CITY OF GOLD BAR

Water System Plan

JANUARY 2015

Prepared by:

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Project No. 09-25-001

PROJECT CERTIFICATION

The technical material and data contained in this Water System Plan was prepared by PACE Engineers, Inc. under the supervision of the below listed individuals. Those responsible staff members who are registered professional engineers are licensed in the State of Washington.

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EXECUTIVE SUMMARY

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TERMINOLOGY

Several terms and acronyms are used in the plan which may not be familiar to the reader. Definitions will be provided in the text, in addition to the following list.

ac	acres
ac-ft	acre-feet
ac-ft/yr	acre feet per year
ADD	average daily demand
AWWA	American Water Works Association
cfs	cubic feet per second
County	Snohomish County
CU	color units
DI	Ductile Iron
DIP	Ductile Iron Pipe
DOE	State of Washington Department of Ecology
DOH	State of Washington Department of Health
DSHS	State of Washington Department of Social and Health Services
ea	each
el	elevation
ENR	Engineering News Record
EPA	U.S. Environmental Protection Agency
ERU	Equivalent Residential Unit
ft	feet
gpcd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
gpm/sq ft	gallons per minute per square foot
HGL	hydraulic grade line
hp	horsepower
hr	hour
in	inch
ISO	Insurance Services Office
L	Liters
lb	pound

MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MDD	maximum day demand
MG	million gallons
MGD	million gallons per day
mg/l	milligrams per liter
min	minutes
ml	milliliters
mm	millimeters
MPN/100 ml	most probable number per 100 milliliters
msl	mean sea level
O & M	operation and maintenance
PHD	peak hour demand
PRV	Pressure Reducing Valve
psi	pounds per square inch
PUD	Public Utility District
SDWA	Safe Drinking Water Act
sec	seconds
SOCs	synthetic organic chemicals
State	State of Washington
sq ft	square feet
sq mi	square mile
SWTR	Surface Water Treatment Rule
TDS	total dissolved solids
THMs	trihalomethanes
THMFP	trihalomethane formation potential
TU	turbidity units
UGB	Urban Growth Boundary
USGS	U.S. Geological Survey
VOCs	volatile synthetic organic chemicals
yr	year

ACKNOWLEDGMENTS

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Linda Loen, Mayor

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Thomas Palmer

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Robert (Bob) Strom

Paul Jones

Joe Beavers, Past Mayor

John Light, Public Works Director

Richard Baker, Water System Operator

Denise Beaston, Utility Clerk

Lisa Stowell, Clerk/Treasurer

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CHAPTER 1:
INTRODUCTION AND EXISTING WATER SYSTEM

1.1 INTRODUCTION

The City of Gold Bar 2014 Water System Plan has been prepared in accordance the requirements for water system planning established by the State of Washington Department of Health (DOH) as expressed in Chapter 246-290 of the Washington State Administrative Code. In addition, the Plan is in accordance with the requirement of the Washington State Department of Ecology (DOE) and follows the guidelines and requirements establish by the Snohomish County Coordinated Water System Plan (CWSP). Most importantly, it has been prepared under the direction of the City of Gold Bar to meet the needs of the City's elected officials and staff e existing and future ratepayers of the water system.

1.2 AUTHORIZATION AND SCOPE

Authorization for preparation of the Gold Bar Water System Plan was provided by the Mayor and City Council. The requirements of the Plan, as specified in the Department of Health *Rules and Regulations for Group A Public Water Systems* are as follows:

- A description of the water system planning area, an assessment of the present and anticipated population growth, and an assessment of water demands.
- A description and inventory of existing water system facilities, including a hydraulic analysis of the system, source of supply, the physical, chemical, and bacteriological quality of both raw and treated water.
- Identification of water system needs projected at least 20 years into the future, an assessment of alternatives, and a program including a time schedule and financial plan for implementing needed improvements.
- A discussion of the relationship and compatibility with plans of adjacent or nearby purveyors (including service area agreements), and other related plans affecting land use or development of water system facilities, including review comments by those agencies or water systems affected by the plan.
- An operations program in accordance with WAC 246-290-410 including provisions for routine maintenance and operation, water quality monitoring, cross-connection control, responding to emergencies, and an identification of person(s) responsible for system management.
- Maps depicting existing and future service area boundaries, water system facilities, existing and proposed pipe networks, critical elevation and pressure zones, existing local zoning and land use, and present and future population distribution patterns within the water system planning area.
- Prepare estimates of the annual cost of the construction, financing, operation and maintenance of the water system.

1.3 PLANNING PERIOD

A 20-year planning period, beginning in 2014, will be analyzed for Gold Bar. Key years in the Plan are as follows:

2010 Census year from which system population projections are based.

2014 First year of comprehensive water plan.

2014 Beginning of financial analysis period.

2024 End of financial analysis period.

2034 End of comprehensive water planning period.

1.4 OWNERSHIP AND MANAGEMENT

The following summarizes the Gold Bar Water System Ownership and Management.

Name: City of Gold Bar Water System (PWS #28300Y).

Ownership: City of Gold Bar
107 – 5th Street
Gold Bar, WA 98251

Management: The City of Gold Bar owns and operates its water system. The Mayor and City Council meet at 7:00 p.m. in the City Hall Council chambers on the first and third Tuesdays of each month to conduct City business. A certified Water Distribution Manager II is employed on a full-time basis to operate the system and perform monthly water quality sampling.

Water Facilities Inventory (WFI): A WFI form is on file with the Department of Health and was last updated November 11, 2013. A copy is provided in Appendix D.

Billing Procedures: The Gold Bar system is metered with a usage-based rate structure. Monthly statements are distributed and payments collected by the Utility Clerk or designee.

Location: As shown in Figure 1-1, the Gold Bar water system is located approximately ten miles east of Monroe, Washington, along State Route 2 between the cities of Sultan and Index. The Retail Water Service is adjacent to the Skykomish River on the south and is bounded by low density rural residential and forest lands to the north. State Route 2 is the main east-west thoroughfare and is the core of the City's commercial district.

1.5 SYSTEM BACKGROUND

1.5.1 History

From approximately the years 1910 to 1970, the City used a surface water source and piped water from an intake structure located at Olney Falls to the distribution system feeding the City. In 1970, a new water system was installed to replace the earlier inadequate system. The new system changed the water supply from a surface source to a groundwater source with the installation of three wells in 1970. Included in the improvements was the construction of a 250,000-gallon wood storage tank and distribution network. Until the year 1983, the water system was owned and operated by the Gold Bar Water Association, Inc. The City of Gold Bar purchased the system in 1983 and has owned and operated the system ever since.

The City's population has increased steadily from the mid-70's through the 1990's. The 2010 census established the population at 2,075. As commercial growth and activities increased, so did the demand for more water storage, especially for fire protection purposes. In 1979, an additional 100,000-gallon storage tank was constructed adjacent to the existing storage facility, and in 1992 an additional 250,000 gallon steel reservoir was constructed at the same site.

Well 4 was constructed in 1995 to serve as the primary source. Several water main replacement and upgrade projects have been completed since then.

Since the last Water System Plan was approved in 2001, the following significant projects and events have transpired:

- An emergency power generator was installed for Well 3 in 2005
- An 8" ductile iron (DI) water main installed in May Creek Road in 2006
- New pipes (8" distributions and 10" transmission) were installed across May Creek as part of Snohomish County's bridge replacement on First Street.
- A 300,000 gallon concrete storage tank, booster pump station, emergency generator and SCADA system were installed in 2011, and the 250,000 gallon wood-stave tank was taken off-line
- Well 4 was rehabilitated and a new pump installed in 2013

1.5.2 Geography

As discussed above and indicated on Figure 1-1, the Gold Bar water system is located along US 2, between the cities of Monroe and Startup, in Snohomish County. The service area is north of the Skykomish River and includes the city of Gold Bar along US 2 and low density rural residential and forest lands to the north.

1.5.3 Adjacent Purveyors

Snohomish County PUD operates the May Creek Estates water system, which serves the eastern portion of the City of Gold Bar and additional customers directly east of the city limits. The PUD's May Creek Estates system serves approximately 400 service connections, 125 of which are within the City of Gold Bar. Service to these customers is authorized by the Settlement and Release Agreement dated June 118, 2001 and expiring January 1. 2020, a copy of which is included in Appendix J. The May Creek Water System operates under DOH water system identification number 52105.

An intertie between Gold Bar and the PUD is located on May Creek Road and provides a backup supply to the Gold Bar system in the event of an emergency or operational issue. The terms of the intertie agreement are put forth in the copy of the agreement contained in Appendix K.

The Startup Water District is located approximately two miles west of the City of Gold Bar and operates under DOH water system identification number 83850 The Startup system consists of roughly 250 connections with three groundwater sources supplying domestic and fire suppression to the system.

1.6 INVENTORY OF EXISTING FACILITIES

Existing facilities are listed below. A more detailed inventory and evaluation is presented in Chapter 3.

1.6.1 Sources

The Gold Bar water system relies on groundwater for its primary water supply and maintains four City owned wells. Wells 1, 2 and 3 (DOH S01, S02 and S03) constitute a wellfield although Well 3 is the only producing well on that site with a maximum capacity of 200 gpm. Well 3 is currently operated 175 gpm. Well 4 (DOH S04) is capable of

producing approximately 400 gpm, but is currently operated at 200 gpm. Both wells pump simultaneously through a dedicated transmission main to the 430 Zone tank site. Simultaneous pumping of the two wells is done to improve water quality by blending the water from the two wells, which draw out of different aquifers. The only treatment required is chlorination which is achieved by sodium hypochlorite injection at each wellhead.

1.6.2 Distribution System

The distribution system consists of nearly ten miles (approximately 51,000 lineal feet) of pipe ranging from 4-inch to 12-inch diameter. Pipe material is predominantly asbestos cement (AC) and poly vinyl chloride (PVC). Portions of the system have been in place for 40 years and are reaching the end of their useful service life.

1.6.3 Storage

Three reservoirs provide a combined total of approximately 700,000 gallons of effective storage. A 300,000 gallon reservoir and booster pump station was constructed on the Well 4 site in 2011 to replace an aging wood stave tank and increase reliability.

1.6.4 Service Connections

Table 1-1: 2013 Service Connection Summary

Classification	Service Connections[1]	Total ERUs
Residential	645	645
Commercial / Multi-Family	21	108
Mobile Home Park (106 units)	1	78
Totals:	667	831

[1]Service connections based on city billing records for December 2013

Table 1-2: Future – Full Build-Out of Service Area *(Estimated)*

Classification	Potential Service Connections	Total ERUs
Residential	1003	1003
Commercial / Multi-Family	45	233
Mobile Home Park	2	150
Totals:	1050	1386

Full build-out estimates are based on maximum capacity of existing lots current land use designations within the current Retail Water Service Area. Chapter 2 provides additional detail regarding demographics and projections.

1.6.5 Interties

There is one existing, manually operated emergency intertie with Snohomish County PUD No.1. The PUD system operates at a higher hydraulic grade than the 340 Zone it supplies, allowing for water supply without the need for pumping. Maximum flow through the intertie is limited to 300 gpm under terms of the contract. The intertie was last utilized in 2013 to allow for rehabilitation of Well 4.

1.7 RELATED PLANS

The City of Gold Bar's Comprehensive Plan was adopted in January 2005 and amended in 2009. This Water System Plan is consistent with both the original Gold Bar Comprehensive Plan and the 2009 amendments. Consistency with the City's Land Use Plan and policies is demonstrated on the consistency statement included in Appendix T.

Other related plans include the "Snohomish County Comprehensive Plan" which was adopted by the County in 2005 and the "Snohomish County Tomorrow – Countywide Planning Policies" plan which was last updated in 2008. The later of these two plans addresses the key elements of the Growth Management Act requirements and provides a basis for the City's planning responsibilities. A statement confirming consistency with Snohomish County land use planning is **(will be)** provided in Appendix __.

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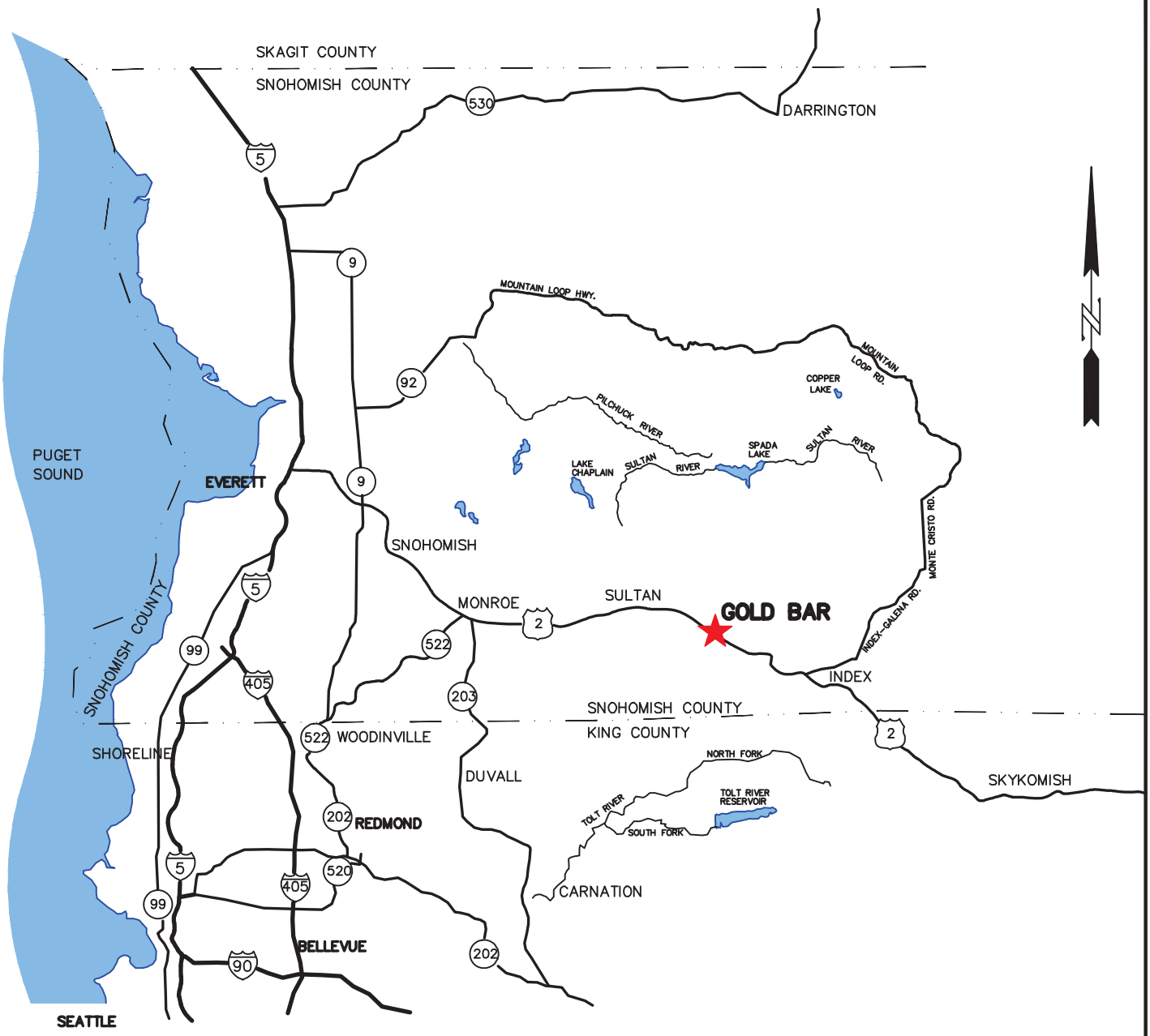

VICINITY MAP

NOT TO SCALE

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CITY OF GOLD BAR
FIGURE 1-1
VICINITY MAP

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CITY OF GOLD BAR
2014 WATER SYSTEM PLAN

Skykomish Hatchery
Wallace River

Wallace River

Skykomish River

144TH ST
145TH ST
150TH ST
MAY CREEK ROAD
164TH ST
156TH ST
169TH ST
REITER ROAD
GUNN ROAD
DORMAN ROAD
REINER ROAD
VERLINDI DR
OLNEY ST
SMELTZER ROAD
ASHGROVE
GRAND
CROFT ST
1ST ST
2ND ST
3RD ST
LEWIS AVE
4TH ST
5TH ST
6TH ST
7TH ST
8TH ST
9TH ST
10TH ST
ORCHARD AVE
LINDA AVE
TIMBER LANE
13TH ST
LARSON ROAD
LARSON DR
AJER DR
GOLD BAR BLVD
GOLD BAR DR
NELSON PL
MOUNTAIN VIEW PL
MAY CREEK DR
391ST ST
395TH AVE
399TH AVE
387TH AVE
MAPLE ST
405TH DR
408TH AVE
415TH AVE
419TH AVE
423RD AVE
424TH AVE
424TH DR
427TH AVE
429TH AVE

2

N

0 700 1,400 2,800
SCALE IN FEET

LEGEND

- Gold Bar Area Currently Served
- Gold Bar Retail Service Area
- City Limits
- Urban Growth Area (UGA)
- May Creek Water System
- City Hall

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FIGURE 1-2
WATER SERVICE AREA MAP

J:\Municipalities\GoldBar\ArcMap\Doc\Figures\1-2_WaterServiceAreaMap.mxd

1.8 EXISTING AND FUTURE SERVICE AREA

Figure 1-2 shows the City of Gold Bar's current Retail Service Areas as agreed upon through the Coordinated Water System Plan process and between the City and Snohomish County PUD for the area currently served by the PUD within the City limits. Copies of interlocal agreements pertaining to service area are provided in Appendix J. The only anticipated potential changes to the Retail Service area are associated with expiration of the agreement for PUD within the City limits and expiration of the interlocal agreement for that area in 2020. Negotiations regarding future service to that area are expected in the next two years. Foreseeable growth within the Retail Service area is limited to in-fill development of current lots under existing zoning. The potential for rezone and additional plats has not been specifically addressed and there are no significant developments of this nature known at this time.

1.9 SERVICE AREA POLICIES

A summary of the Gold Bar water service policies is given below.

Annexation – The City does not currently require annexation in order to obtain water service but there is a surcharge rate for customers outside the City limits. Consideration may be given to a future policy that requires a no-protest agreement to future annexation when water service is extended outside the City limits.

Surcharge for Outside Customers – Water rates for customers outside the City's corporate limits include a surcharge. The surcharge is intended to cover the additional expense associated with system maintenance outside the corporate limits and also compensate for the general tax revenue paid by City customers.

Wholesaling Water – The City will wholesale water to the May Creek Estates system within the terms of the intertie agreement.

Wheeling Water – The City does not currently wheel water through its distribution system. Future opportunities will be evaluated at the time of request.

Direct Connection - All new developments within the Gold Bar service area must be connected to the City system. The City will defer management of systems outside the service area to the Snohomish County P.U.D.

Satellite Systems – Satellite service is not contemplated at this time. Future requests for satellite service will be considered on a case by case basis as requested but at this time, the City defers management of systems outside the service area to the Snohomish County PUD.

Emergency Assistance - Currently, the City has an emergency maintenance and repair agreement with the Startup Water District.

Design and Performance Standards – The City has established developer extension standards in place.

Oversizing – The City will consider participation in the cost of oversizing new developer-installed facilities when necessary for benefit to the existing system or future CIP projects.

Extensions – The City will extend service to existing residences if so requested and the benefiting customers can finance the extension in accordance with the City's developer extension requirements or a local improvement district.

Formation of Local Improvement Districts Outside Legal Boundaries – The City will allow LID's outside the corporate limits on a case by case basis.

Latecomer Agreements – The City will allow latecomer agreements if the City is adequately compensated for administering the agreement and collecting the regulations.

Cross Connection Control – The City requires all customers to comply with the established Cross Connection Control Ordinance.

1.10 SATELLITE MANAGEMENT AGENCIES

As noted above the City of Gold Bar does not intend to become a DOH-approved satellite management agency (SMA) and currently recognizes Snohomish County PUD is the designated SMA in the area. Requests for satellite management of systems that may ultimately become part of the Gold Bar water system will be considered on a case by case basis. In past years, the City has considered operating the Startup Water District. The only step taken in this direction has been an emergency maintenance and repair agreement with Startup.

1.11 CONDITIONS OF SERVICE

Before connecting to the system, customers are required to complete and sign a water service application form. The form specifies customer responsibilities with the following paragraph:

> *"Applicant shall agree to comply with all provisions, rules and regulations of the City now existing or which may be established from time to time. The applicant shall further agree, as a condition precedent to receiving water service that the City shall have the right at any time without notice to shut off or turn on water supply for repairs or testing. Applicant agrees that there shall be no fences, sheds, planters, etc. built or placed within two (2) feet of said water meter service box. (Ord. 385)"*

It is City policy to provide water service in compliance with Washington State drinking water regulations (WAC 246-290). The City's primary obligation under these requirements are as follows:

- Provide a minimum of 30 pounds per square inch (psi) service pressure at the water main tap during peak hour demand conditions except during emergency situations.
- Provide water meeting federal and state health standards.
- Ensure the City system is adequately protected against cross connections.

These obligations are detailed further in Chapter 3.

1.12 COMPLAINTS

Customer complaints are first directed to the system operator. If customer service has been interrupted or restricted, the condition is corrected promptly by the operator. If the complaint is a level of service issue, i.e., low pressures during peak usage, the operator advises the customer of the cause of the condition, what corrective measures are being taken, and what the customer can do to lessen the impact of the condition. Additional information is provided in thee Operations and Maintenance chapter of this Plan.

CHAPTER 2:
BASIC PLANNING DATA & WATER DEMAND FORECASTING

An integral part of any Water System Plan is projecting future needs of the community and evaluating the system's ability to meet those needs. Part of the water system planning process is developing assumptions regarding the timing of development so that water system upgrades can be appropriately planned for, constructed, and funded.

This chapter summarizes zoning, land use, population, and household and employment data used to project future needs for the City's water system. Historical water purchase and sales data are used to develop the value of an Equivalent Residential Unit (ERU). This data is then used to convert the household projections into projected average and maximum day future demands. The future water demands are used to establish criteria for the hydraulic analysis of the water system and for development of the recommended Capital Improvement Program.

2.1 CURRENT POPULATION AND SERVICE CONNECTIONS

Service population and connection data for the City of Gold Bar are summarized in Table 2-1.

Table 2-1: 2013 Service Populations & Connections

	In-City Customers	Outside-City Customers	In-City PUD Customers	Water System Total
Population	2,200	165	280	2,085
Residential Connections	580	65	126	645
Multi-Family and Mobile Home	4	0		4 (139 units)
Commercial Connections	18	0		18
Gold Bar Total Connections	602	65		667

Population based on 2010 Census number with an estimated 2.0% annual growth rate.

2.2 HISTORICAL WATER USAGE

In recent years, Gold Bar has utilized Well 3 and Well 4 as its primary sources. Table 2-2 summarizes the annual production for each well and the water purchased through the PUD intertie.

2.2.1 Water Use Data Collection

Historical water production and sales is recorded by daily source meter readings and monthly service meter readings for all metered connections within the service area.

Table 2-2: Historical Water Usage

	2008	2009	2010	2011	2012	2013
Annual Production						
Well 3 (MG)	24.84	28.77	25.47	21.84	24.98	24.96
Well 4 (MG)	55.07	57.13	56.33	46.67	34.36	23.22
PUD Intertie (MG)		2,970				10.33
Annual Total (MG)	79.90	85.90	81.80	68.50	59.34	58.51
Avg. Daily Production (GPD)	218,318	234,688	223,508	187,166	162,122	160,307

Table 2-2: Historical Water Usage						
	2008	**2009**	**2010**	**2011**	**2012**	**2013**
Max Month Production (MG)	11.17	10.13	8.74	7.24	7.94	7.56
Max Month	June	July	August	March	August	July
Max Day Production (GPD)	491,120	554,410	575,000	519,000	522,590	456,321
Date	9/9	1/21	7/9	3/17	7/31	Estimated
MDD:ADD Factor	2.25	2.36	2.57	2.77	3.22	2.85
Metered Consumption (gallons)	52,260,231	64,135,623	53,131,142	49,327,333	48,736,281	51,793,013
Hydrant Uses (gallons)			400,000	1,172,875	325,000	
Breaks/Repairs (gallons)			261,644	164,000	6,000	
Distribution System Leakage (gallons)	27,644,250	21,760,087	28,011,144	17,838,442	10,269,189	6,719,216
Distribution System Leakage Percent	34.6%	25.3%	34.2%	26.0%	17.3%	11.5%

2.3 EQUIVALENT RESIDENTIAL UNITS (ERUS)

A summary of customer usage based on City meter records is shown in Table 2-3. The current (2013) factor for non-residential connections is 8.5 ERU's per connection.

Table 2-3: 2013 ERU Analysis		
	Metered Consumption (w/o losses)	**Production Volumes (with losses)**
Residential		
Connections	645	645
Annual Volume (gallons)	39,904,611	45,081,520
Avg. Daily Volume (GPD)	109,328	123,511
Avg. Unit Volume (GPD/Connection)	169	191
Total Residential ERU's	645	645
Non-Residential		
Connections	22	22
Annual Volume (gallons)	11,448,665	12,933,924
Avg. Daily Volume (GPD)	31,366	35,435
Avg. Unit Volume (GPD/Connection)	1,426	1,611
Total Non-Residential ERU's	186	186
Non-residential ERU Factor	8.4	8.4
TOTAL SYSTEM ERU'S	831	831
City Water Use (gallons)	439,737	496,785
Losses (gallons)		6,719,216
Total Volume (gallons)	51,793,013	58,512,229
Total System ADD/ERU (GPD/ERU)	171	193

2.4 PROJECTED LAND USE

The City of Gold Bar Retail Water Area includes the City of Gold Bar and its UGAQ, as well as the unincorporated rural area to the north. As such, both the City and Snohomish County land use plans are important to this water system planning process. Both agencies have completed land use plans in

accordance with the Washington State Growth Management Act. Figure 2-1 shows the City's current land use designations and urban growth boundary.

2.4.1 Existing Land Use

The Snohomish County Gold Bar Subarea Plan prepared by the Snohomish County Planning Department provides an accurate summary of existing land use in the rural, unincorporated area in the northern portion of the Retail Water Service Area and surrounding properties. .

The City of Gold Bar, as it currently exists in the central core of the UGA, is best described as a small residential town or city, Single family residential accounts for two-thirds of the land use. There is a significant amount of mobile homes: comprising 40-50% of all residential land uses in the City. Approximately half of the mobile home parks are located to the east and west of the downtown area and the other half are located on single family lots throughout the service area. Most of the commercial activity and land use occurs on land adjacent to, and is located on land oriented to SR 2. The average overall density of the existing residential portions of the City is 3 dwelling units per net acre. The City maintains two parks; one located on BNSF railroad right-of-way south of SR 2, and Gateway Park located across the street from City Hall east of Orchard Avenue.

2.4.2 Future Land Use

Within the City's corporate limits, land use is expected to remain as shown in Figure 2-1. Further development of the SR 2 commercial core is anticipated but for the most part, the area within the corporate limits will be predominantly residential.

Figure 2-1 also shows Snohomish County land use designations for areas outside the corporate limits. May Creek Estates and the Back of the Moon plat east of the City limits are identified as Urban Low Density Residential which is equivalent to the City's residential zoning. Areas outside the UGA are identified as Rural Residential, with a density of one dwelling unit per five acres. Land between SR 2 and the Skykomish River is a mix of Rural Residential, Park, and Riverway agriculture. A sanitary sewer treatment facility is a long-term consideration for this area. Future industrial and commercial growth will likely continue to front SR 2.

2.5 PROJECTED POPULATION

Using historical data and the following assumptions, Figure 2-2 projections were developed.

- The 2013 population is estimated to be 2,200 within the City, and 2,085 currently served by the water system. Approximately 280 residents within the City Limits are within the May Creek Water System service area, and an additional 165 persons are served outside the corporate city limits. See Table 2-1 for a summary of population and connections.
- A 2.0% percent annual population growth is assumed for population and water demand projections.

2.5.1 Future Land Use

Within the City's corporate limits, it is likely land use will remain as shown in Figure 2-1. Further development of the SR 2 commercial core can be expected, but for the most part, the corporate limits will be predominantly residential.

Figure 2-1 also shows Snohomish County land use designations for areas outside the corporate limits. May Creek Estates and the Back of the Moon plat are identified as Urban Low Density Residential which is equivalent to the City's residential zoning. Areas outside the urban growth

boundary are identified as Rural Residential, with a density of one dwelling unit per five acres. Land between SR 2 and the Skykomish River is a mix of Rural Residential, Park, and Riverway agriculture. A sanitary sewer treatment facility is a long-term consideration for this area. Future industrial and commercial growth will likely continue to front SR 2.

2.6 PROJECTED POPULATION

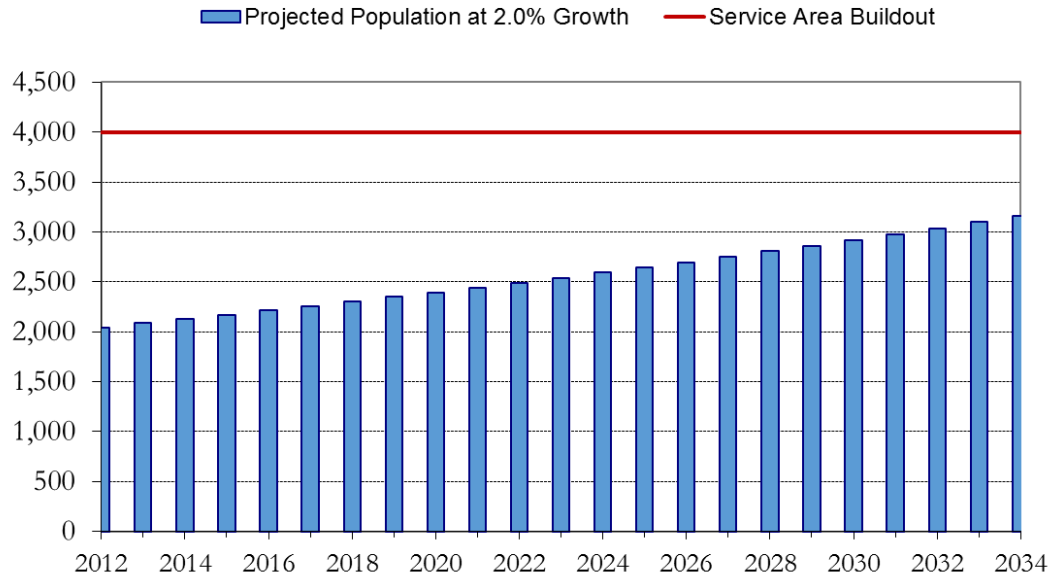
Using historical data and the following assumptions, Figure 2-2 projections were developed.

- The 2010 service area population was approximately 1,965. This is based on a corporate limits population of 2,075 and an additional 165 persons served outside the corporate limits. 2013 population is estimated to be 2,200 within the City, and 2,085 currently served by the water system. Approximately 280 residents within the City Limits are within the May Creek Water System service area. See Table 2-1 for a summary of population and connections.
- A 2.0% percent annual population growth will be used for projections.

2.6.1 Service Area Full Build-out

Based on City and County land use designations, the estimated service area full build-out population is 4,000. As shown in Table 2-2, the service population is not projected to exceed 4,000 within the 20-year planning period.

Figure 2-2: Service Area Population Projections



2.7 NON-REVENUE WATER

As shown in Table 2-2, non-revenue water usage and Distribution System Leakage exceeded 25% prior to 2011. Unaccounted for water included system wide water main flushing, fire department usage, broken water mains, and leaks that had not been found are considered the primary causes of the loss.

In 2011, the City inspected system facilities, and conducted a leak detection effort with the assistance of Evergreen Rural Water Association. As a result, two significant water main leaks were discovered and repaired. In addition, approximately 650 feet of old 6-inch AC water main on SR 2 was replaced

as part of the new booster pump station project, and the deteriorating wood stave tank was disconnected from the system. In 2011 the City also started a program of replacing older service meters at a rate of 50 per year in an attempt to capture lost consumption due to the low-reading meters. With those repairs and improvements, the calculated amount of unaccounted water decreased to an annual average of 17% in 2012, and 11.5% in 2013. It is anticipated that unaccounted water will decrease to less than 10% in 2014.

The following efforts will be implemented to further reduce unaccounted water:

1. Inspections and leak detection efforts will continue in an effort to locate and repair leaks.
2. The water main replacement program is schedule to begin in 2016, and will focus on replacing the oldest AC water mains in the system.

Additional information and detail on the City's Water Use Efficiency program is provided in Chapter 4.

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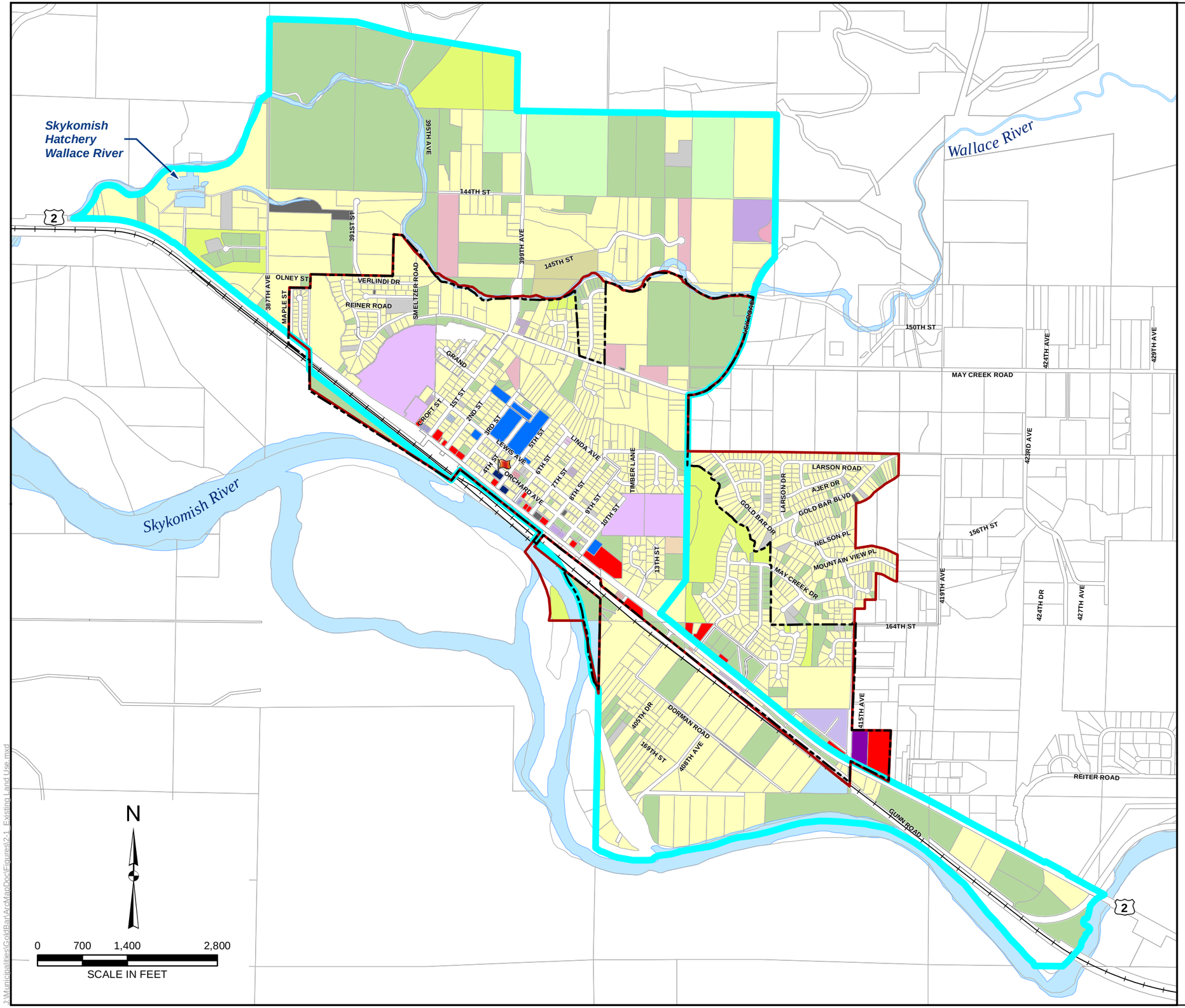
CITY OF GOLD BAR
2014 WATER SYSTEM PLAN



LEGEND

- Gold Bar Retail Service Area
- City Limits
- 1995 Urban Growth Area (UGA)
- City Hall
- Extensive Commercial
- Retail Commercial
- MFR (4+ du)
- SFR & Duplex
- Govt/Educ
- Institutional
- Manufactoring
- Mobile Home Park
- Util/Trans/Comm/Mineral
- Agriculture
- Common Area
- Undeveloped
- Other
- Water Area

PACE
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FIGURE 2-1
EXISTING LAND USE

J:\Municipalities\GoldBar\ArcMapDoc\Figures\2-1_Existing Land Use.mxd

2.8 WATER DEMAND FORECASTING

Water demand projections, based on the population and usage data described above, are shown in Figures 2-3 and 2-4. The three demand projections in these figures, Average day, Maximum Day, and Peak Hour Demand, are defined as follows:

Average Daily Demand (ADD): Total annual volume divided by 365 days per year. Actual usage varies considerably about this average due to seasonal and diurnal patterns. Gold Bar ADD was based on the ERU usage data of Section 2.3. An example calculation for 2013 is shown below.

2013 Total Annual Production Volume = 58.5 MG

$$\text{2013 ADD} = \frac{58.5x10^6\ gal/yr}{366 days} = 160{,}274 \text{ gpd}$$

Maximum Day Demand (MDD): Highest total volume of water used during a calendar day. Historical data has been used to find the MDD from 2008 to 2013 for this plan, which resulted in a MDD of 575,000 GPD, experienced in 2010. However, 2010 experienced a very high Unaccounted Water Rate of 34%, which is not representative of the current system efficiencies since recent improvements have been completed. The 10-year trailing average of Peak Day to Average Day production volumes results in a peaking factor of 2.85. This more accurately reflects the system peaking factor, and will be used as the basis for demand projections.

Peak Hour Demand (PHD): Highest flow recorded within one hour. Frequently PHD will occur during the maximum day, but not in all cases. A large industrial user can increase short-term demand to peak hour levels while the overall day's use is still near the average.

Peak hour demand is calculated as a function of MDD when historical hourly data is not available. The DOH Water System Design Manual provides the following method for calculating PHD based on ERUs:

Equation 5-1:

PHD = (MDD/1440) [(C)(N) + F] + 18

Where N = Number of ERUs = 831

C = 1.6

F = 225

2013 PHD = (550.0/1440) [(1.6)(831) + 225] + 18 = 611.8 gpm

The projections shown in Figures 2-3 and 2-4 indicate the City has adequate water rights to serve the RSA through the 20-year planning period. Further discussion on water rights is presented in Chapter 4.

Figure 2-3: Daily Demand Projections

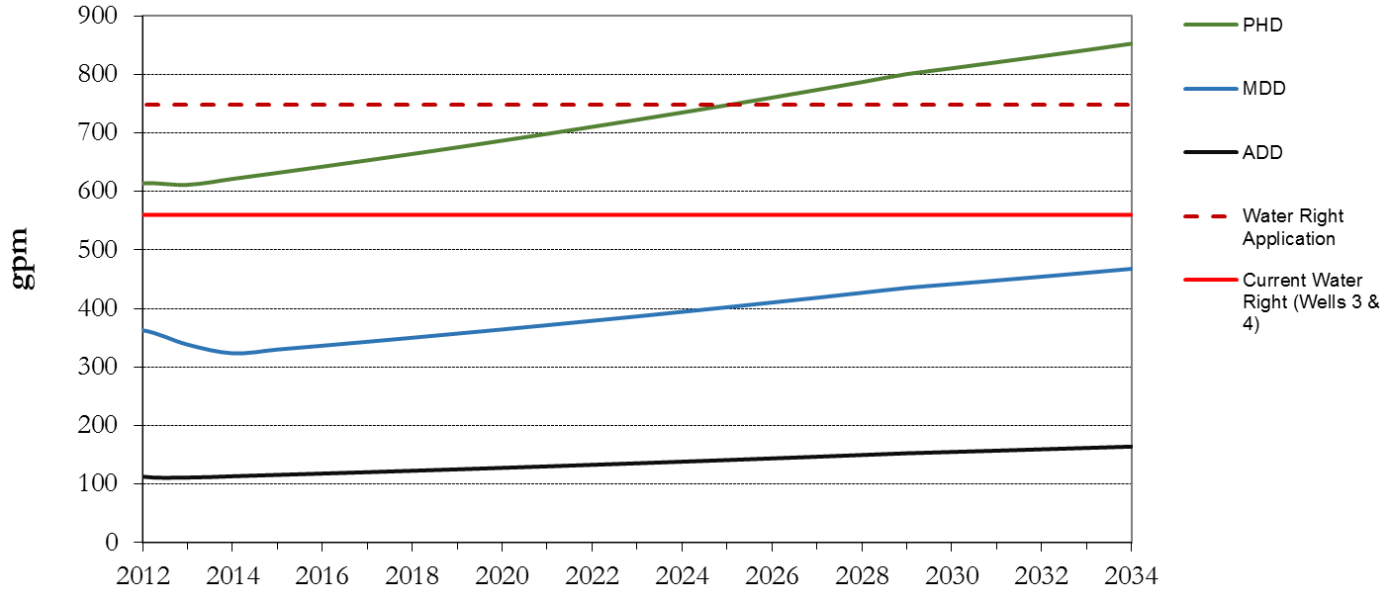
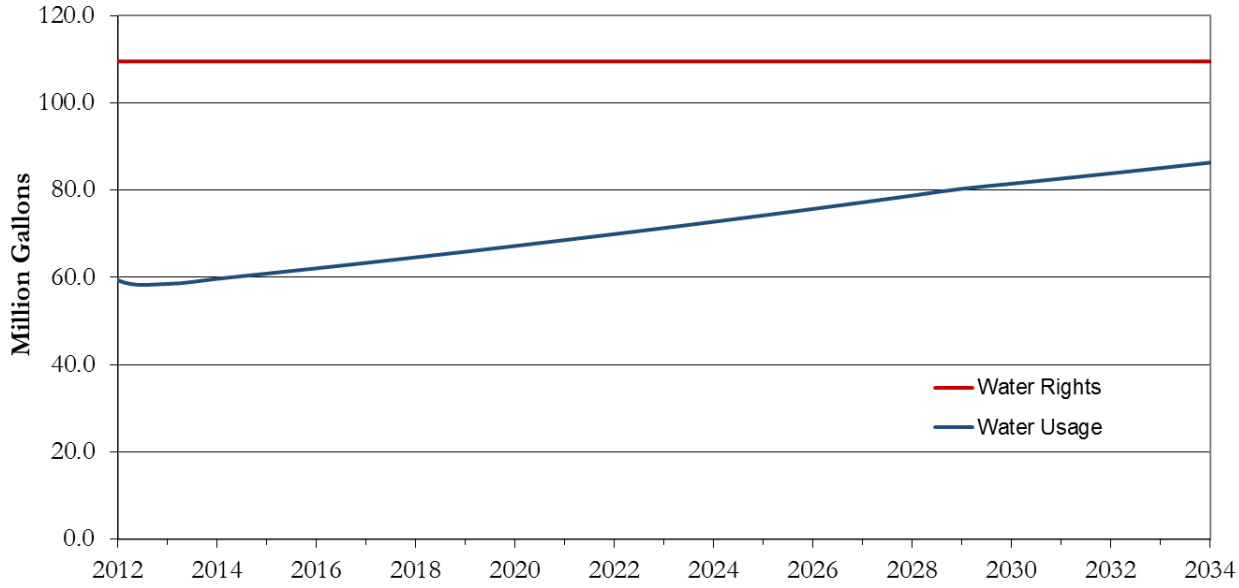


Figure 2-4: Annual Water Use Projection



CHAPTER 3:
SYSTEM ANALYSIS

The objective of this chapter is to determine if the existing Gold Bar water system is capable of supplying the demands projected in Chapter 2 at adequate pressures and flows. Spreadsheets demonstrating source and storage capacity analyses are presented in Appendix M.

3.1 SYSTEM DESIGN AND SERVICE STANDARDS

The Department of Health regulations for Group A Public Water systems (WAC 246-290) are the accepted standards for the Gold Bar water system. Specific service standards for the system are as follows:

Water Quality Parameters: Water quality is to be monitored in accordance with the requirements of WAC 246-290. Monitoring requirements include bacteriological, inorganic chemical and physical characteristics, radionuclides, volatile organic chemicals (VOC'S), and synthetic organic chemicals (SOC'S) unless DOH waivers are issued.

Average and Maximum Daily Demands: Source (well) capacity will be provided to ensure that average day and maximum day demands are met.

Peak Hour Demand: Sufficient equalizing storage or pump capacity will be provided to supply peak hour demands.

Storage Requirements: System storage shall be provided as follows:

Standby Storage: Volume equivalent to twice the average day demand at an elevation providing 20 psi minimum service pressure under peak hour demand conditions. Reductions in standby storage will be allowed in accordance with DOH guidelines.

Fire Storage: Volume providing the required fire flow rate and duration at an elevation providing 20 psi minimum service pressure at maximum day demand conditions.

Equalizing Storage: Volume provided to compensate for peak hour demand exceeding pumping capacity. In accordance with DOH guidelines, equalizing storage must provide 150 minutes of peak hour demand exceeding available source.

Consolidation of Fire and Standby Storage: The smaller of standby and fire storage can be deleted conditional on each component providing the required service pressure. The bottom of the fire storage component must be above the 20 psi pressure elevation under peak hour demand conditions. The bottom of the standby storage component must be above the 30 psi pressure elevation. (See Appendix I for Snohomish County Fire District approval.)

Fire flow Rate and Duration: In accordance with Snohomish County Fire District No. 26, recommended fire flow for residential areas is 1,000 gallons per minute (gpm) with adequate storage for a two-hour duration. Commercial and light industrial areas should be provided with 1,500 gpm for a two hour duration.

Minimum System Pressure: A minimum service pressure of 30 psi will be provided at the customer's meter under peak hour demand conditions.

Minimum Pipe Sizes: Minimum diameter of all distribution mains shall be eight inches unless justified by hydraulic analysis. Installation of standard fire hydrants is prohibited on mains less than 6 inches in diameter.

Backup Power Requirements: Historical records show the Snohomish County PUD power supply meets the DOH reliability criteria. However, emergency power generators have been installed for both primary sources and the booster pump station. Standby storage and water conservation measures will be utilized during any other source interruptions.

Valve and Hydrant Spacing: Valves shall be spaced at a maximum of 600 feet on straight runs. All new tees and crosses shall have valves on all but one branch at the fitting. Hydrants shall be located within 350 feet of any occupied structure and at a minimum of 600 foot spacings on mains fronting residential properties.

3.2 WATER QUALITY ANALYSIS

Both well sources meet all current water quality standards. As is typical for shallow gravel aquifers, Well 3 is a soft water with non-detectable arsenic and radionuclide levels. Well 3 is more vulnerable to surface contamination and is therefore monitored for volatile organics, synthetic organics and pesticides. These compounds have not been detected to date.

Well 4 draws from a deeper, solid rock aquifer and produces a hard water. Radionuclides are detectable but considerably below the maximum contaminant levels (MCL's). Due to the depth of Well 4, volatile organics, synthetic organics and pesticide monitoring requirements have been waived. A contaminant of concern at Well 4 is arsenic which has been measured at a levels of 0.010 milligrams/liter (mg/l), near the state MCL of 0.010 mg/l.

The City continues to operate the system by blending Well 4 water with Well 3 water via a dedicated transmission main to the 430 zone reservoirs. Samples of the blended water are taken quarterly to verify that the concentration of the blended water is below the state MCL. Recent water quality test results are included in Appendix E, and demonstrate that the blended water delivered to customers has consistently been below the MCL.

Due to the presence of asbestos cement pipe in the distribution system, Gold Bar is required to sample for asbestos fibers. Results to date have been below the MCL. Coliform samples are collected monthly in accordance with DOH standards. There are no recurring coliform violations on record.

3.3 SYSTEM DESCRIPTION AND ANALYSIS

The Gold Bar water system components are shown in Figure 3-1 and described below. Deficiencies and life expectancies are noted.

3.3.1 Sources

Gold Bar Wells 1, 2 and 3 are considered a well field and are located near the intersection of Ley Road and First Street. The newest source is Well No. 4, located at the east edge of the city limits. Summaries of each source are given in Table 3-1. Photographs of the well sites are provided in Figures 3-2, 3-3, and 3-4.

NOTE: This is a reduced size .pdf for review purposes.
The actual size is 24 by 36.

CITY OF GOLD BAR
2014 WATER SYSTEM PLAN

TANK SITE EASEMENT
OVERFLOW ELEV. 430'

300,000 GAL STEEL

100,000 GAL STEEL
ABANDONED
250,000 GAL WOOD

WELL #1
WELL #2
WELL #3

TANK 3
300,000 GAL CONC.
OVERFLOW ELEV 225'

WELL 4
& BPS

SAMPLE STATION

EMERGENCY
P.U.D. INTERTIE

May Creek

Wallace River

Skykomish River

N

0 400 800 1,600
SCALE IN FEET

LEGEND

- Gold Bar Retail Service Area
- City Limits
- Urban Growth Area
- May Creek Water System
- PUD No. 1 Service Area
- Air Vac
- Blow-off
- Booster Pump Station
- Intertie
- PRV
- Reducer
- Sample Station
- Water Valve
- Well
- Hydrants

Water Mains

- Distribution
- Transmission

Pressure Zones

- Zone 430
- Zone 340

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FIGURE 3-1
WATER SYSTEM SCHEMATIC

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Table 3-1: System Sources				
	Well 1	**Well 2**	**Well 3**	**Well 4**
Date Drilled	1970	1970	1970	1993
Depth of Completed Well	+/- 20 ft.	+/-20 ft.	+/- 20 ft.	720 ft.
Depth of Drilled Hole	61 ft.	361 ft.	25 ft.	720 ft.
Casing Diameter	10 in.	8 in.	10 in.	12/10/8 in.
Depth to Water Surface	13 ft.	10 ft.	10 ft.	+60 ft. (artesian)
Tested Capacity & Drawdown	100 gpm/2 ft.	110 gpm/4.8 ft.	195 gpm	410 gpm/0 ft.
Installed Pump	10 hp	7.5 hp	20 hp	75 hp
Operating Point	80 gpm	20 gpm	175 gpm	200 gpm

Figure 3-2: Well Field

Well 2 (Background) & Well 3 (Foreground)

Figure 3-3: Well 1

Figure 3-4: Well 4

General Condition: Concerns regarding capacity and surface water influence prompted the City to take Well 1 off-line in the late 1980s. Well 2 is off-line due to severe sand intake. After the well was drilled in 1970, the casing filled with sand to the extent the well was inoperable. Properly abandoning these wells should be examined as a possible non-CIP project in the future.

Well 3 is the remaining operable well field source. The City operates Well 3 in conjunction with Well 4 to improve water quality by blending the water from the two wells, which draw out of different aquifers.

Well 4 is the City's newest source and draws from a deeper aquifer distinct from the primary well field. The aquifer is artesian with a shut-in pressure of 18 psi at the wellhead. As noted, arsenic is present, which necessitates blending with Well 3. Backup power generators are installed at both Well 3 and Well 4 to provide for continued operation during a power outage.

During the summer of 2013, Well 4 was rehabilitated and a new pump and motor was installed. The new pump is the same model as the original and operates at 200 gpm.

Water Treatment: Disinfection is provided by liquid hypochlorite solution injected at Wells 3 and 4. Injection rate is monitored to provide a residual not less than 0.2 mg/l in the transmission main prior to cross over to the distribution main.

Surface Water Influences: The Wellhead Protection Study completed by GeoEngineers in 1997, described Wells 1, 2 and 3 as "completed in a shallow unconfined sand and gravel aquifer that is in direct hydraulic continuity with nearby surface water." However, the wells are greater than 200 feet from surface waters and therefore do not meet the DOH criteria for designation of groundwater under the influence of surface water (GUI).

A 1995 report for Well 4, also by GeoEngineers, states the "well is completed in a deep, highly confined sand and gravel aquifer that is not in direct hydraulic continuity with surface water in the immediate vicinity."

If DOH expands its criteria, it is likely the Gold Bar well field will be classified as a GUI. Additional monitoring of the well field would be required to confirm the hydraulic connectivity. If confirmed, the well field would require treatment in accordance with the Federal Surface Water Treatment Rule, which seeks to prevent waterborne diseases caused by viruses, Legionella, and Giardia lamblia. The rule requires that water systems filter and disinfect water from surface water sources to reduce the occurrence of unsafe levels of these microbes

3.3.2 Storage

Storage in the Gold Bar system is provided by two reservoirs located at the north end of the system and a third reservoir located at the Well 4 site. Dimensions and volumes are summarized in Table 3-2. Figures 3-5 and 3-6 are photographs of the reservoirs.

Table 3-2: Existing Storage Facilities						
No.	**Material / Year Constructed**	**Dimensions**	**Base Elev.**	**Overflow Elev.[2]**	**Volume to Overflow (Gal.)**	**Operating Volume[1]**
1	Steel – 1979	27' dia. x 32' ht.	403.5	430.0	113,500	36,000
2	Steel – 1992	48' dia. x 24' ht.	408.4	430.0	292,377	113,702
3	Concrete – 2012	50' dia. x 20' ht.	205	225.0	300,000	113,830
				Total	**705,877**	**263,532**

Notes:

[1] Volume available for domestic Equalizing and Operating.

[2] Reservoir 1 has the lowest overflow and controls the start/stop signal for Wells 3 and 4.

Reservoir 1 is constructed at a lower elevation than adjacent Reservoir 2. As a result, the overflow at Reservoir 1 is the hydraulic grade limit for the system under normal operation. The Well 4 pump controls are also located in Reservoir 1, making it the critical system component with respect to day to day operations. Draining or maintenance on Reservoir 1 is difficult under this scenario.

Figure 3-5: Existing 430 Zone Reservoir Site

Figure 3-6: 300,000 Gallon Concrete Reservoir

Water system storage consists of four components – standby, fire suppression, equalizing and operational. Descriptions and requirements for each of these components are presented below. Graphical representations of the components for both the existing reservoir conditions and the conditions after the wood-stave reservoir is taken out of service can be found in Figure 3-7, Storage Projections, and the Hydraulic Profile in Figure 3-8.

Standby Storage: During a power outage or mechanical failure of the source pumps, standby storage is relied upon to supply a water system. DOH guidelines recommend standby storage be equivalent to two times average day demand. If a system has multiple sources or an intertie to another system, the standby storage requirement can be reduced by the daily pumping capacity of the smallest source. At a minimum, 200 gallons per connection of standby storage is required.

Fire Suppression Storage: Fire suppression storage requirements are dependent on land use and the local fire authority. To be effective, fire storage must be supported by adequately sized distribution piping and standard fire hydrants. Snohomish County Fire District No. 26 has indicated that a 1500 gpm fire flow for a two hour duration is recommended for the commercial areas. This equates to a fire suppression storage requirement of 180,000 gallons.

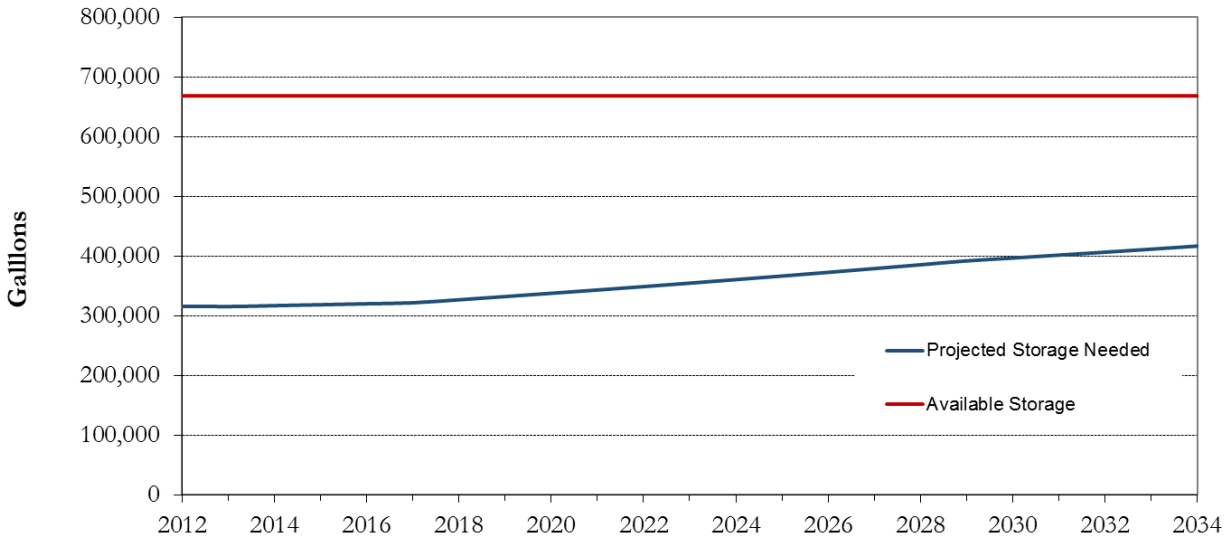
Equalizing Storage: Equalizing storage is provided for use when the system peak hour demands exceed the source capacity.

Operational Storage: A nominal amount of storage serves as the "off" and "on" control for source pumps. For planning purposes, the upper two feet of the reservoirs can be considered as operational storage.

Consolidation of Fire and Standby Storage: The smaller of standby and fire storage can be deleted conditional on each component providing the required service pressure. The bottom of the fire storage component must be above the 20 psi pressure elevation under maximum day and fire flow demand conditions. The bottom of the standby storage component must be above the 20 psi pressure elevation under peak hour demand conditions.

Storage Status: As shown in Figure 3-7, the Gold Bar system currently has a storage surplus that is projected to last through 2034. The replacement of the 250,000 gallon wood stave reservoir with a 300,000 gallon concrete reservoir in 2011 provides an increase in available storage. The location of the new reservoir at the Well 4 site provides a higher level of reliability by reducing the dependency on the vulnerable water main bridge crossings at Wallace River and May Creek. In the event that one of the bridge crossings is damaged, the 340 pressure zone will have access to the 300,000 gallons at Well 4.

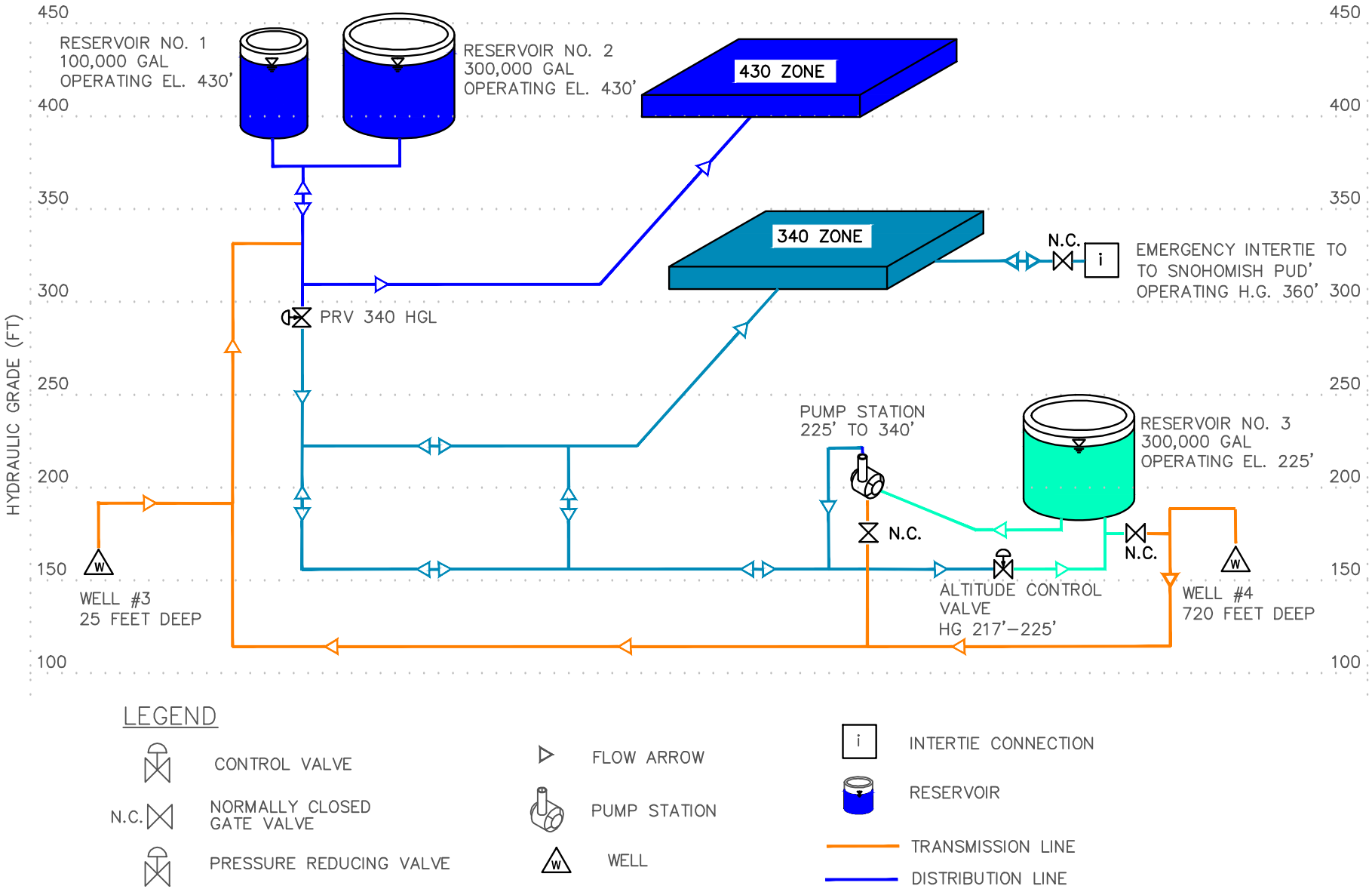
Figure 3-7: Gold Bar Storage Projections



3.3.3 Distribution System

The Gold Bar distribution piping is predominantly six-inch with key eight and twelve-inch transmission links. Materials vary with asbestos cement and PVC constituting the bulk of the system. In recent years, the City has upgraded part of the transmission main between the wells and reservoir to eight-inch ductile iron. A summary of the distribution system is presented in Table 3-3.

\\K-DATASVR4\PLANNING\GOLD BAR\2014 WATER SYSTEM PLAN\CAD\FIG 3-9 HYDRAULIC PROFILE.DWG



LEGEND

- CONTROL VALVE
- N.C. NORMALLY CLOSED GATE VALVE
- PRESSURE REDUCING VALVE
- FLOW ARROW
- PUMP STATION
- W WELL
- i INTERTIE CONNECTION
- RESERVOIR
- TRANSMISSION LINE
- DISTRIBUTION LINE

FIGURE 3-8
HYDRAULIC PROFILE

PACE
An Engineering Services Company

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Table 3-3: Gold Bar Existing Distribution & Transmission Piping							
Material	**Diameter (inches)**						
	≤ 4”	**4”**	**6”**	**8”**	**10”**	**12”**	**Total, LF**
PVC	300	0	5,809	10,200	0	0	16,309
Asbestos Cement	0	4,500	8,700	7,200	0	0	20,400
Ductile Iron	0	0	1,934	11,600	140	4,263	17,937
						System Total	**54,646**

Water/Sewer Separation: All properties are served by on-site septic systems. Water main and service line separation from septic system components is a minimum of 10 feet per Washington State DOH requirements.

Dead End Lines: Several dead-end lines exist in subdivisions located at outer limits of the system. All terminate at service connections, blowoffs, or hydrants which provide some protection against stagnant water.

System Leaks: Unaccounted water is now tracking below 10% due to repairs of several significant leaks. System leaks continue to be investigated and repaired as soon as possible.

System Pressure Monitoring: The system reservoirs provide distribution pressures in excess of 100 psi. A pressure-reducing valve at First Street maintains the distribution grid pressure at 65 psi. Service connections above the valve are equipped with reducing valves. The distribution grid is a closed system with pressure relief valves provided only at Wells 3 and 4. Additional relief valves have been identified as a necessary improvement to ensure pressure buildup can be addressed.

Hydrants: Fire hydrants are distributed throughout the system at spacings and locations appropriate for fire protection. A large percentage are substandard four-inch hydrants and do not provide adequate fire flow.

Valves: Adequate valving is available for isolating most sections of the distribution grid, although the lack of valving in other areas should be addressed. Older parts of the system contain valves that will not close tightly even with regular exercising.

General Condition: The recent transmission piping upgrades have significantly improved the distribution system. However, there are concerns for the core distribution grid, which is undersized and contains considerable asbestos cement and PVC pipe. Identifying and upgrading the distribution grid to eight-inch piping will ensure the City has a core grid that will support commercial growth and reduce maintenance costs.

3.3.4 Hydraulic Capacity Analysis

A hydraulic analysis was performed on the existing system to assist in identifying deficiencies. The analysis was completed using H2ONET computer software. H2ONET is developed by Innovyze, and operates in AutoCAD.

Six scenarios were created and analyzed. Pipe sizes and demands varied in each scenario to simulate either existing or future conditions. To minimize the data input effort, minor losses were not accounted for in the analysis. As a consequence, available and service pressures predicted

by the analysis may exceed actual values by as much as five percent. Summaries of each scenario are as follows:

Scenario 1A – Existing System at 2013 Peak Hour Demand:

Scenario 1 consisted of the existing system under peak hour demand as determined in Chapter 2. The peak hour demand (PHD) was assigned to each node in the system proportional to service connection density. Nodes at pipe intersections with several surrounding connections received a larger proportion of demand than a node at the end of a pipe with fewer nearby connections. The DOH design manual requires that this scenario be analyzed with the equalizing storage volume depleted. As Gold Bar does not currently have an equalizing storage requirement, the storage was reduced by the operating storage component. Both well sources are online for this scenario.

Findings: The system can meet PHD with no drop off in system pressure.

Scenario 1B – Existing System at 2023 Peak Hour Demand:

Scenario 1B increases peak hour demand to the 2023 projection. All other system conditions remain the same.

Results: No changes, PHD provided with no changes to service pressures.

Scenario 1C – Existing System at 2033 Peak Hour Demand:

Peak hour demand is increased to the 2033 projection in Scenario 1C with all other conditions unchanged.

Results: No changes, system capable of providing 2033 PHD.

Scenario 2A – Existing System at Fire Flow Plus 2013 Maximum Day Demand:

Scenario 2A determines the available fire flow under the following constraints.

- *Minimum system pressure – 20 psi*
- *Minimum residual pressure – 20 psi*
- *Fire suppression and equalizing storage volumes depleted.*
- *2013 maximum day demand distributed proportionally.*
- *Minimum 1,000 gpm fire flow required in residential areas.*
- *Minimum 1,500 gpm fire flow required in the commercial area (State Route 2 frontage north to Orchard Avenue).*
- *Both well sources operating.*
- *Pipe velocities less than 10 feet per second (fps)*.

Results: In general, the existing six-inch grid is capable of providing the 1000 gpm residential fire flow without exceeding 10 fps pipe velocities. Exceptions are the following dead-end mains which meet neither the minimum system pressure or pipe velocity criteria.

- 7th Street – Lewis Avenue to dead-end, existing 6-inch PVC, available fire flow – 900 gpm.
- 10th Street – Lewis Avenue to dead-end, existing 4-inch asbestos cement, available fire flow – 600 gpm.
- SR 2 – West end, existing six-inch asbestos cement, available fire flow – 840 gpm.

Scenario 2B – Existing system at fire flow plus 2023 Maximum Day Demand:

This scenario increases the MDD to the 2013 projection. All other conditions are unchanged.

Results: The results under Scenario 2B were not significantly different than 2A. Available fire flow at the deficient dead-ends are less due to the increased MDD.

Scenario 2C – Existing system at fire flow plus 2033 Maximum Day Demand:

Maximum day demand is increased to the 2033 projection with all other conditions unchanged.

Results: Again the results for Scenario 2C, the final fire flow scenario, do not differ from 2A and 2B other than available fire flows continue to decrease proportional to the increase in MDD.

A schematic of the system model and tabulated results for each scenario are provided in the Appendices.

Limitations: A limited comparison of the hydraulic analysis results to actual system pressure readings has been made. As the City collects more system pressure, the model will be calibrated to improve accuracy. It must be noted that even when calibrated, the computer model has limitations. Actual field conditions are difficult to simulate using hydraulic theory and principles. However, the model does serve as a useful tool for assessing system-wide performance.

3.4 SUMMARY OF SYSTEM DEFICIENCIES

The Gold Bar water system is in good condition due in large part to the new reservoir and booster pump station completed in 2011. There are no critical deficiencies in need of immediate attention. However, there are conditions that should be addressed in anticipation of future growth. These are summarized below.

3.4.1 Sources

Water Rights: The city's current water rights are adequate for the projected demands through 2046, with instantaneous flow (Qi) as the limiting factor. The water right self-assessment forms are provide in Chapter 4 with detailed information

Physical Well Capacity: .The current pumping rates for the wells will meet the projected demands through 2022. Higher pumping rates can be achieved for short-term, high-demand periods, but results in silting of the water which can settle out in the distribution system. With proper treatment facilities to remove silt at the well sites, the pumping capacity will meet projected demands through 2040.

3.4.2 Storage

New Storage: Gold Bar has adequate storage volume to serve the system beyond year 2034.

3.4.3 Distribution

Main Replacements: The existing distribution system is capable of meeting projected peak hour demands and in most areas also meets the fire flow minimums. Deficient fire flow areas are primarily at dead-end six-inch and four-inch mains. Specific locations are listed below:

- 7th Street – Lewis Avenue to Dead-end
- 10th Street – Lewis Avenue to Dead-end
- SR2 – West end

Although the existing grid meets fire flow requirements, six-inch mains have limited capacity and are not adequate for commercial growth. There are also concerns of the age and condition of the six-inch grid. A program for upgrading to eight-inch ductile iron mains is appropriate. Chapter 8 presents a schedule of replacements with cost estimates.

Other notable Distribution System Improvements include:

- Installation of one 1,500 gpm pump and VFD at the booster pump station
- PRV installation at the PUD Intertie

3.5 SELECTION AND JUSTIFICATION OF PROPOSED IMPROVEMENT PROJECTS

Completing the Olney Creek water right is the highest priority for Gold Bar. This would be followed by drilling an additional well and implementing the distribution system improvement program. A summary of these improvements is provided with detail in Chapter 8.

3.6 CAPACITY LIMITATIONS

The maximum capacity of each of the major water system components was divided by the appropriate unit demands by ERU in order to identify limiting component or facility. The current maximum physical capacities of Water Rights, Source (combined wells), and Storage, were all assessed for maximum capacity per ERU. The current limiting facility is shown to be the raw water source, or the combined physical capacity of the system wells, with the largest well out of service.

A summary of the capacity limitations of the water system is shown in Table 3-4.

Table 3-4: System Capacity Limitations				
Water System Component	**Current Maximum Capacity**	**Capacity in ERU's**	**Approx. Year** (1)	**Notes**
Source	375 gpm	987	2022	Based on Wells 3 and 4 pumping capacity. (2)
Water Right, Q_i	560 gpm	1,468	2047	
Water Right, Q_a	336 Ac-ft	1,555	2050	
Available Storage	668,032 gallons	2,059	2068	

(1) Based on 2.0 % annual population growth of Retail Service Area
(2) Source capacity may be supplemented with excess storage and/or the emergency intertie with the PUD. Specific approval would be requested from DOH.

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\\K-DATASVR4\PLANNING\GOLD BAR\2014 WATER SYSTEM PLAN\CAD\FIG 3-8 EXISTING TANK VOLUMES.DWG

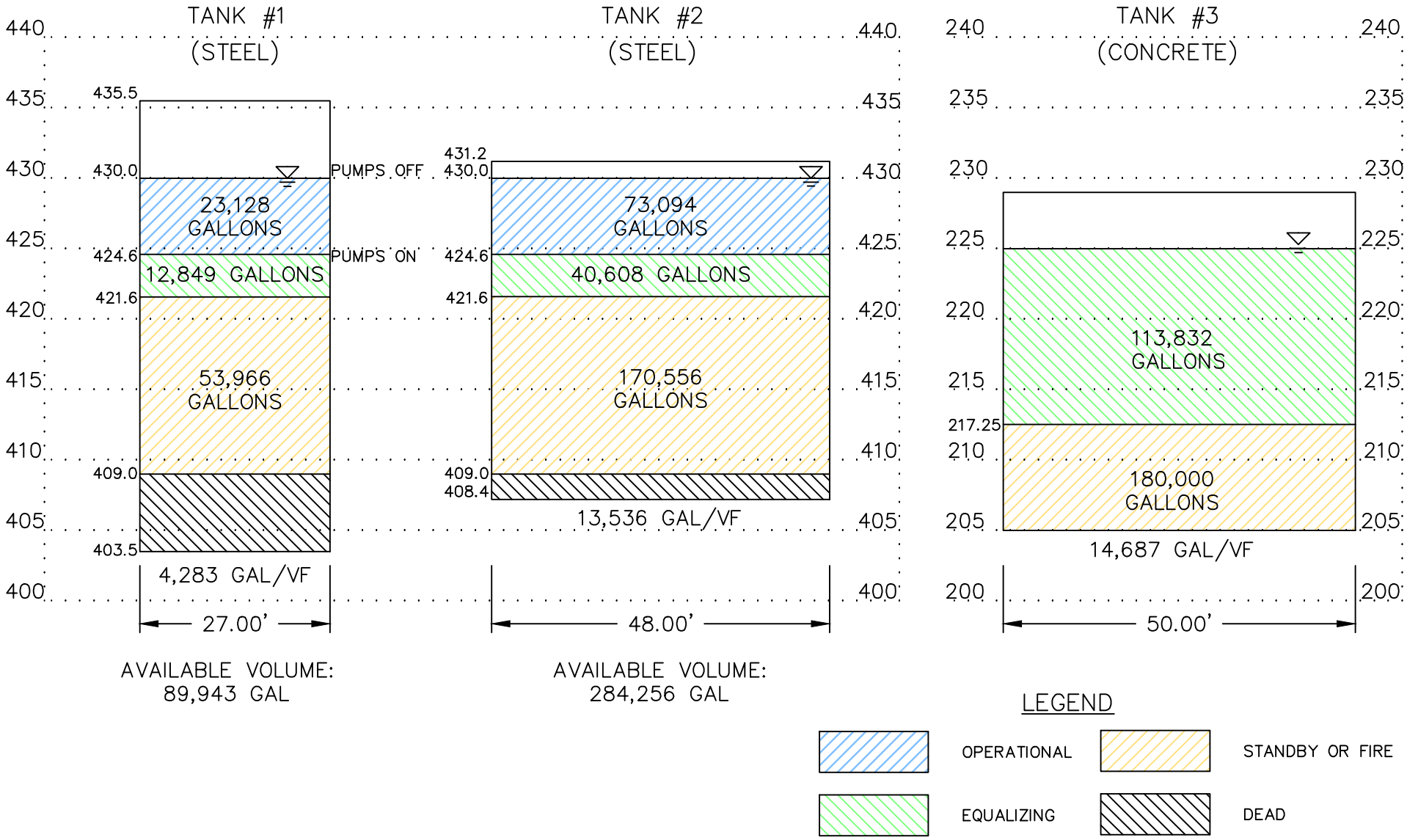

FIGURE 3-9
EXISTING TANK VOLUMES

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CHAPTER 4:
SOURCE ANALSYIS

The objective of this chapter is to describe the existing source of supply to Gold Bar and provide a complete analysis of water rights, source availability, capacity and reliability, including interties. In addition, this chapter provides a summary of the City's Water Use Efficiency Program.

4.1 WATER USE EFFICIENCY PROGRAM

Gold Bar is required by the Department of Health (DOH) and Municipal Water Law to develop and implement a Water Use Efficiency program in accordance with the "Water Use Efficiency Guidebook." The water conservation and efficiency requirements contained in that guidebook were prepared by the Departments of Ecology and Health based on statutes that encourage water use efficiency.

With less than 1,000 services, a conservation program consisting of four elements is recommended for Gold Bar. The four elements are program promotion, source metering, service metering, and conservation pricing. In addition, the guidelines request that water use data be collected and made available for a state-wide analysis.

The City adopted its first conservation plan in 1992 in response to deficiencies in source capacity. The plan identified specific actions required to decrease demand and increase source and storage. The following bullets describe how the City has expanded on the original conservation plan and taken additional steps to meet current requirements regarding water conservation and efficiency.

Program Promotion – The City currently advises customers of the importance of conservation on an on-going basis. This is accomplished by pamphlets, newspaper notices and bill inserts.

Source Metering – The City meters all four well sources.

Service Metering – All customer service connections are metered.

Conservation Pricing – Gold Bar has implemented a rate structure in which charges increase as more water is consumed above the base volumes. This structure promotes avoiding excessive water use, but maintains a reliable revenue for operational costs. Chapter 9 details the rates.

Additional conservation steps that has considered by the City and may be implemented are as follows:

- **Voluntary Water Audits:** The highest residential and commercial water users would be offered a free water audit by City representatives to determine how water is being lost or wasted and how conservation practices may be implemented.
- **Landscape Water Budget:** All significant public and private irrigators of landscapes would receive monthly water budgets for programming into automatic sprinkler timers. These budgets identify the appropriate water needs for their landscaping. This effort relies upon voluntary action by the resident and business.
- **New Landscape Irrigation City Codes:** New codes would be adopted by the City Council that require the use of drought tolerant plant materials, rain sensors and efficient irrigation piping systems, such as drip irrigation.

- **Free Water Conservation Plumbing Components:** Provide residential users free retrofit plumbing parts that conserve water. These parts may include: low flow shower heads, quick closing toilet flapper valves and sink faucet aerators.
- **Rebates for Use of Water Conserving Appliances:** The large appliances in homes account for most of the indoor water use. In this approach, customers would obtain a rebate on installation of water conserving toilet replacement and low water use clothes washing machines.
- **Summer Limited Watering Schedules:** Homes and business with odd house addresses may water on odd numbered days and the same pattern is used for even numbered addresses.

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- **Summer Limited Watering Schedules:** Homes and business with odd house addresses may water on odd numbered days and the same pattern is used for even numbered addresses.

4.1.1 Water Use Efficiency Program and Goal

The City of Goldbar established its original Water Use Efficiency Goal in 2009. That goal was to reduce average daily demand by 10 gallons per person per day which translates to a reduction from 103 to 93 gallons per person per day. As noted on the City's most recent Water Use Efficiency report for 2013, that goal has been achieved and surpassed. In 2013 water consumption was approximately 68 gallons per person per day, representing a 34% reduction in per capita water use.

Another key element of water use efficiency for the City of Gold Bar has been reducing non-revenue water and Distribution System Leakage. Non-revenue water is calculated by simple subtraction of water sales from water produced or purchased to determine that amount of water for which the City receives no revenue. Non-revenue water includes water used for system operation and maintenance (flushing, tank cleaning, facility operation and cleaning, etc.), water used for hydrant testing and other fire department uses, water for emergency response and fires, water taken without authorization from hydrants and water that escapes the system through pipeline and facility leaks. Although the City strives to keep non-revenue water to a minimum, DOH reporting and Water Use Efficiency program success is based on Distribution System Leakage (DSL). DSL represents that portion of non-revenue that is unauthorized and cannot be accounted for. It is intended to represent system leakage and provide purveyors with a guideline to use in identifying the need for and relative importance of pipeline renewal and replacement programs.

In 2008, water loss was estimated at 31%. Through a series of proactive measures, the City of Gold Bar has reduced DSL to 11.5%. The significant strides made in reducing water loss and DSL in recent years are attributable to better tracking of authorized non-revenue water use and aggressive leak detection and repair.

As part of this Water System Plan, the City of Gold Bar has developed a new Water Use Efficiency Goal aimed at continued reduction in non-revenue water and DSL, as well as reducing peak day demands, DSL is anticipated to fall below 10% in 2014.

4.2 SOURCE OF SUPPLY ANALYSIS

The purpose of a source of supply analysis is to evaluate opportunities to obtain or optimize the use of existing sources already developed and evaluate other innovative methods to meet water needs. The Gold Bar well sources, specifically Wells 3 and 4, have a combined pumping capacity of approximately

375 gallons per minute (gpm). Maximum day demands are projected to exceed this capacity by year 2022 when the maximum day demand (MDD) is projected to be 379 gpm. Possible options for increasing source capacity are as follows:

- Bring Wells 1 and/or 2 back online
- Drill a new well, preferably at the Well 4 site
- Utilize the May Creek intertie

4.3 WATER RIGHT EVALUATION

A summary of the Gold Bar water rights are provided in Tables 4-1, 4-2 and 4-3. Copies of the certificates are included in Appendix A. Based on the demand projections put forth in Chapter 2, a water right deficiency may occur by the year 2046. Both the 336 acre-feet annual limit and the existing 560 gpm instantaneous limit will be exceeded. If the City's current application for an increase to 750 gpm instantaneous is approved, some long-term benefit would be realized.

4.3.1 Olney Creek Surface Water Right Assessment

Olney Creek Surface Water Rights – Gold Bar holds title to Surface Water Certificate (SWC) 3659-A, which allows for a 3.0 cubic feet per second (cfs) diversion from Olney Creek for the purpose of municipal supply. The priority date is August 20, 1949, and place of use described as "Within the corporate limits of the Town of Gold Bar and Startup and adjacent areas served by the Gold Bar-Startup Water System." In the 1960s, Gold Bar and Startup terminated the Olney Creek diversion and began to supply water through groundwater withdrawals. The City has requested clarification from \ Ecology as to the specific quantity of the Olney Creek SWC that is allocated to Gold Bar. Ecology has responded that they will not adjudicate water rights, and that the city should seek the services of a water right attorney to investigate this claim. At this point, given current population projections, and the excess capacity of the existing ground water rights, the importance of securing the Olney Creek right is diminished from the previous planning document. However, additional research into this water right will be included in the more comprehensive system-wide service area study.

Groundwater Rights – Gold Bar holds three groundwater right certificates as shown in Table 4-1, 4-2, and 4-3. These rights are supplemental to Certificate No. 03659, meaning that the surface water right is reduced by the groundwater right quantity. Gold Bar's total groundwater rights under these certificates is 740 gpm instantaneous, 336 acre-feet/year volume. The 740 gpm limit is the combination of instantaneous limits from the City's four wells. The maximum output from any one well is 410 gpm at Well 4.

Gold Bar Application for Additional Water Rights – In 1995, the City submitted an application to increase the instantaneous limit at Well 4 by 340 gpm. Ecology has indicated that the application is subject to the 1988 WRIA 7 Instream Flow Rule (WAC 173-507), and would therefore be interruptible. Ecology does not issue interruptible water rights, and recommends pursuing a change application for G1-00004C, and arranging a pre-application meeting to discuss the City's long-term water rights needs.

Table 4-1: Water Rights Self Assessment – Existing Status

Permit Certificate Or Claim #	Name on Document	Priority Date	Source Name / #	Primary Or Supple-Mental	Existing Water Rights		Existing Consumption		Current Water Right Status Excess/(Deficiency)	
					Max. Instantaneous Flow Rate (Q)	Max. Annual Volume (Qa)	Max. Instantaneous Flow Rate (Q)	Max. Annual Volume (Qa)	Max. Instantaneous Flow Rate (Qi)	Max. Annual Volume (Qa)
1. 0-3659	Gold Bar	8/20/49	Olney Crk.	Primary	3.0 cfs (1346 gpm)	2172 ac-ft[1]	0	0		
2. G1-00004C	Gold Bar	8/24/70	Wells 1, 2	Supp.	180 gpm	336 ac-ft	175 gpm	77 ac-ft.	155 gpm	181 ac-ft.
3. G1-23602	Gold Bar	5/14/80	Well 3	Supp.	150 gpm	160 ac-ft				
4. G1-26816P	Gold Bar	12/8/92	Well 4	Supp.	410 gpm	336 ac-ft	200 gpm	103 ac-ft.	210 gpm	233 ac-ft.
TOTAL	**********	*********	******	*********	740 gpm	336 ac-ft[2]	375 gpm	180 ac-ft.	365 gpm	156 ac-ft.

INTERTIE NAME/IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	Existing Limits on Intertie Water Use		Existing Consumption Through Intertie		Current Intertie Supply Status Excess/(Deficiency)	
		Max. Instantaneous Flow Rate (Q)	Max. Annual Volume (Qa)	Max. Instantaneous Flow Rate (Q)	Max. Annual Volume (Qa)	Max. Instantaneous Flow Rate(Qi)	Max. Annual Volume (Qa)
1. May Creek Emergency Intertie	Snohomish Co. PUD	300 gpm	336 ac-ft[3]	0	0	0	0
TOTAL ********	********** **********						

PENDING WATER RIGHTS

Pending Water Right Application	Name on Permit	Date Submitted	Primary or Supple-mental	Max. Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested	
1. GI-27658	Gold Bar	8/28/95	Supp.	340 gpm	N/A[2]	

Notes:

[1] The Olney Creek surface water right does not specify a maximum annual volume. Volume shown is an extension of the instantaneous flow.

[2] Gold Bar is limited to a total of 336 acre-feet annual volume from all well sources.

[3] Intertie agreement limits are 300 gpm/300,000 gpd.

[4] Available Pumping Rate

Table 4-2: Water Rights Self Assessment – 6-Year Forecast

Permit Certificate Or Claim #	Name on Document	Priority Date	Source Name / Number	Primary or Supple-mental	Existing Water Rights		Forecasted Water Use From Sources (6-Year Demand)		Forecasted Water Right Status Excess/(Deficiency)	
					Max. Instantaneous Flow Rate (Q)	Max. Annual Volume (Qa)	Max. Instantaneous Flow Rate (Q)	Max. Annual Volume (Qa)	Max. Instantaneous Flow Rate(Qi)	Max. Annual Volume (Qa)
1. 0-3659	Gold Bar	8/20/49	Olney Crk.	Primary	3.0 cfs (1346 gpm)	2172 a-ft [1]	0	0		
2. G1-00004C	Gold Bar	8/24/70	Wells 1,2	Supp.	180 gpm	336 a-ft	175 gpm[4]	89 ac-ft.	155 gpm	247 ac-ft
3. G1-23602	Gold Bar	5/14/80	Well 3	Supp.	150 gpm	160 a-ft				
4. G1-26816P	Gold Bar	12/8/92	Well 4	Supp.	410 gpm	336 a-ft	200 gpm[4]	103 ac-ft.	210 gpm	233 ac-ft.
TOTAL	**********	*********	******	*********	740 gpm	336 a-ft [2]	375 gpm[4]	192 a-ft.	365 gpm	144 ac-ft.

INTERTIE NAME/IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	Existing Limits on Intertie Water Use		Existing Consumption Through Intertie		Current Intertie Supply Status Excess/(Deficiency)	
		Max. Instantaneous Flow Rate (Q)	Max. Annual Volume(Qa)	Max. Instantaneous Flow Rate (Q)	Max. Annual Volume (Qa)	Max. Instantaneous Flow Rate(Qi)	Max. Annual Volume (Qa)
1. May Creek Emergency Intertie	Snohomish Co. PUD	300 gpm	336 a-ft.[3]	0	0	0	0
TOTAL ********	********** **********	**300 gpm**	**336 ac-ft.**				

Pending Water Right Application	Name on Permit	Date Submitted	Primary or Supple-mental	PENDING WATER RIGHTS	
				Max. Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
1. GI-27658	Gold Bar	8/28/95	Supp.	340 gpm	N/A [2]

Notes:

[1] The Olney Creek surface water right does not specify a maximum annual volume. Volume shown is an extension of the instantaneous flow.

[2] Gold Bar is limited to a total of 336 acre-feet annual volume from all well sources.

[3] Intertie agreement limits are 300 gpm/300,000 gpd.

[4] Available Pumping Rate

Table 4-3: Water Rights Self Assessment – 20-Year Forecast

Permit Certificate Or Claim #	Name on Document	Priority Date	Source Name / Number	Primary Or Supple-Mental	Existing Water Rights		Forecasted Water Use From Sources (20-Year Demand)		Forecasted Water Right Status Excess/(Deficiency)	
					Max. Instantaneous Flow Rate (Q)	Max. Annual Volume (Qa)	Max. Instantaneous Flow Rate (Q)	Max. Annual Volume (Qa)	Max. Instantaneous Flow Rate(Qi)	Max. Annual Volume (Qa)
1. 0-3659	Gold Bar	8/20/49	Olney Crk.	Primary	3.0 cfs (1346 gpm)	2172 a-ft [1)]	0	0		
2. G1-00004C	Gold Bar	8/24/70	Wells 1,2	Supp.	180 gpm	336 a-ft				
3. G1-23602	Gold Bar	5/14/80	Well 3	Supp.	150 gpm	160 a-ft				
4. G1-26816P	Gold Bar	12/8/92	Well 4	Supp.	410 gpm	336 a-ft				
TOTAL	**********	*********	******	*********	740 gpm	336 a-ft [(2)]	468 gpm[(4)]	265 ac-ft.	92 gpm	71 ac-ft.

INTERTIE NAME/IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	Existing Limits on Intertie Water Use		Existing Consumption Through Intertie		Current Intertie Supply Status Excess/(Deficiency)	
		Max. Instantaneous Flow Rate (Q)	Max. Annual Volume(Qa)	Max. Instantaneous Flow Rate (Q)	Max. Annual Volume (Qa)	Max. Instantaneous Flow Rate(Qi)	Max. Annual Volume (Qa)
1. May Creek Emergency Intertie	Snohomish Co. PUD	300 gpm	336 a-ft.[(3)]	0	0	0	0
TOTAL ********	********** **********	**300 gpm**	**336 ac-ft.**				

Pending Water Right Application	Name on Permit	Date Submitted	Primary or Supple-mental	PENDING WATER RIGHTS		
				Max. Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested	
1. GI-27658	Gold Bar	8/28/95	Supp.	340 gpm	N/A [(2)]	

Notes:

[1] The Olney Creek surface water right does not specify a maximum annual volume. Volume shown is an extension of the instantaneous flow.

[2] Gold Bar is limited to a total of 336 acre-feet annual volume from all well sources.

[3] Intertie agreement limits are 300 gpm/300,000 gpd.

[4] Exceeds existing pumping rate. Improvements are required to meet projected 20-year demand.

Startup Application for Additional Water Rights – In response to DOE's denial of application for groundwater rights in 1995, Startup filed an appeal to the Pollution Control Hearings Board (PCHS). The intent of the appeal was to allow Startup to utilize the Olney Creek surface water right and subsequently convert the right to groundwater. The Board issued a stipulation and agreed order with the following conditions:

- Startup is entitled to 50 gpm (0.111 cfs) instantaneous and 80 acre-feet/year of the Olney Creek water right. This is granted as a groundwater right permit.
- Startup and Gold Bar jointly were required to transfer 0.222 cfs of the Olney Creek right to the Trust Water Right Program for the purpose of increasing base flows in Olney Creek, the Wallace River and the Skykomish River.

The stipulation and agreed order does not clearly state what portion of the Olney Creek surface right Gold Bar still holds. An accounting based on the information presented in the Board's report is summarized in Table 4-4. As shown, it appears there is an excess of 205 gpm and 1,527 acre-feet/year. DOE is currently reviewing the PCHB decision to determine what portion of this excess Gold Bar is entitled to. Due to the complexities of water right law, it is possible Startup would be the recipient and Gold Bar would receive none.

Table 4-4: Olney Creek Surface Water Right Distribution

	Instantaneous (cfs)	Annual (acre-ft./yr.)
Olney Creek Water Right Distributions	3.000	2,172[1]
Gold Bar Supplemental Groundwater Rights – Total (740 gpm)	1.65	336
Startup Supplemental Groundwater Rights (250 gpm)	0.560	68
PCHB Stipulation – Startup (50 gpm)	0.111	80
PCHB Stipulation – Trust Water Rights Program	0.222	161[1]
Apparent Remaining Gold Bar Rights (205 gpm)	0.457	1,527

Note:
[1] The Olney Creek surface water right and the PCHB stipulation do not specify a maximum annual volume. Volume shown is an extension of the instantaneous value.

Comparing the City's existing groundwater rights to the 20-year projection of Chapter 2, it appears the City has marginally adequate instantaneous rights but will be deficient in annual volume. Utilizing the remaining Olney Creek right will be necessary. Verifying the actual amount available and converting it to a groundwater right is an improvement identified in Chapter 8.

4.4 WATER SYSTEM RELIABILITY ANALYSIS

The reliability of a water system is a measure of the ability to provide an adequate supply of water during emergencies or system failures. Gold Bar reliability is evaluated below.

Source Reliability: The Gold Bar wells have no immediate contamination threats. As described in Chapter 5, Wellhead Protection Program, residential septic system drain fields are the only potential contamination source identified. The well field and Well 4 serve as redundant sources. In the event one is lost, each has capacity to support the system if customer demand can be reduced.

Water Right Adequacy: As previously discussed in Tables 4-1, 4-2, and 4-3, Gold Bar has surface water and groundwater rights. These rights are reliable in the sense that they are not interruptible. It is likely that future rights granted to the City will be keyed to Skykomish River flows. As described in the previous section, deficiencies are anticipated.

Facility Reliability: An analysis of the Gold Bar system with deficiencies identified is presented in Chapter 3. The age and condition of the A.C. mains is of concerns, and will be prioritized for replacement as funds allow.

Water Shortage Response Planning: In the event of a water shortage due to excessive demands or an emergency, the following response plan would be implemented.

1. Implement strict water usage restrictions to minimize demand. The restrictions would be categorized according to the severity of the shortage.

   Minor Shortages – Notify customers and request voluntary reductions in water usage. The steps identified in the conservation program would be emphasized. A 10 percent reduction in daily consumption could be achieved.

   Extreme shortages – Limit or prohibit non-essential water usage, i.e. car washing, lawn watering, building washing, etc. Implement an emergency condition rate structure which would penalize excess usage.

2. Utilize the May Creek Intertie – The May Creek intertie agreement allows for a 300 gpm/300,000 gal/day transfer. Notification to Snohomish County PUD is required. The intertie would only be used in a crisis situation.

   These steps are in response to a water shortage condition such as a drought or partial loss of source capacity. Chapter 5 describes additional steps that would be necessary if the well sources would be lost due to contamination.

Monitoring Well Levels: Gold Bar monitors well levels on a daily basis. Historical data and analyses show that the aquifers are stable.

4.5 INTERTIES

Gold Bar has an intertie with the Snohomish County PUD May Creek Water System. The intertie agreement is included in Appendix K. The following summarizes the intertie:

Location: 39216 May Creek Road

Date: Intertie agreement dated November 4th, 2013

Purpose: Emergency intertie, mutually beneficial to both systems.

Capacity: Conveyed from District to Gold Bar – 300 gpm instantaneous, 300,000 gal/day volume limit under normal peak consumption. Instantaneous limit of 1,000 gpm in emergency condition. Water to be provided at 370 to 392 hydraulic grade line.

Conveyed from Gold Bar to District – No volume or flow limits specified. City to provide water at 360 hydraulic grade line minimum.

Due to water quality concerns, City policy is to consider use of the intertie only in a crisis situation. Flushing and disinfecting the intertie piping would be required prior to use.

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CHAPTER 5:
SOURCE WATER PROTECTION

The objective of this chapter is to develop a program to protect and improve the Gold Bar well source. This is accomplished by identifying, monitoring, limiting, and controlling, to the extent feasible, all activities present in the zones of groundwater contribution which constitute water quality hazards.

5.1 WELLHEAD PROTECTION PROGRAM

A brief overview of key elements of Gold Bar's Wellhead Protection Program are summarized below:

- In 1995, GeoEngineers completed a hydrogeologic assessment of Well 4.
- An assessment of Wells1, 2 and 3 was completed in 1997.
    - These assessments characterized the hydrogeologic setting of the wells, delineated the wellhead protection areas and identified potential sources of contamination within the protection areas.

5.2 SUSCEPTIBILITY ASSESSMENT

A susceptibility assessment has been completed for the system wells. The susceptibility rating for each source is as follows:

SO3 **–** Wells 1, 2 & 3: High (Due to shallow aquifer, permeable surface soils)

SO4 – Well 4: Low (Deep aquifer, artesian, protected by impermeable strata)

5.3 WELLHEAD PROTECTION AREA DELINEATION

Figure 5-1 show the wellhead protection areas for each source.

5.4 INVENTORY OF POTENTIAL CONTAMINANT SOURCES

The reports prepared by GeoEngineers identified potential contaminant sources within the wellhead protection areas. Table 5-1 summarizes the area, type and location of each.

Table 5-1: Potential Contaminant
Source Wells 1, 2, 3 & 4

Wellhead Area	Contaminant Source	Location(s)
100 ft. sanitary control area	None	–
1-year time of travel	Septic Systems, Heating / Oil USTs[1]	Various
5- and 10-year time of travel	Fertilizer, Pesticides, Herbicides, Fungicides, Traffic Accidents (spills), Surface Water Runoff	Non-point

Note: [1] UST = Underground Storage Tank

5.5 NOTIFICATION OF FINDINGS

The City of Gold Bar has advised residents of the wellhead protection areas through its annual public health and safety program. However, the City has not notified local and state agencies regarding the findings. As part of this planning effort, the following agencies will be notified in writing:

- Washington Military Department- Emergency Management Division
- Washington Department of Ecology – Spill Operations Section
- Snohomish County Fire District No. 26
- Snohomish County Sheriff's Department
- Snohomish County Planning Department

In addition to these agencies, the following private property owners will be notified:

- Owners of septic systems within the six month time of travel area
- Owners of private wells within the 10 year time of travel area
- Owners of businesses which are potential contaminant sources

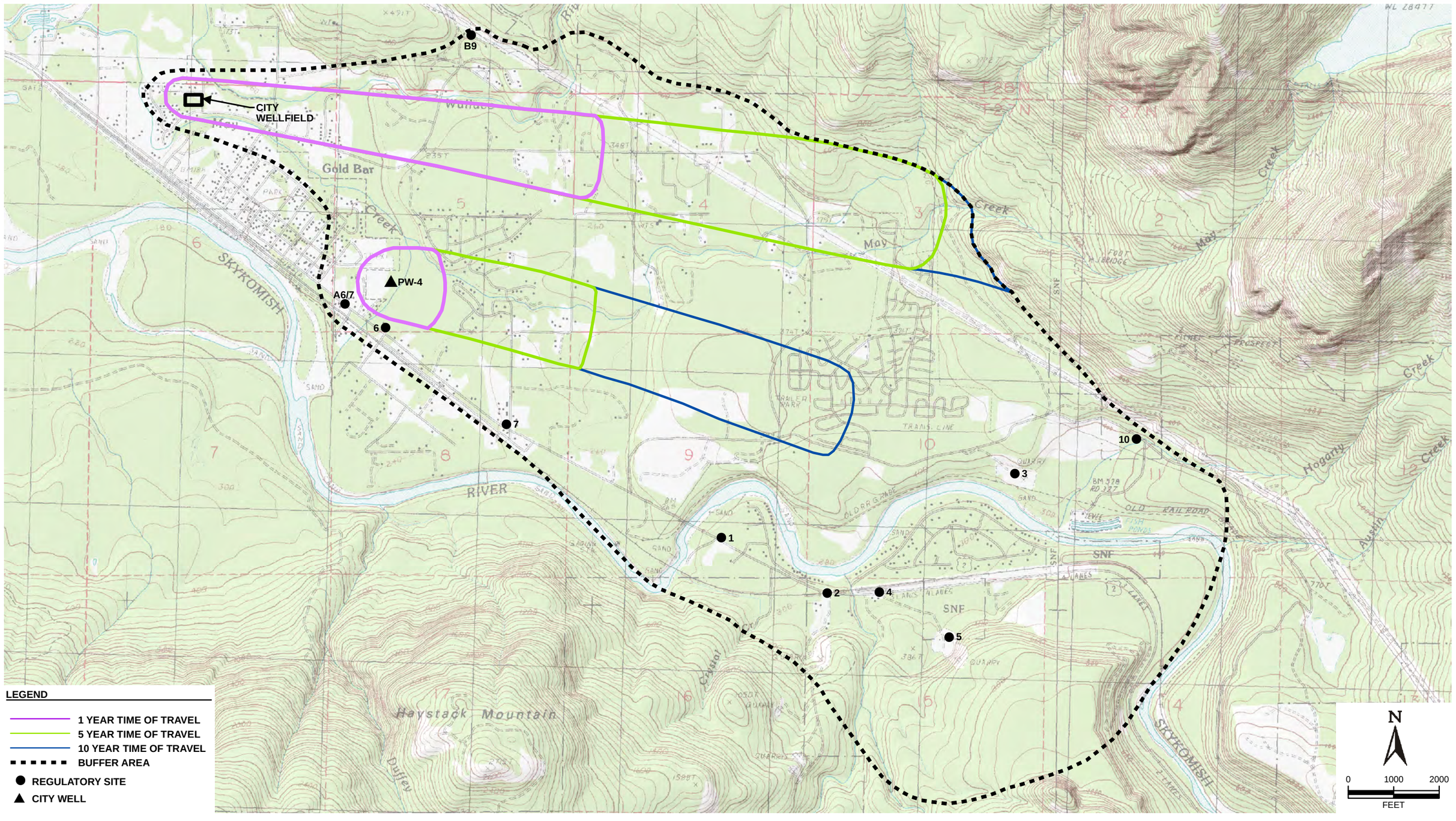
The notification letters will explain the purpose of the program and include a map of the protection areas.

5.6 EMERGENCY PLANNING

The wellfield and Well 4 serve as backup sources to each other. In the event one is lost, each has capacity to support the system if customer demand is reduced. Loss of both the wellfield and Well 4 would require one of the following responses:

- Utilize the May Creek intertie – The May Creek intertie allows for a 300 gpm/300,000 gpd transfer. Notification to the Snohomish County P.U.D. is required.
- Water Hauling – If the intertie supply is not adequate, water could be delivered from an adjacent purveyor (Startup) and provided to residents in containers. This would suffice for one to two weeks and possibly longer if the contaminated water could still be used for bathing and laundry.
- Temporary Surface Water Filtration – A portable filtration facility could be obtained and used to filter surface water from the Skykomish River if the wells will be off-line for an extended period and the intertie is not adequate.

Additional system-wide emergency response actions are described in the Operations and Maintenance Program in Chapter 6.



LEGEND

- 1 YEAR TIME OF TRAVEL
- 5 YEAR TIME OF TRAVEL
- 10 YEAR TIME OF TRAVEL
- BUFFER AREA
- REGULATORY SITE
- CITY WELL

N:\EH090177A GOLD BAR WHPA UPDATE\WHPA.mxd

Associated Earth Sciences, Inc.

WELLHEAD PROTECTION AREA MAP

GOLD BAR WHPA UPDATE
SNOHOMISH COUNTY, WASHINGTON

FIGURE 1

DATE 9/10

PROJ. NO. EH090177A

FIGURE 5-1

CHAPTER 6:
OPERATIONS AND MAINTENANCE

An operations and maintenance program is necessary to ensure satisfactory system management in accordance with Department of Health (DOH) regulations. This chapter summarizes the Gold Bar system operating procedures.

6.1 WATER SYSTEM MAINTENANCE AND PERSONNEL

The following personnel have a role in system operation:

Operator: Richard Baker, Washington DOH Certified Water Distribution Manager I

Responsibilities: Day to day maintenance and operations

Public Works Director: John Light, Washington DOH Certified Water Distribution Manager II, Cross Connection Control Specialist I, Water Pollution Control Plant Operator, and Basic Treatment Plant Operator

Responsibilities: Supervise Public Works staff

Utility Clerk: Denise Beaston

Responsibilities: Administration and billings

Consulting Engineer: PACE Engineers, Inc., Kirkland, Washington

Responsibilities: On-call professional engineering services

6.2 OPERATOR CERTIFICATION

In accordance with the Water Works Operator Certification Regulations, WAC 246-292, a certified Water Distribution Manager Level I is required to operate the Gold Bar system. The current system operator, John Light, maintains a WDM Level II certification, which exceeds these requirements.

6.3 SYSTEM OPERATION AND CONTROL

The primary components of the Gold Bar water system are the source wells, distribution system and reservoirs. The locations of each component are shown in Chapter 3, Figure 3-1.

6.3.1 Sources

Well No. 1 – 7.5 HP submersible vertical turbine pump 20 gpm capacity

Off-line due to recurring sand problems.

Well No. 2 – 10 HP submersible vertical turbine pump, 80 gpm capacity

Currently disconnected from distribution system but still connected to power. Identified as possible emergency back up to Well No. 4.

Well No. 3 – 20 HP submersible vertical turbine pump, 160 gpm capacity

Currently online. Automatically controlled through Well 4.

Well No. 4 – 75 HP vertical turbine pump, 275 gpm capacity

Primary source well, controlled by water levels in Tank 1, and run concurrently with Well 3. Vertical turbine pump and motor were replaced in spring of 2013.

6.3.2 Storage Reservoirs

Tank No. 1 – Steel, 113,500 gallons operating volume

Tank No. 2 – Steel, 308,620 gallons operating volume

Tank No. 3 – Post-tensioned Concrete, 300,000 gallons operating volume

6.3.3 Booster Pump Stations

Tank 3 Booster Pump Station

2 – 25 HP domestic booster pumps, VFD, 255 gpm each. Controlled through SCADA system to maintain system pressure in the 340 zone.

6.3.4 Transmission & Distribution System

Approximately 51,000 lineal feet of six, eight and twelve-inch asbestos cement (AC), poly vinyl chloride (PVC) and ductile iron (DI) pipe. Routine and preventative maintenance procedures are shown in Table 6-1.

Table 6-1: Operations & Maintenance Procedures
Maintenance Schedule (Routine & Preventative)

Function	Frequency
Check source pumps, well house piping, and record source meter readings, check chlorine residual	Daily
Check reservoirs for leaks, overflows, vandalism, etc.	Daily
Check pressure reducing valves for leaks and proper pressure settings.	Weekly
Monitor distribution system for leaks and water quality.	On-Going
Exercise system valves.	Every 6 Months
Flush hydrant runs and dead-end mains.	Annually
Inspect and clean reservoirs	8-10 Years
List of Supplies	*Contact (Name, Telephone No.)*
Hypochlorite (Liquid Solution)	Western Facilities/Hughes Supplies (425-252-2105)

6.4 COMPREHENSIVE MONITORING PLAN

The City complies with all water sampling and monitoring requirements in accordance with DOH guidelines under WAC 246-290-300. Each sampling site has one routine location and two repeat

locations as required by the State. The sampling points are located to reflect different population concentrations so that representative water samples are obtained. Gold Bar water quality monitoring requirements per WAC 246-290-300 are given in Table 6-2.

Table 6-2: Water Quality Baseline Monitoring System

Contaminant	When to Sample (Unless otherwise directed)	Where to Sample	Waiver Option	Next Sample Date
Coliform Bacteria	Two samples per month per Coliform Monitoring Plan, Appendix H	From representative points throughout distribution systems as indicated in the Coliform Monitoring Plan.	N/A	Monthly
Nitrite	One sample per source every 36 months. (Included in IOC)	From each source after treatment and prior to entering the distribution system.	N/A	Wells 1,2,3 – July/2016 Well 4 – May/2016
Nitrate	One sample per source every 12 months (Total Nitrate/Nitrite included in IOC).	From each source after treatment and prior to entering the distribution system.	N/A	Wells 1,2,3 – July/2014 Well 4 – May/2014
Inorganic chemicals (IOCs)	One sample per source every 36 months for ground water.	From each source after treatment and prior to entering the distribution system.	N/A	Wells 1,2,3 – July/2016 Well 4 – May/2016
Volatile organic chemicals (VOCs)	Requirements based on system size, source type and monitoring history (see WAC 246-290-300). For ground water source: Every 3 yrs.	Sampling location is from each source after treatment and prior to entering the distribution system.	Waiver optional	Wells 1,2,3 – Feb/2016
Synthetic organic chemicals (SOCs)	Monitoring requirements based on source vulnerability and waiver status. 1 quarter every three years for test methods 515, 525, 531.	Sampling location is from each source after treatment and prior to entering the distribution system.	Waiver optional	Wells 1,2,3 – July/2016
Lead and Copper	Ongoing monitoring program. 10 samples every 3 years.	Samples are taken from the distribution system at targeted in-home taps.	N/A	Dec/2014
Radionuclides	One sample from each source every 48 months.	From each source, prior to entry to distribution system.	N/A	2017
Asbestos	If system has more than 10% AC pipe – 1 sample every 9 years. Waiver if less than 10% AC pipe.	From distribution system.	N/A	2017
PCBs	As directed by DOH	From each source, after treatment & prior to entering the distribution system	State waiver	Waiver Granted
Dioxin	As directed by DOH	From each source, after treatment & prior to entering the distribution system	State waiver	Waiver Granted
Endothal	As directed by DOH	From each source, after treatment & prior to entering the distribution system	State waiver	TDB
Diquat	As directed by DOH	From each source, after treatment & prior to entering the distribution system	State waiver	TBD
Glyphosate	As directed by DOH	From each source, after treatment & prior to entering the distribution system	State waiver	TDB

Table 6-2: Water Quality Baseline Monitoring System				
Contaminant	**When to Sample (Unless otherwise directed)**	**Where to Sample**	**Waiver Option**	**Next Sample Date**
EDB/DBCP	In high risk counties, if source is either moderate or high susceptibility – 1 quarter every 3 years.	From each source, after treatment & prior to entering the distribution system	Waiver optional	TDB

6.5 EMERGENCY RESPONSE PROGRAM

Gold Bar has developed an Emergency Management Plan to help the City identify, prepare and respond to emergency situations. This plan was developed to be compatible with the Washington State Comprehensive Emergency Management Plan, Snohomish County Emergency Operations Plan and the Federal Response Plan. Water system personnel responsible for making decisions in specific emergency situations are listed in Table 6-3.

Table 6-3: Emergency Response Call-Up List	
EMERGENCY CONTACT	**PHONE NUMBER(S)**
John Light, Public Works Director	(360) 793-1101
Snohomish County PUD, Electric Utility, Monroe Office	(360) 766-2505
PACE Engineers, Inc., Kirkland, WA	(425) 827-2014
Department of Health, Northwest Region Office	Business: (253) 395-6750 Emergency: (877) 481-4901
Erika Lindsey, P.E., Regional Engineer for Snohomish County, DOH	(253) 395-6766
Department of Ecology Spill Response	1-800-424-8802
Snohomish County Health District	(425) 339-5250
Fire/Police/Medical	911

6.5.1 Notification Procedure

Customers are notified of water quality emergencies or usage restrictions by the system operator, utilizing the following methods as appropriate:

- Reverse-911 call system through Snohomish County Office of Emergency Management (OEM)
- Door to door notices
- Postings at City Hall, the post office and local businesses

6.5.2 Vulnerability Analysis

The reservoirs and source wells are the most vulnerable component of the Gold Bar water system. A hazardous chemical spill in the vicinity of the wells could contaminate the entire aquifer for an extended period, at best, and permanently, at worst. A break in the reservoir

transmission main could drain 2 of the 3 storage reservoirs, thereby limiting operations. An assessment of system vulnerability to other emergency conditions is presented in Table 6-4.

6.5.3 Contingency Operational Plan

As described in Chapters 4 and 5, utilizing the May Creek intertie or a newly drilled well as a backup source would be implemented if the primary source is lost. A transmission main break would require immediate repair.

Table 6-4: Emergency Response Actions							
System Vulnerability & Emergency	**Wells**	**Storage**	**Treatment**	**Distribution**	**Power**	**Interties**	**Personnel/ Communications**
Earthquake	Underground shifting, aquifer damage, fire demand. Utilize storage; shift to emergency interties.	Cracks, leakage, rapid drawdown. Inspect facilities. Implement conservation.	No effect.	Main line breakages; high demand flows. Inspect; isolate; repair; notify users of shut-down.	Outage; loss of pumping capacity. Conservation, use of storage. Pursue emergency generator capabilities.	Main break. Inspect and repair.	Unable to respond; injuries. Develop on-call support from neighboring systems, first-aid training; mobile auxiliary communications system.
Windstorm	No effect.	No effect.	No effect.	No effect.	Outage; loss of pumping capacity. Conservation program; use of storage. Pursue emergency generator capabilities.	No effect.	Unable to respond; injuries. Develop on-call support from neighboring systems, first-aid training; mobile auxiliary communications system.
Flooding	Shut off source if water reaches top of well casing.	No effect	No effect.	No effect.	No effect.	No effect.	No effect.
Major Fire	High demand. Bring additional wells on line to maximize supply; utilize storage.	Rapid drawdown. Monitor reservoir status and performance.	No effect.	High flows. No action required.	Outage; loss of pumping capacity. Conservation program, use of storage. Pursue emergency generator capabilities.	Intertie becomes operational. Monitor performance	No effect.
Volcano	No effect from ash. High demand from cleanup. Bring additional well on line. Utilize storage.	No effect from ash. Rapid drawdown. Monitor performance.	No effect.	No effect.	Outage; loss of pumping capabilities. Use storage, implement conservation. Pursue emergency power generation.	No effect.	Unable to respond. Develop or call support from neighboring systems. Prepare vehicles.

Table 6-4: Emergency Response Actions							
System Vulnerability & Emergency	**Wells**	**Storage**	**Treatment**	**Distribution**	**Power**	**Interties**	**Personnel/ Communications**
Drought	Depletion of aquifer supply source. Implement conservation.	Drawdown and non-replenishing. Same action as for source.	No effect.	No effect.	No effect.	Intertie becomes operational. Monitor performance	No effect.
Ice Storm; Severe Cold	Winterize pump house.	No effect.	No effect.	Freezing of mains; leaks and breaks. Inspect; isolate; repair. Notify users of shutdown. Maintain water flows.	Outage; loss of pumping facilities. Use storage; implement conservation. Pursue emergency power generation.	No effect.	Downed communication lines. Use radio units, personal contact. Equip vehicles.
Industrial Spill	Source contamination. Shift to emergency supply. Notify users	No effect.	No effect.	No effect.	No effect.	Intertie becomes operational. Monitor performance	No effect.
Bomb Blast; Sabotage	Loss of well or wells. Intentional contamination. Shift to other wells; implement conservation; shift to emergency intertie supply. Quality test immediately and treat accordingly. Notify users.	Damage affecting loss of a facility or all storage. Use remaining facilities, implement conservation, shift to emergency supply.	Furnish emergency treatment if necessary.	Main breakages. Inspect; isolate; repair. Notify users of shutdown.	Outage; loss of pumping capability. Use storage; implement conservation. Pursue emergency power generation.	Loss of intertie or intertie comes on line. Temporarily reconnect; monitor performance	Down lines; messages restricted. Make contact via radio or personal communications. Call support from neighboring systems.

6.6 SAFETY PROCEDURES

Safety hazards associated with operations and maintenance of the Gold Bar water system are listed below.

Chemical – Liquid hypochlorite is used for disinfection at the source wells. The Department of Labor and Industries requires the use of impervious gloves and protective eyewear when handling hypochlorite. An eyewash fixture in the immediate vicinity is also required. Bulk hypochlorite should be stored in an area protected from moisture to prevent corrosion and potential explosion.

Pressurized Piping – System pressures range from 60 to 110 psi. Pipe ruptures, unsecured fittings, and inadvertently cutting pressurized pipes can cause injury. Adequate pipe restraint and pressure relief is required prior to cutting any piping.

The City is responsible for ensuring maintenance personnel understand these hazards, providing adequate protection in accordance with the Occupational Safety and Health Administration (OSHA), Washington Industrial Safety and Health Act (WISHA) regulations, and reporting to the State Auditor.

6.7 CROSS CONNECTION CONTROL PROGRAM

A cross-connection control program (CCCP) was developed and adopted by the City in 2012, and is included herein as Appendix L.

6.8 CUSTOMER COMPLAINT RESPONSE PROGRAM

Customer complaints are first directed to the system operator. If the customer's water service has been interrupted or restricted the condition is corrected promptly by the staff. If the complaint is a level of service issue, i.e., low pressures during peak usage, the customer is advised of the cause of the condition, what corrective measures are being taken, and what the customer can do to lessen the impact of the condition. All complaints are documented by the system operator.

6.9 RECORDKEEPING AND REPORTING

The City maintains the following records and reports:

- Water Quality Reports
- Equipment Maintenance Records
- As-Built Plans
- Source Meter Readings
- Coliform Results
- These records are stored at City Hall

CHAPTER 7:
DISTRIBUTION FACILITIES DESIGN & CONSTRUCTION STANDARDS

The objective of this chapter is to describe the Gold Bar water system design and construction standards. Documenting these standards will ensure that all future extensions and new facilities will be constructed in an acceptable manner.

7.1 PROJECT REVIEW PROCEDURES

Distribution and storage improvement projects will be reviewed by the City according to the following procedures:

7.1.1 Scheduled Improvements

If the improvement was previously identified and scheduled for in the Water System Plan, the City will consult with a Washington State licensed professional engineer and request preparation of construction plans, specifications, and a cost estimate. The request will specify that design and construction be in accordance with the adopted City of Gold Bar Design and Construction Standards and Specifications.

Scheduled improvements will be submitted for DOH review and approval as follows:

- Water main projects – No DOH review required
- Booster pumps, reservoirs, filtration facilities – Department of Health (DOH) review and approval required

7.1.2 Unscheduled Improvements

If the improvement was not previously identified in the Water System Plan, the City will consult with a licensed professional engineer and request preparation of a project report to evaluate alternatives and present cost estimates. Upon City approval, the engineer will be directed to prepare construction plans, specifications and cost estimates in accordance with system standards. All unscheduled improvements will be reviewed and approved by DOH prior to construction.

7.1.3 Project Completion

After construction is complete, the City or the engineer will submit the following to DOH:

- Construction Completion Report certifying that construction complied with the standards specified by the DOH approved Water System Plan. (Form provided in Appendix Q).
- Documentation of the pressure test, disinfection procedures, coliform test, and water quality sample results obtained prior to placing the distribution pipe into service.

Improvements or modifications to the system sources will be submitted for DOH review in accordance with WAC 246-290-110.

7.2 POLICIES AND REQUIREMENTS FOR OUTSIDE PARTIES

The following policies provide the framework for planning, designing, operating and managing the Gold Bar system. The common goal of the policies identified herein is to provide uniform treatment for all water system customers by including documentation of the City's commitments to current water system customers, as well as potential customers considering service. City policies affecting the water system are summarized below:

7.2.1 Developer Extensions

Extensions to the water system are covered in Chapter 13.04 of the City Code. A copy of the Chapter is included in Appendix P.

7.2.2 North Snohomish County Coordinated Water System Plan

Gold Bar is within the North Snohomish County Coordinated Water System planning area. The plan was a regional effort completed in 1991 and updated in 2010 to conserve water usage and define service areas for existing utilities.

7.2.3 Growth Management Act Planning

A requirement of the Growth Management Act is consistency between land use and utility planning. Gold Bar's water system planning has taken this into account.

7.2.4 Fire Flow Requirements

As stated in WAC 246-290-230, if fire flow is provided, the distribution system shall also provide MDD plus the required fire flow at a pressure of at least 20 psi at all points throughout the distribution system and under the condition where the designed volume of fire flow reserve and equalizing storage has been depleted. The City uses the requirement described under WAC 248-57-400 for minimum fire flow, as shown in Table 7-1. Snohomish County Fire District No. 26 provides fire protection to the City. The District also recommends fire flow requirements for the City to enforce within its building code.

Table 7-1: Fire Flow Requirements*

Development Classification	Minimum Requirements	City Adopted Requirements
Rural	None	500 gpm
Residential	500 gpm for 30 minutes	1,000 for 1 hour
Commercial and multifamily structures (greater than 4000 sq. ft.)	750 gpm for 1 hour**	1,000 gpm for 1 hour
Industrial and SR 2 corridor	1,000 gpm for 1 hour**	1,500 gpm for 2 hours

Notes:

**Minimum flows are in addition to requirements for normal domestic maximum use.*

***Commercial and industrial buildings may be subject to higher flow requirements when evaluated on an individual basis by the local fire protection authority.*

Minimum standards in most cases require less flow than categories in the guidelines published by the Insurance Services Office (Municipal Survey Service, 160 Water Street, New York, New York 10038) and therefore may not result in lower insurance rates.

[Statutory Authority: RCW 43.70.040. 91-02-049 (Order 121), recodified as § 246-293-640, filed 12/27/90, effective 1/31/91. Statutory Authority: Chapter 70.116 RCW. 89-16-065 (Order 2840), § 248-57-500, filed 7/31/89, effective 8/31/89. Statutory Authority: RCW 70.116.080. 79-04-007 (Order 1378), § 248-57-500, filed 3/12/79.]

7.3 DESIGN STANDARDS

The City of Gold Bar will adopt the DOH Water System Design Manual as the system design guide. In addition to the DOH manual, the following will be used as guides for the design of system improvements:

- The most recently published edition of *Recommended Standards for Water Works, a Committee Report of the Great Lakes – Upper Mississippi River Board of State Public Health and Environmental Managers*
- Standard specifications of the American Public Works Association
- Standard specifications of the American Water Works Associations (AWWA)
- Chapter 173-160 WAC Minimum Standards for Construction and Maintenance of Water Wells

7.3.1 Performance Standards

The City must comply with design standards set forth in the Washington State Department of Health standard, WAC 246-290, and the North Snohomish County CWSP. In addition, the City will ensure all improvements are designed to meet the following performance standards:

7.3.1.1 Level of Service

Flow – System facilities shall be sized to meet peak hour demands by a combination of storage and source capabilities. Component sizing accordingly:

Sources – Wells and pumping equipment sized to meet maximum day demands (MDD).

Storage – Equalizing storage and well pumping equipment combined to meet peak hour demands (PHD).

Booster Pumps – Sized to meet peak hour demand (PHD) of the pressure zone served. If storage is provided in the pressure zone served, booster pumps can be sized for maximum day demand (MDD). Average day, maximum day, and peak hour demands shall be based on historical flow records. If accurate flow records are not available the design guides referenced above may be used.

Pressure – A minimum pressure of 30 psi is to be provided at the customer's property line under PHD. A minimum pressure of 20 pounds per square inch (psi) is to be maintained in a fire flow demand situation. Maximum service pressure is 90 psi. Pressure reducing valves on the customer's service line are acceptable for meeting the maximum pressure requirement.

Fire Flow Rate & Duration – Distribution and Storage Facilities are to be sized to deliver 1,000 gallons per minute (gpm) for two hour duration in residential areas. Commercial and industrial areas require 1,500 gpm for a two hour duration.

7.3.1.2 Sizing Criteria

Water Main Sizing Criteria – The minimum diameter of all distribution mains shall be eight inches (8") in residential areas, and twelve inches (12") along SR-2 for commercial and industrial level of service. Standard fire hydrants (5 1/4"

minimum main valve opening) will not be allowed on mains less than six inches in diameter. Pipe velocities shall not exceed 5 feet per second under peak hour demands and shall not exceed 10 feet per second in a fire flow situation.

Storage Sizing Criteria – System storage shall be sized to meet the following criteria:

Standby Storage – Volume equivalent to twice the average day demand at an elevation providing 20 psi minimum service pressure under peak hour demand conditions.
Fire Storage – Volume providing the required fire flow rate and duration at an elevation providing 20 psi minimum service pressure at peak hour demand conditions.
Equalizing Storage – Volume provided to compensate for peak hour demand exceeding pumping capacity. In accordance with DOH guidelines, equalizing storage must provide 150 minutes of peak hour exceedance.
Consolidation of Fire and Standby Storage – The smaller of standby and fire storage can be deleted conditional on each component providing the required service pressure. The bottom of the consolidated volume must be above the 20 psi pressure elevation under peak hour demand conditions. (See Appendix I for Snohomish County Fire Department approval.)

7.3.1.3 Reliability

System reliability shall be considered in the design of all improvements by incorporating the following:

Mechanical Equipment – Utilize equipment that can be service and maintained by suppliers located within 100 miles of Gold Bar. Provide receptacles for connection to backup emergency generators if needed. Require equipment supplier to provide operations training on all new equipment.

Distribution System – Provide closed loops and adequate valving to minimize service interruptions during water main repairs. Provide air relief, vacuum braking, check valves and other control valving as needed to prevent hydraulic malfunctions.

7.4 CONSTRUCTION STANDARDS

The City has developed Design and Construction Standards and Specifications for all aspects of development and construction in the City, which are maintained as a separate document. These standards were adopted in 2002 and are made available to developers upon request and are available for download on the City's website. A copy of the water system related sections of the standards are included as Appendix N.

7.5 CONSTRUCTION CERTIFICATION AND FOLLOW-UP PROCEDURES

Gold Bar will ensure the design and construction standards are met by the following means.

Design Review: All construction plans and specification will be reviewed and approved by the City engineer and Public Works Department prior to construction.

Construction Monitoring: City staff or a qualified City inspector will be employed by the City to monitor construction and ensure compliance with the plans, specifications and construction standards.

Testing: The City inspector will oversee pressure testing, disinfection, and bacteriological sampling and report results to the City and the design engineer. Upon approval by the City and engineer, the facility will be put in service.

Record/As-Built Drawings: Field revisions will be noted on the construction plans by the City inspector. Upon project completion the noted plans will be returned to the design engineer or City for preparation of a reproducible record drawing. Copies of the record drawings will be made for the City. The design engineer will retain the originals.

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CHAPTER 8:
CAPITAL IMPROVEMENT PROGRAM

The previous chapters identified capital and program improvements needed to meet future demands and regulations. This chapter will prioritize improvements, provide cost estimates, and a schedule for implementation.

There are generally three classes of water system improvements. Each class and its relevance to Gold Bar are described below.

> Maintenance Based: Those necessary improvements that are a result of age, wear, or regulatory requirements, i.e. leaking water mains or deteriorated pumping equipment. Few of the Gold Bar improvements are maintenance based.
>
> Growth Based: Improvements that are needed as a direct result of increased demand, i.e., larger water mains or increased pumping capacity.
>
> Management Based: Nonstructural improvements that are required by regulations or would enhance system efficiency, i.e., Cross Connection Control and Conservation Programs.
>
> Reliability Based: Projects that are not required to increase capacity or service area, but will improve the overall reliability of the system to continue uninterrupted service to the customers.

Improvements will also be identified according to the time frame in which their need comes about. The principal time frames to be addressed will be the 6-year, 20-year, and long-term. Long-term will be considered as beyond the 20-year time frame.

8.1 CRITERIA

The criteria used to identify and schedule system improvements are:

- **Health:** Does the improvement provide a safer water supply to the system customers and support all applicable health regulations and standards?
- **Service:** Does the improvement increase the level of service to system customers? Specifically, are service pressures, flows, or water quality upgraded by the improvement?
- **Fire Protection:** Does the improvement enhance fire protection throughout the system?
- **Supply:** Does the improvement increase the available water supply?
- **Cost:** Can the cost of the improvement be financed by the system?
- **Land Use:** Does the improvement conform with land use plans and policies?

In general, the criteria are arranged in order of priority. An improvement that addresses the health criteria will have priority over one that addresses fire protection. Since most improvements will address multiple criteria and others may have benefits that don't match the criteria, some judgment will be used in prioritizing improvements. Recommended improvements in order of priority are described below.

8.2 PRIORITIZED IMPROVEMENTS

8.2.1 Cost of Service Rate Study

The City will expand upon the Financial Analysis of this plan with the assistance of a profession rate consultant to analyze the projected water utility revenues and expenses, and develop a water rate structure for a 6 - 10 year outlook. Considerations will include at a minimum; O&M costs, CIP project costs, funding options and debt service capacity, base rates, overage rates and overage block volumes, water system assessments, and connection charges.

8.2.2 Water System Service Area Study

The City will investigate alternatives for providing water service to those properties currently un-served within the Retail Service Areas (RSA), including potential developer extensions (DE's) and Utility Local Improvement Districts (ULID's). The study will also address other areas adjacent to the water system that may expand the RSA including the current May Creek Estates water system currently operated by Snohomish County PUD under a Settlement and Release Agreement set to expire on January 1, 2020.

8.2.3 Pressure Reducing Valve at PUD Intertie

The City possess a pressure reducing valve assembly, in a concert vault that was recovered from a temporary installation as part of the May Creek Bridge replacement project. This equipment will be installed on the pipe immediately downstream of the PUD Intertie in order to moderate pressure into the 340 zone during emergency use of the intertie.

8.2.4 High Flow Pumps at Booster Pump Station

The Booster Pump Station at Well 4 is intended to provide fire protection flow capacity for the lower pressure zone, including the commercial areas along the highway. The design included two – 1,500 gpm pumps and variable frequency drives. Funding was not sufficient the time of the pump station construction, so the two pumps were deducted from the construction contract. This project will provide for installation of the two pumps, VFD for each, and all necessary SCADA and telemetry equipment, programming and integration into the existing system.

Only one pump is required to provide the design flow. Two pumps are designed to meet the standard level of reliability for fire protection systems.

8.2.5 Convert to Automated Meter Reading

Recording customer water usage by Touch Read or radio signal, reduces labor costs and improves billing accuracy. The City has taken a step towards the conversion by installing service meters with remote reading capability on all new connections. Completing the conversion will require replacing the remaining meters and purchasing the necessary billing software and meter reading equipment.

8.2.6 Rehabilitate Well 2

Rehabilitation of Well 2 offers an economical method to increase source capacity by utilizing existing facilities and water rights. Water rights of up to 180 gpm and 336 ac.ft./yr at Wells 1 and 2. A down-hole video inspection of the existing well and screen will be conducted to determine the condition of the equipment and any necessary repairs or redevelopment for re-activation. Once the well is suitable for service, a new pump, controls, piping modifications and chlorination equipment will be installed to put the well back into service.

8.2.7 Construct New Well (Well 5)

Wells 3 and 4 currently have capacity to meet projected maximum day demand requirements through the twenty year planning period. However, source reliability and redundancy considerations may warrant an additional well to maximize current water rights.

Previous planning efforts identified a potential well site near Dorman Road. This site and the aquifer characteristics will be investigated and the feasibility confirmed. Another option for consideration would be to drill and develop a new well at the Well 4 site, and either blend or treat the wells to pump directly to Tank 3.

8.2.8 Water Treatment System

For full use of the water right and physical capacity of Well 4, a water treatment system will be required to filter silt and sediment created during higher pumping rates, and to remove the trace levels of arsenic present in the ground water. Treat will extend the capacity of the water system, and provide for more efficient use of energy by allowing for pumping directly into Tank 3 (concrete tank at Well 4).

8.2.9 Water Main Replacements and Upgrades

The distribution grid contains segments of four-inch diameter piping, which should be upsized to ensure fire flow can be provided. In addition, there are water main replacements and extensions identified in the previous planning effort which have yet to be completed. The recommended water main projects are listed below, grouped according to priority.

Table 8-1: Recommended Water Main Projects
Grouped by Priority

PRIORITY A:	Length
9th Street – SR 2 to Linda Avenue,	1,400
10th Street – SR 2 to end & loop to 9th	1,450
Grand Avenue – 1st Street to Linda Ave. / 3rd Street	850
Linda Avenue –3rd Street to 9th Street	2,000
1st Street – Replace existing 8-inch AC	1,800
7th Street – SR 2 to Linda Ave.	1,400
Lewis Avenue – 1st Street to 10th Street	2,900
Orchard Avenue – 3rd Street to 10th Street	2,300
Total	14,100
PRIORITY B:	**Length**
2nd Street – SR 2 to Grand Avenue	1,150
3rd Street – SR 2 to Grand Avenue	1,150
4th Street – SR 2 to Lewis Avenue	550
5th Street – SR 2 to Linda Avenue	1,400
6th Street – SR 2 to Linda Avenue	1,400
8th Street – SR 2 to Lewis Avenue	550
Total	6,200

Table 8-1: Recommended Water Main Projects *Grouped by Priority*	
PRIORITY C:	**Length**
391st Ave. SE, Verlinde to end	1,150
Smeltzer and Verlinde Roads	1,300
Green Lane to Smeltzer Road, complete loop	500
Timber Lane to Evergreen Place, complete loop	300
Evergreen Way to Evergreen Place, complete loop	270
Verlinde Avenue to 1st Ave. West, complete loop	280
SR 2 - 2nd Street to Nugget Road with new 12" DI	2,950
Total	6,750

8.3 ALTERNATIVES TO WATER MAIN REPLACEMENT

The water main replacements are required due to existing undersized and substandard piping and future needs anticipated at the outer limits of the service area. There are effectively no alternatives.

These improvements and the proposed implementation year are shown in Table 8-2. Chapter 9 evaluates revenue requirements and funding options for completing the schedule.

Table 8-2
GOLD BAR WATER SYSTEM
CAPITAL IMPROVEMENT PROGRAM

	Project Title	Classification	Description				Cost Estimate[1]	2015	2016	2017	2018	2019	2020	2021-2025	2026-2035
1	Cost of Service Rate Analysis	Management	Consulting services to analyze the projected water utility revenues and expenses, and develop a water rate structure for a 6-10 year outlook.			$	10,000	$ 10,000							
2	Water System Service Area Study	Growth	Investiagte alternatives for serivce to full extent of corpoate City Limits			$	15,000		$ 15,000						
3	PRV at Intertie with PUD #1	Reliability	Install existing PRV and vault at intertie on May Creek Road			$	15,000	$ 15,000							
4	High Flow Pumps at BPS	Reliability	2 - 100 hp pumps and VFD's at Well 4 BPS			$	250,000			$ 125,000			$ 125,000		
5	Automated Meter Reading System	Maintenance	Replace meters with remote read equipment, software and billing system			$	140,000				$ 140,000				
6	Rehabilitate Well 2	Maintenance	Reconnect Well 2 for use as a supplemental source			$	15,000					$ 15,000			
7	Construct New Well (Well 5)	Growth	Secure well site and drill new well with minimum 310 gpm capacity			$	680,000							$ 680,000	
8	Well 4 Water Treatment System	Regulatory	Install treatment equipment to reduce/remove contaminants			$	500,000							$ 500,000	
9	Water Main Replacements & Upgrades	Maintenance	Repalce undersized and asbestos cement pipes with new / larger mains												
			PRIORITY A:												
	8" DI water main cost per LF:	**$ 300.00**	9th Street - SR2 to Linda Avenue,	1400	LF	$	420,000			$ 420,000					
	12" DI water main cost per LF:	**$ 330.00**	10th Street - Lewis Avenue to end & loop to 9th	1450	LF	$	435,000			$ 250,000	$ 185,000				
			Grand Avenue - 1st Street to Linda Ave.	850	LF	$	255,000				$ 255,000				
			Linda Avenue -3rd Street to 9th Street	2000	LF	$	600,000				$ 300,000	$ 300,000			
			1st Street - Replace existing 8 inch AC	1800	LF	$	540,000					$ 350,000	$ 190,000		
			7th Street - SR2 to Linda Ave.	1400	LF	$	420,000						$ 300,000	$ 120,000	
			Lewis Avenue - 1st Street to 10th Street	2900	LF	$	870,000						$ 300,000	$ 570,000	
			Orchard Avenue - 3rd Street to 10th Street	2300	LF	$	690,000								$ 690,000
			Total	14,100	LF	$	4,230,000	$ -	$ -	$ 670,000	$ 740,000	$ 650,000	$ 790,000	$ 690,000	$ 690,000
			PRIORITY B:												
			2nd Street - SR2 to Grand Avenue	1150	LF	$	345,000							$ 345,000	
			3rd Street - SR2 to Grand Avenue	1150	LF	$	345,000							$ 345,000	
			4th Street - SR2 to Lewis Avenue	550	LF	$	165,000							$ 165,000	
			5th Street - SR2 to Linda Avenue	1400	LF	$	420,000								$ 420,000
			6th Street - SR2 to Linda Avenue	1400	LF	$	420,000								$ 420,000
			8th Street - SR2 to Lewis Avenue	550	LF	$	165,000								$ 165,000
			Total	6,200	LF	$	1,860,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 855,000	$ 1,005,000
			PRIORITY C:												
			391st Ave. SE, Verlinde to end	1150	LF	$	345,000								$ 345,000
			Smeltzer & Verlinde Roads	1300	LF	$	390,000								$ 390,000
			Green Lane to Smeltzer Road, complete loop	500	LF	$	150,000								$ 150,000
			Timber Lane to Evergreen Place, complete loop	300	LF	$	90,000								$ 90,000
			May Creek Road to Evergreen Place, complete loop	270	LF	$	81,000								$ 81,000
			Verlinde Avenue to 1st Ave. West, complete loop	280	LF	$	84,000								$ 84,000
			SR 2 - 2nd Street to Nugget Road with new 12" DI	2,950	LF	$	973,500								$ 973,500
			Total	6,750	LF	$	2,113,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,113,500
			TOTAL:			**$**	**9,828,500**	**$ 25,000**	**$ 15,000**	**$ 795,000**	**$ 880,000**	**$ 665,000**	**$ 915,000**	**$ 2,725,000**	**$ 3,808,500**

[1] ***All costs shown in 2013 dollars. Estimates include 25% contingency, 40% indirect costs (engineering, CM, permitting).***

CHAPTER 9:
FINANCIAL PROGRAM

The purpose of this chapter is to present the City of Gold Bar's financial program and provide assurance that the City has and will have the financial ability to maintain and operate the utility and implement the water system improvements as identified in the CIP presented in Chapter 8. The chapter is structured to provide information required by WAC 246-290-100.

The financial plan presented herein provides a cursory review of rates and charges to determine the magnitude of increases that may be required under assumed growth scenarios. It does not provide the City with the detailed cost of service rate analysis that should be performed periodically to ensure equity between the various types of connections served by the City. Instead, this chapter considers the "total system" costs of providing water service – both operating and capital and defines the overall level of funding that will be required to fund the recommendations of this under this Water System Plan.

9.1 FINANCIAL CONSIDERATIONS

Financial review and recommendations are made based on estimated future expenses, operating experience and plans for future projects. The major considerations in estimating expenses include the following:

- Administration, operation, maintenance and the day-to-day expenses of operating and maintaining the water and sewer systems;
- The charges associated with water production and purchases;
- Financing capital improvements which are necessary to provide adequate service and extension to existing and new service areas;
- Replacement and updating of existing facilities that require renewal because they are obsolete or no longer serviceable; and,
- Debt service requirements to provide for repayment of interest and principal for all outstanding bonds for previous system improvements.

9.2 FUNDING SOURCES

The following listed revenue sources are available to the City to fund operation and maintenance expenses and financing capital improvements to the water systems. Although careful review of each potential source of funding (primarily grants and low interest loans) is recommended to develop the most cost effective financial strategy for future system operation, recent economic conditions have greatly lessened the amount and variety of financial assistance available to public water systems. In addition, regular consideration of evaluation of connection charges and rates as discussed below is recommended as a follow-up to this Plan.

9.2.1 Rates

Monthly water rates and charges are utilized to finance expenses which were not paid either when the system (or portion thereof) was initially constructed, or by the assessment of general facility charges. These expenses typically include: operation and maintenance expenses; water production and purchase costs; customer accounting and collection expenses; administration and general expenses; taxes; debt service requirements; and renewal and replacement or capital expenses. The City's current water rates adopted in

City of Gold Bar Resolution 28-03, adopted August 19, 2008 and in effect as of January 2015, are shown in Tables 9-1 and 9-2.

Each individual commercial and residential connection to the water system shall pay a monthly assessment as established by resolution of the council, in addition to the charge for water consumed. This assessment shall be charged to the property owners of all building sites within the city limits. This includes building sites within the city limits that are not connected to the city water system if the property can reasonably be connected to the city water system.

All multiplex business and residential properties connected to the city water system shall also pay an assessment as established by resolution of the council for each separate unit. This assessment shall also extend to mobile home parks connected to the city water system for each usable pad or space in the mobile home park.

The purpose of these assessments is to retire the city's water debt obligations and to fund water system improvements. All monies accumulated from these assessments shall be paid first into the water debt funds and required accounts until a sufficient amount of money has accumulated to make the annual debt payments. Thereafter, an amount to be set each year by council resolution during the annual budget process shall be transferred to the water emergency reserve fund. Thereafter, all monies accumulated from these assessments shall be paid into the water capital improvement fund.

The City's Rate Structure consists of four key components:

- A monthly Base Rate Charged to each connection to the system receiving service. Monthly Base Rate charges are based on customer type and meter size and include an allowance for water usage – also based on meter size.
- A water usage Overage rate for water used in excess of the monthly allowance included in the base meter fee.
- A Reserve Component assessed to each connection or multi-family unit to the water system. Reserve charges fund an emergency reserve to assist with water system emergencies, main breaks or unanticipated equipment failures.
- A water system Assessment Charge is charged to each individual commercial and residential connection to the water system. This assessment is charged to the property owners of all building sites within the city limits. This includes building sites within the city limits that are not connected to the city water system if the property can reasonably be connected to the city water system. This portion of the rate is dedicated to a capital improvement fund, debt service or an emergency fund. Table 9-2 presents current assessment charges associated with funding capital improvements.

Connection Charges are not part of regular rates and are assessed at the time new connections are added to the system. Connection charges are not addressed in this Water System Plan, although it is recommended that they be reviewed as a follow-up to this planning effort.

Table 9-1: 2014 Standard Monthly Water Rates			
Residential & Multi-Family Monthly Base Rates			
Meter Size	**Base Quantity Allowance (gallons)**	**Inside City Limits**	**Outside City Limits**
3/4 to 1 inch	**7,500**	**$30.90**	**$38.27**
1½ to 2 inch	**30,000**	**$112.07**	**$141.60**
3 inch	**100,000**	**$364.64**	**$463.04**
4 inch & above	**250,000**	**$905.85**	**$1,151.85**
Residential & Multi-Family Overage Rates			
Gallons Over Base Quantity		**Inside City $/gal**	**Outside City $/gal**
0 to 50,000		**0.003698**	**0.004704**
50,001 to 100,000		**0.004069**	**0.005178**
100,001 to 500,000		**0.004474**	**0.005695**
500,001 plus		**0.004922**	**0.006264**
Residential and Multi-Family Reserve Component (monthly rate to be added to base rate)			
Residential per connection:			**$2.00**
Multi-Family per unit:			**$1.40**
Commercial & Industrial Base Rates			
	Base Quantity Allowance (gallons)	**Inside City Limits**	**Outside City Limits**
3/4 to 1 inch	**7,500**	**$33.35**	**$40.73**
1 1/2 to 2 inch	**30,000**	**$122.36**	**$151.44**
3 inch	**100,000**	**$397.44**	**$495.84**
4 inch & above	**250,000**	**$987.85**	**$1,233.86**
Commercial & Industrial Overage Rates			
Gallons Over Base Quantity		**Inside City $/gal**	**Outside City $/gal**
0 to 50,000		**$0.004034**	**$0.005043**
50,001 to 100,000		**$0.004437**	**$0.005548**
100,001 to 500,000		**$ 0.004882**	**$0.006102**
500,001 plus		**$0.005370**	**$0.006712**
Commercial Reserve Component Reserve Component (monthly rate to be added to base rate)			
Residential per connection:			$2.00

Table 9-2: 2014 Capital Improvement Charges	
Water System Assessment Charge [1] *(monthly)*	
Individual Residential or Commercial	$12.41/lot/unit
Notes: [1] *Used to pay system debt and finance Capital Improvements.*	

9.3 WATER SYSTEM BUDGET

The financial policies and status of the City's water utility have been reviewed to evaluate the ability to provide the level of service and recommended improvements outlined in this document. In developing the anticipated six-year budget for the water utility, data from the City's current (2015) projected water utility budget information was combined with information from previous plan chapters.

Table 9-3 presents the likely scenario if the water utility were to continue to operate at current rates. As indicated, there is a significant need for additional capital to fund water system operations and the Capital Improvement Plan recommended in Chapter 8. Additional funds from monthly rates and assessment charges, plus financial assistance from grants, low interest loans or bond financing is required.

Several financial scenarios were considered in development of this Plan. Although the ability to fund projects out of cash reserves is often desired, debt financing with low interest loans or bonds is a way to spread improvement costs over a longer period of time and avoid sharp rate increases in the future. Table 9-4 presents a scenario that includes both a rate increase and outside financial assistance to meet the obligations of maintaining the existing water system level of service and implementing the capital improvement recommendations over the next six years. An initial 25% rate increase in 2016 and subsequent 10% increase in 2018 is indicated as a starting point to accumulating funds for needed improvements. Outside debt financing and paybacks are assumed starting in 2017. Outside debt financing has been assumed to be by state funded low interest loans at 3.5%, although bond financing may be needed due to the decline in available funding programs and funds.

The scenario put forth in Table 9-4 provides a conceptual methodology that allows the City to accomplish the most critical (Priority A) water main replacements while maintaining emergency reserves. It is recommended that the City initiate the program to systematically replace pipelines be replacing pipes in high demand areas with a history of pipeline breaks and failures and high fire flow requirements first. Annual review of pipe replacement priority based on system performance and break history is recommended to confirm replacement priority.

A full rate study, including cost of service analysis is required to ensure equity between rate classification (residential, multi-family, commercial) and make sure that ratepayers are paying their fair share of water system facilities and operation and maintenance costs. Following an initial full rate study, it is recommended that water rates and charges be reviewed on an annual basis.

Consideration of reallocation of water rates between meter charges and commodity charges is suggested as a means of ensuring more consistent water revenues despite varying water sales associated with changing weather patterns. A review of water use of the past several years confirms fluctuations in revenue based on economic conditions and weather patterns. This type of fluctuation can be devastating to a utility with limited capital reserves and a relatively small customer base. By increasing water base rates the City is assured of a more steady revenue stream and can better plan for future system upgrades and improvements.

Consideration of the effectiveness of the current water usage allowances is also recommended as a means of giving customers incentive to conserve water and support the City's water use efficiency program. This typically includes a tiered or block rate structure where base water consumption is charged at a lesser rate than higher volumes of use. Although this type of rate structure has been very effective in encouraging conservation of finite groundwater resources, eliminating the usage allowance in the base rate structure and charging for all water used would be more effective. This would provide customers a more direct way to save on their water bills through conservation and mandates that the high water users pay a fair share of system facilities and operation costs determined by volume. Another viable alternative would be a simple differential rate between winter and summer water use to encourage conservation during the typically high demand summer months and offset the additional capacity required to support higher demands during the summer months.

TABLE 9-3: 2015 - 2020 Projected Budget UNDER CURRENT RATES No Rate Increase or Financial Assistance	Annual Growth /Inflation Factor	2%					
	Rate Increase	None					
	2014 Amended Budget	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
BEGINNING BALANCE *(includes Water Fund and CIP Fund)*	***509,728***	***589,792***	***507,377***	***519,215***	***(244,651)***	***(1,089,546)***	***(1,715,399)***
REVENUE							
Water Sales & Receipts Base Rates and Commodity Charges	309,500	310,000	316,200	322,524	328,974	335,554	342,265
Capital Improvement Assessment Revenue	117,000	117,500	119,850	122,247	124,692	127,186	129,729
Subtotal Monthly Rates and Charges	426,500	427,500	436,050	444,771	453,666	462,740	471,995
New Account Fees	*4,150*	4,200	4,284	4,370	4,457	4,546	4,637
Late Fees and Shut offs	3,400	3,500	3,570	3,641	3,714	3,789	3,864
Interest	80	110	112	114	117	119	121
Interfund Transfers and Repayments	29,585	29,453	30,042	30,643	31,256	31,881	32,519
Other Transfers and Reimbursements (CIP Fund)	3,025	3,150	3,213	3,277	3,343	3,410	3,478
Revenue	**466,740**	**467,913**	**477,271**	**486,817**	**496,553**	**506,484**	**516,614**
EXPENDITURES							
Salaries, Wages and Benefits	185,276	167,478	170,827	174,244	177,729	181,283	184,909
Materials and Supplies	31,300	31,900	32,538	33,189	33,853	34,530	35,220
Other Administative and O & M Expenses	53,550	78,110	79,672	81,266	82,891	84,549	86,240
Excise Tax To State	21,000	21,000	420	8	0	0	0
Transfer Out/ Emergency Fund	8,000	111	8,000	8,000	8,000	8,000	8,000
Other Transfers and Disbursements	78,000	123,976	123,976	123,976	123,976	123,976	123,976
Expenses	**377,126**	**422,574**	**415,433**	**420,682**	**426,448**	**432,337**	**438,345**
Operations Surplus/(Deficit)	**89,614**	**45,339**	**61,838**	**66,134**	**70,105**	**74,147**	**78,269**
CUMULATIVE SUBTOTAL	***599,342***	***635,131***	***569,215***	***585,349***	***(174,546)***	***(1,015,399)***	***(1,637,130)***
CIP EXPENSES							
Water Comp Plan Update	6,500	30,000					
Major Maintenance Projects	3,050	5,000	5,000	5,000	5,000	5,000	5,000
Professional Services	-	30,000	30,000	30,000	30,000	30,000	30,000
Major Operations R & M	-	-					
Other Non-Expenditures - Reallocated Costs (DB & CR)	-	-					
Capital Expenditures - CDBG	-	32,754					
PROPOSED CIP							
1 Cost of Service Rate Analysis		15,000					
2 Water System Service Area Study			15,000				
3 PRV at Intertie with PUD #1 (Installation Only)		15,000					
4 High Flow Pumps at BPS				125,000			125,000
5 Automated Meter Reading System					140,000		
6 Rehabilitate Well 2						15,000	
7 Construct New Well (Well 5)							
8 Well 4 Water Treatment System							
9 Water Main Replacements & Upgrades Priority A		-	-	670,000	740,000	650,000	790,000
Annual CIP Expenses		127,754	50,000	830,000	915,000	700,000	950,000
Cumulative Surplus/Deficit		**507,377**	**519,215**	**(244,651)**	**(1,089,546)**	**(1,715,399)**	**(2,587,130)**

TABLE 9-4: 2015 - 2020 Projected Budget ALTERNATE 1 - 25% BASE RATE INCREASE LOW INTEREST (3.5%) FUNDING								
	Growth/Inflation Rate	2%	2%	2%	2%	2%	2%	
	Rate Increase		25%	0%	10%	0%	0%	
	Approx. Base Rate [1]	$ 43.31	$ 54.14	$ 54.14	$ 59.55	$ 59.55	$ 59.55	
		2014 Amended Budget	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
	BEGINNING BALANCE *(includes Water Fund and CIP Fund)*	***509,728***	***589,792***	***507,377***	***607,227***	***452,712***	***345,653***	***370,590***
REVENUE								
	Water Sales & Receipts Base Rates and Commodity Charges	309,500	310,000	395,250	403,155	452,340	461,387	470,614
	Capital Improvement Assessment Revenue	117,000	117,500	149,813	152,809	171,451	174,880	178,378
	New Account Fees	*4,150*	*4,200*	4,284	4,370	4,457	4,546	4,637
	Late Fees and Shut offs	3,400	3,500	3,570	3,641	3,714	3,789	3,864
	Interest	80	110	112	114	117	119	121
	Interfund Transfers and Repayments	29,585	29,453	30,042	30,643	31,256	31,881	32,519
	Other Transfers and Reimbursements (CIP Fund)	3,025	3,150	3,213	3,277	3,343	3,410	3,478
	REVENUE	**466,740**	**467,913**	**586,284**	**598,010**	**666,678**	**680,012**	**693,612**
	Low Interest Loan or Bond				670,000	740,000	650,000	790,000
	REVENUE (incl. Loans)	**466,740**	**467,913**	**586,284**	**1,268,010**	**1,406,678**	**1,330,012**	**1,483,612**
EXPENDITURES								
	Salaries, Wages and Benefits	185,276	167,478	170,827	174,244	177,729	181,283	184,909
	Materials and Supplies	31,300	31,900	32,538	33,189	33,853	34,530	35,220
	Other Administative and O & M Expenses	53,550	78,110	79,672	81,266	82,891	84,549	86,240
	Excise Tax To State	21,000	21,000	21,420	21,848	22,285	22,731	23,186
	Transfer Out/ Emergency Fund	8,000	111	8,000	8,001	8,002	8,003	8,004
	Other Transfers and Disbursements	78,000	123,976	123,976	123,977	123,978	123,979	123,980
	Debt Service on $2.85 Million Loan for Priority A Replacements				150,000	150,000	150,000	150,000
	Expenses	**377,126**	**422,574**	**436,433**	**592,524**	**598,737**	**605,075**	**611,538**
	Subtotal - Surplus before CIP	***599,342***	***635,131***	***657,227***	***1,282,712***	***1,260,653***	***1,070,590***	***1,242,663***
CIP EXPENSES								
	Water Comp Plan Update	6,500	30,000					
	Major Maintenance Projects	3,050	5,000	5,000	5,000	5,000	5,000	5,000
	Professional Services	-	30,000	30,000	30,000	30,000	30,000	30,000
	Major Operations R & M	-	-					
	Other Non-Expenditures - Reallocated Costs (DB & CR)	-	-					
	Capital Expenditures - CDBG	-	32,754					
	PROPOSED CIP							
1	Cost of Service Rate Analysis		15,000					
2	Water System Service Area Study			15,000				
3	PRV at Intertie with PUD #1 (Installation Only)		15,000					
4	High Flow Pumps at BPS				125,000			125,000
5	Automated Meter Reading System					140,000		
6	Rehabilitate Well 2						15,000	
7	Construct New Well (Well 5)							
8	Well 4 Water Treatment System							
	Water Main Replacements & Upgrades Priority A		-	-	670,000	740,000	650,000	790,000
	Annual CIP Expenses		**127,754**	**50,000**	**830,000**	**915,000**	**700,000**	**950,000**
	Cumulative Surplus/Deficit		**$ 507,377**	**$ 607,227**	**$ 452,712**	**$ 345,653**	**$ 370,590**	**$ 292,663**

(1) - Monthly Single Family Base Rates are shown. Taxes, Commodity Overage Charges and Reserve Charges are not included.

9.4 OUTSIDE FUNDING

Under the assumption that Gold Bar will pursue outside financing for capital improvements, the following summary of possible funding sources is presented.

9.4.1 Drinking Water State Revolving Fund (DWSRF) – Loan

Agencies – Washington Public Works Board and Department of Health

Eligibility – Water system improvements necessitated by the Safe Drinking Water Act.

Terms – Interest rate varies (discounts for economically distressed counties or disadvantaged communities plus principal forgiveness based on affordability), 20 year maximum payback.

9.4.2 USDA Rural Development – Loans and Grants

Agency – United States Department of Agriculture (USDA)

Eligibility – Local governments and utility districts

Terms – Interest rate, 2.75% minimum, 4.625% maximum, dependent on service area income. 40-year maximum payback grant funding dependent on health threat and household income.

9.4.3 Community Development Block Grant (CDBG) – Grants

Agency – Washington Office of Community Development

Eligibility – Cities with populations less than 50,000. Projects must principally benefit low-moderate income persons.

Terms – Grants not to exceed $750,000 or $10,000 per benefiting home.

9.4.4 Public Works Trust Fund – Construction Loan Program

Note: The Public Works Trust Fund (PWTF) was not funded for the July 2013 – June 2015 biennium. The status for 2015 and beyond has yet to be determined.

Agency – Washington Public Works Board

Eligibility – Cities, counties, special purpose districts.

Terms – Interest rates vary. 20 year payback

Gold Bar's needed improvements would be strong candidates for a DWSRF loan. Both the USDA and CDBG programs are very competitive and place more restrictions on eligibility.

For the purpose of developing a six-year operating budget presented in Tables 9-3 and 9-4, the DWSRF Loan at a 3.5% interest rate was the assumed funding source. However, it is possible that future circumstances may make another funding program preferable.

9.5 RESERVE ACCOUNTS

Reserve accounts are necessary to protect water systems from unforeseen financial crises. The following reserve accounts are generally accepted. Explanations of the purpose and suitability for Gold Bar are given.

9.5.1 Operating Cash Reserve

An operating cash reserve protects a system from cash flow problems. There can be a significant length of time between when a system provides a service and when the customer pays for that service. A 45-day difference is the accepted industry norm. Because of this delay in payment most systems attempt to keep at least 1/8 of their annual operations, maintenance and administrative expenses in an Operating Cash Reserve. As the City of Gold Bar utilizes its general fund as an operating reserve, a new operating reserve is not necessary.

9.5.2 Emergency Reserve

A funded emergency reserve allows for emergency replacement of a major capital facility, which may be a well, a source of supply, key transmission lines, or the largest piece of pumping equipment. The City currently collects a $2.00 per month connection reserve fee for this purpose.

9.5.3 Replacement Reserve

A replacement reserve is intended to offset the cost of replacing part of or an entire system. It is generally recommended that a system start a replacement reserve by setting aside one-twentieth (1/20) of the total system replacement cost on an annual basis. The replacement cost of the Gold Bar system is estimated at $4,000,000. A one-twentieth annual reserve payment would be $150,000. An annual reserve payment of this size is not realistic under the current financing structure. Gold Bar will focus on establishing an emergency reserve first. Establishing a replacement reserve will be a goal for five to ten years in the future.

9.6 FINANCIAL VIABILITY TEST

The Department of Health requires public water systems to assess their ability to meet the total costs of developing, constructing, operating, and maintaining water service in compliance with federal, state, and local requirements. The financial viability test (FVT) is the method recommended by the DOH to complete this assessment.

Four separate tests comprise the FVT. The first three determine if the system has an adequate operating budget, operating cash reserve and capital cash reserve. The fourth test determines how high the system rates are relative to the service area's median household income (MHI). The DOH provides guidelines for completing an FVT. The results of each test are summarized below.

9.6.1 Operating Budget – Test 1

The operating budget test compares system revenues to expenses for the next six years. Projected increases in number of service connections, demand on sources, and operating expenses are included to determine if the current rate structure is adequate. The six year projected budget, Table 9-8, must show revenues in excess of expenses to pass the test. If not, the rate structure should be evaluated and increased. As shown in Table 9-8, revenues are expected to exceed expenses during the 2014–2019 period. The proposed operating budget in Table 9-8 meets the conditions of Test 1.

9.6.2 Operating Cash Reserve – Test 2

The City utilizes its general reserve as an operating cash reserve. This meets the conditions of Test 2.

9.6.3 Emergency/Reserve – Test 3

The well sources are the most vulnerable component in the system with contaminated well sources being the most critical emergency. Current estimates for drilling and connecting a new well are approximately $200,000. A passing test would require a capital cash reserve equal to this amount. It will take several years for the City to create an adequate emergency reserve. Until then, Test 3 fails.

9.6.4 Household Income Index – Test 4

The final test is a comparison of the system water rates to the service area median household income. It is generally advised that the cost of water service to a household should not exceed 1.5% of the household income. A service cost in excess of 1.5% indicates that water rates are relatively high and that any increases in revenue should not be derived from user rates.

The Median Household Income (MHI) for Gold Bar according to the 2010 Federal Census was $57,700. Assuming household income has and will continue to grow at an annual rate of 2%, the 2014 MHI would be approximately $62,500. The rate schedule proposed and used to develop the operating budget projects an annual cost of service in 2014 of approximately $733 per ERU, which is 1.2% of the MHI. Test 4 passes for the period.

The proposed capital improvements and DWSRF loan payments will necessitate an increase to the System Assessment Charge in 2018. Annual cost of service will then be approximately $968 per ERU. If household income would continue to grow at 2% annually, the 2018 MHI would be $67,700. In comparison to the MHI, the 2018 annual cost would be 1.5%. Test 4 passes for the proposed rate increase.

9.7 SUMMARY

The initial FVT for Gold bar is based on estimated revenues and expenses. Revisions to the budget and the scheduled improvements may be necessary due to funding availability or customer response to rate increases. Passing the FVT is not an indication of solvency, especially in this case where the budget is preliminary. The FVT does however serve as a guide for checking the financial status of the system.