LAKE WHATCOM WATER AND SEWER DISTRICT
1220 LAKEWAY DRIVE
BELLINGHAM, WASHINGTON 98229

REGULAR MEETING
OF THE BOARD OF COMMISSIONERS

AGENDA

March 25, 2015

8:00 a.m. – Regular Session

1. CALL TO ORDER

2. PUBLIC COMMENT OPPORTUNITY
   At this time, members of the public may address the Commission. Please state your name prior to making comments.

3. ADDITIONS, DELETIONS, OR CHANGES TO THE AGENDA

4. CONSENT AGENDA

5. SPECIFIC ITEMS OF BUSINESS:

   A. Division 22 Reservoir Pre-design Report – Gray and Osborne
   B. Resolution 812 – Update Fixed Asset Policy
   C. Resolution 814 – Update Credit Card Usage Policy
   D. Disposal of Surplus Items
   E. 2015 Compensation and Benefits Study – Gene Matt & Associates

6. OTHER BUSINESS

7. MANAGER'S REPORT

8. PUBLIC COMMENT OPPORTUNITY

9. ADJOURNMENT

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL

DATE SUBMITTED:	March 17, 2015		
TO BOARD OF COMMISSIONERS			
FROM: Bill Hunter	MANAGER APPROVAL Bill Hunter FOR PATRICK		
MEETING AGENDA DATE:	March 25, 2015		
AGENDA ITEM NUMBER:	5.A.		
SUBJECT:	Division 22 Reservoir Pre-design Report – Gray & Osborne		
LIST DOCUMENTS PROVIDED ⇨ NUMBER OF PAGES INCLUDING AGENDA BILL: _____	1. Portion of Predesign Report		
	2.		
	3.		
TYPE OF ACTION REQUESTED	RESOLUTION ☐	FORMAL ACTION/ MOTION ☐	INFORMATIONAL/ OTHER ☒

BACKGROUND / EXPLANATION OF IMPACT

Gray & Osborne (G&O) will make a presentation on the predesign report for the Division 22 Reservoir project.

The recommended size and alternative is based on the collaborative effort between District staff and G&O over the past year. G&O has met with District crews to review operational and maintenance requirements, as well as discuss various options. Crews have reviewed and commented on preliminary drafts of the report.

Only main body of the report has been included with the agenda bill. The full report with all attachments can be viewed on the District web site at http://lwwsd.org/resources/projects/

Once the preferred alternative and design options are confirmed, the next step is to begin the conditional use permit process.

The target project schedule is:

March 25, 2015	Confirmed design alternative and options
April – December 2015	Conditional Use Permitting, Design
January – April 2016	Building Permits, Bidding, Award
Summer 2016	Construction

FISCAL IMPACT

Funding for this project is provided by a Drinking Water State Revolving Fund (DWSRF) loan. The loan amount is up to $994,850.00 for 20 years with an interest rate of 1.5%. The loan amount includes engineering, permitting, construction, inspection, testing, and sales tax.

The predesign report estimates a construction cost about $320,000 more than loan application estimates prepared in early 2013 as shown in the table below. At this stage of the project, this is good information to know to proactively plan for contingency funding and think about value engineering decisions that can be made as the project moves into permitting and design phases. In September/October of 2015 when the District begins development of the 2016 capital improvement program, staff will develop funding alternatives using more detailed information generated thru the permitting and detailed design process.

	DWSRF Loan Application Estimates (Feb 2013)	Predesign Report Level Estimates (March 2015)	
DESIGN/PERMITTING/BIDDING			
Admin, Permits, Fees, Etc	$25,000	$25,000	
Predesign Report, CUP (G&O Phase 1	$44,734	$44,734	
Design, Bidding (Phase 2 Estimate)	$80,000	$80,000	
Subtotal	*$149,734*	*$149,734*	
CONSTRUCTION			
Construction Contract	$700,000	$1,021,800	
Admin, Testing, Inspection (Phase 3 E	$100,000	$100,000	
Contingency	$35,266	$35,266	
Subtotal	*$835,266*	*$1,157,066*	
Total	*$985,000*	*$1,306,800*	
Loan Fee	$9,850	$9,850	
Grand Total	*$994,850*	*$1,316,650*	$321,800 *Potential Additional Funding Needed*

RECOMMENDED BOARD ACTION

None

PROPOSED MOTION

None.

LAKE WHATCOM WATER & SEWER DISTRICT

WHATCOM COUNTY, WASHINGTON

DIVISION 22 RESERVOIR PREDESIGN REPORT

DRAFT

G&O #14456

DRAFT MARCH 2015

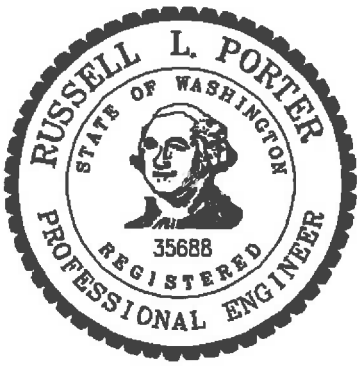
Gray & Osborne, Inc.

CONSULTING ENGINEERS

LAKE WHATCOM
WATER & SEWER DISTRICT

WHATCOM COUNTY **WASHINGTON**

DIVISION 22 RESERVOIR PREDESIGN REPORT
DRAFT



G&O #14456
DRAFT MARCH 2015

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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CHAPTER 1

INTRODUCTION

INTRODUCTION

Lake Whatcom Water and Sewer District (District) has contracted with Gray & Osborne, Inc. to provide professional engineering services for predesign and land use permitting of the new Division 22 Reservoir. The District intends to construct a second reservoir next to the existing steel reservoir, which is located in the District's South Shore Water System (DOH Water System ID #95910). The project will include a new reservoir, new site piping, and site improvements. The District has procured funding for this project from the Washington State Public Works Board through the Drinking Water State Revolving Fund (DWSRF).

This report updates storage analyses and demands, considers several alternatives for reservoir dimensions and material, summarizes initial geotechnical findings for the site, analyzes stormwater and drainage needs, and discusses reservoir features. It also provides a summary of permit processes and requirements. Included with this Predesign Report are a planning level cost estimate and a preliminary site plan.

REFERENCES

The following documents are referenced as part of this analysis:

- *Lake Whatcom Water and Sewer District Water System Comprehensive Plan*, October 2010, Wilson Engineering, L.L.C.

- *Sudden Valley - Geneva Reservoir Capacity Analysis*, August 2009, Wilson Engineering, L.L.C.

BACKGROUND

The District's South Shore Water System has an existing storage deficiency that is identified in the District's most recent *2010 Water System Comprehensive Plan* (Water System Plan). The Water System Plan includes a capital project to construct a new reservoir with a volume of approximately 500,000 gallons in the Sudden Valley Division 22 Service Area, which in combination with pressure zone reconfiguration would mitigate storage deficiencies in the Sudden Valley and Geneva Service Areas.

The existing Division 22 Reservoir property contains a previously cleared area suitable for construction of the new reservoir. The District has also identified additional improvements needed for the existing site, including reconfiguration of the drain and overflow sewer discharges and communications improvements.

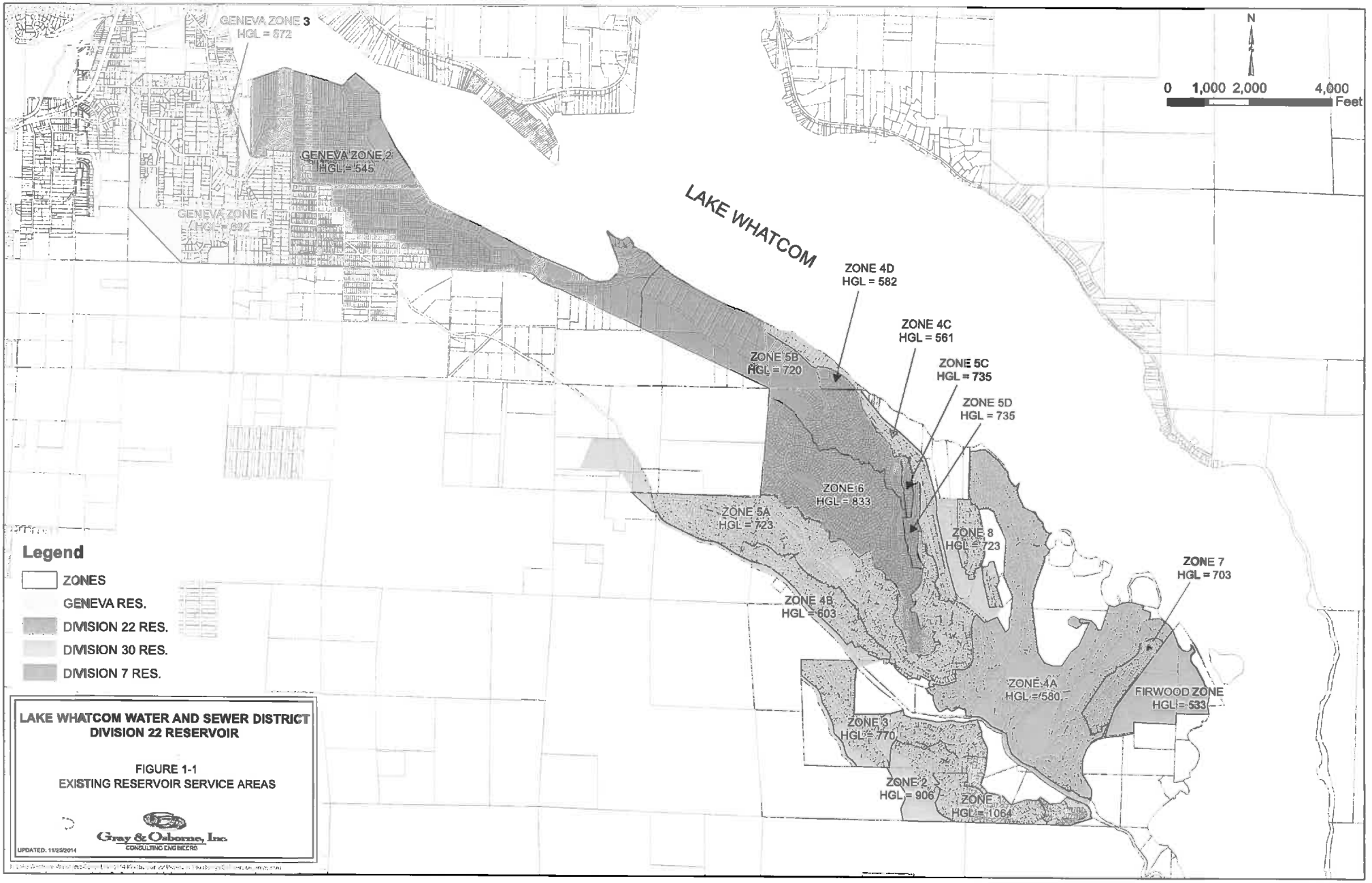
EXISTING FACILITIES

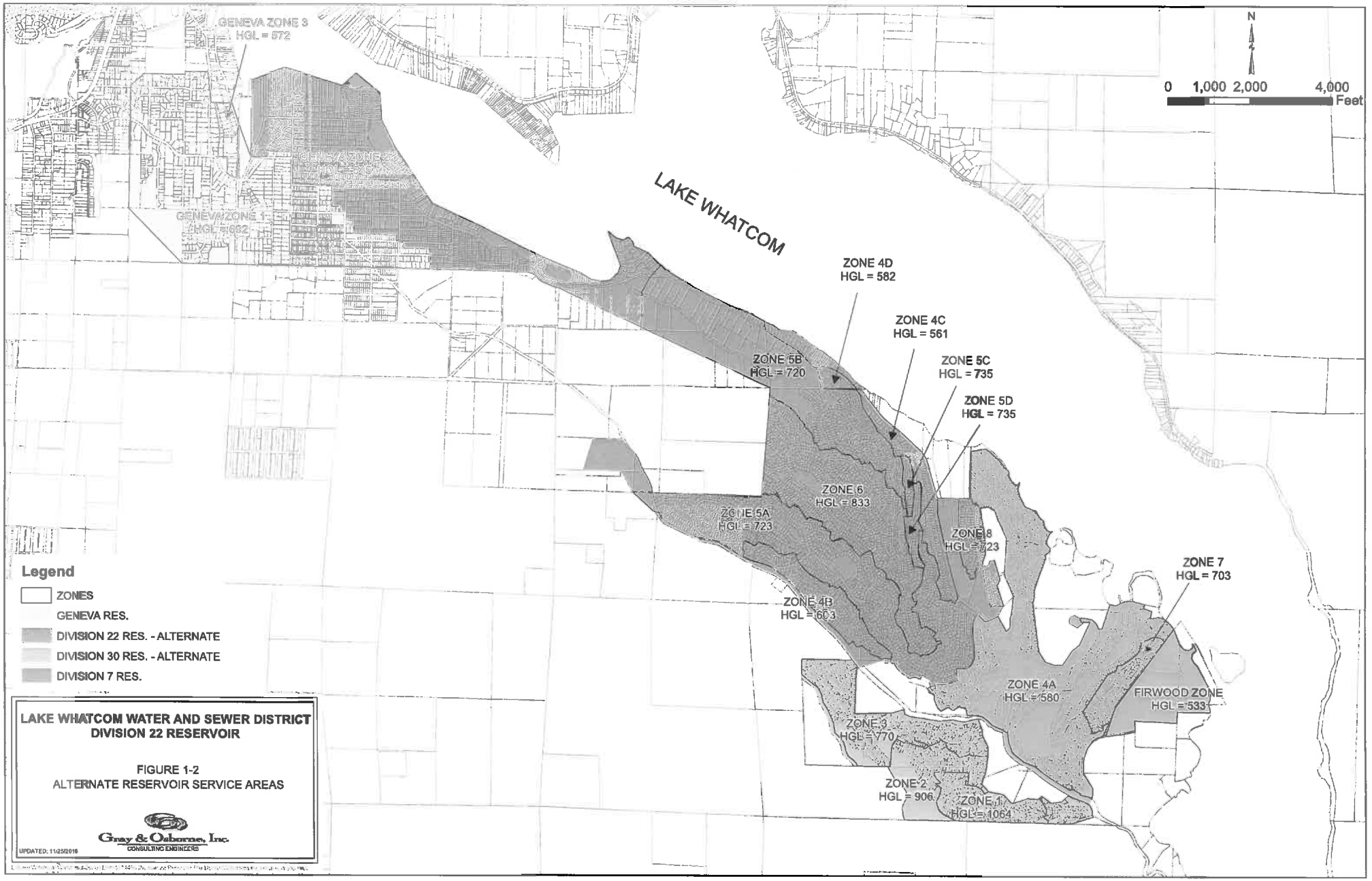
The existing Division 22 Reservoir site is located on a peak in the northwest portion of the Sudden Valley Community, which is located southeast of the City of Bellingham on the southern shore of Lake Whatcom. The existing steel reservoir has a nominal capacity of 500,000 gallons. The existing reservoir property is bordered on the west by the Stimpson Family Nature Reserve and on the north, east, and south by single-family residential properties. The reservoir is located on an easement grated by the Sudden Valley Community Association, which owns the property.

The existing Division 22 Reservoir has a base elevation of approximately 805 feet (NAVD 88 datum), an overflow elevation of 840 feet, and a diameter of approximately 50 feet. The Division 22 Reservoir is fed from the Sudden Valley Treatment Plant via the Division 22 Transmission Pump Station, which contains two pumps with a capacity of 700 gpm at 608 feet TDH. The Division 22 Reservoir currently serves Sudden Valley Zones 5 and 6. The Zone 6 HGL floats on the Division 22 Reservoir level, and Zone 5 is served by PRVs. The Division 22 Reservoir also serves portions of the Geneva Service Area via PRVs and supplies the Geneva Reservoir via the Beecher Booster Pump Station, which has a capacity of 400 gpm. The Geneva Reservoir has a nominal capacity of 500,000 gallons.

The District's other distribution storage facilities include the Division 7 Reservoir and the Division 30 Reservoir. The Division 7 Reservoir has a nominal capacity of 1 million gallons with a maximum water level of 703 feet and is fed from the Sudden Valley Treatment Plant via a transmission pump station. The Division 30 Reservoir has a nominal capacity of 150,000 gallons with a maximum water level of 1,070 feet and is fed from the Division 7 Reservoir via a booster station. Because of the large amount of storage in the Division 7 Reservoir, some areas that could otherwise be served by the Division 22 Reservoir are currently served by the Division 30/Division 7 Reservoirs. However, pumping up to the Division 30 Reservoir consumes additional energy to serve these customers because of the additional 265 feet of head required to fill the Division 30 Reservoir compared to the Division 22 Reservoir. The District has the flexibility to modify the service areas for each reservoir by adjusting the settings of the multiple PRV stations in the Sudden Valley Service Area. Figure 1-1 shows the reservoir service areas with the system's current configuration. Figure 1-2 shows an alternate reservoir service area scenario that would minimize the service area of the Division 30 Reservoir and increase the service area of the Division 22 Reservoir. Both of the reservoir service area schemes will be considered in determining the size of the proposed Division 22 Reservoir. Figure 1-3 shows a hydraulic profile of the pressure zones.

Table 1-1 provides a summary of the characteristics the District's existing reservoirs.


GENEVA ZONE 3
HGL = 572
GENEVA ZONE 2
HGL = 545
GENEVA ZONE 1
HGL = 692
LAKE WHATCOM
ZONE 4D
HGL = 582
ZONE 4C
HGL = 561
ZONE 5B
HGL = 720
ZONE 5C
HGL = 735
ZONE 5D
HGL = 735
ZONE 6
HGL = 833
ZONE 5A
HGL = 723
ZONE 8
HGL = 723
ZONE 7
HGL = 703
ZONE 4B
HGL = 603
ZONE 4A
HGL = 580
FIRWOOD ZONE
HGL = 533
ZONE 3
HGL = 770
ZONE 2
HGL = 906
ZONE 1
HGL = 1064
N
0 1,000 2,000 4,000
Feet
Legend
ZONES
GENEVA RES.
DIVISION 22 RES.
DIVISION 30 RES.
DIVISION 7 RES.
LAKE WHATCOM WATER AND SEWER DISTRICT
DIVISION 22 RESERVOIR
FIGURE 1-1
EXISTING RESERVOIR SERVICE AREAS
Gray & Osborne, Inc.
CONSULTING ENGINEERS
UPDATED: 11/25/2014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LAKE WHATCOM
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ZONE 4C
HGL = 561
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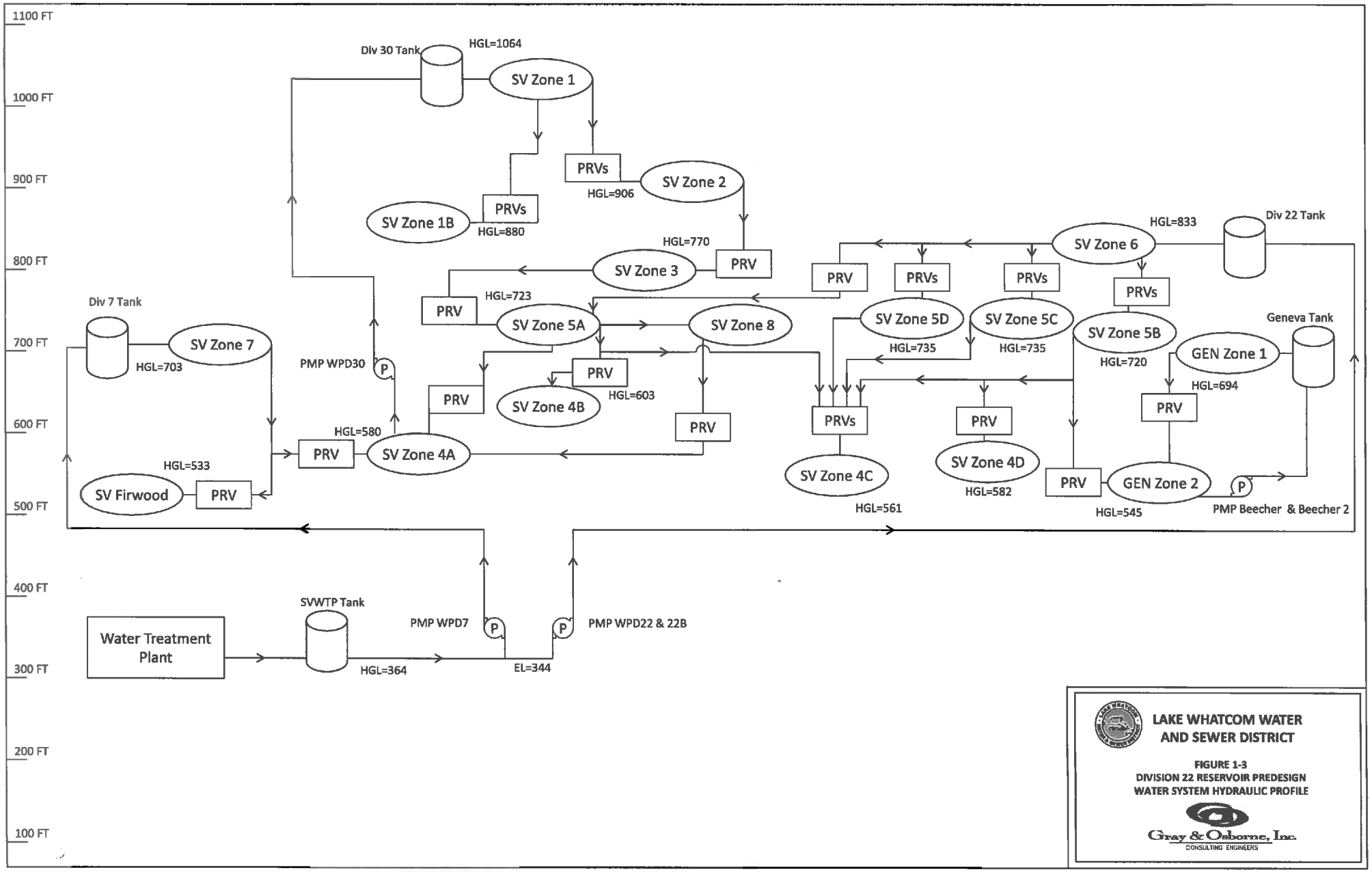
ZONE 3
HGL = 770
ZONE 2
HGL = 906
ZONE 1
HGL = 1064
N
0 1,000 2,000 4,000
Feet
Legend
ZONES
GENEVA RES.
DIVISION 22 RES. - ALTERNATE
DIVISION 30 RES. - ALTERNATE
DIVISION 7 RES.
LAKE WHATCOM WATER AND SEWER DISTRICT
DIVISION 22 RESERVOIR
FIGURE 1-2
ALTERNATE RESERVOIR SERVICE AREAS
Gray & Osborne, Inc.
CONSULTING ENGINEERS
UPDATED: 11/25/2016


1100 FT
1000 FT
900 FT
800 FT
700 FT
600 FT
500 FT
400 FT
300 FT
200 FT
100 FT
Div 30 Tank
HGL=1064
SV Zone 1
PRVs
SV Zone 2
HGL=906
SV Zone 1B
PRVs
HGL=880
HGL=770
SV Zone 3
PRV
PRV
HGL=723
SV Zone 5A
SV Zone 8
Div 7 Tank
SV Zone 7
HGL=703
PMP WPD30
P
PRV
PRV
HGL=603
SV Zone 4B
HGL=580
PRV
SV Zone 4A
PRV
HGL=533
SV Firwood
PRV
PRV
PRVs
PRV
PRVs
PRVs
PRVs
HGL=833
SV Zone 6
Div 22 Tank
SV Zone 5D
SV Zone 5C
SV Zone 5B
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HGL=735
HGL=720
Geneva Tank
GEN Zone 1
HGL=694
PRV
PRVs
PRV
SV Zone 4C
SV Zone 4D
HGL=582
HGL=561
PRV
GEN Zone 2
HGL=545
P
PMP Beecher & Beecher 2
SVWTP Tank
Water Treatment Plant
PMP WPD7
P
P
PMP WPD22 & 22B
HGL=364
EL=344
LAKE WHATCOM WATER AND SEWER DISTRICT
FIGURE 1-3
DIVISION 22 RESERVOIR PREDESIGN
WATER SYSTEM HYDRAULIC PROFILE
Gray & Osborne, Inc.
CONSULTING ENGINEERS

TABLE 1-1

Existing Reservoirs

Reservoir[1]	Year Constructed	Material	Volume (gal)	Overflow Elevation (ft)	Diameter (ft)	Height (ft)	Volume/Foot (gal/ft)	Base Elev. (ft)
SV Div. 7	--	Welded Steel	1,000,000	703	70	34	28,786	669
SV Div. 22	1971	Welded Steel	500,000	840	48	35	13,535	805
SV Div. 30	--	Welded Steel	150,000	1070	25	45	3,672	1025
Geneva	--	Welded Steel	500,000	692	53	30	16,502	662

(1) SV=Sudden Valley.

PROJECT OBJECTIVES

The objectives of the project to construct the new reservoir are as follows:

- Eliminate Storage Deficiencies – The primary objective of the new reservoir is to eliminate the identified storage deficiencies within the South Shore Water System, which are primarily related to standby storage.

- Improve Reliability – The new reservoir will improve reliability in the Division 22 Reservoir Service Area by providing a redundant reservoir in case of emergency or planned maintenance of the existing reservoir.

- Increase Efficiency – Inefficiencies in the existing operational scheme may be reduced with the addition of available storage.

- Improve drainage/overflow capacity – The downstream capacity of the sewer system is limited near the site. The reservoir drain and overflow currently discharge to this sewer system. Rerouting these discharges to other nearby sewer lines will decrease the possibility of sewer overflows in the area.

- Improve communications – The existing remote telemetry unit does not have sufficient capacity for additional input/output and will need to be replaced to accommodate the current project and future upgrades to the existing Reservoir.

The design criteria for these improvements are further discussed in Chapter 2, and the proposed improvements are outlined in Chapter 3.

CHAPTER 2

DESIGN CRITERIA

INTRODUCTION

The new reservoir facility will be designed to meet District and Washington State Department of Health (DOH) standards. This Chapter outlines the basic design criteria for the new facility.

BASIC DESIGN CRITERIA

Storage requirements for the District are based on the sum of storage components laid out in WAC 246-290-235 and Chapter 9 of the *2009 Water System Design Manual* by the Washington State Department of Health, which are comprised of the following:

- Operational Storage
- Equalizing Storage
- Standby Storage
- Fire Suppression Storage
- Dead Storage (if any)

OPERATIONAL STORAGE

According to the DOH *Water System Design Manual*, operational storage is the volume of the reservoir devoted to supplying the water system while, under normal operating conditions, the source(s) of supply are in "off" status. This volume is dependent upon the sensitivity of the reservoir water level sensors and the tank configuration necessary to prevent excessive cycling of source pump motors. Operational storage is in addition to other storage components, thus providing a factor of safety for equalizing, standby, and fire suppression components.

The operational storage for each of the District's reservoirs, based on pump on/off set points, is shown in Table 2-1. The operational storage for the Division 30 and Geneva Reservoirs is determined by booster pump setpoints. The operational storage for the Division 7 and Division 22 Reservoirs is managed manually by the operators to minimize excessive cycling at the Water Treatment Plant.

TABLE 2-1

Operational Storage

Reservoir[1]	Pumps On Level	Pumps Off Level	Operating Range (ft)	Operational Storage (gallons)
SV Div. 7	--[2]	--[2]	5.0	143,932
SV Div. 22	--[2]	--[2]	10.0	135,355
SV Div. 30	35.5	39	3.5	12,851
Geneva	24.5	30.3	5.8	92,135

(1) Additional reservoir information is shown in Table 1-1.
(2) The operational storage in the Division 7 and 22 Reservoirs is managed manually by the operators.

EQUALIZING STORAGE

Equalizing storage is typically used to meet diurnal demands that exceed the average day and maximum day demands. The volume of equalizing storage required depends on maximum system demands, the magnitude of diurnal water system demand variations, the source production rate, and the mode of system operation. Sufficient equalizing storage must be provided in combination with available water sources and pumping facilities such that maximum system demands can be satisfied.

Equalizing storage is calculated using the following equation:

$$V_{ES} = (Q_{PH} - Q_S) \times 150 \text{ minutes}$$

V_{ES} = Equalizing storage component (gallons)
Q_{PH} = Peak hourly demand (gpm)
Q_s = Total source of supply capacity, excluding emergency sources (gpm)

Equalizing storage requirements for each pressure zone are summarized in Table 2-2.

TABLE 2-2

Equalizing Storage

Reservoir	Number of Services		PHD/ERU (gpm/ERU)		PHD (gpm)	Pumped Flows Out[1] (gpm)	Source Capacity[2] (gpm)	Equalizing Storage (gal)
	SV	Geneva	SV	Geneva				
SV Div. 7	714	0	0.42	0.00	300	340	850	0
SV Div. 22	576	470	0.42	0.52	486	400	720	24,948
SV Div. 30	1,104	0	0.42	0.00	464	0	340	18,552
Geneva	0	595	0.00	0.52	309	0	400	0

(1) Includes flows pumped out of each reservoir's service area via booster pump stations.
(2) Includes flows pumped into each reservoir's service are via transfer and booster pump stations.

STANDBY STORAGE

Standby storage is provided in order to meet demands in the event of a system failure such as a power outage, an interruption of supply, or a break in a major transmission line. The amount of emergency storage should be based on the reliability of supply and pumping equipment, standby power sources, and the anticipated length of time the system could be out of service.

Standby storage is calculated using the following equation:

SB_{TSS} = (2 days)(ADD)(N)

SB_{TMS} = Standby storage component for a single source system (gallons)
ADD = Average day demand for the system (gpd/ERU)
N = Number of ERUs

Although standby storage volumes are intended to satisfy the requirements imposed by system customers for unusual situations and are addressed by WAC 246-290-420, DOH recommends that standby storage volumes be no less than 200 gallons/ERU. The District's standby storage is calculated based on the greater of 200 gallons/ERU and the equation above.

Standby storage requirements for each pressure zone are presented in Table 2-3.

TABLE 2-3

Standby Storage

Reservoir	Number of Services		ADD/ERU (gpd/ERU)		ADD (gpd)	Standby Storage (gal)
	SV	Geneva	SV	Geneva		
SV Div. 7	655	0	150	0	98,250	196,500
SV Div. 22	576	474	150	175	169,350	338,700
SV Div. 30	1,104	0	150	0	165,600	331,200
Geneva	0	642	0	175	112,350	224,700

FIRE SUPPRESSION STORAGE

Fire suppression storage is provided to ensure that the volume of water required for fighting fires is available when necessary. The amount of water required for firefighting purposes is specified in terms of rate of flow in gallons per minute (gpm) and an associated duration. Fire flows must be provided while maintaining residual water system pressures of at least 20 pounds per square inch (psi) throughout the distribution system as the storage reservoir approaches the lowest level of the fire suppression storage component within the reservoir.

Fire suppression storage is calculated using the following equation:

$$FSS = (FF)(t_m)$$

FSS = Required fire suppression storage component (gallons)
FF = Required fire flow rate, as specified by fire protection authority (gpm)
t_m = Duration of FF rate, as specified by fire protection authority (minutes)

Per WAC 246-290-235(4), standby and fire suppression storage volumes may be "nested," with the larger of the two volumes being the minimum available, provided that such practice is not prohibited by: (1) a locally developed and adopted Coordinated Water System Plan, (2) local ordinance, or (3) the local fire protection authority or County Fire Marshal. The District policy is to nest fire suppression storage volumes in the standby storage volumes, which are much greater.

The fire suppression storage for each pressure zone is shown in Table 2-4.

TABLE 2-4

Fire Suppression Storage

Reservoir	Max. FF Required (gpm)	FF Duration Required (min)	Fire Suppression Storage (gal)
SV Div. 7	750	60	45,000
SV Div. 22	750	60	45,000
SV Div. 30	500	60	30,000
Geneva	750	60	45,000

DEAD STORAGE

Dead storage is the volume of stored water in a reservoir that is not available for service to customers while maintaining the minimum system design pressures in accordance with WAC 246-290-230(5) and (6). Dead storage is excluded from the volumes provided to meet the other storage requirements.

The service connections with the highest elevation for each pressure zone were compared to the base elevations of the reservoirs. A minimum pressure of 20 psi is to be maintained at all times throughout the distribution system. Based on available LIDAR elevation data and previous analyses, the Sudden Valley Division 7, Sudden Valley Division 30, and Geneva Reservoirs can maintain a minimum pressure of 20 psi at all or nearly all services at the base elevation of the reservoirs. Thus, these reservoirs have no dead storage component.

Based on LIDAR elevation data, developer drawings, and a recent survey of the site, the Division 22 Reservoir cannot serve approximately a dozen services in its immediate vicinity at a pressure of 20 psi at the base elevation of the tank. The pressure at these services is boosted by individual booster pumps. For the purposes of this analysis, dead storage to meet the 20 psi requirement at these services is not included.

OVERALL SYSTEM ANALYSIS

The storage analysis for the District's South Shore Water System Reservoirs is given in Table 2-5. As shown in the table, there is an existing storage deficiency for the Division 22 and Division 30 Reservoirs. The largest storage component for the South Shore Reservoirs is standby storage. Based on the projected buildout demands in the District's Water System Plan, the buildout storage analysis for the South Shore Reservoirs is given in Table 2-6. As shown in the table, the projected increase in demands will increase the storage deficits for the Division 22 and Division 30 Reservoirs.

In a standby scenario, the storage surplus in the Division 7 Reservoir could be used to supply the Division 30 Reservoir. The Division 30 Reservoir is fed from the Division 7 Reservoir via a booster station with a redundant pump and an on-site generator. This level of reliability would be adequate to transfer standby storage in the majority of standby situations, including a prolonged power outage.

The proposed second Division 22 Reservoir will be constructed to eliminate the storage deficiency for the existing Division 22 Reservoir. At least 150,000 gallons of storage would be needed to eliminate this deficiency at projected buildout demands.

ALTERNATIVE OPERATION ANALYSIS

As discussed in Chapter 1, because of the large amount of storage in the Division 7 Reservoir, some areas that could otherwise be served by the Division 22 Reservoir are currently served by the Division 30/Division 7 Reservoirs. Pumping up to the Division 30 Reservoir requires an additional 265 feet of head compared to the Division 22 Reservoir. The District has the flexibility to modify the service areas for each reservoir by adjusting the settings of the multiple PRV stations in the Sudden Valley Service Area. This modification could also offset storage deficiencies for the Division 30 Reservoir by reducing the equalizing and standby storage requirements. The potential benefits of this operational change must be weighed against the potential for water quality problems associated with longer turnover times for the Division 7 Reservoir. Demands in the area served by the Division 30/Division 7 Reservoirs would decrease by approximately one third in the alternate scheme, which would increase turnover times for the Division 7 Reservoirs by 50 percent.

The buildout storage analysis for the alternative operational scenario is shown in Table 2-7. As shown in the Table, approximately 550,000 gallons of storage would be needed to eliminate the storage deficiency for the existing Division 22 Reservoir.

TABLE 2-5

Existing Storage Analysis

Reservoir	Number of Services		Operational Storage (gallons)	Equalizing Storage (gallons)	Standby Storage (gallons)	Fire Suppression Storage (gallons)	Total Required Storage[1] (gallons)	Available Storage Volume (gallons)	Storage Surplus/ (Deficit)
	SV	Geneva							
SV Div. 7	714	0	143,932	0	196,500	45,000	340,432	1,000,000	659,568
SV Div. 22	576	470	135,355	24,948	338,700	45,000	499,003	500,000	997
SV Div. 30	1,104	0	12,851	18,552	331,200	30,000	362,603	150,000	-212,603
Geneva	0	595	92,135	0	224,700	45,000	316,835	500,000	183,165

(1) The total required storage is based on the sum of operational storage, equalizing storage, and the larger of the two of standby or fire suppression storage.

TABLE 2-6

Buildout Storage Analysis

Reservoir	Number of Services		Operational Storage (gallons)	Equalizing Storage (gallons)	Standby Storage (gallons)	Fire Suppression Storage (gallons)	Total Required Storage[1] (gallons)	Available Storage Volume (gallons)	Storage Surplus/ (Deficit)
	SV	Geneva							
SV Div. 7	843	0	143,932	0	245,400	45,000	389,332	1,000,000	610,668
SV Div. 22	833	527	135,355	45,585	473,200	45,000	654,140	500,000	-154,140
SV Div. 30	1,468	0	12,851	41,484	440,400	30,000	494,735	150,000	-344,735
Geneva	0	651	92,135	0	301,700	45,000	393,835	500,000	106,165

(1) The total required storage is based on the sum of operational storage, equalizing storage, and the larger of the two of standby or fire suppression storage.

TABLE 2-7

Alternative Buildout Storage Analysis

Reservoir	Number of Services		Operational Storage (gallons)	Equalizing Storage (gallons)	Standby Storage (gallons)	Fire Suppression Storage (gallons)	Total Required Storage[1] (gallons)	Available Storage Volume (gallons)	Storage Surplus/ (Deficit)
	SV	Geneva							
SV Div. 7	843	0	143,932	0	245,400	45,000	389,332	1,000,000	610,668
SV Div. 22	1,912	527	135,355	113,562	796,900	45,000	1,045,817	500,000	-545,817
SV Div. 30	389	0	12,851	0	116,700	30,000	129,551	150,000	20,449
Geneva	0	651	92,135	0	301,700	45,000	393,835	500,000	106,165

(1) The total required storage is based on the sum of operational storage, equalizing storage, and the larger of the two of standby or fire suppression storage.

RESERVOIR SIZING CRITERIA

Based on the storage analyses, a reservoir capacity of at least 550,000 gallons will be sufficient to meet buildout storage requirements for both the current and alternative operational scenarios. The reservoir will be designed with an overflow level to match the existing reservoir overflow level at approximately 840 feet. To accommodate the constraints of the existing site, the reservoir will be approximately the same diameter and height as the existing reservoir. The reservoir design criteria are summarized in Table 2-8.

TABLE 2-8

Reservoir Design Criteria

Parameter	Value
Volume	630,000 gallons
Overflow Level	841 feet
Diameter	56 feet
Max. Water Level	35 feet

CHAPTER 3

RESERVOIR MATERIAL COMPARISON

RESERVOIR MATERIAL COMPARISON

Both steel and concrete are common construction materials for water storage reservoirs. Each material offers distinct advantages and disadvantages depending on the application for which it will be used. The following sections provide a discussion of the construction methods for steel and concrete and summarize the advantages and disadvantages of each material.

STEEL

Welded or bolted steel storage tanks are common in municipal water storage reservoir applications and are compared in the following sections.

Welded Steel

Welded steel construction provides for versatile reservoir size and low construction costs. Welded steel tanks are comprised of steel panels welded together in the field to form the walls and roof of the tank. The entire tank structure is coated after construction to provide protection against weather and corrosion. Welded steel reservoirs can be constructed as either ground-level reservoirs or elevated storage tanks. There are no height requirements when constructing steel reservoirs. However, if the diameter-to-height ratio is less than 1.5, anchorage may be required to counteract uplift during a seismic event.

Although welded steel reservoirs generally have lower capital costs than bolted steel or concrete reservoirs, one of the arguments against welded steel reservoirs is that they have potentially higher life cycle costs due to maintenance of interior and exterior coatings. Table 3-1 summarizes the advantages and disadvantages of welded steel reservoirs.

TABLE 3-1

Welded Steel Reservoir Advantages and Disadvantages

Advantages	Disadvantages
• Lower capital costs	• Higher ongoing maintenance costs to maintain coatings.
• Three or more local bidders ensure competitive quotes	• Susceptible to corrosion if coatings not maintained
• Negligible leakage	• Cannot be backfilled or buried
• Smooth surface facilitates disinfection	• Cathodic protection is an additional cost
• Can accommodate changes in piping configuration	• Must be taken out of service for painting
• Easy to repair	

Bolted Steel

Glass-fused-to-steel (GFS) bolted tanks are a competitive alternative to welded steel tanks. GFS bolted tanks are comprised of steel panels with fused glass coatings on the interior and exterior that are bolted together to form the walls of the tank. The glass coating provides an exterior and interior barrier against weather and corrosion that replaces the coating systems required for welded steel tanks. Similar to welded steel tanks, there are no height requirements for bolted steel tanks. The roof structure can be domed aluminum or a GFS paneled flat roof supported by columns. Both of these roof structures are lightly constructed and are vulnerable to damage caused by tree branches or other windblown debris. Tanks must be above grade in order to access panels and joints for maintenance.

There are currently two commercially viable manufacturers of GFS bolted steel tanks; one is located in the United States (supplied by Aquastore) and the other in England (supplied by Shearer Tanks). Due to the required competitive bidding process, either manufacturer could win the low bid. Lead time for the panels is significantly increased when they must be shipped from England.

Bolted steel tanks have higher capital costs than welded steel, but have approximately one-third the life cycle costs, as they do not require post-factory coatings. However, bolted steel tanks are most common and most competitively priced at volumes less than 500,000 gallons. Table 3-2 summarizes the advantages and disadvantages of bolted steel reservoirs.

TABLE 3-2

Bolted Steel Reservoir Advantages and Disadvantages

Advantages	Disadvantages
• Lower ongoing maintenance costs • Requires less maintenance • Negligible leakage typical • Smooth surface facilitates disinfection • Can accommodate changes in piping configuration	• Higher capital costs • Joints have the potential to leak • Fewer bidders • Repairs costly, by manufacturer only • Cathodic protection is an additional cost • Light roof structure is more prone to damage from tree limbs • Long lead time for panels

CONCRETE

Generally, concrete reservoirs consist of a concrete floor, concrete walls, and a concrete slab roof supported by a system of columns. The concrete walls are generally installed in sections, with angled reinforcement for seismic stability and vertical tendons. After the sections are installed and the reservoir wall ring is complete, the vertical tendons are post-tensioned to counteract the hydraulic load. A shotcrete layer is then applied as a final protective skin for the structure. Concrete reservoirs can be aboveground or can be partially or completely buried.

Concrete reservoirs generally have higher capital costs than steel reservoirs, but they usually require less maintenance because no interior or exterior coating system is needed. Concrete reservoirs are typically not cost competitive with steel for reservoirs with a capacity of less than 2 million gallons. Table 3-3 summarizes the advantages and disadvantages of concrete reservoirs.

TABLE 3-3

Concrete Reservoir Advantages and Disadvantages

Advantages	Disadvantages
• Lower life cycle costs • Requires less maintenance • Can be partially or completely buried • Higher percentage of construction costs expended within community	• Higher capital cost • Repairs can be difficult and costly • Difficult to prevent leakage entirely • Fewer bidders are qualified to bid for prestressed design • Not cost competitive for reservoirs smaller than 2 MG

ACCESS, SECURITY, AND SAFETY

Access to inside the reservoir does not differ much for steel and concrete tanks. Manways in the sidewalls are possible for all three types, along with roof hatches. Welded steel tank roofs can have ladder or stair access, with stairs welded directly to the tank. Bolted steel tanks have an aluminum domed or flat roof, which limits access to the roof. Reservoir accessories, such as ladders, drains, and conduits, cannot be welded directly to the exterior of the tank either, limiting design and repair flexibility. Concrete tank roof access is typically a ladder bolted to the side of the tank, although stairs could also be installed.

Steel tanks and concrete tanks have minimal security and safety differences.

MAINTENANCE

All three types of tanks require similar periodic inspection and cleaning, although major maintenance needs differ considerably.

Welded steel tanks require significant maintenance throughout the life of the tank. Corrosion is the most common type of deterioration in welded steel reservoirs. Steel reservoirs are susceptible to corrosion from both the atmosphere and the water stored inside. Corrosion in coastal environments can be particularly aggressive because of the higher salt content in the atmosphere. Protective coatings are necessary to prevent corrosion and extend the life of a steel reservoir. Cathodic protection will reduce corrosion on the wetted surfaces of the reservoir in areas where the coating has failed. Properly installed cathodic protection can extend the recoat interval for the reservoir from 20 years up to 30+ years.

Surface preparation is required prior to the application of protective coatings for welded steel tanks. The surface preparation required for different types of coating systems depends on the type of coating as well as the service environment. Typically, the interior of a steel reservoir is coated with a three-coat epoxy-polymide, with a total dry film thickness of a minimum of 12 mils. The exterior of a steel reservoir is coated with a High-Build Acrylic Polyurethane, with a total DFT of a minimum of 10 mils. Recoating systems are typically much cheaper than initial coatings, due to different surface preparation requirements; however, recoats are still a significant maintenance cost.

Bolted GFS tanks require far less ongoing maintenance than welded steel tanks, due to the glass and steel fused surface. Steel sheets are fabricated for uniformity in size and surface, and a glass formulation is applied and fired at extremely high temperatures, creating a surface that is resistant to corrosion. Additional finishes are applied by the manufacturer, with no additional coatings required post construction.

Maintenance of GFS tanks is limited, and generally consists of replacing surface seals between panels every 15 to 20 years. If a panel becomes damaged, such as dented or

gouged, single panels can be replaced. The installation of a replacement panel requires that the tank be drained, seals removed surrounding the damaged panel, and the new panel installed.

Ongoing maintenance of a concrete tank is minimal, as it does not require interior or exterior coatings. If minor exterior damage occurs, the surface can easily be patched. Additional coatings may be applied to the exterior for aesthetic purposes.

Periodic cleaning is needed for all types of reservoirs to limit sediment buildup or growth of biological organisms inside the reservoir.

WATER QUALITY

Water quality will not differ significantly between a welded steel, bolted steel, or concrete tank and water quality monitors are needed regardless of material. However, a partially buried concrete reservoir will have lower water temperature than an above-grade steel reservoir during summer months. Higher water temperature can result in increased potential for organism growth and increased disinfection by-products formation. If water temperature remains lower during the summer in a concrete reservoir and thus more stable year round, water quality could be improved compared to a steel reservoir.

SITE ISSUES AND AESTHETICS

Site issues vary for steel and concrete reservoirs at different stages of construction. The primary difference between steel and concrete tanks in regard to site issues and aesthetics is the ability to bury a concrete tank. Since a steel tank must be completely above grade, grading and/or retaining walls may be needed if constructed in a location where the existing ground elevation is greater than the reservoir base elevation.

Both welded steel and concrete tanks can be coated with murals or a solid color. If highly visible within the site, the District may opt to finish the reservoir with a mural such as trees or graphics more specific to the District to enhance the appearance or blend it in with the existing surroundings. Bolted steel tanks are generally available in two standard factory color finishes. An additional five to six color options are generally available at an added cost. Painting of bolted steel tanks is neither necessary nor desirable.

Figure 3-1 provides typical appearances for each material type.

PRELIMINARY COST COMPARISON

RESERVOIR COST

Reservoir cost increases with size, although the cost per gallon decreases with size. Preliminary budgetary costs for a range of reservoir sizes have been provided by

DN Tanks for concrete reservoirs and Shearer Tanks for bolted steel reservoirs. The cost for bolted steel reservoirs is also based on one recently bid bolted steel reservoir project of a similar size. Welded steel reservoir costs are based on actual bids for projects designed by Gray & Osborne over the past 20 years. Table 3-4 summarizes these costs.

MAINTENANCE COSTS

The ongoing operational and maintenance costs of a reservoir include costs associated with cleaning, utility personnel labor, and recoating. Cleaning and utility staff time will be similar for all three materials, and are thus not factored into the maintenance cost analysis. The costs compared in this analysis include recoating a welded steel tank and resealing joints on a bolted steel tank. A concrete tank will not require significant maintenance throughout its life, thus a maintenance cost is not calculated.

The exterior of a welded steel reservoir typically needs an overcoat every 10 years. Interior surface recoating is required every 25 years for a welded steel tank, which entails removing existing paint and recoating all surfaces including the roof. Recoating costs are estimated to be approximately $9 per square foot for the interior and $3 per square foot for the exterior.

All exposed joints on a bolted steel reservoir must be stripped and resealed approximately every 20 years. Costs for this task are difficult to estimate since the tank supplier typically performs the work. However, GFS tanks are advertised as having maintenance costs equal to approximately one-third of that for a welded steel tank.

COST COMPARISON SUMMARY

Table 3-4 summarizes maintenance costs over a 30-year life cycle in 2014 dollars. These costs do not include costs for other work required to complete the project that would be similar for all reservoir materials, such as site work and piping.

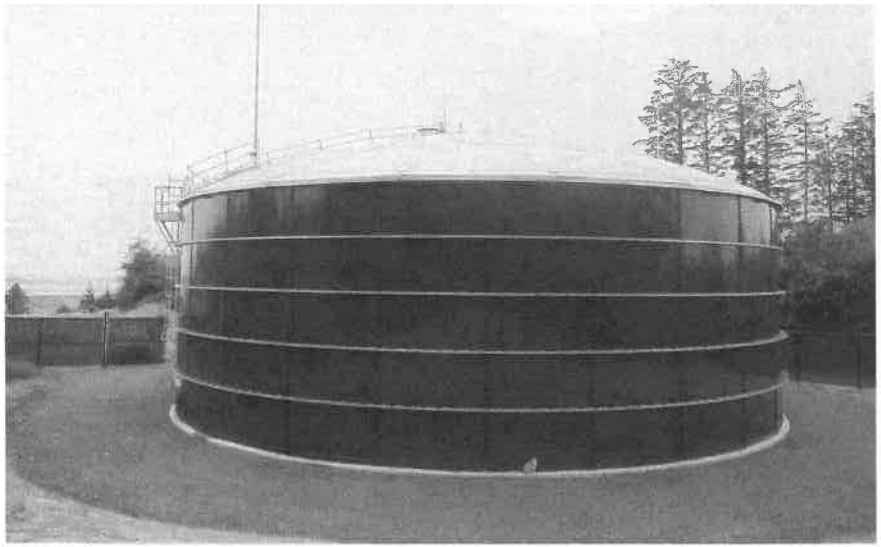
TABLE 3-4

Reservoir Material Cost Comparison

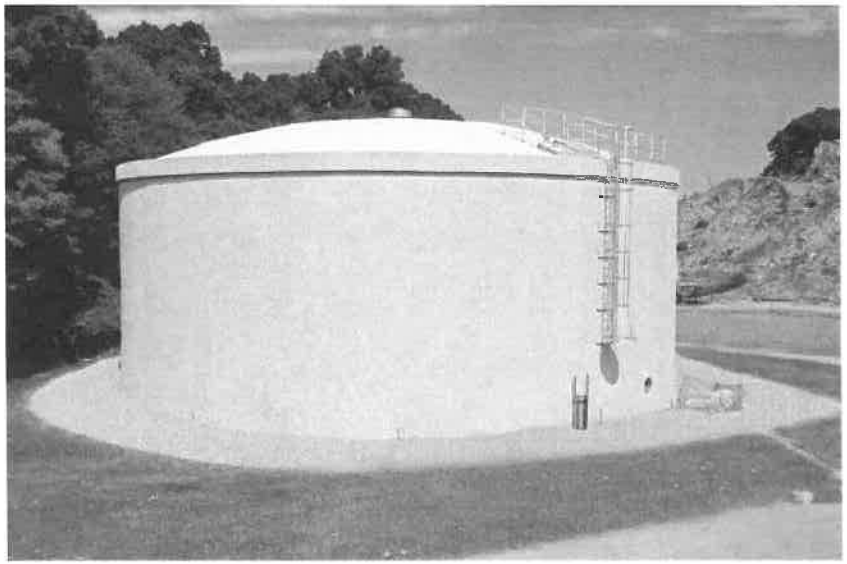
Estimated Costs	Material		
	Welded Steel	Bolted Steel	Concrete
Capital Costs[1]	$490,000	$630,000	$950,000
Maintenance Costs[2]	$155,000	$52,000	-
Life Cycle Costs	$645,000	$682,000	$950,000

(1) Capital costs for reservoir only, not including piping, site work, etc.

(2) Maintenance costs for welded steel based on three exterior overcoats and one interior surface recoating. Maintenance costs for bolted steel are estimated to be approximately one third the maintenance costs for welded steel.



BOLTED STEEL RESERVOIR
PHOTO SOURCE: GRAY & OSBORNE



PRE-STRESSED CONCRETE RESERVOIR
PHOTO SOURCE: DN TANKS

WELDED STEEL RESERVOIR
PHOTO SOURCE: GRAY & OSBORNE

LAKE WHATCOM
WATER & SEWER DISTRICT
DIVISION 22 RESERVOIR
PRE-DESIGN REPORT
FIGURE 3-1 - RESERVOIR MATERIALS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

PROPOSED RESERVOIR MATERIAL SELECTION

The District has selected welded steel construction for the proposed reservoir based on factors such as reservoir capital cost, maintenance needs and costs, aesthetic options, and overall site considerations.

CHAPTER 4

RESERVOIR FEATURES

RESERVOIR FEATURES

The following sections provide information regarding specific reservoir design features. The design features include the type of construction, roof and venting, inlet and outlet, and flexible pipe connections. Figure 4-1 shows an elevation of the proposed reservoir.

STEEL RESERVOIR CONSTRUCTION

The proposed reservoir will be an aboveground steel reservoir designed to meet the 2012 International Building Code (IBC) criteria and the AWWA D100-11 Standard.

COATING SYSTEM

Welded steel reservoirs must have an interior and exterior coating system to protect the steel from corrosion. Steel reservoirs are susceptible to corrosion from both the atmosphere and the water stored inside. Protective coatings are necessary to prevent corrosion and extend the life of a steel reservoir. If desired by the District, cathodic protection can further reduce corrosion on the wetted surfaces of the reservoir in areas where the coating has failed. Properly installed cathodic protection can extend the recoat interval for the reservoir from 20 years up to 30-plus years.

Typically, the interior of a steel reservoir is coated with a three-coat zinc/epoxy/epoxy, with a minimum total dry film thickness (DFT) of 12 mils. Interior coating will be NSF approved and will include a zinc rich primer for cathodic protection. The exterior of a steel reservoir is coated with a zinc/epoxy/polyurethane system, with a total DFT of a minimum of 10 mils. These systems are in accordance with AWWA D102-11.

RESERVOIR ACCESS

One access hatch will be installed on the roof, and two 36-inch manways will be installed in the reservoir wall to provide additional access during construction and future maintenance. At minimum, a ladder will be installed for roof access. The ladder will include security features to limit access. If funding allows, a stairway may be considered in place of the ladder. Railing will be provided to improve roof access safety. At a minimum, the railing will extend from the ladder to stairway to the vent and hatch openings. If funding allows, the railing may be installed around the full circumference of the reservoir.

An internal platform will be provided under the roof access hatch to improve access inside the reservoir.

SECURITY AND SAFETY

Intrusion alarms will be installed on all hatches and ladders for security.

Reservoir safety focuses primarily on safety measures for the water system staff. Harness mechanisms along the ladder and on the roof will be provided.

ROOF AND VENTING

The reservoir roof will be conical and slightly sloped at a minimum of 3/4-inch per foot to shed water. The roof structure will be seal welded on its interior to minimize corrosion.

A protected and screened center roof vent will be provided to allow air exchanges upon filling and drawing down the reservoir. The vent will be sized to prevent roof collapse during rapid withdrawal.

The roof to wall connection will be a chine. A chine is a sharp angled connection that is simpler to construct and easier to maintain.

RESERVOIR INLET, OUTLET, AND OVERFLOW

The reservoir will have a separate inlet and outlet that branch off from a single 12-inch pipe. The inlet and the outlet will be located on opposite ends of the tank. This will promote mixing within the reservoir and will minimize the potential for water quality issues. The reservoir inlet will be a duckbill check valve on a riser.

The overflow pipe will be 12 inch to match the inlet piping. It will discharge to the new sewer connection as discussed in the site design section. The bottom outlet end will be equipped with a rubber check valve to prevent animal or insect intrusion and to provide an air gap for backflow prevention.

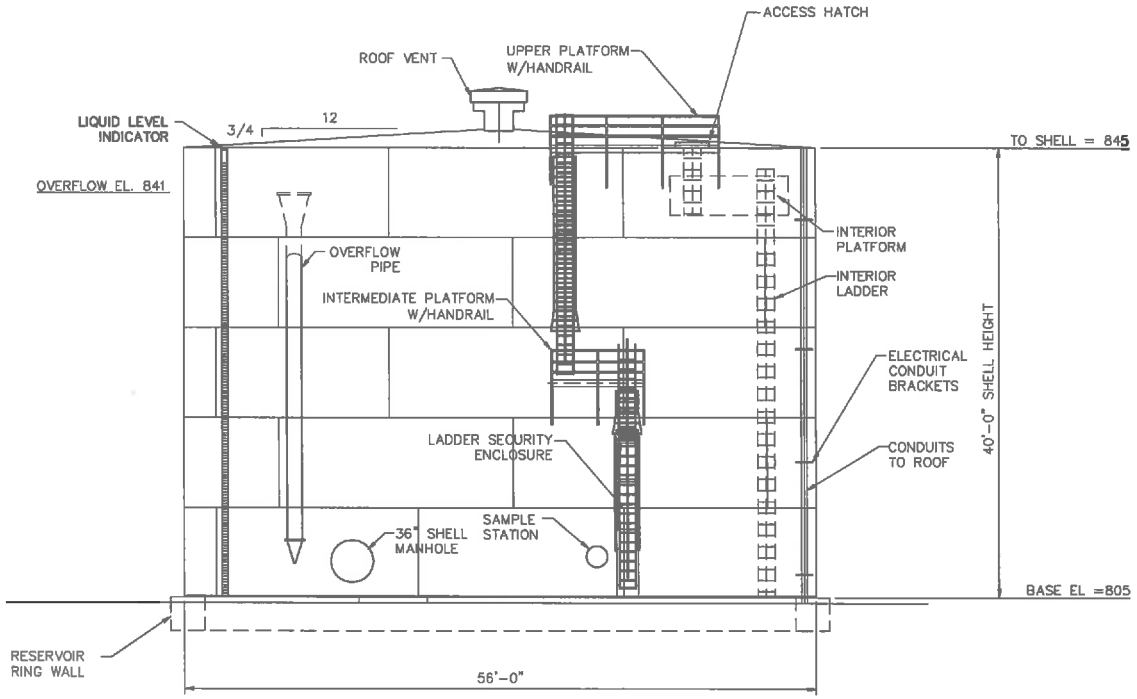
SEISMIC ISSUES

Several design features will help minimize damage and ensure that the reservoir remains fully operational during a seismic event.

FOUNDATION AND ANCHORAGE

All reservoirs that exceed the height to diameter ratio of approximately 1H:2D require anchorage to the foundation to counteract uplift during a seismic event. When a reservoir exceeds this ratio, the base cannot withstand the potential moment that results from a taller reservoir during a seismic event by gravity alone.

RESERVOIR DESIGN SUMMARY	
MATERIAL	WELDED STEEL
DIAMETER	56'-0"
SHELL HEIGHT	40'-0"
OVERFLOW	EL 841
WATER LEVEL	EL 840
FOUNDATION ELEVATION	805
NOMINAL CAPACITY	630,000 GAL



RESERVOIR ELEVATION

SCALE: 3/32"=1'-0"

NOTE:

FOR CLARITY NOT ALL ITEMS SHOWN IN TRUE POSITION.

LAKE WHATCOM WATER & SEWER DISTRICT

DIVISION 22 RESERVOIR PRE-DESIGN

FIGURE 4-1

RESERVOIR ELEVATION

Gray & Osborne, Inc.
CONSULTING ENGINEERS
SEATTLE-YAKIMA

The proposed reservoir has a height to diameter ratio of approximately 1:1.4. Therefore, based on preliminary calculations it appears that regularly spaced anchors will be required at the base of the reservoir to resist seismic overturning forces.

These anchors are typically threaded rods spaced at three to four feet on center which are attached to a chair welded to the shell. The bottom end of the anchors would be embedded into a concrete foundation. The foundation typically would consist of a stem wall with a continuous spread footing along the bottom. The depth and width of the spread footing would need to be sized to adequately resist uplift loads due to the design-level seismic overturning forces.

FREEBOARD

Freeboard must be included in reservoir design to allow for sloshing waves during a seismic event, otherwise the reservoir roof could be damaged. The required freeboard is a function of reservoir dimensions and seismic site class. The proposed reservoir will be designed with approximately 4 feet of freeboard based on seismic calculations.

FLEXIBLE PIPE CONNECTIONS

Reservoirs may experience shell uplifts of approximately 2 inches during seismic events. In anticipation of such uplifts, the inlet/outlet piping will be equipped with "Flex-tend" assemblies utilizing ball joints and expansion sleeves to accommodate any possible uplift or horizontal movements of the pipe at the bottom connection to the reservoir.

VALVE OPERATION

The outlet vault may contain a butterfly valve with an actuator that will close the valve when triggered by a seismic sensor on-site. This would prevent the reservoir from draining if there is a water main break within the system as the result of a seismic event.

SECURITY

Security measures for the proposed reservoir will be increased compared to the existing reservoir. It is now standard practice to install intrusion alarms at reservoirs to prevent public access. Intrusion alarms will be installed on the reservoir hatch, vent, ladder/stairway access gate, and all vaults.

CHAPTER 5

PROPOSED IMPROVEMENTS

GENERAL

The existing Division 22 Reservoir site is shown in Figure 5-1. The existing facilities include the existing reservoir and access driveway, as well as a remote telemetry unit (RTU). The site will be improved with a new reservoir, access improvements, drainage improvements, and new electrical equipment as shown in Figure 5-2. This chapter identifies the proposed improvements to be made as part of the project.

RESERVOIR

A new 630,000-gallon welded steel reservoir will be installed to the north of the existing reservoir. The reservoir features are discussed in Chapter 4.

SITE IMPROVEMENTS

VEHICLE ACCESS

Truck access will be available from an extension of the existing site entrance and loop. There will be at least 15 feet of clearance around the entire reservoir for vehicle and man lift access.

WATER MAINS

A connection to the existing 12-inch water main near the entrance to the site will be made to extend a new 12-inch water main to the proposed reservoir. Valves will be added to allow either reservoir to be taken offline for maintenance while keeping the other reservoir online.

STORMWATER SYSTEM

The stormwater system in the area of the reservoir site is an open channel system of roadside drainage ditches. Discharges to the stormwater system will be limited to surface water drainage of the proposed impervious areas.

SANITARY SEWER

The drain and overflow for the existing reservoir are connected to the sanitary sewer system without an air gap. A flap valve on each discharge is the only cross connection control provided for these connections. Beside the potential for contamination, the sanitary sewer system downstream of this connection is served by a lift station with

insufficient capacity for large flow events from the reservoir connections, such as an uncontrolled overflow. In order to address these issues, the sanitary sewer connection will be upgraded and rerouted to a different sanitary sewer basin. The overflow lines for the existing and proposed reservoirs will be routed to a new dedicated manhole that will be connected to the sewer system on the adjacent street to the north, which is down a steep slope approximately 50 feet below the reservoir. The new sewer connection will drain by gravity and will therefore not be limited by downstream pumping capacity. The separation from nearby sanitary sewer flows and the significant elevation difference will also minimize the potential for contamination. The potential overflow improvements are discussed in more detail in the Overflow Analyses provided in Appendix B.

LANDSCAPING

Existing vegetation will be retained to the extent possible. Priority will be given to the retention of mature trees.

ELECTRICAL AND CONTROL IMPROVEMENTS

Electrical service is already available at the existing reservoir for the existing telemetry system. Electrical conduit and facilities for the reservoir will be upgraded. SCADA equipment will be mounted on a rack above grade within the fenced area. This will replace the existing panel.

The electrical and control improvements will include the following new facilities:

- Control Panel and Programmable Logic Controller (PLC)

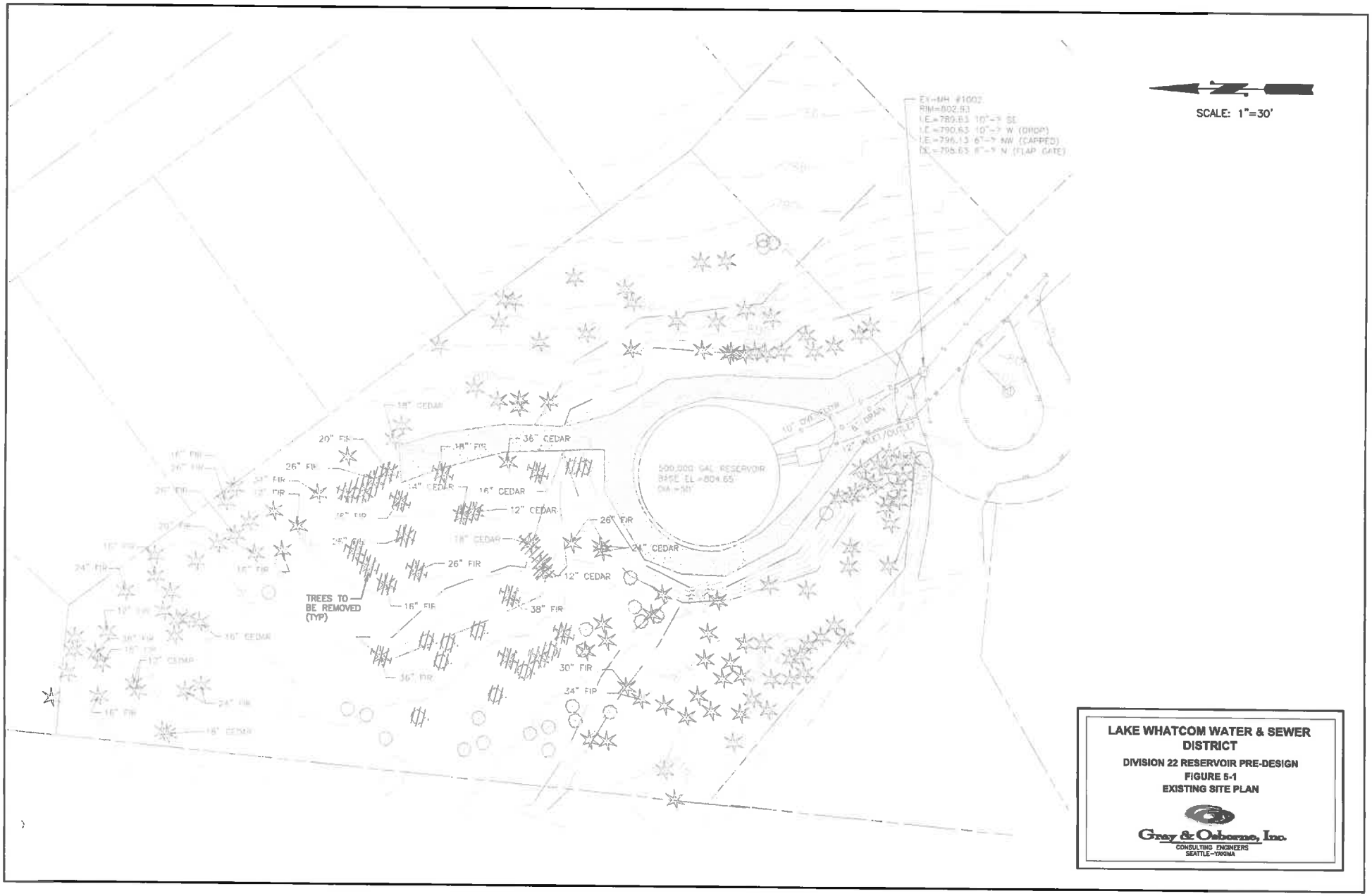
INSTRUMENTATION

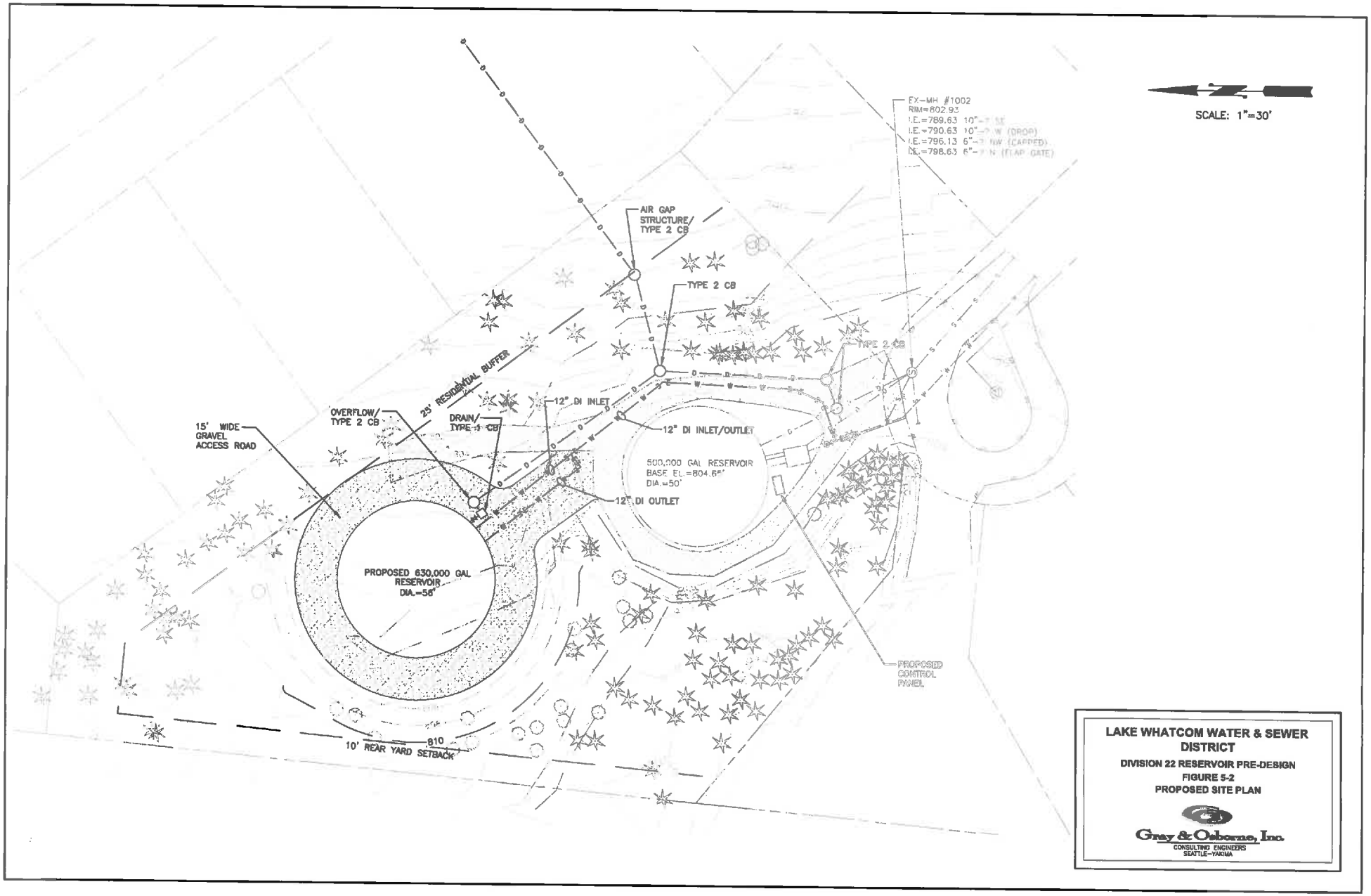
Instrumentation that will be provided will include the following:

- Intrusion Switches
- Overflow Flood Switch
- Flow Meter
- Reservoir Outlet Pressure Transducer

The PLC will monitor the following:

- Existing Reservoir Level
- Proposed Reservoir Level
- Power Status


SCALE: 1"=30'
EX-MH #1002
RIM=802.83
I.E.=789.83 10"-? SE
I.E.=790.63 10"-? W (DROP)
I.E.=796.13 6"-? NW (CAPPED)
I.E.=795.63 6"-? N (FLAP GATE)
500,000 GAL RESERVOIR
BASE EL.=804.65
DIA.=90'
TREES TO BE REMOVED (TYP)
20" FIR
26" FIR
36" CEDAR
16" CEDAR
12" CEDAR
24" CEDAR
38" FIR
30" FIR
34" FIR
LAKE WHATCOM WATER & SEWER DISTRICT
DIVISION 22 RESERVOIR PRE-DESIGN
FIGURE 5-1
EXISTING SITE PLAN
Gray & Osborne, Inc.
CONSULTING ENGINEERS
SEATTLE–YAKIMA



LAKE WHATCOM WATER & SEWER DISTRICT

DIVISION 22 RESERVOIR PRE-DESIGN

FIGURE 5-2

PROPOSED SITE PLAN

Gray & Osborne, Inc.
CONSULTING ENGINEERS
SEATTLE–YAKIMA

The PLC will relay the following alarms:

- Intrusion
- Overflow
- Communication Failure
- Power Fail (Control and 120V)
- PLC Fail
- VFD Fail
- Existing Reservoir Low Level
- Existing Reservoir High Level
- Proposed Reservoir Low Level
- Proposed Reservoir High Level

TELEMETRY

The new facilities will be integrated into the District's existing Supervisory Control and Data Acquisition (SCADA) system for full monitoring and alarming at the District's main office.

PERMITS

Because the project is a non-residential use in a residential zone, it is allowed by conditional use. Therefore the following processes/permits are expected to be required:

- Zoning Preapplication Meeting. The following items must be turned in at, or prior to the meeting:
  - Application (includes site plan, parcel & owner information, etc.)
  - Preliminary Stormwater Proposal
  - Traffic & Concurrency Information
- The project will be required to complete a SEPA Checklist/determination. The District will act as the SEPA official for this project, most likely with a DNS issued.
- Conditional Use Application. Subsequent to the preapplication meeting, the following items must be turned in to continue the conditional use process:
  - Conditional Use Application - Master
  - Land Disturbance Permit Application
  - Zoning/Land Use consistency approval
  - Tree canopy maps
  - Notification

- Public Hearing (in addition to the public hearings required by the County, the District will meet with the Sudden Valley HOA to discuss the project and make provisions to gain approval from the HOA.)

Upon approval of the Conditional Use, the District can then get approval for the land disturbance, design & bid the project, attend a pre-construction meeting and begin construction. . The project will be restricted to land clearing and grading activities during June 1 through September 30 per Whatcom County Code 20.51.410 – Seasonal clearing activity limitations.

Acquisition of the building permit for the tank will be the responsibility of the Contractor hired by the District.

SETBACKS

While the setback requirements will be determined as part of the Conditional Use Permit requirements, the preliminary design assumes that the setbacks will be similar to those required for commercial developments. Per Whatcom County Code 20.62.550-Buffer area, the minimum side and rear yard setbacks for commercial developments adjacent to residential areas are 25 feet. The buffer area would apply near the north property line, which borders residential lots. Per the setbacks table contained in Whatcom County Code 20.80.210-Minimum setbacks, the minimum rear yard setback for a commercial property is 10 feet. The minimum rear yard setback would apply to the western property line, which borders the Stimpson Family Nature Reserve.

STORMWATER REQUIREMENTS

The site is located within the Lake Whatcom Watershed in Whatcom County, and the county's NPDES Phase II permit area. The Lake Whatcom watershed is a sensitive body of water that supplies drinking water to the Lake Whatcom Water & Sewer District and the City of Bellingham. Due to the sensitive nature of the lake, the county has implemented several restrictions regarding development projects within the watershed. The site is subject to several regulations relating to stormwater runoff:

- Zoning Code – WCC 20.32 Residential Rural District (RR) (1996)
- Zoning Code - WCC 20.51 Lake Whatcom Watershed Overlay District (2013)
- Zoning Code - WCC 20.80 Supplementary Requirements (2010)
- Whatcom County Development Standards, Chapter 2, Stormwater (1999, revised 2002)
- Whatcom County Development Standards, Chapter 2, Stormwater, Section 221 Stormwater Special District Standards (2002)
- Stormwater Management Manual for Western Washington – Ecology (2012)

- Whatcom County Phase II NPDES Permit (issued 2013)

It appears that Title 20.51, adopted in 2013, supersedes and/or modifies all of the others. The intent of Title 20.51 is to "…manage and treat stormwater runoff and establish more stringent standards on clearing activities and reduce phosphorus loading into Lake Whatcom,..." The most pertinent regulations are summarized below:

- WCC 20.51 – Lake Whatcom Watershed Overlay District. Passed in 2013, this code section modifies Title 20, WC development Standards Chapter 2 and Section 221. Therefore this section takes precedence over all other state and local regulations.
    - 20.51.410 – Seasonal clearing activity limitations.
    - 20.51.420 – Permanent stormwater management systems. In addition to recording a Declaration of Covenant per the county's requirements to ensure the continued maintenance and operation of the stormwater system of the site, all projects shall:
        - Not exceed the natural runoff phosphorus loading profile; and
        - Incorporate presumptive BMPs and/or demonstrative BMPs to the new impervious areas and new disturbed areas.
            - Presumptive BMPs include:
                - Full infiltration and full downspout infiltration (per Ecology Manual BMP T5.10A).
                - Full dispersion (per Ecology Manual BMP T5.30).
            - Demonstrative BMPs must meet Ecology Minimum Requirements #3-#9, while also conforming to at least one of the following:
                - Phosphorus reduction to less than 0.1875 lb of P/acre/year;
                - No increase in monthly runoff volume; or
                - No runoff (disperse all of it).
- Stormwater Management Manual for Western Washington AND the County's NPDES Phase II Permit. Review of the requirements of the NPDES Phase II Permit (Appendix 1) and the Ecology Manual indicate

that the project is required to apply all the minimum requirements (1-9) to the new and replaced impervious surfaces for the project.

- Minimum Requirement #4 - Preservation of Natural Drainage Systems and Outfalls. If the 100-year peak discharge from the site is less than 0.3 cfs under existing conditions and will remain under 0.3 cfs for the proposed conditions, runoff may be dispersed onsite, without needing to construct a tight-line conveyance system. The existing peak runoff is 0.161 cfs and the peak runoff for the completed project is 0.234 cfs, therefore a tight-line is not necessary.

- Minimum Requirement #5 – On-Site Stormwater Management. Requires that projects utilize BMPs to the greatest extent feasible to reduce the amount of runoff from the site. Projects that are exempt from MR #7, Flow Control, do not have to achieve the LID standard, but are required to implement soil amendments and dispersion to the extent feasible. Review of MR #7 indicates the project is exempt from flow control since the project adds less than 10,000 square feet of new or replaced impervious surface.

- Minimum Requirement # 6 – Runoff Treatment. Requires that projects creating more than 5,000 square feet (SF) of new and replaced Pollution Generating Impervious Surfaces (PGIS) construct treatment facilities. This project is exempt from this requirement since it only adds 3,976 SF of PGIS, but also removes 696 SF for a net increase of 3,280 SF of PGIS.

To summarize, under the regulations of the Ecology manual and the county's NPDES Phase II permit, the project is exempt from constructing flow control facilities (but would be required to implement flow control BMPs) and is exempt from runoff treatment. However, WCC 20.51 takes precedence over all other local regulations and can be more stringent that state regulations and therefore, the project must incorporate presumptive BMPs and/or demonstrative BMPs to be applied to the new impervious and new disturbed areas. It is believed that flow dispersion can be implemented on the site to the greatest feasible extent to control the runoff and provide adequate treatment of stormwater.

A phone call to Whatcom County Public Works Engineering Services confirmed that the project will be subject to the Ecology manual requirements, as it relates to, and as stated in WCC 20.51.420. A Preliminary Stormwater Proposal will be required to be submitted to the County at the time of Conditional Use Permit application. The County may also require a Stormwater Design Report prior to issuance of any construction permits.

INVESTMENT GRADE ENERGY AUDIT

Because the financing for the project includes a Drinking Water State Revolving Fund (DWSRF), the project must meet Investment Grade Efficiency Audit (IGEA) requirements. The IGEA requirements can be met in the following ways:

1. Documentation that you have met the IGEA requirements in the past.
2. A third party design review of your project.
3. Demonstrating there are no "obtainable" energy savings.
4. Complete a preliminary energy audit and/or an Investment Grade Efficiency Audit (IGEA) on your existing system.

This project does not include the installation or replacement of any motors, pumps, blowers, electrical, or heating/air conditioning equipment. Since the hydraulic gradeline of the existing system is set by the elevation of the existing reservoir, the installation of the proposed reservoir will not impact the power required to pump water from the Water Treatment Plant to the reservoirs. Therefore, there are no "obtainable" energy savings for this project.

OPERATIONS

During construction, the existing reservoir will be kept on-line. The existing reservoir is served by a single inlet/outlet line connected to the Sudden Valley Zone 6 distribution system. The inlet and outlet for the existing reservoir branch off from the inlet/outlet line just outside the tank. The inlet line discharges near the top of the existing tank. The outlet line draws from the bottom of the tank and contains a check valve. In order to accommodate the existing reservoir inlet/outlet configuration and ensure adequate turnover in both reservoirs, the existing and new reservoirs will be operated in parallel.

CONSTRUCTION SCHEDULE

A preliminary construction schedule is as follows:

- June 2015 – Complete Clearing and Grading Design/Advertise
- July 2015 – Award Clearing and Grading Construction Contract
- September 2014 – Complete Clearing and Grading Activities
- January 2016 – Complete Reservoir Design/Advertise
- February 2016 – Award Reservoir Construction Contract
- September 2016 – Complete Reservoir Construction

CONSTRUCTION COST ESTIMATE

Table 5-1 provides the estimated construction costs for the project.

TABLE 5-1

Project Construction Cost Estimate

No.	Item	Quantity		Unit Price	Amount
1.	Minor Changes	1	CALC	$25,000.00	$25,000.00
2.	Mobilization and Demobilization	1	LS	$95,000.00	$95,000.00
3.	Clearing and Grubbing	1	LS	$10,000.00	$10,000.00
4.	Temporary Erosion Control	1	LS	$5,000.00	$5,000.00
5.	Locate Existing Utilities	1	LS	$2,000.00	$2,000.00
6.	Trench Excavation Safety System	1	LS	$3,000.00	$3,000.00
7.	Site Earthwork	1	LS	$50,000.00	$50,000.00
8.	Unsuitable Excavation	200	CY	$40.00	$8,000.00
9.	Site Piping	1	LS	$68,000.00	$68,000.00
10.	Gravel Borrow	250	TN	$20.00	$5,000.00
11.	Crushed Surfacing Base Course	540	TN	$25.00	$13,500.00
12.	Surface Restoration	1	LS	$2,000.00	$2,000.00
13.	Welded Steel Reservoir	1	LS	$490,000.00	$490,000.00
14.	Electrical, Telemetry, and Instrumentation	1	LS	$100,000.00	$100,000.00

Subtotal $861,500.00
Contingency (15%) $87,000.00
Sales Tax at 8.5% $73,300.00
Total Construction Cost: $1,021,800.00

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL

DATE SUBMITTED:	March 17, 2015		
TO BOARD OF COMMISSIONERS			
FROM: Patrick Sorensen	MANAGER APPROVAL		
MEETING AGENDA DATE:	March 25, 2015		
AGENDA ITEM NUMBER:	5.B.		
SUBJECT:	Resolution 812 – Update Fixed Asset Policy		
LIST DOCUMENTS PROVIDED ⇨ NUMBER OF PAGES INCLUDING AGENDA BILL: _____	1. Resolution 812		
	2. Red-lined version of Fixed Asset Policy		
	3.		
TYPE OF ACTION REQUESTED	RESOLUTION ☒	FORMAL ACTION/ MOTION ☒	INFORMATIONAL/ OTHER ☐

BACKGROUND / EXPLANATION OF IMPACT

Staff has prepared Resolution 812 to update the District's Fixed Asset Policy to include language recommended by the State Auditor. The new language is shown on page 2 of the red-lined Fixed Asset Policy, attached.

FISCAL IMPACT

N/A

RECOMMENDED BOARD ACTION

Discuss/consider adopting Resolution 812 updating the District's fixed asset policy.

PROPOSED MOTION

To adopt Resolution 812 updating the District's Fixed Asset Policy.

LAKE WHATCOM WATER AND SEWER DISTRICT

RESOLUTION No 812

A Resolution of the Board of Commissioners
Amending Resolution 742 and Updating the District's Fixed Asset Policy and Administrative Code

WHEREAS, the District will establish guidelines and criteria for what a capital asset is and what is an attractive asset, monitor and safeguard District assets, comply with state regulatory requirements and provide accurate information for financial reports.

WHEREAS, in order to be able to implement fixed asset guidelines, the District is adopting a resolution establishing certain procedures.

NOW, THEREFORE, THE BOARD OF COMMISSIONERS OF LAKE WHATCOM WATER AND SEWER DISTRICT HEREBY RESOLVES AS FOLLOWS:

1. The attached Fixed Asset Policy dated March 25, 2015 is hereby accepted by Lake Whatcom Water & Sewer District.

ADOPTED by the Board of Commissioners of Lake Whatcom Water and Sewer District, Whatcom County, Washington, at a Regular Meeting thereof, on the 25th day of March, 2015.

_____
Leslie Mc Roberts, President

_____
Todd Citron, Secretary

_____
John W. Millar, Commissioner

_____
Laura Weide, Commissioner

_____
Bruce R. Ford, Commissioner

Approved as to form:

_____
Robert A. Carmichael, Attorney for District

Lake Whatcom Water and Sewer District Fixed Asset Policy

To ensure that all District-owned real and personal property is adequately protected and that its use is properly managed, particularly with respect to custody, insurance, maintenance, and planning.

1. *Definitions*
   Fixed Asset – Any District-owned real and personal property that the District intends to use or keep for more than one year and exceeds the cost threshold amount.

   Attractive (theft sensitive) Asset – Portable, durable items that do not meet the minimum capitalization threshold but require special attention because of their potential to be stolen. Examples of these items include but are not limited to computers, printers, copiers, digital cameras, and DVD players; regardless of initial acquisition cost. These objects are tagged and tracked by the District, but are not capitalized.

   Infrastructure – Water treatment plants, water transmission and distribution systems, sewage collection and conveyance systems.

   Capitalize – To formally record a fixed asset for depreciation purposes.

   Depreciate – To expense the original acquisition value of a capitalized fixed asset over a specified time period.

   District Official – Commissioners and staff.

2. *Custody*
   All District officials are equally responsible for the care and proper use of District-owned property.

3. *Marking*
   The District shall mark District-owned motor vehicles as prescribed by RCW 46.08.065. The District shall mark, tag, or engrave all other fixed assets at the General Manager's discretion, and shall establish corresponding procedures.

   The District identifies and monitors Attractive Assets (theft sensitive) that cost less than the minimum capital asset cost threshold. These items are tagged and tracked by the District. Specifically excluded are keyboards, cellular phones, pagers and other similar electronics.

4. *Records*
   The District shall establish and maintain internal control procedures and documents to track fixed asset acquisition, annual verification of existence, physical condition, relocation, maintenance and/or repair, alteration, transfer, and disposal.

   The District shall establish and maintain internal control procedures and documents to track attractive (theft sensitive) asset acquisition, annual verification of existence, physical condition, relocation, maintenance and/or repair, alteration, transfer, and disposal.

physical condition, relocation, maintenance and/or repair, alteration, transfer, and disposal.

5. *Capitalization*
   The District shall capitalize the following categories of fixed assets:
   - Valued at more than $5,000.00 at the time the District originally acquires the fixed asset.
   - Assets purchased with grant funds may have a different threshold amount as stipulated by the grant.

6. *Original Acquisition Value Determination*
   The District shall determine the acquisition value of any given fixed asset in priority sequence as follows:
   - Vendor's invoiced cost to the District, including shipping and interest charges.
   - District Engineer's evaluation.

7. *Useful Life Determination*
   The District Engineer shall determine the useful life of all infrastructure fixed assets, as well as all improvements to existing infrastructure fixed assets. The useful life of all other types of fixed assets shall be determined either by using standard United States Internal Revenue Service guidelines, or by the District's CPA.

8. *Depreciation*
   The District shall depreciate each capitalized fixed asset at its value at original acquisition using the straight-line method, starting in the year following the fixed asset's original acquisition.

9. *Acquisition*
   The Board shall approve the acquisition of fixed assets through the Budget process.

10. *Disposal*
    The Board shall pre-approve all disposal actions of any capitalized fixed assets not being replaced in kind. The General Manager shall pre-approve all other fixed asset disposal actions.

11. *Existence Verification*
    The General Manager shall ensure that all fixed assets undergo physical existence verification periodically. Verification results will be presented to the Board with the Budget for the following year. Physical condition assessments will be performed under the Maintenance Planning Program.

12. *Spare Parts, Raw Materials and Supplies*
    The District shall maintain stocks of spare parts, raw materials, and supplies at the minimum levels necessary to perform its work safely, consistently, and reliably.

13. *Adoption of Other Relevant Authority*
    The District hereby adopts the BARS Manual references noted above for additional guidance and procedures.

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL

DATE SUBMITTED:	March 18, 2015		
TO BOARD OF COMMISSIONERS			
FROM: Patrick Sorensen	MANAGER APPROVAL		
MEETING AGENDA DATE:	March 25, 2015		
AGENDA ITEM NUMBER:	5.C.		
SUBJECT:	Update Credit Card Usage Policy-Resolution 814		
LIST DOCUMENTS PROVIDED ⇨ NUMBER OF PAGES INCLUDING AGENDA BILL: _____	1. Resolution 814		
	2.		
	3.		
TYPE OF ACTION REQUESTED	RESOLUTION ☒	FORMAL ACTION/ MOTION ☒	INFORMATIONAL/ OTHER ☐

BACKGROUND / EXPLANATION OF IMPACT

Resolution 814 updates the District's Credit Card Usage policy to add that "A credit card user agreement shall be kept on file for each card" (Exhibit A). This is in response to a recommendation by the State Auditor.

FISCAL IMPACT

N/A

RECOMMENDED BOARD ACTION

Review/discuss/consider Resolution 814.

PROPOSED MOTION

To adopt Resolution 814 Updating the District's Credit Card Usage Policy.

LAKE WHATCOM WATER AND SEWER DISTRICT

RESOLUTION No 814

A Resolution of the Board of Commissioners
Updating the District's Credit Card Usage Policy and
Rescinding Resolution 745

WHEREAS, RCW 43.09.2855, states that "special Purpose districts... are authorized to use credit cards for official government purchases and acquisitions," and,

WHEREAS, RCW 42.24.115, states that "any municipal corporation or political subdivision may provide for the issuance of charge cards to officers and employees for the purpose of covering expenses incident to authorized travel," and,

WHEREAS, Bank of America, the District's financial depository institution has agreed to provide the District with credit cards for the purpose of purchases and travel expenses; and,

NOW, THEREFORE, BE IT RESOLVED THAT: The District may purchase goods, services, and pay travel expenses using a credit card, subject to the following conditions:

1. The credit limit for the card shall be $10,000.00

2. The credit card may be used for the purchase of items or travel expenses approved in the current fiscal year budget, and for no other purpose.

3. Cash advances on any District credit card are prohibited.

4. There shall be four credit cards one each. A credit card user agreement (Exhibit A) shall be kept on file for each of the following:

   a) For the: General Manager
   b) For the: Finance Manager
   c) For the: Assistant General Manager
   d) For the: Maintenance Supervisor

ADOPTED by the Board of Commissioners of Lake Whatcom Water and Sewer District, Whatcom County, Washington, at a Regular Meeting thereof, on the 25th day of March, 2015.

Leslie Mc Roberts, President

Todd Citron, Secretary

John W. Millar, Commissioner

Laura Weide, Commissioner

Bruce R. Ford, Commissioner

Approved as to form:

Robert A. Carmichael, Attorney for District

EXHIBIT A

CREDIT CARD USER AGREEMENT

I, _____, as an employee of the Lake Whatcom Water and Sewer District accept personal responsibility for the safeguard and proper use of the District credit card (ending in the last 4 digits) #_____ which has been assigned to me for use in the performance of my job, in accordance with the terms outlined below.

> Credit cards are to be used solely for travel related business expenses (within and outside the district), and conference/class registrations.
>
> Credit cards may be used for purchasing department supplies up to $4000 only if prior approved by the assigned card holder's Department Head.

I have read and understand the credit card policies and procedures as set out in Resolution 745.

I understand that each time I use, or authorize the use thereof, that I am adhering to the following statement:

> "I hereby certify under penalty of perjury that this is a true and correct claim for necessary expenditures incurred by me and that no payment has been received by me on account thereof."

I understand that I will be help personally liable for inappropriate charges I incur to the District credit card, and payment for any such inappropriate charges is hereby authorized to be withheld from my paycheck.

I will safeguard use of the issued credit card and use appropriate security whenever and wherever I use the card. If my card is lost or stolen, I agree to immediately notify Bank of America as well as the District's Finance Manager.

The undersigned individual has read and understands the above statements.

_____ _____

Employee Date

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL

DATE SUBMITTED:	March 17, 2015		
TO BOARD OF COMMISSIONERS			
FROM: Patrick Sorensen	MANAGER APPROVAL		
MEETING AGENDA DATE:	March 25, 2015		
AGENDA ITEM NUMBER:	5.D.		
SUBJECT:	Disposal of Surplus Items		
LIST DOCUMENTS PROVIDED ⇨ NUMBER OF PAGES INCLUDING AGENDA BILL: _____	1. March 2015 Surplus List		
	2.		
	3.		
TYPE OF ACTION REQUESTED	RESOLUTION ☐	FORMAL ACTION/ MOTION ☒	INFORMATIONAL/ OTHER ☐

BACKGROUND / EXPLANATION OF IMPACT

Attached is a list of surplus equipment that the District is in no longer need of.

FISCAL IMPACT

None

RECOMMENDED BOARD ACTION

To declare the items listed on the March 2015 Surplus List as surplus and authorize staff to dispose of them in a manner consistent with state law.

PROPOSED MOTION

To declare the items included on the March 2015 Surplus List as surplus and authorize staff to dispose of them in a manner consistent with state law.

March 2015 Surplus List

Quantity	Description	Number		Bar Code
1	Hach Pocket Colormeter II	58700-00		
2	Biosystems MultiPro w/ calibration kit	B111874	B111874	
2	Sperian cylinder	54-9049E		
1	Allegro Industries qualitative fit test kit	2041		
1	Regal Dual Cylinder Scale	SC401		0906-025

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL

DATE SUBMITTED:	March 17, 2015		
TO BOARD OF COMMISSIONERS			
FROM: Patrick Sorensen	MANAGER APPROVAL		
MEETING AGENDA DATE:	March 25, 2015		
AGENDA ITEM NUMBER:	5.E.		
SUBJECT:	2015 Compensation and Benefits Study Results – Gene Matt & Associates		
LIST DOCUMENTS PROVIDED ⇨ NUMBER OF PAGES INCLUDING AGENDA BILL: _____	1. 2015 Compensation and Benefits Study e-mailed to you earlier		
	2.		
	3.		
TYPE OF ACTION REQUESTED	RESOLUTION ☐	FORMAL ACTION/ MOTION ☒	INFORMATIONAL/ OTHER ☐

BACKGROUND / EXPLANATION OF IMPACT

Consultants Gene Matt & Associates have completed an updated Compensation and Benefits Study on behalf of the District. A revised copy of the report entitled "LWWSD Draft Report 3-12-15" was emailed to you earlier this week. It is the most up to date copy of the report. In addition, a smaller version of the report as it relates to the General Manager's position entitled "3-13-15 LWWSD GM Draft Report" was provided to you at our last meeting. If you need another hard copy, or for a copy to be emailed again, please do not hesitate to contact me. Mr. Matt will be present to give an overview of the Survey results and answer questions from the Board.

FISCAL IMPACT

Unknown at this time.

RECOMMENDED BOARD ACTION

Listen to the presentation and ask any applicable questions.

PROPOSED MOTION

Unknown at this time.

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL

DATE SUBMITTED:	March 17, 2015		
TO BOARD OF COMMISSIONERS			
FROM: Patrick Sorensen	MANAGER APPROVAL		
MEETING AGENDA DATE:	March 25, 2015		
AGENDA ITEM NUMBER:	7.0		
SUBJECT:	Manager's Report		
LIST DOCUMENTS PROVIDED ⇨ NUMBER OF PAGES INCLUDING AGENDA BILL: _____	1. Manager's Report		
	2.		
	3.		
TYPE OF ACTION REQUESTED	RESOLUTION ☐	FORMAL ACTION/ MOTION ☐	INFORMATIONAL/ OTHER ☒

BACKGROUND / EXPLANATION OF IMPACT
Updated information from the General Manager in advance of the Board meeting.

FISCAL IMPACT
None

RECOMMENDED BOARD ACTION
None required.

PROPOSED MOTION
None

General Manager Comments

March 25, 2015

Board Meeting

Important Upcoming Dates:

- **Meetings Associated with the Lake Whatcom Management Program:**
  - **Policy Group Meeting:** The next meeting is set for **April, 13, 2015 at 2:30 p.m.** in the City of Bellingham's Fireplace Meeting Room located in the bottom floor of the Municipal Court Building at 625 Halleck Street. The Fireplace Room is located next to the City's Information Technology Office on the east side of the Court Building. Remember, all Policy Group Meetings are publicly noticed by the District.
  - **Management Meeting:** The next meeting with the Mayor and County Executive has not been set at this time.
- **Next Regular Board Meeting:** The next regular meeting is scheduled for **Wednesday, April 8, 2015** at 6:30 p.m.
- **Employee Staff Meeting**: The next meeting is set for **Thursday, April 9, 2015 at 8:00 a.m.** in the Board Room. Commissioner McRoberts is scheduled to attend this meeting. Scheduling is rotated by alphabetical order each month.
- **Employee Safety Committee Meeting**: The next meeting will be held on **March 26, 2015** at 8:00 a.m. The April date has not been set yet. The meeting will be held in the District's Conference Room.
- **Washington Association of Sewer & Water Districts Section III Meeting:** The upcoming Section III meeting will be held on **Thursday, April 16, 2015** at 7:00 a.m. held at the WASWD 2015 Spring Conference & Trade Show at the Yakima Convention Center. The room location will be posted in the Convention Center. All WASWD Section III Meetings are publicly noticed by the District.
- **Whatcom Water District's Caucus Meeting**: The Caucus meeting for **April, 2015** has not been set yet. Typically the meeting is held on the third Wednesday of each month. However, the third Wednesday conflicts with the WASWD Spring Conference.

Other:

- **Committee Meeting Reports as Needed**: This is a place holder for Board and staff members to report on recent committee meeting reports since the last Board Meeting.