Timberlake Community Club, Inc.

2018 Comprehensive Water System Plan

April, 2018

CHS ENGINEERS

TIMBERLAKE COMMUNITY CLUB, INC.

2018 COMPREHENSIVE WATER SYSTEM PLAN

April, 2018

CHS ENGINEERS

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This plan was prepared under the direction of a Registered Professional Engineer.

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Approved by: _____

Date: 4/2/18

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~Pride in Ownership~

March 28, 2017

The Timberlake Board of Directors has adopted the six (6) year plan for their 2016 Water System Comprehensive Plan.

President _____

Vice President Catherine Robertson

Treasurer _____

Secretary Linda Bruder

Covenants Director N/A

Director at Large Lynda L Miller

Director at Large N/A

CHAPTER 1

DESCRIPTION OF WATER SYSTEM

1.1 OWNERSHIP AND MANAGEMENT

The Timberlake Community Club is a residential community located in Mason County, Washington. The Community operates a privately owned water system dedicated to providing water to the residents of the Community Club. The water system is registered as a non-profit corporation and is owned by the members of the Community. The system is regulated by the Washington State Department of Health (DOH) and is formally identified as:

Timberlake Community Club Inc.
Mason County
System ID No. 88370Y

A copy of the current Water Facilities Inventory (WFI) Report is included Appendix A.

The Timberlake Community Club is governed by the Board of Directors. The rules and regulations pertaining to the Board of Directors can be found in the By-Laws of Timberlake Community Club, included in Appendix B.

The operation of the water system is under the control of the Water Board, which reports to the Board of Directors. The rules and regulations pertaining to the Water Board can be found in the Timberlake Community Club Water System Policy, also included in Appendix B.

1.2 AUTHORIZATION

Recognizing the need for establishing a uniform process to identify the present and future needs of the Community's water facilities and setting forth a means to meet those needs in an efficient manner, the Board of Directors authorized CHS Engineers to proceed with the studies required to prepare this updated Comprehensive Water System Plan (CWSP).

This plan brings together information regarding the existing water system and data from future projections into an organized document. This document will be used for the planning and prioritization of improvements within the Community's water retail service area.

1.3 SYSTEM BACKGROUND AND CHARACTERISTICS

1.3.1 Historical Water Systems Development

The water system for the Timberlake Community Club was developed in 1967 during the division of the lots around Timberlake and Little Timberlake,

which is located in southern Mason County approximately six miles due east of the Town of Shelton (see Figure 1.1). Well #1 was drilled and a 60,000 gallon concrete reservoir was constructed at this time. The area was originally developed as a private camping area but has since grown into a community with both full time residential and recreational users. Well #2 was drilled in 1971. In 1976, Robischon Engineers was contracted to write a Comprehensive Plan for the Water System. At that time, the two water system wells were reportedly capable of a combined production of approximately 600 gallons per minute (gpm). These two wells were providing water to 50 services.

The 1976 Comprehensive Plan proposed the construction of an additional well and a 200,000 gallon storage tank to supply the build-out needs of the water system. This plan also stated that concentrations of iron found in the water supply were slightly higher than the allowable level of 0.3 mg/L. This was noted as a large decrease from the amount found in the water in 1969, which was reportedly 0.8 mg/l. Although the iron concentrations were high, there were no reported complaints of staining or any iron bacterial growth in the water system.

In 1982, an engineering status report was completed which stated that combined well production had dropped to 455 gpm while the total amount of services increased to approximately 140. The iron concentrations were reported as lower than the allowable level but manganese concentrations were reported at twice the maximum allowable level.

Another engineering status report was completed in 1988, which focused mainly on water quality issues. In this report, tests showed the presence of iron bacteria and small amounts of hydrogen sulfide gas in the system. In this report, it was recommended that more flushing of the lines be performed along with super chlorinating the trouble areas. The plan also highlighted the rapid turnover in the small storage facilities which caused the chlorine contact time to be limited and intensified the gas and bacterial growth. This report recommended that a third well be constructed along with the installation of water service meters and a hydro-pneumatic pressure tank to replace the existing pressure control valve.

In 1995, the Community constructed a 200,000 gallon steel reservoir in response to increased demands.

In 1999, the Community began work on a complete revision of the Comprehensive Water System Plan written under the recently published DOH guidelines. The plan reviewed all aspects of the water system including items such as system demands, water quality, operation procedures and recommended capital improvement projects. Some of the recommended projects included the construction of a third well, the construction of a water filtration facility and various main replacement projects aimed at improving flows within the system.

In 2000, CHS Engineers Inc. prepared the *New Water Source Planning Report* incorporating recommendations from Robinson & Noble Inc. The report noted a need for either an additional source or additional storage based on the future demands of the Community.

The Community constructed a third well based on the recommendations of the *New Water Source Planning Report* in 2001. Well #3 was drilled in the near vicinity of Wells #1 and #2, under the existing Community water rights. After the construction of Well #3, Well #1 became a point of emergency withdrawal instead of a primary production well. The Community applied to have Wells #1, #2 and #3 designated as a well field. The well field was approved by DOE in 2013.

In 2004, a major construction project was undertaken by the Community. The supply/distribution system for the 200,000 gallon steel reservoir was reconfigured, a new filtration and booster pump station was constructed and a new hypochlorite generation and injection system was constructed that replaced the previously constructed chlorine generation system.

The Comprehensive Water System Plan was updated in 2008 and approved by the Office of Drinking Water (ODW) in 2010. In their approval letter, ODW limits the number of service connection to 1,020. This approval letter is included in Appendix C.

1.3.2 Topography

The Community's retail service area encompasses approximately 670 acres. In the late 1960s, the entire area was platted into residential lots spread amongst forest land and two lakes (see Figure 1.2). The topography is generally flat with slightly increased elevations along the northwestern edge and decreased elevations in the southeastern corner of the Community. Elevations range from 160 feet in the depression to 260 feet at the high point. The wells and reservoirs are located in the southwestern portion of the Community and are at an approximate elevation of 230 feet. Both lakes have a surface elevation of approximately 160 feet.

1.3.3 Soils

As a part of the investigation for the *New Water Source Planning Report* discussed above in Section 1.3.1, Robinson & Noble, Inc. conducted hydrogeologic site investigations.

In general, the report found that the surface geology in the Timberlake area is dominated by glacial till deposits of Vashon age, varying in thickness from one to 145 feet. Beneath the till, Vashon advance outwash deposits were found throughout the study area. Underlying the advance outwash is the undifferentiated Kitsap Formation. The Kitsap Formation is a low permeability unit that acts as a confining unit within the study area. The source aquifer for the Timberlake wells lie beneath the Kitsap Formation. The presence of the Vashon till material and the thick, fine-grained Kitsap

Formation gives this aquifer system a high level of protection from potential contamination at the surface.

1.3.4 Climate

The climate near the Timberlake Community is typical of the Puget Sound region. The Pacific Ocean air masses are relatively mild, producing moderate summer and winter temperatures. Local precipitation is generally heavy in the winter, moderate in the fall and spring, and light in the summer. The mean annual rainfall is approximately 66 inches with winter means of about 28 inches per year and summer means of about 4 inches per year. The mean annual air temperature is about 51° Fahrenheit (F) with average high and low winter temperatures of 46° F and 34° F, respectively, and average high and low summer temperatures of 75° F and 51° F, respectively.

Climatic data used in this report was obtained from the Western Regional Climate Center division of the Atmospheric Sciences Center of the Desert Research Institute. The Institute maintains weather records from Weather Station #457584, which is located approximately 6 miles west of the Community in the City of Shelton.

1.3.5 Surface Waters

The Timberlake Community is located in the southern region of the Puget Sound. Hammersley Inlet lies about one mile south of the community and Hood Canal is approximately 10 miles to the north. Approximately 3 miles to the west lays Oakland Bay and 1.5 miles to the east is Pickering Passage. None of these water bodies are believed to pose any potential threat of flooding the service area. Within the boundaries of the Community there are two lakes, Timberlake and Little Timberlake. These are private fresh water lakes and are limited to use by Community residents.

1.3.6 Neighboring Purveyors

There is no other public or private water purveyor that borders the Timberlake Community Club. The closest water system is a private system, which is located approximately ¾ of a mile to the south. There are currently no agreements between any other water systems and the Timberlake Water System.

1.3.7 Ordinances

The ordinances pertaining to the Community's Water System can be found in the *Bylaws of Timberlake Community Club* and the *Timberlake Community Club Water System Policy, Regulation 10-07.* Copies of these two regulations are included in Appendix B.

1.4 INVENTORY OF EXISTING FACILITIES

The Community's existing water system includes the following facilities and is illustrated in Figure 3.1.

1.4.1 Sources

The Community has three wells but only two of the wells (Wells #2 and #3) are utilized as everyday points of withdrawal.

Well #1 is located adjacent to the Community's concrete reservoir and is generally the well that is held in reserve as an alternate point of withdrawal.

Well #2 is approximately 700 feet southeast of Well #1. Both Well #1 and #2 were drilled by Bedell Drilling using cable tool methods. Pump testing performed on both wells in October of 1999 resulted in a combined sustainable yield of 426 gpm.

Well #3, which is located 150 feet southeast of Well #1, was drilled in May of 2001 by Charon Drilling. Pump testing on this well revealed a sustainable yield of 400 gpm. Further details regarding the Community's source wells are provided in Chapter 3.

1.4.2 Treatment

The injection of sodium hypochlorite for disinfection purposes and the filtration of iron and manganese are the two treatment processes currently performed by the Community.

The Community constructed a chlorine injection system in 1995. This system operated for approximately 9 years until it was replaced in conjunction with the construction of the Community's new filtration and booster pump systems in 2004. It was replaced with an on-site hypochlorite generation system and an injection system that is capable of self-regulating the chlorine residual in the system.

The Community's filtration system is an in-line pressure filtration system manufactured by ATEC systems. See Section 3.3.2 for more details about the disinfection and filtration systems.

1.4.3 Storage

Storage is provided by two reservoirs, both of which are located in the area of Well #1. The Community's original reservoir is an above-grade 60,000-gallon concrete reservoir, which consists of two separate 30,000-gallon storage basins. This reservoir is located in a rectangular concrete building, which also houses a shop area and the Community's original distribution pump station. The second reservoir is an above-grade 200,000 gallon steel reservoir, which was constructed in 1995. The interior of this reservoir was recoated in 2012.

1.4.4 Booster Pump Station

Since the reservoirs are not located at the high point of the service area, the Community relies on a booster pump station to maintain system pressures within the closed distribution system. The Community's original booster station was constructed in 1967 in conjunction with the construction of the concrete reservoir. However, in 2004 the Community constructed a new booster pump station in conjunction with a water filtration system.

The new booster station is located in a CMU building behind the concrete reservoir. The Community's newer booster pump system is a tri-plex packaged system composed of three end-suction pumps. The unit is rated at a total system capacity of 1500 gpm. The lead pump is a 20 horsepower (hp) pump and is capable of supplying 150 gpm. The second and third pumps are 40 hp pumps and are each capable of supplying 675 gpm. The system is designed to provide a constant discharge pressure of 69 psi measured at the system discharge. Under normal operating conditions, the pumps are fed by gravity from the concrete reservoir. However, under high flow conditions an automatically controlled gate valve allows the pumps to pull water from both reservoirs.

In addition, the Community's original booster pump station is still operational and can be used as an emergency back-up should the need arise. This station has four end-suction pumps. Pumps #1 and #3 are 7.5 hp pumps and are believed to be rated at 150 gpm @ 104' Total Dynamic Head (TDH). Pumps #2 and #4 are 15 hp pumps which each have a capacity of 400 gpm each. The pumps are fed by gravity from the smaller reservoir and the electrical control panel is located on a pole next to the pumps. The pumps are configured to operate in pairs, with each pair including a smaller pump and a larger pump.

1.4.5 Distribution System

Table 1.1 presents the Community's water main and fire hydrant inventory as of December, 2014.

TABLE 1.1 Water System Piping	
Piping	
2" Polyvinyl-chlorine (PVC)	20,800 Feet
3" PVC	11,800 Feet
4"PVC	18,800 Feet
6" (PVC)	15,890 Feet
8" Asbestos Cement Pipe (AC)	1,150 Feet
8" Ductile Iron Pipe (DI)	2,610 Feet
10" Ductile Iron Pipe (DI)	100 Feet
(Total length equals 71,150 feet or approximately 13.5 miles.)	
Hydrants	
3 port	16 each

1.4.6 Connections

As of December 2014, there were 813 residential connections, 34 RV connections, 53 camping lots, and 457 vacation/vacant lot connections to the system. According to the 2013/2014 budget report, the Community owned 51 lots at the end of 2014. These connections provide various types of service including use by residential homes, part-time use for recreational cabins and vehicles and service to vacant lots, which may or may not use water each year.

1.4.7 Interties

There currently no interties between the Community's water system and other purveyors, nor are any planned.

1.5 RELATED PLANS

The following is a list of planning documents, with a brief summary of each, that have been reviewed and have an impact on the development of a Comprehensive Water System Plan for the Timberlake Community Club.

A. **Timberlake Community Club — Comprehensive Water System Plan,** updated October 2007

This plan is the prior water system plan. The plan provides data for

historical conditions and provides insight on Community changes through the development of past planning documents. This plan was approved by DOH in 2010.

B. **Mason County Comprehensive Plan,** 2005

The Mason County Comprehensive Plan provides the existing and future land use-planning element to be considered in the determination of future growth within the Community. Data from this plan includes County-wide growth rates, zoning and land use designations. In February 2015, Mason County initiated the process of updating their comprehensive plan.

1.6 COMMENTS FROM AGENCIES AND ADJACENT PURVEYORS

As part of the development of this plan, draft copies of the plan were sent to the following organizations for review and comment:

Organization	Mailing Address	Comments	
		YES	NO
Washington State Department of Health	Southwest Drinking Water Operations P.O. Box 47823 Olympia, WA 98504-7823	**X**	
Washington State Department of Ecology	Department of Ecology SW Regional Office P.O. Box 47775 Olympia, WA 98504-7775		X
Mason County Public Health	Mason County Public Health P.O. Box 1666 Shelton, WA 98584		**X**
Mason County Planning Department	Mason County Planning Department 426 W. Cedar Street Shelton, WA 98584		**X**
Mason County Fire Marshal	Mason County Fire Marshal 426 W. Cedar Street Shelton, WA 98584		**X**

A summary of all comments received is included in Appendix N.

1.7 EXISTING SERVICE AREA CHARACTERISTICS

The water system retail service area encompasses the entire area within the boundary of the Timberlake Community Club (see Figure 1.2). There are thirteen subdivisions platted into 1,431 total lots (see Figure 1.3). Approximately 74 of these lots have been deemed "unbuildable" due primarily to topography or sewage disposal limitations. Additionally there are 53 lots designated as camping only in Division 11. The estimated number of buildable lots is 1,314. As of December 2014, there were 814 residential homes spread throughout the Community. The remaining lots are generally

vacant with some designated as park lands or green space and some owned by the Community for various uses.

The local area encompassing the Community is designated as *Rural Area* by the current Mason County Comprehensive Plan, 2005. This designation allows one house per five-acre lot. The area within the boundaries of Community is designated as *legal non-conforming,* which allows for the construction of single-family homes on the previously platted lots of the community. The Community is strictly residential in nature with no existing or proposed commercial or industrial areas. Non-residential lot uses are limited to the Community clubhouse, parks and water system facilities.

1.8 FUTURE SERVICE AREA AND ZONING

The Community's future service area is not projected to change due to the current land use designations for the areas surrounding the Community. Per the current Mason County Comprehensive Plan the areas encompassing the Community are projected to remain as *Rural Areas.*

1.9 SERVICE AREA AGREEMENTS

Currently, there are no existing service area agreements between the Community and any other purveyors.

1.10 SERVICE AREA POLICIES

Since the Timberlake Community has been completely platted into residential lots, the service area agreements for the water system are very limited. Currently, water service is available to each lot within the Community. Therefore, no extensions of the system will be required to serve new development within the existing service area boundary.

In addition, the Community bylaws limit water service to the areas within the current system boundary. Therefore, no annexations or satellite systems are projected for service in the future.

1.11 CONDITIONS OF SERVICE

1.11.1 Duty To Serve

The State Municipal Water Law (RCW 43.20.260) provides water service conditions to be followed by water utilities of the State. Under this law, a municipal water supplier has “a duty to provide retail water service within its retail service area.” Timberlake Community Club will provide water service to all the properties within its retail service area, which is the same as the Community’s future service area.

The Community is committed to providing retail water service to all property within its retail service area in a timely and reasonable manner, consistent with applicable Community resolutions and policies, the Municipal Water Law,

Washington State Department of Health rules and regulations and other applicable federal, state and local laws. Pursuant to RCW 43.20.260, as a municipal water supplier as defined in RCW 90.03.015, the Community has a duty to provide retail water service within its retail water service area if:

- Community water service can be available in a timely and reasonable manner.
- The Community has sufficient water rights and other sources of supply to provide the service;
- The Community has sufficient capacity to serve the water in a safe and reliable manner as determined by DOH; and
- It is consistent with the requirements of applicable comprehensive plans or development regulations adopted under Chapter 36.70A RCW (GMA) or any other applicable comprehensive plan, land use plan, or development regulation adopted by a city, town, or county for the service area.

The Community defines "timely" as the availability of retail water service consistent with the terms and conditions in this Chapter and applicable Community resolutions, policies and procedures.

The Community defines "reasonable" retail water service as follows:

- Water service that is consistent with applicable local land use plans and development regulations;
- The conditions of water service and associated fees, costs and charges are consistent with the conditions of service described in this Plan and applicable adopted Community resolutions, policies and procedures; and
- The conditions of service and associated fees, costs and charges are consistent with the Community's requirements applied to other property owners requesting water service who are similarly situated and are requesting the same type or level of water service from the Community.

1.11.2 Connection to System and Applicable Fees

A. Application for Connection to Water System

An application for service through the completion of a Water Connection Request shall be submitted to the Timberlake Community Water Board on forms provided by the Community.

B. Construction Materials and Standards

All construction shall meet the Community's Methods and Materials Standards as outlined in Appendix L. All connections shall meet cross connection control standards per the Community's Cross Connections Control Plan, which can be found in Appendix K.

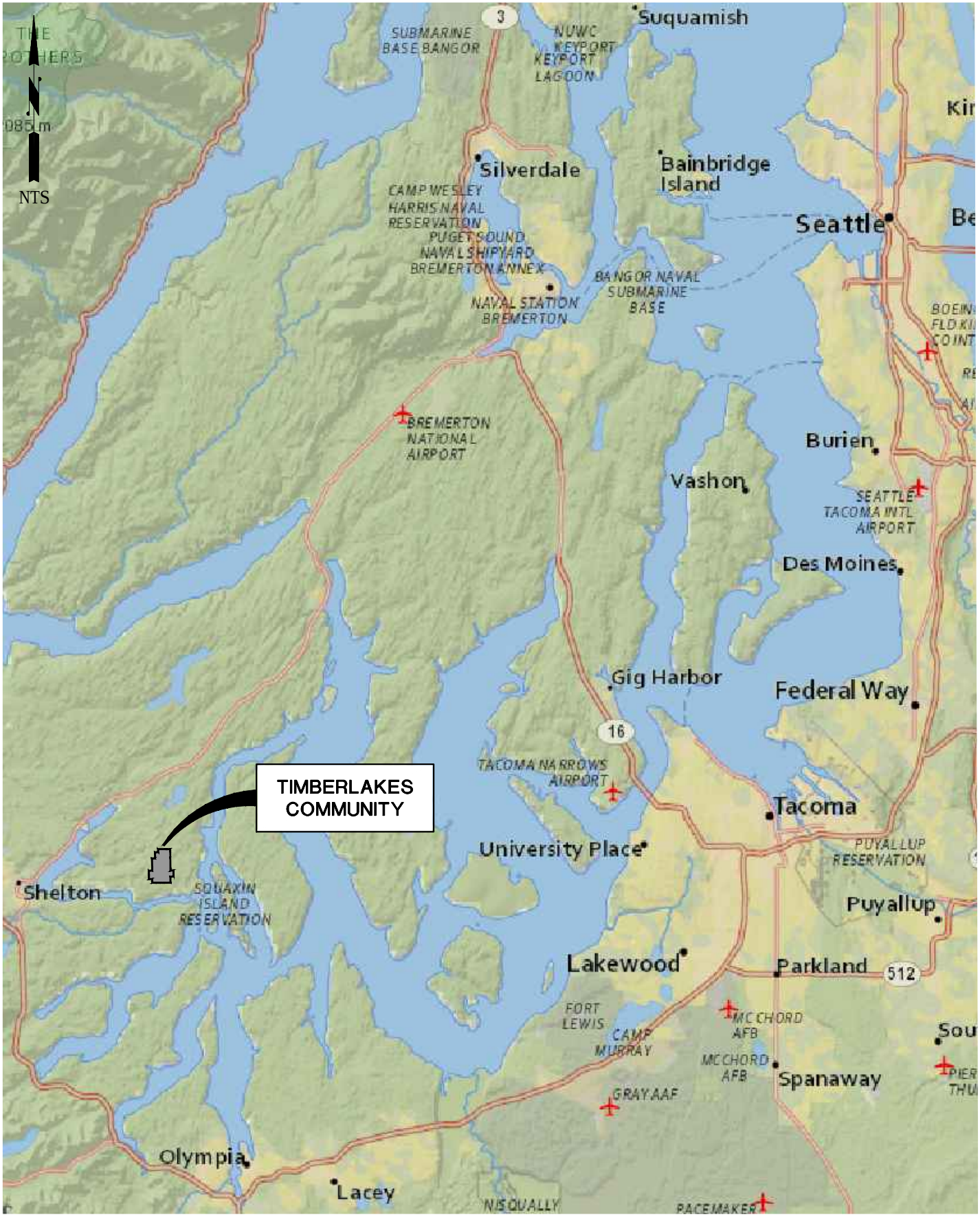
C. Fees

The applicant is responsible for all costs including permit, design, review, construction, inspection, testing and the General Facilities

charge.

1.12 COMPLAINTS

All complaints pertaining to the water system are logged into the Community's billing software package. The program allows individual accounts to be tagged with notes regarding the complaint. Once a complaint is received it is referred directly to the Operations Manager. The Operations Manager initially investigates all complaints and advises the Board of Trustees if applicable.



Timberlake Community Club, Inc.

2018 Comprehensive Water System Plan

FIGURE 1.1

LOCATION MAP

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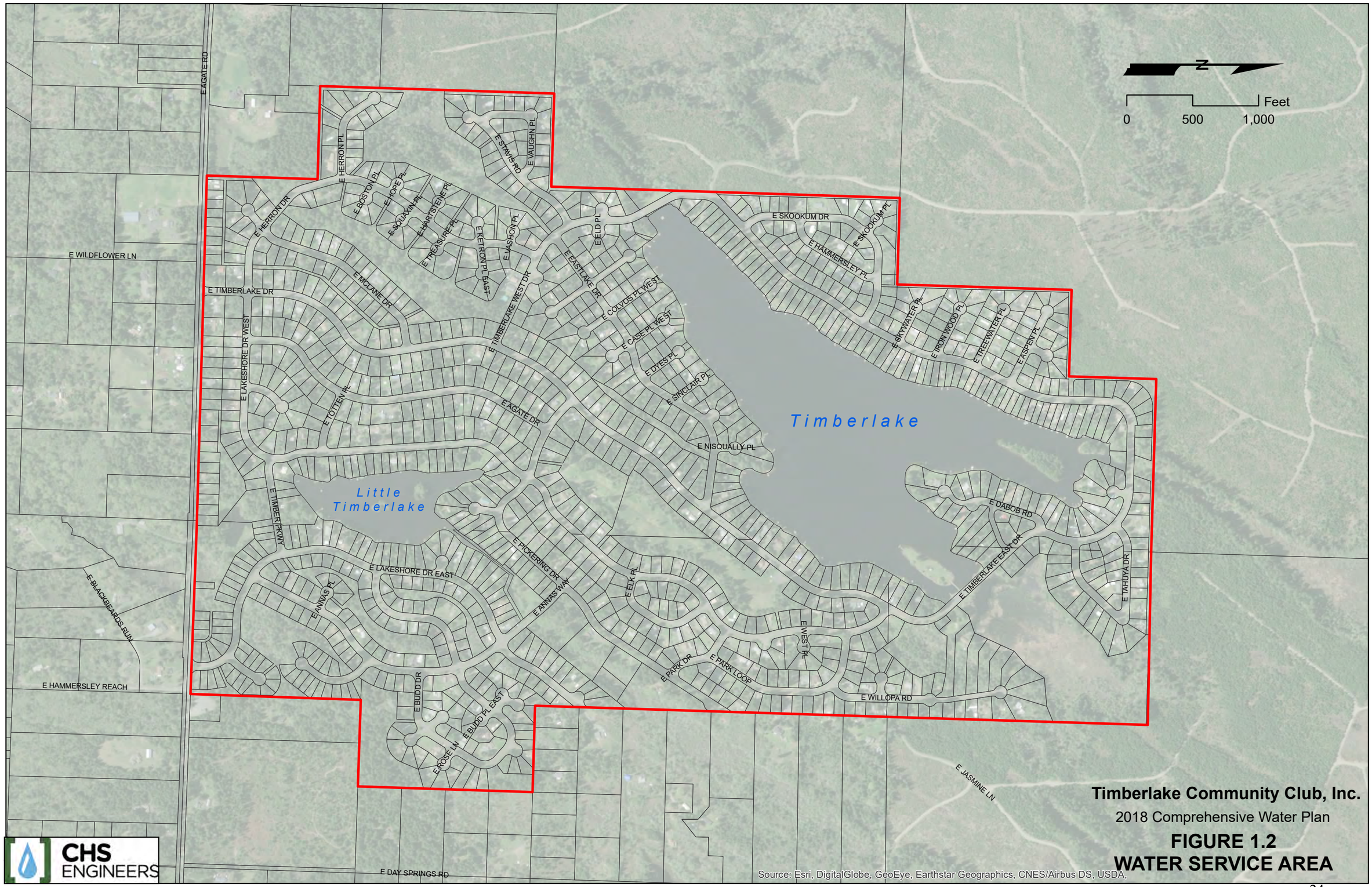
FILE LOCATION: K:\50-Timberlake\2014\501401-WSPUpdate\2016 WSP\CAD\FIG-1.1.dwg



Timberlake Community Club, Inc.

2018 Comprehensive Water Plan

FIGURE 1.2
WATER SERVICE AREA

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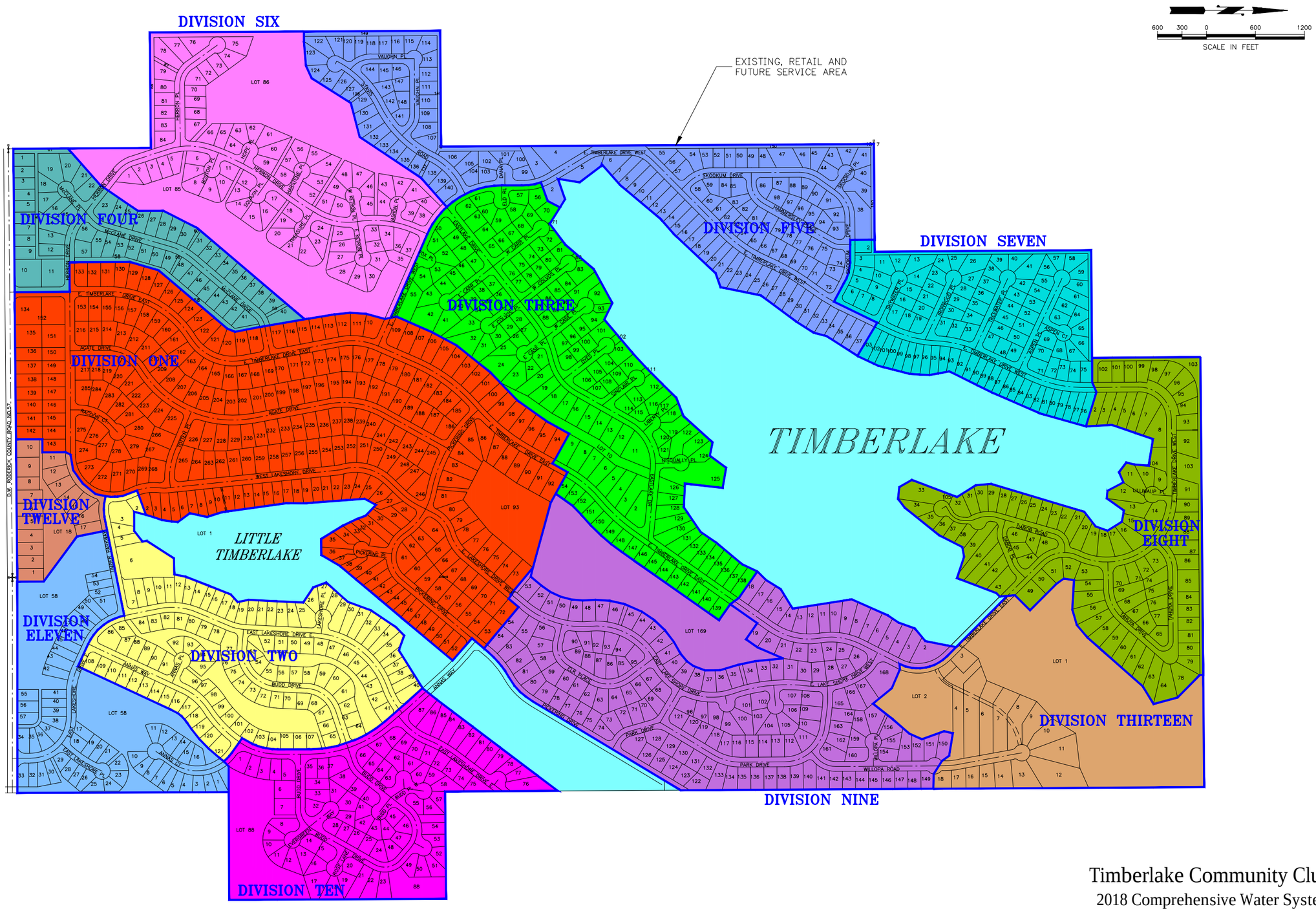

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USER: Evan Henke

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Timberlake Community Club, Inc.
2018 Comprehensive Water System Plan
FIGURE 1.3
EXISTING PROPERTY LAYOUT

CHAPTER 2

PLANNING DATA AND WATER DEMAND FORECASTING

Basic planning is essential for the assessment of the Timberlake Community Club's water system. To evaluate the future performance and limitations of the system, it is necessary to assess the current state of the water system and to forecast future demand based on foreseeable demographic trends over the next 20 years. This is accomplished by projecting local population trends and determining the projected land use within the service area. From this information the impacts affecting the capacity and placement of future system improvements will be determined.

The water system assessment includes the study of historical and projected growth and water usage within the Community. The land use projections are based on the current land use designations as delineated by Mason County.

2.1 EXISTING CONDITIONS

As stated in Chapter 1, the service area for the Timberlake Community encompasses residential lots spread around two small lakes. The thirteen subdivisions are divided into 1,431 lots, 1,304 of which are buildable. Water service is currently available to every buildable lot within the Community. Sanitary sewer service is not available to the Community so individual on-site septic systems must be utilized.

Currently, 62% of the lots within the Community have been developed with homes with approximately 2/3 being used on a year around basis and the remaining 1/3 only being occupied periodically. Approximately 34 lots have been developed by the owners for use by recreational vehicles. Division 11 is made up of 57 lots designated for camping use only; these camping lots do not have individual water services. The remaining lots are primarily vacant lots with a small amount set aside as parks or green space.

2.1.1 Current Residential Population

The Community is situated in a rural area of southeastern Mason County. The County has no population data specific to the Community and the 2010 U.S. Census covered the area as unincorporated Mason County. In addition, the Community itself has no official records of population. Currently, the best estimate of population is based on water use records.

A *high-end* population value for the Community has been estimated by multiplying the average household density of 2.53 people per household (density for Mason County, 2009-2013, as provided by the U.S. Census Bureau) by the number of service connections showing any usage during 2015. The resulting figure from this calculation is 3,300 people.

The actual population, at any given time, is most likely lower than the figure presented above considering the large amount of seasonal residents within the Community. A *low-end* population for the community has been estimated by multiplying the average household density by the number of service connections showing continuous usage (usage all twelve months of the year) during 2013-2014. This calculation results in a value of 1,320 people.

The estimated Average Annual population is based on dividing all produced water by the current Equivalent Residential Unit value of 146 GPD (see section 2.1.5) which yields an estimate of 1,910 people for 2014.

Table 2.1 below illustrates the estimated population as taken from previous Comprehensive Water Plans and as determined above. It should be noted that the high-end estimates in the 1994 and 2000 plans were based solely on residential connections multiplied by household density. Population estimates for seasonal usage were not calculated.

TABLE 2.1
Community Population Estimates

Year	*Low-End Population Estimate*	*High-End Population Estimate*
1994	N/A	1,140*
2000	N/A	1,568*
2006	1,266*	2,168*
2014	1,320	3,300
2014 Avg. Ann.	1,910	

*Population estimates as reported in previous Water System Plans, dated December 1994, October 2000 and October 2007

2.1.2 Total Service Connections

As stated in Section 2.1 above, the Community is made up of thirteen divisions with a total of 1,431 lots. These lots have been separated into four categories – HOM, VAC, RV and NM. HOM are lots that have residential homes on them. HOM lots were further subdivided based on water records to indicate full time or part time usage. VAC represents lots that are undeveloped with no water usage or lots with primitive camping sites. The RV lot designation accounts for parcels developed with recreational vehicles that generally remain on the property. Finally, the NM designation includes lots that do not have a meter and are not currently developed and are never intended to be developed or require water service. The NM designation includes lots that are designated as open space, parks, lake, and camping (Division 11). The NM designation also includes community-owned metered lots.

The number of service connections in each of the four categories as of December 2014 is:

HOM	813	(56%)
VAC	457	(33%)
RV	34	(2%)
Total Developable Lots	1,304	
NM	127	(8%)
	Total 1,431	

2.1.3 Regional Land Use Designation and Current Land Use

The area encompassing the Community is designated as *Rural Area* in the current Mason County Comprehensive Plan, 2005. This designation allows one house per five-acre lot. The area within the boundaries of the Community is designated as *legal non-conforming*, which allows for the construction of single family homes on the previously platted lots of the community.

Land use within the service area boundary is restricted to single family dwellings by the current bylaws of the Community. No commercial or industrial activities are allowed within the community.

2.1.4 Water Use Data Collection

DOH requires that public water systems collect water use data for use in forecasting demand, system planning, evaluating conservation program success and other objectives (WUE Guidebook). The Community is collecting data as summarized in Table 2.2.

TABLE 2.2
Water Use Data Collection Requirements

Type of Data	*Units of Measure*	*Required Action*	*Current Community Policy*
Source Meter Readings			
Source of Supply Meter Readings	Gallons	Collect: Monthly and annual totals	Read daily or every other day. Daily usage logged
Emergency Interties-Amount Imported	Gallons	Collect: Monthly totals	N/A
Wholesale-Amount Purchased	Gallons	Collect: Monthly totals	N/A
Peak Day/Peak Month	Gallons	Collect: Each year's peak month total	Monthly & daily production available from well use logs
Non-Revenue Water			
Distribution System Leakage	Gallons	Collect: Annual totals	Bi-monthly total reviewed
Authorized Consumption	Gallons	Collect: Annual totals	Monthly totals estimated from bi-monthly meter readings
Service Meter Readings			
Single-Family	Total gallons used by this customer class	Collect: Monthly totals*	Measured bi-monthly, monthly totals estimated
Population Served	ERUs and connections	Collect: Annual totals	Monthly totals tracked
Economic Data	Existing water rates for each customer class	Review existing water rates for each customer class	Rates reviewed annually
Conservation Data	Report type of measure and level of implementation	Collect: Once per year	Conservation programs reviewed annually

Monthly totals may be estimated if water system billing is less frequent

The Community completed the installation of individual service meters for all service connections in the summer of 2000. This task was performed to track water usage and as a water conservation measure. In addition, it provided an opportunity to evaluate the Community's water rate structure.

Individual customer usage has been tracked since 2001 and this data is maintained in a spreadsheet. Annual well withdrawal data has been tracked for a number of years and is also maintained in a spreadsheet.

Individual water use data prior to installing customer meters in 2000 was estimated based on source data and number of connections.

2.1.5 Equivalent Residential Unit (ERU)

The single family residential (SFR) home connections (HOM classification) were filtered to evaluate only those accounts that had at least 4 billing periods (8 months or more) of usage and usage that was greater than 50 gallons per day (GPD). Only the active months, as defined above, were used to avoid calculating an artificially low value.

2013	499 SFR accounts	26.16 MG/yr	=	144.7 GPD/SFR
2014	521 SFR accounts	27.72 MG/yr	=	145.7 GPD/SFR

Use 146.0 GPD = 1 ERU_a (ADD)

It should be noted that these calculations do not account for distribution system leakage. Distribution system leakage is further described in Section 2.2.4.

The 146 gpd/ERU (ADD) value is viewed as conservative and it will be applied to future residential connections. The 146 GPD is a significant reduction compared to the 180 GPD value used in the prior plan. Table 2.3 illustrates the number of connections within the Community and subsequent ERUs as of December 2015.

The Max Day Demand was calculated from reviewing the daily source meter logs for the years 2012, 2013, and 2015, as shown in Table 2.3. Data from 2014 was invalid and not included in the determination.

TABLE 2.3 Maximum Day Demand Development				
	ADD measured, (gpd)	MDD measured, (gpd)	Date of MDD	Resulting Peaking Factor, (MDD/ADD)
2012	101813	208885	8/6/2012	2.05
2013	106200	197504	7/24/2013	1.86
2014	109986			
2015	115702	251688	7/5/2015	2.18
Average				2.03

The MDD factor of 2.1, which is slightly more conservative than the value based on data for the three available years' data and is greater than the minimum value of 1.7 proscribed in the DOH Water System Design Manual, will be used.

Use 306.6 GPD = 146 * 2.1 = 1 ERU (MDD)

2.1.6 Water Rates

The Community reads and bills all of the customer accounts every other month resulting in a bi-monthly billing cycle for each customer. The customer's bill reports the previous meter reading and the current reading along with the difference shown as the current usage amount.

The current water rate structure includes a two-month base rate, a two-month reserve charge and a volume charge. The current base rate for all lots except for camping lots is $30.00 per month. The current base rate for camping lots is $14.00 per month. There is a $30.00 reserve charge per month for all lots, including camping lots. The volume charges for a two-month period for all lots, including camping lots, are as follow:

Step 1 – 0,000 to 8,000 gal = $1.33/1,000 gal
Step 2 – 8,001 to 12,000 gal = $2.00/1,000 gal
Step 3 – 12,001 to 20,000 gal = $2.66/1,000 gal
Step 4 – Over 20,000 gal = $3.33/1,000 gal

The reserve charges are split with 60% going to water and 40% going to general.

2.2 WATER DEMAND PROJECTIONS

The projection of future water demands is a key element in the water system planning process. This projection is utilized to determine the timing and sizing of required facilities. The following sections describe the methods used for projecting the water use demands for the Timberlake water system.

2.2.1 Projected Land Use

The area within the service boundary of the Community is under the jurisdiction of Mason County and, therefore, is subject to the comprehensive land use plans and zoning codes set forth by Mason County Code.

The land use patterns within the Timberlake Community Club service area are not projected to change over the 20-year planning horizon. The bylaws of the Community restrict land use to single family dwellings and the Mason County land use designations for the surrounding areas are for rural usage.

The Mason County Comprehensive Plan was updated in 2005. In this plan, the areas surrounding the Community are designated to remain as *rural area*, which allows one house per five acres.

2.2.2 Projected Population

The mixture of full time residential use and seasonal vacation use makes it very difficult to determine the actual population at any specific time. However the water demand and use patterns do allow us to make a conservative estimate of the effective population during peak periods and as an annual average.

The average growth trend in Water Production from 2011 through 2015 was 3.7% per year. A comparable growth trend was seen in the number of lots whose water usage met the criteria for being considered as full time. The 2015 estimated effective population is 1650 and is expected to increase to 2030 by the year of 2021. The 20 year projection (year 2036) provides a population of 2530.

2.2.3 Historical Water Production

The historical record shows an increasing trend. TMB staff attribute this to more seasonal homes being used as full time residences and the continuing infill of previously undeveloped lots.

TABLE 2.4
Historical Water Production Records

Year	Gallons per Year	Gallons per Day	Growth (y/y)
2011	36523968	100066	
2012	37161784	101813	1.7%
2013	38762848	106200	4.3%
2014	40144872	109986	3.6%
2015	42231304	115702	5.2%
2015 Baseline ADD (gpd) USE =		**116000**	
Avg Growth Trend			**3.7%**

2.2.4 Projected Non-Residential Water Demands

The entire Timberlakes Community has been platted as residential lots for use by single-family dwellings. The bylaws of the Community specifically restrict the use to single-family dwellings and no changes in these bylaws are foreseen within the planning horizon. There is no commercial or other significant water demand other than residential.

2.2.5 Projected Non-Revenue Water

Non-Revenue water has three primary categories:

- Operations includes the water used for flushing, sampling and testing,
- Community irrigation of the parks and other public open spaces.
- Distribution System Losses (DSL) through leaks or metering under reporting.

Non-revenue water volumes are calculated by taking the difference between the source water pumped through system's master meter and the volume of water sold (metered to customers) for a given period of time.

The Community has constructed the full extent of the distribution system. Future growth will be as infill to the existing vacant lots and will not require an extension of the system. Operations (maintenance) is projected to remain at a relatively stable use throughout the planning period.

Irrigation is primarily dependent on the weather. We have projected an increase of 1.5% per year to allow for the trend of hotter, drier weather.

Distribution System Losses continue to be a significant problem for the community. Historically losses have exceeded 20%. For the period from 2013-2015 the losses have been reduced to an average of 12.5%. Further reduction is a primary goal of the community. A reduction of 8% per year of loss is projected to bring the community below the 10% DSL threshold by 2019. Further discussion on the means of reducing the DSL is presented in later chapters.

2.2.6 Water Demand Forecast

Water demand forecasting is the culmination of the information presented in this chapter. In summary, the Community's historical water use records were reviewed for the period 2011 through 2015.

Detailed analysis was performed on the SFR meter records for 2013 and 2014, from this data, the average day demand (ADD) for one ERU_a was determined to be 146 gpd, as shown in section 2.1.5. The development of a peaking factor to calculate the maximum day demand (MDD) resulted in a value of 2.1 and a ERU_m of 306 gpd, is also presented in section 2.1.5.

Population and connection growth rates were estimated based on the Community's historical growth trend developed in section 2.2.3. Table 2.5 follows.

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TABLE 2.5
WATER DEMAND PROJECTION
6 & 20 Year

ERU = **146** **GPD (ADD/SFR)** *** =** **2.53** **Population per residence**

Billed Water (Gal/Yr)

		Baseline			6 Year Projection								20 Year Projection		
# Conn	**Type**	**2015**	**'15 ERU**	**Rate/Yr**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**'21 ERU**	**Rate/Yr**	**2036**	**'36 ERU**
521	Res FT	27716250	520	3.7%	28741751	29805196	30907988	32051584	33237492	34467280	647	3.0%	44346000	832
292	Res PT	5536898	104	4.0%	5758373	5988708	6228257	6477387	6736483	7005942	131	2.0%	7751657	145
34	RV	321195	6	1.0%	324407	327651	330928	334237	337579	340955	6	1.0%	385434	7
457	Vac	1237263	23	-3.3%	1196434	1156951	1118772	1081852	1046151	1011628	19	-2.0%	742358	14
1304		34811606	653		36020965	37278507	38585945	39945060	41357706	42825805	804		53225449	999
Non-Billed Water (Gal\Yr)														
	Maint	850000	16	0.0%	850000	850000	850000	850000	850000	850000	16		850000	16
	Irr & Com	720000	14	1.5%	730800	741762	752888	764182	775644	787279	15		800000	15
	DSL	6000000	113	-8.0%	5520000	5078400	4672128	4298358	3954489	3638130	68		4500000	84
		7570000	142		7100800	6670162	6275016	5912540	5580134	5275409	99		6150000	115
Total Demand (Gal/Yr)		**42381606**	**795**		**43121765**	**43948669**	**44860961**	**45857600**	**46937839**	**48101214**	**903**		**59375449**	**1114**
Total Demand (MG/Yr)		42.4			43.1	43.9	44.9	45.9	46.9	48.1			59.4	
		Projected WSL			12.8%	11.6%	10.4%	9.4%	8.4%	7.6%			7.6%	
Effective Population		**1650**								**2030**			**2530**	

CONSERVATION	ERU Effect		-1.0%	per year 2016>2021 =		137	GPD 2021	
			-0.5%	per year 2022>2036 =		128	GPD 2036	
	Non-Bill Water Effect		-0.3%	per year 2016>2036 =		-22710	Gal/Yr	
	Billed			35660756	36532937	37428366	38347258	39289820	40256257			46529687	
	Non-Billed			7078090	6647452	6252306	5889830	5557424	5139149			5695800	
Total C-Demand (Gal/Yr)		**42381606**	**795**	**42738846**	**43180389**	**43680673**	**44237087**	**44847244**	**45395406**	**906**		**52225487**	**1121**
Total C-Demand (MG/Yr)		42.4		42.7	43.2	43.7	44.2	44.8	45.4			52.2	
Reduction over No Action				0.9%	1.6%	2.7%	3.7%	4.5%	5.6%			12.1%	

CHAPTER 3

SYSTEM ANALYSIS

The purpose of this chapter is to determine if the existing distribution system and facilities are able to supply sufficient quantity and quality of water to the Community's customers while meeting the existing and projected demands of the system. In this section five major planning components are analyzed in detail including:

- System design standards
- Water quality analysis
- System description and analysis
- Summary of system deficiencies
- Selection and justification of proposed improvements

The design standards identify the design criteria that apply to the Timberlake Community Water System facilities. The design and water quality standards for Group A public water systems are summarized in Chapter 246-290 WAC. These standards provide a set of minimum design and performance criteria for new water utilities and for all existing utilities planning to install capital facilities for expansion purposes.

System description and analysis includes a description of the general condition of each system component and an analysis of the physical capacity of each component. The summary of system deficiencies identifies the improvements needed for the water system to meet present and future demands. The selection and justification for proposed improvements analyzes and discusses the improvements necessary to eliminate existing and anticipated deficiencies.

3.1 PERFORMANCE AND DESIGN STANDARDS

This chapter establishes the criteria to be used in the planning and analysis of facilities that will be required by the Timberlake Community Club Water System to meet future consumer demand. The criteria include considerations of adequate water quality and supply, storage, and distribution facilities. The design criteria are based on actual water usage records, recommended design standards by the Washington State Department of Health, and other accepted standards normally used in the design and construction of water facilities.

The Washington State Department of Health's *Water System Design Manual* (WSDM), dated December 2009, was utilized for this system analysis. The primary design criteria included maintaining 30 psi in the distribution system under peak hourly design flow conditions and 20 psi under maximum day demand and fire flow conditions.

3.1.1 Abbreviations

In this report, a number of common technical terms and expressions have been abbreviated. These terms and their abbreviations are presented here.

ADD	Average Day Demand
cfs	cubic feet per second
DOH	Washington State Department of Health
ERU	Equivalent Residential Unit
gal	gallon(s)
g/d/conn	gallons per day per connection
gpd	gallons per day
gpm	gallons per minute
MDD	Maximum Day Demand
MSL	Mean Sea Level
MGD	million gallons per day
PHD	Peak Hour Demand (gpm)
ppb	parts per billion
ppm	parts per million

3.1.2 Reference Datum

The planning of facilities in this study is based on the National Geodetic Vertical Datum (NGVD) of Mean Sea Level at elevation zero.

3.1.3 Period of Design

As discussed in Chapter 2, this plan will look in detail at the projection for the next six years (2016-2021) as well as the 20 year horizon (2036).

3.1.4 Water Quality Parameters

The DOH relies on various publications, agencies, and the utility itself to develop and establish design criteria. WAC 246-290-200 *Design Standards* lists the various criteria allowed by DOH. It provides that:

(1) Purveyors shall ensure that good engineering criteria and practices are used in the design and construction of all public water systems, such as those set out in:

(a) Department guidance on design for Group A public water systems;
(b) The most recently published edition of the *International Building Code (IBC), the Uniform Plumbing Code* (UPC), and other national model codes adopted in Washington State;

(c) 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*;
(d) Standard specifications of the American Public Works Association (APWA), the American Society of Civil Engineers (ASCE), the American Water Works Association (AWWA), or the American Society for Testing and Materials (ASTM);
(e) Design criteria, such as contained in current college texts and professional journal articles, acceptable to the department;
(f) Chapter 173-160 WAC *Minimum Standards for Construction and Maintenance of Water Wells*; and
(g) The latest edition of the PNWS-AWWA *Cross-Connection Control Manual*, or the University of Southern California (USC) *Manual of Cross-Connection Control*.

3.1.5 Average Day, Maximum Day and Peak Hour Demands

Development of ERU values and the relationship between ADD and MDD is discussed in section 2.1.5. Historical data for the development of the ADD is presented in Table 2.4 (section 2.2.3). The water demand for the Community's system is forecast through the year 2036, in terms of gallons per year, based on historical water use patterns by customer class and projected growth within each customer class, both with and without estimated impact of future water conservation efforts as shown on Table 2.5 (follows section 2.2.6).

Actual flow data for PHD for the Community is not available. Therefore, DOH Equation 5-1 was used to develop PHD. PHD is a function of MDD and the number of service connections for systems with more than 500 connections.

The following equation from the DOH WSDM was used:

$$PHD = (MDD/1440)[(1.6)(\#\ ERUs) + 225] + 18$$

The resulting peaking factors (PHD/ADD) range from 4.16 for the year 2016 to 3.94 for the year 2036, without considering conservation.

The yearly detailed demand projections are presented in Table 2.5 and are further developed into gpd and gpm values for ADD, MDD and PHD in Table 3.1.

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TABLE 3.1
DEMAND PROJECTION
6 & 20 Year

Legend

ERU = Equivalent Residential Unit
ADD = Average Daily Demand
MDD = Maximum Daliy Demand
PHD = Peak Hour Demand
GPD = gallons per day
GPM = gallons per minute
Mg/yr = Million gallons per year
PF:ADD = resulting multiplier from ADD to PHD

ERU = **146** **GPD (ADD)** **306** **GPD (MDD)** (See Section 2.1.5)

MDD = **2.1** **x ADD** based on production meter analysis 2012-2015

PHD = **((MDD/ERU)/1440)[C*(ERU)+F)+18** (see DOH Eq. 5-1) **where C=1.6, F=225**

	ADD				MDD		PHD
	Mg/yr	GPD	GPM	ERU	GPD	GPM	GPM
2015	42.4	116164	81	796	243945	169	337
2016	43.1	118082	82	809	247973	172	341
2017	43.9	120274	84	824	252575	175	347
2018	44.9	123014	85	843	258329	179	353
2019	45.9	125753	87	861	264082	183	359
2020	46.9	128493	89	880	269836	187	366
2021	48.1	131781	92	903	276740	192	373
2036	59.4	162740	113	1115	341753	237	446

WIYH CONSERVATION

	ADD			ERU	MDD		PHD
	Mg/yr	GPD	GPM	(count)	GPD	GPM	GPM
2015	42.4	116164	81	796	243945	169	337
2016	42.7	116986	81	809	245671	171	338
2017	43.2	118356	82	824	248548	173	341
2018	43.7	119726	83	843	251425	175	344
2019	44.2	121096	84	861	254301	177	347
2020	44.8	122740	85	880	257753	179	350
2021	45.4	124384	86	903	261205	181	353
2036	52.2	143014	99	1115	300329	209	394

3.1.6 Storage Requirements

There are five components of storage that must be considered when designing a water system: operational, equalizing, standby, fire suppression and dead storage. Chapter 9 of the DOH WSDM provides recommendations and equations for determining the quantities of each component and each of the five components are detailed below.

Operational Storage

Operational storage (OS) is the volume of a reservoir reserved for supplying system demands during times that the sources of supply are not delivering water.

Equalizing Storage

Equalizing storage (ES) provides water during periods of heavy consumption. It allows the use of smaller, more economical pumps and places less demand on the water source. Supply transmission mains can also be designed smaller because they do not have to supply peak demands.

The volume of storage required for equalizing purposes depends upon the peak hour demand and the rate of supply from the sources. The DOH manual sets forth a procedure for determining the required equalizing storage by utilizing typical variables historically found in most systems.

Equation 9-1 from the DOH WSDM relates supply (pumping) capacity with PHD to determine an applicable ES volume.

Equation 9-1:

ES = (PHD - Qs)(150 min), where

PHD = Peak Hourly Demand (gpm)
Qs = sum of all installed and active sources of supply (gpm)

Standby Storage

Standby storage (SB) is defined as the storage necessary to augment the available supply in the event that the system's largest source is out of service for an extended period of time. The Community's water system is a multiple source system. Therefore, standby storage is determined by DOH Equation 9-3 for multiple sources, which assumes loss of supply from the source with the largest capacity.

Equation 9-3:

SB = (2 days)(ADD)(N) - t_m (Q_S – Q_L), where

ADD = Average day demand for design year (gpd/ERU)
N = number of ERUs
Q_S = sum of all installed and continuously available sources (gpm)
Q_L = the largest capacity source (gpm)
t_m = time remaining sources are pumped (min., usually 1440 min.)

Fire Suppression Storage

The fourth component of the storage requirements is the volume necessary for fire suppression storage (FSS).

The fire flow rate and duration for the Timberlake Water System are set forth by the Mason County Fire Marshal and the current regulation adopted by Mason County.

The determination of the FSS storage volume is determined by DOH WSDM Equation 9-4.

Equation 9-4:

FSS = (FF)(t_m), where

FF = required fire flow rate (gpm)
t_m = required duration (min.)

Dead Storage

Dead storage (DS) is the volume of water not available for the system such as the lower volume in a standpipe or the upper volume in a reservoir that is too high to be filled by the system's source of booster pumps.

3.1.7 Fire Flow Rate and Duration

The fire flow requirement defined by the Mason County Code is currently 500 GPM for a 30 minute duration. However the Mason County Fire Marshal recommends 1,000 gpm for one hour duration in all new residential plats. The 1000 GPM for 60 minutes standard will be used for all storage volume calculations.

3.1.8 Minimum System Pressure

The water distribution system is required to provide dependable service. This is accomplished through interconnection and proper pipeline sizing which results in adequate water pressure and fire protection for the Community. It is

recommended that water pressure be maintained between 30 and 80 psi through the use of pressure reducing valves, booster pump stations, and water storage reservoirs.

WAC 246-290-230 addresses the requirements for minimum water pressure in a distribution system. In summary, two conditions govern minimum pressure. Under PHD conditions, minimum pressure of 30 psi shall be maintained at all meter connections under the condition where all equalizing storage is depleted. Under MDD and fire flow conditions, minimum pressure of 20 psi shall be maintained at all meter connection under the condition where all equalizing and fire suppression storage has been depleted.

3.1.9 Minimum Pipe Size/Looping

All water mains shall be designed in accordance with good engineering practice by a professional engineer to suit actual conditions at the project location. All pipelines shall be constructed in accordance with the requirements of the Community's Water System Policy, which is included in Appendix B of this plan and the Community's construction standards, which are included in Appendix L. All water mains are owned, operated, and maintained by the Community.

In general, all water mains should be looped where feasible to minimize dead-end lines. Water mains shall be a minimum of six inches in diameter or eight inches in diameter if providing fire flow. Water mains that don't provide fire flow may be smaller under certain conditions, if approved by the Community. Dead-end fire hydrant runs shall be six inches in diameter for runs up to 50 feet. Runs of 50 feet and longer shall have a minimum diameter of eight inches.

If the need to expand the system ever arises, an engineering analysis shall be completed for any extension of the system. This analysis shall consider the specific hydraulic conditions and fire flow requirements for the area being served.

3.1.10 Telemetry and Control Systems

See Section 3.3.4 for information about the Community's telemetry system.

3.1.11 Standby Power Requirements

The main objective of standby power requirements is to assure that the system is pressurized at all times to minimize cross-connection contamination concerns and maintain minimum service pressures. Each booster pumping station should contain no less than two pumps with capacities such that peak demand can be satisfied with the largest pump out of service. System power shall be provided from at least two independent sources or a standby auxiliary source should be provided to provide redundancy to the system's single source.

Timberlake Community Club's water system is able to continue service during power outages because the pump station standby generator will provide electrical power supply during power outages. See Section 3.3.1 for more information about the Community's standby generator.

3.1.12 Valve and Hydrant Spacing

Valving shall be placed to allow the operators sufficient control to maintain service to most residents while selectively isolating segments of the water distribution system for repairs or extension. Valves shall be placed on all Tee branches and all significant branch loops.

Fire hydrants shall be placed on all water mains capable of providing a minimum of 500 GPM for 30 minutes duration. Hydrants shall be spaced at 500 LF or less on applicable mains.

3.2 WATER QUALITY ANALYSIS

All Group A public water systems must comply with the provisions of the Federal Safe Drinking Water Act (SDWA). Washington State water quality provisions are contained in Chapter 246-290 WAC and generally incorporate the SDWA requirements.

The water distributed by the Community is supplied by two wells, with a third well held in reserve as an additional point of withdrawal. The water quality of the Community's source water is considered good and has generally remained within State guidelines for all contaminants.

In the summer of 2004, the Community completed the construction of a filtration system in order to remove iron and manganese from the source water. Prior to filtration, historical records indicated that, on occasion, iron and manganese levels had been higher than allowable limits under some conditions. Completion of the filtration plant has resulted in iron levels close to non-detect and manganese below detectable levels.

An on-site chlorine generation system and chlorine injection system were also constructed in conjunction with the filtration plant. Chlorine is injected into the source water prior to entering the storage reservoirs and also prior to distribution. The target residual in the distribution system is 0.4 to 0.6 mg/L.

In regard to water quality testing, the Community takes daily chlorine residual samples and two coliform monitoring samples from twelve alternating locations each month per the adopted Coliform Monitoring Plan. To address the Disinfection Byproducts Rule, the Community also tests for total trihalomethanes (TTHMs) and haloacetic acids on an annual basis. Samples are forwarded to a local lab for analysis. The testing results are provided to the Community and DOH. When performing coliform testing, the Community also takes additional chlorine residual samples at the two sample locations and the residual amount is noted on the lab slip. A copy of the Community's Coliform Monitoring Plan is included in Appendix J.

In addition to the above sampling, the Community is required to take lead and copper samples once every five years and VOC and IOC samples every three years.

The Community also publishes an annual Water Quality Report to meet Federal requirements. Copies of the Community's recent Annual Water Quality Reports are included in Appendix E.

3.3 SYSTEM DESCRIPTION AND ANALYSIS

The Community's major facilities and the water distribution system are illustrated in Figure 3.1.

3.3.1 Source of Supply

Currently the Community has three production wells for use as their sources of supply. Well #2 and #3 are used as the primary source wells. Well #1 is held as an additional point of withdrawal should one of the other wells be down for repair. Under normal operating conditions, pumping is automatically alternated between Well #2 and Well #3. Should one of these wells be off-line, Well #1 can be placed in the rotation with either Well #2 or Well #3. The following describes each of the wells in more detail.

Well #1

Well #1 is a 6-inch well that was drilled in 1967. The screen for this well is placed from 342 to 362 feet deep. The well was drilled by Bedell Drilling of Shelton, Washington, using cable tool methods and is located adjacent to the concrete water reservoir. The initial drilling of Well #1 began with an eight-inch casing; however, this casing size could not be placed to the desired depth.

Therefore, a six-inch casing was inserted and used as the finished well size. The well is approximately 362 feet deep with a 15-foot screen interval and a 25 Hp Grundfos submersible pump; the pump motor was replaced in 2003.

Pump testing conducted in October of 1999 indicated a sustainable yield of 176 gpm. Pumping had to be reduced to 128 gpm after the drawdown reached depths below 293 feet; however, the pump rate was again increased to 176 gpm and sustained for 40 minutes. During the test, the water was mostly clear with occasional rust and flakes of scale. A slight odor of hydrogen sulfide (H_2S) was noted during testing. Water samples were taken and testing results indicated good water quality. Within four minutes after testing, the well returned to within one foot of the static level.

In 2003, an attempt was made to regain some of the well's lost capacity by refurbishing the well. However, the effort led to little improvement.

The condition of Well #1 is generally good. When the well was drilled, it was reportedly capable of supplying 230 gpm. This indicates a loss of approximately 24 percent of the well capacity over the last 33 years. Redevelopment of Well #1 was recommended as a result of the source evaluation.

Well #2

Well #2 is an 8-inch well drilled in 1971, with the screen placed 370 to 380 feet deep. This well was also drilled by Bedell Drilling of Shelton, Washington, using cable tool methods. It is located approximately 700 feet southeast of Well #1. The drilling of Well #2 also began with a larger casing size and was reduced to an 8-inch casing to complete to the desired depth. The well is approximately 400 feet deep and records indicate it is screened for about 10 feet. Well #2 has a 25 Hp Peerless pump and this motor was also replaced in 2003.

Pump testing performed on Well #2 in 2000 resulted in a sustainable yield of 250 gpm. A slight odor of H_2S was also noted in this well and water sampling indicated good water quality. This well returned to within one foot of its static level one minute after pumping ceased.

The current pumping capacity of the well is approximately 230 gpm. This well is in very good shape and appears to be operating close to its original performance level.

The transmission mains between these wells and the steel reservoir are comprised of some older 6-inch mains and new 8-inch ductile iron (DI) mains installed in 2004. All of the mains are believed to be in good condition.

Well #3

Well #3, which is located 150 feet southeast of Well #1, was drilled by cable tool methods in May of 2001. The well was drilled by Charon Drilling of Graham, Washington. Drilling started with a temporary 16-inch surface casing which was then reduced to a 12-inch casing. Drilling continued with the 12-inch casing for 335 feet, where it became necessary to reduce to an 8-inch casing. The total depth of the final well is 409 feet. The well is screened for 35 feet with the bottom of the screen at 407 feet and the top at 372 feet below the ground.

The well was completed with a 30 Hp Franklin Electric pump. Initial pump testing for the well indicated a sustainable yield of 400 gpm. Water quality samples taken at the time of drilling indicated good water quality with a slight H_2S odor.

The current pumping capacity of the well is approximately 280 gpm. This well is considered to be in excellent shape.

Standby Power Generator

The Community's standby power generator is an Onan, 100 kW, diesel-powered generator that is set to start automatically should the power fail. The generator is capable of running all of the water system components at the reservoir site except for two of the well pumps and one of the larger booster pumps. The System Operator manually selects which well will be operated by the generator and the system controls are configured to automatically lock out the other two wells and one of the larger booster pumps. The System Operator monitors the basic generator components such as fluids, etc., and annual maintenance is performed through a service contract with a local provider.

As of summer 2016, the Community is planning to replace the existing standby generator with a 200 kW unit.

Source Capacity Analysis

A source of supply analysis along with information on water rights (see Tables 4.3 and 4.4) are included in Chapter 4 of this plan. Under the current operating configuration, Wells #2 and #3 are the Community's primary wells and together they have a combined production of approximately 510 gpm. Table 3.2 shows the well capacity in gpm and ERU.

TABLE 3.2 SOURCE CAPACITY					
ERUm =	306	gpd =	0.2125	gpm	
	Well	Yield (gpm)	ERU capacity		
	1	176	828		
	2	230	1082		
	3	280	1318		
	Totals	686	3228		
Normal Operation (W2 + W3)		510	2400		
Largest Out of Service (W1 + W2)		406	1910		

The wells are capable of handling the current and planning horizon (2036) water demand. In addition, considering the projected 2036 PHD conditions of 446 gpm, the wells are also capable of supplying the projected PHD demand beyond the year 2036.

With the system's larger production well, Well #3, out of service, Wells #1 and #2 could support the estimated year 2036 projection of 1,115 ERUs associated with production of 59.4 Mg/yr. The wells are adequate throughout the 20 year planning horizon.

3.3.2 Water Treatment

The injection of sodium hypochlorite for disinfection purposes and the filtration of iron and manganese are the two treatment processes currently performed by the Community.

The on-site hypochlorite generation and injection system is capable of self-regulating the chlorine residual in the system. Currently, hypochlorite is generated and stored within the filtration/pump building. The solution is then injected into the system in two separate places. The first injection point is into

the raw well water just prior to the filtration system. The filtration system utilizes the solution as a catalyst to precipitate and absorb iron and manganese. The amount of sodium hypochlorite is regulated by an analyzer, which constantly analyzes the chlorine residual after filtration and then adjusts the injection pumps prior to filtration in order to respond to highs and lows versus the preset residual value. Chlorine residual levels prior to the water entering the reservoirs are maintained at 1.2 to 1.3 mg/L.

The second injection point is just prior to the booster pump system. As the water passes through the filtration system, it is sent to storage within the Community's two storage reservoirs. The water entering the reservoirs is maintained at the preset chlorine residual as analyzed after filtration. However, if this residual level drops below the target residual, the second injection point boosts the chlorine level to the desired residual prior to entering the distribution system. This injection system operates just like the other, with an analyzer reading the residual and an injection pump reacting to the result.

The entire disinfection system—sodium hypochlorite generation and distribution of the solution—are connected to the Community's standby power generator.

The Community's filtration system is an in-line pressure filtration system manufactured by ATEC systems. Raw water (with hypochlorite solution injected as described above) from the wells is pumped through the filter tanks before entering the two reservoirs. The filter tanks contain a pyrolusite media, which essentially captures the iron and manganese particles through an ionic exchange process. The results of the process show almost complete removal of the iron and manganese.

The filtration system also has an automatic backwash cycle that backwashes each of the filtration tanks individually. The timed system backwashes a single tank without taking the remaining filtration system off line. The backwash water is piped to an infiltration pond that allows the water to infiltrate back into the ground.

Water Treatment Capacity Analysis

In regard of treatment capacity, the chlorine injection system is capable of supporting the demands of the Community through build-out conditions. The hypochlorite system can process up to 12 pounds per day of sodium hypochlorite. The system typically generates 1% hypochlorite solution. The injection pump that treats the raw water has a maximum injection rate of 24 gallons of hypochlorite solution per hour and the pump that provides a boost to the water prior to distribution has a maximum injection rate of 5 gallons of hypochlorite solution per hour. Each gallon of solution can disinfect approximately 2,300 gallons of water resulting in a distribution system residual of approximately 0.4 to 0.6 mg/L. The resulting capacity of the injection system is

the treatment of approximately 400,000 gpd of raw water or (400,000/306) 1307 ERU. This figure is above the 20 year projected maximum day demand of the system; therefore, the capacity of the chlorine injection system is projected to not limit the number of connections to the water system.

3.3.3 Storage

The Community has two separate storage reservoirs that are both located in close proximity to Well #1. Storage consists of a large steel reservoir and a smaller concrete reservoir.

The smaller reservoir is an above-grade rectangular concrete reservoir that was constructed when the system was originally built in 1967. The total capacity of this reservoir is 60,000 gallons and it is divided into two separate 30,000-gallon containers.

This reservoir is close to 50 years old; however, it is in relatively good shape. Easy access allows the reservoir to be inspected on a daily basis and it is cleaned approximately every two years or as needed. Under normal operating conditions, this reservoir is the main source of supply to the system's booster pump station. Water from the wells enters the Community's larger steel reservoir and then passes to the concrete reservoir. The reservoir is fed from the top through two distribution pipes and draws from the bottom through a common chamber open to both halves of the reservoir. In 2005, the Community replaced the reservoir's aging cast iron fill pipe and spray bars with PVC pipe. Under typical demand conditions, water within the reservoir will be replaced approximately two times per day.

The Community's second reservoir is a 200,000-gallon above-grade steel reservoir. This reservoir was constructed in 1995 to meet the growing demands within the Community. The reservoir is 42 feet in diameter and has a high-water level of 19 feet above the floor of the reservoir. Under normal operating conditions, the wells supply this reservoir which, in turn, supplies the smaller reservoir by gravity. An electronic transfer valve is located in a vault between the two reservoirs. This valve maintains the level in the 60,000 gallon reservoir by automatically allowing water to transfer from the steel reservoir into the concrete reservoir when the concrete reservoir level reaches the set point. This valve is also connected to the Community's emergency generator. Under typical demand conditions, water within the steel reservoir is replaced approximately every one-and-a-half days.

The steel reservoir was designed to be supplied from the top and then gravity feed from the bottom to the concrete reservoir. However, this design in relation to the overall system created a large amount of dead storage in this reservoir because the base of the steel reservoir is located approximately 16 feet below the supply point into the concrete reservoir. Because the Community's original

booster pump station could only draw from the concrete reservoir, the lower 16 feet of the steel reservoir was essentially useless.

To alleviate this problem, the entire supply/distribution system between the wells and the reservoirs was reconfigured in conjunction with the filtrations/booster station project. As described previously, under normal operating conditions the steel reservoir gravity feeds to the concrete tank and then the concrete tank feeds the Community's booster station; see Figure 3.2. However, under higher demands, an electronically-controlled valve, located in the filtration building, opens to enable the booster pumps to draw water directly from the bottom of the steel tank. This eliminates the dead storage issue within the steel reservoir and provides the Community with additional redundancy in terms of supply to the booster station.

The entire supply/transmission network between the wells and the reservoirs was also reconfigured to allow any one component of the system to be taken off line without disrupting the distribution of water to Community's customers. This allows either reservoir or the filtration system to be taken off line for cleaning or repair without disrupting service. Water from the wells can be directed to either reservoir or directly into the distribution system, if needed.

The steel reservoir was fully cleaned in 2005 and inspected in 2006. During the inspection, the reservoir was determined to be in excellent shape. The concrete reservoir was fully cleaned and inspected in 2006 and was also determined to be in excellent shape.

The interior of the steel reservoir was recoated in 2012. The exterior of the steel reservoir was recoated in April 2016.

Storage Capacity Analysis

The storage requirements of the Community's water system are described in the following sections. Where applicable, equations from the DOH *Water System Design Manual* have been used to determine required storage capacities. The relative equations are further detailed in Section 3.1.5 of this plan. Table 3.3 summarizes the total required storage volumes for the water system.

Operational storage is required to meet system demands when water is not being supplied by the source. Each of the Community's two primary wells contributes to the supply of the system in an alternating fashion. The design of the system activates the chosen lead well pump to replenish supply in the steel reservoir. In the event the system demands are greater than the supply, the second well is activated to meet the demands. When reservoir levels return to full, both pumps are shut down.

The amount of storage between the first well call and the high reservoir level has been determined as the operational storage volume. This volume represents the storage volume utilized with all sources shut down. Under the current configuration, the floats within the concrete reservoir have a 1-foot difference between well shut-off and the first well call. This equates to 10,364 gallons of operational storage.

Equalizing storage provides water during daily periods when system demands are higher than the source capacity. The Community's source capacity is 510 gpm and the capacity of the largest source is 280 gpm. Equation 9-1 from the DOH manual was utilized to determine the ES volume. The source capacity of 510 gpm (without considering the capacity of well #1) is greater than the projected 2036 PHD of 446 gpm (without conservation). Therefore, Equalizing Storage is not required.

Standby storage for a dual source system assumes the loss of the largest capacity source from the system. Equation 9-3 from the DOH design manual was used to determine the SB storage requirements, and indicates that no standby storage is required through 2036.

Fire Suppression Storage is a function of the rate and duration of required fire flow and has been discussed previously in section 3.1.8. The Mason County Interim Fire Flow Standards for Group A Water Systems (circa 2007) requires 500 gpm for 30 minutes duration for existing residential development (see Appendix N). The Mason County Fire Marshal recommends fire flow of 1,000 gpm for 60 minutes (see Appendix N). The Community has elected to use the Fire Marshal's recommendation for planning purposes. In addition, the "nesting" of the FSS and SB volumes is not recommended by the former Fire Marshal.

Equation 9-4 from the DOH design manual was utilized to determine the corresponding existing and future FSS volumes:

FSS Volume = 1,000 gpm x 60 min. = 60,000 gallons

Dead storage is that volume not available to the water system. Upon reconfiguration of the reservoir outlet piping in conjunction with the filtration/booster pumps project as described in Section 3.3.3, the Community's amount of dead storage has essentially been reduced to zero.

TABLE 3.3
STORAGE CAPACITY ANALYSIS
(gallons)

	2015	*2016*	*2021*	*2036*
Operational Storage (OS)	10,364	10,364	10,364	10,364
Equalizing Storage (ES)	0	0	0	0
Standby Storage (SB)	0	0	0	0
Fire Suppression Storage (FSS)	60,000	60,000	60,000	60,000
Dead Storage	0	0	0	0
Total Required	70,364	70,364	70,364	70,364
Available	260,000	260,000	260,000	260,000
Surplus/Deficit	189,636	189,636	189,636	189,636
Available w/FSS nested	249,636	249,636	249,636	249,636

Using the formulas provided in the WSDM, the Community is projected to have adequate storage through the year 2036. The volumes listed in Table 3.3 represent the storage volumes as required by DOH. As illustrated in the table, the Community is required to have approximately 70,000 gallons of storage through the 20 year projection.

The required standby storage calculations are based on current and projected ADD, the number of current and projected ERUs, and source pumping capacities with the largest well out of service. These calculations show that no standby storage is required through the 20 year planning period. However, other circumstances, such as a large earthquake event, could greatly reduce or destroy source capacity for extended periods of time. The WSDM recommends that 200-gal/ERU of standby storage be provided for emergency situations. Based on the number of projected ERUs in 2036, DOH recommendations suggest 223,000 gallons of standby storage is needed. The projected surplus storage volume, excluding the FSS storage, in 2036 will provide approximately 170 gal/ERU, or 85% of the recommendation. If the FSS is nested in the SB storage, then there would be 249,636 gallons available, which exceeds the DOH recommendation. The Community essentially meets the intent of the standby storage recommendations of the WSDM.

Storage Capacity (as recm. SB) = (249,636/200) = 1248 ERU

3.3.4 Telemetry Systems

The Community's telemetry systems are simple systems that activate the wells and the booster pumps. The water system is designed to have a great amount of redundancy, to the extent that every component of the system can be taken off line without affecting the supply of water to the distribution system. Therefore, each reservoir has a series floats for calling the wells, and water can be provided to customers without the filtration system, if necessary. The well and pump controls are interconnected through the use of a programmable logic controller (PLC). The PLC is connected to the Community's back-up power grid for service during power outages.

3.3.5 Distribution System

General Description

The Community's water distribution system is made up of one pressure zone that encompasses the entire service area boundary. The Community's three-pump booster pump station provides all of the water to the system and it also provides and maintains distribution pressure within the system. The current booster pump operating pressure is 50 psi and the average system pressure is about 65 psi.

The lowest pressure in the system is approximately 36 psi and the highest is just over 80 psi. In order to increase system pressures and to improve fire flows, the Community has considered increasing the hydraulic grade line by 10 psi by revising the booster system set points accordingly. However, the hydraulic gradient has not been increased to date. The Community has installed individual pressure reducing valves (PRVs) on the service connections in the lower elevation areas of the service area in anticipation of the hydraulic gradient increase. The PRVs are installed to limit the system pressure to 80 psi or below at the customer meter.

The majority of the distribution system is comprised of PVC pipe smaller than 8 inches. However, there is an 8-inch DI section in the area of the reservoirs leading from the booster pumps to the roadway and there is approximately 1,200 feet of 8-inch asbestos concrete pipe in the roadway, running parallel to the Community's reservoirs. In late 2008, approximately 2,600 feet of 4-inch PVC was replaced with 8-inch DI along Eastlake Drive and four fire hydrants were installed. A large system loop constructed of 6-inch PVC pipe connects to the western edge of this 8-inch main. This loop continues around the larger lake (Timberlake) and then back to the booster station. This loop provides water to approximately one third of the Community and has eight of the Community's 16 fire hydrants on it.

A complete inventory of the Community's distribution mains, by size and quantity of pipe, is included in Section 1.4. A schematic of the water system is included as Figure 3.1.

Evidence from maintenance and routine inspections suggests that the distribution mains are in acceptable condition with isolated locations requiring repair. A large amount of repairs were made as the Community initiated the installation of individual service meters in 1998. During this installation process the crews discovered and repaired numerous leaks in the system. These leaks were most commonly caused by the deterioration of the tapping fittings between the water main and the service line connections. Subsequently, nearly all tapping fittings in the Community have been replaced.

The Community's water loss has consistently been greater than 10%, even with replacement of tapping fittings. A meter replacement program is currently being considered and will likely more accurately measure billed water. The Community's Water Loss Control Action Plan addresses this issue and is contained in Appendix D.

All water system "as built" records are kept by computer mapping and include the locations of all facilities, pipe sizes, and hydrant and valve locations.

Fire hydrants within the Community do not have adequate spacing and coverage per the requirements of the Mason County Fire Marshal. The current hydrant spacing requirement is 500 feet. In addition, isolation valve spacing is poor in some areas.

Booster Pump Station

The Community's main booster station was manufactured by PACO pumps and was installed in the summer of 2004. The system is a triplex package system with a smaller lead pump and two larger high flow pumps. The lead pump was designed to deliver 150 gpm and the two larger pumps were designed to each provide 675 gpm. The system is controlled by a PLC that sequences the pump operation at five different settings, or staged output levels. The pump system is connected to the Community's emergency back-up generator; however, the control system locks out the use of one of the larger 40 Hp pumps due to limitations with the size of the generator. Therefore, the smaller lead pump and only one large pump can be operated (in conjunction) while under standby power from the generator. The booster pump system is fully operational and considered to be in excellent shape.

TABLE 3.4 BOOSTER PUMP CAPACITY					
ERUm =	306	gpd =	0.2125	gpm	
		Yield	ERU		
	Pump	(gpm)	capacity		
	1	150	706		
	2	675	3176		
	3	675	3176		
	Totals	1500	7058		
Normal Operation		1500	7058		
Emergency Power (W1 + W2)		825	3882		

If necessary, the Community can also operate the original booster station, which is located in the concrete reservoir/shop building. This booster system is a two-pump system that can be run manually should the newer triplex system be down for maintenance. These pumps draw from the concrete reservoir and deliver water to the distribution system. The water delivered to the system through these pumps does not pass through the second chlorine injection point. However, a residual is maintained within the water stored in the concrete reservoir. Also, the original booster station is not capable of utilizing all of the storage within the steel reservoir due to elevation constraints.

Hydraulic Capacity Analysis

A computer network model that simulates the elements of the Community's distribution system was prepared in August 2009 as part of the prior plan to determine the adequacy of the distribution system under normal operating, maximum day and fire flow conditions. A schematic of the system model is illustrated in Figure 3.3.

The prior hydraulic model was not updated for this plan. With current and projected water use revised downward from that in the prior planning period (ADD of 146 gpd/ERU vs. prior plan ADD of 180 gpd/ERU), the 20-year demand

projections are less than the prior plan (i.e., 2036 PHD of 446 gpm vs. prior plan 2026 PHD of 669 gpm). The model effectively evaluated a capacity of 1672 ERU with satisfactory results

Based on the modeling in the prior plan, the lowest system pressure of 36 psi under PHD conditions is estimated to be at the crest of a small hill along the western edge of the service area.

As stated previously, the Community has considered increasing the system pressures provided by the booster pumps by 10 psi. Increasing the booster pump discharge pressure to 60 psi will bring the lowest pressure within the Community to approximately 46 psi during PHD conditions and will improve the available fire flow. Additional information regarding fire flow is presented in the following section.

Fire Flow Conditions: As described in Section 3.3.3, the Community's recommended fire flow rate and duration is 1,000 gpm for 60 minutes. For fire flow modeling, flows of 1,000 gpm were introduced at all nodes within the model; however, only nodes representing the existing 12 hydrant locations and the nodes along 6-inch water mains were specifically analyzed.

From the modeling it was determined that, under the current operating conditions, the system can support the fire flow recommendations at each existing hydrant location except for hydrants H7, H8, and H9; see Figure 3.1. These three hydrants are located along the northwestern and northern end of Timberlake along Timberlake Drive West. Per the modeling data, each of these hydrants can support the required flow of 1,000 gpm; however, the minimum system pressure of 20 psi cannot be maintained at the system high point, which is also located in the northwestern corner of the Community. However, modeling results demonstrate that the required fire flow rate of 500 gpm can be obtained while maintaining minimum pressures of 20 psi within the distribution system.

As described previously, the Community intends to eventually increase the system hydraulic grade line by approximately 10 psi to 60 psi at the pumps. By increasing the system pressure, the full fire flow of 1,000 gpm would be available at hydrant H7; however, hydrants H8 and H9 still remained below the 1,000 gpm requirement. From the data, the hydraulic grade line would need to be elevated an additional 80 feet in order to achieve the 1,000 gpm fire flow at the remaining two hydrants. This is not seen as feasible; therefore, other improvements, as described in Section 3.4.4, will be considered.

The input data for the model along with selected model runs has been included in Appendix F.

3.3.6 *ERU Capacity Summary*

The ERU capacities of individual elements of the system are summarized in Table 3.5. All components exceed the number of ERUs projected for 20 years

TABLE 3.5
LIMITING CAPACITY SUMMARY

	ERU Capacity	Surplus / Deficit
Projected Target Year 2036 Req.	**1115**	
Sources (w/ largest out of service)	1910	795
Storage (as recm. SB)	1248	133
Treatment	1307	192
Booster Pump (under emergency power)	3882	2767
Distribution (2009 PHD model)	1672	557

Based on the analysis presented above, the system appears to have adequate capacity throughout the 20 year planning horizon. In the future, beyond year 2036, the system may first be limited by the available Stand By storage meeting the DOH recommended requirement followed by the capacity of the current treatment system.

3.4 **SYSTEM DEFICIENCIES AND RECOMMENDATIONS**

The following system deficiencies have been identified from the preceding system analyses.

3.4.1 Source of Supply

The Community's existing sources are adequate to serve the system through the projected 20-year planning period.

Therefore, no improvements are recommended for the wells at this time.

3.4.2 Water Treatment

The water treatment systems are fully operational and capable of meeting the projected system demands. Therefore, no improvements are recommended at this time.

3.4.3 Storage

The Community's existing storage reservoirs are projected to be adequate to serve the system through the projected 20-year planning period.

Therefore, at this time, there are no recommend storage improvements.

3.4.4 Telemetry Systems

The Community's existing telemetry systems are considered adequate to handle the projected situations that could arise with the water system. The Operations Manager is notified by all system alarms and the alarms cover most of the components of the system.

Therefore, there are no recommend improvements for the telemetry systems at this time.

3.4.5 Distribution System

General Distribution

Hydraulic modeling indicates that the current configuration of the booster pumps and the condition of the existing distribution system are adequate to meet the projected future peak hour demands through the year 2026. With the current pump outlet pressure of 50 psi, the system can maintain the required minimum pressure of 30 psi throughout the distribution system for all planning years.

The proposed increase in booster pump outlet pressure from 50 psi to 60 psi adds additional pressure, thus elevating the lowest pressure area from approximately 36 psi to 46 psi. A pressure increase also has the risk of exacerbating leakage and increasing water loss. Therefore, it is recommended the Community continue with effort to reduce Distribution System Loss prior to the plan to increase the system pressure.

Water Loss Control Action Plan

Distribution System Loss (DSL) is calculated as the difference between water produced and the accounted for water either sold or utilized in the operations. TCC records indicate an average of 12.7% (93.6 ERU) DSL for the 3 year period (2013, 2014, 2015). This represents an improvement over earlier periods but still is above the 10% threshold required by DOH.

The Community continues to work to reduce the DSL volume. Maintenance records and system information reviewed during the preparation of this plan

suggests that the actual DSL may be lower than the calculations indicate, it is suspected that aging meters are not accurately tallying water usage.

The Community recently purchased a large lot of residential meters and is scheduling to replace the majority of existing meters within the next 2 years. New analysis tools have been provided to the operations staff and they will monitor the DSL at the end of each 2 month billing cycle. The meter replacement program will improve the accuracy of data and billing data and will allow the Community to narrow the potential sources of DSL.

It is recommended that the Community closely evaluate the DSL volumes to determine if additional leaks in the system mains are continuing to contribute to the volume of lost water. Should the amount of lost water exceed acceptable limits, it is recommended that the Community begin an aggressive leak detection effort to identify and correct water loss. The Community's Water Loss Control Action Plan is included in Appendix D.

The most recent data showed DSL for 2016 at 15.4% (122 ERU). By the end of 2017 all meter replacements had been completed and the DSL was reported to have decreased to 6.2% (49 ERU). DSL will continue to be monitored to verify that this is a consistent trend.

Fire Flow

Fire flow availability within the Community is currently limited to specific areas due to the large quantity of small diameter (2" thru 6") lines and insufficient hydrant spacing. All of the existing hydrants do provide service above the 500 GPM they were originally designed for. The existing fire flow recommendation of 1,000 gpm for 60 minutes is achievable at thirteen of the existing hydrant locations; however, three hydrants cannot currently meet the recommendation.

The Fire Department is aware of the availability and restrictions of fire flow within the Community. The Fire Department routinely dispatches tanker trucks to fire calls within TCC. In consideration of increasing fire flows at the existing hydrants and improving fire protection in other areas by installing additional hydrants, the Community has selected a combination of water main replacement projects, which strive to meet these two goals.

The following improvements were first identified and modeled in the 2009 plan update and have been selected to improve fire flows and to add additional fire hydrants for increased fire protection.

- Consider increasing the distribution hydraulic grade line by approximately 23 feet, (10 psi).

- Replace approximately 2,600 linear feet of existing 3-inch main with 8-inch DI main along Agate Dr. Replacement would extend from W. Lakeshore Dr. W. to Pickering Dr. (Node J930 to Node J950).
- Replace approximately 2,000 linear feet of existing 2-inch main with 8-inch DI main along McClane Drive and Totten Place. Replacement would extend along McClane Drive from Herron Dr. to Timberlake Dr. and along Totten Pl. from Agate Dr. to Lakeshore Dr. W. (Node J850 to Node J870 and Node J910 to Node J1010).
- Replace approximately 2,400 linear feet of existing 4-inch and 2-inch main with 8-inch DI main along Lakeshore Dr. W. and Timber Parkway. Replacement would extend along Lakeshore Dr. W. from Timberlake Dr. to Totten Pl. and along Timber Parkway from Lakeshore Dr. W. to E. Lakeshore Dr. (Node J890 to Node J980 and Node J1040 to Node J1010).
- Replace approximately 2,800 linear feet of existing 4-inch main with 8-inch DI main along Pickering Drive, Park Drive and W. Lakeshore Drive. Replacement would extend along Pickering Dr. from Annas Way to Park Dr., then along Park Dr. to W. Lakeshore Dr., then along W. Lakeshore Dr. to Timberlake Dr. (Node J1430 to Node J1460, Node J1460 to Node J1480, Node J1480 to Node J1530 and Node J1530 to Node 240).

In addition to the main replacement projects listed above, the Community is also advised to add additional fire hydrants, where feasible, to improve fire protection within the Community. The main replacement projects would add hydrants along the routes described above; however, additional hydrants should be located along the existing 6-inch mains that make up the major loops within the system. It has been proposed that the Community add two hydrants per year until hydrant spacing meets fire code requirements.

3.5 PROPOSED IMPROVEMENT PROJECTS

Projects that are recommended to correct the existing and anticipated system deficiencies, along with other capital needs, are presented in Chapter 8.

WELLS, RESERVOIRS, FILTRATION/
BOOSTER STATION BUILDING
SEE FIGURE 3.2 FOR DETAIL

600 300 0 600 1200
SCALE IN FEET

LEGEND

- 2" PIPE
- 3" PIPE
- 4" PIPE
- 6" PIPE
- 8" PIPE
- H1 FIRE HYDRANTS

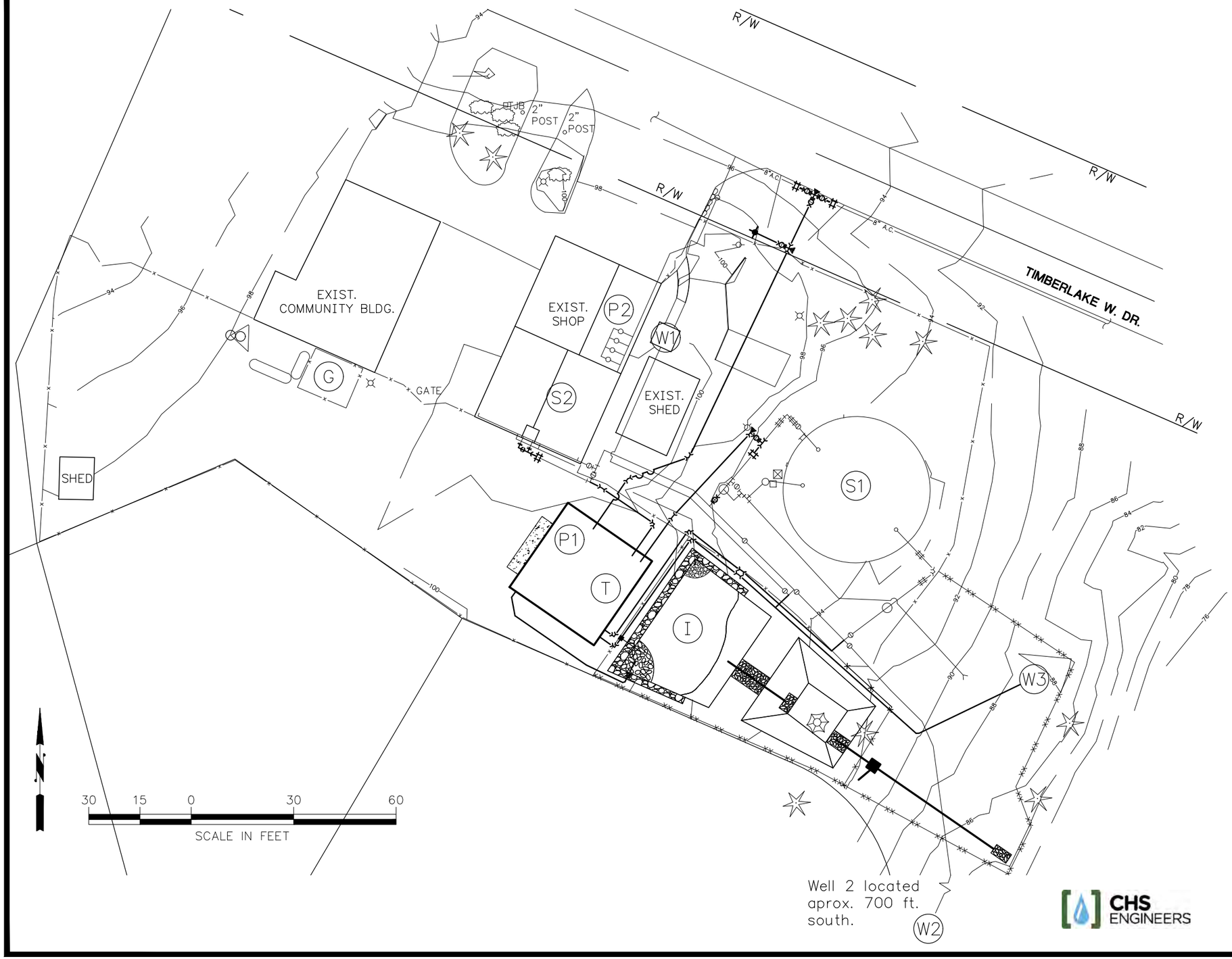
TIMBERLAKE

LITTLE TIMBERLAKE

Timberlake Community Club, Inc.
2018 Comprehensive Water System Plan
FIGURE 3.1
EXISTING WATER SYSTEM

CHS ENGINEERS

PLOTTING DATE:
USER: Evan Henke



(W1) Well 1

(W2) Well 2

(W3) Well 3

(S1) Reservoir 1: 200,000 Gal, Steel

(S2) Reservoir 2: 60,000 Gal, Concrete

(T) Treatment: Media Filtration and Chlorination

(P1) Booster Pumps (3): Primary System

(P2) Booster Pumps (4): Emergency Use Only

(I) Filtration Backwash Infiltration Basin

(G) Emergency Electrical Generator

CHS ENGINEERS

Timberlake Community Club, Inc.
2018 Comprehensive Water System Plan

FIGURE 3.2
EXISTING WATER SYSTEM WELLS,
RESERVOIRS AND BOOSTER PUMP STATION

600 300 0 600 1200

SCALE IN FEET

LEGEND

- PIPES
- J1600 JUNCTION NODES
- H1 FIRE HYDRANTS

Timberlake Community Club, Inc.

2018 Comprehensive Water System Plan

FIGURE 3.3

WATER SYSTEM MODEL

CHS ENGINEERS

USER: Evon Henke PLOTTING DATE: 8/2/2016 FILE LOCATION: K:\SO-Timberlake\2014\501401-WSP\Update\2016 WSP\CAD\Fig 3.3 Model.dwg

CHAPTER 4

WATER USE EFFICIENCY PROGRAM, WATER RIGHTS ANALYSIS, SYSTEM RELIABILITY AND INTERTIES

4.1 WATER USE EFFICIENCY PROGRAM DEVELOPMENT AND IMPLEMENTATION

A water use efficiency (a.k.a. conservation) program should include components of long-term conservation measures and peak use management. Short-term emergency response plans, which are associated with drought and other emergency conditions of water shortage, are not considered conservation.

The water conservation program is intended to promote efficient water use, protect water as a valuable resource, reduce per-capita consumption, and save Community funding by deferring capital investments otherwise necessary for increased system capacity. In addition, programs should satisfy utility growth requirements, ensure sufficient water for current and future customers and, finally, promote a regional approach to conservation.

Washington State adopted the "Municipal Water Law" (MWL, 2E2SHB 1338) in 2003. This law amends and clarifies sections of the RCW pertaining to public water systems, including requirements for specific water conservation efforts. WAC 246-290 was amended effective January 22, 2007, to include the final rules developed from the Municipal Water Law. The rules require development of a water use efficiency (WUE) program, including WUE planning requirements, WUE goal setting and performance reporting, and distribution system leakage monitoring, and correction as required. More specific direction is presented in DOH Publication #331-375, *Water Use Efficiency Guidebook*.

4.1.1. Water Conservation Program

The Community's previous and continuing conservation program includes source and system metering, system leak detection and repair, usage-based consumption charges, and distribution of program promotional materials. More details about each component of the Community's conservation program are given below.

Source Meters

The Community's original two wells have had source meters installed since they were constructed. Well #3, which was brought online in 2005, also has a meter installed on it. These meters are read on a semi-daily basis.

Service Meters

There are also service meters on each customer connection. Each customer meter is read bi-monthly and meter water usage is the basis for bi-monthly service charges.

System Leak Detection and Repair

One of the Community's primary conservation goals is the reduction of distribution system leakage. Distribution system leakage quantities are calculated by comparing the water distributed into the system with the quantities of water billed to the customers. The Community documents and monitors these volumes on a regular basis. They also take a proactive approach to finding distribution system leakage and the measures that they implement are discussed below.

The Community previously had a large amount of distribution system leakage due to the deterioration of the tapping fitting between water mains and service line connections. The Community has found and repaired 97% of these leaking fittings. The repair of these fittings decreased the distribution system leakage from over 20 percent prior to 2008 to consistently less than 10% in the last eight years.

The Community monitors system flows in the pump station daily with a data recorder (a Monarch Data Chart 2000). The data recorder tracks system flows, chlorine residuals, well flows, time, date and alarm history for up to 24 hours. By comparing daily readings at a low usage time (approximately 2 am), the Community can detect an abnormal increase in flow above previous readings and start looking for a leak somewhere in the distribution system. The data recorder is also used to calculate water loss from flushing mains, fire department drafting and calculating water loss from leaks and flushing after a repair. All information gathered is entered into a log book for tracking water loss.

Finally, the Community is notified by the telemetry alarm system when the volumes in the reservoirs are too high or too low, which provides an indication of a potential reservoir overflow event or potential main break or system leak.

Conservation Pricing

All of the buildable lots in the Community have system connections that are metered. Bi-monthly service charges include a base rate and a reserve charge. There are four tiers of volume usage charges above and beyond the bi-monthly service charges to promote water conservation. The current base, reserve and conservation pricing (for all lots except camping lots) is as follows:

Base Rate	$50.00 bi-monthly
Camping Base Rate	$24.00 bi-monthly
1-8,000 Gallons	$1.33 per 1000 gallons
8,001-12,000 Gallons	$2.00 per 1000 gallons
12,001-20,000 Gallons	$2.66 per 1000 gallons
>20,000 Gallons	$3.33 per 1000 gallons

Public Outreach

The Community promotes conservation to its members in several ways. The Community has previously included promotional information in their Annual Water Quality Report publication.

The Community publishes a newsletter every two months covering all aspects of the community. This newsletter includes general information and, when applicable, it discusses water system projects, current water supply status, and possible upcoming system maintenance. In addition, the newsletter routinely includes information regarding water conservation and the protection of groundwater.

The Community also promotes its conservation program postings on a reader board located at the entrance to the community and on its website.

4.1.2. Goals

The conservation objectives for a typical water system should be the detection and reduction of distribution system leakage along with the reduction of water consumption on a daily, monthly, seasonal, and annual basis. Initially, the Community focused on reducing their distribution system leakage. They have been partly successful, having reduced DSL from over to 20% to just below 13% currently.

The previous goal for the Community's conservation program was to reduce the growth adjusted annual peak season demand by one percent each year for the period from 2009 to 2014. This goal also has been successful as the ERU value has dropped from 180 to 146 GPD per ERU

The Community needs to establish a new goal to continue to meet its conservation objectives. It is recommended that the Community holds a public forum and establishes a new goal within the next year. It is also an option for the Community to extend its current goal for another two years.

4.1.3. Measure Evaluation

The Community's conservation program for 2016-2021 consists of five measures which are discussed below. The program reflects the continuation and/or enhancement of existing measures and includes additional measures. The Community plans for the conservation program to remain flexible; therefore, details may be modified to meet the conservation goal and maintain cost-effectiveness of the program.

System Leak Detection and Repair

The Community will continue to support system leak detection and repair. Evaluation will consist of reviewing the DSL percentage and volume each billing cycle and each year to gauge compliance with the distribution system leakage requirement of 10% or less on a rolling three year average.

Conservation Pricing

The Community will continue to support their existing conservation pricing structure. Conservation pricing will continue to be implemented for years 1-6 of the conservation program. Evaluation will consist of reviewing the impact of pricing during peak summer months. In particular, when such data is available, peak day, week and month water usage can be compared to prior years to detect changes that can be associated with new pricing strategies.

Public Outreach

The Community currently distributes its annual Water Quality Report each year. Future Water Quality Report reports will include information about the Community's conservation programs. The Community will continue to promote its conservation program through the publication of a bi-monthly newsletter and postings located at the entrance to the community and on their website.

Bills Showing Consumption History

The Community is not currently providing customers with an expanded consumption history on each water bill. When the Community prepares for a significant upgrade to their billing system, they will consider having the ability to show more detailed water consumption on customers' bills.

Conservation Kits

The Community currently does not distribute water conservation kits. However, as part of their expanding conservation program, the Community will be disseminating additional conservation information through the annual Community

newsletters. Information on water saving devices will be included in future issues.

4.1.4. Measure Implementation

All WUE measures described in Section 4.1.3 above are planned for implementation by the Community, as described above.

4.1.5. Customer Education

Customer education with respect to water use efficiency is accomplished through public outreach (see Sections 4.1.1 and 4.1.3).

4.1.6. Projected Water Savings

Estimated total system savings during 2016-2021 with conservation efforts ranges from 0.4 mg/yr 2016 to 2.7 mg/yr 2021 from MDD and 0.006 mgd from ADD (see Table 2.3).

4.1.7. Effectiveness Evaluation

The Community has two major goals with their conservation program: further reduction in distribution system leakage and the reduction of the growth adjusted annual peak season demand. The latter may be seen through a public education program to promote awareness and educate people how to reduce seasonal peak demands. The Community will also include conservation ideas in future articles in the annual Water Quality Report.

Beginning in 2008, the Community's conservation goal included a projected decrease in the adjusted annual peak season demand by one percent each year for the period 2009 to 2014. The Community met this conservation goal every year from 2011 to 2014 and saved over 4 MG of water from 2008 to 2014.

The Community needs to establish a new goal to continue to meet its conservation objectives. It is recommended that the Community holds a public forum and establishes a new goal within the next year.

The performance of the water conservation program will be evaluated annually as the WUE annual report is prepared each Spring. Evaluation procedures will vary for each program component based on its conservation tactic (i.e. hardware versus behavioral), but reviewed to assess its effectiveness in achieving the program's conservation goal. Amount of water saved and savings in terms of water facilities will also be considered in the review process. If program measures are not meeting the established conservation goal, appropriate modifications will be made to uphold the program's goals.

The WUE rule requires municipal water suppliers to submit a WUE performance report to the DOH by July 1st of each year for the previous year [WAC 246-290-840(1)(a)]. The information submitted to DOH must be made available to the public. The Community plans to distribute the performance report to the public in conjunction with its annual Consumer Confidence Report (CCR).

4.1.8. Distribution System Leakage

WUE guidelines require all municipal water suppliers to maintain their distribution system leakage (DSL) at or below ten percent of their production, based on a rolling three-year average. If municipal water suppliers are not meeting the distribution leak standard they must develop and implement a Water Loss Control Action Plan (WLCAP) which outlines steps and timelines needed to reduce system leakage.

The Community became aware of a problem with tapping fittings between water mains and service line connections deteriorating and causing distribution system leakage in the mid 90s. The Community replaced many of these fittings in 1998 and continued actively replacing a portion of these fittings each summer from 2000 through 2008. This effort reduced the distribution system leakage from above 20% in the early 2000s to consistently below ten percent from 2008 through 2014.

The Community continues to take measures to minimize leaks on both the supply-side (Community) and demand-side (customer), as listed below and previously described in Section 4.1.1, Item 3.

- monitoring
- meter testing/replacement
- non-revenue water tracking
- water main repair and replacement program

See Section 2.2.4 for additional discussion of DSL.

4.1.9. Water Rate Structure

The Community intends to continue their existing conservation pricing structure. Since its implementation in 2010, there has been a consistent reduction in seasonal peak usage. The Community will continue to evaluate its effectiveness and make adjustments in price and/or structure as necessary to continue to encourage conservation.

4.1.10. Reclaimed Water Opportunities

There is currently no potential for uses of reclaimed water because the local area is served by individual onsite sewage disposal systems. See Section 4.2.5 for a more complete discussion of water reuse.

4.1.11. Water Supply Characteristics

The Community has three groundwater wells located in Water Resource Inventory Area (WRIA) 14. Well #1 is an emergency source of supply and Wells #2 and #3 are primary points of withdrawal for the Community water supply. See Chapter 3.3.1 for a more detailed description of the three wells.

The Community has adequate water rights at this time, as described in Chapter 3. However, systems that are not pursuing additional water rights are also encouraged to conduct a source of supply analysis even though it is not required.

The Community will evaluate the benefit of conducting a source of supply analysis during the next WSP update in 2021.

4.2. SOURCE OF SUPPLY ANALYSIS

The Department of Ecology requires water systems to demonstrate serious consideration of all options prior to issuing new or expanded water rights. The purpose of a 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.

A source of supply analysis is required of all systems that will be pursuing water rights within 20 years of approval of their WSP as defined by the water demand forecast. The Timberlake Community has adequate water rights at this time and is not projected to require additional rights within the 20-year planning period. Systems that are not pursuing additional water rights are also encouraged to conduct a source of supply analysis; however, it is not required.

4.2.1 Enhanced Conservation Measures

As discussed in Section 4.1, the Community has or will implement five water use efficiency measures with the goal of reducing MDD and ADD system-wide.

4.2.2 Water Rights Changes

As further discussed in Section 4.3, the Community is not projected to pursue additional water rights within the six-year planning period. Therefore, no changes in water rights are foreseen.

4.2.3 Interties

The Community does not have any emergency interties in place at this time and the possibility of a future intertie is low due to the proximity of the surrounding water purveyors.

4.2.4 Artificial Recharge

Artificial recharge is the injection or infiltration of available surface water, typically from high winter flows or other available water, into an aquifer and its subsequent withdrawal. An artificial recharge program has not been considered by the Community due to the reliability of its sources. Should the need for additional water rights occur, this alternative would be considered.

4.2.5 Use of Reclaimed Water, Reuse, and other Non-Potable Sources

Because the existing wastewater disposal systems within the Community consist entirely of on-site septic systems, there is currently no possibility for a water reuse project using reclaimed water. If a sewer system were developed for the area, reclaimed water and water reuse would be analyzed during the design of this system.

4.2.6 Treatment

The Community constructed an on-site hypochlorite generation system and an injection system that is capable of self-regulating the chlorine residual in the system in conjunction with the construction of the Community's new filtration and booster pump systems in 2004. They also constructed an in-line pressure filtration system manufactured by ATEC systems at that time. See Section 3.3.2 for more details about the disinfection and filtration systems.

4.3 WATER RIGHTS EVALUATION

4.3.1 Existing Water Rights

Currently, the Community has two water rights that describe withdrawal points for three groundwater sources within four separate quarter-quarter sections. Each of the sections is located within the service boundary of the water system. The Certificates of Water Rights and copies of the affidavit of publications have been included in Appendix G. The locations of the four quarter-quarter sections relative to the service area are illustrated in Figure 4.1, and Table 4.1 below summarizes the Community's water rights.

TABLE 4.1 Water Rights Summary			
Water Right/ Permit	*Priority Date*	*Maximum Annual Quantity (acre-feet)*	*Maximum Instantaneous Quantity (gpm)*
G2-8337-6763	10/10/1966	368	230
G2-20035	3/16/1972	382	350

The description of Water Right Number 6736 covers all four of the quarter-quarter sections illustrated in the figure. The initial affidavit of publication indicated rights of withdrawal of 900 gpm for this water right. However, the final approved withdrawal for this water right is a maximum quantity of 368 acre-feet annually and a 230-gpm instantaneous rate. This water right originally covered Well #1, which is located within Lot 85 of platted Timberlake No. 6 adjacent to the Community's concrete reservoir, and has a depth of 380 feet.

The affidavit of publication for the Water Right Number G2-20035 is confined to Lot 85 of Timberlake Section No. 6, which is a large parcel of undeveloped land extending south from the reservoir site. The maximum annual quantity for this water right is 382 acre-feet and the instantaneous rate is 350 gpm. This water right originally covered Well #2, which is also located within Lot 85 of platted Timberlake No. 6, approximately 700 feet southeast of Well #1 and has a depth of 400 feet.

The purpose and place of use for these water rights is for residential water service within the current service boundary of the Community. No future service areas are projected. There are no *time-of-use limits* or any other limitations for either water right.

In November 2007, the Community received an approval of the Showing of Compliance filed with DOE in June, 2005. This document relates to the approval of Well #3 as an additional point of withdrawal attached to both of the Community's existing water rights. Well #3 was constructed approximately 150 feet southeast of Well #1 and is within Lot 85 of platted Timberlake No. 6. Tables 4.2, 4.3A and 4.3B, as described below, illustrate the Community's existing rights and the assignment of each well to each right.

4.3.2 Current Water Usage and Projected Needs

Tables 4.2, 4.3A and 4.3B have been adapted from tables provided by the Department of Health. The tables are intended to evaluate the existing water rights and to project the possible need for future water rights.

Table 4.2 illustrates the allocation of the Community's existing water rights along with the December 2013 consumption rates for the system. The maximum instantaneous flow rate (Qi) of withdrawal from the wells was determined from the sustainable withdrawal rates for Wells #2 and #3. These wells represent the Community's two active points of withdrawal and equate to the two largest pumping capacities out of all three wells. Should one of the wells fail or be down for service, the Community would begin using Well #1. In this case, the total Qi would be lower than shown.

Maximum annual withdrawal volumes (Qa) presented in Table 4.2 were determined by averaging the annual well withdrawal amounts for the period of January 2011 to December 2015.

As illustrated by the three tables, the existing water rights are projected to adequately supply the Community through the planning year 2036 in terms of both annual withdrawal quantities and instantaneous withdrawal.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Table 4.2

WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – EXISTING STATUS – Year 2015

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER [1]	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		EXISTING CONSUMPTION		CURRENT WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)[2]	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 1. G2-8337-6763C	Timberlake Development Company	03/11/66	Wells #1 & #3	No	230 gpm	368 ac-ft/yr	(see below)	(see below)	(see below)	(see below)
2. G2-20035C	Timberlake Community Club	03/16/72	Wells #2 & #3	No	350 gpm	382 ac-ft/yr	(see below)	(see below)	(see below)	(see below)
3.										
4. (Combined Well Field)					**580 gpm**	**750 ac-ft/yr**	337 gpm	130.1 ac-ft/yr	+243 gpm	+619.9 ac-ft/yr
Claims 1.										
TOTAL	**********	*********	*********	**********	**580 gpm**	**750 ac-ft/yr**	**337 gpm**	**130.1 ac-ft/yr**	**+243 gpm**	**+619.9 ac-ft/yr**

INTERTIE NAME/ IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		EXISTING CONSUMPTION THROUGH INTERTIE		CURRENT INTERTIE SUPPLY STATUS (Excess/Deficiency)	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1.							
2.							
3.							
4.							
TOTAL	**********						

PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
1.					

1. Well #3 draws from either Water Right.
2. Qi reported as calculated 2015 PHD (see Table 3.1)

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Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Table 4.3A

WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – 6 YEAR FORECAST – Year 2021

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER [1]	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		FORECASTED WATER USE FROM SOURCES (6-year Demand)		FORECASTED WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)[2]	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 1. G2-8337-6763C	Timberlake Development Company	03/11/66	Wells #1 & #3	No	230 gpm	368 ac-ft/yr	(see below)	(see below)	(see below)	(see below)
2. G2-20035C	Timberlake Community Club	03/16/72	Wells #2 & #3	No	350 gpm	382 ac-ft/yr	(see below)	(see below)	(see below)	(see below)
3.										
4. (Combined Well Field)					**580 gpm**	**750 ac-ft/yr**	373 gpm	147.7 ac-ft/yr	+207 gpm	+602.3 ac-ft/yr
Claims 1.										
TOTAL	**********	*********	*********	**********	**580 gpm**	**750 ac-ft/yr**	**373 gpm**	**147.7 ac-ft/yr**	**+207 gpm**	**+602.3 ac-ft/yr**

INTERTIE NAME/ IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		FORECASTED CONSUMPTION THROUGH INTERTIE		FORECASTED INTERTIE SUPPLY STATUS (Excess/Deficiency)	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1.							
TOTAL	**********						

PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
1.					

1. Well #3 draws from either Water Right.
2. Qi reported as calculated 2021 PHD (see Table 3.1)

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Table 4.3B

WATER SYSTEM PLAN

WATER RIGHTS SELF ASSESSMENT – 20 YEAR FORECAST – Year 2036

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER [1]	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		FORECASTED WATER USE FROM SOURCES (6-year Demand)		FORECASTED WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)[2]	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 1. G2-8337-6763C	Timberlake Development Company	03/11/66	Wells #1 & #3	No	230 gpm	368 ac-ft/yr	(see below)	(see below)	(see below)	(see below)
2. G2-20035C	Timberlake Community Club	03/16/72	Wells #2 & #3	No	350 gpm	382 ac-ft/yr	(see below)	(see below)	(see below)	(see below)
3.										
4. (Combined Well Field)					**580 gpm**	**750 ac-ft/yr**	446 gpm	182.2 ac-ft/yr	+134 gpm	+567.8 ac-ft/yr
Claims 1.										
TOTAL	**********	*********	*********	**********	**580 gpm**	**750 ac-ft/yr**	**446 gpm**	**182.2 ac-ft/yr**	**+134 gpm**	**+567.8 ac-ft/yr**

INTERTIE NAME/ IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		FORECASTED CONSUMPTION THROUGH INTERTIE		FORECASTED INTERTIE SUPPLY STATUS (Excess/Deficiency)	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1.							
TOTAL	**********						

PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
1.					

1. Well #3 draws from either Water Right.
2. Qi reported as calculated 2036 PHD (see Table 3.1)

4.4 WATER SUPPLY RELIABILITY ANALYSIS

4.4.1 Source Reliability

The source aquifer utilized by the Community has historically provided excellent water in terms of both quality and quantity.

In regard to quality, the source of water has been generally within state guidelines except for an occasional spike in iron and manganese levels prior to construction of the filtration facility. Installation of the water treatment facilities has reduced the levels of these contaminants to an average of <0.1 for iron and <0.01 for manganese. The MCLs for these contaminants are 0.3 and 0.05 respectively. In addition, the hydrogeologic composition of the source aquifer for the Community's wells provides a naturally high level of protection from contamination. Wellhead protection and water quality protection efforts will continue as outlined in Chapter 5 of this plan.

Pump testing done on the Community wells as part of the *New Water Source Planning* report completed by CHS Engineers in March, 2000, implied an aquifer transmissivity of 120,000 gallons per day per foot (gpd/ft). This indicates that the aquifer is capable of large production rates. Based on this information, it is anticipated that the aquifer is capable of supplying the water system through the projected build-out of the Community.

In terms of area demands, the local region surrounding the Community is rural in nature and is projected to remain as such. Therefore, average withdrawal quantities from the source aquifer are not projected to change significantly aside from estimated annual growth projections.

4.4.2 Water Rights Adequacy

In Table 4.3B, the forecasted 20-year maximum instantaneous flow rate (Qi) was determined from the projected PHD for the year 2035 and the existing pumping capacities of the wells. As shown in the table, the Community is projected to remain within its allotted water rights through the 20-year planning period.

4.4.3 Water Shortage Response Planning

The Community currently has no stand-alone water shortage response plan. The Community has completed an Emergency Response Plan, which is included in Appendix D. This plan, generally addresses the needs of the Community during periods of water shortages.

4.4.4 Well Monitoring Program

The Community has no documented well monitoring program at this time. However, each well is visited on a daily basis by the System Operator. Installation of a more formal monitoring program has been proposed and will be included in the next update of the Community's Operation and Maintenance Manual, the current version of this manual is located in Appendix I.

4.5 INTERTIES

The Community currently has no interties with any other systems, nor are any interties planned. The closest established water system is approximately 1 mile south of the Community. Therefore, at this time, an intertie is not foreseen as feasible for daily or emergency use.

4.6 IDENTIFICATION OF SYSTEM IMPROVEMENTS

4.6.1 Water Use Efficiency Improvements

The Community is and will continue to be proactive in conserving water and implementing measures to improve their conservation. The Community will look for opportunities to further promote their conservation program, include consumption history on bills and provide conservation kits to its members when the benefits of a particular measure are determined to outweigh the costs.

The Community is moving forward with a meter replacement program that will assist in documenting actual usage vs system loss.

600 300 0 600 1200

SCALE IN FEET

WATER SYSTEM WELLS, RESERVOIRS AND BOOSTER PUMP STATION

TIMBERLAKE

LITTLE TIMBERLAKE

SECTION 18

SECTION 17

A PORTION OF SECTION 17 AND SECTION 18, TOWNSHIP 21 NORTH, RANGE 2 WEST

CHS ENGINEERS

Timberlake Community Club, Inc.

2018 Comprehensive Water System Plan

FIGURE 4.1

WATER RIGHTS ADVERTISED AREAS

CHAPTER 5

SOURCE PROTECTION

This chapter is intended to develop a program to protect and improve the source water utilized by the Community. Any facilities and activities within the zone of contribution to the source wells that may adversely impact the quality of the Community's source water must be identified, monitored, limited, and controlled to the greatest extent possible. Source water protection for Group A systems is required under WAC 246-290-135, -668 and -690. Because the Community's sources include only groundwater wells, a surface water watershed protection program is not required. However, a wellhead protection program is required.

5.1 WELLHEAD PROTECTION PROGRAM

The Community has completed all of the steps necessary to implement the Community's wellhead protection program. The appropriate susceptibility assessments have been performed and contaminant source inventories have been completed for all wells. In addition, local agencies and residents within the wellhead protection areas have been notified about the formation of contingency and spill response plans. The completed Well Head Protection Program is included in Appendix H.

5.1.1 Overview

The intent of the wellhead protection program is to reduce the potential risk for contamination of groundwater within the wellhead protection area. The components of wellhead protection include programs for identifying potential contaminant sources, education, and implementation of actions to protect groundwater supply, and the creation of locally defined spill response procedures for spill incidents within the wellhead protection area. The Community is responsible for administering the Well Head Protection Program.

5.1.2 Completed Susceptibility Assessment

Groundwater Contamination Susceptibility Assessment Survey forms for all three wells have been filed with the Department of Health as of July, 2007. These forms can be found in the Well Head Protection Program in Appendix H.

5.1.3 Delineated Wellhead Protection Area

A wellhead protection area (WHPA) is defined as the surface and subsurface area surrounding a well that is used as a public water supply. Within this area there is a higher risk that contaminants will eventually reach the water in the wells.

A spill of hazardous materials within the WHPA could pose a direct risk to the drinking water supply for the Community. The method used to delineate the wellhead protection zones is the calculated fixed radius method. This method is part of the basic Washington State susceptibility assessment form. Utilizing this form, the calculated fixed radii were determined for the 6-month, 1-year, 5-year, and 10-year time of travel for contaminants. Table 5.1 lists the size of the related zones of contribution for each of the Community's wells in relation to the established travel times. This is an approximation of the distance a contaminant will travel through the substrate around a particular well for a given period of time. For example, it is projected that it would take one year for a contaminant that was spilled 980 feet from Well #2 to reach that well. These delineated areas for the Community's wells are also shown in the illustrations located at the end of this chapter.

TABLE 5.1
Zone of Contribution for Wells (ft.)

Well	*6 month*	*1 year*	*5 year*	*10 year*
1	200	280	620	880
2	700	980	2,200	3,110
3	280	390	880	1,240

The Community also has a dedicated Declaration of Covenants that protects the sanitary control area (SCA) for all three wells. This document is in the Well Head Protection Program included in Appendix H.

5.1.4 Inventory of Potential Sources of Contamination

The purpose of creating an inventory of all potential sources of groundwater contamination in and around the wellhead protection areas is to identify past, present, and proposed activities that may pose a threat to the aquifer associated with the wells. The sources of available information include State databases and historical knowledge of the area. Prior to the development of the Timberlake community the area was generally forestland. There is little possibility of historical contamination points unless contamination occurred during construction of the community.

There are potential contaminant sources that exist within the calculated wellhead protection zones for all of the Community's wells. These potential contaminant sources include:

- Residential on-site sewage disposal systems.

- Agriculture activities such as residential use of pesticides.
- Vehicular traffic-related spills.
- Activities affecting the Community's lakes.
- Operations at Mason County Fire District 5, Station 5.

The possibility also exists for contamination from unanticipated sources unknown at this time. However, the limited development within the wellhead protection zones suggests that potential for contamination is minimal. Figures 5.1 through 5.3 show these zones relative to the Community's boundaries.

The Washington State Department of Ecology (DOE) tracks and monitors sites registered as toxic cleanup sites. As a part of this effort, DOE keeps an inventory of all underground storage tanks within the State of Washington. For the area surrounding the Community, DOE identifies the Mason County Fire District 5, Station #5, as having the only registered underground storage tank within one mile of the Water System. This 550-gallon gasoline underground storage tank was removed in 1994. Monitoring and remediation of the site has been ongoing since its removal. More detailed information is located in the Well Head Protection Program in Appendix H. This facility is the only business allowed within the wellhead protection area per the covenants of the Community.

5.1.5 Notification of Findings

Timberlake Community Club notified State and local agencies of the wellhead protection program's findings including the wellhead protection boundaries in September 2012. At that time, they also notified residents and customers within the contribution zone radii by a letter discussing the risks to groundwater and actions to be taken in case of a spill or accidental contamination. The letter included a list of precautions residents can take to minimize impacts from on-site sewage disposal systems. Both letters can be found in the Well Head Protection Program in Appendix H.

5.1.6 Contingency Plans

In the event of groundwater source contamination, the affected well or wells will be shut down and the Community will rely on other sources of water as listed in the Well Head Protection Program (Appendix H) and the Emergency Response Plan (Appendix N).

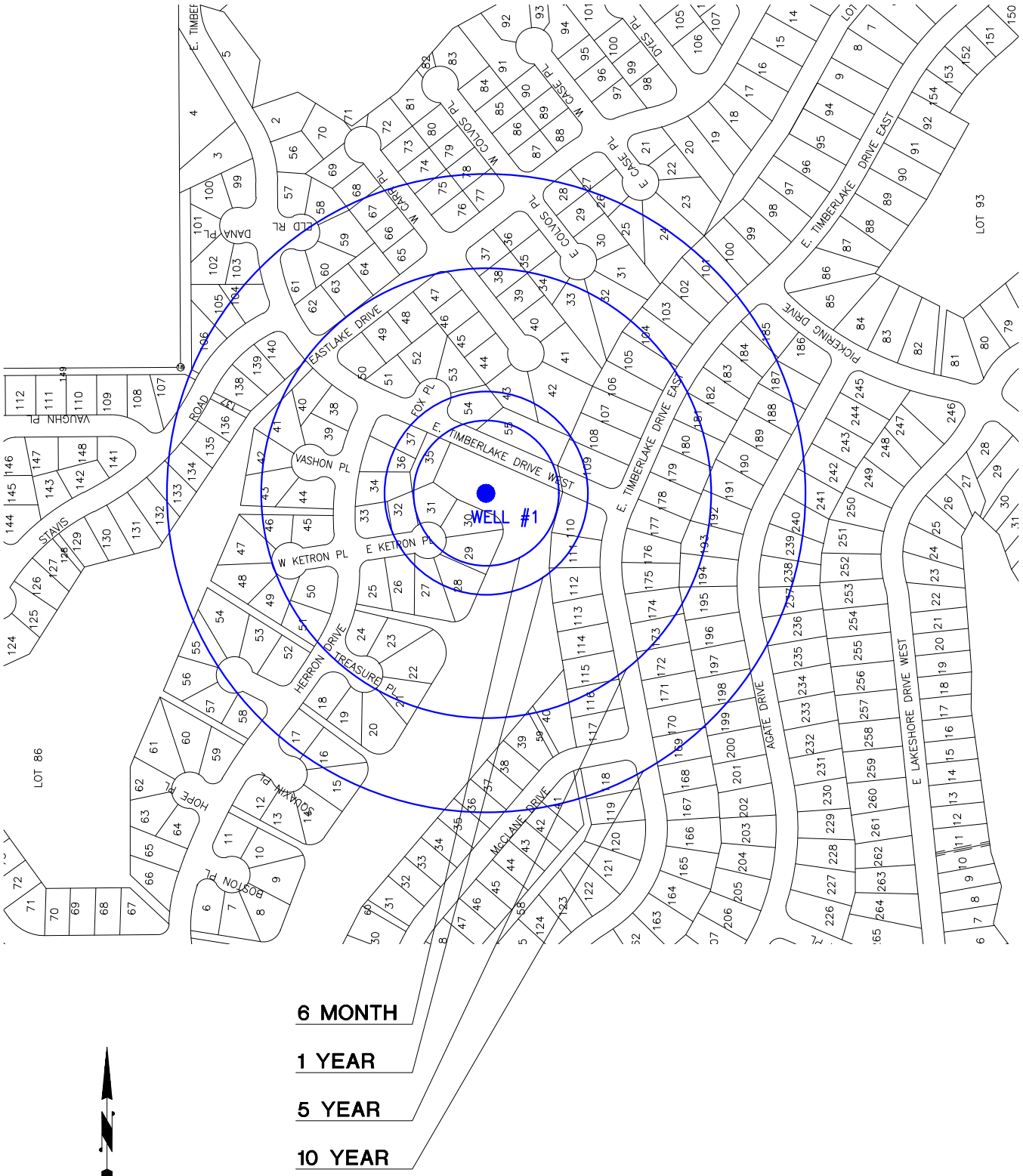
Once the contamination is detected, the Community will isolate the affected well or wells and any contaminated portions of the distribution system. The Community will then need to disinfect, flush, and test the distribution system in order to restore service to these areas. Once service has been restored, the Community should concentrate on restoration of the affected well(s), if possible.

If one of the wells is contaminated beyond the point of use, the Community will need to evaluate the use of one of the remaining wells as the primary point of withdrawal. Because all of the Community's wells are within 800 feet of each other, there is a strong possibility that the other wells could also become contaminated. Therefore, it is important that the Community responds quickly to isolate any spills or accidents that have the potential to contaminate the wells.

Because there is not a nearby adjacent water system to serve as an emergency supply, the only viable alternative for another source of water is the construction of a new well at another location. The construction of a new well is feasible since the Community owns many other parcels of land within the service area. However, this option is time consuming because the new location would need to be evaluated, additional water rights might be required, and the new well would need to be drilled. The cost associated with this option is estimated to be approximately $150,000.

5.1.7 Spill/Incident Response Measures

The local Fire District, Mason County Health Department, and County Emergency Services Department have been informed of the wellhead protection area boundaries. Procedures for response to a spill incident within the wellhead protection area can be found in the Emergency Response Plan in Appendix C.



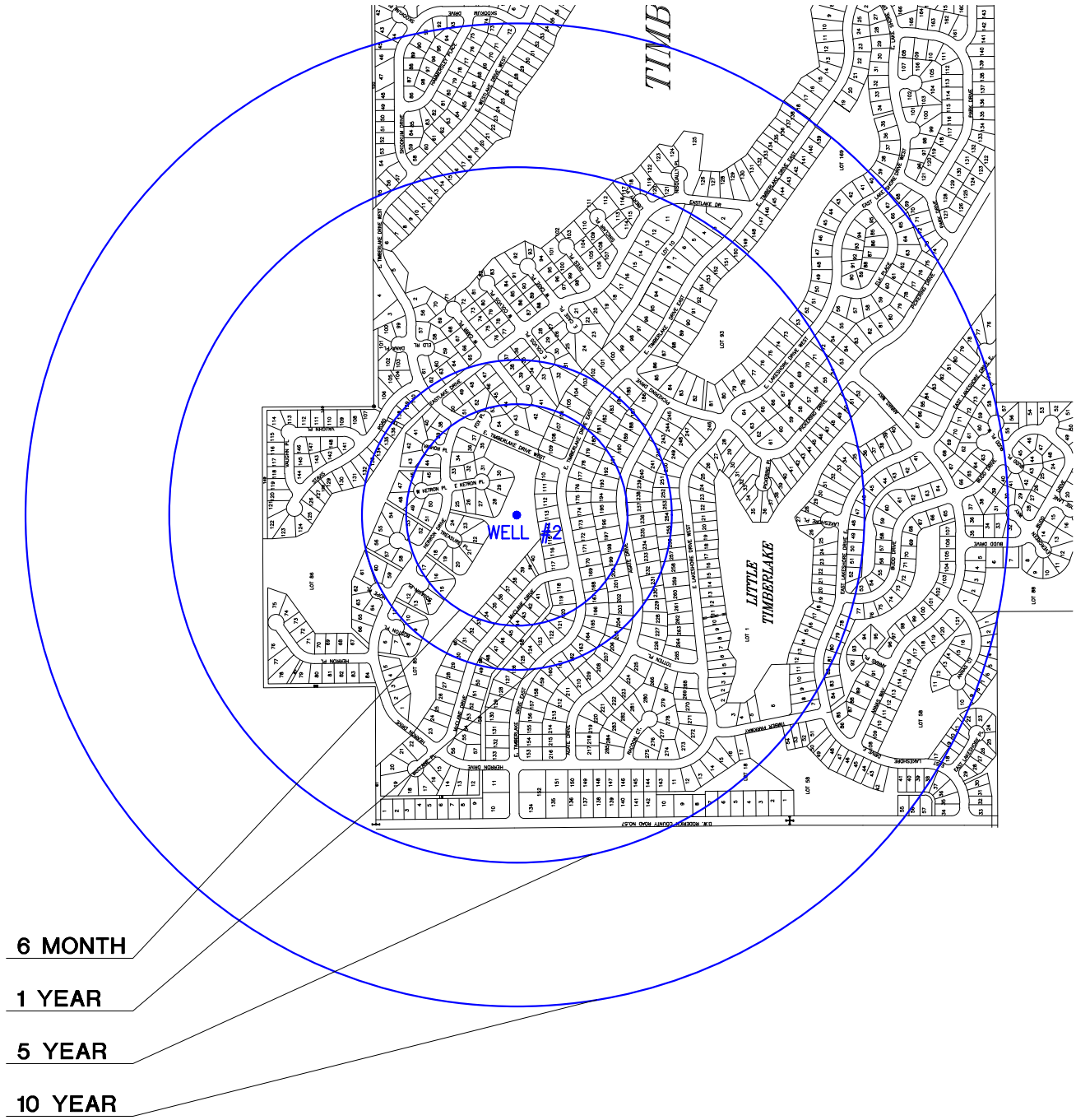
Timberlake Community Club, Inc.

2018 Comprehensive Water System Plan

FIGURE 5.1

WELL #1 WELLHEAD PROTECTION AREA WITH TRAVEL TIMES

CHS ENGINEERS



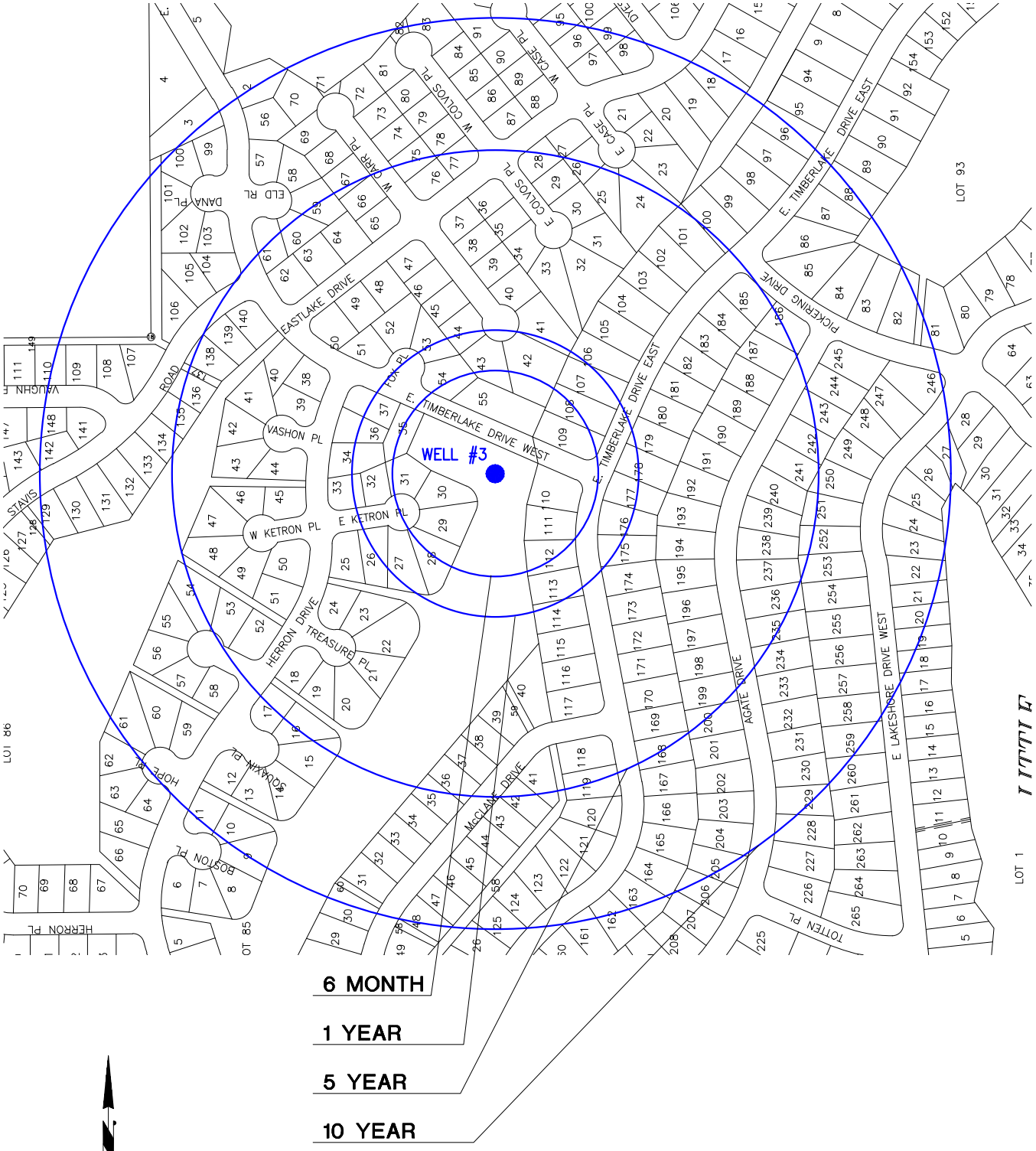
Timberlake Community Club, Inc.

2018 Comprehensive Water System Plan

FIGURE 5.2

WELL #2 WELLHEAD PROTECTION AREA WITH TRAVEL TIMES

CHS ENGINEERS



Timberlake Community Club, Inc.

2018 Comprehensive Water System Plan

FIGURE 5.3

WELL #3 WELLHEAD PROTECTION AREA WITH TRAVEL TIMES

CHS ENGINEERS

CHAPTER 6

OPERATIONS AND MAINTENANCE PROGRAM

The following section summarizes the operations and maintenance (O&M) procedures, which assure satisfactory management of the water system operations in accordance with WAC 246-290. Ideally, the O&M programs should be a stand-alone document that clearly outlines the day-to-day functions involved in keeping the water system running smoothly. This section is intended to summarize the Community's stand-alone document. The O&M Manual is presented in Appendix I.

6.1 COMMUNITY MANAGEMENT AND WATER SYSTEM PERSONNEL

The Timberlake Community Club (Community) is a private non-profit entity that operates under the direction of a Board of Directors. The Community members elect directors to the Board of Directors and each director is required to be a property owner of property within the Community. The Community also has a water system board that is known as the Timberlake Water Board (TWB). Per community policy, "*the TWB will have a minimum of three (3) to a maximum of five (5) members. Each member will serve two year, overlapping terms. This will provide the required continuity. The TWB will have responsibility for disciplines in the following areas: Regulation Management, Engineering, Finance, and Maintenance."*

The TWB currently holds regular public meetings on the third Tuesday of every month at 6:30 p.m. Meetings are held at the Community's multipurpose center. The Community's business address and general information are presented below.

Community Address and Phone Number:	Timberlake Community Club 2880 E. Timberlake West Drive Shelton, WA 98584-7936 (360) 427-8928 Phone (360) 427-1755 Fax E-mail: timberlakecc@hctc.com Web Site: www.timberlakecc.com
Community Contact Person:	Mr. Marcus Vind, Water System Operator
Department of Health (DOH) Identification Number:	88370 Y

DOH Contacts:

Corina Hayes, Regional Planner
Regina Grimm, P.E., Regional Engineer
Southwest Drinking Water Operations
243 Israel Road S.E. 1st floor
Olympia, WA 98501

The current Water System Operator is Mr. Marcus Vind who is responsible for the day to day operations of the water system and who reports directly to the Board of Directors and the TWB. This position is specifically responsible for preventive maintenance, field engineering, water quality monitoring, troubleshooting**,** emergency response, and cross-connection control. The Operator also coordinates the operation of the system with DOH.

In addition to the Water System Operator, the Community also has two full-time employees to assist in the operation of the system. These individuals perform duties including system maintenance, repairs, and meter reading. Currently, one employee is certified as a Water Distribution Manager Level I and the other is certified as a Water Distribution Manager Level 2.

The Community's office staff assists the Operator in areas of customer management and billing. The office staff answers phone calls in regard to the water system and coordinates with the Operator in regard to water system issues and complaints.

The duties of the Operator and the field staff include, but are not limited to:

- Community administration and board meeting preparation.
- Inspection of major facilities including the wells, reservoirs, and pump stations.
- Inspection and maintenance of distribution system.
- Direction of consultants such as legal, financial, and engineering.
- Reading of water service meters on a bi-monthly cycle.
- Reading of water source meters on a daily basis.
- Investigation of complaints and reported problems.
- Locating water facilities as requested.
- Response to emergency situations in the appropriate manner.
- Repair of leaks and line breaks.
- Installation of new service connections, including road restoration.
- Investigating and resolving reported cross-connection problems.
- Inspection of construction projects that may affect the water system in any way.
- Maintenance of all inventory required for repairs.
- Maintenance and repair of all fire hydrants including painting and clearing around hydrants.
- Locking and unlocking meters.
- Flushing of dead-end mains.

- Working with other utilities for coordinated efforts on construction projects.
- Water sampling and testing.
- Meter replacement.

The general water duties of the Community's office staff include, but are not limited to:

- Preparing and sending water bills.
- Making deposits and payments.
- Typing and filing of documents.
- Preparation for payment of bills.
- Preparation of monthly and annual financial statements.
- Answering general water phone calls.
- Management of customer accounts.
- Preparation of Community's investment actions.

6.2 SYSTEM OPERATOR CERTIFICATION

The Operator of a Class 2 Distribution System must have a Water Distribution Manager II certification or higher per WAC 246-292-050. The current Operator is Mr. Arthur Bushey and he has the required certification. He is also certified as a Cross Connection Control Specialist. In addition, the current Maintenance Technician is Larry Dearman and he is certified as a Water Distribution Manager I. A copy of these certifications are included in Appendix A.

6.3 SYSTEM OPERATION

The Community has a stand-alone Operations and Maintenance (O&M) manual that was last updated in December 2013. The O&M manual, located in Appendix I, includes the following:

- System Personnel Information
- Contacts for Emergency Service and Parts
- Day to Day Operations
- Weekly Operations
- Monthly Operations
- Quarterly Operations
- Annual Operations
- Troubleshooting
- Preventative Maintenance
- Appendices

The Operator performs routine inspections and repairs to the system along with valve cleaning and exercising, hydrant repairs, and reservoir inspection. The following is a description of the major system components.

6.3.1 System Components

The major system components of the Community include the following (also see Figure 3.1):

- Three wells located in the general area of the Community's offices.
- Source meters at each well.
- Two storage reservoirs.
- Two pump stations.
- One water filtration facility.
- One on-site chlorination system.
- Distribution system ranging in size from 2 inches to 10 inches.
- Isolation valves.
- Service meters.
- Fire hydrants.
- Telemetry system.
- Stand-by generator.

For additional information regarding these facilities, see Section 3.3.

6.3.2 Routine System Operations and Maintenance

The following are summaries of the operation and facility list. For more detail see the O&M manual located in Appendix I.

Day to Day Operations

- Check email and phone messages.
- Check all major system components at the beginning and end of day.
- Record weather and readings for well, flow meter, pump control panel, water softener meter, generator, system and filter analyzers, filter back wash, well run filter meter, daily distribution chlorine residual, reservoir level, etc.
- Test analyzers, record results and adjust as necessary.
- Record usages based on present versus previous readings.
- At end of day, check pump station, salt level, and make sure auto dialer is armed and in normal position.

Weekly Operations

- Check pagers.
- Check backwash outflow line mesh screen.
- Check and exercise all generators.
- Check reservoir control panel lights.
- Check concrete reservoir.
- Zero calibrate analyzers.

- Check and re-fuel trucks.

Monthly Operations

- Billing and usage report
- Well and distribution system report
- Send residual report to DOH.
- Take bacteriological samples.
- Obtain OSEC-BP values.

Annual Operations

- Flush distribution system.
- Complete annual reports.
- Exercise valves.
- Complete required reservoir maintenance.
- Inventory water system supplies.
- Inspect well houses.
- Exercise wells and pump stations.

Wells #1, #2, and #3

Each well site is inspected daily to verify security and proper operations of the facility. Confirmation of operation is verified by visual inspection of connection points and checking of electrical controls where applicable.

Storage Reservoirs

Both storage reservoirs are visually inspected on a daily basis for volume and security. The reservoirs are observed for signs of leakage and corrosion. The inside of the concrete reservoir is visually inspected on a weekly basis. The coating on the steel reservoir and the exterior ladder are checked for boiling or delaminating. Any deficiencies in the coating system should be scheduled for repair in order to prevent excessive oxidation. Operation of the reverse level sight gauge is also checked. The sight gauge reading is read daily although it is not currently recorded. Cleaning of reservoirs is per the schedule in Section 6.3.3

Distribution Pump Stations

The two pump stations are checked daily to verify site conditions, security, and the proper operation of all equipment and controls. The pump station located in the shop building is held in reserve should the primary pump station require repair. This station is exercised and operated bi-annually to ensure that it remains operational.

Water Treatment Facility and On-Site Generation of Chlorination

The Community's water treatment facility and on-site chlorination equipment are inspected on a daily basis to verify site conditions, security, and the proper operation of all equipment and controls. The Operator ensures proper operation of the chlorine system, the filtration equipment, and the chemical feed equipment.

Distribution System

The Community maintains a small inventory of pipe, miscellaneous fittings, repair couplings, hydrants, hydrant repair kits, and other system-related components. The Operator and the field staff generally perform all emergency pipeline repairs and system work. Verification of inventory items is performed annually.

Dead-end mains are flushed once a year to provide necessary cleaning of these potential water quality problem areas. Additional flushing occurs in response to customer complaints or pipeline repairs that necessitate the flushing of lines.

Isolation Valves

Valves are exercised annually as part of a valve maintenance program. Valve covers are inspected for damage and proper setting to grade and are adjusted or replaced as necessary.

Service Meters

Community personnel maintain all service meters. Meters that are not operating or not operating satisfactorily are identified by the meter readings and are replaced as necessary. Meter usage data is analyzed in an effort to determine faulty meters. Records for each meter including location, meter number, and installation date are kept in a database at the Community.

Fire Hydrants

Fire hydrants are inspected and painted, as required, on an annual basis. In addition, the operation of the main valve is verified and the valve is exercised. Hose and pumper port threads are lubricated and checked for damage as well as conformity to local fire department requirements. Caps are checked for damage and ease of removal. Cap gaskets are checked and replaced as necessary. Fire hydrant access is cleared of obstructions. Any identified hydrant deficiencies are addressed as soon as possible.

Stand-by Generator

The water system generator is tested and fluid levels are weekly. Annual maintenance is done by service contract with Cummins Northwest or another local Certified Onan service provider.

6.3.3 Preventive Maintenance Program

Preventive maintenance actions are either performed by Community personnel or contracted out to certified professionals. The preventive maintenance actions that are routinely performed are presented below including the frequency of occurrence.

- Line flushing of dead-end lines
  - Lines flushed every year

- Exterior Cleaning of steel reservoir
  - Annually

- Interior cleaning of all reservoirs
  - 60,000 gallon concrete reservoir - every two years
  - 200,000 gallon steel reservoir - every three to five years

- Exercising of system valves
  - Inspection and exercising every year

6.3.4 Equipment and Supplies

As stated in the previous section, the Community maintains an inventory of repair parts and couplings, including repair parts for pipe sizes ranging from ¾ inch to 8 inches. Parts needed for repairs or minor improvements that are not stocked by the Community are obtained as fast as reasonably possible. The Community maintains an inventory of 3/4 x 5/8 service meters, meter setters, and PRVs.

6.4 WATER QUALITY MONITORING

Water quality sampling is performed by the Operator and submitted to the DOH. Routine water quality samples are taken monthly at two out of the twelve available sampling stations located within the boundaries of the Community. Chlorine residual samples are also taken with the water quality samples. The chlorine residual analyzers are calibrated weekly. In the event a positive bacteriological sample is discovered, the Community takes repeat samples at the predetermined locations as specified in the Community's Coliform Monitoring Plan. This plan is included as Appendix J of this report.

The Operator, as required by DOH, also performs water sampling for lead, copper, and additional inorganic and organic substances. All water sampling is conducted per Chapter 246-290-300 WAC and results are distributed to customers through the Community's Annual Water Quality Report.

The following table summarizes the Community's testing requirements including individual tests, testing locations, and descriptions of the test.

Table 6.1
State and Federal Water Quality Testing Requirements

Required Testing	*Location*	*Description*
Total Coliform	From monitoring locations as specified in the Coliform Monitoring Plan	Coliform testing is required monthly. Two samples shall be taken as designated by the Coliform Monitoring Plan and submitted for testing.
Inorganics	From a point representative of each source	Test each source on a three-year cycle for inorganic compounds such as iron and manganese.
Volatile Organics	From a point representative of each source	VOC compounds such as petroleum byproducts are to be tested for at each source on a triennial basis.
Nitrates	From a point representative of each source	Nitrates shall be tested for on a yearly basis. All sources must be tested.
Radionuclide	From each source	Each source shall be tested for radionuclide level every four years.
Lead-Copper	From the distribution system at targeted sample tap locations	Lead and copper testing is required on a 3-year cycle.
Synthetic Organics	From a point representative of each source	SOC testing is required every three years.
Disinfection Byproduct Monitoring	System Extents	Yearly sampling for THHM panels.

6.5 EMERGENCY RESPONSE PLAN

The Community currently has a stand-alone Water Department Emergency Response Plan (plan) which was created in 2010 and approved by Mason County in 2012. The plan is located in Appendix C. The plan details the following:

- Emergency Response Mission and Goals
- System Information
- Chain of Command - Lines of Authority
- Events that Cause Emergencies
- Severity of Emergencies
- Emergency Notification
- Notification Procedures
- Water Quality Sampling
- Effective Communication
- Response Actions for Specific Events
- Alternative Water Sources
- Curtailing Water Use

Other specific information and responses in regard to the water system, including notification procedures, vulnerability assessment and contingency operations, are addressed in the following sections.

6.5.1 *Emergency Community Call-Up List*

During Office Hours: Contact the Operator or the Community office staff at:

Community and System Operator office phone: (360) 427-8928
System Operator TLCC cell phone: (360) 463-6938
System Operator cell phone no. 2: (360) 890-5171
On-call water system pager/phone: (360) 463-0664

Community Office Closed: Calls to the Community office are forwarded to the Community's voice mail system. The greeting instructs the caller to leave a message. The greeting also instructs the caller to contact the On-call water system pager in the case of a water emergency.

After Hours Emergency Contact Numbers:

On-call water system pager/phone: (360) 463-0664
System Operator TLCC cell phone: (360) 463-6938
System Operator cell phone no. 2: (360) 890-5171

Note: When the on-call water system pager/phone is called, the auto-dialer on the phone places calls in the following order:
1. No. 1 designated on-call number.
2. If no response, calls System Operator TLCC cell phone: 360-463-6938 (Art)

3. If no response, calls backup TLCC cell phone: 360-401-5424 (Larry)
4. If no response, calls 2nd backup TLCC cell phone: 360-463-2533 (Marcus)
5. If no response, calls System Operator cell phone no. 2: (360) 890-5171 (Art)
6. If no response, calls Larry's home
7. If no response, repeats 1-6 until acknowledged

6.5.2 Notification Process

The Water Department Emergency Response Plan, located in Appendix C, describes in detail the notification process and steps that should be followed in the case of specific emergency events affecting the water system (e.g., health risk, hazardous situation, natural disaster, security breach, vandalism, terrorism, etc.).

6.5.3 Vulnerability Analysis

Improvements proposed to maintain or improve the reliability of the Community's facilities are presented in Chapters 3 and 8. These improvements are focused on eliminating the system deficiencies in the existing facilities, replacing older portions of the system that have or will soon reach the end of their useful life, and the provision of fire flows that are appropriate throughout the water service area.

A water system's vulnerability assessment identifies areas of the system that are in danger of damage or failure during various types of emergency or threat scenarios. The assessment also evaluates alternative operating modes and provides additional emergency response procedures.

On June 12, 2002, the President of the United States signed the Public Health Security and Bioterrorism Preparedness and Response Act (PL. 107-188). Section 1433(a) of the act requires water systems that serve a population of more than 3,300 people to complete a Vulnerability Assessment (VA). These communities must also certify to the US EPA that the VA has been completed and submit a copy the EPA. In January 2003, the US EPA finalized guidance for preparation of a VA.

The size of the Community is under the threshold for communities that are required by EPA to complete a vulnerability assessment. However, a summarization of a system's vulnerability is required for this planning document. This information is considered confidential and has been excluded from this plan. The Community will maintain the information in a separate document, which will be kept secure by Community staff.

6.6 SAFETY PROCEDURES

Currently, the Operator and the two full-time employees are the only individuals that are frequently involved in water main repair and replacement projects. These activities can possibly expose these individuals to heavy construction activities, excavations and, in many cases, vehicle traffic. In terms of safety training, the Operator participates in annual safety training and maintains training documentation. For the employees, the safety procedures that must be followed for each potential work place hazard are routinely discussed at monthly safety meetings. In addition to conducting the monthly meetings, the Operator maintains historical safety records on file at the Community office.

6.7 CROSS-CONNECTION CONTROL PROGRAM

Washington State regulations place the primary responsibility for control of cross-connections with the water purveyor. In 2011, the Community adopted Regulation No. 2011-01 as the policy relating to cross-connection control and backflow prevention assemblies (see Appendix K). This set of policies establishes cross-connection control requirements per Chapter 246-290-490 WAC. The Operator is a Cross-Connection Control Specialist (CCS) and a copy of his certification is provided in Appendix A.

6.8 CUSTOMER COMPLAINTS RESPONSE PROGRAM

The Community maintains a record of complaints by making notations in the Community's phone log book and in the billing software. In addition, complaints that are filed by customers who attend board meetings are logged into the minutes of the meeting.

The Operator determines the appropriate corrective action and responds to complaints. Multiple complaints that arise from maintenance activities (such as dirty water complaints that often come after water is run through hydrants) are not individually documented.

6.9 RECORDS AND REPORTS

The Operator and Community office staff share in the responsibility of maintaining all records pertaining to water use, billings, receipts, and water utility financial records. In addition, the staff also maintains records regarding the system facilities, utility locate requests, repairs, water quality monitoring, and reporting.

6.10 OPERATIONS AND MAINTENANCE IMPROVEMENTS

The Community continually strives to improve O&M procedures but no specific improvements are planned at this time.

CHAPTER 7

DESIGN AND CONSTRUCTION STANDARDS

The objective of this chapter is to describe the Community's water system Design and Construction standards. The inclusion of the standards in this document enables the Community to utilize an alternative review and approval process from DOH for distribution related projects as allowed by WAC 246-290-125. The alternative review process allows the Community to approve individual project reports and construction documents for distribution main and other distribution related facilities without written approval from the DOH. The Community is still responsible for complying with all applicable sections of the regulations, including project report and construction document requirements listed under WAC 246-290-110 and 120.

Eligible distribution related projects include distribution reservoirs/storage tanks, booster pump facilities, transmission mains, distribution mains, pipe linings and tank coatings. The water system standards must be at least as stringent as those discussed in WAC 246-290.

7.1 PROJECT REVIEW PROCEDURES

It is anticipated that the majority of construction projects related to the Community's water system will be initiated by the Community. The Community's Engineer will review such projects prior to construction. If an entity or individual other than the Community proposes a project, construction documents will be reviewed and approved by the Operator and the Community's Engineer prior to construction to ensure that they are consistent with this plan. Significant modification to the water distribution system, not identified in this plan, as well as any modification to water storage or booster pumping will require review and approval by DOH.

7.2 POLICIES AND REQUIREMENTS FOR OUTSIDE PARTIES

Policies for development are set forth in this plan in Chapter 1, Section 1.10, Service Area Policies and Section 1.11, Conditions of Service.

7.3 DESIGN STANDARDS

This section outlines the general performance and design criteria used in evaluating the acceptability of system performance and construction of replacement and new facilities. The Community's design standards and construction specifications, located in Appendix L, are based on meeting or exceeding the following standards, which are hereby incorporated by reference:

1. Water System Design Manual, Washington State DOH, latest edition.

2. Washington State Department of Transportation (WSDOT) Standard Specifications for Road, Bridge and Municipal Construction including APWA Supplement, latest edition.
3. Standards of the American Water Works Association (AWWA).
4. IAPMO Uniform Plumbing Code and Installation Standards, latest edition.
5. International Building Code (IBC), latest edition.

7.3.1 Ownership

All water lines and appurtenances shall become and remain the exclusive property of the Community for future operation, maintenance, and service responsibilities. The point of Community ownership and responsibility shall end at the customer's side of the service meter. Lines and appurtenances shall be constructed in the right-of-way whenever feasible. If ever required, lines and appurtenances constructed on private land shall be located within the boundaries of a recorded utility easement dedicated specifically to the Community.

7.3.2 Design Responsibility

Water system construction plans and specifications shall be prepared under the supervision of and signed by a professional engineer registered in the State of Washington and shall comply with the design standards of the Community. The designer shall confirm all requirements and design criteria with the Community.

7.3.3 Pressure

A minimum pressure of 30 psi will be provided at customer meters during normal and peak hour demand conditions and under the condition where all equalizing storage has been depleted. Systems will be designed to minimize pressure fluctuations between normal and peak hourly design conditions.

Customers of new service connections where normal pressure may exceed 80 psi will be notified of this pressure and will be advised that the installation of a pressure-reducing valve (PRV) is recommended. The cost, ownership, and responsibility for maintaining this PRV will be the Community's.

During fire flow conditions, a minimum pressure of 20 psi will be provided at all points throughout the distribution system under maximum day demand (MDD) plus required fire flow conditions, and under the condition where the designed volume of fire suppression and equalizing storage has been depleted.

7.3.4 Velocities

Under normal demand conditions, the velocity of water in a transmission main should be less than four feet per second (fps). Under emergency conditions

such as fire, the velocity of water in a distribution main should be less than eight fps.

7.3.5 Pipe Size and Layout

Minimum pipe sizes shall be determined as necessary to allow minimum required fire flow and/or peak hour demand, whichever is greater. Pipes shall be sized for a maximum velocity of eight fps, minimum pressure of 20 psi during emergency operating conditions, and 30 psi during normal operating conditions. Minimum pipe diameter shall also be determined by the following.

- Any pipeline providing fire flow shall be a minimum of 6”
- All distribution mains shall be 6” minimum unless hydraulic analysis justifies a smaller diameter.
- Fire hydrant laterals shall be six or eight inches in diameter depending on the site. Fire hydrant laterals shall be a maximum of 150 feet in length, measured from the distribution main.

All water mains shall be designed within the right-of-way whenever feasible. When this is not possible, the water main shall be located within a recorded utility easement dedicated specifically to the Community. Water main extensions should include the installation of the water main to the farthest common or individual lot corner.

Where applicable, the water system shall be designed with “loops” within the development and/or multiple connections to the existing system. Pipe shall be designed for maximum trench depth of 48 inches and a minimum depth to top of pipe of 36 inches. All pipe shall maintain a positive or negative slope between respective high and low points in the water line. High points shall be fitted with air-vacuum release assemblies and the Community shall fit low points with flushing assemblies as determined necessary.

Extensions to the Community’s system will not be allowed to connect to the system prior to completion of pressure testing, flushing and passing of bacteriological testing.

7.3.6 Domestic Water Services

Water service installation shall include all materials indicated on the appropriate standard detail as shown in Appendix L. Service lines that are part of a water main extension shall be installed concurrently with the water main installation. Service lines shall be connected to the water mains and extended to the customer property line. Service lines shall be terminated at the connection to a meter setter located in a meter box. The cost of service lines installed as part of a water main extension shall be borne by the developer/customer.

7.3.7 Easements

Legal descriptions for easements to be dedicated to the Community for all portions of the water system that lie outside of the public right-of-way shall be signed and stamped by a professional land surveyor and transmitted to the Community. Easement documents shall also include AutoCAD drawings illustrating the easement location.

Easements shall be a minimum of 15 feet in width, or as required by the Community. An easement may coincide with another utility easement, but it should be noted that separation from sewer mains shall be in accordance with the requirements of the *Washington State Department of Ecology (DOE) Criteria for Sewage Works Design*. Water lines shall be located no closer than five feet from the easement edge. There shall be a separate easement provided for each lot that a water line crosses. A single easement can be written as long as it is recorded against all appropriate lots.

Easements must be approved by the Community prior to water service connection.

7.4 CONSTRUCTION STANDARDS

The Community's current construction standards for materials and methods and standard details for water system appurtenances and construction are included in Appendix L.

7.5 CONSTRUCTION CERTIFICATION AND FOLLOW-UP PROCEDURES

All construction activity related to the Community's water system must be coordinated through the Community. The Community will inspect the construction of water related facilities up to the property line prior to authorizing connection to a potable water main. No work on the water system shall be performed without a Community Inspector being present. The Community may refuse acceptance of any portion of the work installed without the Inspector having reviewed the work. The Community must be notified a minimum of two full working days in advance of a firm starting date and time to arrange for and schedule the Inspector. Work must proceed in a continuous manner. If there are breaks in construction, there must be two working days' notice before beginning work again.

The TCC approved construction plans and specifications shall be followed. No deviations will be allowed without written approval from the Community. The Community reserves the right to order changes in the event of conditions or circumstances discovered during construction.

All new constructed water main shall be disinfected, flushed and hydrostatically pressure tested in accordance with the Communities testing standards prior to connection to the existing water system. The Contractor shall provide all testing equipment. The final testing shall be performed in the presence of the Community's Inspector.

The Community will not permit final tie-in to the existing Community system until after acceptance of the entire installation. All taps to existing Community mains must be performed while the Community Inspector is present. Final acceptance will not be made until all submittals required are completed and after acceptable system installation is complete.

Backflow prevention devices shall meet the standards of the Community's Cross-Connection Control Program and must be on the Washington State Department of Health's approved list of backflow prevention devices. Assemblies must be initially tested and certified by a Cross-connection Control Specialist prior to being placed into service. Backflow prevention devices must be tested and certified annually and a copy of the certification provided to the Community. The property owner is responsible for the cost of maintaining and certifying the assemblies.

Following project acceptance by TCC, the construction must be certified by a professional engineer on the appropriate DOH form.

CHAPTER 8

IMPROVEMENT PROGRAM

The purpose of this chapter is to incorporate the system needs previously identified in other chapters into an improvement program. The capital improvement program presented in this chapter has been developed in accordance with the requirements identified in WAC 246-290-100.

The development of a comprehensive plan and an improvement program provide for orderly maintenance and improvement of the Community's water system. The population and water demand forecasts and the existing system analyses, which were discussed in previous chapters, were used to formulate the following Capital Improvement Plan. The Community's design criteria were also included in the formation of the plan.

The existing piping system was also reviewed to determine the necessity of replacing older water mains. Considerations included material condition, size and capacity.

8.1 PRIORITIZING PROJECTS

A three-step process was used to develop the Community's Capital Improvement Plan (CIP). Steps include identification of potential system improvements, evaluation of the alternatives and selection of alternatives.

8.2 IDENTIFICATION OF SYSTEM IMPROVEMENTS AND ASSESSMENT OF ALTERNATIVES

Each aspect of the water system was analyzed and a draft list of potential improvements was developed to address existing or anticipated system deficiencies. When applicable, alternative improvements were developed for each deficiency. The alternatives were determined in consideration of meeting DOH and Community standards, improving reliability of the water system and minimizing capital and operating costs.

The following sections summarize and describe the improvements that have been recommended in previous chapters of this plan.

8.2.1 Source of Supply

As described in Chapter 3, the Community's sources of supply have adequate capacity to meet the projected ADD and MDD demands through the 20-year planning period. No source improvements are recommended during the planning period.

8.2.2 Water Treatment

There is currently no specific treatment required for the Community's drinking water. The filtration facility improves the quality of the water distributed to the Community by reducing the content of iron and manganese that exists in the raw source water. The on-site hypochlorite generation injection system provides sufficient disinfection and has capacity to meet the Community's anticipated demands through the planning period.

No water treatment improvements are recommended during the planning period.

8.2.3 Storage

The Community's storage volumes are adequate to meet the demands of the system into the year 2036 as demonstrated in Chapter 3. Should the Community elect to retain 200 gallons of standby storage per ERU, the DOH *recommended* minimum standby storage volume, the need for additional storage facilities is anticipated after 2021.

No storage improvements are recommended at this time.

8.2.4 Telemetry Systems

The Community's telemetry systems are currently adequate to handle the need of the system. No telemetry system improvements are recommended at this time.

8.2.5 Distribution/Transmission System

As described in Chapter 3, a hydraulic model was used to analyze the existing distribution system during the prior planning period. The hydraulic model results were again utilized for this plan as the usage per ERU and corresponding system demands are less than presented in the prior planning period. Analysis results indicate the existing system is capable of providing adequate flow and pressure under PHD, MDD and ADD conditions and Mason County *required* fire flow (500 gpm during MDD) can be achieved at existing hydrants.

However, under MDD conditions the existing system is not capable of providing the recommended fire flow (1,000 gpm) at several fire hydrants at higher elevations within the Community. In addition, fire hydrant spacing is insufficient to meet that required by the IFC, as adopted by Mason County.

Therefore, distribution system improvements have been identified to address these deficiencies.

8.3 SELECTION OF ALTERNATIVES

The discussions of projects for supply, storage and distribution are contained within Chapter 3 and summarized in Section 8.2 above. The sequence and scheduling of projects was developed by following a general priority outline balanced with the review of the current and projected financial resources of the Community. These financial resources are further detailed in Chapter 9. The considerations in selecting projects included:

a) Current deficiencies with the potential of impacting water quality
b) Current deficiencies limiting supply of MDD and PHD to the system.
c) Current deficiencies in delivering fire flow to areas of the Community's existing service area.
d) Anticipated in-fill growth.

8.4 CAPITAL IMPROVEMENT PLAN AND SCHEDULE

Table 8.1 presents the projects that have been selected to address the deficiencies presented above and discussed in Chapter 3. The cost estimates presented are based on 2016 prices and represent estimated total project costs.

The pipe replacement study presented in the Community's Reserve Study is based on the schedule presented in the prior comprehensive plan. The Reserve Study replacement schedule is conservative as it predicts a relatively short life span for PVC pipe. The life span of PVC is subjective and dependent on many factors including manufacture batch, exposure to UV light, bedding, backfill and installation practices, and operations, including the severity and frequency of transient pressures.

The Community's PVC pipes have not demonstrated significant deterioration to date, indicating that the pipes may remain viable for several more decades. Without the indication or presence of PVC pipe failures, the Community's distribution system could extend for an additional 50 years or more.

In addition, the Community's current policy is to not replace distribution mains solely for the purposes of providing additional fire protection. If the Community's policy changes and increased fire protection becomes a higher priority and/or if distribution piping repairs and/or maintenance costs dictate main replacement, it is recommended that mains be replaced to meet current DOH sizing criteria and fire hydrants be added to meet Mason County Fire Marshal standards (and current Community policy) spacing requirements.

The CIP and associated schedule presented in Table 8.1 provided a modest approach to main replacement and fire hydrant additions. If policy changes or field conditions dictate differently, the CIP and schedule should be revisited.

8.5 IMPROVEMENT PROJECT FUNDING

As further detailed in Chapter 9, it is projected that all planned capital improvement projects scheduled for the next 20 years may be funded by projected cash reserves.

CHS ENGINEERS

Timberlake Community Water System

TABLE 8.1
CAPITAL IMPROVEMENTS
20 YEAR FORECAST

ID	Capital Improvement	Project Description	Estimated Project Cost (2016)	Estimated Project Start Date
TRANSMISSION / DISTRIBUTION MAINS				
A	3" Main Replacement	Replace approximately 2,600 linear feet of existing 3-inch main with 8" DI main along Agate Dr.. Replacement would extend from W Lakeshore Dr. to Pickering Dr.	$650,000	2021
B	2" Main Replacement	Replace approximately 2,000 linear feet of existing 2-inch main with 8" DI main along McClane Drive and Totten Place. Replacement would extend along McClane Drive from Herron Dr. to Timberlake Dr. and along Totten Pl. from Agate Dr. to Lakeshore Dr.W.	$500,000	2026
C	2" & 4" Main Replacement	Replace approximately 2,400 linear feet of existing 4-inch and 2-inch main with 8" DI main along Lakeshore Dr.W. and Timber Parkway Replacement would extend along Lakeshore Dr.W. from Timberlake Dr. to Totten Pl. and along Timber Parkway from Lakeshore Dr.W. to E Lakeshore Dr.	$600,000	2031
D	4" Main Replacement	Replace approximately 2,800 linear feet of existing 4-inch main with 8" DI main along Pickering Drive, Park Drive and Lakeshore Drive W. Replacement would extend along Pickering Dr. from Annas Way to Park Dr., then along park Dr. to Lakeshore Drive W, then along Lakeshore Drive W to Timberlake Dr.	$700,000	2036
E	Fire Protection	Add additional fire hydrants (2/year) to provide improve coverage and spacing. ($10,000 per year for 20 years)	$200,000	Each Year
		CIP Grand Total	**$2,650,000**	

PROPOSED IMPROVEMENT PROJECTS

- A 3" MAIN REPLACEMENT
- B 2" MAIN REPLACEMENT
- C 2" AND 4" MAIN REPLACEMENT
- D 4" MAIN REPLACEMENT
- ADDITIONAL FIRE HYDRANTS (VARIOUS LOCATIONS)

600 300 0 600 1200

SCALE IN FEET

LEGEND

- 2" PIPE
- 3" PIPE
- 4" PIPE
- 6" PIPE
- 8" PIPE
- H1 FIRE HYDRANTS

TIMBERLAKE

LITTLE TIMBERLAKE

WELL #1 WELL #2 WELL #3

H1 H2 H3 H4 H5 H6 H7 H8 H9 H10 H11 H12

A B C D

Timberlake Community Club, Inc.

2018 Comprehensive Water System Plan

FIGURE 8.1

CIP PROJECTS MAP

CHS ENGINEERS

USER: Evan Henke PLOTTING DATE: 9/23/2016 FILE LOCATION: K:\50-Timberlake\2014\501401-WSPUpdate\2016 WSP\CAD\Figure 8.1.dwg

CHAPTER 9

FINANCIAL PROGRAM

There are three objectives of a financial program. These include identification of the total cost of providing water service, the assurance that the scheduled Capital Improvement Projects are adequately funded and establishment of adequate rates and fees for service to meet the two previous objectives. Statutory authority for financial programs is derived from RCW 43.20, 70.116 and 70.119A. Regulatory authority includes WAC 246-293, 246-294 and 246-290-100.

9.1 PAST AND FORECAST FINANCIAL STATUS

The historical revenues and expenses of the Community for the years 2014 to 2016 are illustrated in Table 9.1. The Community operates on a financial year, which runs from July 1st to June 30th. The detailed forecast then extends for the 6 year period covering years ending 2017 – 2022. A final 20 year forecast covers year 2036.

The primary assumptions are that:

- Revenues (Rate Increases) will keep pace with inflation.
- Operating Expenses will grow slightly faster than revenues.
- Reserve Assessments will fund the Capital Improvement Program.

In regard to the Community's plan for financing major improvements, the Community will look first to funds in excess of their emergency fund in its Water Reserve fund, then from new customer revenues, and finally from rate increases, if necessary. If adequate on-hand funding is not available, the Community will either apply for low interest loans or utilize another resource. The loans would be requested from the Drinking Water State Revolving Fund or similar source. The Community currently has a Drinking Water State Revolving Fund loan, which will be paid off in the year 2021.

When considering rates and expenses, the Community must understand that to project future revenues and expenses with accuracy is difficult at best. Some categories may have historical trends, which allow them to be projected relatively accurately while others may range up and down over the years by a factor of ten or more. Some of the causes for these fluctuations are weather, local economic conditions, and water operating costs, which are significantly higher in hotter, drier years than in colder, wetter years.

CHS ENGINEERS

Timberlake Community Water System

TABLE 9.1
Financial History & Forecast

	Actual			Budget	NT	Forecast					
(Fiscal Year: Ending June 30th /	2014	2015	2016	2017	Growth	**2018**	**2019**	**2020**	**2021**	**2022**	**2036**
REVENUES				F1		F2	F3	F4	F5	F6	F20
Water Rates (A1)	341146	279229	297200	288720	3.5%	298825	309284	320109	331313	342909	480719
Fees and Other Service (A2)	63393	52610	20045	29000	1.0%	29290	29583	29879	30178	30480	34510
Reserve Assm (B1)	102940	152137	179697	219783	F	200000	200000	200000	200000	200000	100000
Transfer In: Rsrv>Capital (B2)			0	47598							
TOTAL REVENUES	507479	483976	544540	537503		528115	538867	549988	561491	573389	615229
EXPENSES											
Wages	93724	116629	104090	127951	4%	133069	138392	143928	149685	155672	225194
Taxes	26354	17595	41238	36488	5%	38312	40228	42239	44351	46569	71152
Training	359	0	495	1500	4%	1560	1622	1687	1754	1824	2640
Office	15184	18268	26071	20650	4%	21476	22335	23228	24157	25123	36344
Utilities	21591	23245	20885	24500	6%	25970	27528	29180	30931	32787	52430
Vehicles	3342	5459	2975	3300	6%	3498	3708	3930	4166	4416	7062
Backhoe	0	2930	73	200	4%	208	216	225	234	243	352
Genset	3403	11976	0	2000	4%	2080	2163	2250	2340	2434	3520
O&M	13634	23689	14892	14000	8%	15120	16330	17636	19047	20571	35280
License	2394	2113	1844	2000	5%	2100	2205	2315	2431	2553	3900
Prof. Fees	61252	14298	30424	34130		15000	15000	15000	5000	5000	25000
Insurance	19218	12629	17628	14000	8%	15120	16330	17636	19047	20571	35280
Operating Expenses Total	260455	248831	260615	280719		273513	286057	299254	303143	317763	498154
DEBT SERVICE											
SRF principal	18166	18166	18166	18170		18166	18166	18166	18166	18166	0
SRF interest	4087	3633	3179	4200		2700	2300	1900	1600	1200	0
GF loan	12000	11360	12000	12000		12000	12000	12000	1000	0	0
Debt Total	34253	33159	33345	34370		32866	32466	32066	20766	19366	0
Operations + Debt (D)	-294708	-281990	-293960	-315089		-306379	-318523	-331320	-323909	-337129	-498154
Revenue A	404539	331839	317245	317720		328115	338867	349988	361491	373389	515229
NET Operations	109831	49849	23285	2631		21736	20344	18668	37582	36260	17075
Net > 0 Test	OK	OK	OK	OK		OK	OK	OK	OK	OK	OK
CAPITAL											
Truck		12822								20000	
Tools	97	1406		1000			2000		2000		
Recoat Reservoir			20824								30000
Reserve Study		1070	1205				2000		2000		
WSP	1522	16905	26774			10000	10000	10000	10000	10000	0
CP-1 Meter Replacement				89917			15000				
Genset Replacement				160000							
CP-2017				10000							
CP-2018						10000					
CP-2019							10000				
CP-2020								10000			
CP-2021									666000		
CP-2022										10000	
											365000
Capital Total	1619	32203	48803	260917		20000	39000	20000	680000	40000	395000
TOTAL EXPENSES	296327	314193	342763	576006		326379	357523	351320	1003909	377129	893154
>Reserves (Rev - Exp)	211152	169783	201777	-38503		201736	181344	198668	-442418	196260	-277925
Reserves YE Balance	450000	614846	785256	746753		948489	1129833	1328501	886083	1082343	>140K

Reserve Minimum Levels have been set as:

Operating Reserve (1/8) =	40000
Emergency Reserve =	100000
	$ 140,000.00

9.2 AVAILABLE REVENUE SOURCES

The Community has four sources of revenue:

- Bi-Monthly fixed Water Base Charge
- Water Consumption (volume) Charge
- Service Fees
- Reserve Assessment

9.3 FINANCIAL VIABILITY TEST

The Financial Viability Test (FVT) requirements for Group A community water systems under 1,000 connections consists of four related financial tests. The FVT covers the six-year planning period in the CWSP. The first three individual tests examine the adequacy of the utility's operating budget, operating cash reserve, and emergency reserve. The fourth test, the household income index analysis, allows the utility and the DOH to evaluate the water rate impact on system users of existing and additional operating procedures and/or capital improvements. All four individual tests are discussed in detail below.

Test No. 1 - Develop an Operating Budget

The first test requires the utility to develop an operating budget that demonstrates sufficient revenue to meet all of its incurred expenses. The initial operating budget is for a six-year period. Updates to the budget should be completed at least every three months, including impacts from projects and activities identified in the utility's CWSP.

To pass the test, revenues must be greater than expenses. The Projected Revenues and Expenses show that the Community passes the test for 2017 through 2022. It is recommended that an annual increase or an increase in rates every few years be done to ensure the Community is collecting adequate funds to cover operating expenses. The Community reviews and revises all rates and fees annually as part of their budgeting process. Therefore, the Community passes this test.

Test No. 2 - Create and Fund an Operating Cash Reserve

The second test requires the utility to develop and fund an Operating Cash Reserve. The Operating Cash Reserve is essentially the "check-book balance" a utility must maintain to meet its cash flow needs and provide contingency funds for unforeseen operating emergencies. It is recommended that utilities attempt to keep at least 1/8 of their annual operating and maintenance (O&M) and general and administrative (G&A) expenses in an Operating Cash Reserve to prevent

potential cash flow problems. This 1/8 annual operating budget figure is established by DOH as Test No. 2.

The Community has established a target minimum of $40,000 and has exceeded this value in all recent years. Therefore, the Community also passes this test.

Test No. 3 - Create and Fund an Emergency Reserve

The third test requires the utility to demonstrate its ability to cover the costs of an emergency or the failure of its most vulnerable system component. This can be accomplished by either 1) developing and funding an Emergency Reserve, or 2) obtaining an alternative financing arrangement. Generally, replacement of a production well, the largest pumping equipment, or key transmission lines represent the most expensive and difficult facilities to replace. The replacement costs of these facilities are generally used to estimate the minimum Emergency Reserve amount.

The Community currently has an operating emergency reserve account and the Community's earthquake insurance has a deductible of $250 per event. The Community has a goal of maintaining a $100,000 minimum balance in the Reserve Fund, which will cover this deductible. The Community passes Test No. 3 because it has adequate money available in the reserve account.

Test No. 4 - Conduct Median Household Income Index Analysis

The fourth and final test requires the utility to measure the customer impacts due to increasing water rates required to fund operating and facility expenses. To complete this test, the utility must:

1) Compute 1½ percent of the respective County's average annual median household income (MHHI). The MHHI is a value computed by the U.S. Census Bureau. The US Census estimated the 2014 median annual income for Mason County to be $62,286. 1½ percent of the MHHI would be $934.
2) Determine the current and projected average annual residential water bill for all six years.
3) Compare the existing and projected average annual residential bill to 1½ percent annual MHHI for all six years.

This analysis provides an indication of a residential customer's ability to pay the existing and projected water rates. When rates exceed 1½ percent of the MHHI in any year of the budget, it suggests the utility's rates may not be affordable.

Currently average annual charges for water (including reserve assessment) are $780.

Again, the Community easily passes Test No. 4.

9.4 RESERVE STUDY

The Community, in compliance with State law related to home owner associations, commissioned a reserve study. The Reserve study was last updated in 2015 and is included in Appendix M. The study evaluates the financial impacts to fully replace all community systems as the approach the end of their service life. This has led the Community to adopt an aggressive plan to fund the reserve through bi-monthly assessments. The reserve incorporates all of the existing water system and proposed Capital Improvement Program.

Currently lots are assessed $30 per month ($60 per billing). The assessment rate is expected to remain stable during the 6 year planning horizon of this plan.

9.5 RATE STRUCTURE

The Community's current (Sept. 2016) rate structure

Category	Fee
Water Base Rate	$30.00 per Month
Vacant Lot Base – Camping Lots	$14.00 per Month
Reserve Charge	$30.00 per Month
Commodity Charge (per 2 month billing period)	
0-8,000 gallons	$1.33 per Kgal
8,001 to 12,000 gallons	$2.00 per Kgal
12,001 to 20,000 gallons	$2.66 per Kgal
➢ 20,001 gallons	$3.33 per Kgal

The tiered consumption charge encourages responsible water use and promotes conservation. Rates are expected to increase moderately to maintain pace with inflation.

9.6 PROCEDURES

The advent of the Reserve Fund combined with staff turnover creates a target for financial impropriety. We recommend that the Community review their policy and practices for all phases of their financial transactions to ensure that the proper checks & balances are in place and all funds are constantly accounted for.

CHAPTER 10

MISCELLANEOUS DOCUMENTS

10.1 CORRESPONDENCE

The creation of this plan included correspondence with the Mason County Planning Department and the Mason County Fire Marshal. As required through the Municipal Water Law, the Community must provide the local planning department a Water System Plan Program Consistency Statement Checklist. This checklist is to be reviewed by the local planner to determine if the applicable land use elements in the Water Plan are consistent with the designation in the County Plan. A copy of this checklist has been included in this chapter.

10.2 COMMUNITY REVIEW

Members of the Timberlake Community were encouraged to review and provide comments on the draft of this plan. The Community held its annual meeting in November 2016. At this meeting a representative from the Water System announced that copies of the draft plan were available at the Community center for review from the meeting through January 2017.

10.3 OTHER DOCUMENTS

Other documents as referenced throughout the plan are included in the following appendices.

Washington State Department of Health

Local Government Consistency Determination Form

Water System Name: Timberlake Community Club, Inc. PWS ID: 88370Y

Planning/Engineering Document Title: Water System Plan Plan Date: August 2016

Local Government with Jurisdiction Conducting Review: Mason County

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

	For use by water system	For use by local government
Local Government Consistency Statement	**Identify the page(s) in submittal**	**Yes or Not Applicable**
a) The water system service area is consistent with the adopted land use and zoning within the service area.	2.1.3 – 2.2.1	Yes
b) The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	2.2.2	Yes
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.	-	Not Applicable
d) Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	1.10	Yes
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	1.5 8.0	Yes

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Signature

4/5/17
Date

David Lindsey, Director, Mason County Community Services
Printed Name, Title, & Jurisdiction

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1
Updated: 03/16/2018
Printed: 3/29/2018
WFI Printed For: On-Demand
Submission Reason: Pop/Connect Update

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
88370 Y	TIMBERLAKE COMMUNITY CLUB INC	MASON	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. OWNER NUMBER: 006046
MARCUS L. VIND [OPERATOR] 2880 E TIMBERLAKE DR W SHELTON, WA 98584	TIMBERLAKE COMMUNITY CLUB INC TERRY HUBBARD PRESIDENT 2880 E TIMBERLAKE DR W SHELTON, WA 98584	
STREET ADDRESS IF DIFFERENT FROM ABOVE	**STREET ADDRESS IF DIFFERENT FROM ABOVE**	
ATTN ADDRESS CITY STATE ZIP	ATTN ADDRESS CITY STATE ZIP	

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone: (360) 427-8928		Owner Daytime Phone: (360) 427-8928	
Primary Contact Mobile/Cell Phone: (360) 463-2533		Owner Mobile/Cell Phone: (360) 401-5944	
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone: (xxx)-xxx-xxxx	
Fax:	E-mail: xxxxxxxxxxxxxxxxxxxx	Fax: (360) 427-1755	E-mail: xxxxxxxxxxxxxxxxxxxx

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed
- [ ] Managed Only
- [ ] Owned Only

SMA NAME: _____ SMA Number:

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

- [ ] Agricultural
- [ ] Commercial / Business
- [ ] Day Care
- [ ] Food Service/Food Permit
- [ ] 1,000 or more person event for 2 or more days per year
- [ ] Hospital/Clinic
- [ ] Industrial
- [ ] Licensed Residential Facility
- [ ] Lodging
- [x] Recreational / RV Park
- [x] Residential
- [ ] School
- [ ] Temporary Farm Worker
- [ ] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [x] Association
- [ ] City / Town
- [ ] County
- [ ] Federal
- [ ] Investor
- [ ] Private
- [ ] Special District
- [ ] State

14. STORAGE CAPACITY (gallons)

260,000

15	16	17	18 SOURCE CATEGORY										19 USE			20	21 TREATMENT						22	23	24 SOURCE LOCATION			
Source Number	SOURCE NAME LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	WELL #1 ABR116 8"				X										X	Y		X	X				342	180	NW SE	18	20N	02W
S02	WELL #2 AFK577 8"				X								X			Y		X	X				280	250	NW SE	18	20N	02W
S03	WELL #3 AEC923				X								X			Y		X	X				373	280	NW SE	18	20N	02W
S04	WF(S1, S02, S03)			X									X			Y						X		710	NE SW	18	20N	02W

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
88370 Y	TIMBERLAKE COMMUNITY CLUB INC	MASON	A	Comm

	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)		830	1020
A. Full Time Single Family Residences (Occupied 180 days or more per year)	530		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	300		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	0		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	0		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	88	88	0
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	7	7	0
28. TOTAL SERVICE CONNECTIONS		925	1020

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 1400

30. PART-TIME RESIDENTIAL POPULATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many part-time residents are present each month?	200	200	250	300	400	600	800	900	400	300	250	200
B. How many days per month are they present?	31	28	31	30	30	30	31	31	30	31	30	31

31. TEMPORARY & TRANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many total visitors, attendees, travelers, campers, patients or customers have access to the water system each month?	100	100	100	300	400	700	700	800	500	300	200	200
B. How many days per month is water accessible to the public?	31	28	31	30	30	30	30	30	30	30	30	31

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students daycare children and/or employees are present each month?	10	10	10	10	10	10	10	10	10	10	10	10
B. How many days per month are they present?	20	20	20	20	20	20	20	20	20	20	20	20

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
* Requirement is exception from WAC 246-290	2	2	2	2	2	2	2	2	2	2	2	2

34. NITRATE SCHEDULE	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
(One Sample per source by time period)			

35. Reason for Submitting WFI:

☐ Update - Change ☐ Update - No Change ☐ Inactivate ☐ Re-Activate ☐ Name Change ☐ New System ☐ Other _____

36. I certify that the information stated on this WFI form is correct to the best of my knowledge.

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____ **TITLE:** _____

WS ID	WS Name
88370	TIMBERLAKE COMMUNITY CLUB INC

Total WFI Printed: 1

STATE OF WASHINGTON

Public Water System

Operating Permit

The Department of Health Office of Drinking Water issues a permit to operate:

TIMBERLAKE COMMUNITY CLUB INC (ID# 88370 Y)

to owner: TIMBERLAKE COMMUNITY CLUB INC County: MASON

TIMBERLAKE COMMUNITY CLUB INC
2880 E TIMBERLAKE DR W
SHELTON, WA 98584

This Permit is valid through: May 2015

PERMIT CATEGORY: **** Green ****

The permit category may be modified or the permit revoked subject to water system compliance with applicable State of Washington drinking water rules and regulations and the folowing statements:

The system operating permit color category is based on information on file with the Department at the time this permit was printed.

System is substantially in compliance with applicable drinking water requirements.

Washington State Department of Health

DOH 331-030 (11/08)

Report Date: 05/20/2014

Washington State Department of Health
Division of Environmental Public Health
Office of Drinking Water

WATER WORKS OPERATOR CERTIFICATION
VALIDATION CARD
FOR CERTIFICATE OF COMPETENCY

Certificate No.	Valid for Year	Classification(s)
011492	2015	CCS, WDM 2

Be it known that the Washington State Department of Health
Office of Drinking Water has recognized

BUSHEY, ARTHUR F
441 E TIMBERLAKE DR
SHELTON, WA 985849057

as a Certified Water Works Operator.

This Validation Card must be posted with your certificate.

(Rev. 8/13)

Washington State Department of Health
Division of Environmental Public Health
Office of Drinking Water

WATER WORKS OPERATOR CERTIFICATION
VALIDATION CARD
FOR CERTIFICATE OF COMPETENCY

Certificate No.	Valid for Year	Classification(s)
010125	2015	WDM 1

Be it known that the Washington State Department of Health
Office of Drinking Water has recognized

DEARMAN, LARRY G
670 E LAKESHORE DR E
SHELTON, WA 985847959

as a Certified Water Works Operator.

This Validation Card must be posted with your certificate.

(Rev. 8/13)

WASHINGTON STATE CERTIFIED WATERWORKS OPERATOR

Certificate of Competency

Arthur F. Bushey

is hereby certified as a Waterworks Operator in the State of Washington.
This individual has met the established qualifications of the Washington State Department of Health and has passed the Waterworks Operator Certification exam for this classification.

Classification: **Cross Connection Control Specialist**

Certification Number: **011492**

Chris McCord, Program Coordinator,
Waterworks Operator Certification Program

July 31, 2012
Date

This certificate shall be in full force and effect when accompanied by an annual validation card.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

Certificate of Competency

Arthur F. Bushey

is hereby certified as a Waterworks Operator in the State of Washington.
This individual has met the established qualifications of the Washington State Department of Health and has passed the Waterworks Operator Certification exam for this classification.

Classification: **Water Distribution Manager 2**

Certification Number: **011492**

Richard P. Sarver, Manager, Water System Support Section

August 31, 2010
Date

This certificate shall be in full force and effect when accompanied by an annual validation card.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

Certificate of Competency

Larry G. Dearman

is hereby certified as a Water Works Operator in the State of Washington. This individual has met the established qualifications of the Washington State Department of Health and has passed the Water Works Operator Certification exam for this classification.

Classification: **Water Distribution Manager 1**

Certificate Number: **10125**

Cheryl L. Bergener
Water Works Certification Program Manager

March 12, 2003
Date

This certificate shall be in full force and effect when accompanied by an annual validation card.

Washington State Department of Health
Environmental Health Programs
Division of Drinking Water

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

STATE OF WASHINGTON

DEPARTMENT OF HEALTH

SOUTHWEST DRINKING WATER REGIONAL OPERATIONS

P.O. Box 47823 Olympia, Washington 98504-7823

TDD Relay 1-800-833-6388

October 16, 2012	Timberlake Community Club ID #88370Y	
	County:	Mason
Arthur Bushey Timberlake Community Club 2880 East Timberlake Drive West Shelton, Washington 98584	System Type:	Community
	Operating Permit Color:	Green
	Surveyor:	Regina Grimm
	Inspection Date:	8/31/12

Thank you for meeting with me to conduct a survey of this water system. Sanitary surveys are the Office of Drinking Water's (ODW) way to inspect public water systems through a field visit. ODW is also able to offer technical assistance to help utilities improve their system operations and ensure that public health is protected.

The Timberlake operation staff is doing an excellent job operating the system and keeping in compliance with the drinking water regulations. They are well trained and take pride in doing excellent work. Thank you for your dedication and doing such great work.

This report documents the findings of this survey. No deficiencies were observed during the survey.

SIGNIFICANT DEFICIENCIES—No significant deficiencies were identified.

OTHER FINDINGS—No "other findings" were identified.

RECOMMENDATIONS

- Operation of the filtration treatment system most likely requires an operator with a Water Treatment Plant Operator 1 (WTPO1) certification. However, there is no treatment plant rating form in our files and it appears the plant was not rated by our office. A treatment rating will be completed in the next couple of months and we will contact you about the certification requirements. If a treatment operator certification is required, the operator certification program allows a period of time to come into compliance and for current staff to obtain the necessary certification.
- The top of the steel reservoir needs to be painted and it is recommended to do so in the next few years.
- Neither of the reservoirs have a dedicated sample tap. It is recommended to install sample taps, so they are available in case you need to sample the reservoirs during a contamination investigation.
- Wells #2 and #3 are very close together and it is likely they can be designated as a wellfield, which would reduce the source monitoring requirements. The wellfield evaluation was not done prior to issuing this report, so contact Sophia Petro at (360) 236-3046 if you would like to pursue a wellfield designation.

Because there have been no coliform violations since the last survey and no significant deficiencies were identified during this survey, this system qualifies for the reduced frequency of Sanitary Surveys under WAC 246-290-416 (1). Your next survey is due in five years.

SYSTEM INFORMATION

Timberlake water system is a community system located in Mason County that serves primarily residential connections. Their last water system plan was approved in 2010 and they were approved to serve 1,020 service connections (1,139 ERUs). The system has two active wells, two storage reservoirs, two booster stations, disinfection treatment, and iron and manganese treatment.

SECTION 1: SOURCE

This system has two permanent active sources and one inactive emergency source. All three are groundwater wells.

Source ID #	Name:	Description:	Ecology Tag #
S01	WELL #1 ABR116	Groundwater Well—Emergency (not evaluated for compliance)	ABR116
S02	WELL #2 AFK577	Groundwater Well—Permanent	AFK577
S03	WELL #3 AEC923	Groundwater Well—Permanent	AEC923

WELLHEAD	Source ID #S02		Source ID #S03	
	Yes	No	Yes	No
Wellcap seal	☒	☐	☒	☐
Openings sealed	☒	☐	☒	☐
Screened vent	☒	☐	☒	☐
Wellhead terminates 6" above grade	☒	☐	☒	☐
Wellhead protected from flooding	☒	☐	☒	☐
Source meter	☒	☐	☒	☐
Pressure gauge	☐	☒	☐	☒
Raw water sample tap	☒	☐	☒	☐
Check valve	☒	☐	☒	☐
Protected from unauthorized access	☒	☐	☒	☐
Adequate sanitary control area	☒	☐	☒	☐
Frequency of routine site visit	Daily (M-F)			
Frequency of source meter reading	Daily (M-F)			

WELL PUMP EQUIPMENT	Source ID #S02		Source ID #S03	
	Yes	No	Yes	No
Pump type	Submersible		Submersible	
Pumping capacity (gpm)	250		280	
Functional pump controls	☒	☐	☒	☐
Generator available	☒	☐	☒	☐
Generator has automatic startup	☒	☐	☒	☐
Generator fuel source	Diesel			

BUILDINGS/ENCLOSURE	Source ID #S02		Source ID #S03	
	Yes	No	Yes	No
Facility secure	☒	☐	☒	☐
Structure in good condition	☒	☐	☒	☐

The sources are in good condition. Pressure gauges should be installed so system pressures can be observed.

SECTION 2: DISINFECTION

This system is chlorinated to provide oxidation of iron and manganese prior to filtration. Chlorination has not been required for disinfection purposes and there is no CT6 requirement. The water system has onsite generation that produces 0.8% sodium hypochlorite. If the onsite generator needs to be taken offline for repairs or maintenance, there is a backup chlorination system using a batch chlorine solution mixed from 12.5% sodium hypochlorite purchased from a vendor.

#	SITE OR LOCATION	TREATMENT TYPE AND CHEMICAL USED	CT PROVIDED
1	Well #1 Well House	Sodium Hypochlorite (Not inspected for compliance, emergency source.)	☐
2	Well #2 and Well #3 Treatment Building	Sodium Hypochlorite	☐

TREATMENT	2	
	Yes	No
Operated & maintained properly	☒	☐
Redundant equipment available	☒	☐
Schematic of treatment facilities available	☒	☐
Chlorine residual test kit available	☒	☐

CHEMICALS	2	
	Yes	No
Flow paced feed	☒	☐
Feed system calibrated	☒	☐
Approved chemicals used	☒	☐

HYPOCHLORITE ADDITION	2	
	Yes	No
Hypochlorite concentration %	0.8%	
Feed solution concentration	0.8%	
Double tank or containment area provided	☐	☒
Hypochlorite solution located in separate room	☐	☒

ONSITE GENERATION	2	
	Yes	No
Stock solution container vented outside	☒	☐
Hydrogen alarm	☒	☐

DISINFECTION COMPLIANCE	2	
	Yes	No
Disinfection required	☐	☒
CT required	☐	☒
Minimum CT met at all times	N/A	
Peak flow used to calculate CT	N/A	
Monthly report submitted	☒	☐
Residuals maintained in distribution system	☒	☐
Daily residuals recorded	☒	☐

SECTION 3: OTHER TREATMENTS

The primary treatment process is an oxidation and filtration system for iron and manganese removal. The treatment was approved in 2003. Water from the wells is pumped directly to the ATEC treatment system to remove iron and manganese, and dosed at the inlet of the filter with hypochlorite at a free residual of 1.2 to 1.35 milligram per liter (mg/L). The hypochlorite is used as an oxidant and to regenerate the pyrolusite filter media. The treated water is then pumped with wellhead pressure to the 200,000-gallon reservoir. This system has a chlorine residual goal of about 0.4 to 0.8 mg/L for treated water entering the reservoirs and at the booster pumps.

#	TREATMENT PROCESS	CHEMICAL ADDED	PURPOSE	LOCATION IN SYSTEM
1	ATEC Filtration System	Chlorine	Iron & Manganese Removal	Treatment Building and Shop

TREATMENT	1	
	Yes	No
Operated & maintained properly	☒	☐
Redundant equipment available	☒	☐
Schematic of treatment facilities available	☒	☐
Testing equipment available and used	☒	☐

CHEMICALS	1	
	Yes	No
Flow paced feed	☒	☐
Feed system calibrated	☒	☐
Approved chemicals used	☒	☐

SECTION 4: DISTRIBUTION SYSTEM

The distribution system is comprised of a single pressure zone. Most of the distribution piping is composed of PVC pipe smaller than 8 inches. There are also about 1,150 feet of 8-inch AC pipe and 100 feet of 10-inch ductile iron pipe. The distribution system includes some large loops and multiple dead-end lines. The distribution system has blowoffs on all its dead ends. An ARV is located on the highest point of the system.

FEATURES	Yes	No
Service area and facility map	☒	☐
Minimum pressure requirements met	☒	☐
Service meters (reading frequency every 2 months)	☒	☐
Leak detection program	☒	☐
Water system leakage (%)	7.4% (2010 report)	
Adequate valving for flushing and pipe repair	☒	☐
Blow-offs on dead ends	☒	☐
Routine flushing (frequency is twice per year)	☒	☐
Routing valve exercise (frequency is twice per year)	☒	☐

CROSS CONNECTION CONTROL	Yes	No
System has enabling authority	☒	☐
Ongoing hazard inspections	☒	☐
High hazards identified	☒	☐
High hazards protected	☒	☐
Annual testing	☒	☐
System has installation standards	☒	☐

SECTION 5: FINISHED WATER STORAGE

The community has two reservoirs, located next to Well #1. Water enters both of the reservoirs from their tops, and neither reservoir floats on the system. The smaller reservoir of 60,000 gallons with two internal compartments, is about 40 years old, but is in good condition. The screens are intact the wood roof is in good condition (a new roof was installed in 2004). Under normal operating conditions, this reservoir receives its water from the larger steel reservoir by gravity (regulated by an electronic transfer valve), and is the main source of supply to the booster pump station.

The larger steel reservoir has a capacity of 200,000 gallons and was constructed in 1995. Under higher water demands (such as for fire flows), an electronically controlled valve in the bottom of the reservoir opens and delivers water directly to the booster station, thus eliminating the bottom 16 feet of its otherwise dead storage. The inside of this reservoir was re-coated in 2011.

RESERVOIR	RESERVOIR NAME	DESCRIPTION	YEAR BUILT	TOTAL VOLUME (GAL)
1	Reservoir 1	Concrete, two separate 30,000 gallon compartments.	1967	60,000
2	Reservoir 2	Steel Reservoir	1995	200,000

HATCH	Reservoir 1		Reservoir 2	
	Yes	No	Yes	No
Locked	NA		☒	☐
Watertight seal or gasket	NA		☒	☐
Over-lapping cover	NA		☒	☐

FEATURES	Reservoir 1		Reservoir 2	
	Yes	No	Yes	No
Separate inlet/outlet	☒	☐	☒	☐
Protected drain outlet	☒	☐	☒	☐
Protected overflow outlet	☒	☐	☒	☐
Screened air vent	☒	☐	☒	☐
Operational water level gauge	☐	☒	☒	☐
Bypass piping or isolation possibility	☒	☐	☒	☐
Protected from unauthorized entry	☒	☐	☒	☐
Low level alarms	☒	☐	☒	☐
Sample tap at outlet	☐	☒	☐	☒

MAINTENANCE	Reservoir 1		Reservoir 2	
	Yes	No	Yes	No
Frequency of interior inspection	Every 5 Years			
Frequency of routine site visit	Every Couple Weeks			
Exterior in good condition	☒	☐	☒	☐
Clear of excessive vegetation	NA		☒	☐

To get some help writing a maintenance program, please check out the "Preventative Maintance Program-Guide For Small Public Water Systems Using Groundwater" on our website at:
http://www.doh.wa.gov/portals/1/documents/pubs/331-351.pdf

SECTION 6: PRESSURE TANKS

This system does not have any pressure tanks.

SECTION 7: BOOSTER PUMPS AND FACILITIES

The previous booster pump station was replaced several years ago, because the pumps were outdated and undersized for projected system capacity needs. The new booster pump station (part of ODW Project #03-

0307) received final approval in November 2005 following its installation, and is located next to the small concrete reservoir. This system is designed to provide a maximum discharge pressure of 69 pounds per square inch (psi). This system can pump over 1,000 gallons per minute (gpm) of water when all three booster pumps are in operation. The booster pump output is metered. This system's original booster pump station is still operational and is maintained to be used as an emergency backup.

Facility	Name	Description
1	Booster Station	New Station–Main Booster Station
2	Backup Booster Station	Backup booster, but undersized for full system demand.

BOOSTER PUMPS	Facility 1		Facility 2	
	Yes	No	Yes	No
Number of pumps	3		4	
Frequency of routine site visit	Daily		Daily	
Isolation valves	☒	☐	☒	☐
Pressure gauge(s)	☒	☐	☒	☐
Pressure relief valve	☐	☒	☐	☒
Pump failure alarm	☒	☐	☒	☐
Control systems functional	☒	☐	☒	☐
Protected from flooding	☒	☐	☒	☐
Redundant pumps	☒	☐	☒	☐
Equipment in good condition	☒	☐	☒	☐

BUILDINGS/ENCLOSURE	Facility 1		Facility 2	
	Yes	No	Yes	No
Facility secure	☒	☐	☒	☐
Structure in good condition	☒	☐	☒	☐

SECTION 8: WATER QUALITY MONITORING AND REPORTING

Refer to your Water Quality Monitoring Report (WQMR) for monitoring requirements. If you have any questions on source monitoring, please contact Sophia Petro at (360) 236-3046.

During the survey, we talked about the sampling entry points and whether the two sources can be combined as a wellfield. It was not determined whether a wellfield can be designated prior to issuing this report. So, please contact Sophia and she will evaluate whether Wells #2 and #3 can be designated as a wellfield. The advantage of a wellfield designation is that your source monitoring requirements and the associated cost will be reduced.

Entry Point #	Description
1	Well #1 Sample Tap
2	Well #2 Sample Tap
3	Well #3 Sample Tap

CHEMICAL	Entry Point #1		Entry Point #2		Entry Point #3	
	Yes	No	Yes	No	Yes	No
Monitoring adequate	☒	☐	☒	☐	☒	☐
ODW WQ data reviewed	☒	☐	☒	☐	☒	☐
Sample collection sites correct	☒	☐	☒	☐	☒	☐

System has prior:
- ☐ Nitrate results above 5 mg/L
- ☐ Nitrite results above 0.5 mg/L
- ☐ Primary MCL
- ☐ Secondary MCL exceedance(s)
- ☐ Organic detections
- ☐ Other _____

COLIFORM	Yes	No
Monitoring adequate	☒	☐
Monitoring plan adequate	☒	☐
Monitoring plan followed	☒	☐
# of violations since last survey	None	

LEAD & COPPER	Yes	No
Monitoring adequate	☒	☐
Results below action level	☒	☐

DISINFECTION BYPRODUCTS	Yes	No
Monitoring adequate	☒	☐
# of treatment plants	1	
Monitoring plan adequate	☒	☐
Monitoring plan followed	☒	☐
Results satisfactory	Yes	

SECTION 9: SYSTEM MANAGEMENT AND OPERATIONS

The system is in very good condition and the staff has implemented excellent operational and maintenance practices. The system has been implementing long-term planning projects, completing ongoing preventive maintenance activities, and completing all required monitoring requirements. Great work!

PROJECT/PLANNING	Yes	No
System approved	☒	☐
Current WSP/SWSMP	☒	☐
Year WSP/SWSMP approved	2010	
Distribution main submittal exception	☒	☐
Emergency response plan	☒	☐

REPORTING	Yes	No
WFI reviewed and updated with purveyor	☒	☐
Consumer confidence report (Community's Only)	☒	☐
Water use efficiency report (Municipal Water Suppliers)	☒	☐

OPERATOR CERTIFICATION

This system is required to have at least **one** certified operator with a minimum of a WDM certification. In addition, there is a treatment operator certification requirement, because of the filtration system. Our records show that the treatment plant was not rated and a treatment operator certification requirement was not assigned. In the next few weeks, we will review the treatment project report and complete the certification form. Based on this rating the system may be required to have a treatment operator certification. In that case, you will need to contact the operation certification staff regarding timeframes for complying with the requirement and information about testing if you want to have current staff certified.

Name of Operator	Certification Number	Certifications	Mandatory Operator
Arthur Bushey	011492	WDM2, CCS	☒
Larry Dearman	010125	WDM1	☐

WDS-Water Distribution Specialist; WDM-Water Distribution Manager; WTPO-Water Treatment Plant Operator, BTO-Basic Treatment Operator; CCS-Cross Connection Specialist; BAT-Backflow Assembly Tester

If you have any questions or this information is inaccurate, please contact Operator Certification at (800) 525-2536.

OPERATIONS	Yes	No
Operational records maintained	☒	☐
Complaints followed up	☒	☐
Complaints documented	☒	☐
# of complaints recorded at ODW (since last survey)	None	
Operation and maintenance program	☒	☐

CLOSING

Regulations established a schedule of fees including fees for sanitary surveys (WAC 246-290-990). The total cost of this survey is $1,836. The Office of Drinking Water has used state and federal funds to pay $918 of this amount. An itemized invoice showing the remaining amount due of $918 is enclosed.

If you have any questions, please contact me at (360) 236-3035 or by e-mail at regina.grimm@doh.wa.gov.

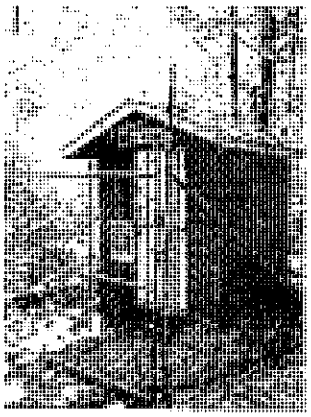
Sincerely,

Regina Nicole Grimm

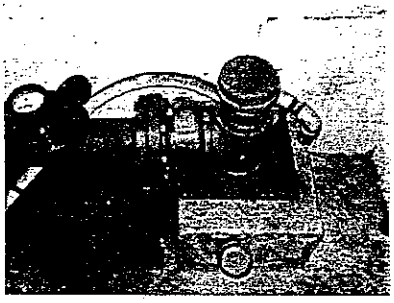
Regina N. Grimm, P.E.
Office of Drinking Water, Regional Engineer

Enclosures

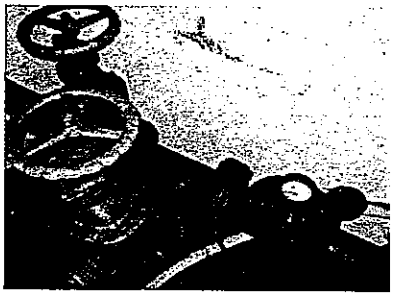
cc: Mason County Public Health



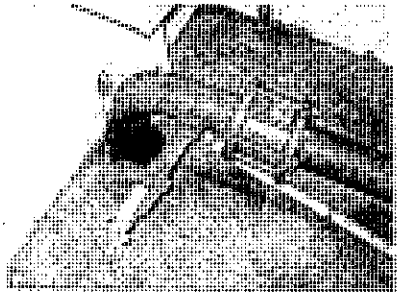
Emergency Well House



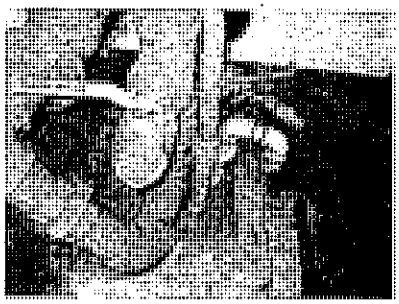
Emergency Well–Well #1



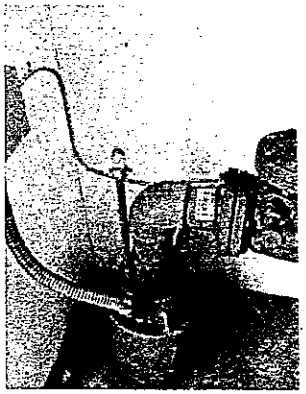
Well #1–Source Meter



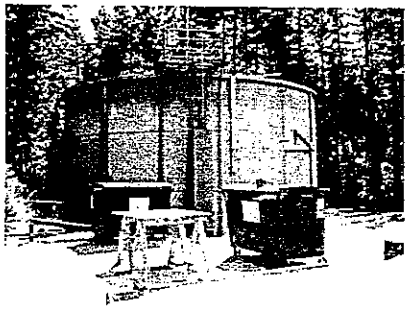
Well #1–Sample Tap



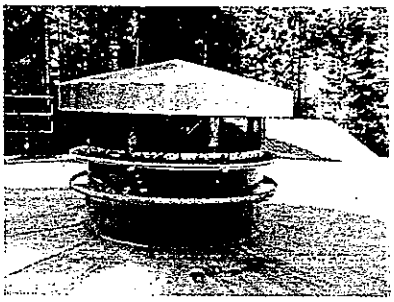
Well #2



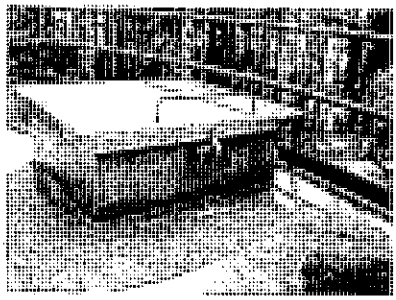
Well #3



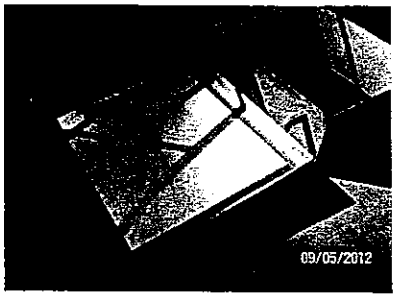
Reservoir 2



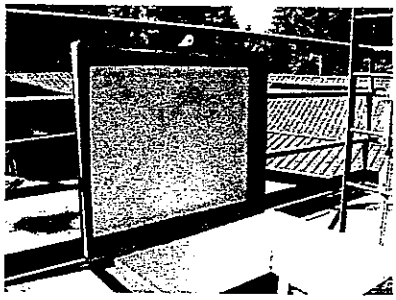
Reservoir 2 Vent



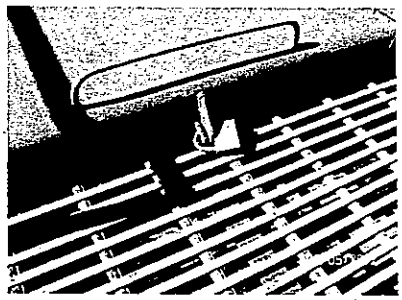
Reservoir 2 Hatch



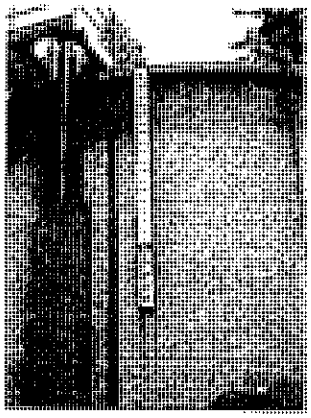
Reservoir 2–Hatch With Seal



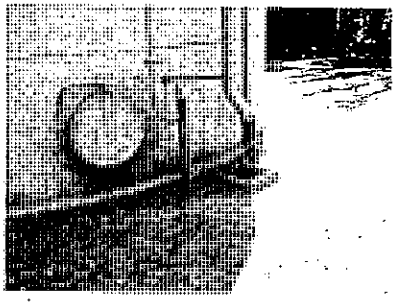
Reservoir 2 Hatch



Reservoir 2–Locked Hatch

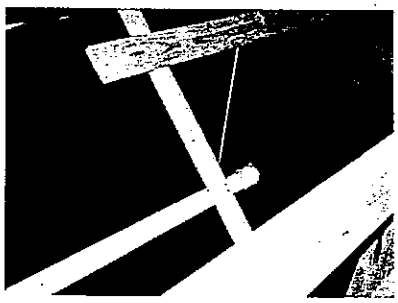


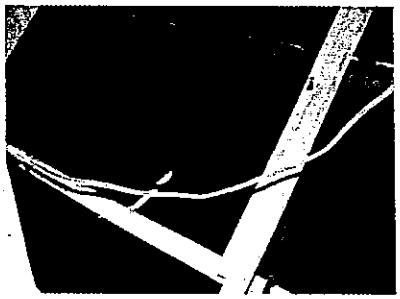
Reservoir 2–Water Level Gauge



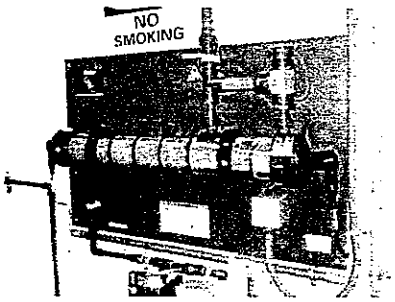
Reservoir 2–Overflow Pipe

Reservoir 1-Walkway

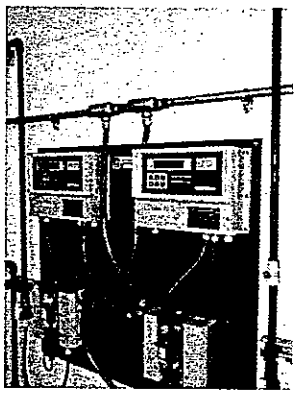




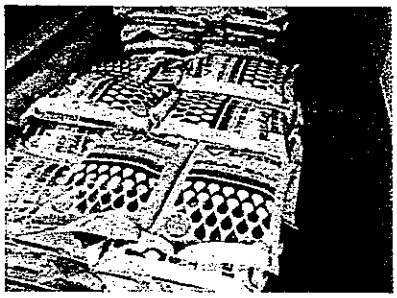
Iron & Mn Filtration Tanks–ATEC With Pyrolusite Media



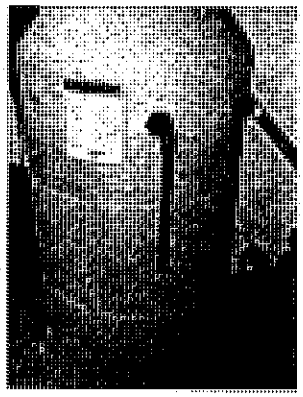
Onsite Generation Unit



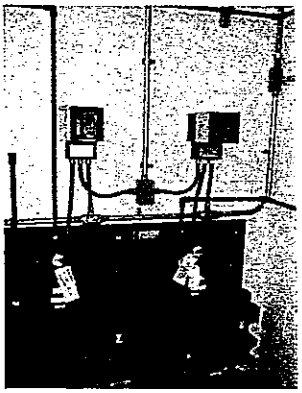
Analyzers



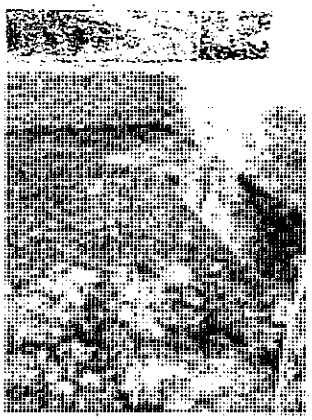
NSF Approved Salt



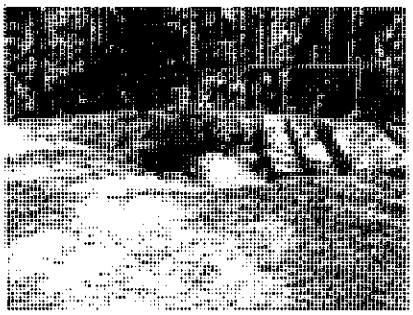
Salt Water Saturation Tank



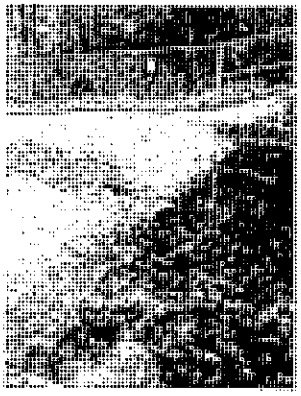
Chlorine Injection Pumps



Fe and Mn Treatment Backwash Pond



Backwash Pond



Backwash Pond

INVOICE

Engineering, Planning, and Sanitary Survey Review Form

TO: ARTHUR BUSHEY
TIMBERLAKE COMMUNITY CLUB INC
2880 E TIMBERLAKE DR W
SHELTON WA 98584

ATTN: ACCOUNTS PAYABLE DEPT

Invoice Number	SW614
Invoice Date	October 17, 2012
Billing Period	30 days SW

DATE	DESCRIPTION	QTY	COST	AMOUNT
10/17/2012	SURVEY FEE TIMBERLAKE COMMUNITY CLUB INC MASON COUNTY PWS ID 88370 DATE OF SURVEY: 8/31/2012	1	1	$1836.00
	DOH Share			$918.00
	Total			$918.00
	Payment due within 30 days. Interest shall accrue at 1% per month after 30 days.			

Make Checks Payable to Department of Health
Return Lower Portion to:
Department of Health
PO Box 1099
Olympia, WA 98507-1099

Paid 11/14/12 CK# 19120

Office of Drinking Water
Engineering, Planning, and Sanitary Survey Review Form

NAME	TIMBERLAKE COMMUNITY CLUB INC
INVOICE NUMBER	SW614
INVOICE DATE	October 17, 2012 SW
AMOUNT	$918.00

DOH Form #331-332

Return to:
Department of Health
Revenue Section
PO Box 1099
Olympia, WA 98507-1099

For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

2 044129 00878

Washington State Department of Health
Division of Environmental Public Health
Office of Drinking Water

WATER WORKS OPERATOR CERTIFICATION

VALIDATION CARD

FOR CERTIFICATE OF COMPETENCY

Certificate No.	Valid for Year	Classification(s)
012450	2016	CCS, WDM 2

Be it known that the Washington State Department of Health
Office of Drinking Water has recognized

MARCUS L VIND
601 E TIMBERLAKE EAST DR
SHELTON, WA 985846902

as a Certified Water Works Operator.

This Validation Card must be posted with your certificate.

(Rev. 8/13)

Certificate temporarily valid 01/01/2017 through 02/28/2017

Washington State Department of Health
Division of Environmental Public Health
Office of Drinking Water

VALIDATION CARD FOR CERTIFICATE OF COMPETENCY

WATER WORKS OPERATOR CERTIFICATION

Certificate No. 012450	Valid for Year: 2016
Name MARCUS L VIND	
Classification(s) CCS, WDM 2	

Carry this wallet card for proof of current certification.

Certificate of Competency

Marcus L. Vind

is hereby certified as a Waterworks Operator in the State of Washington.
This individual has met the established qualifications of the Washington State Department of Health and has passed the Waterworks Operator Certification exam for this classification.

Classification: **Cross Connection Control Specialist**

Certification Number: **012450**

Deni Gray, Program Manager,
Waterworks Operator Certification Program

May 31, 2016
Date

This certificate shall be in full force and effect when accompanied by an annual validation card.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

Certificate of Competency

Marcus L. Vind

is hereby certified as a Water Works Operator in the State of Washington. This individual has met the established qualifications of the Washington State Department of Health and has passed the Water Works Operator Certification exam for this classification.

Classification: **Water Distribution Manager 2**

Certificate Number: **012450**

Cheryl L. Bergener
Water Works Certification Program Manager

March 31, 2010
Date

This certificate shall be in full force and effect when accompanied by an annual validation card.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

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Page: 1 of 11
06/30/2006 11:11A
TIMBERLAKE COMM CLUB MISC 42.00 Mason Co, WA

After Recording Return To:
Timberlake Community Club, Inc.
2880 East Timberlake West Drive
Shelton, Washington 98584-7936

DOCUMENT TITLE:	Bylaws of Timberlake Community Club
REFERENCE NUMBERS OF RELATED DOCUMENTS:	N/A
GRANTORS:	TIMBERLAKE COMMUNITY CLUB
GRANTEES:	Public-residents of the Timberlake community
LEGAL DESCRIPTION:	Timberlake Divisions 1 - 13
ASSESSOR'S PROPERTY TAX PARCEL NO.	Division 1 – 20018-50-00001 thru 22018-50-09162 Division 2 – 22017-50-00001 thru 22017-50-00908 Division 3 – 22018-51-00001 thru 22018-51-00902 Division 4 – 22018-52-00001 thru 22018-52-00061 Division 5 – 22018-53-00001 thru 22018-53-00903 Division 6 – 22018-54-00001 thru 22018-54-00088 Division 7 – 22017-50-00001 thru 22017-50-00104 Division 8 – 22007-51-00001 thru 22007-51-90933 Division 9 – 22017-51-00001 thru 22017-51-00169 Division 10 – 22017-52-00001 thru 22017-52-00088 Division 11 – 22017-53-00001 thru 22017-53-00900 Division 12 – 22018-55-00001 thru 22018-55-00018 Division 13 – 22008-50-00001 thru 22008-50-00900

BYLAWS OF TIMBERLAKE COMMUNITY CLUB
June 15, 2006

ARTICLE I
GENERAL PROVISIONS

A. **Name.** The name of the Association is Timberlake Community Club (TCC).

B. **Jurisdiction.** This Association has jurisdiction over all land within the development, hereinafter "TCC," legally described as:

Plat of Timberlake No. 1, Sections 17 and 18, Township 20 North, Range 2 W.W.M., Mason County, Washington, and any other areas adjacent thereto which hereafter may be developed as tracts or divisions of Timberlake; as well as all activities therein related to the purposes of the association.

C. **Purposes.** The purposes for which this association is founded are to promote the community welfare of the members and their families to make TCC a better place in which to live and enjoy life, for the benefit of members and their families. To foster and maintain acquaintanceship and friendship among the members of the corporation through social, sporting, and recreational activities and events. To exercise any or all powers of non-profit associations and homeowners' associations pursuant to the laws of the State of Washington, including RCW chs. 24.03 and 64.38, or as amended.

D. **Common Areas.** The ownership of the common areas in TCC is vested in the Association. Such common areas are for the exclusive use and enjoyment of members, their families and their guests; and those invited by the Association to use said common areas, including holders of easements, licensees and other rights granted by written permission of the Board of Directors. The Association is responsible to pay taxes and assessments on the common areas, and to operate and maintain the same, and pay the costs associated therewith. The Association, through its Board of Directors, may create reasonable rules and regulations for the use of its common areas, and for the conduct of members, their family members and guests, and others with respect thereto. The Association may also own any other property, real or personal.

E. **Authorities.** This Association is subject to the applicable recorded Protective Covenants of TCC, as well as any other applicable recorded documents; its Articles of Incorporation; these Bylaws; other Association governing documents; rules and regulations of the Association; RCW ch. 24.03, the Nonprofit Corporation Act, or its successor; RCW ch. 64.38, the Homeowners' Association Act, or its successor; and the laws of the State of Washington and of the United States.

ARTICLE II
MEMBERSHIP

A. **General.** Although the Board of Directors acts in most instances on behalf of the Association, the primary authority of TCC rests with its members. Members are the owners of all real property within the jurisdiction of TCC. The members elect directors to the Board of Directors, approve or disapprove the annual budget and further financial proposals, and vote on initiatives or referenda. The members are responsible for complying with all Association requirements, including paying in a timely manner all assessments due to the Association. Membership is appurtenant to ownership of each lot in TCC. No member may withdraw membership except by transfer of ownership.

Each member in good standing has the right to use Association property and facilities, and to permit guests and family members to do so as well, pursuant to TCC's reasonable rules and regulations. Members in good standing also have the right to apply for TCC approval for permit applications, and participate in association processes and activities.

Failure to comply with TCC's covenants and other rules, including the obligations to pay assessments, may result in loss of the rights to use such facilities, including the TCC water system.

Each member is personally responsible for the actions of himself or herself, and all such others, as they relate to the facilities and operations of the Association, governing documents, and other Association rules and regulations and other requirements. The Board of Directors shall enact fair and reasonable rules providing for the administration of a system for the accountability of owners with respect to such others, which may include restrictions on the use of TCC lots as rental housing.

Each member in good standing also has all of the rights and responsibilities conferred by TCC covenants and governing documents and other Association rules and regulations ("Timberlake rules"), as well as state law.

B. Voting and Membership Rights. Owners of record shall have one membership regardless of the number of lots so owned or purchased and the interest of each member shall be equal to that of any other member and no member can acquire any interest which shall entitle him to any greater voice, vote or authority in the Association than any other member. The purchaser, under a recorded contract of purchase, shall be deemed to be an owner for membership purposes. If any tract or tracts are held by two or more persons, the several owners of such interests shall be entitled to cast one vote. The vote for any membership owned by a single marital community may be cast by either spouse without presentation of authority from the other, but if both are present, it shall be cast by the wife.

C. Members in Good Standing.

1. Members in good standing are those without any current property covenant or other rule violations, and are not delinquent in the payment of any amount due to the Association. Members shall not lose their status as members in good standing unless the Board acts to change that status, after notice and an opportunity to be heard at a Board meeting; or they are delinquent in their payments.

2. During any period in which a member is in violation of any covenant restriction or bylaw, or is delinquent in payment of any dues or assessments levied by the Board of Directors, his voting rights and use of any and all corporate services and facilities shall be automatically suspended until all violations are corrected and delinquencies paid. Notice of suspension of rights and privileges shall be provided to the member by letter.

D. Membership Meetings.

1. **Annual Membership Meeting.** There shall be an annual membership meeting of the Association on the second Sunday of August of each year, or at such other time as the Board of Directors may designate.

2. **Special Membership Meetings.** Special meetings of the membership may be called by the President of the Board of Directors, a majority of the Board of Directors, or by at least forty members of the Association, in writing.

3. **Notice.** Notice of all membership meetings shall be delivered, including by electronic communication, or sent by prepaid, first class United States mail to each member. Notice shall be given not less than 14 days, and not more than 50 days prior to the meeting. The notice shall state the time, place and agenda of the meeting.

4. **Place.** Membership meetings shall be held at the property site referred to as Timberlake No. 1, Little Lake Park, commonly known as Cedar Park, or such other reasonably convenient place as designated by the Board of Directors.

5. **Agenda.** The notice of any membership meeting shall include the agenda for the meeting, as set by the Board of Directors. Matters to be determined at membership meetings may include elections, approval of a budget and/or other financial proposals, and discussions. At the annual membership meeting, the officers and committee chairpersons shall provide summary reports of operations of the preceding year, and plans for the upcoming year, as well as long-range plans.

The agenda may also include referenda, which are issues submitted to the general membership by the Board of Directors; and initiatives, which are issues submitted by the signatures of fifty members in good standing. In order to be fair to members unable to attend, neither the agenda nor any items on it may be amended during the course of the meeting, and all items to be voted on shall be considered as presented without amendment or modification.

6. **Quorum.** A quorum for the transaction of business at any general membership meeting shall be fifty members in good standing, voting either in person or by proxy (absentee ballot).

7. **Ballots.** A member's vote may be cast in person or by proxy (absentee ballot), according to procedures established by the Board of Directors. Votes cast by proxy (absentee ballot) shall be specific as to each particular issue.

8. **Majority.** Actions of the membership shall be taken by a majority vote of the members in good standing who cast ballots, except as otherwise provided by law or TCC governing documents.

9. **Procedures.** The Board of Directors shall establish procedures for initiatives, referenda, and membership meetings that are reasonable and fair, including additional procedures to ensure the accuracy of voting as deemed appropriate.

ARTICLE III
BOARD OF DIRECTORS
POWERS AND DUTIES

A. **General.** The Board of Directors is responsible for acting in all instances on behalf of the Association, except where otherwise expressly provided. It conducts, manages, and controls the affairs and business of the Association, and exercises ownership authority and control over all of the common properties of the Association. Members of the Board of Directors develop skills and insight into the work of the Association through their service to the Association, including as Directors. Their responsibilities are to follow state laws and TCC governing documents and rules and regulations in ways that, in their individual and collective judgments, best serve the purpose of the Association, and are fair and reasonable. The Board shall adopt procedures for its own operation, and that of the membership, that are fair and reasonable.

B. **Membership Participation.** The Board shall keep the membership informed of current and prospective issues. The Board shall define significant issues, take steps to educate and inform the membership about them, and listen to the members' responses, including use of informational "town meetings" as appropriate. In evaluating the opinions of the members, the Board shall take care to consider its duties to the purposes of the Association, and to avoid allowing any one member to exercise a disproportionate role in the process.

C. **Rules and Regulations.** The Board shall, when necessary and appropriate, develop rules and regulations to support the purposes of the Association, and to provide procedures for the enforcement of the same. The Board shall give a minimum of thirty days notice to members of proposed enforcement actions, except in emergency situations when immediate action is needed to protect the interests of the Association.

ARTICLE IV
BOARD OF DIRECTORS
GENERAL

A. **Number.** There shall be a minimum of five and a maximum of seven members of the Board of Directors.

B. **Qualification.** Any member in good standing is qualified to serve as a Director.

C. **Terms of Office.** Each Director shall serve a term of three years. In the first year of a three-year cycle, three Director positions shall be open for election; in each of the second and third years of the three-year cycle, two Director positions shall be open for election.

D. **Removal.** A Director may be removed with or without cause by a majority vote of the members in good standing voting at a meeting with a quorum, upon proper submission of a member initiative or Board referendum. A Director may also be removed by resignation or disqualification. A Director shall become disqualified if he or she is no longer a member, or a member in good standing; or misses three consecutive meetings without cause.

E. **Vacancies.** If a Director is removed, disqualified, or resigns, the Board of Directors shall appoint a successor within a reasonable period of time. **The successor shall fill the remainder of the unexpired term of the former Director.**

F. **Board Meetings.**

1. **Where and When.** The Board of Directors shall meet at the multi-purpose center (MPC) of the Association at least monthly. The Board may determine to omit any regular monthly meeting at its discretion.

2. **Notice.** Notice of regular Director meetings shall be given by general reference in mailings to the membership, by electronic communication, by posting at the office, clubhouse, and/or reader board. Notice of other Board meetings shall be given to the Directors at least 24 hours prior to the meeting, by personal communication, or if not possible, by reasonable alternate means best calculated to be received. Notice of other Board meetings shall also be given to the members at least 24 hours prior to the meeting, by posting notice at the office, clubhouse, and/or reader board.

3. **Quorum.** A quorum of the Board of Directors for the transaction of business shall be a majority of the then sitting Directors.

4. **Majority.** A majority vote of the Directors at a meeting at which a quorum is present is sufficient to transact the business of the Board of Directors.

5. **Procedures.** The Board of Directors shall develop procedures for its operation that are fair and reasonable under all the circumstances.

6. **Distance Meeting.** Any meeting of the Board of Directors may be conducted by telephone conference call, or similar communications medium, whereby all directors participating are in voice or electronic contact with each other throughout the meeting without the necessity of gathering physically in each other's presence, subject to all other meeting requirements as set forth herein.

7. **Delegation of Powers.** The Board of Directors may delegate such powers with respect to management of the Association as it deems appropriate, subject to state law and the governing documents and rules and regulations of the Association.

8. **General or Special Budget for income, expenses and reserves.** The Board of Directors shall adopt an annual budget for assessment and other income, expenses, and reserves. This budget shall be submitted to the membership for ratification as provided herein. The Board may also adopt special budgets for the same purposes, also to be ratified by the membership as provided herein. In addition, the board shall prepare and distribute to the members an analysis of the financial impact of any project anticipated to exceed 25% of the annual budget.

9. **Budget Reports.** The Board will provide budget reports to the members at least quarterly, demonstrating expenditures as compared to budget allocations for the same.

ARTICLE V
OFFICERS

A. **Election.** At the first meeting of the Board of Directors after each annual meeting of the members, the Board of Directors shall elect its President, Vice-President, Secretary, and Treasurer from among the Directors. Officers of the Association so elected shall hold office until their successors are seated.

B. **Removal.** Any officer may be removed as such by a majority vote of all of the Directors. Upon removal of an officer, the Board of Directors shall elect a replacement within a reasonable time, to fill the remainder of the unexpired term.

C. **President and Vice-President.** The President shall preside at all meetings of the Directors and members, shall sign as President on all agreements, contacts and instruments authorized by the Board of Directors, and shall be its chief executive officer. The Vice President shall perform the duties of the President when the President is unavailable.

D. **Secretary.** The Secretary shall be responsible for all meeting notices and the minutes of all meetings of the membership and of the Board of Directors, and shall have charge of all of the Association documents.

E. **Treasurer.** The Treasurer shall be responsible for keeping safely all money and financial accounts of the Association, and for preparing and keeping a complete accounting of the financial records of the Association, for presentation to the members at the annual membership meeting, and at all other times as required.

F. **Execution of Documents.** The President, or in the absence of the President, the Vice-President, shall sign and execute all contracts, conveyances, notes and all security agreements on behalf of the corporation. The same shall also be signed and executed by either the Treasurer or the Secretary. When necessary due to particular circumstances, the Board of Directors may specifically authorize signing and execution otherwise. Checks, drafts, and other negotiable instruments, and all other documents except amendments to Association documents may be signed and/or executed as provided by the Board of Directors. The President or Vice President and Secretary or Treasurer shall together be responsible for preparing, executing, certifying and recording Association governing documents, Association rules and regulations, and amendments thereto.

G. **Employees and Agents.** The Board of Directors may appoint, engage and/or employ, pursuant to its direction, employees, agents and volunteers.

ARTICLE VI
COMMITTEES

A. **General.** Committees may be formed at any time by the Board of Directors for such purposes as it may deem necessary. The Board of Directors may delegate, pursuant to law, its authority to take action to any committee that is composed entirely of Directors. Except for actions taken pursuant to properly delegated powers, the actions of any committee shall be subject to the ratification or disapproval of the Board of Directors at its next meeting.

B. **Nominating Committee.** The President of the Board of Directors shall appoint, with the consent of the Board of Directors, a chairperson and other members to a Nominating Committee. The Nominating Committee shall solicit and present candidates to serve on the Board of Directors, and for other positions, pursuant to procedures established by the Board. Any Association member in good standing may also nominate any such candidate.

ARTICLE VII
CODE OF ETHICS

A. **Standard of Care.** All Directors, officers, committee members, agents, employees, volunteers and others performing services for or on behalf of the Association, shall do so in a manner he or she believes to be in the best interest of the Association, and with such care, including reasonable inquiry, as an ordinarily prudent person in a like position would use in similar circumstances.

B. **Open Meetings.** All meetings of the Board of Directors and its committees shall be open for observation by all members and their authorized agents, except as otherwise pursuant to law.

C. **Open Records.** Except as otherwise specified by law, the minutes of all the meetings, and all other records of the Association, shall be available for examination by all members and the holders of any mortgages on any lots and their authorized agents, on reasonable notice, and upon payment of reasonable costs incurred to provide the same.

D. **Compensation.** No Director, officer, committee member or volunteer shall be compensated for work performed as such without approval by the Board. Reasonable expense reimbursement is not considered compensation.

E. **Conflict of Interest.** No member of the Board of Directors, or of any Board committee, shall participate in any vote on any subject in which he or she has a specific personal, professional, financial, or other conflict of interest. He or she may, however, participate in discussions regarding the same.

F. **Loans.** The Association shall make no loans to its Directors or Officers.

G. **Audit.** The Board may authorize an audit of any or all of the financial accounts or affairs of the Association at any time, and to what extent, it deems appropriate. In addition, at least annually, the Board shall cause to be prepared a financial statement of the Association. Such financial statements shall be audited where provided by law, or as directed by the Board.

H. **Accounts.** The funds of the Association shall be kept in accounts in it name, and shall not be commingled with the funds of any other Association, any member of the Board of Directors, or any other person responsible for custody of such funds.

ARTICLE VIII
IMPOSITION OF ASSESSMENTS

A. TCC assessments will be imposed pursuant to Washington State law. If required by law, within thirty days after adoption by the Board of Directors of any proposed regular or special budget of the Association, the Board shall set a date for a meeting of the owners to consider ratification of the budget not less than fourteen nor more than sixty days after mailing of a budget summary to the members. Unless

at that meeting the owners of a majority of the votes in the Association reject the budget, the budget is ratified, whether or not a quorum is present. If the proposed budget is rejected or the required notice not given, the periodic budget last ratified by the owners shall be continued until such time as the owners ratify a subsequent budget proposed by the Board of Directors.

B. If not so required by law, any general or special budget adopted by the Board of Directors for assessments, expenses and/or reserves shall be submitted to the membership for its approval or rejection as a referendum.

ARTICLE IX
ASSESSMENTS–GENERAL

A. Each member, by accepting an ownership interest in any lot within the development, agrees to pay all assessments as provided herein or otherwise by law.

B. Assessments as defined herein shall constitute a personal obligation of each lot owner. In addition, they shall constitute a lien as specified herein, whether this lien is reduced to writing and recorded, or not. A "lot" for assessment purposes means any lot as shown on the original plats of TCC.

C. If necessary in the judgment of TCC, such liens may be foreclosed when delinquent.

D. The lien of TCC for payment of all assessments as defined herein is prior to any other lien, mortgage, deed of trust, or any other encumbrance, regardless of filing date of the same. However, as to any lot, this TCC lien shall be automatically subordinated to one mortgage, deed of trust, or other financing encumbrance in favor of an institutional lender, which is undertaken for the purpose of purchase of the lot, construction (or remodeling) of improvements to the same, or refinancing of the same; provided that the Association account with respect to any such lot is not delinquent at the time of recordation of the encumbrance, and that a copy of such encumbrance is received at the office of TCC within sixty days of its execution.

E. In addition, TCC may choose to subordinate its lien to any other encumbrance, when in the best interests of the Association, and consistent with the purposes of TCC as set forth herein.

F. Assessments. The following are included in the meaning of "assessments:"

1. General Annual Assessment. The Board of Directors shall impose a general annual assessment on each lot or member within the development.

2. Special Assessments. Special assessments for particular expenses may also be imposed as specified in these Bylaws.

3. Other Charges. In addition to these general and special assessments, the following charges may also be imposed, and are for the purposes of the Bylaws also considered assessments:

a. Service Fees. The Board of Directors may in its discretion impose direct fees for such goods and services as, for example, water supply.

b. Fines. The Board of Directors may adopt a system for the imposition of fines for violation of TCC covenants and/or rules;

c. Late Fees and Interest. The Board of Directors may add reasonable late fees, and interest of not more than 12% per annum, compounded annually, to any delinquent account and all assessments related thereto;

d. **Expenses.** If the Board of Directors is required to expend any funds, with or without litigation, in pursuit of the collection of any assessments, as defined herein, the correction of any violation of TCC covenants and/or rules, or with regard to any dispute concerning its actions and/or powers; all expenses, including but not limited to attorney, accountant, other expert, title report and surveyor fees; lot condition remediation costs; and all other costs of litigation, including court and discovery expenses; and any and all other amounts reasonably expended in the process of collection, dispute resolution or correction; shall be paid by the member responsible.

e. **Delinquency.** Annual dues and assessments shall be due and payable July 1st of each year and will become delinquent on August 1st of each year. Any account with an outstanding balance on the 1st day following any billing month will be considered delinquent and subject to fines and/or fees as stated above.

ARTICLE X
GOVERNANCE

A. **Binding Rules.** The rules of the Association, including the covenants, Articles of Incorporation, these Bylaws, and other Association rules and regulations, are binding on all members. The acceptance of an interest in title also constitutes an agreement that the Association governing documents and rules and regulations as they exist now and may be lawfully amended in the future are accepted by the member, for himself or herself as well as for all family members, guests and tenants.

B. **Construction.** Where any terms of the covenants and/or other rules are unclear, the Board of Directors shall have the right, power and authority to interpret the same by providing a meaning that is reasonable and fair, and advances the purpose of the Association and the collective interests of the members.

C. **Violations of Rules.** In addition to collection of assessments, it may from time to time be necessary for legal action to be brought in order to correct violations of TCC covenants and/or rules. Such actions may be brought by the Association itself, or, where the rule violated is a recorded restrictive covenant, any individual members. A corrective action may be brought at law or in equity, and may request relief in the form of injunction, remediation, foreclosure, damages and/or collection of assessments as defined at Article IX above, or any other relief authorized by law or in equity.

D. **Limitation on Actions Against the Board of Directors.** No legal action may be brought against the Board of Directors, its officers, employees, and agents, committee members and/or volunteers, for failure to enforce any provisions of the governing documents or rules and regulations under any circumstances; or for actions taken reasonably and in good faith regarding the approval or failure to approve building or other lot improvement plans.

E. **Acquiescence.** Each member is conclusively deemed to acquiesce to any Board or Association action by payment of assessments, by the use of the TCC facilities, or by other acceptance of any benefit of membership, after actual or constructive notice of any such action. Constructive notice includes notice of such actions by mail or electronic means to the member.

F. **Indemnification.** The Association may indemnify current or former directors or officers, or any other persons, pursuant to law.

G. Severability. If any provision of these bylaws is deemed illegal or without effect, the remaining provisions shall not be effected.

H. Non-Waiver. Failure of the Board of Directors to enforce any Association covenant, Article of Incorporation, Bylaw, or any other rule or regulation against any member shall not operate (1) to waive the right of the Association to enforce at any time the same rule or any other rule against the same or any other member; (2) to acquiesce in the future non-enforcement of the same or any other rule; or (3) as the abandonment of the right to enforce the same or any other rule. No member may rely on any such non-enforcement for any purpose.

I. Amendments. These Bylaws may be amended in the following manner only:

1. A proposed amendment must be first approved at a regular meeting of the Board of Directors.
2. A copy of the proposed amendment and a ballot shall be directed by mail to each member. The ballot shall include a "must be returned by" date not less than 30 or more than 60 days from the ballot meeting.
3. 50% plus one yes vote of the total number of votes cast by midnight of the last day for return as shown by the postmark on the envelopes shall be required for the amendment to pass.

ARTICLE XI
CERTIFICATION OF AMENDMENT

A. Certification. We, the president and secretary of TCC, certify that the above stated Bylaws were properly adopted according to all requirements as an amendment to the Bylaws of the Association as specified in Article II, Para D, Section 6).

B. Effective Date. The effective date of these amended Bylaws is the 1st day of July, 2006. All provisions of these amendments shall apply to all members and circumstances subject hereto immediately upon said date, except as otherwise prohibited by law.

By our signatures hereto, we so certify.

Karen L Moyer
Signature
President, Board of Directors

KAREN L. MOYER
Typed Name

6/27/06
Date

Charity B. Reid
Signature
Secretary, Board of Directors

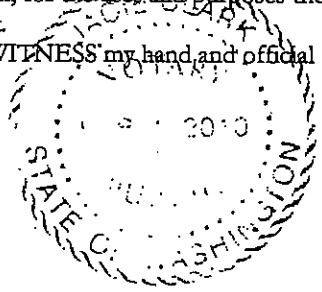
CHARITY B. REID
Typed Name

6/27/06
Date

STATE OF WASHINGTON)
) ss.
COUNTY OF MASON)

On this 27th day of June, 2006, personally appeared before me, Karen L. Moyer, personally known to me to be the President of Timberlake Community Club, the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that she is authorized to execute the said instrument.

WITNESS my hand and official seal affixed the day and year first above written.



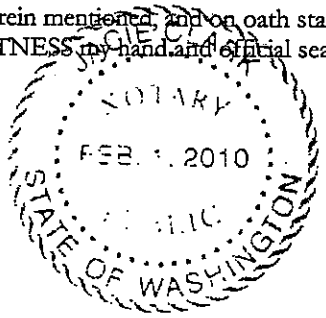
Jacie Clark

PRINT NAME: Jacie Clark
NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON, residing at Shelton
My commission expires: February 1, 2010

STATE OF WASHINGTON)
) ss.
COUNTY OF MASON)

On this 27th day of June, 2006, personally appeared before me, Charity B. Reid, personally known to me to be the Secretary of Timberlake, the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that she is authorized to execute the said instrument.

WITNESS my hand and official seal affixed the day and year first above written.



Jacie Clark

PRINT NAME: Jacie Clark
NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON, residing at Shelton
My commission expires: February 1, 2010

After Recording Return To:
Timberlake Community Club, Inc.
2880 East Timberlake West Drive
Shelton, Washington 98584-7936

DOCUMENT TITLE:	**WATER SYSTEM POLICY REGULATION 04-01**
REFERENCE NUMBERS OF RELATED DOCS:	**N/A**
GRANTORS:	**TIMBERLAKE COMMUNITY CLUB**
GRANTEES:	**Public-residents of the Timberlake community**
LEGAL DESCRIPTION:	**Timberlake Divisions 1 - 13**
ASSESSOR'S PROPERTY TAX PARCEL NO.	**Division 1 – 20018-50-00001 thru 22018-50-09162** **Division 2 – 22017-50-00001 thru 22017-50-00908** **Division 3 – 22018-51-00001 thru 22018-51-00902** **Division 4 – 22018-52-00001 thru 22018-52-00061** **Division 5 – 22018-53-00001 thru 22018-53-00903** **Division 6 – 22018-54-00001 thru 22018-54-00088** **Division 7 – 22017-50-00001 thru 22017-50-00104** **Division 8 – 22007-51-00001 thru 22007-51-90933** **Division 9 – 22017-51-00001 thru 22017-51-00169** **Division 10 – 22017-52-00001 thru 22017-52-00088** **Division 11 – 22017-53-00001 thru 22017-53-00900** **Division 12 – 22018-55-00001 thru 22018-55-00018** **Division 13 – 22008-50-00001 thru 22008-50-00900**

Timberlake Community Club

WATER SYSTEM POLICY
REGULATION 15-09

This Regulation supersedes 10-07 and prior water system policies.

The Timberlake Community Club, Inc., Board of Directors Finds as Follows:

1. Pursuant to the Articles of Incorporation, By-Laws and Conditions, Covenants, and Restrictions (C.C. & R.'s) the Board of Directors is responsible to install, own, operate and maintain a State approved water system; Articles of Incorporation par. III (2). The Timberlake Community Club Board of Directors is the Water Purveyor for the Homeowners Association and as Water Purveyor has obligations to the membership of Timberlake Community Club and to the State of Washington Department of Health. As Water Purveyor the Timberlake Community Club Board of Directors must meet the Department of Health

requirements in all things required by them in order to retain a valid system OPERATING PERMIT.

2. This Water Policy is intended to establish Rules, funding Guidelines and Enforcement Procedures that are fair and equitable for all concerned.

3. Recommended changes to this policy shall be submitted to the Timberlake Water Board (TWB) and approval will be by majority vote of both the TWB and the Timberlake Community Club Board of Directors (TBD).

A. GENERAL INFORMATION

1. New Construction: For any new construction the member must complete an application for water service to the Timberlake office prior to initiating construction. The applicant will be required to pay a non-refundable fee of $ 2,000.00. Owners of record prior to August 1, 1997 will be required to pay a non-refundable fee of $ 250.00.

2. The current property owner is responsible for advising Timberlake of a change of status, upgrade of lot, sale, etc.

3. All attachments to, repairs, disconnects or reconnects shall comply with the appropriate RCW's, WAC's, Uniform Plumbing Code and the Washington State Drinking Water Act.

4. Approved check valves or other back-flow prevention or cross-connection devices shall be installed on any connection as determined by the current, state approved Water System Plan and/or the Cross Connection Control Program and WAC 246-290-490.

5. Service line pipe size shall be no less than ½ inch diameter or greater than 1 inch diameter. A ¾ inch pipe is recommended.

6. Due to the requirements of the Cross Connection Control Regulation property owners **are advised** to install a private shutoff valve somewhere within two (2) feet of their Timberlake Water Box. Due to Cross Connection regulations, said shut off valves **shall not be** a waste and drain type valve. A ¾ inch gate valve is recommended.

7. No plumber or other person(s) are authorized to make connections with the Timberlake water mains or make alterations without prior approval of the Water Board Manager or the TBD. **Approvals must be confirmed in writing.**

8. Water line breaks caused by contractors, repairmen, property owners, or anyone not associated with Timberlake Water shall be charged to the property owner at the rate of $ 250.00 plus appropriate charges for labor and materials.

9. The water may be turned off at anytime without notice for repairs and other necessary purposes. Timberlake will make every effort to notify affected lot owners or residents of **anticipated** water shut off, whenever possible.

10. Timberlake will not be responsible for the safety of fixtures on any lot.

11. Employees of Timberlake, or their designated representative(s), shall have access to all property supplied by Timberlake water within Timberlake utility easements as specified in C.C. & R.'s for the purpose of inspecting the conditions of outside pipes and faucets and in the manner in which the water is used. (Note: Washington State Regulation WAC 246-290-490 requires water conservation and the prevention of wasteful practices.

12. Each meter box shall be kept clear and visible to provide easy access to Timberlake employees. Any person not keeping the service valve clear will be charged an hourly labor fee if Timberlake employees are required to clear away any debris, dirt, landscaping, fence, etc. to reach the valve. The hourly rate will equal 200% of the current hourly water operator/manager pay scale.

13. No service connections shall be permitted to any lot from any other source.

B: PENALTIES

1. Property owners are reminded that, as stated in C.C. & R.s, any violation of any Timberlake Governing Documents results in loss of their Membership in good standing status and water lock-out. Violation of any of the terms of this Regulation will also cause loss of Membership in good standing status and result in water shut-off.

   a. Upon loss of membership in good stand status the water will be locked-out (disconnected) and a Water Disconnect/Reconnect Fee will be charged. The fee will only be charged once and will cover both lock-out and reconnection.
   b. Payment of fees will only be accepted at the Timberlake office. Water and maintenance personnel will not accept payments.
   c. Water will not be reconnected unless the reason for loss of membership in good standing has been corrected. If the disconnect occurred because of delinquency the account must be made current or acceptable payment arrangements made before the water will be reconnected. If the disconnect occurred because of covenant, rules or regulation violations the condition must be corrected prior to the water being reconnected.
   d. if the conditions listed in c above are met and payment is received by 10:00 am on any regular business day, water reconnection will be made by 2:00 pm of the day payment is received in the office.
   e. If a member has an urgent and valid reason, such as health concerns, that they must have water, the reconnection may take place on hours other than those regularly scheduled. This will be done only when the need is urgent and an additional reconnection fee of $60 will be charged the member.
   f. If membership in good standing status is lost and the event causing the loss is not corrected a lien will be assessed against the member's property. The fees for recording the lien as well as the release of lien will be assessed at the time the lien is recorded. The cost of recording the lien and the release of lien will vary depending on what the Auditor's Office charges to record the lien.
   g. The last step of this process is to turn the problem over to the attorney for suit to ensure compliance. Attorney fees are added back to the member's accounts.

2. If the owner feels that there is a valid reason for waiving the re-connection fee, the fee must be paid and the owner may petition the Board of Directors for a refund or credit t be applied to the balance on the account.

3. A fee of $ 100.00 will be assessed to lot owners for any unauthorized reconnects.

4. Any tampering to Timberlake Community Club water meters, setters, or locks caused by an illegal connection or by removing a lock from a meter will be charged back to the member. Charges will include the cost of the equipment and the labor time to replace the damaged equipment. In addition, the member will be assessed a $300 fine for the intentional tampering of Timberlake property. This will be in addition to any other fines assessed.

5. Any failure to comply with this regulation shall result in a fine of $ 50.00, loss of "Member-in-Good-Standing" status, plus cost of time and material that Timberlake provides.

6. Provisions of this policy, fines and other penalties may be appealed to the Timberlake Board of Directors (TBD). The TBD will provide a fair hearing process to decide any questions presented.

C: SUMMARY OF CHARGES

New Construction Fee - $ 250.00 or $ 2,000.00 as applicable, see paragraph A.1.
Shut off and Re-connection Fee - $ 50.00 each ($100 charged at the time of lock-out – no additional charge when the water is reconnected)
Unauthorized Re-Connect - $ 100.00
Off-hours Reconnect - $60.00
Tampering with Timberlake property – cost of replacement equipment, cost of labor to repair/replace and $300 fine
Lien Fee/Release of Lien: Charged at the time the lien is recorded (charge will vary depending on Auditor's fee for recording)
Attorney Fees: Vary depending on severity of situation and time attorney is required to spend on the case

D: WATER SYSTEM OPERATING PLAN

1. This policy will establish a Timberlake Water Board (TWB). The TWB will have a minimum of three (3) to a maximum of five (5) members. Each member will serve two year, overlapping terms. This will provide the required continuity. The TWB will have responsibility for disciplines in the following areas: Regulation Management, Engineering, Finance and Maintenance.

2. It will be the responsibility of the Water Board Manager (a member of the TBD) to nominate candidates for positions on the TWB. Approval of TWB positions shall take a majority vote of the TBD.

3. Should there not be adequate volunteers in the community that are qualified and willing to serve, the TBD shall entertain compensation for TWB members in an effort to fill these positions. The use of Satellite Management Organization is not precluded nor are negotiations with a PUD. Associated costs will be reflected in the TWB budget proposal.

4. The Water Board Manager will be appointed by the TBT. The Water Board Manager shall be a member of the TBD.

5. The TWB will operate independent of the TBD but will be responsible to the TBD for the everyday operation of the water system.

6. The purpose of the TWB will be to conduct all business regarding the Timberlake Water System. This will include but is not limited to, system maintenance, required improvements, finances, and budgetary and rate forecasts. Water rates will be based on a six (6) year forecast of the upgrade and maintenance requirements.

E. SEVERABILITY

If any provision of this policy or their application to any person or circumstance is held invalid, the remainder of the policy, or the application of the provision to other persons or circumstance, shall not be affected.

F. EFFECTIVE DATE

This policy shall take effect 30 days after distribution and passage.

THIS WATER POLICY IS IN ADDITION TO OTHER EXISTING WATER USE REGULATIONS AND RESOLUTIONS.

This policy which was duly enacted by the Timberlake Community Club Board of Directors, pursuant to the By-Laws and other Lawful authorities, on the 26th day of September, 2015

Colleeen Raitt, President

Cathie Robertson, Vice- President

TIMBERLAKE COMMUNITY CLUB

WATER DEPARTMENT EMERGENCY RESPONSE PLAN

TIMBERLAKE COMMUNITY CLUB
2880 E Timberlake W Drive
Shelton, WA 98584
360-427-8928
360-427-1755 (fax)
timberlakewater@hctc.com

WATER DEPARTMENT EMERGENCY RESPONSE PLAN

Section 1. Emergency Response Mission and Goals

MISSION STATEMENT FOR EMERGENCY RESPONSE	IN AN EMERGENCY, THE MISSION OF THE TIMBERLAKE COMMUNITY CLUB WATER SYSTEM IS TO PROTECT THE HEALTH OF OUR CUSTOMERS BY BEING PREPARED TO RESPOND IMMEDIATELY TO A VARIETY OF EVENTS THAT MAY RESULT IN CONTAMINATION OF THE WATER OR DISRUPTION OF SUPPLYING WATER
Goal 1	Be able to quickly identify an emergency and initiate timely and effective response action.
Goal 2	Be able to quickly notify local, state, and federal agencies to assist in the response.
Goal 3	Protect public health by being able to quickly determine if the water is not safe to drink or use and being able to advise them of appropriate protective action.
Goal 4	To be able to quickly respond and repair damages to minimize system down time.

Section 2. System Information

SYSTEM IDENTIFICATION NUMBER	88370Y
System name and address	Timberlake Community Club 2880 E Timberlake W Drive Shelton, WA 98584-7924
Directions to the system	From Shelton proceed 6 miles north on State Route 3, turn right onto Agate Road, proceed 3.7 miles to stop sign, turn left on Agate Road and proceed 1.6 miles, turn left onto Timberlake Drive East, proceed approximately .5 miles (3rd left) turn left on Timberlake Drive West. The office and water system facilities are on the left.
Basic description and location of system facilities	The Timberlake Community Club water system consists of two storage reservoirs, a 60,000 gallon covered concrete reservoir and a 200,000 steel reservoir. Three groundwater wells of 335', 365', and 400'. One of the wells is used as a back-up source. The wells in operation pump to a central treatment facility consisting of an onsite hypochlorite generating system, pressure vessel filtration, triplex booster pump station and electronic control systems. The finished water transfers into the storage reservoirs. The water transfers from the reservoirs to the booster pump station which feeds the distribution system. The wells, pump station and reservoirs are located at 2880 E Timberlake West Drive, Shelton, WA.
Location/Town	2880 E Timberlake W Drive Shelton, WA 98584-7924
Population served and service connections from Division of Drinking Water records	Population: 2035 people Service Connections: 814 connections
System owner	Timberlake Community Club Home Owners Association Lead Contact: Arthur Bushey

NAME, TITLE AND PHONE NUMBER OF PERSON RESPONSIBLE FOR MAINTAINING AND IMPLEMENTING THE EMERGENCY PLAN.	ARTHUR BUSHEY WATER SYSTEM OPERATOR TIMBERLAKE COMMUNITY CLUB WDM 2, CCS PHONE: 360-427-8928 CELL: 360-490-4037 PAGER: 360-463-0664

Section 3. Chain of Command – Lines of Authority

NAME & TITLE	RESPONSIBILITIES DURING AN EMERGENCY	CONTACT NUMBERS
Arthur Bushey WDM 2, CCS Water system operator	Responsible for overall management and decision making for the water system. The Operations Manager is the lead for managing the emergency, providing information to regulatory agencies, the public and news media. All communications to external parties are to be approved by the Operations Manager and the President of the Timberlake Board of Directors	Phone: 360-427-8928 Cell: 360-490-4037 Pager: 360-463-0664
Larry Dearman Maintenance Lead WDM 1	Assists Operations Manager in operating the water system, performing inspections, maintenance and sampling and relaying critical information, assessing facilities, and providing recommendations to the Operations Manager.	Phone: 360-427-8928 Home: 360-427-6457 Pager: 360-401-2454
Water Maintenance	Assists Operations Manager, running water treatment facility, performing inspections, maintenance, sampling, relaying critical information, assessing facilities and providing recommendations to the maintenance lead and Operations Manager.	Phone: 360-427-8928 Home: 360-427-3913 Pager: 360-463-6938
Susan Dolittle Member Services Manager	Responsible for administration functions in the office including receiving phone calls and keeping a log of events. This person will provide a standard, carefully pre-scripted message to those who call with general questions. Additional information will be released through the Operations Manager.	Phone: 360-427-8928 Fax: 360-427-1755

Section 4. Events that Cause Emergencies

The events listed below may cause water system emergencies. They are arranged from highest to lowest probable risk.

TYPE OF EVENT	PROBABILITY OF RISK (HIG-MED-LOW)	COMMENTS
Earthquake	High	Had minimal earthquake damages in February 2001 quake
High winds	High	System is vulnerable to high wind events. Power is disrupted. Must maintain adequate fuel on hand for back-up generator.
Ice Storm	Medium	Minor damage caused in December 1996. Extended power outage and temporary road closures.
Construction accident	Medium	Construction crews often hit pipes.
Waterborne Diseases	Medium	Distribution system contamination as a result of back siphonage due to main breaks, repairs or loss of pressure.
Vandalism	Low	Facilities are fenced, locked, well lit and secured.
Chemical Spill	Low	Residential area only; no commercial activity or major roads in wellhead protection area.
System neglect	Low	Major components replaced 2002 to 2004 and regular maintenance is done on vulnerable equipment.
Cross Connection	Low	Residential area only; no commercial activity.
Flood	Low	System not located in an area vulnerable to flooding. Have two locations where main line could be exposed or broken.
Drought	Low	Need to increase frequency of well draw

TYPE OF EVENT	PROBABILITY OF RISK (HIG-MED-LOW)	COMMENTS
		down monitoring during extended drought conditions.
Terrorism	Low	Rural location; vandalism more likely.

Section 5. Severity of Emergencies

Decisions on severity should be collaborative among system personnel, but are ultimately made by the person in charge of the emergency. The information for making such a decision will accumulate over time, and may result in changes in the assessment of severity.

Communicate each assessment of severity immediately to all those dealing with the emergency. Make sure staff has cell phones, pagers, or radios when they are in the field.

Level I – Normal (Routine) Emergency:

DESCRIPTION: THE TIMBERLAKE COMMUNITY CLUB WATER SYSTEM CONSIDERS THE FOLLOWING AS LEVEL I EMERGENCIES:

- DISTRIBUTION LINE BREAKS.
- SERVICE LINE BREAKS.
- SHORT POWER OUTAGES.
- MINOR MECHANICAL PROBLEMS IN PUMP-HOUSES.
- OTHER MINOR SITUATIONS WHERE IT IS NOT LIKELY THAT PUBLIC HEALTH WILL BE JEOPARDIZED.

THE SYSTEM HAS SPECIFIC RESPONSE ACTIVITIES IDENTIFIED FOR THESE TYPES OF EMERGENCIES, INCLUDING PROPER SAMPLING, DISINFECTION, AND PRESSURE TESTING ACTIVITIES. SYSTEM PERSONNEL ARE ADVISED AND ARE DIRECTED TO WORK ON THE PROBLEM AND ARE USUALLY CAPABLE OF RESOLVING THE PROBLEM WITHIN 24 HOURS. IT IF IS DETERMINED THAT THE PROBLEM WILL TAKE LONGER THAN 24 HOURS TO RESOLVE AND STORAGE IS LIKELY TO BE DRAWN DOWN BELOW A SAFE OPERATING LEVEL, THE SITUATION WILL BE ELEVATED TO LEVEL II.

Level II – Minor Emergency (Alert Status):

Description: The Timberlake Community Club water system considers the following to be Level II emergencies:

- Disruption in supply such as a transmission main line break, pump failure with a potential for backflow, and loss of pressure.
- Storage is not adequate to handle disruption in supply.
- An initial positive coliform or E. coli sample.
- An initial primary chemical contaminant sample.
- A disruption in chlorine/chemical feed for the groundwater sources.
- A minor act of vandalism.
- Drought, with a noticeable and continuing decline of water level in the well

Level III – Significant Emergency:

DESCRIPTION: THE TIMBERLAKE COMMUNITY CLUB WATER SYSTEM CONSIDERS THE FOLLOWING AS LEVEL III OR ACTUAL EMERGENCIES:

- A VERIFIED ACUTE CONFIRMED COLIFORM MCL OR E. COLI/FECAL POSITIVE SAMPLE REQUIRING IMMEDIATE CONSIDERATION OF A HEALTH ADVISORY NOTICE TO CUSTOMERS.
- A CONFIRMED SAMPLE OF ANOTHER PRIMARY CONTAMINANT REQUIRING IMMEDIATE CONSIDERATION OF A HEALTH ADVISORY NOTICE TO CUSTOMERS.
- A LOSS OR COMPLETE MALFUNCTION OF THE WATER TREATMENT FACILITIES FOR THE GROUND WATER SOURCE, INCLUDING CHLORINATION.
- A MAJOR LINE BREAK OR OTHER SYSTEM FAILURE RESULTING IN A WATER SHORTAGE OR REQUIRING SYSTEM SHUTDOWN.
- AN ACT OF VANDALISM OR TERRORIST THREAT SUCH AS INTRUSION OR DAMAGE TO A PRIMARY FACILITY.
- SEVERE DROUGHT SIGNIFICANTLY AFFECTING WELL YIELD.
- AN IMMEDIATE THREAT TO PUBLIC HEALTH OF THE CUSTOMERS AND AN ADVISORY IS REQUIRED.

Level IV – Catastrophic Disaster/Major Emergency:

DESCRIPTION: THE TIMBERLAKE COMMUNITY CLUB WATER SYSTEM CONSIDERS THE FOLLOWING EVENTS TO BE LEVEL IV OR MAJOR EMERGENCIES:

- EARTHQUAKE THAT SHUTS DOWN THE SYSTEM OR IMPACTS SOURCES, LINES, ETC.
- ACT OF TERRORISM POSSIBLE CONTAMINATING THE WATER SYSTEM WITH BIOLOGICAL OR CHEMICAL AGENTS.
- FLOOD THAT INFILTRATES SYSTEM FACILITIES AND SOURCES.
- CHEMICAL SPILL WITHIN 2000 FEET OF THE SYSTEM'S SOURCES.
- MUDSLIDE OR OTHER EARTH SHIFT THAT CAUSES FAILURE OF TRANSMISSION OR LOSS OF WATER IN WELL.
- STORM THAT SIGNIFICANTLY DAMAGES POWER GRID AND SYSTEM FACILITIES.

Section 6. Emergency Notification

Notification call-up lists

Use these lists for notifying important parties during an emergency.

Local Notification List:

NAME	TELEPHONE NUMBER
Mason County Sheriff	Dispatch: 360-427-9670, Ext. 313 Emergency: 911 Night: 911
Mason County Fire District 5	360-426-5533 Emergency: 911 Night: 911
Ambulance Service	Day: 911 Night: 911
Mason County Health Services:	360-427-9670, Ext. 352 24 Hour Emergency: 360-427-9670, Ext. 274
Mason County Emergency Management	Day: 360-427-7535 After Hours: 911
Water System Operator	Day : 360-427-8928 Page: 360-463-6938 cell 360- 490-4037 On call Water System Operator Pager: 360-463-0664

State Notification List:

NAME	TELEPHONE NUMBER
Washington State Patrol	360-426-6674 – Shelton Office Emergency: 911
Division of Drinking Water, Southwest Regional Office 360-236-3030	360-236-3030 Division of Drinking Water after hours (emergency only) 1-877-481-4901
Washington State Public Health Laboratory	206-418-5400
Washington State Department of Ecology	24 hour spill response: 360-407-6300

Service/repair notification list

NAME	TELEPHONE NUMBER
Bainbridge Island Electric Ron Lubovich, Office	206-842-4200 Cell: 206-714-6136
PUD #3 Electric Utility	Day: 360-426-8255 Night: 360-426-8255
Hypochlorite Generation and Injection System	TMG Services:253-779-4160 ATEC Filtration System: 360-901-4533
PACO Pump Specialist	Day: 206-433-2600 Night: 206-730-0539
Lydel Construction, Inc. Todd Smith, Excavation and main replacement	Day: 360-598-4741 Night: 206-930-1628
Well Pumps Day Chad Gresham, Gresham Well Drilling	Day: 360-779-9323 Night: 360-340-4965

ELECTRONIC CONTROL SYSTEM **SYSTEMS INTERFACE INC,** **TERRY LARSON**	DAY : 425-481-1225 CELL: 425-260-1477
Onan Backup Generator **Cummins Northwest, Inc.**	1-800-451-5506 Cell: 360-269-5787
Water Manager Backup Operator, **Drew Noble** **H2O Water Management**	360-463-6189 360-427-0654
Robinson, Noble & SaltBush, **Hydrogeologist**	206-842-4443 253-475-7711

Section 7. Notification Procedures

Notifying water system customers

WHO IS RESPONSIBLE:	ARTHUR BUSHEY, WATER SYSTEM OPERATOR
Procedures:	Refer to specific procedure for individual events, Section 7, Pages 14-16

Alerting, local law enforcement, state drinking water officials, and local health

WHO IS RESPONSIBLE:	**ARTHUR BUSHEY, WATER SYSTEM OPERATOR**
Procedures:	Refer to Section 6 Emergency Notification List pages 10 & 11 – notify parties as required for situation.

Contacting service and repair contractors

WHO IS RESPONSIBLE:	ARTHUR BUSHEY, WATER SYSTEM OPERATOR
Procedures:	Refer to Section 6 Emergency Notification list, Page 11-12 Dependent on services needed.

Contact neighboring water systems, as necessary

WHO IS RESPONSIBLE:	ARTHUR BUSHEY, WATER SYSTEM OPERATOR
Procedures:	Contact Shorecrest Water, 360-426-0773

Procedures for issuing a health advisory

WHO IS RESPONSIBLE:	ARTHUR BUSHEY, WATER SYSTEM OPERATOR
Procedures:	▪ Operations Manager confers with key staff to verify problems. ▪ Water System manager organizes staff to develop the message to be delivered to the customers. ▪ Operations Manager consults with state drinking water staff regarding the problem. ▪ Operations Manager with assistance with staff prepares door hangers, signs and radio message. ▪ Water system operator continues to investigate problem and make repairs as necessary. ▪ The health advisory notification will be distributed by: 1. Field staff placing "health advisory notices" on doors and along travel routes 2. Post notice on reader board at entrance to community. 3. Staff will place signs on main travel routes into the community. 4. Water system manager contacts KMAS am radio and requests issuance of the water health advisory notice. 5. Member Services Manager will provide a pre-scripted message to phone callers and log in each phone call. ▪ Once contamination is resolved, notify customers.

Procedures for notifying system customers of water outage due to main breaks.

WHO IS RESPONSIBLE:	ARTHUR BUSHEY, WATER SYSTEM OPERATOR
Procedures:	▪ Operations Manager confers with key staff to verify problems. ▪ Operations Manager consults with state drinking water staff regarding the problem (if repairs will take longer than six hours). ▪ Water System manager organizes staff to develop the message to be delivered to the customers.

WHO IS RESPONSIBLE:	ARTHUR BUSHEY, WATER SYSTEM OPERATOR
	▪ Operations Manager with assistance of staff prepares door hangers to distribute to the affected areas. ▪ Water system operator continues to investigate problem and make repairs as necessary. ▪ The water outage notification will be distributed by: 1. Field staff placing "water outage notifications" on doors. 2. Post notice on reader board at entrance to community. 3. Member Services Manager will provide a pre-scripted message to phone callers and log in each phone call. ▪ Water system personnel continuously update the Operations Manager on water outage and repair status. ▪ Once water outage is resolved, notify customers.

Procedures for notifying system customers of potential water shortage

WHO IS RESPONSIBLE:	ARTHUR BUSHEY, WATER SYSTEM OPERATOR
Procedures:	▪ Operations Manager confers with key staff to verify problems. ▪ Operations Manager consults with state drinking water staff regarding the problem. ▪ Water System manager organizes staff to develop the message to be delivered to the customers. ▪ Operations Manager with assistance of staff prepares door hangers to distribute to the affected areas. ▪ Water system operator continues to investigate problem and make repairs as necessary. ▪ The water shortage notification will be distributed by: 1. Field staff placing "water shortage notices" on doors and along travel routes 2. Post notice on reader board at entrance to community. 3. Staff will place signs on main travel routes into the community. 4. Water system manager contacts KMAS am radio and request issuance of the water shortage notice and request to curtail water use.

WHO IS RESPONSIBLE:	ARTHUR BUSHEY, WATER SYSTEM OPERATOR
	5. Member Services Manager will provide a pre-scripted message to phone callers and log in each phone call. ▪ Water system personnel continuously update the Operations Manager on water outage and repair status. ▪ Once water shortage is resolved, notify customers.

Section 8. Water Quality Sampling

If contamination is suspected, notify and work with the local health jurisdiction and Sate DOH, Division of Drinking Water (DDW) regional office to help identify what testing should be done. This may help prevent illness or even death.

Water Quality Sampling

SAMPLING PARAMETER	DO WE HAVE PROCEDURES? YES/NO	BASIC STEPS TO CONDUCT SAMPLING (SITES, FREQUENCY, PROCEDURES, LAB REQUIREMENTS, LAB LOCATIONS, CONTACT, ETC.)
Coliform Bacteria	**Yes**	Refer to Coliform Monitoring, Plan Take samples of affected sites, wells and reservoirs. Take samples to Thurston County Health Laboratory
Hetertrophic Plate Count (HPC)	**No**	Contact Lab Management for sample containers and procedures
Chlorine Residual	**Yes**	Check residual at outlet to distribution system. Compare to affected areas.
Chlorine Demand	**Yes**	Monitor for increase in coverage at plant. Compare to residual in affected areas.
Nitrate/Nitrite	**Yes**	Sample at well head sample tap of wells in operation. Acquire sample bottles at Arcadia Well Drilling – take to Lab Management.
Total Organic Carbon (TOC)	**No**	Contact Lab Management for sample containers and procedures
Total Halogenated Organic Carbon (TOX)	**No**	Contact Lab Management for sample containers and procedures
Cyanide	**No**	Contact Lab Management for sample containers and procedures

Section 9. Effective Communication

Communication with customers, the news media, and the general public is a critical part of emergency response.

Designated public spokesperson

SPOKESPERSON	ALTERNATE 1	ALTERNATE 2
Arthur Bushey	**Linda Sage, Water Director**	**Timberlake Board of Directors President**

Key Messages

MESSAGE #1 – WATER CURTAILMENT

TIMBERLAKE WATER PRODUCTION CAPABILITIES HAVE BEEN REDUCED DUE TO (FILL IN REASON). THE REPAIRS TO THE (STATE AFFECTED SYSTEMS) ARE EXPECTED TO BE COMPLETED BY (DATE).

IN AN EFFORT TO SUPPLY ESSENTIAL WATER SERVICE A WATER USE RESTRICTION IS CURRENTLY IN PLACE. ALL OUTDOOR WATER USE SUCH AS IRRIGATION, CAR WASHING, POOLS AND CLEANING IS PROHIBITED. PLEASE LIMIT INDOOR USE. SHOWER WHEN POSSIBLE RATHER THAN BATHE, LIMIT LAUNDRY USE AND FLUSH TOILETS ONLY AS NEEDED.

YOU WILL BE NOTIFIED WHEN THE PROBLEM IS RESOLVED.

MESSAGE #2

DRINKING WATER WARNING

THE TIMBERLAKE COMMUNITY CLUB WATER SYSTEM, ID 88370Y, LOCATED IN MASON COUNTY IS CONTAMINATED WITH FECAL COLIFORM/E.COLI BACTERIA.

FECAL COLIFORM/E.COLI BACTERIA WERE DETECTED/CONFIRMED IN THE WATER SUPPLY ON (DATE). THESE BACTERIA CAN MAKE YOU SICK AND ARE A PARTICULAR CONCERN FOR PEOPLE WITH WEAKENED IMMUNE SYSTEMS.

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. BRING ALL WATER TO A ROILING BOIL FOR ONE MINUTE. LET IT COOL BEFORE USING.

BOILED OR PURCHASED BOTTLED WATER SHOULD BE USED FOR DRINKING, MAKING ICE, BRUSHING TEETH, WASHING DISHES, AND FOOD PREPARATION UNTIL ***FURTHER NOTICE.*** BOILING KILLS BACTERIA AND OTHER ORGANISMS IN THE WATER.

FECAL COLIFORMS AND E.COLI ARE BACTERIA WHOSE PRESENCE INDICATES THAT THE WATER MAY BE CONTAMINATED WITH HUMAN OR ANIMAL WASTES. MICROBES IN THESE WASTES CAN CAUSE SHORT TERM EFFECTS, SUCH AS DIARRHEA, CRAMPS, NAUSEA, HEADACHES, OR OTHER SYMPTOMS. THEY MAY POSE A SPECIAL HEALTH RISK FOR INFANTS, YOUNG CHILDREN, SOME OF THE ELDERLY, AND PEOPLE WITH SEVERELY COMPROMISED IMMUNE SYSTEMS. ***THE SYMPTOMS ABOVE ARE NOT CAUSED ONLY BY ORGANISMS IN DRINKING WATER. IF YOU EXPERIENCE ANY OF THESE SYMPTOMS AND THEY PERSIST YOU MAY WANT TO SEEK MEDICAL ADVICE. PEOPLE AT INCREASED RISK SHOULD SEEK ADVICE ABOUT DRINKING WATER FROM THEIR HEALTH CARE PROVIDER.***

WHAT HAPPENED? WHAT IS THE SUSPECTED OR KNOWN SOURCE OF CONTAMINATION? (FILL IN WITH CORRECT INFORMATION)

THE FOLLOWING IS BEING DONE TO CORRECT THE PROBLEM. (FILL IN WITH APPROPRIATE INFORMATION).

Section 10. Response Actions for Specific Events

In any event there are a series of general steps to take:

1. Confirm and analyze the type and severity of the emergency
2. Take immediate action to save lives.
3. Take action to reduce injuries and system damage.
4. Make repairs based on priority demand.
5. Return the system to normal operation.

The following tables identify the assessment, set forth immediate response actions, define what notifications need to be made, and describe important follow-up actions.

A. Power outage

ASSESSMENT	THE WATER SYSTEM HAS A BACKUP GENERATOR AND AN 8 DAY FUEL SUPPLY – CHECK WITH PUD #3 FOR ESTIMATED DATE OF REPAIRS
Immediate Actions	Check fuel levels, order diesel if tanks are at or below half full. Connect other generator to office building.
Notifications	Notify Fire Department that maximum flow is not available. Flow at hydrants limited to 800 GPM
Follow-up actions	Top off generator fuel. Notify Fire Department that flow at hydrants normal.

B. Transmission or main break

ASSESSMENT	CONFER WITH STAFF ON LOCATION, MAIN SIZE, AND REPAIR COMPONENTS AND EQUIPMENT NEEDED FOR REPAIR.
Immediate Actions	Reduce flow by throttling valves, maintain positive pressure until excavation and drainage completed for repair. Make repair.
Notifications	See Notification Procedure for Main break. Section 7; Page 14-16. Notify Fire Department if hydrants are shut down
Follow-up actions	Flush and test affected main. Resume services. Notify Fire Department.

C. Chlorine treatment equipment failure.

ASSESSMENT	DETERMINE FAILED COMPONENT – REFER TO SYSTEM O & M FOR SPECIFIC COMPONENT.
Immediate Actions	Hypochlorite generation cell failure: Remove and replace with back-up cell. Brine pump: rebuild pump head – rebuild kits are kept in inventory. Control system: Check fuses and replace as needed. Control Board failure: contact TMG Services. Purchase hypochlorite in quantities sufficient to complete repairs. 6 gallons per day winter, 10 gallons per day summer. Injection pumps: rebuild pump heads – rebuild kits are kept in inventory. Injection pump control unit failure: put in hand mode, monitor residual to determine feed rate. Contact TMG Services for replacement. Residual analyzers for pump control unit. Reboot if unit is still malfunctioning, contact TMG Services for repair. Put in hand mode
Notifications	Contact DOH if residual drops below .2PPM – notify customer – Drinking Water Advisory
Follow-up actions	Contact DOH system normal. Notify customer.

D. Filter Failure:

ASSESSMENT	DETERMINE FAILED COMPONENT – REFER TO O & M MANUAL FOR ATEC FILTRATION SYSTEM.
Immediate Actions	Shut down wells if storage is adequate. Control Board Failure: Replace board with back up board (have spare on hand) Pneumatic Control Failure: Check and/or replace compressor or failed lines. Clayvalve Control Failure: Check solenoids – replace as needed. Check control unit – if control unit off turn off automatic back flush – manually back flush filter as needed until repaired. Contact Clayvalve for replacement.
Notifications	Filter is for removal of iron and manganese only. No threat to health. Notify Board of Directors.
Follow-up actions	Monitor filters operation after repair. Perform on site tests for iron and manganese removal.

E. Source (Well) Pump Failure:

ASSESSMENT	CHECK SYSTEM CONTROL PANEL, SOFT STARTS, AND ERROR CODES FOR CAUSE. SEE O & M MANUALS.
Immediate Actions	Determine cause of failure, put back up well on line if needed. Determine which component has failed. Contact appropriate repair contact for repair. Decontaminate well and test as needed before putting back online. Determine if water restriction notice is needed.
Notifications	Notify customers and Fire Department if water shortage is anticipated. Contact DOH with assessment.
Follow-up actions	Remove water use restriction; notify customers, Fire Department and DOH.

F. Microbial (coliform, E. coli) contamination

ASSESSMENT	UPON RECEIPT OF A TOTAL COLIFORM POSITIVE SAMPLE, DETERMINE BY RESAMPLING IF CONTAMINATION IS LOCALIZED OR SYSTEM-WISE.
Immediate Actions	Timberlake samples two locations monthly for bacteriological contamination at opposite ends of the distribution system. (Refer to Coliform Monitoring Plan). If both samples test positive for total coliform a total of six repeat samples will be collected per the Coliform Monitoring Plans, repeat sample locations within 24 hours of notification. At least one additional sample will be taken at the sample tap at the entry to the distribution system. If any of the repeat samples detect coliform bacteria, the initial findings are considered confirmed. An inspection of all system facilities will be done to determine the source of contamination. Contact the WSDOH for assistance upon confirmation of an E.coli positive sample and issue a health advisory within 24 hours to alert all users that there is a health risk associated with the water supply. Take additional samples to find and eliminate potential contamination sources. See appendix B for coliform information. Make necessary repairs, disinfect and flush system. Take follow-up samples to confirm removal of contamination in all affected areas.
Notifications	Notify WSDOH Drinking Water Division of potential contamination. Issue Health Advisory/Boil Water Notice to all customers. Notify local news media and other areas, i.e. Olympia, KOMO news, etc. of health advisory. See Appendix B for notification and news release.
Follow-up actions	The Operations Manager with assistance from staff will confirm satisfactory follow up samples. Confer with DOH on satisfactory samples and ability to deliver safe water. Notify customers of satisfactory sample results and issue a Safe To Drink the Water Notification. Notify news media that the health advisory has been lifted. Put information regarding contamination and remediation in annual Consumer Confidence Report. See appendix B for notification and reporting requirements

G. Chemical contamination

ASSESSMENT	DETERMINE SOURCE OF CONTAMINATION IF POSSIBLE AND EFFECTED AREAS OF SYSTEM.
Immediate Actions	Contact DOH for assistance. Remove source of contamination if possible
Notifications	Notify customers of hazard based on contaminates and hazard level.
Follow-up actions	Disinfect, flush, test effected systems, and verify results of test. Confer with DOH on system status. Notify customers.

H. Vandalism or terrorist attack

ASSESSMENT	INSPECT THE FACILITIES BUT DO NOT DISTURB ANY EVIDENCE. TAKE ANY SUSPICIOUS ACTIVITY OR EVIDENCE OF VANDALISM OR SABOTAGE SERIOUSLY. DOCUMENT WHAT YOU SEE AND KEEP NOTES AS YOU ASSESS THE SITUATION. DETERMINE WHETHER THERE IS BIOLOGICAL OR CHEMICAL CONTAMINATION, OR DAMAGE TO SYSTEM COMPONENTS THAT DISRUPTS SUPPLY.
Immediate Actions	Notify Operations Manager immediately. Operations Manager will assess situation and notify the Board of Directors. Call DOH regional office at 360-236-3030. Contact Mason County Sheriff Department. Consult with Sheriff Department to determine whether the threat is credible. If there is strong evidence of sabotage or terrorist activity call the FBI at 206-622-0460. Consult with DOH to determine immediate actions needed to protect the public health. Isolate affected areas, shut down critical facilities and issue boil water or do not drink advisories. If contamination is suspected, sample for coliform, chlorine residual, nitrate or nitrite. Collect samples for future analysis and store them appropriately according to specific sample requirements. Assemble a response team with expertise in the areas needed to resolve the situation. Designate a response coordinator. Develop a communication strategy and communicate with affected people regularly. If appropriate, drain, clean, repair and disinfect the system. Contact alternative drinking water supplier if needed. Make necessary repairs to affected equipment.

Notifications	Operations Manager, Board of Directors Mason County Sheriff Department FBI if needed WSDOH Drinking Water Division if contamination is suspected. Customers if there is a potential health threat or water use restriction necessary. KMAS and the Shelton Journal as needed.
Follow-up actions	Operations Manager with support of response team coordinator determines system condition, satisfactory test results and system's capability to provide safe and adequate water to customers. Coordinate with Department of Health on system condition and water quality results for recommendation to resume normal operations. Notify customers when situation is normal.

I. Reduction or loss of water in the well

ASSESSMENT	DETERMINE IF DIMINISHED WATER PRODUCTION IS DUE TO PHYSICAL LOSS OF WATER, WELL PUMP OR WELL SCREEN ISSUES.
Immediate Actions	Check static well water level and compare to records. Perform draw down test and recovery test. Calculate gallons per foot. Check amp draw of well pump if static and draw down are acceptable. If the pump is failing contact Gresham Well. If static level of well is ok, but draw down and recovery are not contact Robinson, Noble & SaltBush at 206-842-4443 or 253-475-7711. They are the hydrogeologists for assessment. If static water level is below normal check static levels in the other 2 wells and compare to records. If all wells static levels are down, contact Robinson, Noble & SaltBush. Issue water use restriction notice. If water production problem is limited to one well bring back up well on line and curtail use of problem well until repairs or reconditioning of well is completed.

Notifications	Notify DOH if water production decline will affect the system ability to supply customers or affect fire flow capabilities. Notify customers if a water use restriction becomes necessary. Notify Fire Department if fire flow will be affected.
Follow-up actions	Disinfect, flush and take bacteriological samples for testing if well required pump replacement or screen rehabilitation. If test satisfactory put well back in service. Notify customers, Fire Department and DOH that system is back to normal.

J. Drought

ASSESSMENT	THE WELLS ARE ALL OVER 300 FEET DEEP AND HAVE NEVER BEEN AFFECTED BY DRY SUMMER CONDITIONS. STATIC WATER LEVELS ARE ALL THE SAME AS THEY WERE WHEN INITIALLY DRILLED.
Immediate Actions	If a prolonged, severe, drought condition exists increase frequency of well draw down test. If static levels drop issue water restrictions. Notify DOH and Fire Department.
Notifications	Notify DOH and Fire Department. Notify customers of water use restrictions
Follow-up actions	When static well water levels return to normal lift water use restriction, notify DOH, Fire Department, and customers.

K. Flood

ASSESSMENT	WELLS ARE IN LOCATIONS NOT AFFECTED BY FLOOD WATER OR RUN-OFF.
Immediate Actions	Check well houses for any evidence of flooding. If flooding is suspected issue a boil water precautionary statement. Shut down and test well for contamination if flooding suspected. Decontaminate, flush and test if tests are positive. If the Big Timber Lake or Beaver Pond breach the banks and threaten water mains shut down the main line valves on each side of the earthen dam on the south end of the Big lake and/or the built up area of Timberlake Drive at the North end of the lake at Island Park and D-8 Park.
Notifications	If the valves at both the South and North ends of the lake have to be shutdown, notify customers on the West side of the lake of water shut

	down, DOH and Fire Department. Contact Mason County Public Works Department if road washout likely.
Follow-up actions	After flood event verify earthen dam, roads at Island and D-8 are safe. Check for exposed or broken main lines. Make repairs to main line, work with mason County PWD to coordinate main and road repairs. Flush, disinfect and test if mains broken and repaired. Provide water from unaffected area or make available at facility until tests verified. Notify customers when water is safe to drink and conditions normal. Contact DOH and Fire Department.

L. Earthquake

ASSESSMENT	INSPECT BUILDINGS AND RESERVOIRS TO DETERMINE IF STRUCTURAL DAMAGE CREATES A SAFETY ISSUE FOR PROXIMITY OR ENTRY TO FACILITIES. DETERMINE CONDITION OF ELECTRICAL SUPPLY, CRITICAL EQUIPMENT AND OPERATIONAL LEVELS OF RESOURCES AVAILABLE.
Immediate Actions	During earthquake and aftershocks vacate buildings, stay a safe distance from reservoirs and structures. If reservoirs and structures are intact and safe temporarily shut down wells to prevent pump cycling due to water movement in reservoirs. Check water flow levels to distribution system to determine if water mains have been damaged. Locate and isolate broken main lines to reserve existing water supply. Isolate damaged reservoir before putting wells back in service. Monitor well production, booster pump operation and confirm treatment equipment operation is satisfactory. In the event that major structural damage has occurred, but power supply is intact, shut off main power supply feed (if safe to enter electrical control building) until damage to electrical supply lines can be assessed. If normal power supply has been interrupted and back-up generator is operational, shut down generator until damage to electrical system has been assessed. Restore power to water system components if it has been determined that electrical systems and equipment are in satisfactory condition. Contact electrician and equipment repair vendors to make repairs to damaged components as necessary. Issue water use restrictions if production levels are below normal to conserve water for drinking until repairs are complete.
Notifications	Notify customers in affected areas of use restrictions, water use curtailment or outages for repairs.

	Issue boil water notice if contamination due to low pressure or main breaks suspected. Notify DOH of possible contamination and public notification. Contact Fire Department if unable to provide fire flow.
Follow-up actions	Operations Manager and support staff inspect all system facilities, insure all water quality tests have been done and the system has been flushed and disinfected if necessary. Operations Manager makes a decision on current condition of system. Operations Manager verifies water quality results and coordinates with DOH on system condition and water quality results. Notify customers and Fire Department that normal operations resumed.

Section 11. Alternative Water Sources

There are no Group A systems within 10 miles capable of supplying water to the community.

Alternate source(s) of water

ALTERNATIVE SOURCES	NAMES	PHONE	AVAILABILITY	IS THE WATER SAFE FOR DRINKING?
Bottled Water	Walmart	360-427-6226	Up to 1000 gallons in one gallon jugs in 2 hours. 350 gallons per pallet can be ordered and available in 48 hours.	Yes
Bottled Water	Mason County Emergency Management	360-427-7535	Up to 1000 gallons in 1 gallon jugs in 2 hours	Yes
Tanker	Mason County Fire District #5	360-426-5533	5,000 gallons in one hour	No
Lake Water – Timberlake lakes	On-site		Unlimited amount	No – must be boiled and/or disinfected for drinking and cooking purposes

Section 12. Curtailing Water Use

Example: Curtailing water Use

WATER CURTAILMENT MEASURES	ACTIONS
Restrict outside water usage including watering lawns, washing cars, etc. Request curtailment of inside usage Contact owners of vacation property with irrigation system to shut down automatic watering.	Upon making the decision that curtailment is needed: ▪ Draft door hanger with curtailment messages. ▪ Post on customer doors. ▪ Contact KMAS AM news to announce curtailment message. ▪ Post message on Timberlake entrance Reader Board ▪ Monitor system usage and spot check meter usage if time is available. ▪ Continue message as long as curtailment is warranted.

Water Curtailment Message:

Timberlake water production capabilities have been reduced due to (fill in reason). the repairs to the (state affected systems) are expected to be completed by (date).

In an effort to supply essential water service a water use restriction is currently in place. All outdoor water use such as irrigation, car washing, pools and cleaning is prohibited. Please limit indoor use. Shower when possible rather than bathe, limit laundry use and flush toilets only as needed.

You will be notified when the problem is resolved.

Plan approval

This plan is officially in effect when reviewed, approved, and signed by the following people:

NAME/TITLE	SIGNATURE	DATE
Clay Long, President, Board of Directors		8-23-12
Pat Utley, Water Board Director		8-23-12
Arthur Bushey, Water system operator	Arthur Bushey	8-23-12

Washington State Department of Health

Office of Drinking Water Key Contacts

Administration

Clark Halvorson, Office Director - 360-236-3110 FAX: 360-236-2253

Joe Crossland, Budget and Performance Accountability Manager - 360-236-3166 FAX: 360-236-2252

Headquarters Operations

Dan Alexanian, Deputy Director - 360-236-3101 FAX: 360-236-2252

Policy and Constituent Services

Paula Smith, Manager - 360-236-3098 FAX: 360-236-2253

Regulation development, policy development, legislation, water resources, constituent and media relations, local health jurisdiction liaison, publications, and Internet/intranet development.

Water Quality

Mike Means, Manager - 360-236-3178 FAX: 360-236-2253

Water quality, cross connection control.

Water System Capacity

Chris McCord, Manager - 360-236-3137 FAX: 360-236-2252

State revolving fund (DWSRF), operator certification, capacity development, and contracts management.

Field Operations

Vacant, Deputy Director

Regional office field operations, sanitary surveys

Northwest Regional Office

Bob James, Northwest Region Manager - 253-395-6768 FAX: 253-395-6760

Counties: Island, King, Pierce, San Juan, Skagit, Snohomish, and Whatcom

Southwest Regional Office

Bonnie Waybright, Southwest Region Manager - 360-236-3025 FAX: 360-664-8058

Counties: Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Kitsap, Lewis, Mason, Pacific, Skamania, Thurston, and Wahkiakum

Eastern Regional Office

Dorothy Tibbetts, Eastern Region Manager - 509-329-2105 FAX: 509-329-2104

Counties: Adams, Asotin, Benton, Chelan, Columbia, Douglas, Franklin, Ferry, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Orielle, Spokane, Stevens, Walla Walla, Whitman, and Yakima

Washington State Department of Health

Drinking Water After-Hours Emergency Hotline

Toll-Free: 1-877-481-4901

Around-the-Clock Troubleshooting for Drinking Water Emergencies

Call this number after-hours if a drinking water emergency:

- Threatens the health of your customers.
- Threatens the integrity of your system.
- Can't wait until the next business day.

More important numbers from the Department of Health Office of Drinking Water:

ODW Headquarters: 360-236-3100

Toll-free within Washington: 1-800-521-0323

Northwest Regional Office: 253-395-6750

Southwest Regional Office: 360-236-3030

Eastern Regional Office: 509-329-2100

Office of Drinking Water staff are available around the clock to troubleshoot drinking water emergencies and help protect the health of your customers. Call it Murphy's Law or whatever - emergencies don't just happen during business hours.

Imagine...

- A midnight landslide damages your distribution system.
- You are notified on Friday evening before a three-day weekend that your repeat samples were E.coli positive.
- A nearby stream floods, leaving your wellhead underwater on the day after Thanksgiving.

This service is intended for water system operators, local health officials, laboratory operators and others who need immediate technical, engineering or public health advice from state drinking water experts during emergencies.

While citizen's concerns will be addressed if they call, this is not a public emergency hotline. Individuals with concerns about their drinking water should call their water utility, their local health department, or 911.

This hotline is intended for after-hours emergencies only, not for problems that arise during business hours, and not for routine business. Here's how the system works:

- After-hours calls will be evaluated to determine the nature of the emergency.
- Callers clearly seeking routine business assistance will be asked to contact their regional office during business hours.
- The Office of Drinking Water staff person on call will return the call within 30 minutes.
- Callers using the emergency number during normal business hours will receive a recorded message directing them to the regional office serving their area.

Washington State Department of Health

Southwest Regional Office Staff

Physical Address:
Southwest Drinking Water Operations
243 Israel Road S.E. 1st floor
Tumwater, WA 98501

Mailing Address:
Southwest Drinking Water Operations
P.O. Box 47823
Olympia, WA 98504-7823

Main Phone: 360-236-3030 FAX 360-664-8058 TTY Relay Service 1-800-833-6388
Map with driving directions
Printer-friendly version of this page (PDF)

Requests for information and technical assistance

The Southwest Drinking Water Operations office is open Monday through Friday from 8 a.m. to 5 p.m. Please direct all general inquiries to our main line at (360) 236-3030. Staff are available to assist with most questions immediately. As necessary, other questions will be referred to the appropriate staff for response.

Bonnie Waybright, P.E., Regional Manager • Manages the Southwest Regional Office • Participates on the Field Operations Management Team • Emergency Response	(360) 236-3025
Andy Anderson, P.E., Assistant Regional Manager • Manages Planning and Engineering Staff • Participates on the Field Operations Management Team	(360) 236-3024

Regional Engineers and Planners: Regional Engineers are responsible for the implementation of the state's drinking water program in assigned counties. They conduct sanitary surveys and special purpose investigations of public water systems and promote needed water facility improvements. Regional Planners and Engineers review and approve water system plans and specifications for system improvements and provide technical assistance to local health departments upon request.

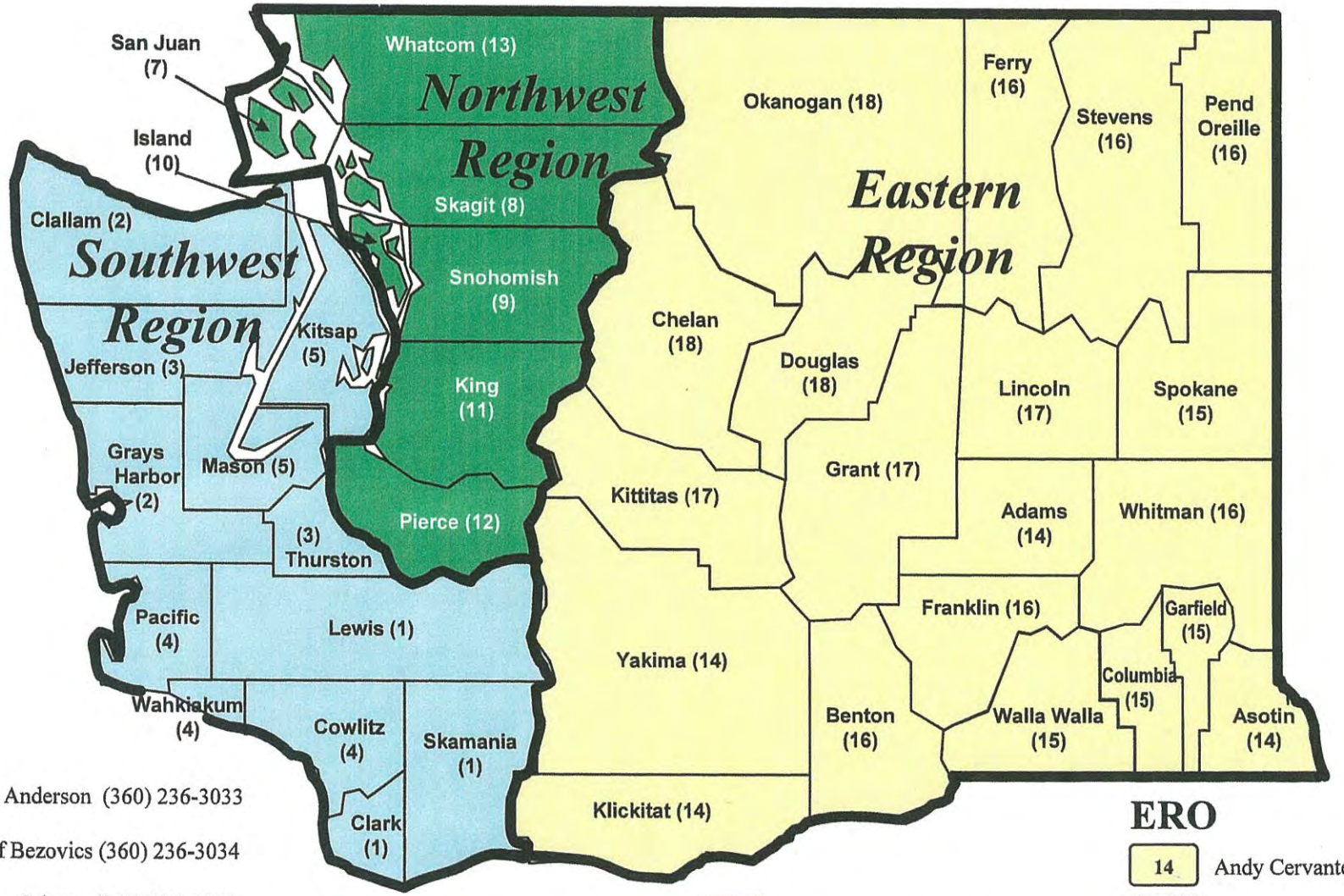
Jozsef Bezovics, P.E.	Thurston and Wahkiakum Counties	(360) 236-3034
Janet Cherry	Lewis and Skamania Counties	(360) 236-3036
Regina Grimm, P.E.	Clark, Grays Harbor, and Mason Counties	(360) 236-3035
Teresa Walker, P.E.	Cowlitz, Jefferson, and Pacific Counties	(360) 236-3032
Virpi Salo-Zieman	Clallam and Kitsap County	(360) 236-3037
Mark Mazeski, Regional Planner • Clallam, Grays Harbor, Lewis, Mason, Pacific, and Thurston Counties • Water System Plans • Small Water System Management Program Plans • Water System Consolidation		(360) 236-3038
Corina Hayes, Regional Planner • Clark, Cowlitz, Jefferson, Kitsap, Mason, Skamania, and Wahkiakum Counties • Water System Plans • Small Water System Management Program Plans • Funding		(360) 236-3031
Brad Brooks, Water Facilities Coordinator • Reviews and processes Water Facilities Inventory (WFI) and Source Treatment • Administers Transfers of Ownership Program		(360) 236-3049
Gael Kantz, Compliance Program Manager • Administers Regional Office Compliance Activities • Orders, BCAs, NOVs • Administers the Operating Permit Program		(360) 236-3027
Sophia Petro, Source Monitoring and Water Quality		(360) 236-3046

• Day-to-day Contact Person for Chemical Monitoring Requirements and Compliance • Nitrate, Lead and Copper Rule Implementation • Provides Technical Assistance to Utilities and Local Health Departments with Respect to Water Quality Sampling and Monitoring Requirements • Groundwater under the direct influence of surface (GWI) specialist	
Sandy Brentlinger, Coliform Monitoring and Water Quality • Day-to-day contact person for Coliform Monitoring Requirements and Compliance • Provides technical assistance to utilities and local health departments with respect to Water Quality Sampling and Monitoring Requirements	(360) 236-3044
Denise Miles, Sanitary Survey Program Manager • Administers Sanitary Survey Program for the SW Region for Local Health Department and Third Party Surveyors and SWRO staff.	(360)236-3028
Arlene Hyatt, Sanitarian • Conducts sanitary surveys and special purpose investigations on public water systems • Works with water purveyors and inspects water system facilities to identify any immediate health concerns and to assess the operation, maintenance and management of the water system • Administers the SW Region Chlorination and Disinfection	(360) 236-3019
Debbie Phillips, Office Manager/Administrative Secretary • Provides secretarial support to managers and compliance section • Accounts payable, Equipment, Training, Personnel • Records Manager, Public Disclosure and Publications Coordinator • New Engineering and Planning Submittals, Final Approvals	(360) 236-3023
Torie Young, Administrative Support	(360) 236-3030

• Provides secretarial support to Regional Engineers, Planners, and Program staff • Project invoicing for Water System Reviews/Approvals • SW Region Consumer Confidence Data Entry	
Katie Groeneveld, Administrative Support • Provides secretarial support to Regional Engineers, Planners, and Program staff • Provides Chlorination Data Entry • Project invoicing for Water System Reviews/Approvals • SW Region Consumer Confidence Data Entry	(360) 236-3022

DOH Drinking Water Engineer Assignments

9/30/09



SWRO

1	Andy Anderson (360) 236-3033
2	Jozsef Bezovics (360) 236-3034
3	Regina Grimm (360) 236-3035
4	Teresa Walker (360) 236-3032
5	Virpi Salo-Zieman (360) 236-3037
6	Vacant

NWRO

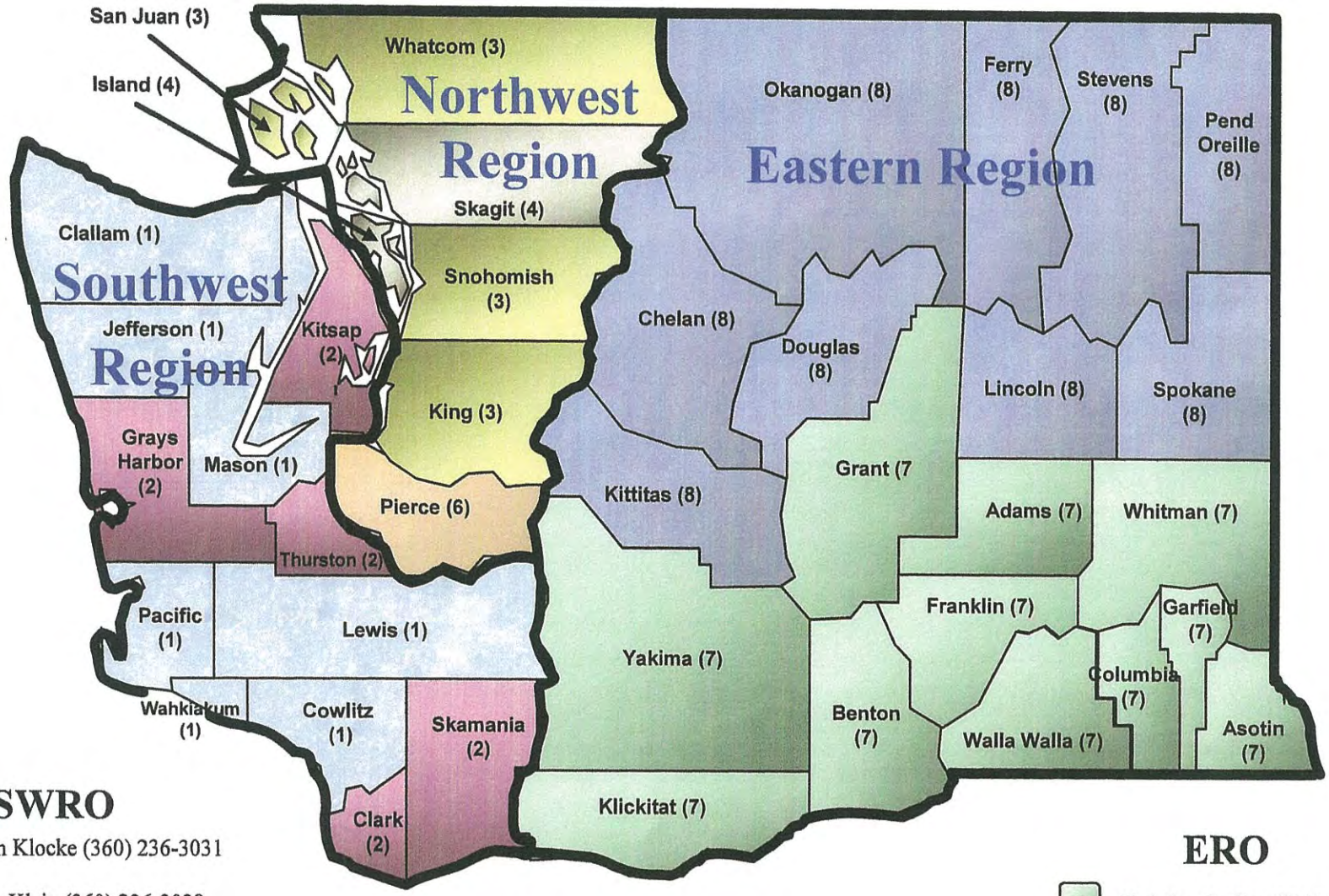
7	Steve Deem (253) 395-6767
8	Nancy Feagin (253) 395-6765
9	Jolyn Leslie (253) 395-6762
10	Erika Lindsey (253) 395-6766
11	Derek Pell (253) 395-6763
12	John Ryding (253) 395-6757
13	John Thielemann (253) 395-6761

ERO

14	Andy Cervantes (509) 329-2120
15	Ed Parry (509) 329-2123
16	Tom Justus (509) 329-2119
17	Scott Torpie (509) 329-2116
18	Mike Wilson (509) 329-2117

DOH Drinking Water Planner Assignments

7/21/09



SWRO

1 Karen Klocke (360) 236-3031

2 Darin Klein (360) 236-3038

NWRO

3 Richard Rodriguez (253) 395-6771

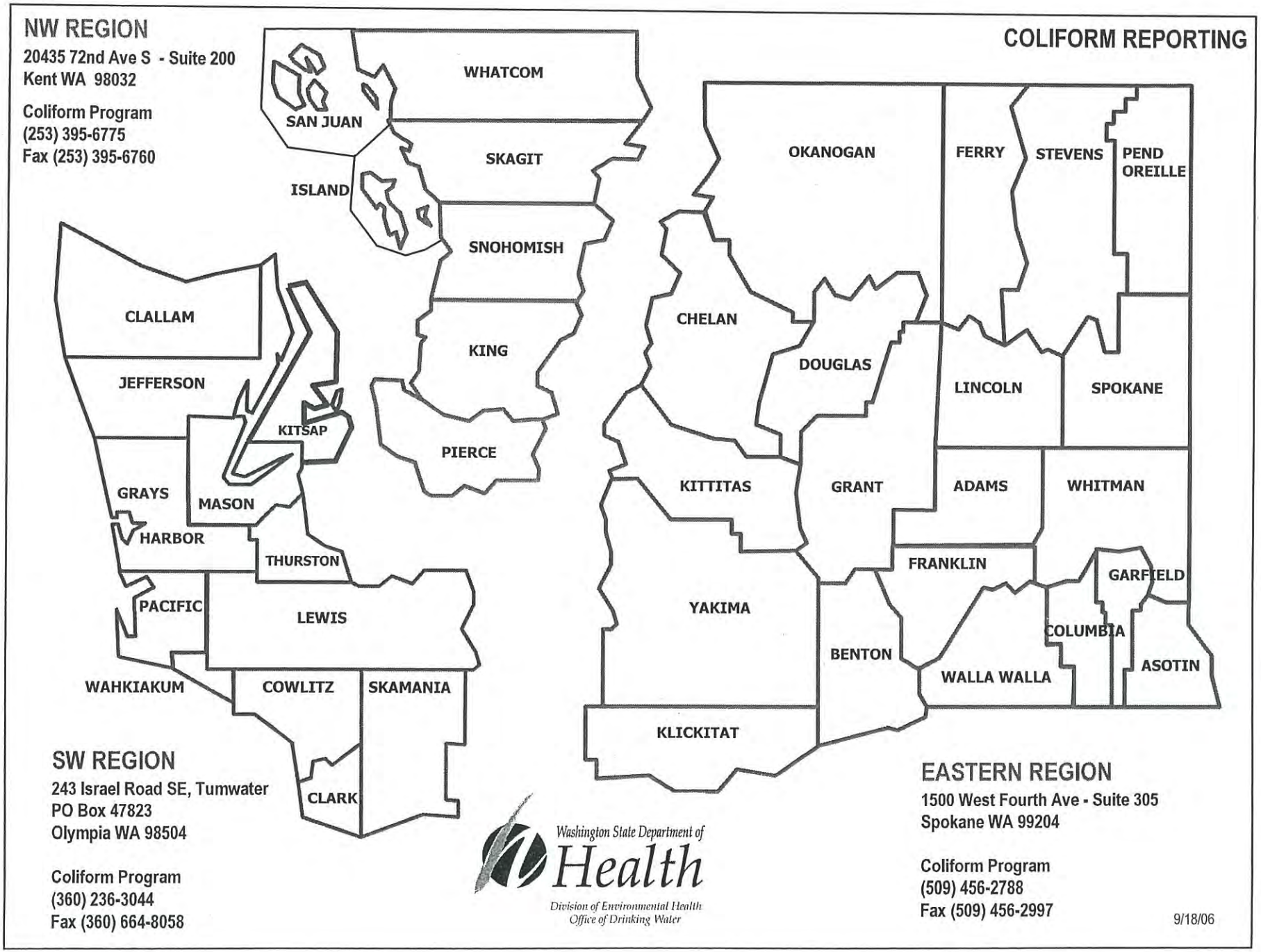
4 Jennifer Kropack (253) 395-6769

6 Richard Rodriguez and Jennifer Kropack

ERO

7 Christine Collins (509) 329-2122

8 Heather Cannon (509) 329-2121


NW REGION
20435 72nd Ave S - Suite 200
Kent WA 98032
Coliform Program
(253) 395-6775
Fax (253) 395-6760
COLIFORM REPORTING
WHATCOM
SAN JUAN
SKAGIT
ISLAND
SNOHOMISH
CLALLAM
JEFFERSON
KING
KITSAP
PIERCE
GRAYS
MASON
HARBOR
THURSTON
PACIFIC
LEWIS
WAHKIAKUM
COWLITZ
SKAMANIA
CLARK
OKANOGAN
FERRY
STEVENS
PEND OREILLE
CHELAN
DOUGLAS
LINCOLN
SPOKANE
KITTITAS
GRANT
ADAMS
WHITMAN
FRANKLIN
GARFIELD
YAKIMA
COLUMBIA
BENTON
WALLA WALLA
ASOTIN
KLICKITAT
SW REGION
243 Israel Road SE, Tumwater
PO Box 47823
Olympia WA 98504
Coliform Program
(360) 236-3044
Fax (360) 664-8058
Washington State Department of
Health
Division of Environmental Health
Office of Drinking Water
EASTERN REGION
1500 West Fourth Ave - Suite 305
Spokane WA 99204
Coliform Program
(509) 456-2788
Fax (509) 456-2997
9/18/06

Fact Sheet

Follow-up to an Unsatisfactory Coliform Sample

November 2007
DOH PUB. #331-187
(Revised)

A drinking water sample is unsatisfactory whenever coliform bacteria are present. If your water system receives unsatisfactory sample results, you must collect a set of repeat samples within 24 hours.

The purpose of repeat samples is to confirm the presence of coliform bacteria in the system and determine possible causes of contamination. **Do not** shock-chlorinate the system before collecting repeat samples without prior approval from the Department of Health Office of Drinking Water (ODW).

Thoroughly inspect the water system

Try to identify potential sources of contamination, such as "openings" in the system and/or treatment equipment failure. Make needed repairs to your system. For help see *Troubleshooting Checklist for Coliform Contamination* (DOH Pub. #331-180).* If obvious sources of contamination are found, contact your ODW regional office at the number listed on back of this Fact Sheet.

Review your sampling procedure

Review your sampling procedure to make sure samples are taken correctly. For help see *Coliform Sampling Procedure* (DOH Pub. #331-225).*

Collect repeat samples

The number of required repeat samples is based on the number of routine samples your system collects monthly.

If your system collects ONE routine sample per month, a total of **FOUR REPEAT** samples are required from the following locations:

1. The same tap as the original unsatisfactory routine sample.
2. An active service within five active connections upstream from where the original unsatisfactory sample was taken.
3. An active service within five active connections downstream from where the original unsatisfactory sample was taken.

4. Another location – such as the source or right after the storage tank – that will provide useful information for determining a source of contamination. If you do not have a tap at the source or storage tank, choose another active service.

If a system collects TWO OR MORE routine samples per month, a total of **THREE REPEAT** samples are required from the following locations:

1. The same tap as the original unsatisfactory routine sample.
2. An active service within five active connections upstream from where the original unsatisfactory sample was taken.
3. An active service within five active connections downstream from where the original unsatisfactory sample was taken.

If you cannot sample as outlined above, or **if any repeat samples are unsatisfactory**, call your ODW regional office at the number listed below.

The month after an unsatisfactory sample

In the month following an unsatisfactory sample, a minimum of FIVE ROUTINE samples are required. These samples must be marked as "Routine" on the lab slips submitted with the samples.

If you usually take five or more samples each month, follow your regular schedule.

If any of these samples are unsatisfactory, further investigation and more repeat samples are required. Contact ODW for assistance.

For more information

Northwest Region – Kent
Coliform Program: 253-395-6775
Main Office: 253-395-6750

Southwest Region – Olympia
Coliform Program: 360-236-3044
Main Office: 360-236-3030

Eastern Region – Spokane
Coliform Program: 509-456-2788
Main Office: 509-456-3115

* ODW publications are online at http://www4.doh.wa.gov/dw/publications/publications.cfm

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND
HEALTHIER WASHINGTON

Fact Sheet

Coliform Bacteria and Drinking Water

November 2007
DOH PUB. #331-181
(Revised)

Public water systems are required to deliver safe and reliable drinking water to their customers 24 hours a day, 365 days a year. If the water supply becomes contaminated, consumers can become seriously ill. Fortunately, public water systems take many steps to ensure that the public has safe, reliable drinking water. One of the most important steps is to regularly test the water for coliform bacteria.

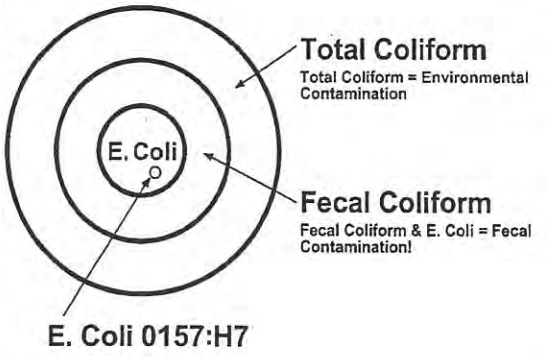
What are coliform bacteria?

Coliform bacteria are organisms that are present in the environment and in the feces of all warm-blooded animals and humans. Coliform bacteria will not likely cause illness. However, their presence in drinking water indicates that disease-causing organisms (pathogens) could be in the water system. Most pathogens that can contaminate water supplies come from the feces of humans or animals. Testing drinking water for all possible pathogens is complex, time-consuming, and expensive. It is relatively easy and inexpensive to test for coliform bacteria. If coliform bacteria are found in a water sample, water system operators work to find the source of contamination and restore safe drinking water. There are three different groups of coliform bacteria; each has a different level of risk.

Total coliform, fecal coliform, and E. coli

Total coliform, fecal coliform, and *E. coli* are all indicators of drinking water quality. The total coliform group is a large collection of different kinds of bacteria. Fecal coliforms are types of total coliform that mostly exist in feces. *E. coli* is a sub-group of fecal coliform. When a water sample is sent to a lab, it is tested for total coliform. If total coliform is present, the sample will also be tested for either fecal coliform or *E. coli*, depending on the lab testing method.

TOTAL COLIFORM, FECAL COLIFORM AND E. COLI



Total coliform bacteria are commonly found in the environment (e.g., soil or vegetation) and are generally harmless. If only total coliform bacteria are detected in drinking water, the source is probably environmental. Fecal contamination is not likely. However, if environmental contamination can enter the system, there may also be a way for pathogens to enter the system. Therefore, it is important to find the source and resolve the problem.

Fecal coliform bacteria are a sub-group of total coliform bacteria. They appear in great quantities in the intestines and feces of people and animals. The presence of fecal coliform in a drinking water sample often indicates recent fecal contamination – meaning that there is a greater risk that pathogens are present than if only total coliform bacteria is detected.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

E. coli is a sub-group of the fecal coliform group. Most *E. coli* bacteria are harmless and are found in great quantities in the intestines of people and warm-blooded animals. Some strains, however, can cause illness. The presence of *E. coli* in a drinking water sample almost always indicates recent fecal contamination – meaning there is a greater risk that pathogens are present.

A note about *E. coli*: *E. coli* outbreaks receive much media coverage. Most outbreaks have been caused by a specific strain of *E. coli* bacteria known as ***E. coli O157:H7***. When a drinking water sample is reported as "*E. coli* present" it does not mean that this dangerous strain is present and in fact, it is probably not present. However, it does indicate recent fecal contamination. Boiling or treating contaminated drinking water with a disinfectant destroys all forms of *E. coli*, including *O157:H7*.

What happens if coliform bacteria are found in my water?

When coliform bacteria are found, water systems investigate to find out how the contamination got into the water. They collect additional, or "repeat," water samples for testing, and often inspect the entire system. Taking repeat samples helps determine whether an actual problem exists in the system. If any of the repeat samples detect coliform bacteria, the initial findings are considered confirmed.

What happens if total coliform bacteria are confirmed in my water?

If total coliform bacteria are confirmed in your drinking water, your water system should be inspected to find and eliminate any possible sources of contamination. Once the source is identified, it can usually be resolved by making system repairs, flushing, and adding chlorine for a short period of time. The state Health Department works with water systems and utility managers to help resolve such problems. When total coliform bacteria are confirmed in drinking water, a water system or utility is required to notify its customers within 30 days about the situation. The Health Department recommends that this notice be distributed as soon as possible. The notice will inform you of actions being taken to correct the problem, when the problem will likely be resolved, and what you may need to do until then.

What happens if fecal coliform bacteria or *E. coli* are confirmed in my water?

Confirmation of fecal coliform bacteria or *E. coli* in a water system indicates recent fecal contamination, which may pose an immediate health risk to anyone consuming the water. Responding to health emergencies is the state Health Department's highest priority. A "Health Advisory" will be issued within 24 hours to alert all water users that there is a health risk associated with the water supply. In most cases, the use of boiled or bottled water will be recommended for drinking and cooking. The notice will inform customers of actions being taken to correct the problem, and when the problem will likely be resolved. The department will inspect the system as soon as possible to assist the water system in resolving the problem. More water samples will be taken to find and eliminate potential contamination sources, and chlorination and flushing of the system will most likely occur. The Health Advisory will remain in effect until the situation is resolved and the water is safe to drink.

For more information:

Northwest Regional Office – Kent
Coliform Program: 253-395-6775 Main Office: 253-395-6750
Southwest Regional Office – Tumwater
Coliform Program: 360-236-3044 Main Office: 360-236-3030
Eastern Regional Office – Spokane
Coliform Program: 509-456-2788 Main Office: 509-456-3115

Fact Sheet

Troubleshooting Checklist for Coliform Contamination

September 2006
DOH PUB. #331-180
(Updated)

Coliform bacteria in a water system are generally either a result of a failure to maintain a "closed" water system and/or a treatment failure. Visually inspect the system for "openings" and/or treatment equipment failures. Look for areas of the system where soil, leaves, insects, birds, sewage, or animal wastes could possibly get into your water system.

Check the following:

WELLS

- Well casing is above the floor or ground and the area around the well is clean.
- Well has a watertight seal and has a U-shaped, inverted, screened (minimum 24 mesh) vent.
- There are no openings in the well cap or casing, including around the electrical wires.
- There is no standing water around the source.
- The well is at least 100 feet from sources of contamination, such as septic tanks, drain fields, sewers, manure, or garbage.
- The well has been effectively disinfected following any well or pump repairs.
- A dug well has a watertight lid with overhanging edge and a neoprene-type seal between the lid and the well casing.

SPRINGS

- The collection box and the hatch or lid are watertight. The hatch should have an overhanging edge and a neoprene-type seal.
- Vents are covered with an insect-proof non-corroding screen (minimum 24 mesh).
- Overflow and drain lines are screened or protected with an angle-flap valve.
- Surface water is directed away from the spring collection area by a diversion ditch.
- The spring is at least 200 feet from sources of contamination, such as septic tanks, drain fields, sewers, manure, or garbage.

TREATMENT

- Chlorine residual is measured and levels are adequate.
- UV system is operating correctly.

HYDROPNEUMATIC and BLADDER TANKS

- Tank(s) are not waterlogged.
- Sediment has not accumulated in the tank.
- Bladders are intact and functional.

RESERVOIRS and STORAGE TANKS

- There are no openings that allow entry of surface water, debris, insects, etc.
- The access hatch has an overlapping, watertight cover and a neoprene-type seal.
- Vents are clean, directed downward, and screened (minimum 24 mesh).
- Overflow and drain lines are protected with screens or angle-flap valves and discharge above ground. The drainpipe should not be submerged in non-potable water.
- There are no signs of dirt, insects, growth, sediment or debris inside the tank.
- There are no cracks, leaks, or vegetative growth on the outside of the tank.

DISTRIBUTION SYSTEM

- There are no obvious leaks or breaks.
- The system has been effectively disinfected following any construction or repair work.
- There have been no low pressure or water outage incidents.
- Non-looped, dead-end sections are regularly flushed.
- System is free of possible cross connections.

AFTER INSPECTING SYSTEM

- Make needed repairs and improvements.
- Disinfect and flush the system according to DOH guidelines.
- Install sample taps at source and storage facilities, if needed.
- Establish or improve preventative maintenance program (routine sanitary control area inspection, storage tank inspection, and distribution system flushing).

FOR MORE INFORMATION

Northwest Regional Office – Kent
Coliform Program: 253-395-6775 Main Office: 253-395-6750

Southwest Regional Office – Tumwater
Coliform Program: 360-236-3044 Main Office: 360-236-3030

Eastern Regional Office – Spokane
Coliform Program: 509-456-2788 Main Office: 509-456-3115

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND
HEALTHIER WASHINGTON

WARNING:

Do not drink tap water without boiling it first!

☐ **Fecal coliform**
☐ **E. coli bacteria**
☐ **Other:** _____

were detected in the water supply on:
(date) _____.

Boiling kills bacteria and other organisms in the water:

- **Bring water to a rolling boil for one minute**
- **Let water cool before using**

To avoid possible illness: use boiled or purchased bottled water for drinking, making ice, brushing teeth, washing dishes, and food preparation until further notice.

Contact your doctor, if you experience one or more of these symptoms: nausea, cramps, diarrhea, jaundice, headache, and/or fatigue. People with chronic illnesses, infants and the elderly may be at higher risk and should seek medical advice.

Water System: _____

I.D.: _____

County: _____

Contact: _____

Telephone: _____

Date notice distributed: _____

See reverse side for more information

WARNING:

Do not drink tap water without boiling it first!

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☐ **E. coli bacteria**
☐ **Other:** _____

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(date) _____.

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Water System: _____

I.D.: _____

County: _____

Contact: _____

Telephone: _____

Date notice distributed: _____

See reverse side for more information

What is fecal coliform and E. coli?

Fecal coliform and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these waters can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely comprised immune systems.

How long will this warning be in effect?

We will consult with the Washington State Department of Health about this incident. We will notify you when you no longer need to boil the water.

October 2008

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Fecal coliform and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these waters can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely comprised immune systems.

How long will this warning be in effect?

We will consult with the Washington State Department of Health about this incident. We will notify you when you no longer need to boil the water.

October 2008

Your logo or
company name here.

News Release

For Immediate Release: <DATE>
Contact: Water purveyor/system contact name and telephone number

<Water System> announces boil water advisory for all customers in <area>

CITY NAME — The <SYSTEM NAME> is advising all water customers to boil their drinking water after recent samples showed the presence of <fecal coliform, E. coli, total coliform>. The Washington State Department of Health (DOH) has been notified and <SYSTEM NAME> is working closely with the Office of Drinking Water to find the source of contamination and fix the problem, which may include disinfecting the system. The boil water advisory will remain in effect until further notice.

<System spokesperson quote> (e.g. "We are doing all we can to eliminate the bacteria from the water system. Safe and reliable drinking water is critical to good health and responding to this kind of emergency is our highest priority," said system spokesperson.)

<NUMBER or NO> illnesses related to the community's drinking water have been reported. To correct the problem <WHAT IS BEING DONE> (e.g. Chlorine was applied to the entire system on DATE.)

The boil water advisory includes several precautionary steps that customers should take. These include using purchased treated bottled water or boiled water for any water that might be consumed: drinking, brushing teeth, dishwashing, preparing food and making ice. Water should come to a rolling boil for one minute, then allowed to cool before using.

The advisory will remain in effect until <SYSTEM NAME> and DOH are confident there is no longer a threat of illness to their customers. Once satisfactory results are reported, customers will be notified that the advisory has been lifted.

If you have any questions, please call us at <TELEPHONE NUMBER>.

###

10-17-08

Your logo or
company name here

News Release

For Immediate Release: <DATE>

Contact: Water purveyor/system contact name and telephone number

<Water System Name> Boil Water Advisory Rescinded

CITY NAME – The <SYSTEM NAME> is advising all its water customers that it is no longer necessary to boil their drinking water. Recent test samples show the absence of <fecal coliform, E. coli, total coliform> bacteria.

<SYSTEM SPOKESPERSON QUOTE> (e.g. "Working with the Washington State Department of Health over the last <NUMBER OF > days, we have completed inspections, water quality sampling, disinfection, and flushing to resolve the contamination problem," stated <NAME OF WATER SYSTEM MANAGER>. "We're pleased to be able to lift the boil water advisory."

The inspection of the water system indicated <DESCRIPTION OF SOURCE OF CONTAMINATION, if known, and what will be done to maintain good water quality>

If you have shut off or not used fixtures, water fountains, ice machines, soda machines, and/or other equipment over the past several days, flush the fixture or equipment until there is a change in water temperature before putting it back into service.

The <SYSTEM NAME> encourages customers with questions to call <TELEPHONE NUMBER>.

###

9-15-06

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

PUBLIC NOTICE CERTIFICATION
Acute Coliform MCL

Within 10 days of notifying your customers, you must send a copy of each type of notice you distribute (hand-delivered notices, press releases, newspaper articles, etc.) to your Regional Office of Drinking Water. Also complete and send this form, which certifies that you have met all the public notification requirements. If the boil water advisory remains in effect more than three months, you must notify your water users again and provide another Public Notice Certification to the Department of Health. *With this certification, you are also stating that you will meet future requirements for notifying new billing units of the violation or situation.*

Water System:_____ ID #_____ County:_____

Violation Date:_____ / _____ / _____ Violation Type:_____

This public water system certifies that public notice has been given to water users, following state and federal requirements for delivery, content, and deadlines.

Complete the following items:

Yes No

☐ ☐ Distribution was completed on ___ / ___ /____. Check all that apply:
- ☐ Hand delivery,
- ☐ Press release (TV, radio, newspaper, etc.),
- ☐ Posting at_____ (by DOH approval only),
- ☐ Other _____ (by DOH approval only).

☐ ☐ Were the water users notified within 24 hours?

_____ _____ _____
Signature of owner or operator | Position | Date

The Department of Health is an equal opportunity agency. For persons with disabilities, this form is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

Northwest Regional Office:
20435 72nd Ave. S.
Suite 200
Kent WA 98032
(253) 395-6775
Fax: (253) 395-6760

Southwest Regional Office:
243 Israel Road SE
Town Center 3
Tumwater, WA 98501
(360) 236-3030
Fax (360) 664-8058

Eastern Regional Office:
1500 West Fourth Ave.
Suite 305
Spokane WA 99201
(509) 456-2788
Fax: (509) 456-2997

DOH Form #331-264 (Updated 05/07)

Fact Sheet

Public notification helps to protect public health

June 2007
DOH PUB. #331-239
Revised

Water systems must deliver safe and reliable drinking water to their customers 24 hours a day, 365 days a year. If the drinking water supply becomes contaminated, many people could get seriously ill or die. Therefore, state and federal laws require water systems to notify their customers any time a problem with drinking water poses a health risk.

The Office of Drinking Water's (ODW) highest priority is responding to drinking water emergencies. We work hand-in-hand with water systems to resolve problems. Notifying water system customers when their water may not be safe to drink, gives them time to protect themselves and their families.

Public notification rules

Public notification requirements help ensure customers know – as soon as possible – if a situation poses a public health risk. The rules apply to all Group A public water systems. (Group A systems serve more than 14 connections or more than 24 people).

Group A public water systems must notify their customers whenever they:

- Violate drinking water quality or monitoring requirements.
- Operate under a variance or exemption.
- Have any situation that poses a public health risk, such as a disruption in service.
- Receive an order from the Office of Drinking Water.
- Fail to comply with an ODW order.
- Receive a red operating permit.

Public notification requirements also give water systems an opportunity to educate their customers about drinking water quality, and build trust by sharing information openly. Notices used in this positive way can help customers understand the basis for rate increases necessary for additional drinking water treatment and protection.

Public notification timing and distribution requirements

Notifying customers in a timely manner about actual or potential threats related to their drinking water allows them to make informed decisions affecting their health. Public notification timing and distribution requirements depend on the level of threat associated with the violation or event.

Tier 1: Acute health concerns require notification within 24 hours.

Tier 2: Chronic health concerns require notification within 30 days.

Tier 3: Reporting and monitoring violations require notification within 365 days.

You must send a copy of all public notifications and the appropriate *Public Notice Certification* to ODW.

Other aspects of the public notification rules:

Water systems may combine notices for individual violations into their annual Consumer Confidence Reports, as long as they meet the public notification timing requirements.

The rules, including the following, are online at http://apps.leg.wa.gov/WAC/default.aspx?cite=246-290 (See Part 7, Reporting, Subpart A.)

- A list of violations and situations that require 24-hour notification.
- Simplified health effects language.
- Standard language for monitoring violations.

Technical assistance

The U.S. Environmental Protection Agency and the Association of State Drinking Water Administrators developed a ***Public Notification Handbook***. It includes sample public notices and is online at http://www.doh.wa.gov/ehp/dw/Publications/PNhandbook.pdf

You can access public notification forms and links to ODW publications online at http://www.doh.wa.gov/ehp/dw/fact_sheets/public_notification.htm

You can also call your ODW Regional Office for technical assistance. We are open 8 a.m. to 5 p.m. Monday through Friday. If you have an after-hours emergency, call (877) 481-4901.

Eastern Region (509) 456-3115
Serving Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima counties.

Northwest Region (253) 395-6750
Serving Island, King, Pierce, San Juan, Skagit, Snohomish, and Whatcom counties.

Southwest Region (360) 236-3030
Serving Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Kitsap, Lewis, Mason, Pacific, Skamania, Thurston, and Wahkiakum counties.

More detailed contact information is online at http://www.doh.wa.gov/ehp/dw/Staff_Lists/dwnames.htm

Jan. 2011
DOH 331-242 (Rev.)

Emergency Disinfection of Small Water Systems

A water system should disinfect if it experiences any of the following:

- The water system loses pressure for any reason.
- Any part of the water system is "opened up" for maintenance or repairs.
- Backflow or backsiphonage creates a cross-connection event.
- The water system experiences an acute or non-acute total coliform MCL (maximum contaminant level) violation and an exact cause of the contamination has not been determined.

If you receive an unsatisfactory routine coliform sample result, you should not disinfect until after you collect the required repeat samples. Contact your regional coliform staff if you're not sure how to proceed.

Notify your customers first

If you normally do not disinfect your water, notify **all** your customers first. Water with high levels of chlorine can seriously affect people with unique medical needs, such as kidney dialysis patients. All water systems should maintain a list of such customers. People with aquariums or ponds that contain fish will also be especially interested in knowing that the water is to be chlorinated.

Disinfecting a well

1. Calculate the volume of water in the well. You will need to know the total depth of the well and the depth to the static water level (level of water when the pump is off). Subtract the static water depth from the total depth of the well; this is the depth of water in the well. Use the table at right to calculate the volume of water in your well.

Calculating Well Volume	
Well Casing Diameter (inches)	**Volume** (gallons per vertical foot of water)
6	1.5
8	2.6
10	4.1
12	5.9
14	8.0
16	10
36	53

2. Calculate how much chlorine to add to the well using this table (see "Notes related to the tables" on Page 4):

Well Disinfection: Amount of chlorine bleach to use				
Well Volume (gallons)	**Desired Chlorine Dosage**			
	Household Bleach (6%)			**12 % bleach**
	2 mg/L	***5 mg/L***	***20 mg/L***	***5 mg/L***
50	½ Tbsp	1 ¼ Tbsp	4 ½ Tbsp	½ Tbsp
100	1 Tbsp	2 ¼ Tbsp	9 Tbsp	1 Tbsp
200	2 Tbsp	5 Tbsp	1 ¼ cups	2 Tbsp
500	4 ½ Tbsp	¾ cup	2 ¾ cups	5 Tbsp
1000	9 Tbsp	1 ½ cup	5 ½ cups	¾ cup

3. Pour the required quantity of bleach into a five-gallon bucket of water. Pour the bucket of chlorine solution down the inside of the well.

   Connect a garden hose that has never been used to the nearest outside faucet and circulate the water through the hose and back into the well. This will mix the chlorine with the water and the pump will draw the chlorine to the bottom of the well. After you start smelling the chlorine in the water coming out of the hose, use the hose to rinse the upper portion of the well casing with the disinfectant.

Disinfecting water in pressure tanks

You must disinfect the water in your pressure tanks or hydropneumatic tank, especially if you are doing a follow-up to a coliform MCL violation or other known contamination event. You will need to drain the water from each tank and then refill them with water containing chlorine from your well or storage tank, depending on the layout of your water system. The chlorinated water should remain in the tank(s) for at least 6 hours; 24 hours is preferred. Drain or flush the chlorinated water from the tank(s) and then refill the tank volume with untreated water. Draining the water from this tank or tanks may affect the air pressure in the tank(s) and recharging of the air maybe required.

Disinfecting a storage tank and distribution system

If you must chlorinate both your source and your storage reservoir, disinfect the source first.

1. If the contamination does not appear to be originating at the water source, you can add disinfectant just to the storage tank rather than the water source.

2. Determine the amount of chlorine that will need to be added to the storage tank, using the table below (see "Notes related to the tables" on Page 4):

Reservoir Disinfection: Amount of chlorine bleach to use				
Tank Volume (gallons)	**Desired Chlorine Dosage**			
	Household Bleach (6%)			**12 % bleach**
	1 mg/L	***5 mg/L***	***10 mg/L***	***1 mg/L***
5,000	1 ⅓ cups	6 ⅔ cups	13 ⅓ cups	1 cup
10,000	2 ⅔ cups	13 ½ cups	1 ¾ gallons	1 ¼ cups
20,000	5 ⅓ cups	1 ¾ gallons	3 ½ gallons	3 cups
50,000	13 ½ cups	4 ¼ gallons	8 ½ gallons	7 cups
100,000	1 ¾ gallons	8 ½ gallons	16 ¾ gallons	¾ gallon

Also, see "What chlorine dose is needed?" on Page 4.

If your distribution system is extensive, calculate the volume of water in the distribution piping and add it to the volume of the storage tank; use that total volume in the table above when determining how much chlorine to add to the storage tank. The table below shows some common water distribution main sizes and volumes per foot of pipe. Estimate the total length of water pipes in your water system and multiply the total by the appropriate value from the table. You can use as-built drawings of the water system or a simple map to help estimate pipe diameters and lengths.

Estimating volume of water in the distribution system		
Pipe Diameter (inches)	**Volume** (gallons per linear foot of pipe)	**Volume** (gallons per 100 feet of pipe)
1	0.04	4
2	0.16	16
4	0.65	65
6	1.47	147

3. Draw down the level of water in the storage tank, but keep sufficient quantity for fire flow, if required.
4. Pour the chlorine into the tank as the tank is refilling, in order to get some mixing.
5. Use a blowoff, fire hydrant, or outside faucet in the distribution system to draw chlorinated water from the tank out into the distribution system. Then go to all of the faucets in the water system and flush water from them until you detect chlorinated water. Usually you can smell the chlorine, but to be more accurate, use a chlorine residual test kit to measure chlorine residual. (We recommend every water system own a chlorine residual test kit.)
6. Allow the chlorine to remain in the water system overnight (6 hours minimum, 24 hours is preferable). Chlorine needs time to do an effective job of disinfecting.
7. Use one or more outside faucets, blowoffs, or hydrants to draw water out of the water system in order to replace the chlorinated water with chlorine-free water from your source. During this process, make sure you don't damage a pump by drawing water down below a pump intake. Never discharge chlorinated water into any water body, wetland, or drainage ditch because it is extremely toxic to fish. You must dechlorinate the water prior to discharge. Depending on the chlorine levels in the water, you may also use normal water usage to replace the chlorinated water more slowly with chlorine-free water.
8. You should wait at least seven days—or until you know there is no chlorine remaining in the water—before collecting a coliform sample.* The coliform sample result will indicate whether the disinfection was effective.

   If you are disinfecting in follow-up to an acute total coliform MCL violation, you should be working with our regional office coliform or engineering staff to determine when coliform sampling should occur relative to chlorination and flushing.

   When you are collecting a coliform sample, measure the chlorine residual and note the level on the lab slip. If you are collecting a coliform sample in follow-up to emergency disinfection, a measure of zero chlorine residual is worth noting on the lab slip.

   * If you are using a chlorine residual test kit and are able to measure zero free chlorine residual throughout the water system sooner than seven days following the disinfection, you may collect coliform samples at that time.

Disinfecting a distribution system that does not have a storage tank

Some water systems don't have storage tanks and use only the well pump and a pressure tank to provide water. If the volume of water in the distribution system is greater than the volume of water in the well, then only partially disinfected water may reach parts of the distribution system when you attempt to bring chlorinated water from the well into the system.

Estimate the volume of water in your distribution system using the table above. After disinfecting the well and pressure tanks as described above, draw chlorinated water into the farthest part of the distribution system as described in step 5. Then immediately re-disinfect the well and draw chlorinated water into the distribution system closest to the well. Measure the chlorine residual with a chlorine residual test kit to make sure you have enough chlorine everywhere in the water system. Now follow steps 6 - 8.

For more information

If you have questions about disinfecting your water system, call the coliform or engineering staff at our regional office:

Eastern Region: Spokane Valley (509) 329-2100

Northwest Region: Kent (253) 395-6750

Southwest Region: Tumwater (360) 236-3030

Our publications are available online at https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm

Other references to help you disinfect water system facilities:

- American Water Works Association (AWWA) Standard C564-87, "Disinfection of Wells"
- AWWA Standard C651-92, "Disinfecting Water Mains"
- AWWA Standard C652-92, "Disinfection of Water-Storage Facilities"

These AWWA standards assume the component you're disinfecting, such as a well or storage tank, is isolated from the rest of the water system during the disinfection. For this reason, these references discuss chlorine doses significantly higher than those discussed here do. Do not use high doses if there is a chance that any water system user could consume, or otherwise use, the water.

What chlorine dose is needed?

If you suspect contamination, such as following a pressure loss due to a power outage, or in response to a non-acute MCL violation of the Total Coliform Rule, a chlorine dose of 1 to 2 mg/L is sufficient. Larger chlorine doses may be required to address an acute MCL violation, a bacteriological cross-connection event, or flooding of water system facilities. Please consult with our regional office in these cases.

Notes related to the tables

Volume of bleach needed, $V_1 = (C_2 \times V_2) / C_1$, in gallons, where:
C_2 = desired chlorine dose, ppm
V_2 = the volume water to be treated, gallons
C_1 = the concentration of the bleach solution, ppm

You can use this formula to calculate the quantity of bleach for specific volumes other than those shown in the tables. You can also add the volumes in the tables (e.g., for 150 gallons add the bleach quantity needed for 100 gallons to that needed for 50 gallons); or extrapolate between values shown in the table.

Well volume = $7.48 \times H \times 3.14 \times (D/12)^2 / 4$, in gallons, where:
H = the height of water standing in the well, in feet
D = the well casing diameter, in inches

6 percent household bleach contains 60,000 parts per million hypochlorite
12 percent bleach contains 120,000 parts per million hypochlorite
1 cubic foot of water = 7.48 gallons
1 gallon = 16 cups
1 cup = 16 tablespoons or 8 fluid ounces
1 Tablespoon (Tbsp) = ½ fluid ounce (14.8 mL)

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (877) 833-6341.

EMERGENCY DISINFECTION OF DRINKING WATER

USE ONLY WATER THAT HAS BEEN PROPERLY DISINFECTED FOR DRINKING, COOKING, MAKING ANY PREPARED DRINK, OR FOR BRUSHING TEETH

1. Use **bottled water** that has not been exposed to flood waters if it is available.

2. If you don't have bottled water, you should **boil water** to make it safe. Boiling water will kill most types of disease-causing organisms that may be present. If the water is cloudy, filter it through clean cloths or allow it to settle, and draw off the clear water for boiling. **Boil the water for one minute**, let it cool, and store it in clean containers with covers.

3. If you can't boil water, you can **disinfect it using household bleach**. Bleach will kill some, but not all, types of disease-causing organisms that may be in the water. If the water is cloudy, filter it through clean cloths or allow it to settle, and draw off the clear water for disinfection. **Add 1/8 teaspoon (or 8 drops)** of regular, unscented, liquid household bleach **for each gallon of water**, stir it well and let it stand for 30 minutes before you use it. Store disinfected water in clean containers with covers.

4. If you have a well that has been flooded, the water should be tested and disinfected after flood waters recede. If you suspect that your well may be contaminated, contact your local or state health department or agriculture extension agent for specific advice.

(U.S. federal agencies and the Red Cross recommend these same four steps to disinfect drinking water in an emergency. Please, read the text below for important details about disinfection.)

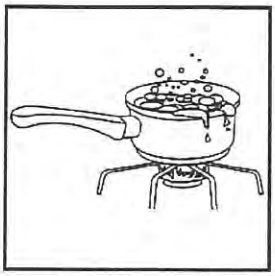
More information about disinfection

In times of crisis, follow advice from local officials. Local health departments or public water systems may urge consumers to use more caution or to follow additional measures than the information provided here.

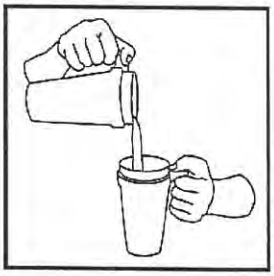
Look for other sources of potable water in and around your home. When your home water supply is interrupted by natural or other forms of disaster, you can obtain limited amounts of water by draining your hot water tank or melting ice cubes. In most cases, well water is the preferred source of drinking water. If it is not available and river or lake water must be used, avoid sources containing floating material and water with a dark color or an odor. Generally, flowing water is better quality than stagnant water.

Examine the physical condition of the water. When emergency disinfection is necessary, disinfectants are less effective in cloudy, murky or colored water. Filter murky or colored water through clean cloths or allow it to settle. It is better to both settle ***and*** filter. After filtering until it is clear, or allowing all dirt and other particles to settle, draw off the clean and clear water for disinfection. Water prepared for disinfection should be stored only in clean, tightly covered, containers, not subject to corrosion.

Choose a disinfection method. Boiling and chemical treatment are two general methods used to effectively disinfect small quantities of filtered and settled water.



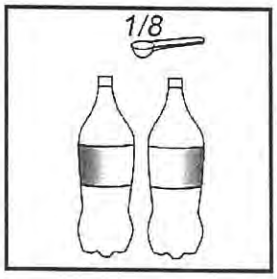
Boiling is the surest method to make water safe to drink and kill disease-causing microorganisms like *Giardia lamblia* and *Cryptosporidium*, which are frequently found in rivers and lakes. These disease-causing organisms are less likely to occur in well water (as long as it has not been affected by flood waters). If not treated properly and neutralized, *Giardia* may cause diarrhea, fatigue, and cramps after ingestion. *Cryptosporidium* is highly resistant to disinfection. It may cause diarrhea, nausea and/or stomach cramps. People with severely weakened immune systems are likely to have more severe and more persistent symptoms than healthy individuals. Boil filtered and settled water vigorously for one minute (at altitudes above one mile, boil for three minutes). To improve the flat taste of boiled water, aerate it by pouring it back and forth from one container to another and allow it to stand for a few hours, or add a pinch of salt for each quart or liter of water boiled.



If boiling is not possible, chemical disinfection of filtered and settled water collected from a well, spring, river, or other surface water body will still provide some health benefits and is better than no treatment at all.

When boiling is not practical, certain chemicals will kill most harmful or disease-causing organisms. For chemical disinfection to be effective, the water must be filtered and settled first. Chlorine and iodine are the two chemicals commonly used to treat water. They are somewhat effective in protecting against exposure to *Giardia,* but may not be effective in controlling more resistant organisms like *Cryptosporidium.* Chlorine is generally more effective than iodine in controlling *Giardia*, and both disinfectants work much better in warm water.

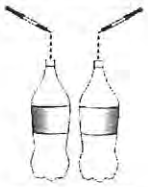
- **You can use a non-scented, household chlorine bleach that contains a chlorine compound to disinfect water.** Do not use non-chlorine bleach to disinfect water. Typically, household chlorine bleaches will be 5.25% available chlorine. Follow the procedure written on the label. When the necessary procedure is not given, find the percentage of available chlorine on the label and use the information in the following table as a guide. (Remember, 1/8 teaspoon and 8 drops are about the same quantity.)



Available Chlorine	Drops per Quart/Gallon of Clear Water	Drops per Liter of Clear Water
1%	10 per Quart -- 40 per Gallon	10 per Liter
4-6%	2 per Quart -- 8 per Gallon (1/8 teaspoon)	2 per Liter
7-10%	1 per Quart -- 4 per Gallon	1 per Liter

(If the strength of the bleach is unknown, add ten drops per quart or liter of filtered and settled water. Double the amount of chlorine for cloudy, murky or colored water or water that is extremely cold.)

Summary of Key Points:

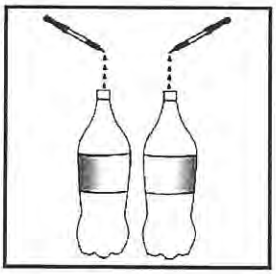
Filter murky or colored water through clean cloths or allow it to settle. It is better to both settle *and* filter.	
Boiling is the surest method to make water safe to drink and kill disease-causing microorganisms like *Giardia lamblia* and *Cryptosporidium*, which are frequently found in rivers and lakes.	
To improve the flat taste of boiled water, aerate it by pouring it back and forth from one container to another and allow it to stand for a few hours, or add a pinch of salt for each quart or liter of water boiled.	
When boiling is not practical, certain chemicals will kill most harmful or disease-causing organisms. Chlorine (in the form of unscented bleach) and iodine are the two chemicals commonly used to treat water.	
You can use a non-scented, household chlorine bleach that contains a chlorine compound to disinfect water. (Remember, 1/8 teaspoon and 8 drops are about the same quantity.)	
You can use tincture of iodine to disinfect filtered and settled water. Common household iodine from the medicine chest or first aid kit may be used to disinfect water.	
Tincture of iodine. For cloudy water add ten drops and let the solution stand for at least 30 minutes.	

Office of Water 4606-M EPA 816-F-06-027 August 2006 www.epa.gov/safewater

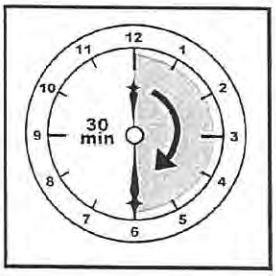
Mix the treated water thoroughly and allow it to stand, preferably covered, for 30 minutes. The water should have a slight chlorine odor. If not, repeat the dosage and allow the water to stand for an additional 15 minutes. If the treated water has too strong a chlorine taste, allow the water to stand exposed to the air for a few hours or pour it from one clean container to another several times.

- **You can use granular calcium hypochlorite to disinfect water.** Add and dissolve one heaping teaspoon of high-test granular calcium hypochlorite (approximately ¼ ounce) for each two gallons of water, or 5 milliliters (approximately 7 grams) per 7.5 liters of water. The mixture will produce a stock chlorine solution of approximately 500 milligrams per liter, since the calcium hypochlorite has available chlorine equal to 70 percent of its weight. To disinfect water, add the chlorine solution in the ratio of one part of chlorine solution to each 100 parts of water to be treated. This is roughly equal to adding 1 pint (16 ounces) of stock chlorine to each 12.5 gallons of water or (approximately ½ liter to 50 liters of water) to be disinfected. To remove any objectionable chlorine odor, aerate the disinfected water by pouring it back and forth from one clean container to another.

- **You can use chlorine tablets to disinfect filtered and settled water.** Chlorine tablets containing the necessary dosage for drinking water disinfection can be purchased in a commercially prepared form. These tablets are available from drug and sporting goods stores and should be used as stated in the instructions. When instructions are not available, use one tablet for each quart or liter of water to be purified.



- **You can use tincture of iodine to disinfect filtered and settled water.** Common household iodine from the medicine chest or first aid kit may be used to disinfect water. Add five drops of 2 percent U.S. or your country's approved Pharmacopeia tincture of iodine to each quart or liter of clear water. For cloudy water add ten drops and let the solution stand for at least 30 minutes.



- **You can use iodine tablets to disinfect filtered and settled water.** Purchase commercially prepared iodine tablets containing the necessary dosage for drinking water disinfection at drug and sporting goods stores. Use as stated in instructions. When instructions are not available, use one tablet for each quart or liter of filtered and settled water to be purified.

ONLY USE WATER THAT HAS BEEN PROPERLY DISINFECTED FOR DRINKING, COOKING, MAKING ANY PREPARED DRINK, OR FOR BRUSHING TEETH

April 2006

DOH PUB. #331-242
(Revision)

Emergency Disinfection of Small Systems

Has your system lost pressure lately due to a power outage, failed pumping system, main break, or other unusual event? Or have you just learned you have an Acute or Non-Acute Total Coliform Rule MCL violation? If so, and if you normally provide water that is not disinfected, please read on.

When to disinfect

A water system should be disinfected any time it experiences any of the following:

- The system loses pressure for any reason.
- Any part of the system is "opened up" for maintenance or repairs.
- Backflow or back-siphonage creates a cross-connection event.
- Total coliform, fecal coliform, or E. coli is found present in both routine and repeat coliform samples.

A system should also be batch chlorinated if multiple routine coliform samples in one month show the presence of total coliform, fecal coliform, or E. coli. This disinfection should not occur until after the required repeat samples have been collected for each of the unsatisfactory routine samples.

Notify your customers first

Before disinfecting any system that is normally not disinfected, notify all users first. Of special concern are people with unique medical needs, such as kidney dialysis patients. All water systems should maintain a list of such customers. People with aquariums or ponds that contain fish will also want to know that the water is to be chlorinated.

Note: *This document is primarily written for smaller, non-municipal type systems, though the information may be helpful to any system. The document discusses how to disinfect both for a simple groundwater system with pressure tanks and distribution pipes, as well as a system with a storage reservoir. The first four steps are different for the two kinds of systems, but steps 5-8 are identical.*

Adding chlorine to a groundwater source

1. Calculate the volume of water in the well or spring box. To do this, multiply the number of cubic feet by 7.5 to determine the number of gallons. (Or use the table on the next page.)

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

CALCULATING WELL VOLUME	
Well Casing Diameter (inches)	**Volume** (gallons per vertical foot of water)
6	1.5
8	2.6
10	4.1
12	5.9
14	8.0
16	10
36	53

2. Calculate how much chlorine to add to the well or spring box, using this table:

WELL DISINFECTION: Amount of chlorine bleach to use				
Well Volume (gallons)	**Desired Chlorine Dosage**			
	5 ¼ % bleach			**12 % bleach**
	5 ppm	***20 ppm***	***50 ppm***	***5 ppm***
50	1 ¼ Tbsp.	¼ cup	1 cup	½ Tbsp.
100	2 ½ Tbsp.	½ cup	1 ½ cups	1 Tbsp.
150	¼ cup	1 cup	2 ¼ cups	1 ½ Tbsp.
200	5 Tbsp.	1 ¼ cups	3 cups	2 Tbsp.
250	6 Tbsp.	1 ½ cups	4 cups	3 Tbsp.
500	¾ cup	3 cups	½ gallon	5 Tbsp.
750	1 ¼ cup	4 ½ cups	¾ gallon	½ cup
1000	1 ½ cup	6 cups	1 gallon	¾ cup

(Also see the boxed information on the last page of this document: *What chlorine dose is needed?*) If your distribution system is extensive, consider the volume of water in the distribution piping when determining how much chlorine to use.

3. Pour the required quantity of bleach into the well or spring box.

4. Connect a brand new garden hose to the nearest outside faucet and circulate the water through the hose and back into the source. This will mix the chlorine with the water, and the pump will draw the chlorine to the bottom of the well. After you start smelling the chlorine in the water coming out of the hose, use the hose to rinse the upper portion of the well with the disinfectant. Note: If you cannot reach the well with the hose, mix one cup chlorine bleach per bucket of water and pour chlorinated water down the inside of the casing. The bucket method will also work when you are disinfecting a gravity-flow spring box.

Now proceed to Step 5, next page.

Adding chlorine to a storage reservoir

Note: *If you must chlorinate both your source and your storage reservoir, disinfect the reservoir and distribution system first, and then do the source and the pipe leading to the reservoir. This will ensure adequate disinfection of the source.*

1. If the contamination does not appear to be originating at the water source, the system may be disinfected by adding disinfectant to the storage reservoir rather than the water source.

2. Determine the amount of chlorine that will need to be added to the storage tank, using the table below:

RESERVOIR DISINFECTION: Amount of chlorine bleach to use				
Reservoir Volume (gallons)	Desired Chlorine Dosage			
	5 ¼ % bleach			12 % bleach
	1 ppm	*20 ppm*	*50 ppm*	*1 ppm*
5,000	1 ½ cups	2 gallon	5 gallon	1 cup
10,000	3 cups	4 gallon	10 gallon	1 ¼ cups
15,000	4 ½ cups	6 gallon	14 gallon	2 cups
20,000	6 cups	8 gallon	19 gallon	3 cups
25,000	½ gallon	10 gallon	24 gallon	3 ¼ cups
50,000	1 gallon	19 gallon	48 gallon	7 cups
75,000	1 ½ gallon	29 gallon	71 gallon	10 cups
100,000	1 ¾ gallon	38 gallon	95 gallon	¾ gallon

(Also see the boxed information on the last page of this document: *What chlorine dose is needed?)* If your distribution system is extensive, the volume of water in the distribution piping should be considered when determining how much chlorine to use.

3. Draw down the level of water in the storage tank, but keep sufficient quantity for fire flow, if required.

4. Pour the chlorine into the tank as the tank is refilling, in order to get some mixing.

Steps 5-8 are identical for both types of disinfection operations.

5. Beginning with the outlet closest to the point of chlorine addition (that is, either the source or the reservoir) draw water at every outlet until you can smell chlorine. To be more accurate, use a chlorine residual test kit. DOH recommends that every water system own such a kit. Turn off each outlet once chlorine is detected.

6. Allow the chlorine to remain in the system overnight (24 hours is preferable.) Chlorine needs time to do an effective job of disinfecting.

7. Use one or more outside faucets, blow-offs, hydrants, etc. to draw water out of the system to remove the chlorine. The system should be thoroughly and repeatedly flushed to remove the chlorine. During this process, make sure you don't damage a pump by drawing water down below the pump intake. Chlorinated water is extremely toxic to fish. It should never be discharged to any water body, wetland, or drainage ditch. High chlorine residuals must be dechlorinated before discharge.

8. After following this procedure and rendering the water completely free of disinfectant, you should wait a minimum of seven days following disinfection before collecting a bacteriological sample. (Note: If you are disinfecting in follow-up to an Acute Total Coliform Rule MCL violation, you should be working with the DOH Regional Office Coliform or Engineering staff to determine when coliform sampling should occur relative to chlorination and flushing.) The chlorine residual should be measured and noted on the coliform lab slip whenever coliform samples are collected. In follow-up to an emergency disinfection event, the measurement of a zero residual is worthy of note too. The bacteriological analysis will indicate whether or not the system disinfection was effective.

If you have any questions about disinfecting your system, please call your DOH regional engineer or coliform program staff member:

Northwest Regional Coliform Program	253-395-6775
Southwest Regional Coliform Program	360-236-3044
Eastern Regional Coliform Program	509-456-2788

Other, more detailed references regarding disinfection of water system facilities include:
- American Water Works Association (AWWA) Standard C564-87, "Disinfection of Wells"
- AWWA Standard C651-92, "Disinfecting Water Mains"
- AWWA Standard C652-92, "Disinfection of Water-Storage Facilities"

These AWWA standards assume that the component being disinfected, such as a well or storage tank, is isolated from the rest of the system during the disinfection. For this reason, these references discuss chlorine doses significantly higher that those discussed above. Such high dose should not be used if there is a chance that any water system user could consume, or otherwise utilize, the water.

What chlorine dose is needed?

A chlorine dose of 1 to 2 ppm (mg/L) should be sufficient whenever contamination is suspected (such as following a pressure loss due to a power outage) or in response to a Non-Acute MCL violation of the Total Coliform Rule. In some cases when responding to a Non-Acute violation, this dose may not be sufficient and a larger dose such as 3 to 4 ppm might be needed. Larger doses may be required in response to an Acute MCL violation of the Total Coliform Rule or when a known bacteriological cross-connection has occurred. Please consult with your DOH regional office in these cases.

Note: There is a regulatory maximum chlorine residual for systems that disinfect full-time. That maximum residual is 4 ppm. It is therefore recommended that for emergency disinfection, the chlorine dose be such that this maximum is not surpassed.

Notes related to the tables

Volume of bleach needed, $V_1 = (C_2 \times V_2) / C_1$, in gallons, where
- C_2 = desired chlorine dose, ppm
- V_2 = the volume water to be treated, gallons
- C_1 = the concentration of the bleach solution, ppm

Well volume = $7.48 \times H \times 3.14 \times (D/12)^2 / 4$, in gallons, where
- H =the height of water standing in the well, in feet
- D = the well casing diameter, in inches

5 ¼ % household bleach contains 52,500 ppm hypochlorite
12 % bleach contains 120,000 ppm hypochlorite
1 cubic foot of water = 7.48 gallons
1 gallon = 16 cups
1 cup = 16 tablespoons (Tbsp.) or 8 fluid ounces

Fact Sheet

Jan. 2009
DOH 331-300
Updated

Flood advice for drinking water systems

Floods are the most common and widespread of all natural disasters, except fire, according to the Federal Emergency Management Agency. Most communities have experienced some degree of flooding following heavy rain or spring and winter thaws.

Floods pose a particular threat to drinking water systems because floodwaters often carry biological and chemical contaminants that can make consumers sick. If source water or any part of the water distribution system flood, these contaminants can end up at consumer taps.

How floods contaminate drinking water

Surface water sources: Increased water flow during a flood often makes rivers and streams murky. Elevated turbidity in source water could make it impossible for a water system's treatment plant to treat water. If that occurs, the water system may have to rely on emergency storage capacity or an emergency water source.

Either way, the system will have to ask customers to conserve water. That request can confuse customers when flooding or heavy rains make it look like there's water everywhere.

Even if the water system can overcome high turbidity, the change in disinfection levels may cause taste or odor problems in the treated water.

Groundwater sources: Contaminants can enter the water supply if the wellhead or the areas immediately around the wellhead flood.

The December 2007 floods completely submerged Interstate 5 in Lewis County. Flooding damaged several area water systems. (Photo courtesy of Washington Department of Transportation.)

Distribution systems: Contaminants can enter the water distribution system if a significant loss of pressure occurs when all or part of the service area floods.

What to do when the weather forecaster predicts flooding in your area

- Have enough coliform sample bottles on hand to sample each well and the distribution system daily for at least a week.
- If you routinely disinfect your water system with chlorine, increase the chlorine level. This will not ensure your drinking water will remain safe, but it will make it easier to monitor chlorine residuals in your system. A drop in the chlorine residual may indicate contaminated water entered your system.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

What to do if your well floods

- Advise residents to bring their drinking water to a rolling boil for one minute to kill disease-causing bacteria and parasites. Do this even if you chlorinate your water system because your treatment may not be effective against contaminated floodwaters.
- Collect coliform samples at your well and throughout the distribution system as soon as you are able to gain safe access. Exercise extreme caution any time an electric power supply component is under or near floodwater.
- Contact the Office of Drinking Water anytime you advise customers to boil their water, or when water test results show coliform bacteria is present.

What to do if your distribution system floods

- Monitor chlorine residuals and system pressure as soon as you can safely gain access to the system and its control facilities.
- If the system loses pressure at any time while the area is flooded, advise residents to bring their drinking water to a rolling boil for one minute to kill disease-causing bacteria and parasites. Collect coliform samples throughout the flooded area and let your customers know when the water is safe to drink.
- If you are monitoring chlorine levels and notice a drop in the residual while the area is flooded, advise residents to bring their drinking water to a rolling boil for one minute. Collect coliform samples throughout the flooded area, especially in the area where chlorine is low.
- Even if you don't believe your system flooded, plan to collect extra coliform samples.
- Contact the Office of Drinking Water anytime you advise customers to boil their water, or when water test results show fecal coliform bacteria is present.

Communicate with your customers

- Your customers' perception of risk during a flood may be high. They need timely and accurate information about the quality of their drinking water.
- Not all customers experience the same flooding conditions. Some may feel a direct threat from floodwaters while others do not. It's important to know your water quality and communicate to all customers.
- Be conservative and informative, not sorry later on! Make sure your customers have the information they need to make good decisions about their drinking water.

Where to go for help

Visit the Office of Drinking Water at http://www.doh.wa.gov/ehp/dw/our_main_pages/dwflood.htm or call the nearest regional office:

Eastern Region (509) 456-3115
Northwest Region (253) 395-6750
Southwest Region (360) 236-3030
After hours and weekends (877) 481-4901

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You can also call your local health or emergency management agency. Contact information is online at http://access.wa.gov/emergency/index.aspx

Questions & Answers

Responding to Pressure-Loss Events

April 2006
DOH PUB. #331-338

What is a pressure-loss event and what causes it?

A pressure-loss event occurs when pressure in the water distribution system drops significantly below normal. These events may be planned or unplanned. For example, system operators may plan to reduce pressure when they install, replace or repair water lines. Unplanned pressure loss can be caused by broken water mains, a failed pumping system, power outages, leaking storage reservoirs and excessive demand.

Should I be concerned about pressure loss events in my water system?

Yes. Pressure loss can be a serious threat to public health. A reduction or loss of pressure in the distribution system can result in backflow, allowing contaminants to enter drinking water through unprotected cross-connections. Backflow is a reverse of normal water flow due to back pressure or back siphonage that occurs when the pressure of a polluted source exceeds the pressure in the distribution system. Backflow incidents have caused illness, injury and, in some cases, death.

How can I prevent backflow?

The best way to prevent backflow is by developing and implementing a cross-connection control program. For guidance see Department of Health Office of Drinking Water's (ODW) ***Cross Connection Control for Small Water Systems*** (331-234).*

What should I do if a pressure loss event occurs?

Immediately take the following steps to ensure the safety of your customers:

1. **Find the cause of the problem and restore pressure.** Your first priority is restoring water pressure and maintaining the ability to fight fires.
2. **Call your ODW regional office.** Phone numbers are on page 2. We will help you determine if a health advisory is needed. For guidance on health advisories see ODW's ***Coliform Public Health Advisory Packet*** (331-260) or ***Nitrate Public Health Advisory Packet*** (331-259).*
3. **Flush the lines.** Customers face greater risk of consuming contaminated drinking water after a pressure-loss event. Flush the lines to reduce the risk and cleanse the system of contaminants. Follow general industry standards for flushing the system.
4. **Disinfect the system.** Disinfection is a preventive measure to protect the water system. However, you must notify your customers first. For guidance see ODW's ***Emergency Disinfection of Small Systems*** (331-242).*
5. **Collect Samples.** After you restore normal operating pressure, check the quality of the water.

How do I know if backflow occurred?

Most pressure-loss events are obvious; however, there are times when you may not know an event occurred. These events can be a serious threat to public health because of the ever-present link to possible contamination through a cross-connection.

Indications of a backflow incident include:

- **Discolored or unusual looking water.** Investigate any abnormal appearances of water, such as an unusual color, or soapy, foamy or oily water. Discolored water can also be caused by increased flows in pipes or changes in normal pipe flows that disturb sediments in the distribution system. Investigate all reports of colored water.
- **Inconsistent chlorine residuals throughout the distribution system.** Chlorine in the distribution system reacts with many different substances, including possible backflow contaminants. Low or zero chlorine residuals in the distribution system following a loss of pressure event could be a sign that chlorine is reacting with substances not normally found.
- **Taste and odor complaints.** If there are taste and odor complaints after a low pressure event, evaluate the nature of the complaints and call ODW for technical assistance. Detectable differences in taste and odor could indicate a backflow incident occurred. The human nose and taste buds are extremely sensitive and can detect some contaminants in water at extremely low concentrations.

For more information

Call the nearest ODW regional office:

Eastern Region (509) 456-3115
Northwest Region (253) 395-6750
Southwest Region (360) 664-0768

* ODW publications are online at http://www4.doh.wa.gov/dw/publications/publications.cfm

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Truck Transportation Guidelines

View this publication in Acrobat PDF format

Emergency Water Supply For Public Use

Introduction

These guidelines are for water system utilities, companies or associations that need to deliver potable water to the public during emergencies. Although the Washington State Department of Health (DOH) does not encourage this method of supplying water, trucked water may be the only viable alternative in some situations. When trucking water, there are important considerations for protection of public health.

DOH recommends that someone with water treatment expertise be responsible for the operation and management of trucked potable water. Usually this expertise is found in municipal water utilities.

A water system that plans to use trucked water in response to an emergency should first contact the appropriate regional office of the DOH Office of Drinking Water (DOH-ODW) or local health department to discuss current requirements and approve the proposed operation. [see WAC 246-290-415(2)(d) and 246-290-451(4)].

Guidelines

Truck Container

The truck container must be contaminant-free and capable of being maintained so that water contamination is prevented. Appropriate trucks include milk trucks, military-style water trucks, or others approved by DOH, the state Emergency Management Office, or local health departments. All container interiors must be visually inspected, flushed with disinfected water (see "Initial Truck Disinfection" guidelines), filled with water to be transported, and then tested for coliform organisms. Initial testing must show absence of coliform organisms before the truck is used for routine water hauling. Once the routine hauling operation has begun and precautions are in place to prevent contamination, testing does not need to be repeated during the course of the emergency response.

If a truck container has been previously used only for potable water and has been protected from possible contamination, it may be used without disinfection and testing for bacteria. The DOH-ODW regional office or the local health jurisdiction must approve use of these truck containers, unless the state or local Emergency Management division has pre-approved their use in emergencies.

Truck containers that cannot pass the initial testing criteria after disinfection (i.e. absence of coliforms) shall not be used. Trucks previously used for substances other than potable water will be evaluated on

an individual basis. Consult with DOH-ODW before using trucks that may have previously carried toxic or other non-potable liquids.

All truck containers must be filled or emptied through an air gap or approved double-check valve assembly, in accordance with WAC 246-290-490. All containers must be completely enclosed and tightly sealed, with lockable lids or hatches. Containers that are open to the atmosphere during hauling are not acceptable for use.

Initial Truck Disinfection

To insure that water-hauling equipment is adequately disinfected before using, all rust and sediment must be rinsed or flushed from the tank. The tank should then be completely filled with water containing at least 50-60 parts per million (ppm) of chlorine. This chlorine solution should be held in the tank for at least 24 hours. All hoses, pumps, and other equipment used in handling water, should be disinfected in the same manner.

About one gallon of liquid bleach is required in every 1,000 gallons of water to produce 50-60 ppm. Bleach should be 5.25-6 percent hypochorite with no additives, such as scent or cleaning enhancers. To insure adequate mixing, the bleach should be added in proportion to the water as the tank is being filled. For example: add approximately one-half gallon of bleach with each 500 gallons of water.

The chlorine solution must be flushed from the tank after 24 hours. It should not be discharged directly into a stream because it can kill fish and plants. In some cases, the chlorinated water may be treated with citric acid or thiosulfate to remove the chlorine before discharging it. Once the tank is emptied, refill it with the water to be transported, and test for coliform bacteria. If coliforms are present, repeat the process. If the tank cannot be disinfected to eliminate coliforms, it must not be used.

Source of Water

The source for emergency trucked water must come from an approved public water supply. Another source of water can be used only with a formal written agreement between DOH or the local health department and the receiving purveyor. The unapproved source must be shown to be safe to use when treated to the minimal levels described in the "Handling" guidelines.

Every precaution should be taken to ensure that the water remains potable once it is collected and transported. The receiving water system should check that the truck hauler is familiar with proper handling procedures at the source and during transport.

Handling

All hoses and other handling equipment used in the operation must be stored off the ground at all times. They must be thoroughly flushed, disinfected, and then flushed again with the source water prior to use. Hoses should be capped at each end when they are not in use. The disinfection solution should be the same as that used for disinfecting the truck container.

All equipment surfaces that contact the potable water, including fill-point equipment, containers, caps, valves, filters, fittings, and other plumbing attachments should be regularly inspected and either disinfected or replaced as needed.

All equipment associated with the collection, transport, and delivery should be designed for potable

water and must be able to be disinfected.

Water to be transported by tank trucks should contain a free chlorine residual of about one part per million (1 pip or mgl) at the beginning of the haul. This is done by adding 5-6 tablespoons (2.5 – 3 ounces) of common household bleach to each 1,000 gallons. The bleach should be 5.25-6 percent strength, unscented and without additives. It should be added in proportion to the quantity of water during filling to insure uniform distribution.

Receiving Tank

The water system's receiving tanks must be inspected to assure that water quality issues will not occur during filling and later distribution to consumers. Receiving tanks must be cleaned and disinfected using the same procedures identified for the truck containers (see "Initial Truck Disinfection" guidelines). The receiving tanks must be kept secure and protected from contamination throughout the emergency response. Comments regarding receiving tanks should be documented in written records.

The customer's receiving tank must be filled through an air gap or an approved double-check valve assembly in accordance with WAC 246-290-490.

Documentation And Record-Keeping

The receiving water system is responsible for documenting and keeping proper records of the emergency trucked water operation. This includes:

- written records of the names and contact numbers of the hauler(s),
- the quantity delivered per trip,
- the approved water source(s) used,
- dates and times of delivery, free chlorine residual at point of delivery,
- assurance by the hauler (or a representative of the receiving system at the fill site) that proper disinfection was performed for each trip,
- the chlorine dose at the fill point and the free chlorine residual, if taken, after filling,
- any notes regarding the receiving tank.

These records should be retained for at least six months for review upon request by health agencies, haulers, or the supplying water system.

For more information

For more information on this issue, please call the regional office nearest you:

Northwest Regional Office (Kent) – 253/395-6750
Southwest Regional Office (Olympia) – 360/236-3030
Eastern Regional Office (Spokane) – 509/456-3115

You may also call toll free: 1-800-521-0323, or email: dwinfo@doh.wa.gov

DOH Pub#: 331-063

Links to external resources are provided as a public service and do not imply endorsement by the Washington State Department of Health

Dept. of Health
Office of Drinking Water
243 Israel Road S.E. 2nd floor
Tumwater, WA 98501

Mail:
P.O. Box 47822
Olympia, WA 98504-7822
(360) 236-3100

Send inquiries about DOH and its programs to the Health Consumer Assistance Office
Comments or questions regarding this Web site? Send mail to Office of Drinking Water.

Last Update : 05/21/2009 06:24 PM

WATER LOSS CONTROL ACTION PLAN

The Timberlake Community Club water system has established a goal to reduce Distribution System Leakage (DSL) to 10% or less by 2019.

Historic non-revenue water in the mid-2000's ranged from 14% to over 30%.

The Community is currently fully metered as of 2000. Replacement of failing service-to-main connections circa 2007-2009 resulted in reduced DSL. Also, the use of non-revenue water for flushing and drafting by the fire department is now being documented since the last Comprehensive Plan was approved in 2010.

The three year average DSL for 2013-2015 is 12.4%.

In July 2016, the Community purchased replacement meters for all connections within the system. The Community plans to replace its aging meters by July 2017. The Community will track DSL bimonthly as the meter replacement program is implemented to measure the success of its meter replacement program.

As a result of the meter replacement work, the Community expects that revenue will increase and DSL will decrease below 10%.

Upon completion of the meter replacement program, DSL will be reviewed. Other measures such as leak detection, a water audit and/or main replacement projects may be considered at that time if necessary to meet the Community's DSL goal of 10% or less.

TIMBERLAKE COMMUNITY CLUB PRESENTS
THE ANNUAL DRINKING WATER QUALITY REPORT

We're pleased to present to you the Annual Drinking Water Quality Report. This report is designed to inform you about the water quality and services we deliver to you every day. Our constant goal is to provide you with a safe and dependable supply of drinking water. We want you to understand the efforts we make to continually improve the water treatment process and protect our water resources. We are committed to ensuring the quality of your water. Our water source is ground water drawn from 3 deep wells. Our Aquifer draws from the Oakland Bay Watershed. The water is disinfected with sodium hypochlorite and filtered to remove iron, manganese and hydrogen sulfide.

Our drinking water is safe and meets federal and state requirements.

If you have any questions about this report or concerning your water utility, please contact Art Bushey, WDM 2 at 427-8928 between 8:00 am and 4:00 pm, Monday through Friday. If this is inconvenient please leave a message on our answering machine and we will return your call. Please be aware that your Water Board meets every 3rd Thursday of each month at 6:30 p.m. We would be happy to have you attend.

The Timberlake Water Department regularly monitors for various contaminants in your drinking water according to Federal and State laws. All drinking water, including bottled water, may be reasonably expected to contain at least small amounts of some contaminants. It's important to remember that the presence of these contaminants does not necessarily pose a health risk. More information can be obtained by calling the Environmental Protection Agency's Safe Drinking water Hotline at 1-800-426-4791. Also be aware that you may attend any of our regularly scheduled community meetings held on the 3rd Saturday of each month at 6:00 p.m. at the Multi-Purpose Center. Pat Utley Water Board President and Board of Director member provides regular Water Department updates.

The **MCL's (Maximum Contaminant Level)** are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect.

Total Coliform: The Total Coliform Rule requires water systems to meet a stricter limit for coliform bacteria. Coliform bacteria are usually harmless but their presence can be an indication of disease-causing bacteria. When coliform bacteria are found, special follow-up tests are done to determine if harmful bacteria are present in the water supply. If this limit is exceeded in these follow-up tests, the water supplier must notify the public by newspaper, television or radio. At Timberlake we use the Reader Board at the entrance and the automatic calling system.

Lead: If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Timberlake Community Club is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water you may wish to have your water tested. Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immune-compromised persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly or infants can be particularly at risk from infections. These people
should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the Safe Drinking Water Hotline, 1-800-426-4791.

In the following table you will find many terms and abbreviations you might not be familiar with. To help you better understand these terms, we've provided the following definitions:

Note: We have an asbestos waiver, this is because we have less than 10% asbestos content pipe in our total system.

Also: The Washington State Department of Health reduced the monitoring requirements for Synthetic Organic Chemicals because the source is not at risk for contamination. The last sample collected for these contaminants was taken in 2008 and was found to meet all applicable standards.

Millireims per year (mrem/yr) – measure of radiation absorbed by the body.
Million Fibers per Lit (MFL) – measure of the presence of asbestos fibers that are longer than 10 micrometers.
Nephelometric Turbidity Unit (NTU) – a measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.
Variances & Exemptions (V&E) – State EPA permission not to meet an MCL or a treatment technique under certain conditions. The Timberlake Water System has not found it necessary to apply for any Variances and Exceptions.
Action Level (AL) – the concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
Treatment Technique (TT) – A treatment technique is a required process intended to reduce the level of a contaminate in drinking water.
Maximum Contaminant Level (MCL) – The "Maximum Allowed" is the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
Maximum Contaminant Level (MCLG) – The "Goal" is the level of a contaminant in drinking water below which there is no know or expected risk to health. MCLGs allow for a margin of safety.

Parts Per Million (ppm)
Parts Per Billion (ppb)

WATER QUALITY DATA 2011

The Timberlake Water Department tests for over 80 drinking water contaminates as required by the Environmental Protection Agency and the state. The state requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminates are not expected to vary significantly from year to year. Most of the data, though representative of the water quality, is from tests taken during the 2011 calendar year unless other wise noted. Only those contaminants that have been detected are listed in the table. Complete copies of all contaminates that are tested for are posted in the MPC and available upon request.

Tests for total Coliform Bacteria are taken monthly, (2 tests at alternating locations though out the community). All the samples tested in 2011 were satisfactory.

Disinfection Byproducts Based
On the last EPA required test

Contaminants	MCL	MCLG	Timberlake Water	Sample Date	Violation Y/N	Typical Source of Contamination
Haloacitic Acids (HAA's)						**Byproduct of drinking water disinfection**
❖ Monochloroacetic Acid (PPB)	*	1.5	ND	08/06/09	N	
❖ Monobromoactic Acid (ppb)	*	1.0	ND	08/06/09	N	
❖ Dichloroacetic Acid (ppb)	*	1.0	ND	08/06/09	N	
❖ Dibromoacetic Acid (ppb)	*	0.5	ND	08/06/09	N	
❖ Trichloroacetic Acid (ppb)	*	0.5	12.3	08/06/09	N	
❖ Dalapon (ppb)	200		0		N	
***Total HAA's**	**60**	**5**	**12.3**		**N**	
Trihalomethanes (THHM)						**Byproduct of drinking water disinfection**
❖ Chloroform (ppb)	*	0.5	25.7	08/05/09	N	
❖ Bromodichlormethane (ppb)	*	0.5	1.5	08/05/09	N	
❖ Chlorodibrormethane (ppb)	*	0.5	ND	08/05/09	N	
❖ Bromoform (ppb)	*	0.5	ND	08/05/09	N	
****Total THHM/s (ppb)**	**80**	**0.5**	**27.2**	08/05/09	**N**	

*Potential health effects of HAA's from ingestion of Water: Increased risk of cancer.
**Potential Health Effects of TTHM's from Ingestion of Water: Liver, kidney or central nervous system problems; increased risk of cancer

Complete Timberlake Water System Data is available by entering system ID number 88370 at:
http://www4.doh.wa.gov/SentryInternet/FindWaterSystem.aspx

For more information:
Division of Drinking Water: http://www.doh.wa.gov/ehp/dw
EPA Arsenic Information: http://www.epa.gov/OGWDW/arsenic.html
Agency for Toxic Substances and Disease Registry (U.S. Centers for **Disease Control and Prevention):** http://www.atsdr.cdc.gov/tfacts2.html

TIMBERLAKE COMMUNITY CLUB, INC.
THE ANNUAL DRINKING WATER QUALITY REPORT

We are pleased to present to you the Annual Drinking Water Quality Report, this report is designed to inform you about the water quality and services we deliver to you every day. Our constant goal is to provide you with a safe and dependable supply of drinking water. We want you to understand the efforts we make to continually improve the water treatment process and protect our water resources while improving the system for the future.

We would like to share with Timberlake Community Club Inc. members that there are 2,100 Group A water systems in the state of Washington, of these 2,100 systems only 10 have a Sanitary Survey conducted by the Washington State Department of Health every 5 years (taken from a DOH publication). Members should be proud that the Timberlake Community Club water system is one of the 10 systems surveyed every 5 years.

Our water source is ground water drawn from 3 deep wells. Our Aquifer draws from the Oakland Bay Watershed. The water is disinfected with sodium hypochlorite and filtered to remove iron, manganese and hydrogen sulfide.

Our drinking water is safe and meets federal and state requirements.

If you have any questions about this report or concerning your water utility, please contact Arthur Bushey, WDM2 /CCS at 427-8928 between 8:00 am and 4:00 pm, Monday through Friday. If this is inconvenient please leave a message on our answering machine and we will return your call. The Timberlake Water Board meets the 3rd Thursday of each month at 6:30 p.m. We would be happy to have you attend. Water Board members are, Clay Long, Mont Jeffreys, Dennis Winchel, Bill Bruder and Scott Woods.

The Timberlake Water Department regularly monitors for various contaminants in your drinking Water according to Federal and State laws. All drinking water, including bottled water, may be reasonably expected to contain at least small amounts of some contaminants. It's important to remember that the presence of these contaminants does not necessarily pose a health risk. More information can be obtained by calling the Environmental Protection Agency's Safe Drinking water Hotline at 1-800-426-4791.

The MCL's (Maximum Contaminant Level) are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect.

Total Coliform: The Total Coliform Rule requires water systems to meet a stricter limit for coliform bacteria. Coliform bacteria are usually harmless but their presence can be an indication of disease-causing bacteria. When coliform bacteria are found, special follow-up tests are done to determine if harmful bacteria are present in the water supply. If this limit is exceeded in these follow-up tests, the water supplier must notify the public by newspaper, television or radio. At Timberlake Community Club Inc. we also use the Reader Board at the entrance and our automatic calling system.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immune-compromised persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly or infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the Safe Drinking Water Hotline, 1-800-426-4791.

In our continuing efforts to maintain a safe and dependable water supply, it may be

TIMBERLAKE COMMUNITY CLUB, INC.
THE ANNUAL DRINKING WATER QUALITY REPORT

necessary to make improvements in the water system.The costs of these improvements may be reflected in the rate structure. One of the most recent improvements was the reconditioning of the 200,000 gallon reservoir in January of 2012; this was a large expense for all Timberlake Community Club Inc. members but was necessary to keep the reservoir in top condition for the next 20yrs.

In the following table you will find many terms and abbreviations you might not be familiar with. To help you better understand these terms, we've provided the following definitions:

Maximum contamination level (MCL): The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum contamination level goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Action Level (AL): concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

The Treatment Technique (TT): A treatment technique is a required process intended to reduce the level of a contaminant in drinking water.

Millireims per year (MREM/YR): The measure of radiation absorbed by the body.

Million Fibers per Lit (MFL): The measure of the presence of asbestos fibers longer than 10 micrometers.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the Benefits of the use of disinfectants to control microbial contaminants.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant Allowed in drinking water. There is convincing evidence that the addition of a Disinfectant is necessary for the control of microbial contaminants.

Variances and exceptions (V&E): State EPA permission not to meet an MCL or a treatment technique under certain conditions. The Timberlake Community Club Inc. water system has not found it necessary to apply for any variances or exceptions.

PPM- Parts per million
PPB- Parts per billion
VOC's- Volitile organic chemicals

Note: We have an asbestos waiver; this is because we have less than 10% asbestos content pipe in our total system.

Also: The Washington State Department of Health reduced the monitoring requirements for Synthetic Organic Chemicals because the source is not at risk for contamination. The last samples collected for these contaminants were taken in 2012 and was found to meet all applicable standards.

Tests for total Coliform Bacteria are taken monthly (2 tests at 12 alternating locations throughout the community). All of the samples tested in 2012 were satisfactory, information on these test results are available at the MPC.

Information on water conservation, your irrigation system and why you may need a backflow preventer on your irrigation system, hot water tank expansion and more are all available at the MPC also.

Water conservation helps save money and water, we have available at the Timberlake Community Club Inc. MPC or the water department "**100 tips to help conserve water**" among others, stop by for a copy.

2880 E Timberlake W Drive
Shelton, WA 98584
www.timberlakecc.com
timberlakewater@hctc.com

WATER QUALITY DATA 2012

The Timberlake Water Department tests for over 80 drinking water contaminates as required by the Environmental Protection Agency and the state. The state requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminates are not expected to vary significantly from year to year. Most of the data, though representative of the water quality, is from tests taken during the 2012 calendar year unless other wise noted. Only those contaminants that have been detected are listed in the table. Complete copies of all contaminates that are tested for are posted in the MPC and available upon request.

EPA Lead Statement:

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Timberlake Community Club, Inc. is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at *http://www.epa.gov/safewater/lead*

After the steel reservoir interior was recoated in January 2012 a required test for VOC's was completed before putting the reservoir back on line. The results were Ethylbenzene at 15ug/l and xylenes at 79ug/l, both of these are regulated analytes, and are below the MCL of 700ug/l and 10,000 ug/l.

Disinfection Byproducts Based On the last EPA required test

Contaminants	MCL	SRL	Timberlake Water	Sample Date	Violation Y/N	Typical Source of Contamination
Haloacitic Acids (HAA's)						**Byproduct of drinking water disinfection**
❖ Monochloroacetic Acid (PPB)	*	2.0	ND	09/12/12	N	
❖ Monobromoactic Acid (ppb)	*	1.0	ND	09/12/12	N	
❖ Dichloroacetic Acid (ppb)	*	1.0	ND	09/12/12	N	
❖ Dibromoacetic Acid (ppb)	*	1.0	ND	09/12/12	N	
❖ Trichloroacetic Acid (ppb)	*	1.0	ND	09/12/12	N	
***Total HAA's**	**60**		**ND**	09/12/12	**N**	
						Byproduct of drinking water disinfection
Trihalomethanes (THHM)						
❖ Chloroform (ppb)	*	0.25	38.2	09/12/12	N	
❖ Bromodichlormethane (ppb)	*	0.5	1.65	09/12/12	N	
❖ Dibromochlormethane (ppb)	*	0.5	ND	09/12/12	N	
❖ Bromoform (ppb)	*	0.5	ND	09/12/12	N	
****Total THHM/s (ppb)**	**80**		**39.9**	**09/12/12**	**N**	

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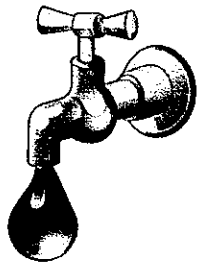
EPA Arsenic Information: http://www.epa.gov/OGWDW/arsenic.html
Agency for Toxic Substances and Disease Registry (U.S. Centers for **Disease Control and Prevention):** http://www.atsdr.cdc.gov/tfacts2.html

TIMBERLAKE COMMUNITY CLUB, INC.
THE ANNUAL DRINKING WATER QUALITY REPORT



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Our water source is ground water drawn from 3 deep wells. Our Aquifer draws from the Oakland Bay Watershed. The water is disinfected with sodium hypochlorite and filtered to remove iron, manganese and hydrogen sulfide.

Our drinking water is safe and meets federal and state requirements.

If you have any questions about this report or concerning your water utility, please contact Arthur Bushey, WDM2 /CCS at 427-8928 between 8:00 am and 4:00 pm, Monday through Friday. If this is inconvenient please leave a message on our answering machine and we will return your call. The Timberlake Water Board meets the 3rd Thursday of each month at 6:30 p.m. We would be happy to have you attend. Water Board members are, Clay Long, Mont Jeffreys, Dennis Winchel and Don and Ardeth McBride.

The Timberlake Water Department regularly monitors for various contaminants in your drinking

Water according to Federal and State laws. All drinking water, including bottled water, may be reasonably expected to contain at least small amounts of some contaminants. It's important to remember that the presence of these contaminants does not necessarily pose a health risk. More information can be obtained by calling the Environmental Protection Agency's Safe Drinking water Hotline at 1-800-426-4791.

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In our continuing efforts to maintain a safe and dependable water supply, it may be necessary to make improvements in your water

TIMBERLAKE COMMUNITY CLUB, INC.
THE ANNUAL DRINKING WATER QUALITY REPORT

supply. The costs of these improvements may be reflected in the rate structure. One of the most recent improvements was the reconditioning of the 200,000 gallon reservoir in January of 2012; this was a large expense for Timberlake Community Club Inc. members but was necessary to keep the reservoir in top condition for the next 20yrs.

In the following table you will find many terms and abbreviations you might not be familiar with. To help you better understand these terms, we've provided the following definitions:

Maximum contamination level (MCL): The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum contamination level goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Action Level (AL): concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

The Treatment Technique (TT): A treatment technique is a required process intended to reduce the level of a contaminant in drinking water.

Millireims per year (MREM/YR): The measure of radiation absorbed by the body.

Million Fibers per Lit (MFL): The measure of the presence of asbestos fibers longer than 10 micrometers.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the
Benefits of the use of disinfectants to control microbial contaminants.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant Allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for the control of microbial contaminants.

Variances and exceptions (V&E): State EPA permission not to meet an MCL or a treatment technique under certain conditions. The Timberlake Community Club Inc. water system has not found it necessary to apply for any variances or exceptions.

PPM- Parts per million
PPB- Parts per billion
VOC's- Volitile organic chemicals

Note: We have an asbestos waiver; this is because we have less than 10% asbestos content pipe in our total system.

Also: The Washington State Department of Health reduced the monitoring requirements for Synthetic Organic Chemicals because the source is not at risk for contamination. The last sample collected for these contaminants was taken in 2012 and was found to meet all applicable standards.

Tests for total Coliform Bacteria are taken monthly (2 tests at 12 alternating locations throughout the community). All of the samples tested in 2012 were satisfactory, information on these test results are available at the MPC.

Information on water conservation, your irrigation system and why you may need a backflow preventer on your irrigation system, hot water tank expansion and more are all available at the MPC also.

Water conservation is big these days, we have available at the Timberlake Community Club Inc. MPC or the water department "**100 tips to help conserve water**" among others, stop by for a copy.

WATER QUALITY DATA 2013

The Timberlake Water Department tests for over 80 drinking water contaminates as required by the Environmental Protection Agency and the state. The state requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminates are not expected to vary significantly from year to year. Most of the data, though representative of the water quality, is from tests taken during the 2011 calendar year unless other wise noted. Only those contaminants that have been detected are listed in the table. Complete copies of all contaminates that are tested for are posted in the MPC and available upon request.

EPA Lead Statement: *If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Timberlake Community Club, Inc. is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using your water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the SAFE DRINKING WATER HOT LINE or o line at http://www.epa.gov/safewater/lead.*

Timberlake Community Club is required to test for **Lead and Copper** every three years. Ten (10) lead and copper samples were taken in 2013 at various residential locations in the community. All of the samples tested and reported were below the **Action Level** of **1.3 mg/l** copper and **0.015 mg/l** lead. The results of the tests were sent to all participating Timberlake Members.

Disinfection Byproducts Based on the last EPA required test

Contaminants	MCL	MCLG	Timberlake Water	Sample Date	Violation Y/N	Typical Source of Contamination
Haloacitic Acids (HAA's)						**Byproduct of drinking water disinfection**
❖ Monochloroacetic Acid (PPB)	*	2.0	ND	09/12/12	N	
❖ Monobromoactic Acid (ppb)	*	1.0	ND	09/12/12	N	
❖ Dichloroacetic Acid (ppb)	*	1.0	ND	09/12/12	N	
❖ Dibromoacetic Acid (ppb)	*	1.0	ND	09/12/12	N	
❖ Trichloroacetic Acid (ppb)	*	1.0	ND	09/12/12	N	
• **Total HAA's**	**60**		**ND**	09/12/12	**N**	
Trihalomethanes (THHM)						**Byproduct of drinking water disinfection**
❖ Chloroform (ppb)	*	0.25	38.2	09/12/12	N	
❖ Bromodichlormethane (ppb)	*	0.5	1.65	09/12/12	N	
❖ Chlorodibrormethane (ppb)	*	0.5	ND	09/12/12	N	
❖ Bromoform (ppb)	*	0.5	ND	09/12/12	N	
****Total THHM/s (ppb)**	**80**		**39.9**	09/12/12	**N**	

*Potential health effects of HAA's from ingestion of Water: Increased risk of cancer.
**Potential Health Effects of TTHM's from Ingestion of Water: Liver, kidney or central nervous system problems; increased risk of cancer

Complete Timberlake Water System Data is available by entering system ID number 88370 at:
http://www4.doh.wa.gov/SentryInternet/FindWaterSystem.aspx

For more information: Division of Drinking Water: http://www.doh.wa.gov/ehp/dw
EPA Arsenic Information: http://www.epa.gov/OGWDW/arsenic.html
Agency for Toxic Substances and Disease Registry (U.S. Centers for **Disease Control and Prevention):** http://www.atsdr.cdc.gov/tfacts2.html

2014 Timberlake Community Club
ANNUAL DRINKING WATER QUALITY REPORT

In our continuing efforts to maintain a safe and dependable water supply, it may be necessary to make improvements in the water system.The costs of these improvements may be reflected in the rate structure.

In the following table you will find many terms and abbreviations you might not be familiar with. To help you better understand these terms, we've provided the following definitions:

Maximum contamination level (MCL): The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLGs as feasible using the best available treatment technology.

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Information on your irrigation system and why you may need a **back flow preventer** on your irrigation system, hot water tank expansion and more, are all available at the MPC or at the Water Department.

Water Conservation helps save money and water, we have available at the Timberlake Community Club Inc. MPC or the Water Department "**100 tips to help conserve water**" among others, stop by for a copy.

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2014 Timberlake Community Club
ANNUAL DRINKING WATER QUALITY REPORT

We are pleased to present to you the Annual Drinking Water Quality Report, this report is designed to inform you about the water quality and services we deliver to you every day. Our constant goal is to provide you with a safe and dependable supply of drinking water. We want you to understand the efforts we make to continually improve the water treatment process and protect our water resources while improving the system for the future.

Our water source is ground water drawn from 3 deep wells. Our Aquifer draws from the Oakland Bay Watershed. The water is disinfected with sodium hypochlorite and filtered to remove iron, manganese and hydrogen sulfide.

Some water facts: The first water lines in the US were made of wood (bored logs that were charred with fire).

It takes more than ten (10) gallons of water to produce 1 slice of bread.

In one year the average American uses 100,000 gallons of water (indoors and outside).

Our drinking water is safe and meets federal and state requirements.

If you have any questions about this report or concerning your water utility, please contact Arthur Bushey, WDM2 /CCS at 427-8928 between 8:00 am and 4:00 pm, Monday through Friday. If this is inconvenient please leave a message on our answering machine and we will return your call. The Timberlake Water Board meets the 3rd Tuesday of each month 6:30 p.m. at the MPC. We would be happy to have you attend. Water Board members are, Linda Sage Water Director, Mont Jeffreys, Dennis Winchel, Bill Bruder and Scott Woods.

The Timberlake Water Department regularly monitors for various contaminants in your drinking Water according to Federal and State laws. All drinking water, including bottled water, may be reasonably expected to contain at least small amounts of some contaminants. It's important to remember that the presence of these contaminants does not necessarily pose a health risk. More information can be obtained by calling the Environmental Protection Agency's Safe Drinking water Hotline at 1-800-426-4791.

The MCL's (Maximum Contaminant Level) are set at very stringent levels. To understand the possible health effects described for many regulated contaminants, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect.

Total Coliform: The Total Coliform Rule requires water systems to meet a stricter limit for coliform bacteria. Coliform bacteria are usually harmless but their presence can be an indication of disease-causing bacteria. When coliform bacteria are found, special follow-up tests are done to determine if harmful bacteria are present in the water supply. If this limit is exceeded in these follow-up tests, the water supplier must notify the public by newspaper, television or radio. At Timberlake Community Club Inc. we also use the Reader Board at the entrance and our automatic calling system.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immune-compromised persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly or infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the Safe Drinking Water Hotline, 1-800-426-4791.

WATER QUALITY DATA 2014

The Timberlake Water Department tests for more than 80 drinking water contaminates as required by the Environmental Protection Agency and the Washington State Department of Health (DOH). The DOH requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminates are not expected to vary significantly from year to year. Most of the data, though representative of the water quality, is from tests taken during the 2013 calendar year unless other wise noted. Only those contaminants that have been detected are listed in the table. Complete copies of all contaminates that are tested for are posted in the MPC and available upon request.

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