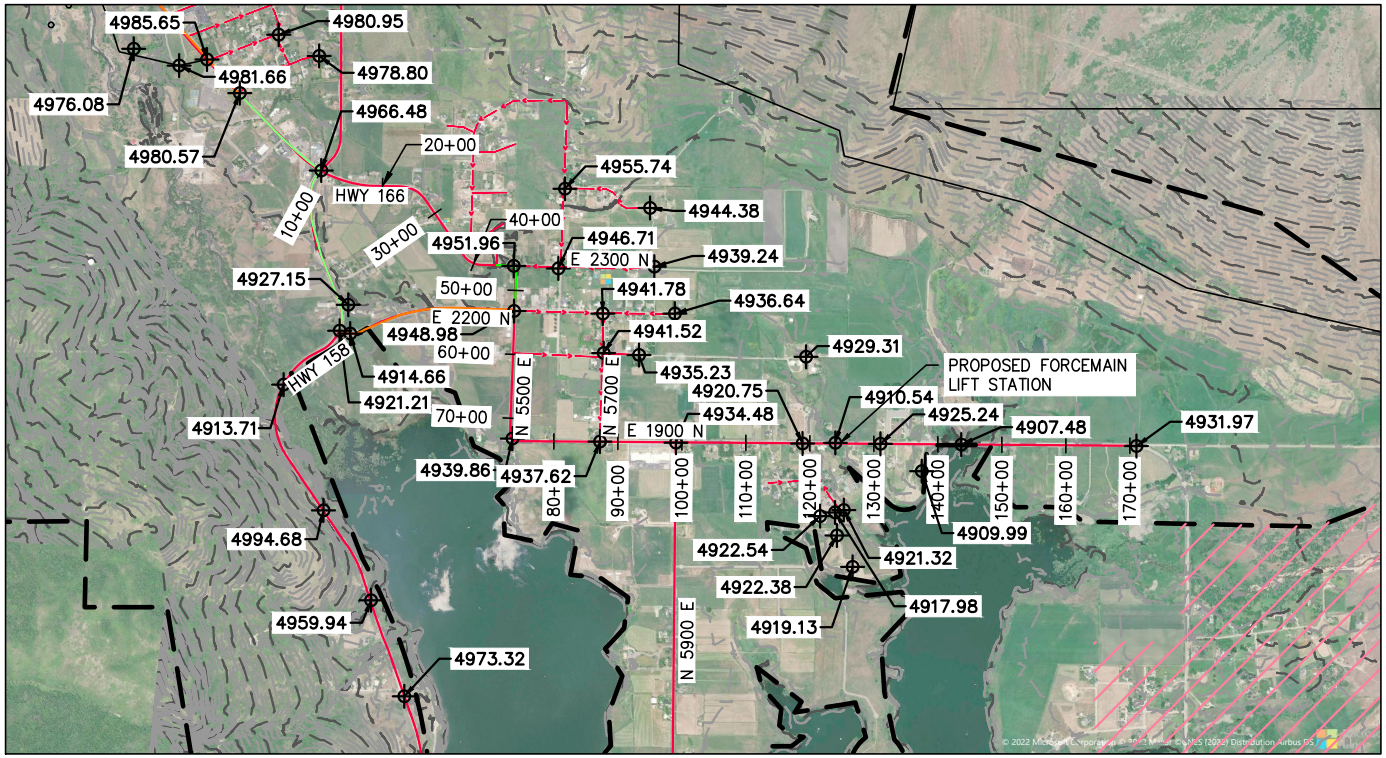
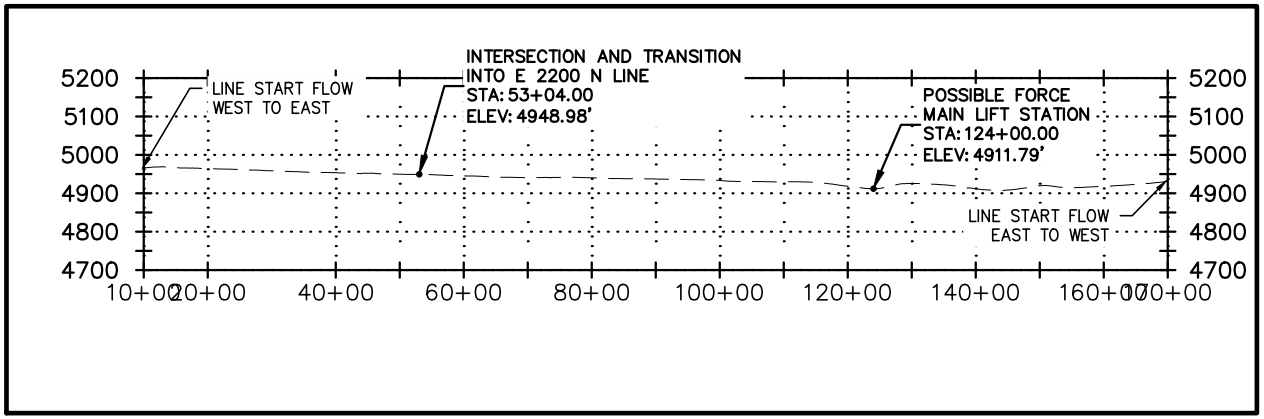
WEBER COUNTY		
UPPER VALLEY SEWER STUDY		
OVERVIEW 2200N		
SEI NO. 08041	DESIGNED JA	DRAWN CR
CHECKED JA	PP4 (TOPO)	





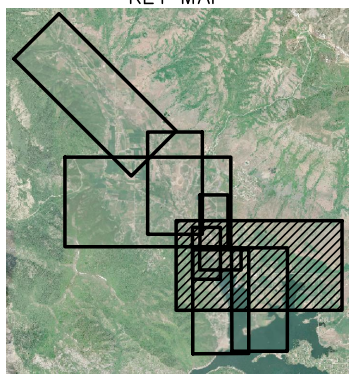
NORTH

SCALE
0 3000' 6000'

HORIZ: 1" = 3000'
VERT: 1" = 500'

5615.58 APPROXIMATE ELEVATION
PROPOSED SEWER LINE ALIGNMENT
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY
MAJOR CONTOUR (50' INTERVAL)
MINOR CONTOUR (10' INTERVAL)
SLOPE DIRECTION

KEY MAP



SEWER LINE SPECS
L=16,107'
1 LIFT STATION REQUIRED
42 MANHOLES REQUIRED

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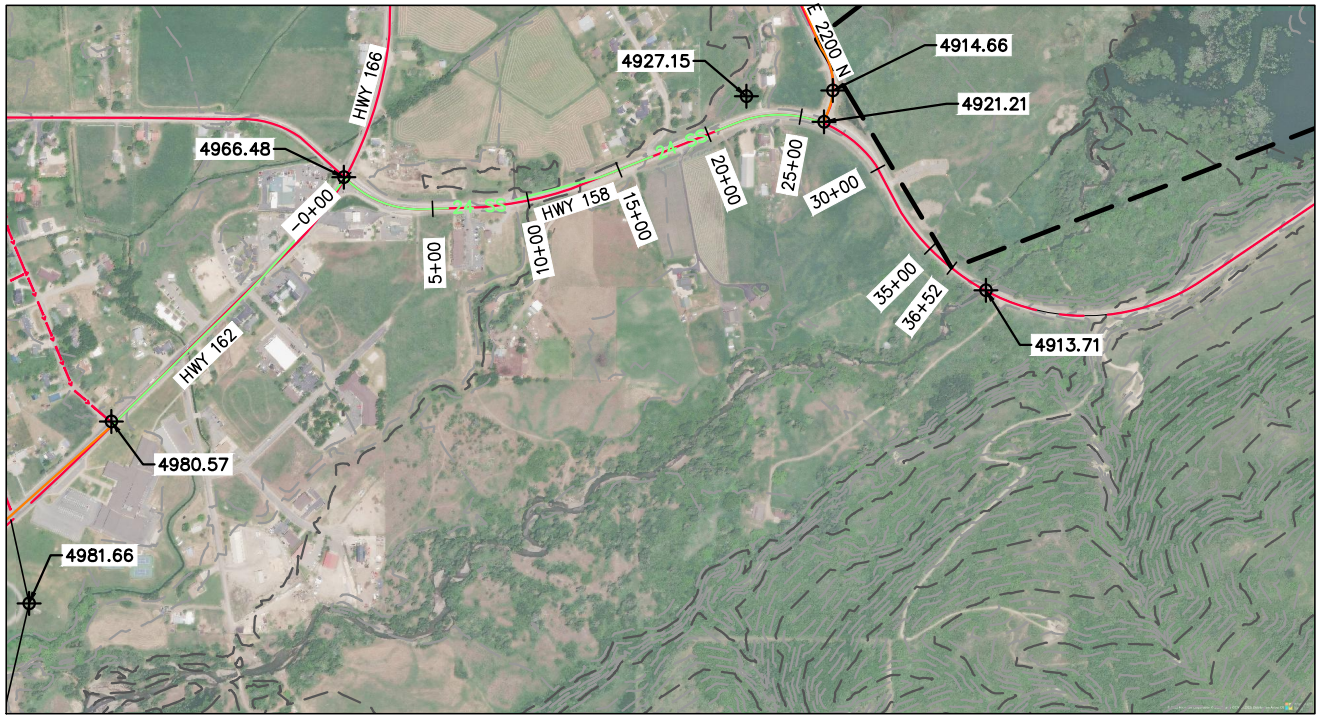
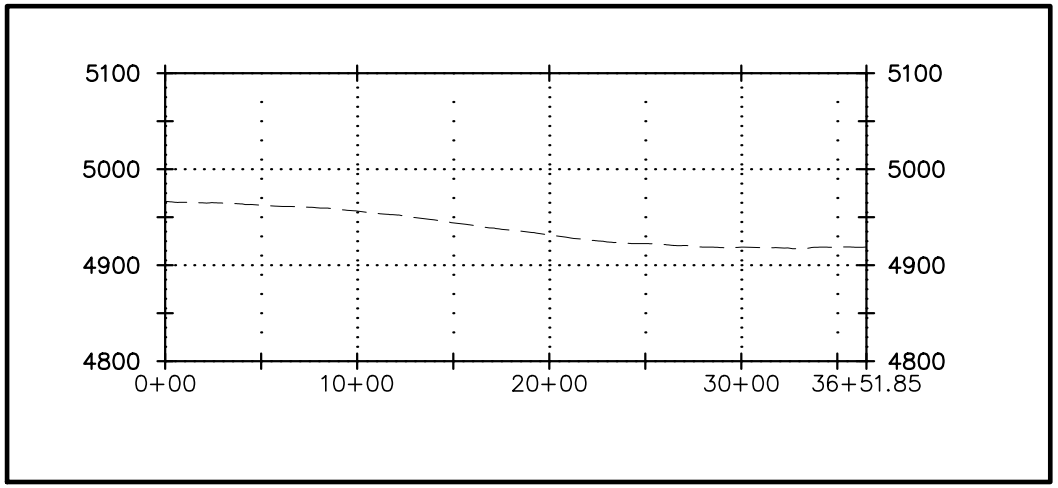
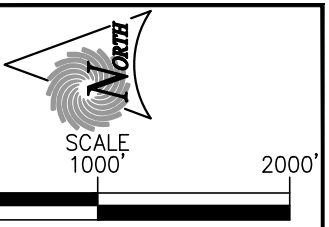
WEBER COUNTY
UPPER VALLEY SEWER STUDY

OVERVIEW
1900N TO 4 WAY

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED	PP5 (TOPO)	
JA		



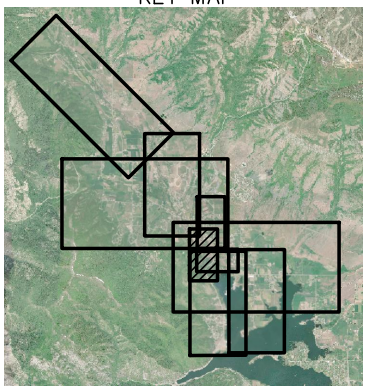




HORIZ: 1" = 1000'
VERT: 1" = 200'

5615.58 APPROXIMATE ELEVATION
PROPOSED SEWER LINE ALIGNMENT
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY
MAJOR CONTOUR (50' INTERVAL)
MINOR CONTOUR (10' INTERVAL)
SLOPE DIRECTION

KEY MAP



SEWER LINE SPECS
L=3,652'
NO LIFT STATIONS REQUIRED
11 MANHOLES REQUIRED

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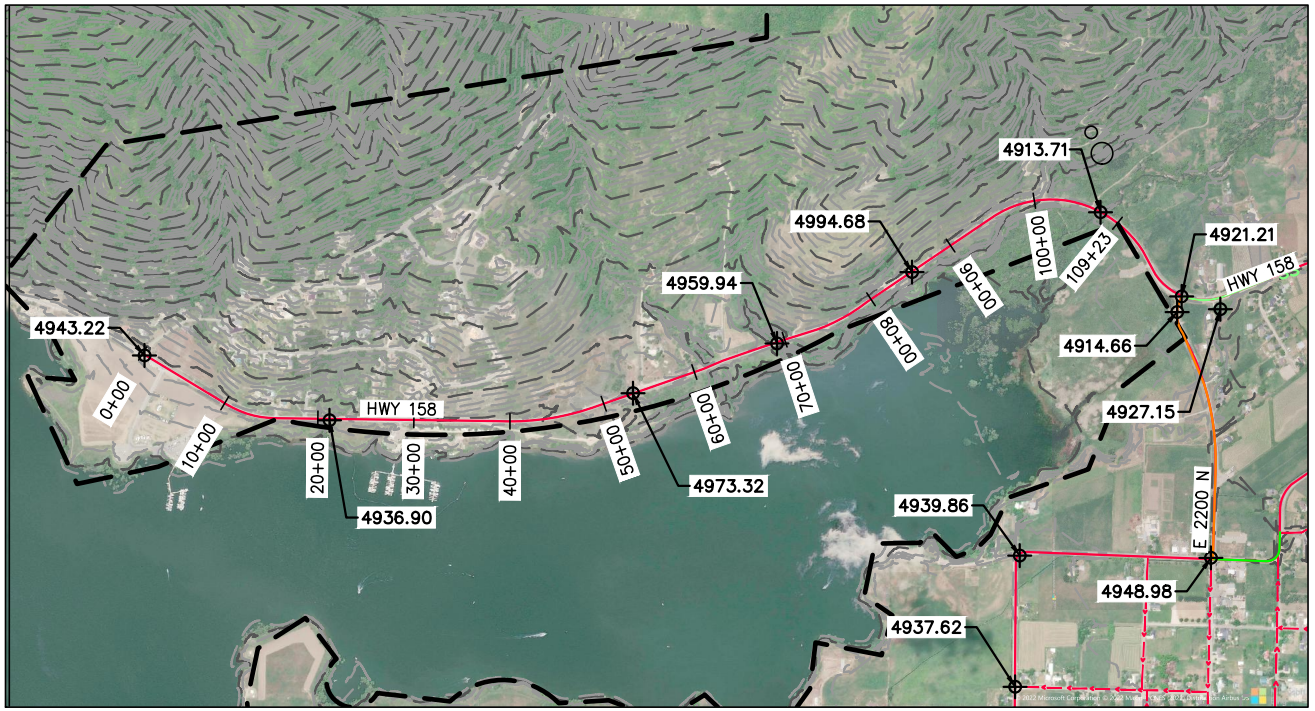
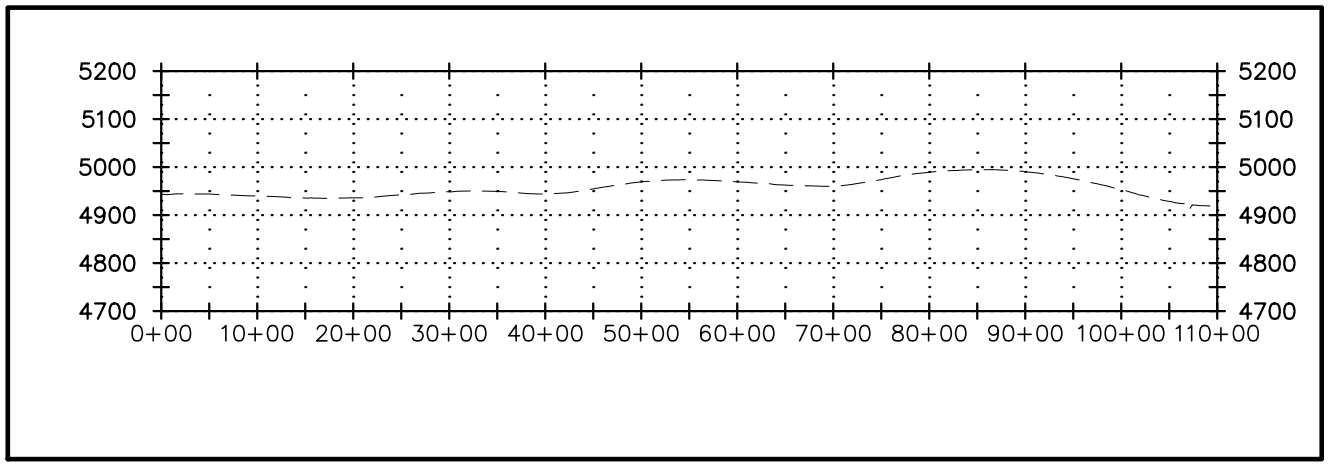
WEBER COUNTY		
UPPER VALLEY SEWER STUDY		
OVERVIEW 4 WAY TO TREATMENT AREA		
SEI NO. 08041	DESIGNED JA	DRAWN CR
CHECKED JA	PP6 (TOPO)	





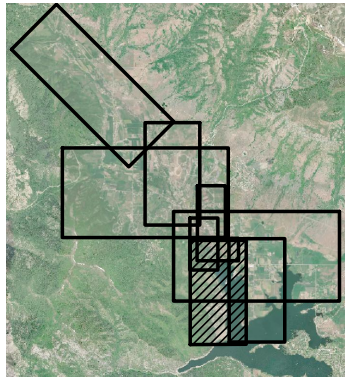
NORTH

SCALE
0 2000' 4000'

HORIZ: 1" = 2000'
VERT: 1" = 400'

5615.58 APPROXIMATE ELEVATION
PROPOSED SEWER LINE ALIGNMENT
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY
MAJOR CONTOUR (50' INTERVAL)
MINOR CONTOUR (10' INTERVAL)
SLOPE DIRECTION

KEY MAP



SEWER LINE SPECS
L=10,923'
5 LIFT STATIONS REQUIRED
29 MANHOLES REQUIRED

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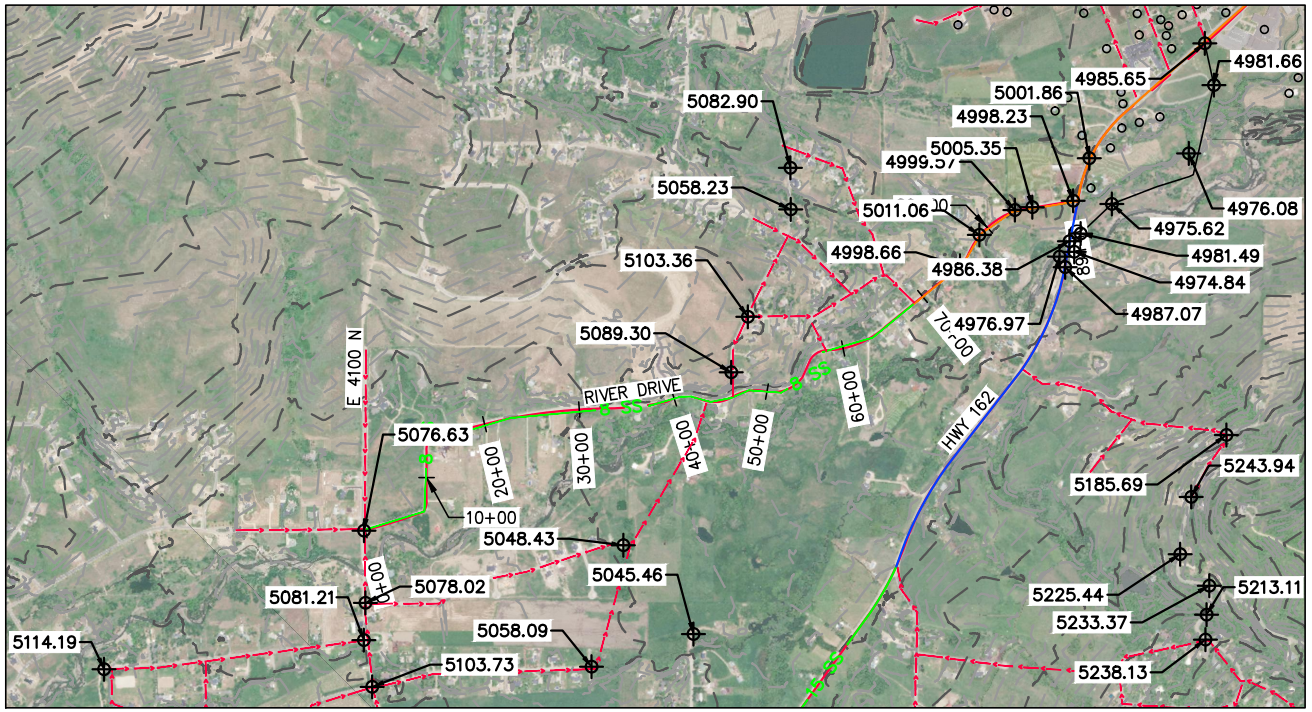
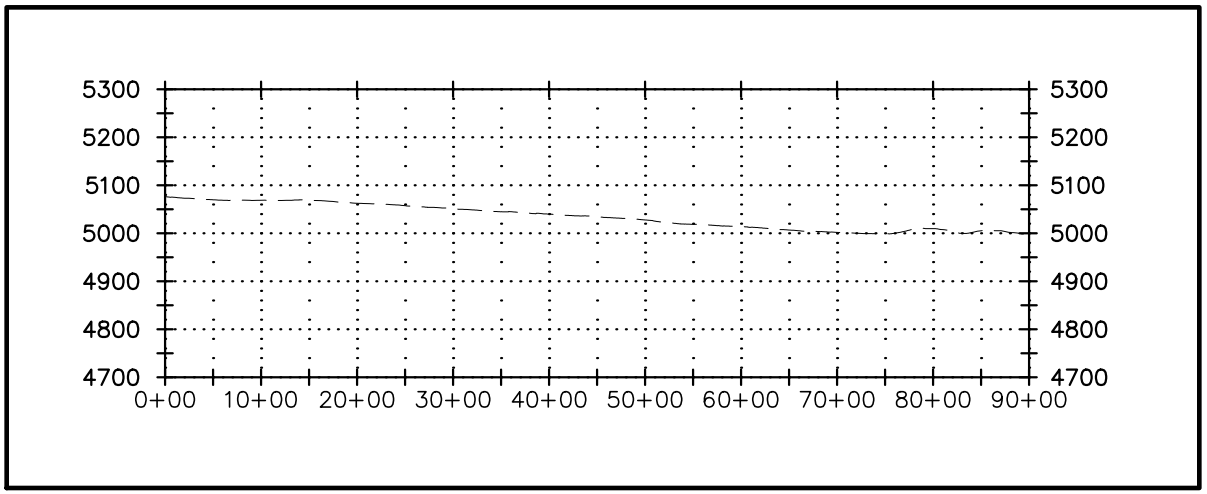
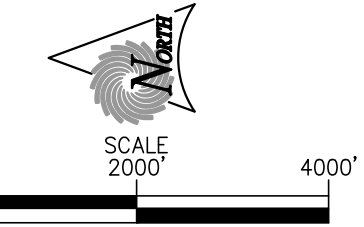
WEBER COUNTY
UPPER VALLEY SEWER STUDY

OVERVIEW
158 TO TREATMENT AREA

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED	PP7 (TOPO)	
JA		







HORIZ: 1" = 2000'
VERT: 1" = 400'

5615.58 APPROXIMATE ELEVATION

PROPOSED SEWER LINE ALIGNMENT

EXISTING ZONING BOUNDARIES

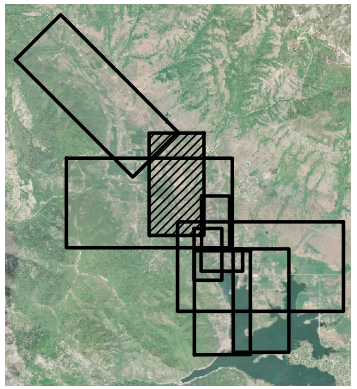
CONTRIBUTING BOUNDARY

MAJOR CONTOUR (50' INTERVAL)

MINOR CONTOUR (10' INTERVAL)

SLOPE DIRECTION

KEY MAP



SEWER LINE SPECS
L=8,940'
NO LIFT STATIONS REQUIRED
24 MANHOLES REQUIRED

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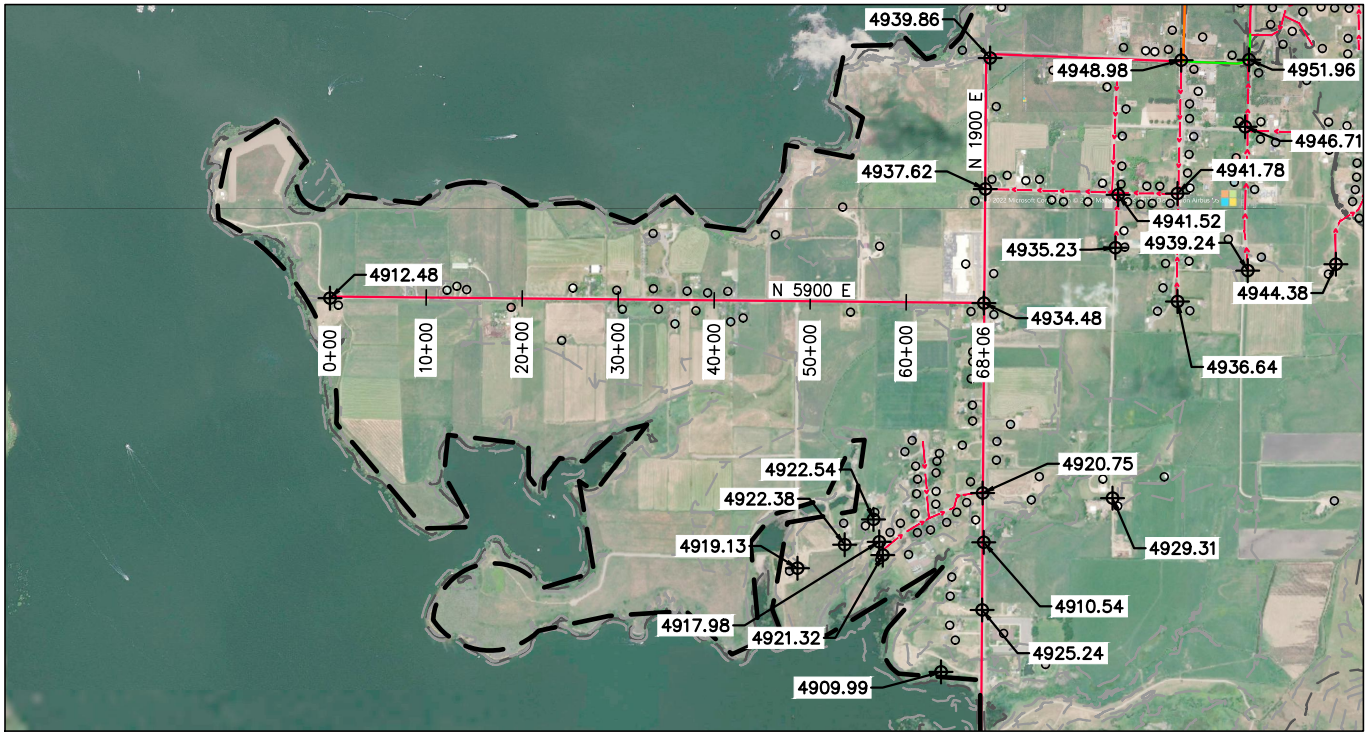
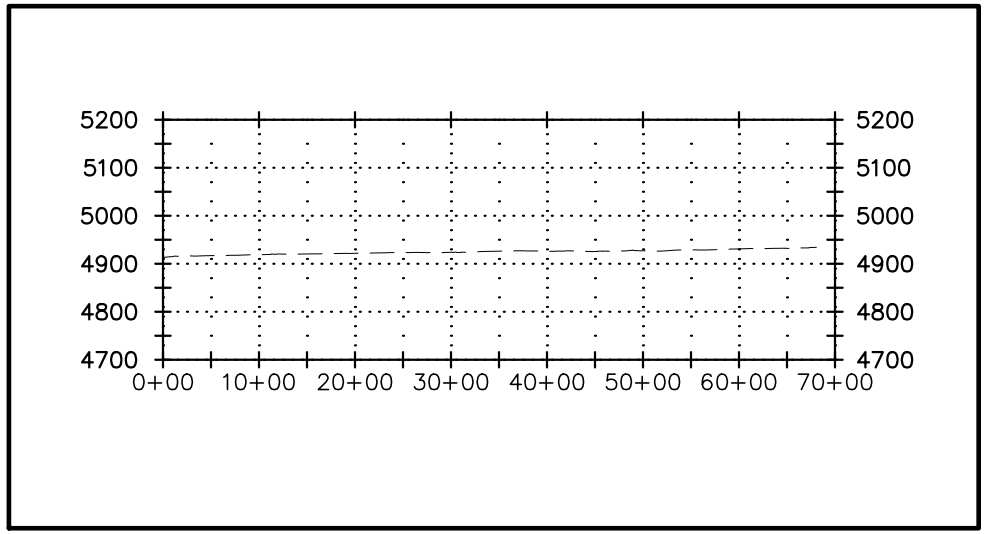
WEBER COUNTY

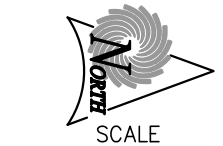
UPPER VALLEY SEWER STUDY

OVERVIEW
RIVER DRIVE

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED	PP8 (TOPO)	
JA		



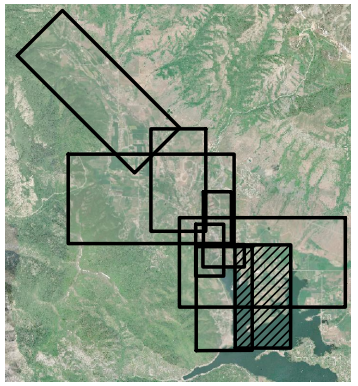




HORIZ: 1" = 2000'
VERT: 1" = 400'

5615.58 APPROXIMATE ELEVATION
PROPOSED SEWER LINE ALIGNMENT
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY
MAJOR CONTOUR (50' INTERVAL)
MINOR CONTOUR (10' INTERVAL)
SLOPE DIRECTION

KEY MAP



SEWER LINE SPECS
L=8,940'
NO LIFT STATIONS REQUIRED
24 MANHOLES REQUIRED

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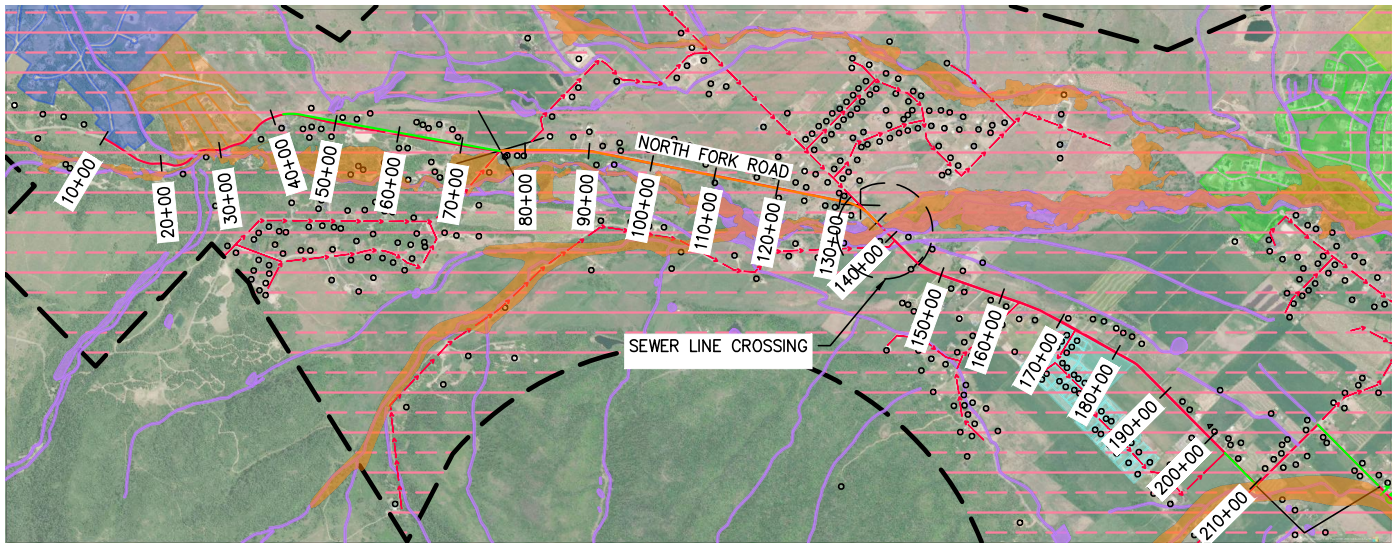
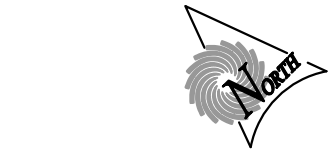
WEBER COUNTY
UPPER VALLEY SEWER STUDY
OVERVIEW
PENINSULA

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED	PP9 (TOPO)	
JA		





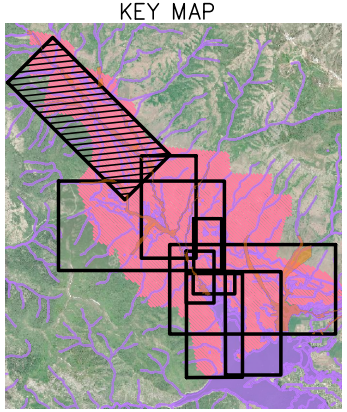
SCALE

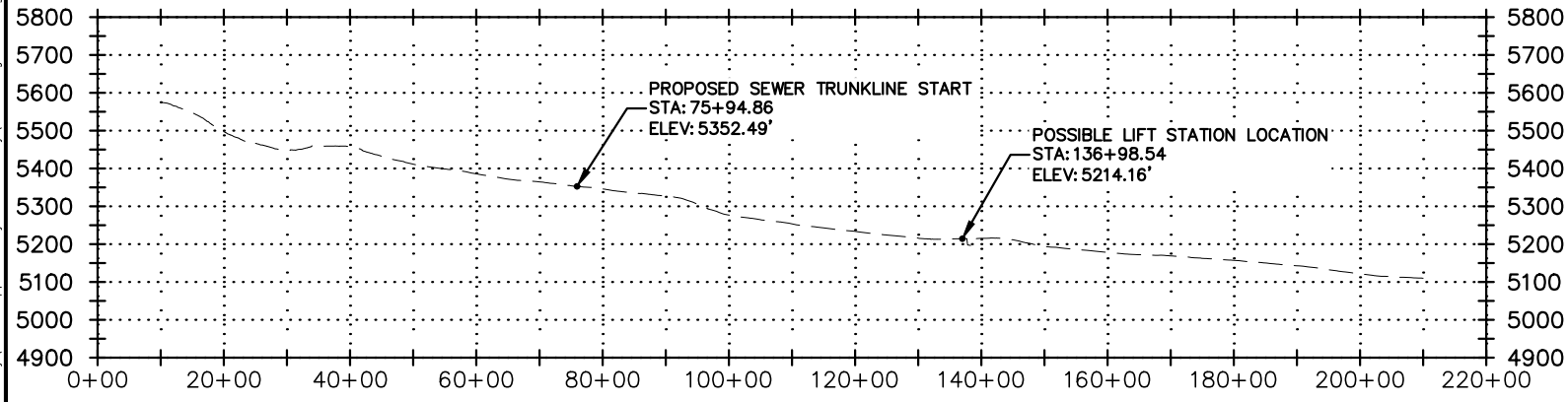
0 3000' 6000'

HORIZ: 1" = 3000'
VERT: 1" = 500'

PROPOSED SEWER LINE
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY

KEY MAP





SEWER LINE SPECS
L=20,088'
1 LIFT STATIONS REQUIRED
51 MANHOLES REQUIRED

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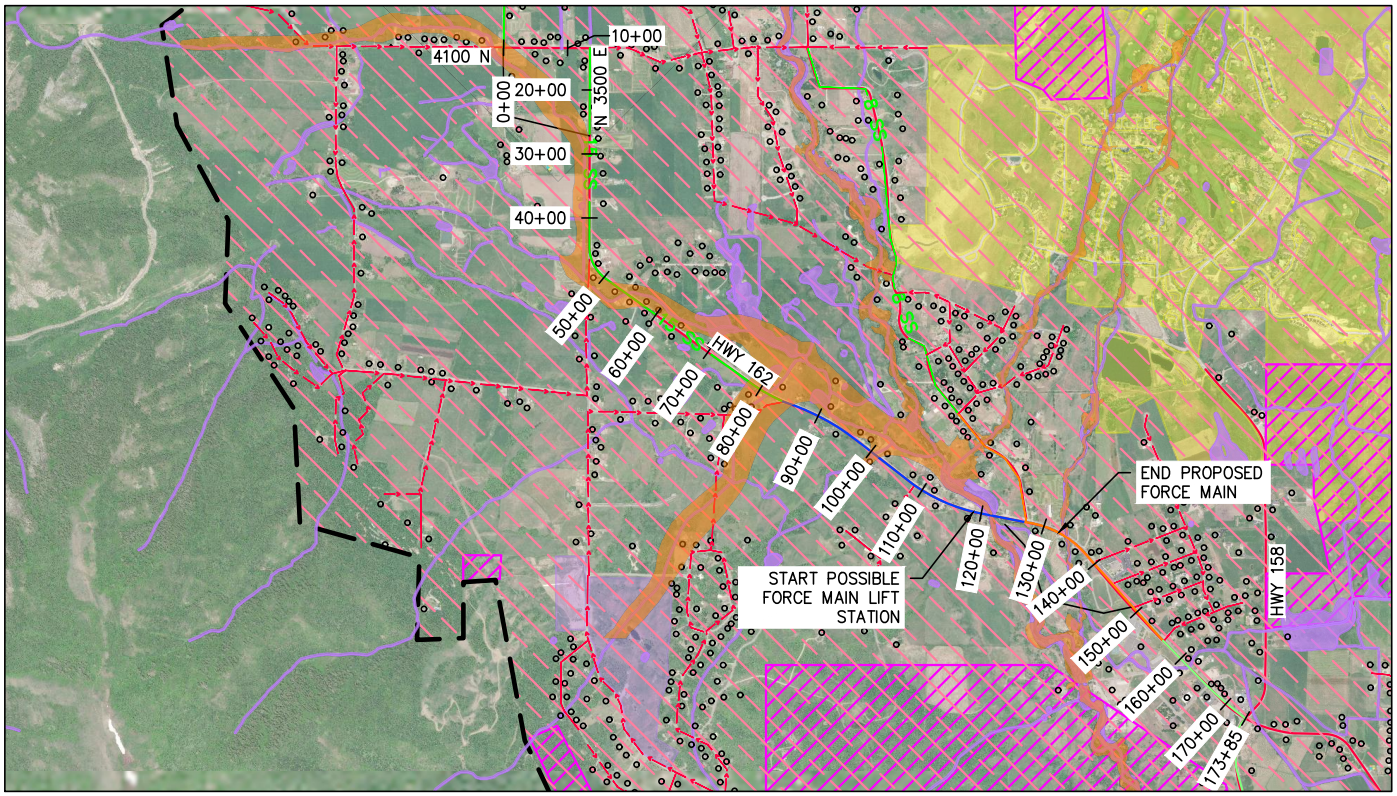
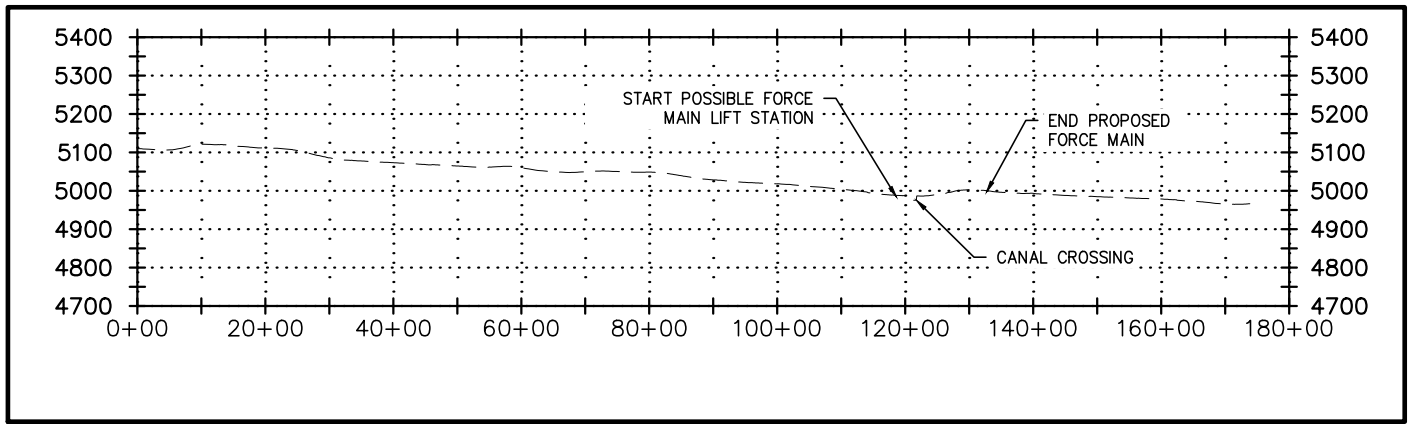
WEBER COUNTY		
UPPER VALLEY SEWER STUDY		
OVERVIEW NORTH FORK ROAD		
SEI NO. 08041	DESIGNED JA	DRAWN CR
CHECKED JA	PP1	





NORTH

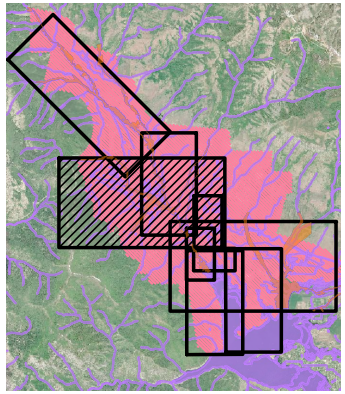
SCALE

0 3000' 6000'

HORIZ: 1" = 3000'
VERT: 1" = 500'

PROPOSED SEWER LINE
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY

KEY MAP



SEWER LINE SPECS
L=19,993'
1 LIFT STATIONS REQUIRED
52 MANHOLES REQUIRED

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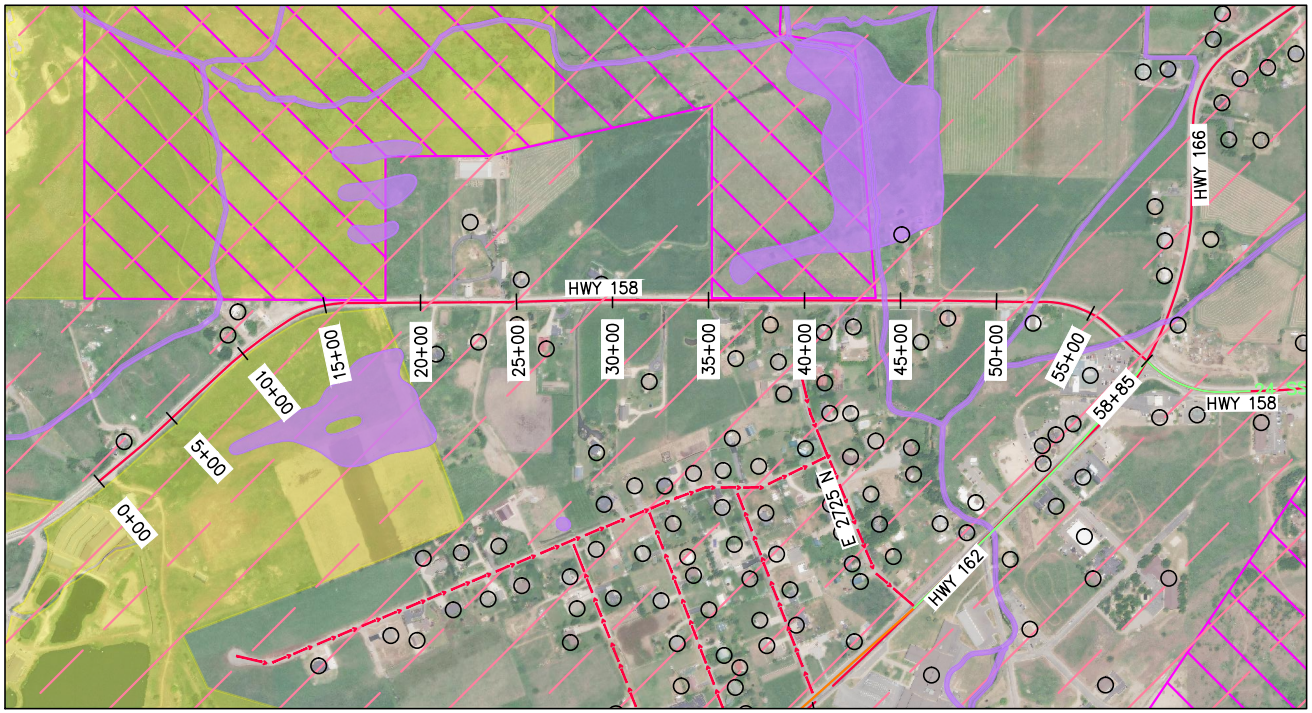
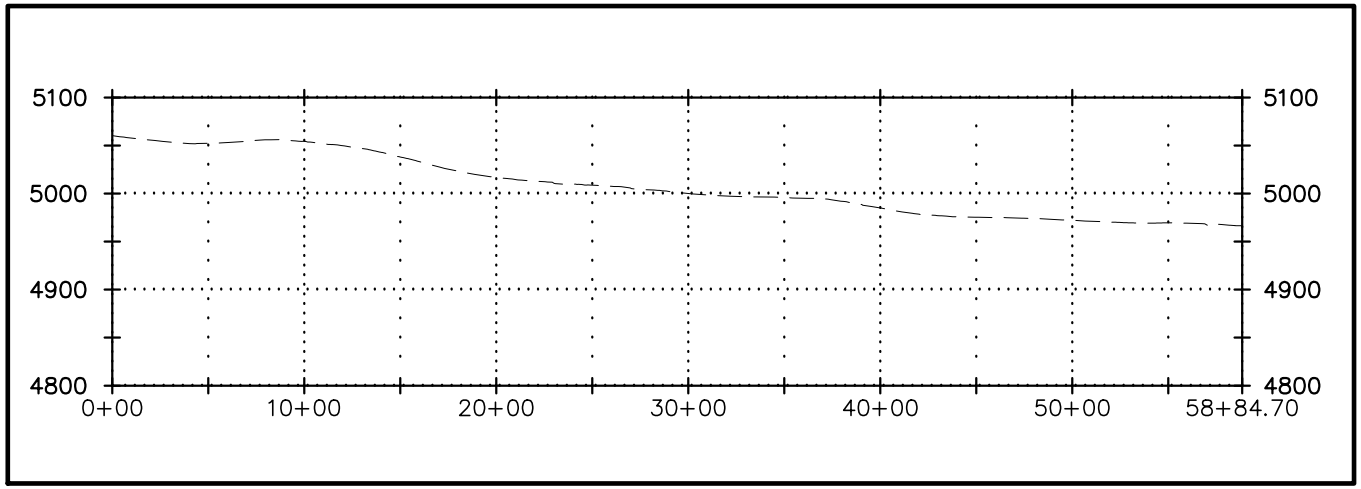
WEBER COUNTY
UPPER VALLEY SEWER STUDY

OVERVIEW
4100N AND HWY 162 TO 4-WAY

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED	PP2	
JA		





NORTH

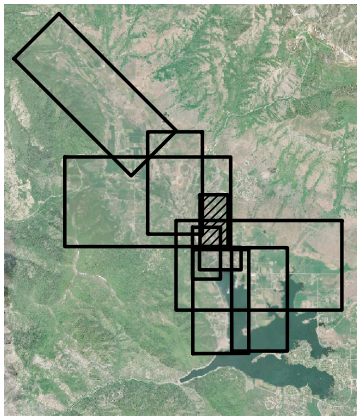
SCALE

0 1000' 2000'

HORIZ: 1" = 1000'
VERT: 1" = 200'

PROPOSED SEWER LINE
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY

KEY MAP



SEWER LINE SPECS
L=5,885'
NO LIFT STATIONS REQUIRED
15 MANHOLES REQUIRED

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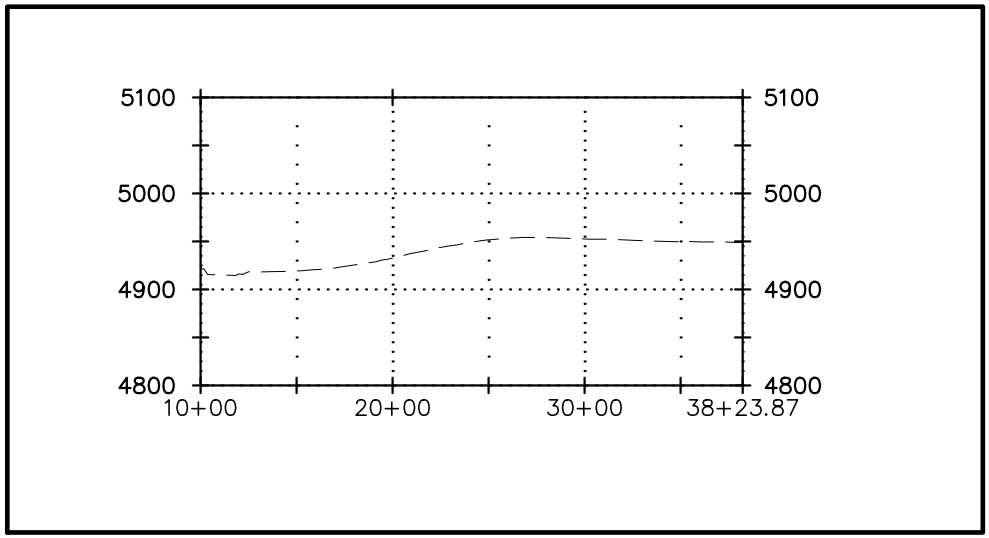
WEBER COUNTY
UPPER VALLEY SEWER STUDY
OVERVIEW
HWY 158

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED JA	PP3	



NORTH

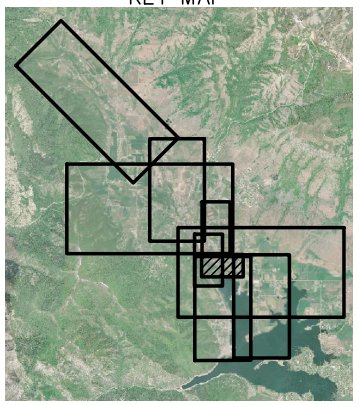
SCALE

0 1000' 2000'

HORIZ: 1" = 1000'
VERT: 1" = 200'

PROPOSED SEWER LINE
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY

KEY MAP



SEWER LINE SPECS
L=2824'
0 LIFT STATIONS REQUIRED
9 MANHOLES REQUIRED

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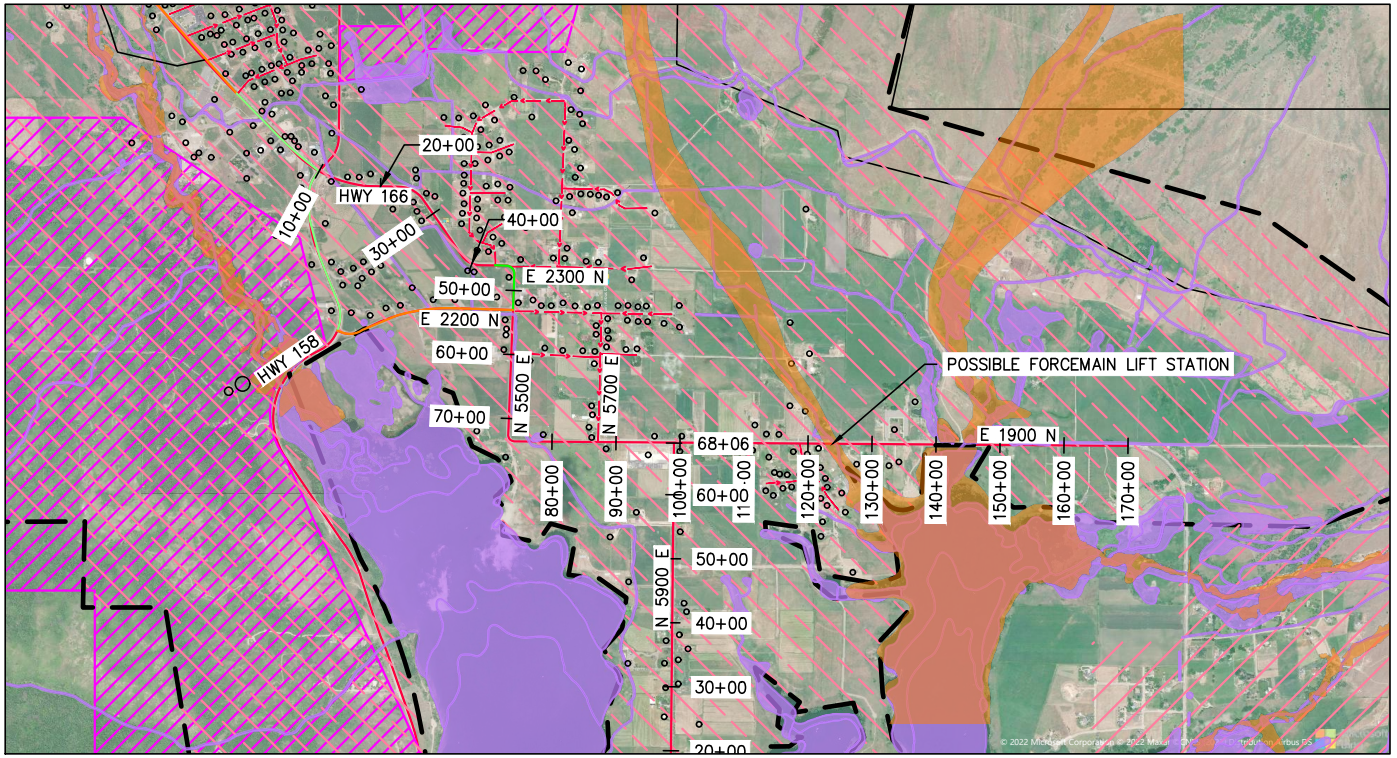
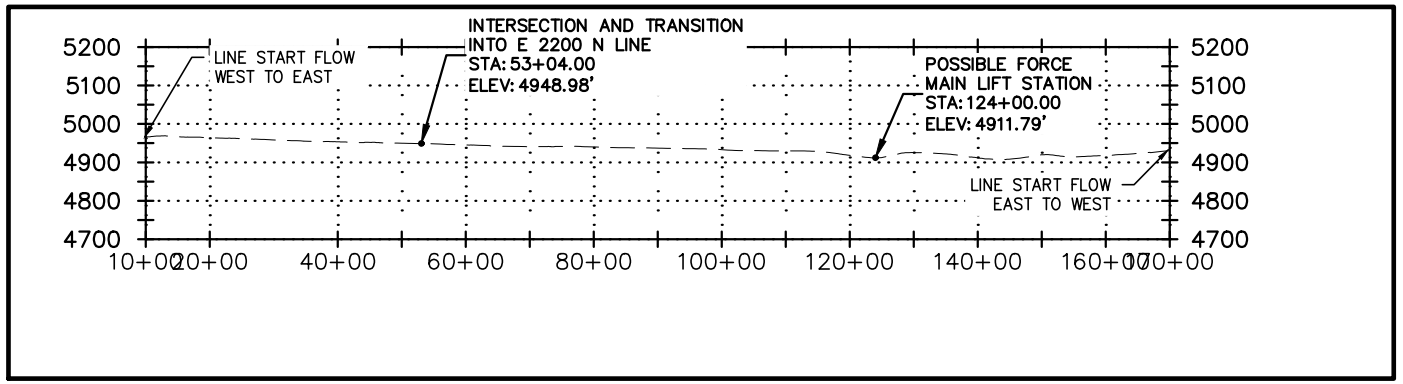
WEBER COUNTY
UPPER VALLEY SEWER STUDY

OVERVIEW
2200N

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED	PP4	
JA		





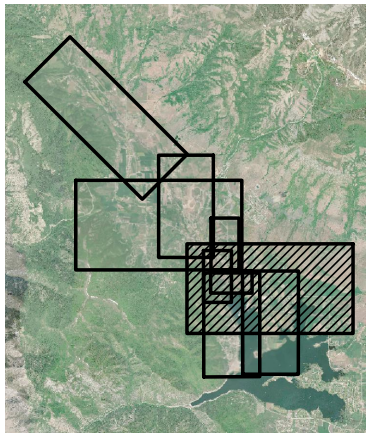
SCALE

0 3000' 6000'

HORIZ: 1" = 3000'
VERT: 1" = 500'

CONTRIBUTING BOUNDARY
EXISTING ZONING BOUNDARIES
PROPOSED SEWER LINE

KEY MAP



SEWER LINE SPECS
L=16,107'
1 LIFT STATION REQUIRED
42 MANHOLES REQUIRED

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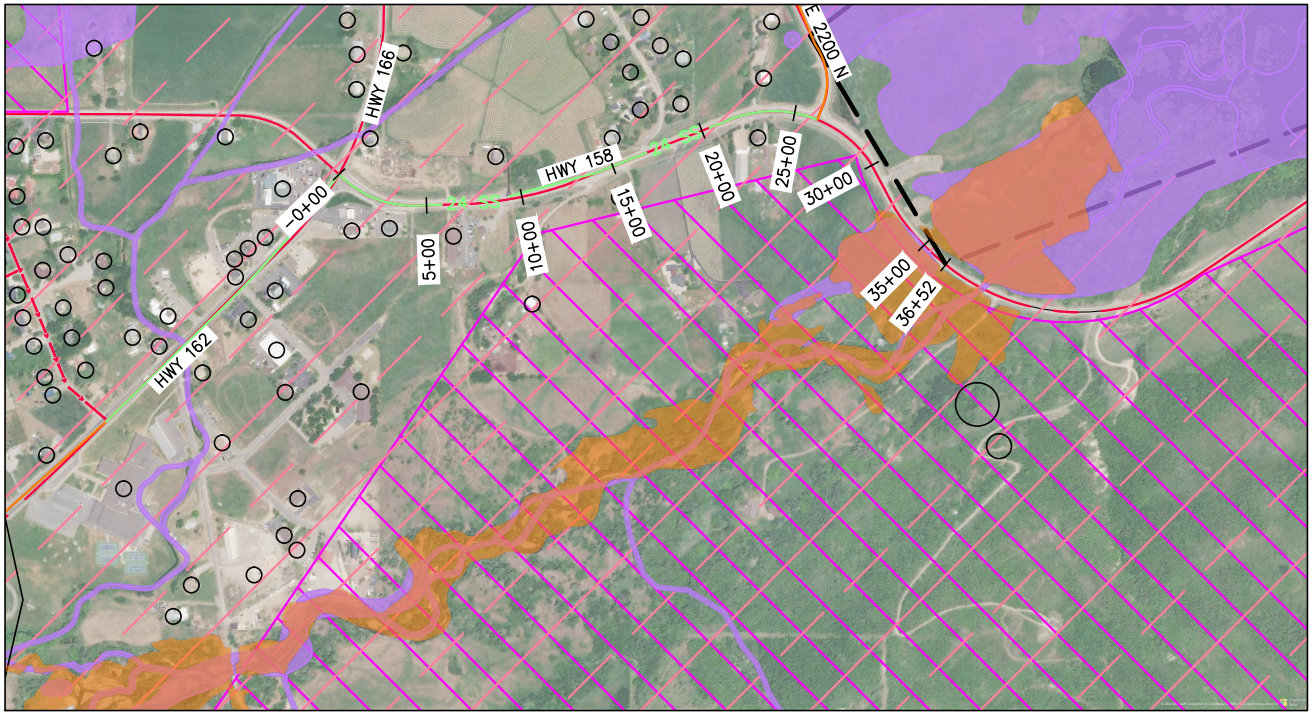
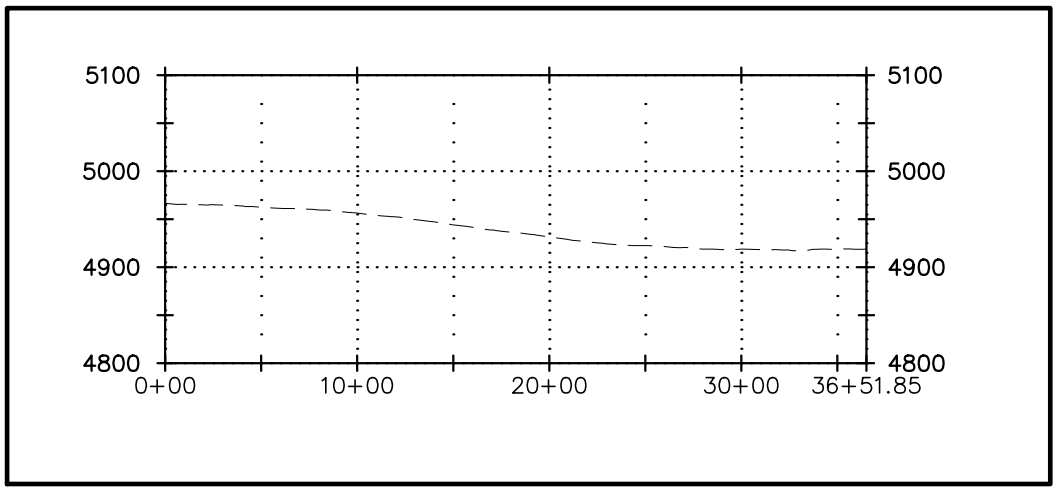
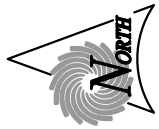
WEBER COUNTY
UPPER VALLEY SEWER STUDY

OVERVIEW
1900N TO 4 WAY

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED JA	PP5	





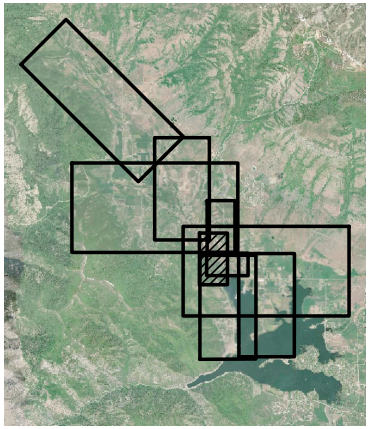


SCALE
0 1000' 2000'

HORIZ: 1" = 1000'
VERT: 1" = 200'

PROPOSED SEWER LINE
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY

KEY MAP



SEWER LINE SPECS
L=3,652'
NO LIFT STATIONS REQUIRED
11 MANHOLES REQUIRED

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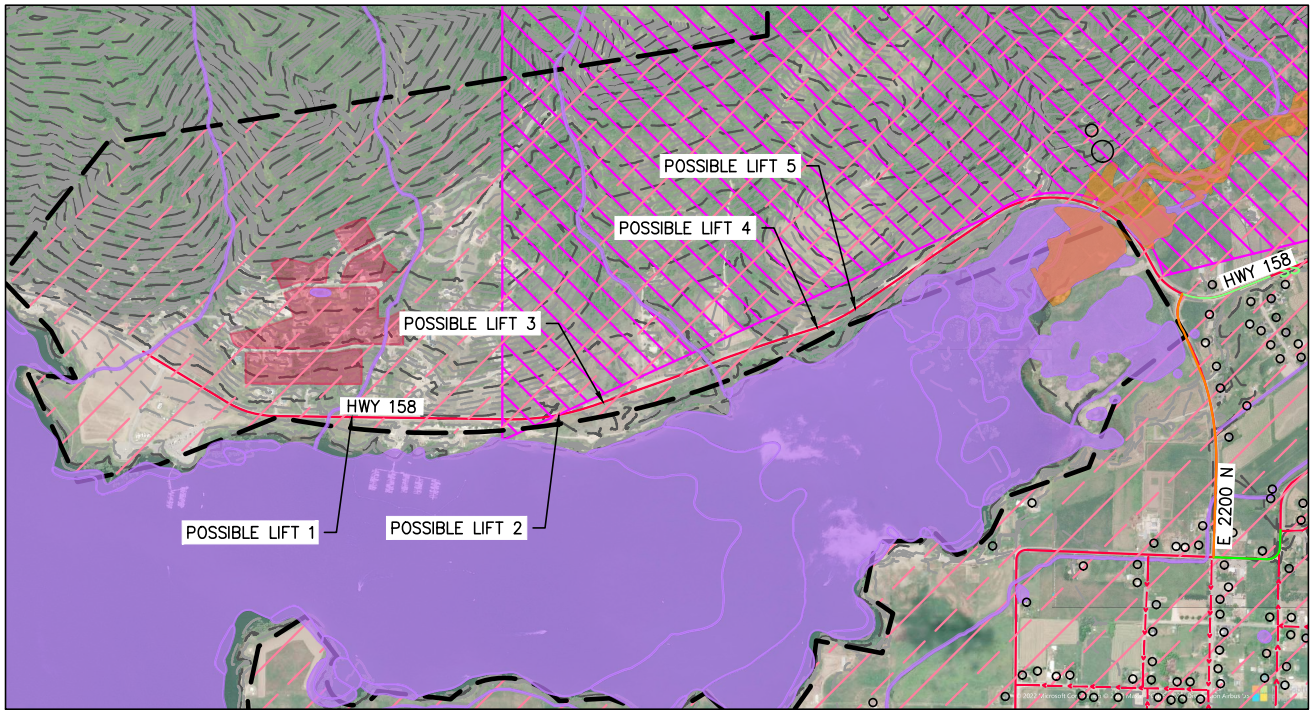
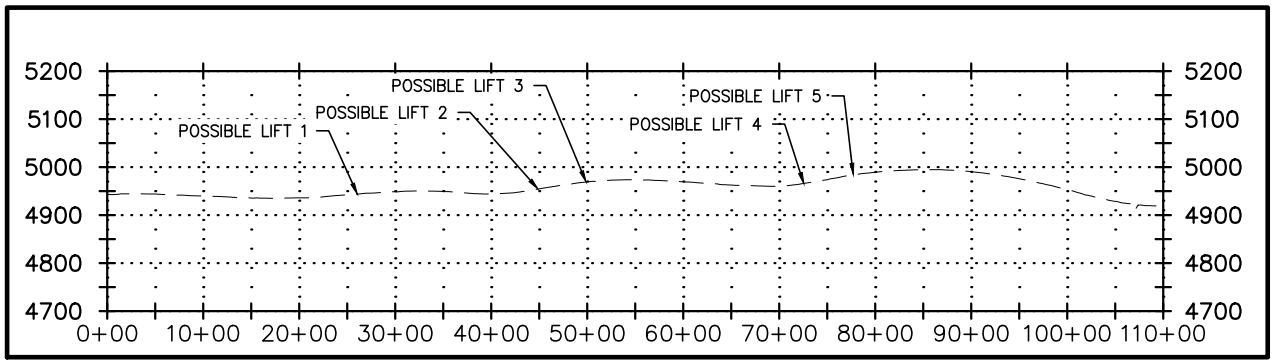
WEBER COUNTY		
UPPER VALLEY SEWER STUDY		
OVERVIEW 4 WAY TO TREATMENT AREA		
SEI NO. 08041	*DESIGNED* JA	*DRAWN* CR
CHECKED JA	PP6	





NORTH

SCALE
0 2000' 4000'

HORIZ: 1" = 2000'
VERT: 1" = 400'

PROPOSED SEWER LINE
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY

SEWER LINE SPECS
L=10,923'
5 LIFT STATIONS REQUIRED
29 MANHOLES REQUIRED

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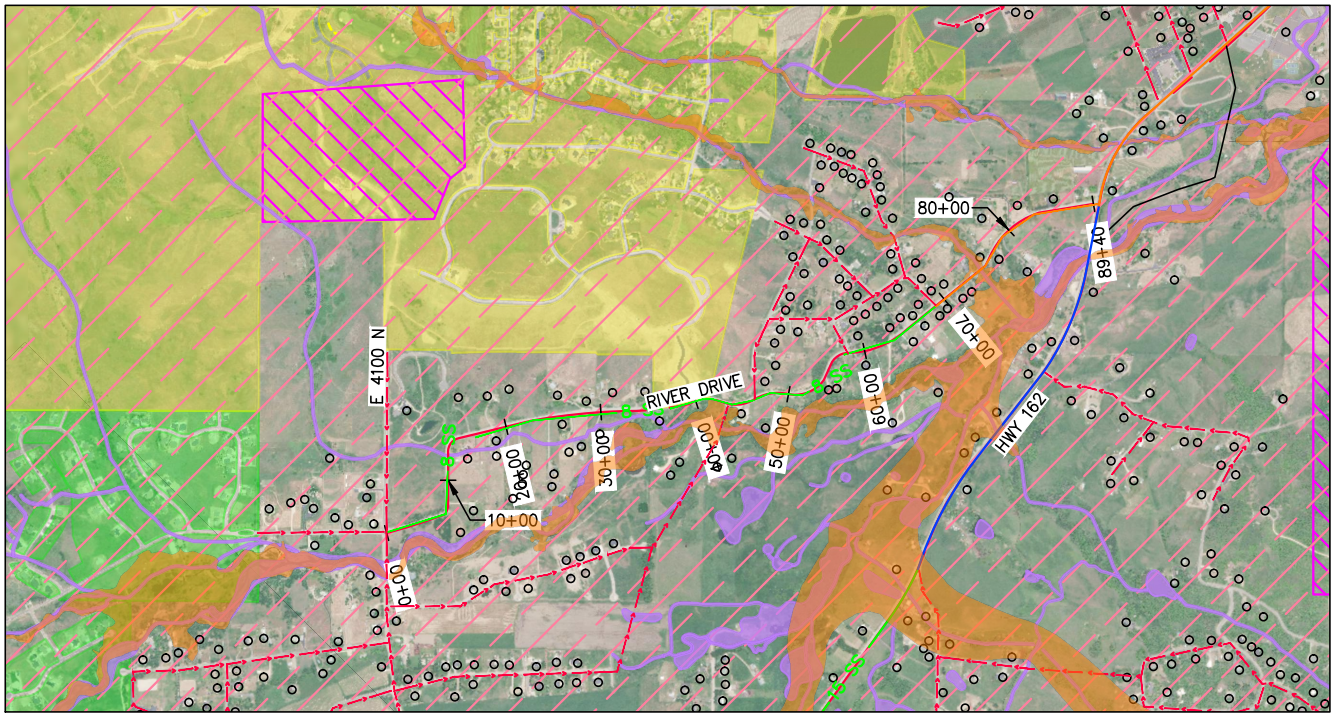
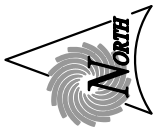
WEBER COUNTY

UPPER VALLEY SEWER STUDY

OVERVIEW
158 TO TREATMENT AREA

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED JA	PP7	





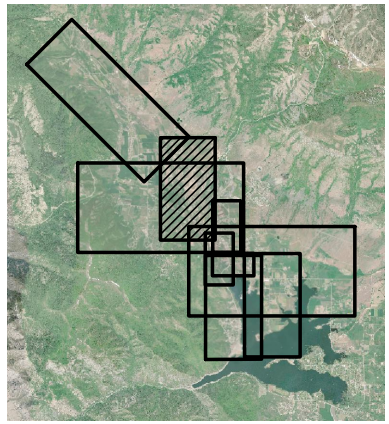
SCALE

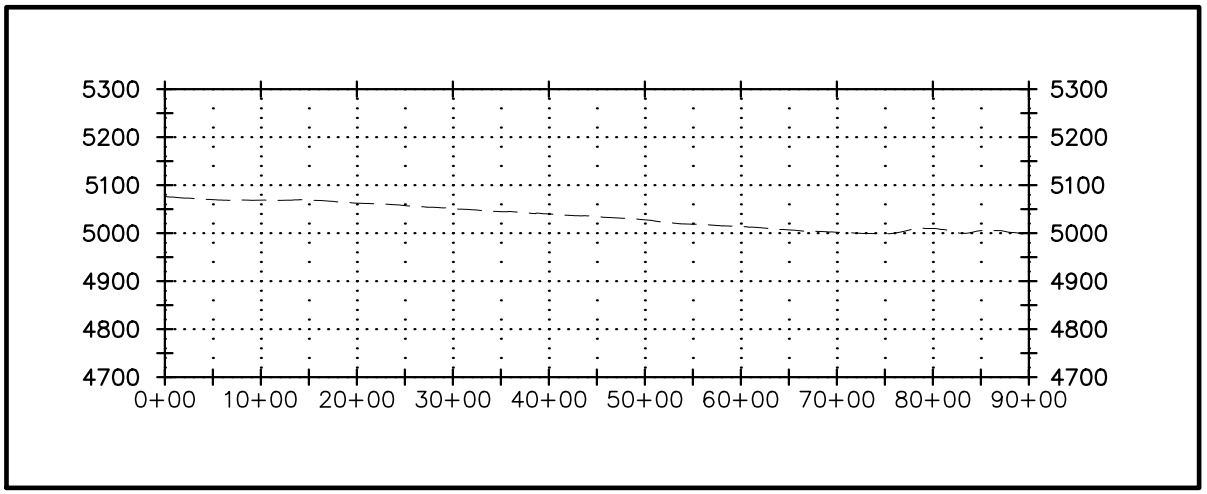
0 2000' 4000'

HORIZ: 1" = 2000'
VERT: 1" = 400'

PROPOSED SEWER LINE
EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY

KEY MAP





SEWER LINE SPECS
L=8,940'
NO LIFT STATIONS REQUIRED
24 MANHOLES REQUIRED

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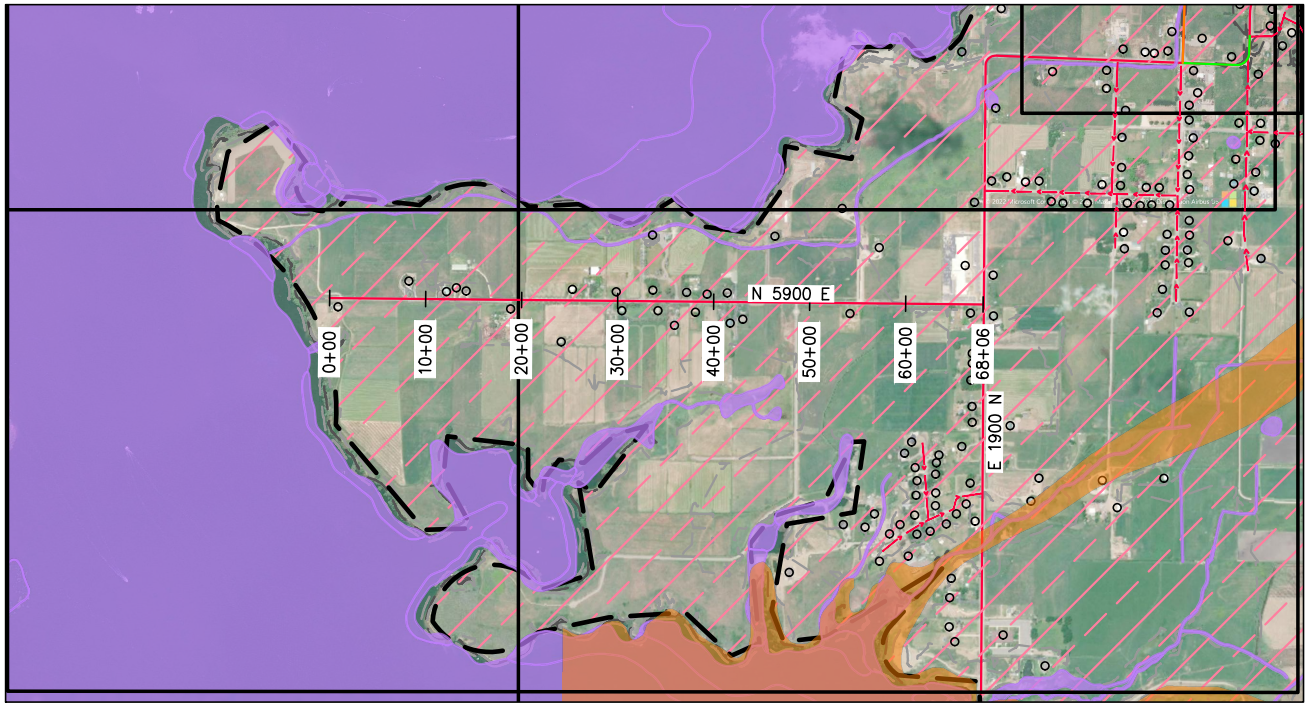
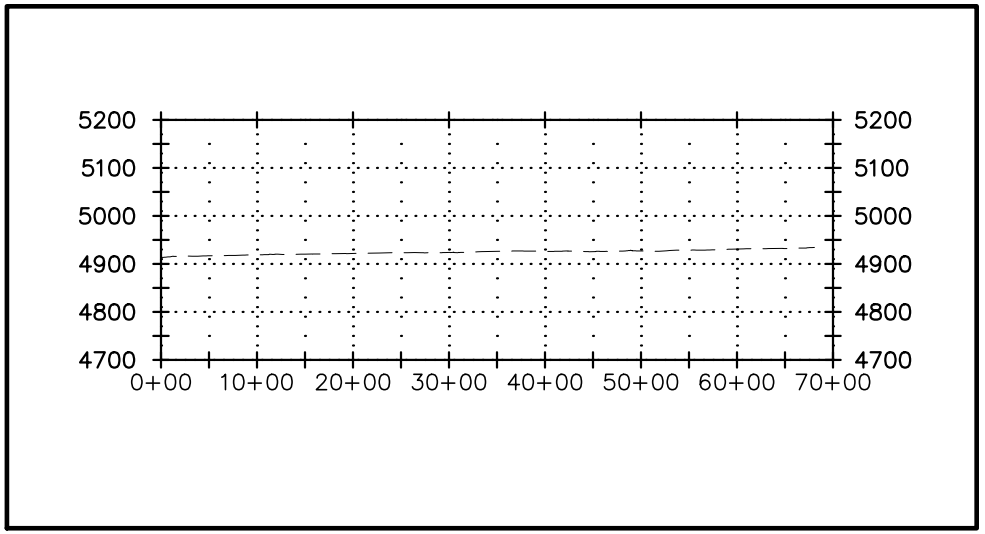
WEBER COUNTY
UPPER VALLEY SEWER STUDY

OVERVIEW
RIVER DRIVE

SEI NO.	DESIGNED	DRAWN
08041	JA	CR
CHECKED JA	PP8	





NORTH

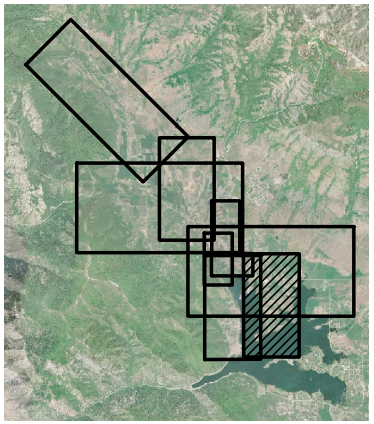
SCALE

0 2000' 4000'

HORIZ: 1" = 2000'
VERT: 1" = 400'

EXISTING ZONING BOUNDARIES
CONTRIBUTING BOUNDARY
PROPOSED SEWER LINE

KEY MAP



SEWER LINE SPECS
L=8,940'
NO LIFT STATIONS REQUIRED
24 MANHOLES REQUIRED

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WEBER COUNTY		
UPPER VALLEY SEWER STUDY		
OVERVIEW PENINSULA		
SEI NO. 08041	DESIGNED JA	DRAWN CR
CHECKED JA	PP9	