LAKE LIMERICK COUNTRY CLUB

WATER SYSTEM PLAN

ID# 44150-T

PROJECT NUMBER

120805

March 2013

Prepared for:

Lake Limerick Country Club
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Water System Plan Update
For The
Lake Limerick Water System
WSID: 44150-T

EXECUTIVE SUMMARY:

The Lake Limerick Water System (DOH ID 44150) is submitting a Water System Plan (WSP) Update. This 6-year plan amendment is required for compliance with the Washington Administrative Code. This document will serve to provide the necessary technical information to administer and operate this system. The Lake Limerick Water System is currently an approved Group A Community water system approved for 1,250 connections. No changes are desired in the number of connections at this time.

Population:	1,600
Sources:	7 Groundwater sources totaling 944 gpm[1].
Pressurization:	Booster pump and well pump driven
Distribution	Primarily Asbestos Cement installed in the late 1960's. Small portions of PVC installed during repairs and replacements of sections. 2,006' 2" 52,310' 4" 20,041' 6" 973' 8"
Water Rights	890 gpm, 446 acre-feet per year
ADD/ERU	224 gpd
MDD/ERU	728 gpd
Current PHD	794 gpm
20 Yr PHD	815 gpm
Fire Flow Requirements	The system was installed prior to adoption of Mason County fire flow standards. Future waterline replacements are planned that are adequate to support 1,000 gpm.
Management	Satellite Management Agent: Northwest Water Systems

Lake Limerick is a well-equipped system that requires no urgent upgrades or modifications. No significant operational, technical, or financial deficiencies exist at this time. The system is advised to begin a significant capital reserve program to replace waterlines over the next 20 to 40 years to maintain existing service levels.

[1] S02 is only used for flushing and fire-fighting events due to relatively poor water quality. Without S02 total source capacity is 744 gpm.

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Acronyms

ADD	Average Daily Demand
C	Coefficient of Friction
DSL	Distribution System Leakage
ERU	Equivalent Residential Unit
GWI	Groundwater Under the Influence of Surface Water
MCL	Maximum Contaminant Level
MDD	Maximum Daily Demand
MPA	Microscopic Particulate Analysis
NTNC	Non-Transient Non-Community
PHD	Peak Hourly Demand
ppb	Parts per Billion
ppm	Parts per Million
RSA	Retail Service Area
SMA	Satellite Management Agency
SWL	Static Water Level
SWSMP	Small Water System Management Program
UTC	Utilities and Transportation Commission
WDM	Water Distribution Manager
WFI	Water Facilities Inventory (form)
WSDOH	Washington State Department of Health
WSP	Water System Plan
WUE	Water Use Efficiency

Chapter 1 System Description

1.1 Ownership and Management

The Lake Limerick water system is owned and operated by the Lake Limerick Country Club, Inc. (LLCC), a non-profit corporation chartered to care for the public amenities in the development of the same name. Water service is provided to customers in the Lake Limerick Country Club community in unincorporated Mason County, Washington. The community stretches around its namesake lake in Township 21 North, Range 3 West, W.M. and occupies Section 27 as well as portions of the southeast quarter of Section 21, the southern half of Section 22, and the southwest quarter of Section 23. Specific data about the system can be found in the Water Facilities Inventory included in Section 10-5. Pertinent information about the water system is summarized below:

Water System Name:	Lake Limerick Water
System Type:	Group A Community Water System
WSDOH ID Number:	44150-T
Location:	Mason County, Washington
Source:	Groundwater
Type of Ownership:	Non Profit Corporation
Service Connections:	1,199
Population Served:	1,594
Type of Management:	Satellite Management Agency (SMA)
Name of SMA:	Northwest Water Systems
SMA Contact:	Kelly Alsin, WDM3
SMA Address:	PO Box 123 Port Orchard WA 98366
SMA Phone:	(360) 876-0958

1.1.1 Association Responsibilities

The Lake Limerick Country Club Board of Directors, composed of nine members serving 3-year terms each, manages and controls the affairs and business of the corporation and exercises ownership authority and control over all of the common properties and assets of the corporation.

To fulfill the responsibility of operating and maintaining the water system, the Lake Limerick Board of Directors created a six-member Water Committee in 1976. The Water Committee's structure and responsibilities are outlined in the Water Department Bylaws (see attachment 10-13). Terms are staggered so that two members are elected to the Water Committee each year for a 3-year term. The Water Committee monitors and administers routine financial responsibilities of the Lake Limerick water system and implements planning and capital improvements.

The Lake Limerick Country Club employs one staff person dedicated to the water system, Steve Wheaton, who serves as the on-site contact for the Lake Limerick Water Department.

1.1.2 SMA Responsibilities

Northwest Water Systems (NWS) has been contracted by Lake Limerick Country Club to serve as the water system's satellite management agency (SMA). In this capacity, NWS provides routine operation and maintenance services including 24-hour emergency response, coordination of repairs, development and implementation of the cross-connection control program, water quality monitoring, and oversight of other regulatory compliance topics. The SMA provides certified operations and management services meeting the requirements for Group A water systems. On-site operation and maintenance activities are coordinated with the Lake Limerick on-site staff person. A copy of the contract for SMA services is included in Section 10-18.

1.2 History and Background

The Lake Limerick Country Club (LLCC) was incorporated in 1966 as a non-profit maintenance corporation chartered to care for the public amenities in the development, located in Mason County about 5 miles northeast of Shelton WA. The land was developed as 1,397 residential lots and a nine-hole golf course in 5 divisions. A public water system was developed to supply the domestic needs of the community, with the first 4 groundwater wells drilled between 1966 and 1969, each with an associated water right. Engineering for the system was approved in June of 1968, and the LLCC board approved completion of all waterline installation in all divisions in 1970.

Waterline installation was completed in the early 1970's. Small problems were fixed, initial configurations were tuned, and the system achieved normal operations by the middle of the 1970s. A letter from 1977 notes that the final cost of the system was $230,592.48, of which $31,541.89 was for well drilling and equipment, and $199,050.50 for waterline installation. The source and purpose of the note are unexplained, but are interesting historical record. In comparison, waterline replacement today is anticipated to cost approximately $4,000,000, with an additional $2,000,000 in wells, reservoirs, booster pumps and other ancillary equipment.

By the beginning of the 1980s concerns regarding system capacity induced the community to explore options for additional capacity. A groundwater resources study was commissioned recommending that the system increase its source capacity, by drilling one source into a deeper aquifer. Through the 1980's the system drilled 3 additional sources, two drilled to the upper aquifer near 150' below grade, and one to an aquifer located near 450'. The community also installed its first two reservoirs. Supplemental water rights applications were filed for 2 of the 3 sources in the 1980s, with a third application filed in 1997 for Well 3B. All of the water rights except the application for Well 3B have been perfected to certificates.

In the 1990s and 2000s, source capacity issues had been largely resolved and the system focused on operational upgrades. The most recent two reservoirs were added, and a Supervisory Control and Data Acquisition System (SCADA) was installed to control and coordinate operation at the various sites located throughout the community, and backup power generating capacity was installed at the two most critical sites in the community. Touch read service meters were installed in the late 1990s and were updated to radio read meters between 2010 and 2013.

At this time the community is approaching complete build-out, and additional capacity is unlikely to be required. System management has been automated from wellhead to customer meter, sources are redundant and very reliable, storage is more than sufficient and backup power is available at multiple sites. Forward planning should focus on maintaining this state and preparing for future replacements as waterline and other key infrastructure elements age.

The community was platted at a far higher density than permitted under current county zoning, but was completed prior to Mason County comprehensive planning. As a result lots are "grandfathered", but cannot be subdivided. Factoring consolidation of lots and building site requirements it is estimated that the water system serving the development will have 1,250 connections at maximum build out. The golf course is irrigated with water pumped from Lake Limerick under separate surface water rights and does not affect water system operations.

1.3 Existing Facilities

The system's source of potable water is entirely from groundwater. The golf course is irrigated using surface water from Lake Limerick. With this irrigation system in place, no potable water is used in the irrigation of the golf course. The irrigation system is not physically connected to the potable water system, and its operation is fully independent of the water system, with its own source, pumps, waterlines, and water rights. It therefore does not factor into the capacity of the potable water supply, except that it reduces demand from the golf course that would otherwise be drawn from the water system. This effect is considered in the capacity analysis in Chapter 3.

Groundwater is withdrawn from 7 wells located on 6 separate sites. The wells were drilled between 1966 and 1988. Most of the sources are completed between 110 and 180 feet, although the latest source (Well 6) was drilled to a depth of over 440 feet. The total pumping capacity of all sources is 944 gpm (complete analysis is available in Chapter 3). Several sources are infrequently used, and one (Well 2) is only used for flushing and during firefighting activities.

The water system is comprised of multiple groundwater sources, storage, pressure boosting pumps, and waterlines. Backup power is available at two of the source and boosting stations, providing multiple redundancies. Control and monitoring is provided by a SCADA system connecting and coordinating the operation of the 6 sites from the water office.

1.4 Related Plans

The following documents were consulted in the preparation of this Water System Plan:

- *Mason County Comprehensive Plan*, updated 2005, and
- *WRIA Watershed Management Plan, Kennedy-Goldsborough Watershed,* Final Draft, February 2006.

Mason County maintains a *Comprehensive Plan* which was last updated in 2005. This document was developed to comply with the State's Growth Management Act (GMA). The *Comprehensive Plan* provides guidance on which the planning and land use projections within this WSP are based.

Lake Limerick is within the Kennedy-Goldsborough watershed (WRIA 14). In 2006, planning efforts lead by Mason County resulted in a final draft watershed management plan that has not been officially adopted. The draft plan addresses water quality, conservation, and environmental resource issues.

In accordance with the Municipal Water Law, Lake Limerick Country Club has obtained a signed consistency statement from Mason County to document that this WSP is consistent with local area planning. A copy of the Mason County consistency statement is provided in Section 10-19 of the WSP.

No inconsistencies or objections to the Water System Plan have been identified at the time of writing. Any comments received will be addressed and included in Section 10-19.

There are no adjacent water systems with which to coordinate in regard to water system planning; the nearest water system, Emerald Lake, is approximately one mile northeast of Lake Limerick.

1.5 Existing Service Area Characteristics

The Lake Limerick retail service area encompasses an area of approximately 875 acres. A map of the Retail Service Area (RSA) is found on the following page. Detailed system maps are included in Section 10-1.

Zoning within the Lake Limerick community is shown on maps prepared by Mason County (see maps included in Section 10-6). The area is zoned primarily for Rural Residential development with a density of one home per 5 acres. Other zoning designations in the Lake Limerick area include Rural Tourist/Recreational Area (the golf course) and Rural Commercial. Single-family residential land use makes up over 90 percent of the Lake Limerick total land area. One small area of rural commercial development is located at the southern edge of community. Lands identified as Rural Commercial serve neighboring residences with quick shopping or other services compatible with neighboring uses.

1.6 Future Service Area

No increase in the system's service area is anticipated; all growth on the water system in the future is expected to be from the infill of empty lots within the existing service area.

1.7 Service Area Agreements

The community has never formed any service area agreements with outside utilities. No competing utilities have registered service areas within the bounds of the existing or future service areas proposed by Lake Limerick; therefore, no utility coordination is required.

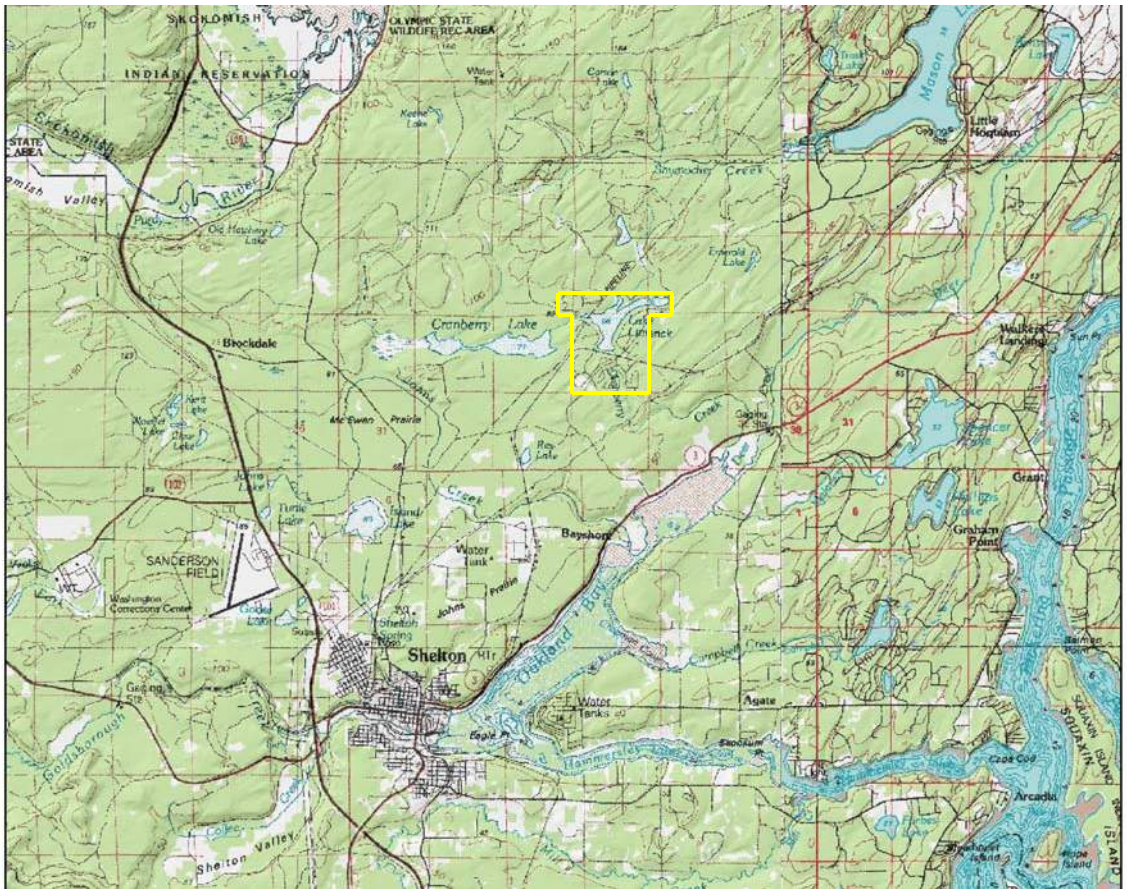


Figure 1: Lake Limerick Water System vicinity map.

SITE INFORMATION PROVIDED BY: THE CLIENT AND BY SITE INSPECTION

THIS IS NOT A SURVEY. PROPERTY LINES AND ELEVATIONS SHOWN ARE BASED UPON THE AVAILABLE INFORMATION AND ARE APPROXIMATE ONLY.

DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

BOLD LINE DENOTES THE RETAIL SERVICE AREA.

NO EXPANSION IS OF THE EXISTING SERVICE AREA IS PLANNED, EXISTING, RETAIL, AND FUTURE SERVICE AREA BOUNDARIES ARE COINCIDENT.

ADJACENT AREAS ARE ZONED RURAL-20. AREA IS NOT PART OF ANY UGA

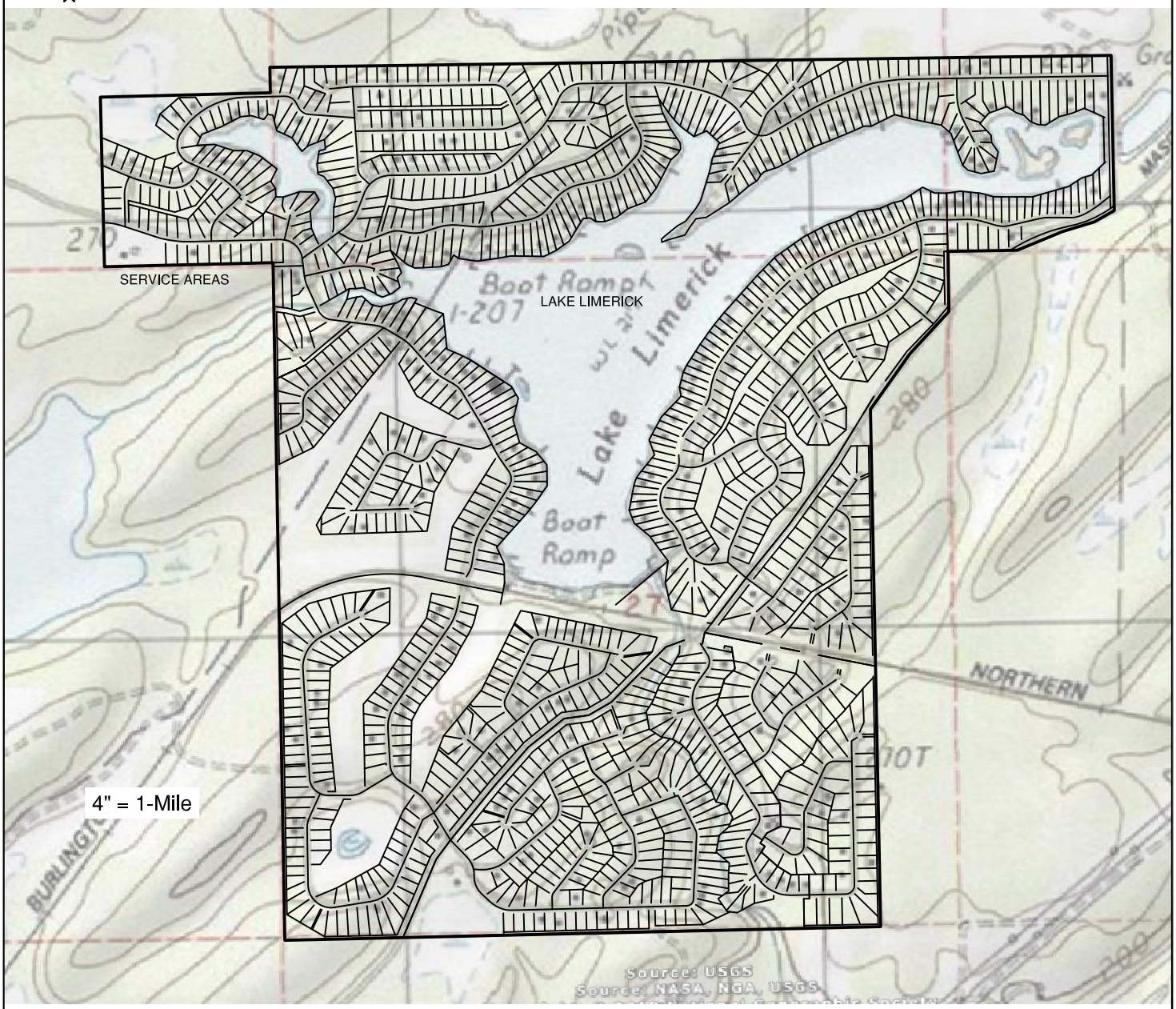


FIGURE 2: LAKE LIMERICK WATER SYSTEM SERVICE AREA BOUNDARIES

DRAWN BY:	SYSTEM: LAKE LIMERICK	OWNER: LAKE LIMERICK	
CHECKED BY:	FILE NO.: 120805	FILE NAME: SERVICE AREA	SHEET NO.:
REVISION	DATE: MARCH 11, 2013	SCALE: 4" = 1-Mile	
DESCRIPTION / DATE	NORTHWEST WATER SYSTEMS, INC. DESIGN - CONSULTING - MANAGEMENT P.O. BOX 123 PORT ORCHARD, WA 98366 (360) 876-0958		

1.8 Service Area Policies

The Lake Limerick water system, in its commitment to provide dependable water service in accordance with all applicable regulatory rules and regulations, observes the following general policies.

1.8.1 Annexation

Annexation will not serve as a condition for providing service.

1.8.2 Direct Connection and Satellite/Remote Systems

Future direct connections to the Lake Limerick water system will occur as a result of infill within the retail service area.

Satellite systems are noncontiguous or separate water systems that use separate facilities and infrastructure and may be served by a different source. Lake Limerick does not operate nor has responsibilities associated with any satellite water systems.

1.8.3 Design and Performance Standards

All design and construction shall be completed under the direction of the Lake Limerick Country Club. Standards and details for pipe replacement and new service connection details are included in Section 7.

1.8.4 Outside Customers and Improvement Districts

The system will not serve any outside customers or districts.

1.8.5 Urban Growth Area

The system is not located within an urban growth area.

1.8.6 Late-Comer Agreements

Late-comer agreements do not apply to the system.

1.8.7 Oversizing

The existing distribution system is capable of serving the entire existing service area.

1.8.8 Cross-Connection Control Program (CCCP)

Lake Limerick has adopted a cross-connection control policy statement and developed a cross-connection control program and backflow incident response plan. In accordance with these documents, the installation or maintenance of a cross connection is prohibited. Cross connections that cannot be eliminated shall require the installation of an approved backflow protection device and shall be annually inspected and tested in accordance with the Lake Limerick cross-connection control program.

Services are connected to the watermains in pairs. A misinterpretation of Cross Connection Control regulations led the community to install a single Double Check Valve Assembly (DCVA) on every pair of services at the service lateral. As configured the main distribution lines are fully protected from a backflow incident; however, none of the individual properties were protected from their neighbor. As a result, no one on the system was fully protected from backflow hazards; although the effect of a backflow incident would be greatly limited in scope. The CCCP program has been re-evaluated and redefined to only require installation of DCVAs or other backflow devices on connections identified in hazard surveys conducted every 3 to 5 years.

1.8.9 Extension

No extensions are anticipated nor proposed.

1.9 Conditions of Service

The Lake Limerick water system has a duty to serve all new connections located within its Retail Service Area, so long as the following four threshold factors are met, as described in Washington Administrative Code (WAC) 246-290-106:

1. *Lake Limerick has sufficient capacity to provide water in a safe and reliable manner.*
   Lake Limerick holds a GREEN operating permit with no restrictions on expansion up to the allowed number of connections established by the DOH.

2. *The service request is consistent with state and local regulations.*
   The provision of service within the Retail Service Area is considered to be consistent with the *Mason County Comprehensive Land Use Plan*.

3. *Lake Limerick has sufficient water rights to provide service.*
   The Water Rights Self-Assessment forms included in the Water System Plan (see Section 10-8) show that the system has sufficient water rights to meet the water right criteria through build-out.

4. *Lake Limerick can provide service in a timely and reasonable manner.*
   Any applicant requesting water service with the Lake Limerick water system will be required to submit a written request to the Lake Limerick Water Committee. The written request shall include the name and address of the applicant, location of premises where water service is requested, and the purpose for which water is requested. The Lake Limerick Water Committee will respond to service requests with a determination of water availability within 60 days of receipt of the written application.

   For planning purposes, "timely service" is defined as receiving water service within 120 calendar days plus construction time. If the extent of water service requested requires construction of major facilities such as the replacement or installation of new storage tanks, wells, booster pumps or distribution mains, the time associated with construction may be added to the 120 days.

   The provision of new water service is "reasonable" if:

   - The conditions of service are consistent with local land use plans and development regulations.
   - The conditions of service and associated costs are consistent with those documented in the water system plan, and
   - The conditions of service and associated costs are consistent with the water system's standard practice experienced by other applicants requesting similar water service.

1.10 Complaints

Complaints regarding water service issues may be directed to the water office during regular business hours or to the SMA in the event of after-hours emergencies. The SMA is available on a 24-hour basis for emergency response. The SMA investigates each complaint and maintains records describing the nature of the complaint and the steps taken to resolve it. The SMA coordinates with the Lake Limerick Water Committee and the Board of Directors to ensure that the water system owner is aware of any issues and their resolution.

Chapter 2 Basic Planning Data

2.1 Demand Analysis

2.1.1 Population and Demographics

The Lake Limerick Community Club is a residential community comprised of full-time residences, seasonal residences, vacation properties, commercial services, and community recreational areas. The community includes a 9-hole golf course and recreational lake, 17 community parks, a restaurant, and a pro-shop for golfing supplies. The breakdown of services is as follows:

- 771 Full time residences
- 71 Seasonal Residences
- 337 Vacation Properties
- 17 Community Parks
- 3 Commercial Services

The 2010 census data suggests that the Mason County households in unincorporated areas have on average 2.48 people her household. Based on this, there are estimated to be 1,912 full time residents living in the 771 full time residences. The seasonal residences tend to be occupied by retired couples and individuals. The average Part-Time residential population is therefore estimated based on 2 persons per residence during the summer months, with a peak of 142 residents. The 337 vacation properties see occupancy ranging from a handful to many dozens of persons per day. See the updated WFI for monthly transient population estimates. There are between 20 and 35 non-resident employees of Lake Limerick present throughout the year.

2.1.2 Meter Data

The community has record of production meter data going back over 12 years in one form or another. The community keeps service meter data; however, given the sheer volume of data collected, only the summarizing results are shown. Charts shown in this section were generated using data available in Appendix 10-6. Water use has steadily declined over the past 12 years, as shown in Figure 3.

Meter data for the past 12 years clearly shows the effect of water use efficiency and leak detection efforts on the part of the community. The community has grown from approximately 1,016 connections since 1999 to 1,199 today, but water use has fallen. Meter data in Figure 3 shows a steadily declining trend from 98 million gallons pumped in 1999 to 60 million gallons in 2012. Figure 4 shows monthly data for the past 5 years, which established that very significant gains in decreasing peak summer-time demand have occurred over the past 5 years, where summertime peaking has fallen from 14,000,000 gallons per month to just over 8 million gallons per month.

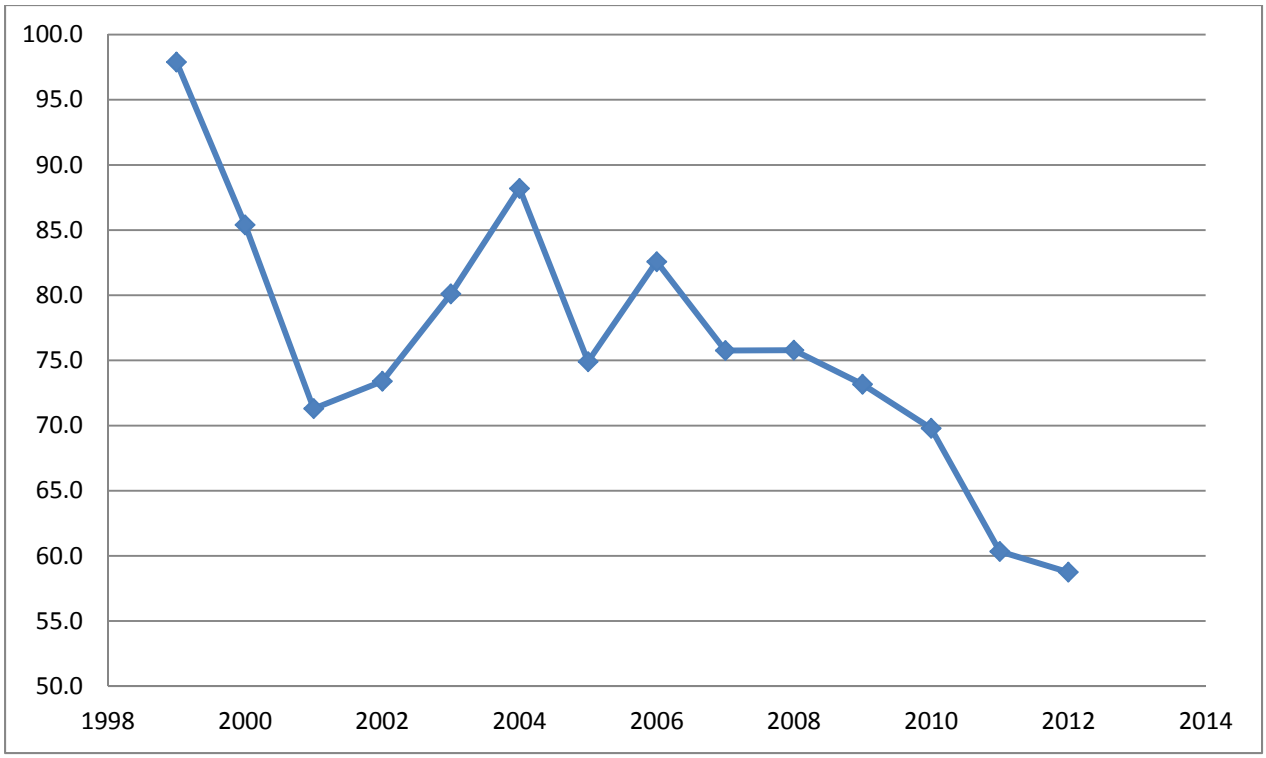


Figure 3: Annual Source Production from 1999 to 2012, MGY

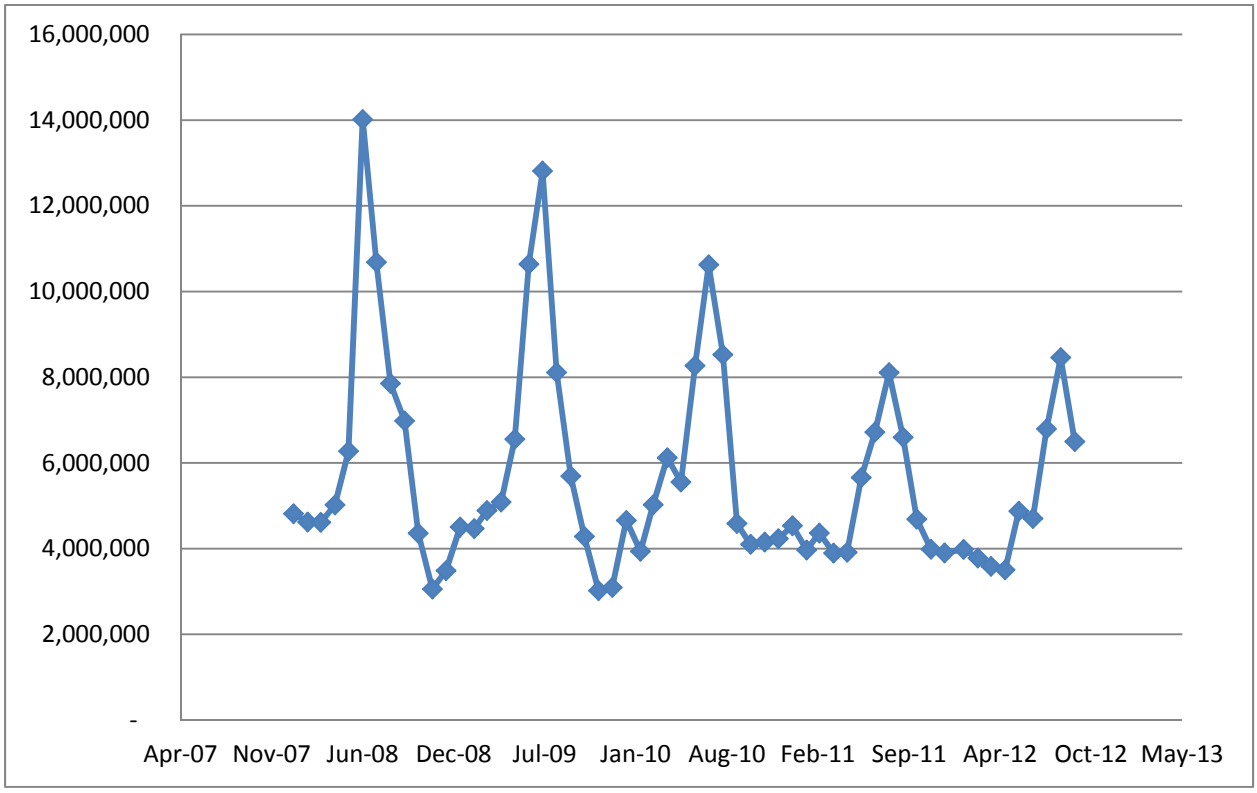


Figure 4: Monthly Source Production in Gallons

2.1.3 Usage by Customer Class

The system serves the following four classes of customer:

1) Full Time Residential
2) Seasonal Residential
3) Vacation Properties
4) Commercial
5) Recreational

The full time residential users are the predominant share of connections with 771 connections, accounting for over 64% of the connections, and are the basis for the Equivalent Residential Units (ERU). Seasonal connection usage is essentially indistinguishable from full time residences when occupied, and zero when not occupied. The vacation properties are used for recreational vehicle hookups, water access when camping, and washing boats and other recreational gear. There are three significant commercial services, the Pro-Shop, Clubhouse, and Fire Station, each of which use between 200 gpd and 400 gpd throughout the year. 17 public recreational services see monthly usage ranging from just a few tens of gallons up to a couple thousand gallons per month in the summer.

2.1.4 ERU Analysis

For the purpose of this report, one ERU is defined as the equivalent usage of a single family residence occupied full time. The commercial services all exhibit usage patterns that are reasonably similar to the typical residential use on the system; therefore, they are each counted as a single ERU.

Seasonal residences are counted as a single ERU during the months when they are occupied, and zero ERU for non-occupancy months. The occupancy of the homes begins in April when seasonal residents begin returning from warmer climates, and rises to a peak in July and August, before falling back off. Meter Data sheets show the estimated number of ERU contributed by the seasonal connections varying from 0 to 71 ERU.

Vacation properties are generally owned by people who live nearby and use the property more frequently, and more irregularly than the seasonal population. These properties tend to be used throughout the year, as golfing and fishing amenities are available nearby. It is estimated that on average residential properties are used approximately 35 days per year, or 10% of the time. On this basis, the Vacation properties account for 0.1 ERU for each recreational property.

The two commercial connections exhibit usage that is typical of residential use; therefore, the commercial services were assumed to be 1 ERU each for the analysis for simplicity. The public recreational connections at the parks were evaluated and found to be most similar in use to the vacation properties; they are therefore accounted as 0.1 ERU each.

ERU per class was evaluated and characterized for the winter and summer to determine the maximum and minimum ERU on the system. Since seasonal residences cause the total system ERU to vary over

the course of the year, summertime system ERU is different than winter. The system's average ERU is used in calculating average day demand, and the peak ERU is used to estimate demand during the summer months.

Table 2-1: ERU Analysis

Class	Services	ERU
Full Time Residences	771	771
Seasonal Residences	71	0 – 71[1]
Vacation Properties	337	33.7
Commercial Services	3	3
Community Recreational Services	17	1.7
Total, Average	1,199	841
Total, Peak	1,199	880

*See footnotes below

2.1.5 System Parameters: ADD, MDD, and PHD

The system's metered source production over the past 4 years divided by the system's average ERU yields an average day demand (ADD) of 218 gpd/ERU. Over this same period the maximum months average demand (MMAD) on record was 485.3 gpd/ERU. Since the system has consistently been reducing its consumption over the past 10 years, the peak for the last 4 years is used rather than choosing previous years. The period evaluated includes 2009, which was a relatively hot, dry year during which many water systems exhibited high demand.

The Water System Design Manual (WSDM) recommends that maximum day demand (MDD) be calculated by multiplying the MMAD by 1.7 for communities in western Washington. In the case of Lake Limerick a factor of 1.5 is chosen instead because (1) the community is comprised of small lots with minimal irrigation, and (2) service meter records for August of 2012 show an MDD/MMAD ratio of just 1.201. For all these reasons an MDD/MMAD ratio of 1.5 is adequately conservative. From this, MDD may be calculated as:

$$MDD = 1.5 * MMAD = 1.5 * 485.3 gpd = 728\ gpd/ERU$$

When calculating flow rates during fire flow conditions, MDD in terms of gpm/ERU is a useful parameter. This is a simple conversion from days to minutes:

$$MDD = \frac{728 gal}{day} * \frac{1 day}{1{,}440\ minutes} = 0.506\ gpm/ERU$$

With MDD, the peak hourly demand (PHD) may be found with this information using equation 5-1 of the WSDM. PHD is here calculated for the existing community's peak summertime flow, when 880 ERU of demand is expected.

[1] Seasonal Residences are generally unoccupied from November to March, with occupancy increasing April through June to a peak in July and August, and back down through October. The average number of ERU is the weighted average throughout the year

$$PHD_{exist} = \frac{MDD}{1440}\big((C)(N) + F\big) + 18 = \frac{728}{1440}\big((1.6)(880) + 225\big) + 18 = 844gpm$$

Table 2-2: Summary of Current Systems Design Parameters

Existing ERU	817
ADD/ERU	224 gpd
MDD/ERU	728 gpd
MDD Average Flow	445 gpm
PHD	844 gpm
PHD w/1,250 ERU	1,143 gpm

Based on the available Water Use Efficiency (WUE) reports, distribution system leakage (DSL) historically has been between 4% and 7% DSL, or about 3 and 6 million gallons per year over the past 3 years. Since there are 525,600 minutes per year, DSL is estimated at between 6 and 12 gpm. DSL is therefore not further evaluated for the purpose of capacity since all of the above calculations are derived from production rather than consumption meter data.

2.1.6 Pressure Zones

The system is comprised of a single pressure zone. The elevations in the community range from 210' to 295' based on data obtained from the Puget Sound LIDAR Consortium (PSLC). As a common reference point, the lake is located at 224' of elevation in this data. The system's booster pumps and those wells pumping directly to distribution provide pressure to the system. By matching of the pressure settings of the 6 sites throughout the community, an overall average hydraulic grade of approximately 443' elevation is maintained. Hydraulic analyses at PHD and other conditions are included in section 10-1 showing pressure at various points around the system.

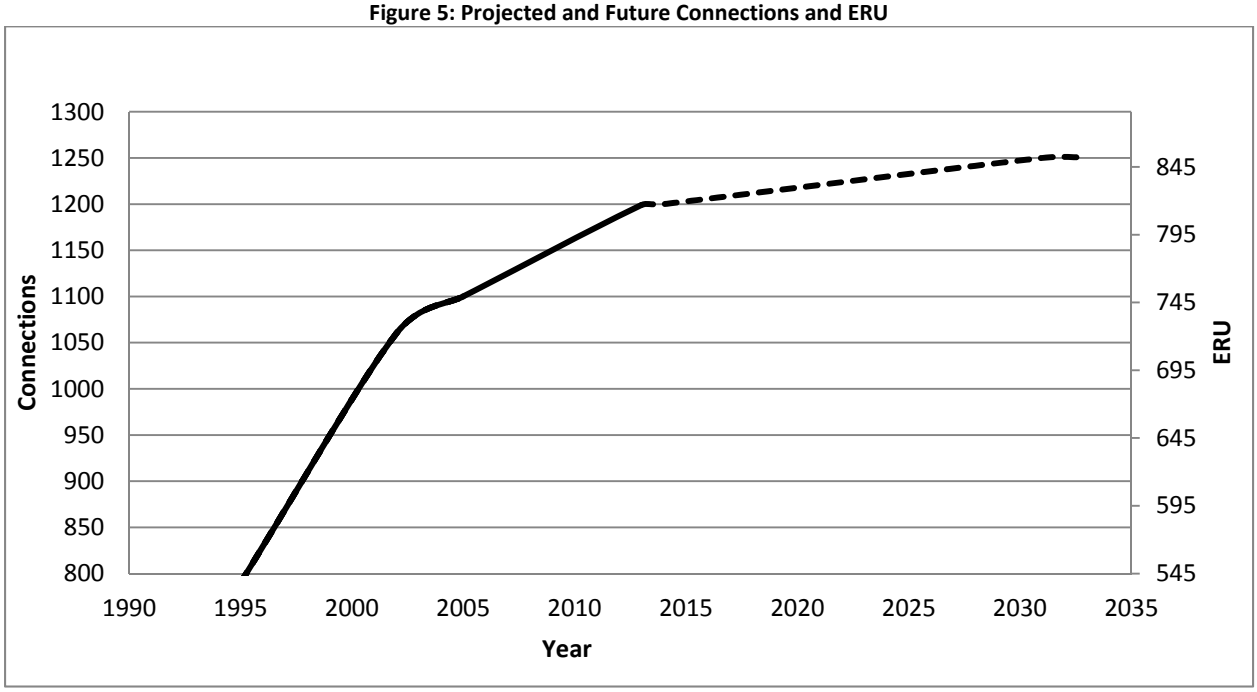
2.1.7 Other Systems

No interties exist or are planned to the Lake Limerick water system within the next 20 years. No water use by other systems is therefore considered.

2.2 6 & 20 year projections

The community was originally developed with 1,397 lots and the golf course. At this time, 1,199 services are active. The system's 2006 Water System Plan projected service connection counts through 2027, and projected that 1,191 services would be active in 2013. The old Water System Plan anticipated a build-out capacity of approximately 1,250 services. There have been no significant changes to the community or plans in the intervening 6 years, and the projection for maximum build-out is still expected to be correct. As a result of the housing collapse of 2008, a number of the services are likely to be disconnected and foreclosed upon and the system is not projected to return to a steady growth path until after 2015. New projections for a path to 1,250 services are shown in Figure 5.

Figure 5: Projected and Future Connections and ERU

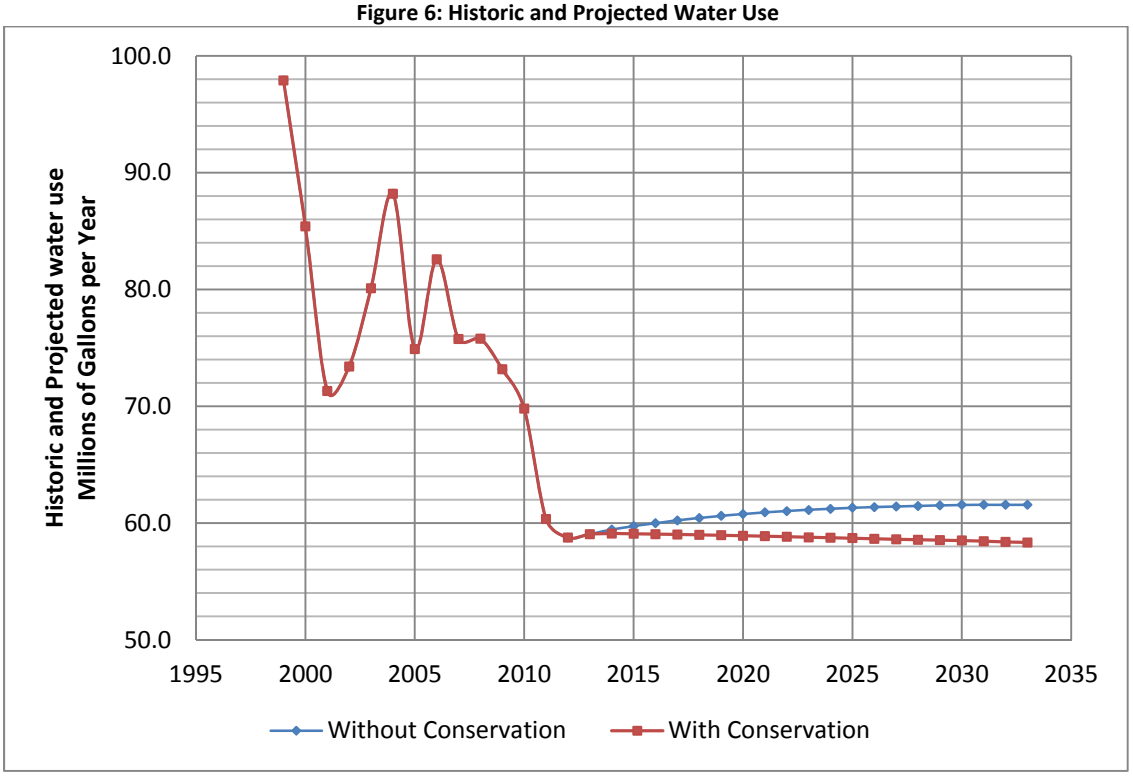


The nearby golf course, lake amenities, and character of the area are likely to continue attract retired and part time residents well into the future. For that reason, the approximate 65/35 ratio of full-time to non-full-time residents is anticipated to persist for the foreseeable future. It is critical to acknowledge that the system must plan for peak demands based on the busy summer time occupancy.

At the next water system plan, it will be useful to evaluate the number of full time and part time residents to begin to evaluate if there are any changes in demographics over time. The system has historically grown rapidly enough for increased connections to overcome changes in the relative number of full time and part time homes. As the 1,250 connection projected build-out is approached however, future changes in water use will become closely tied to changes in this ratio.

The community has resolved several significant leaks over the past 6 years, and has instituted a tiered water rate. The community is comprised of largely modern homes with low flow indoor plumbing. It is therefore likely that future conservation efforts will yield less impressive results than those of the past decade. The figure below shows the projected water demand based on no improvement and a maximum 6% reduction in per/ERU water usage over the next 20 years. It is not likely that the community will be able to exceed this level of conservation.

Figure 6: Historic and Projected Water Use



2.3 Interties

No interties with other systems exist or are proposed for the Lake Limerick Water System.

2.4 Land Use and Zoning

The community was platted for relatively high density rural residential homes, and the golf course. The community is approaching completion of this plan with over 90% of the likely lots already connected. The land use and zoning for the community are therefore not expected to change over the next 6 to 20 years.

2.5 Distribution System Leakage and Volume

Lake Limerick takes monthly service meter readings and compared them to the source meters to determine leakage. The system has exhibited Distribution System Leakage of less than 10% for the past three years. The year by year leakage is shown in Table 2-3 below.

Table 2-3: Distribution System Leakage and Volume

Year	**Pumped**	**Sold**	**Lost**	**Loss**
2010	69,790,309	66,840,300	2,950,009	4.2%
2011	60,958,882	56,483,665	4,475,217	7.3%
2012	57,963,886	54,775,298	3,188,588	5.5%
Avg.	**62,904,359**	**59,366,421**	**3,537,938**	**5.7%**

Converting the gallons lost per year into a more familiar unit of gallons per minute, we find that the average leak rate for Lake Limerick is 6.73 gpm. This may be compared to the permissible leak rate as recommended by the AWWA Manual for Pipeline Install Practices, M-23 document regarding acceptable leakage rates. Per the AWWA, acceptable leakage rates may be calculated using the following equation:

$$L = \frac{N * D * \sqrt{P}}{7400}$$

Where L is the acceptable leakage rate, D is the nominal diameter of the pipe, and N is the number of joints in the pipe. Since the system is comprised of pipe installed in 20' lengths, the total permissible leakage can be calculated for the system. The pipe inventory is used in conjunction with the equation above to estimate the loss that can be expected for a system this size, and is shown in Table 2-4.

Table 2-4: Acceptable Loss

Nominal Pipe Size (inch)	Installed Length (feet)	Joints	Loss (gpm)
2"	2,006'	100	0.2
4"	52,310'	2615	10.0
6"	20,041'	1002	5.7
8"	973'	48	0.4
Total	**75,330**	**3765**	**16.3**

Distribution system leakage is therefore less than that considered acceptable by the AWWA for newly installed waterline. It is therefore possible that there are no actionable leaks in the Lake Limerick Distribution System at this time, which is evidence of the effectiveness of Lake Limericks commitment to addressing leaks. The system intends to continue this successful leak detection and repair program.

Chapter 3 System Analysis

3.1 System Design Standards

All design and future construction shall be completed in accordance with the Washington State Department of Health Water System Design Manual (Design Manual). The following is a brief summary of relevant standards set forth in the Design Manual:

ADD/MDD	Section	5.2
PHD	Equation	5-3
Distribution System	Chapter	8
Hydraulic Analysis	Section	8.2

Over the next 20 years the system does not anticipate growing beyond its existing service area. There are various sizes and types of waterline in service today. The distribution and pumping systems provide sufficient capacity to meet residential peak demands for the community well beyond build-out; however, they do not meet fire flow requirements. Two of system's six sites have automatic backup power installed on site to provide service in the event of power failure. Either of these sites is capable of providing average daily demand.

3.2 System Inventory

3.2.1 Overview

The community is served water by infrastructure located at 6 sites and the distribution system. Four of these sites include a reservoir and booster station, while two sites consist of wells inside small buildings. All of the sites are tied to the main office by the SCADA system. Each of the sites contain one well, except for site 3 which incorporates wells 3A and 3B. The sites without reservoirs pump directly to distribution. All of the sites are monitored and controlled by Remote Telemetry Units (RTUs) which are essentially Programmable Logic Controllers (PLCs) with communications hardware. These RTUs communicate to a central PLC and Master Telemetry Unit (MTU) from which the entire system may be monitored and controlled. Most of the sites use licensed serial radios; site 6 however, uses an unlicensed 900-mhz serial modem. Table 3-1 lists the sites and associated hardware.

Table 3-1: Summary of Sites

Well Site	Well(s)	DOH Source Number	Tanks	Booster Pumps	Backup Power	Reservoir
1	Well 1	SO5	Tank 1	Booster 1	None	Tank 1: 125,000 Gallons
2	Well 2	SO2	None	None	Gen. 2[1]	None
3	3A and 3B	SO3 and S06	Tank 3	3A and 3B	Gen. 3	Tank 3: 150,000 Gallons
4	Well 4	SO4	Tank 4	Booster 4	None	Tank 4: 60,000 Gallons
5	Well 5	SO7	None	None	None	None
6	Well 6	SO8	Tank 6	6A and 6B	Gen. 6	Tank 6: 160,000 Gallons

[1] Site 2 is not generally used due to poor water quality and generator 2 is not connected. The generator and site could be brought online in a matter of hours if necessary.

The community's distribution system consists of an array of 2", 4", 6" and 8" waterline. Waterlines are looped throughout the community, include a complete loop around the lake and several subsidiary loops. A summary of pipe sizes and quantities in service are shown in Table 3-2.

Table 3-2: Pipe Inventory

Nominal Pipe Size	Installed Length
2"	2,006 feet
4"	52,310 feet
6"	20,041 feet
8"	973 feet
Total	75,330 feet

The community's sources and services are all metered. Touch read meters installed in the late 1990's were replaced by radio read meters between 2010 and 2013. The new service meters are capable of providing hourly logs for the month if a customer desires detailed logs. The new meters are read and billed monthly.

3.2.2 Sources

Lake Limerick has seven wells located at six sites. The pump curves and well logs are given for each site in Section 10-3. Current pumping capacity at each well was measured in the field by the system operator in preparation for this Water System Plan update. The current capacity for each well has been updated on the WFI Update form located in Section 10-7. A summary of the wells is shown in Table 3-9.

Table 3-3: Summary of Sources

Well	Elevation	Pumps To	Controlled By	Capacity (gpm)
1	275	Tank 1	Water Level	49
2	240	Distribution	Pressure	200
3A	300	Tank 3	Water Level	144
3B	300	Tank 3	Water Level	194
4	270	Tank 4	Water Level	74
5	275	Distribution	Pressure	35
6	270	Tank 6	Water Level	248

The combined source capacity for the system is approximately 944 gpm. Well 6 is the highest capacity well on the system with an instantaneous capacity of 248 gpm. In the absence of this well the system is still able to produce 696 gpm. Well 2 is only used for routine flushing and maintenance as was anticipated in the 2006 Water System Plan.

3.2.3 Water Rights and Capacity

Table 3-4 summarizes the system's water rights and pumping capacities. The water rights self-assessment tables and copies of the water rights certificates can be found in Section 10-9. It is likely

that well 3B will not require a separate water right certificate, as it is drilled very near well 3A, and to a similar depth. On these grounds, a showing of compliance was prepared and submitted to the State Department of Ecology, permitting the use from Well 3B to be applied to the certificate for 3A.

Table 3-4: Water Rights and Pumping Capacities

Well	Certificate Number	Priority Date	Qi[1] (gpm)	Qa[2] (acft/yr)	Current Capacity (gpm)
1	5566	4/19/1966	100	117	49
2	5887	6/30/1967	200	166	200[3]
3A	5888	6/30/1967	100	84	144
3B	-				194
4	7012	11/19/1968	100	79	74
5	2-27215C	11/17/1987	190	152[4]	35
6	G2-27443C	10/26/1988	200	160[4]	248
Total			890	446	944

*See Foot-Notes Below for notes 1,2,3, and 4

3.2.4 Storage

The system's four reservoirs are summarized in Table 3-5. All of the tanks are round concrete structures located on site. Reservoir fill elevations governing the operational storage may be adjusted by the SCADA control interface located in the main water office. Reservoir fill levels are stopped 3.5 feet below the overflow elevation, effectively making that storage inaccessible. Water cannot be withdrawn below the 6" mud-ring level, leaving a total of 4' of unusable volume in each of the reservoirs.

Table 3-5: Storage Summary

Tank Name	Dimensions (Ft)		Volumes (Gallons)				
	Height	Diameter	Volume	Gallons per Foot	Operational Storage	Inaccessible and Dead Storage	Remaining Volume
Tank 1	24	25	84,600	3,525	17,625	14,100	52,875
Tank 3	30	30	158,600	5,287	29,079	21,148	108,374
Tank 4	30	21	77,000	2,567	10,268	10,268	56,464
Tank 6	30	30	158,600	5,287	29,079	21,148	108,374
Total			**478,800**		**86,050**	**66,664**	**326,086**

[1] Qi is defined as the maximum instantaneous withdrawal rate allowed by water rights.
[2] Qa is defined as the maximum annual withdrawal allowed by water rights
[3] Well 2 is not used for day-to-day operations.
[4] The annual water rights for Wells 5 and 6 are supplemental to previous water rights and therefore not included in the total annual water rights.

3.2.5 Booster Pumps

Lake Limerick has six booster pumps. Sites 1 and 4 each have one booster pump, while Sites 3 and 6 each have two. The booster pump curves are provided in Section 10-4. Booster pumps at sites 1, 3 and 4 are controlled by pressure settings in the distribution system at the respective sites. These pressure settings may be adjusted as necessary from the water office. The system booster pumps are configured to maintain an HGL of approximately 443'. These elevations are measured with a sea level datum, from which the water surface elevation for Lake Limerick as 224'.

Booster Pump	Capacity (gpm)	Backup Power Source
1	130	No
3A	210	Generator 3
3B	210	Generator 3
4	150	No
6A	200	Generator 6
6B	200	Generator 6
Total	**1,100**	**Partial**[1]

The system retains 820 gpm of booster pump capacity during a power outage, and 400 gpm if either of the generator stations fails to operate when called on. Both generators are protected from the weather, and one generator is housed in a heated building. Generator 3 is plumbed into utility natural gas giving it an indefinite potential operating capacity. Generator 6 has a 250 gallon propane fuel tank that is topped off when the level approaches 50%. Both generators automatically exercise for a set period each month. Given this maintenance regimen it is extremely unlikely that simultaneous generator and power failures will occur.

3.2.6 Buildings

Most of the Lake Limerick Water System's wells and all of the booster pumps and controls are located within buildings. These buildings are summarized in Table 3-6.

Table 3-6: Summary of Buildings

Site	Building Size	Year Constructed	Notes
1	12' x 9'	1969	
2	9.5' x 20'	1967	
3	9.5' x 9'	1967	Well + Controls
3	6.5' x 9'	1967	Booster Pumps
4	8' x 18.5'	1968	
5	9.5' x 11.5'	1968	
6	17.4' x 26'	2004	Generator Inside

[1] 820 gpm is available during power outages

3.3 System Capacity Analysis

3.3.1 Service Area

The system does not intend to expand its service area. All growth is anticipated to come from infill within the existing service area. The original plat provisioned 1,397 lots, although combinations and combined ownership will likely prevent the system from ever reaching this number of services. The previous two water system plans projected a maximum build-out of 1,250 lots, because many of the lots are unfavorable to site development, while others have been combined. Since there have been no significant changes in site development requirements, this maximum build-out projection is still considered valid.

$$N_{Service\ Area} = 1{,}250\ ERU$$

3.3.2 Water Rights

The system's water right is limited to 890 gpm and 446 acre-feet per year (See Section 10-9). Reservoir storage could be increased to serve as many ERU as the instantaneous water right permits be pumped at MDD. Therefore the ERU's that may be served by the systems permitted withdrawal under MDD conditions are considered.

$$N_{wr,instant} = \frac{890\ gal/min * 1{,}440 min/day}{728 gpd/ERU} = 1{,}760\ ERU$$

From Table 2-2 the ADD is 218 gpd/ERU, or multiplying by 365 days per year and converting to acre-feet, a typical ERU uses 0.244 acre-feet per year. Therefore, water rights limit the system as follows:

$$N_{wr,annual} = \frac{446 acft/yr}{0.244 acft/yr} = 1{,}827\ ERU$$

3.3.3 Source Capacity

Reservoir storage can be used to increase the capacity of the system to serve instantaneous demand of the system. The sources must still provide sufficient capacity for the maximum daily demands. Peak daily production is found by taking the product of the instantaneous capacity for each well, the number of minutes in the day, and the percentage of the day that the wells may be operated. In general wells should not be pumped for more than 50% of their peak capacity; however, on peak demand days they may be pumped up to 80% of the day. Using this ratio, the source capacity from each well is as follows:

Table 3-7: Daily Source Capacities

Well	Pumping Capacity
1	56,448 gpd
2	230,400 gpd
3A	165,888 gpd
3B	223,488 gpd
4	85,248 gpd
5	40,320 gpd
6	285,696 gpd
Total	1,087,488 gpd

Using the MDD per ERU to calculate the limiting number of ERUs that may be served:

$$N_{source} = \frac{1{,}087{,}488\ gal}{728\ gpd/ERU} = 1{,}493\ ERU$$

3.3.4 Pressure Pumps

The booster pumps listed in Section 3.2.5 have a total combined capacity of 1,100 gpm. Well 2 and Well 5 both pump directly to distribution at pressure and may be added to the total pressure supply capacity. Wells 2 and 5 have 200 and 35 gpm capacity respectively. In all, the system can deliver 1,335 gpm to the distribution system between the two wells and 6 booster pumps. Using the rearranged PHD equation for ERU, the booster pump limits the system to:

$$N_{Booster} = \frac{\left(\frac{1{,}440(1{,}335 - 18)}{728} - 225\right)}{1.6} = 1{,}487\ ERU$$

3.3.5 Storage

As noted in Section 3.2.4 the system has storage located at 4 sites totaling 478,800 gallons. Typical set points reduce the available usable volume of the reservoir. Although this could be readily adjusted, it is included since it is the current operating condition. Table 3-5 gives the sum of unusable volumes for the system; 66,664 gallons.

Given the flow rates from each of the well pumps throughout the system (all of which are under 250 gpm), none of the reservoirs should require more than 1,000 gallons of operational storage; however, additional storage is allocated by control settings. To promote additional turnover of water in the reservoirs, the SCADA control settings are configured to draw down as much as 5 feet prior to starting well pumps. The operational storage shown in Table 3-5 was calculated from the typical control settings, which provide operational storage greatly exceeding that required by the WSDM. From this table, 86,050 gallons are allocated to operational storage.

Fire flow is not provided by the Lake Limerick Water System. Although the pumping system is adequate to provide fire flow, and portions of the water system could also support fire flow, a large portion of the distribution system cannot. Notice was provided during the preparation of an early water system plan to the Mason County Fire Marshall specifically instructing them not to use the system for fire flow. When the distribution system has been upgraded and hydrants installed to support fire flow, current fire code effective in Mason County would require 120,000 gallons of fire suppression storage. The system is not required to maintain this volume at this time because the distribution system is inadequate, but it is provisioned in this analysis to establish its inclusion will not become a limiting factor once fire flow is provided by the distribution system.

Standby storage for systems with multiple sources is calculated by Equation 9-3:

$$SB = (2\ days)[(ADD)(N) - t(Qs - Ql)]$$

The equation only gives a valid response when:

$$(ADD)(N) - t(Qs - Ql) > 0$$

Solving for number of ERU:

$$N > t(Qs - Ql)/ADD => N > 1440 * (944 - 248)/224 => N > 4{,}474$$

Since equations 9-2 and 9-3 do not apply, the alternative minimum of 200 gpd per connection could be used. As noted in Section 3.2.5 the system has several independent sites with backup power generation. Each of the backup power systems are well maintained, and two of them include boosting systems capable of delivering ADD flow to the community. The daily capacity of each site to deliver water to (1) the reservoir, and (2) the distribution system are shown in Table 3-8.

Table 3-8: Capacity of sites with standby power

Site	Source Capacity
Site 2	288,000 gpd
Site 3	486,720 gpd
Site 6	357,120 gpd

Any of the above sites could provide more than the 200 gpd required per service, and in the more likely event of all three sites operating, PHD could be provided by standby power alone. The community has never needed to draw on standby storage. For this reason, no standby storage is provided by the reservoirs.

The only remaining use for the reservoir is equalization storage, providing additional capacity to the system during PHD. WSDM equation 9-1 is solved for PHD, and then substituted into equation 5-1 solved for the number of ERU to determine the limitation imposed by standby storage. Equalization storage is the remaining storage shown in Table 3-5, 326,086 gallons, less 120,000 gallons of fire suppression storage, for a total Equalization storage of 206,086 gallons. The value used for source capacity, Qs, is the capacity of all sources less Well 2, which is generally not used except for flushing and fire prevention.

$$ES = (PHD - Qs)(150\text{min}) \rightarrow PHD = \frac{206{,}086gal}{150min} + 744gpm = 2{,}117\ gpm$$

Rearranging equation 5-1 of the WSDM to obtain ERU from PHD:

$$PHD = \frac{MDD}{1440}\big((C)(N) + F\big) + 18 \rightarrow N = \frac{\left(\frac{1440(PHD - 18)}{MDD} - F\right)}{C}$$

$$N_{Reservoir} = \frac{\left(\frac{1440(2{,}117\ -18)}{728} - 225\right)}{1.6} = 2{,}454\ ERU$$

Dead storage, operational storage, and fire suppression storage do not constrain the reservoir's capacity to serve. Standby storage is not provided by the reservoirs, but rather by multiply redundant, geographically dispersed backup power and pumping systems, so it is also not a limiting factor. Therefore, the limiting factor for the reservoir is the ability to provide equalization storage. The reservoirs can serve 2,454 ERU as configured, and are therefore more than adequate.

3.3.6 Distribution System

Maximum PHD that the current distribution system can support was determined by configuring a base demand at each of the 61 node hydraulic model, and iteratively increasing flow rates until the worst case node fell to 30 psi. The flow required to reach this amount of friction loss was found to be 3,968 gpm. Using this into the rearranged Equation 5-1 from the WSDM as used above yields the distribution system limitation.

$$N_{Distribution} = \frac{\left(\frac{1440(3{,}968\ -18)}{728} - 225\right)}{1.6} = 4{,}742\ ERU$$

The system does not intend to provide fire flow; therefore, no resulting limitations were evaluated.

3.3.7 Summary

The current systems limits are shown in Table 3-9.

Table 3-9: System Capacity Summary

Limitation	**Maximum ERU**
Service Area	**1,250**
Water Rights, Instantaneous withdrawal	**1,760**
Water Rights, Annual withdrawal	**1,769**
Total Source Production	**1,493**
Booster Pumps	**1,487**
Reservoirs	**3,691**
Distribution System	**4,742**
Most Limiting Factor: Service Area	**1,250**

3.4 Distribution System Analysis

3.4.1 Model Description

The system hydraulic analysis has been prepared using WaterCAD software. The model was comprised of a 69 node system. 62 nodes are distributed to represent the system's lot distribution, and are assigned a unit demand. 7 nodes are placed for pipe intersections and given zero demand because of close proximity to other nodes that would have exaggerated the demand for a given region. System

records were examined to determine the appropriate pipe size and material for the model. Google Earth, PLSC, and system pressure measurements were reconciled to provide the most accurate elevation model feasible. The node map, pipe inventory, and model results for the various scenarios evaluated are included in Section 10-1.

Pump stations are modeled as reservoirs with a set free surface elevation designed to model the set points for the booster stations, the points with the highest hydraulic grade. The system elevations and pressure measurements show that the system maintains an HGL of 443' under normal operations using Puget PSLC and Google Earth data. For comparison to previous hydraulic analysis of the system, this datasets gives a mean water surface of Lake Limerick at 224'. The HGL was selected to match the set point pressures on the system. The booster pump capacities listed in section 3.2.5 are evaluated assuming water service is provided at this pressure. There are no distinct pressure zones in the water system.

3.4.2 Scenarios

The system does not provide fire flow; therefore, only the capacity to serve PHD and Static conditions were evaluated. Demand was assigned by multiplying the unit demand at the node by a demand adjustment factor. For PHD this model was run using current conditions (817 ERU), the 20 year projection (845 ERU), and for complete build-out with full occupancy (1,250 ERU). The static condition was evaluated by setting the demand adjustment factor to zero, which gives zero system demand and maximum pressures.

The community does not plan on replacing any waterlines within the 6-year planning period; however, the community has chosen to increase looped lines to 6" and dead end lines over 250 feet in length with 8" main-lines whenever they are replaced. This is being done so that the system will eventually meet fire flow standards. A scenario was prepared that showed that this level of upgrade will be sufficient to meet fire flow requirements.

3.4.3 Model Results

Model results show that the system exhibits minor friction losses, with pressures differences largely driven by elevation. The system will be able to deliver water to every point in the system at PHD with just 4.5 feet of head loss due to friction to the worst case location (both located at extreme ends of long lines). Excluding waterlines from the booster stations to the distribution system, the maximum velocity at PHD will be 2.10 ft/s throughout the water system. The minimum system pressure throughout the system at build-out PHD is 57.5 psi, and the maximum is 93.0 psi.

Table 3-10: Summary of Distribution Model Results

Parameter	2013	2019	2033	Build Out
ERU	817	830	852	1,250
PHD (gpm)	792	794	815	1,142
PHD Low Pressure (psi)	57.5	57.5	57.5	57.4
PHD High Pressure (psi)	93.0	93.0	93.0	91.8
Peak Line Velocity (ft/s)	1.46	1.46	1.51	2.10

Static conditions were evaluated assuming maximum pressure set points for booster pumps are reached. This occurs at 444 feet HGL, giving a peak and distribution pressure of 101.2 psi along East Olde Lyme Road as it follows a small valley at the south east of the lake. Public water systems typically maintain pressures below 80 psi; however, the system has operated in this manner for several years without experiencing problems or complaints from customers. No operational changes are proposed to change the peak pressures in division 5.

3.5 Summary of Deficiencies

The previous WSP update, prepared in 2006, noted several deficiencies. Steps have been taken to address every significant deficiency noted in that plan, including:

1. A water right application for Well 3B has been filed with the Washington State Department of Ecology. The application is included in section 10-9.
2. The system has upgraded all of its service meters with equipment that permits drive by radio reading. Meters are routinely evaluated and calibrated as necessary.
3. The system has had a comprehensive financial plan prepared (see sections 8 and 9) which will permit the system to replace its distribution system.

The system has no significant hydraulic capacity limitations. Modeling suggests that the system will be able to provide adequate flow and pressure through any likely level of community build out and occupancy.

The only significant improvement that is suggested to the community is to address the miss-matching of water rights to the sites. Annual water production is, and is projected to remain, significantly lower than the annual water right available; however, the instantaneous permitted flows at several of the sites significantly exceeds the installed pump capacity, while at other sites the installed capacity exceeds the legally permitted right. These discrepancies can be clearly seen in Table 3-4.

To resolve this issue the community should consider engaging a hydrogeologist to aid in completing a water rights change application. An ideal application would permit the same overall instantaneous use of 890 gpm, but would permit the water to be withdrawn more flexibly from any combination of sites. This would permit the system to use its SCADA control software to limit the overall output of the wells to match the permitted water right. As configured, there is no way to accomplish this, as several of the wells simply pump at greater instantaneous rates than permitted. Note that overall production, and thereby impact on the region aquifers, would not be changed as a result of the change application. The key change this would have would be to make it possible to use the SCADA control system to meet legal appropriation limits.

Chapter 4 Resource Analysis & Water Use Efficiency (WUE)

In 2003, the Washington State Legislature passed Engrossed Second Substitute House Bill 1338, known as the Municipal Water Law, to address increasing demand on the state's water resources. The law established that all municipal water suppliers must use water more efficiently in exchange for water right certainty and flexibility to help them meet future demand. The Legislature directed the Department of Health to oversee and enforce a WUE program to help support the collective goal of ensuring a safe and reliable drinking water supply. The WUE program seeks to support this goal in the following ways:

- Contribute to long-term water supply reliability and public health protection,
- Promote good stewardship of the state's water resources, and
- Ensure efficient operation and management of water systems.

This program became effective on January 22, 2007, and established certain responsibilities that water suppliers must fulfill. Fundamental elements include the following:

- Water use efficiency program,
- Distribution leakage standard,
- Goal-setting and performance reporting, and
- Metering requirements

The requirements and deadlines are listed below and in order of due date for Group A municipal water suppliers.

Table 4-1: Summary of WUE Program Requirements

Requirement	Deadline for MWS with 1,000 or more connections
Include WUE program in planning documents	January 22, 2008
Submit first annual WUE report	July 1, 2008
Submit service meter installation schedule	July 1, 2008
Set your own WUE goals	July 1, 2009
Meet distribution leakage standard (based on 3-year rolling average)	July 1, 2010, or 3 years after installing all service meters
Complete installation of all service meters	January 22, 2017

This chapter summarizes Lake Limerick's compliance with conservation planning requirements including the actions taken to promote water use efficiency, and the conservation program that Lake Limerick will implement. The applicable WUE program requirements and guidelines are contained in *Water Use Efficiency Guidebook*, Third Edition, January 2011 (DOH 331-375).

4.1 Metering Program

4.1.1 Source Meters

All sources are metered. Any additional sources developed in the future will be metered when installed.

4.1.2 Service Meters

The system is fully metered. Lake Limerick replaced "touch read" service meters with "radio read" meters between 2010 and 2013. The new meters are read and billed monthly. The system billing software provides month by month total usage reports which are used for calculating distribution system leakage. The individual meters record data on an hourly basis, permitting the detection of leaks on private residences as well.

4.1.3 Leak Detection and Prevention

If a system's distribution system leakage exceeds 10 percent, the conservation program must also provide an implementation program that includes leak detection and repair, and other measures to reduce water loss. Lake Limerick's distribution system leakage was approximately 7.4 percent in 2012 and has averaged approximately 6.2 percent over the last three years. Because the system's lost and unaccounted for water is significantly below 10 percent, Lake Limerick is not required to implement leak detection by regulation.

Lake Limerick maintains this low level of leakage with a continuous leak detection program. On-site staff have training and equipment to respond to leak reports from customers generally within a few hours of the report. Significant discrepancies between service meter and source meter records are investigated. In an effort to improve customer side efficiency, the system operator performs on site leak detection and education for the customers. The effectiveness of these efforts is shown in the community's low rate of DSL, and in the strong improvements in water consumption over the past 6 years.

4.2 Water Use Efficiency Program

4.2.1 Current Program

The Lake Limerick board of directors recognizes that water is a valuable commodity and the wise and efficient use of water is a goal that is in the best interests of its customers.

4.2.2 Goals

State regulation (WAC 246-290-830) requires the governing body of the municipal water system (the Lake Limerick Board of Directors in this case) to develop the water use efficiency goals through a public process. The current WUE goal was considered in a public meeting held on November 23, 2011.

The goal must identify a water savings target and timeframe for achieving the goal. Over the past 6 years, significant improvements on the system have resulted in the lowest overall production in almost 20 years, a period of time in which the size of the community has doubled. Over the past 15 years, usage has fallen from over 500 gpd to just 224 gpd per ERU[1]. The improvements have slowed over the past 3 years as the implemented measures have reached the limits of their effectiveness. Simply

[1] Note that the definition of an ERU has changed significantly since the 2006 WSP. In the 2006 WSP, every connection, including part time and recreational services, was considered an ERU. The current usage is 153 gpd per connection.

sustaining the gains made in the past decade is therefore the goal of the system. The proposed goal to be achieved during the next 6 years is as follows:

Maintain the current per-ERU average usage of 224 gpd/ERU

4.2.3 Measures

As part of a water system plan, DOH regulations also require the implementation of a specified number of water use efficiency measures. With over 1,000 connections (797 residential, 402 part time or recreational) Lake Limerick is required to evaluate or implement five WUE measures. Lake Limerick has implemented the following five water use efficiency measures:

1. A conservation rate structure encourages people to track and reduce their usage.
2. Service invoices include water usage history.
3. The systems service meters provide hourly data permitting the operator to identify leaks within private residences.
4. Customer leak detection information is mailed to customers annually.
5. The community provides an annual water usage education forum

4.2.4 Consumer Education Program

Lake Limerick is required to provide general education to its customers on the importance of using water efficiently on an annual basis. Water conservation information is included in the annual consumer confidence report provided to all Lake Limerick customers in order to meet the annual customer education requirement.

If customer education is provided more than once a year, then conservation education may be counted as one of the required measures. Conservation reminders are regularly included in the Lake Limerick Country Club monthly newsletter. The water system operator and manager also present a public forum at Lake Limerick annually regarding leak detection and water conservation.

4.2.5 Annual Reports

Lake Limerick collects meter data and reports total production, in gallons, from all sources for the year and total authorized consumption, in gallons, from all customers for the year to DOH in their annual Water Use Efficiency Report.

4.2.6 Water Rates

The community operates on a simple base-rate plus overage fee structure. The base charge is $27 per month for 10,000 gallons, and $2.00 per month for every 1,000 gallons over 10,000 gallons. Meters are read and billed on a monthly basis.

4.2.7 Water Savings

Most of the water savings has come from an aggressive leak fixing program implemented between 2005 and 2010. During this period, annual water production dropped from over 75 million gallons per year to under 60 million gallons per year. The leak program and replacement of service meters are likely to be the last major efficiency improvements that are possible. Future reductions in consumption are likely to

be driven by customer behavior, as has been the case over the past 3 years, when reductions have become more modest.

The community has tracked electrical consumption and compared it to production to determine the effectiveness of water delivery. It has found that the system overall delivers between 250 and 400 gallons of water per kilowatt hour (KWHr) of energy input. The effectiveness varies significantly between summer and winter as higher heating costs combine with smaller demand to reduce the water delivered per watt of energy input. It is estimated that the system overall can deliver 300 gallons per KWHr. Using this delivery effectiveness measure, and the average electrical rate of about 10 cents per KWHr, the system can evaluate the cost-benefit of prospective water use efficiency measures. Two useful metrics are that the system saves $1,000 per 3 million gallons conserved, or the system can spend up to one dollar for every 3.67 gpd conserved by residential customers.

Using this basis, it can be seen that the leak detection and correction project is saving the community about $5,000 per year, a price that is likely to show some benefit over the long term. In order for the $1,500 estimated cost of the current WUE measures to be financially viable, they must result in at least 4.5 million gallons of water savings. In a community using just 224 gpd per home, it is unlikely that additional measures would be financially viable. Further measures, such as offering faucet replacement incentives etc, would likely cost dozens to hundreds of dollars per customer, and would require the customers to use essentially no water to produce practical returns on investment. Therefore, additional measures are not proposed or considered.

4.3 Source of Supply Analysis

The water system is served by 7 groundwater sources tapping into two distinct aquifers. As established in Section 3.3, the systems sources have more than adequate capacity to serve the community. Even with the loss of one or more sources, the system would have adequate supply to meet all demands. The system is projected to never require full exertion of its annual permitted water right. There is therefore no reason to expect any applications for additional water capacity to be necessary for the community.

4.4 Water Supply Reliability

The Lake Limerick community enjoys a remarkable level of reliability. The community is served water from 7 sources with sufficient capacity to serve MDD at build-out for the entire community without any reservoir storage. In addition to this the community has 326,000 gallons of excess reservoir capacity which is unused at this time. The community has sufficient backup power installed at redundant sites to provide service to the entire community during sustained power outages. Well site three in particular has sources drilled into distinct aquifers and backup power. With all of these factors, it is important to realize that it would take a truly extraordinary confluence of events to disrupt water service to the Lake Limerick water system.

Chapter 5 Source Water Protection

5.1 Wellhead Protection

The wellhead protection program has been developed in conjunction with the WSP. The following susceptibility assessment, protection area, and contamination source inventory will provide the necessary documentation to make educated management and land use decisions to prevent aquifer contamination.

5.1.1 Susceptibility Assessment

Ground Water Contamination Susceptibility Assessment forms for each source for the Lake Limerick Water System are included in Section 10-10. The results of the assessment are summarized in this Chapter.

5.1.2 Wellhead Protection Area

A map showing the 100-foot protected radii and the 6-month, 1-year, 5-year, and 10-year ground water travel radii given in Section 10-10. The well protection radii are calculated using the formula found in the susceptibility assessment as provided by the WSDOH.

5.1.3 Contamination Source Inventory

The following are potential sources of contamination within the 10 year travel time radii:

1. Residential Septic Systems
2. Residential Chemical Applications (Pesticides, herbicides, etc)
3. Private and County Roadways
4. Pesticide and Herbicide application on golf course fareways

Since land use and zoning throughout the service area is unlikely to change, changes in, or addition of, sources of contamination are unlikely.

5.1.4 Notification of Findings

The following agencies were provided with a letter (see Chapter 10-10 for a copy of the notification letter) requesting information about any potential sources of contamination within the Wellhead Protection Radii:

Mason County Health Department
Mason County Department of Community Development
Emergency Services (911)
Public notice of travel time radii shall be included in annual consumer confidence reports

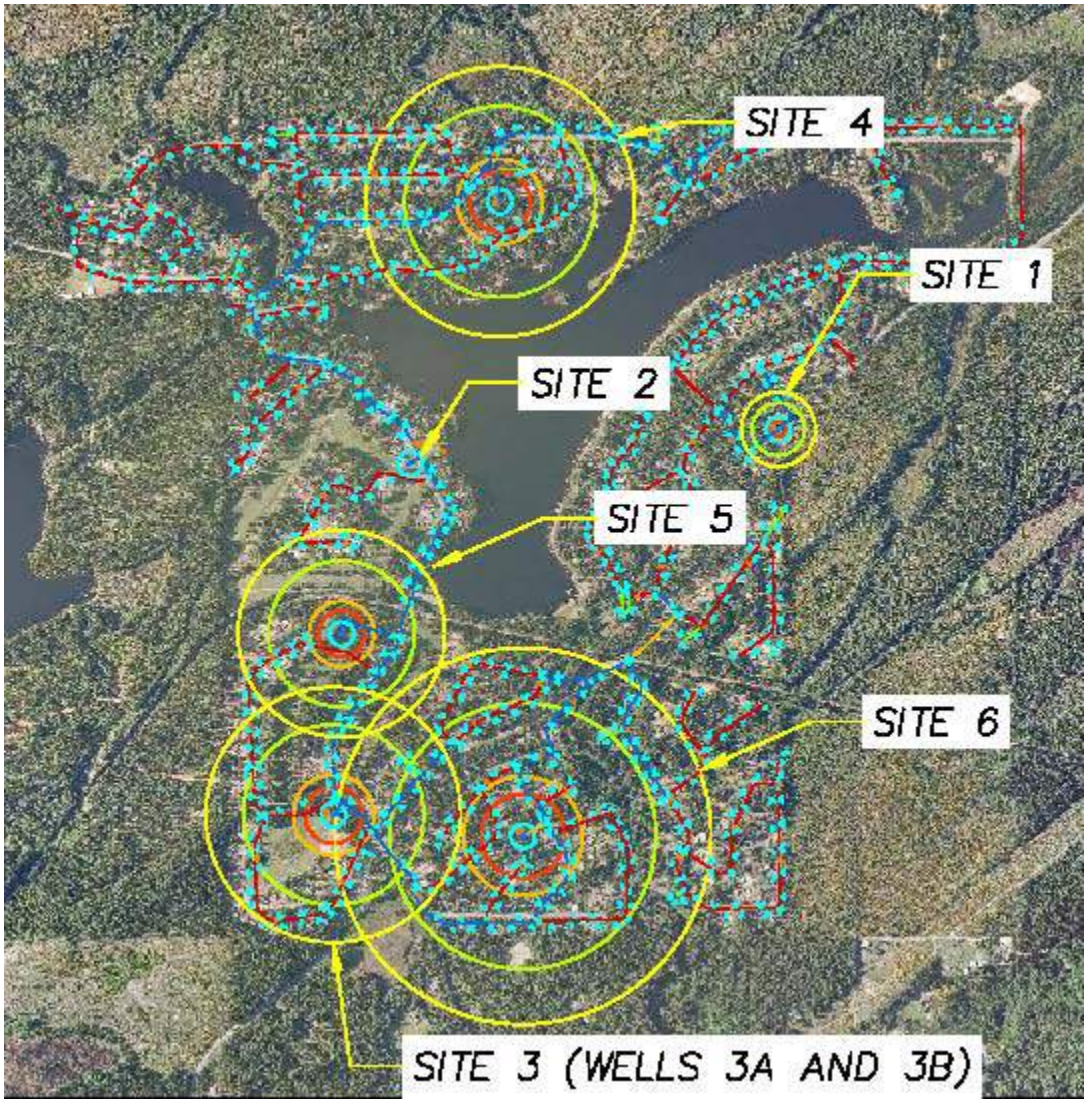


Figure 7: Wellhead Protection Areas

5.1.5 Contingency Planning

The community has sufficient source redundancy to lose several groundwater sources to contamination and maintain service. In the event of contamination, the source would be taken offline while the source of contamination was located and corrected. Since the sources are approximately a quarter of one mile from each other, it is unlikely that anything short of intentional contamination would affect more than one source at once.

In the extraordinarily unlikely event that both aquifers were completely contaminated and groundwater was inaccessible to the community, boil water notification and lake water could be used on a short term interim basis while emergency responders took action. The possibility of this action being required is extremely remote.

5.2 Water Quality Analysis

5.2.1 Asbestos

Asbestos levels in the water system's samples were below detection levels in the most recent round of sampling, which was performed in December of 2009.

5.2.2 Bacteriological Testing

The system tests two samples from the distribution system for coliform bacteria each month. In the past 5 years there have been 4 coliform violations. These were in samples taken October 27th, 2009, January 25th, 2011, March 14th 2012, and April 17th 2012. The system has historically been sampled from hosebibs throughout the community, which can be problematic when collecting samples. The system is currently in the process of installing dedicated sample stations to reduce the false-positive detection rate.

5.2.3 Inorganic Chemicals (IOC)

IOC samples have been taken from each source on the system over the past 5 years. No EPA-regulated primary contaminant has exceeded the states Maximum Contaminant Level (MCL). Only Well 2 has exceeded any MCL, with Manganese levels of 0.12 ppm. Well 2 is not used in day-to-day operations, and has pressure set points that prevent it from starting unless auxiliary capacity is required. Therefore, no treatment is proposed for the well.

Section 10-10 includes a table showing all IOC results that were above detection limits in samples over the past 5 years. Several analytes, including Iron, Nitrate-N, and Sulfate, Chloride, and Lead were detected in other sources; however, none of them exceeded MCL levels.

5.2.4 Lead and Copper

The system performs routine lead and copper sampling every 3 years from the distribution system. Lead and copper have been present in the samples above the minimum detection limits; however, none have exceeded the action level of the Lead/Copper rule so no treatment is required.

5.2.5 Nitrates

Annual Nitrate testing is performed at each of the systems sources. Three of the seven wells have no detectable nitrates in the source water. Three wells have nitrate levels which occasionally reach the lower limit of lab detection, at 0.2 to 0.3 mg/L, and one site had a sample reach 0.48mg/L. The worst sample taken in the past 5 years was less than 1/20th the MCL.

5.2.6 Radionuclides

Radionuclides samples were taken in June 2009 and July 2010, no Radium or Alpha particle emission was detectable in any of the samples.

5.2.7 VOCs and SOCs

Samples have been tested for volatile organic compounds (VOCs) and sythetic organic compounds (SOCs) from each source in the past 6 years with no samples showing any detectable compounds from any of the system's 7 sources.

Chapter 6 Operations and Maintenance

6.1 Water System Management and Personnel

The authority for the water system is vested in the Board of Directors. The board of directors created a six-member Water Committee in 1976 to oversee the operation and maintenance of the water system. The six members of the water committee serve 3 year terms. The terms are staggered such that two new committee-people are elected at each annual membership meeting, so that there is never a complete change of the water committee during any single year.

At the behest of the Water Committee, the Lake Limerick Country Club general manager provides billing and financial management services for the water system. Systems operations planning, scheduling, and oversight are provided by Northwest Water Systems, the Satellite Management Agency (SMA) selected by Lake Limerick to replace their outgoing manager in 2011. Bill Bernier, WDM-2 with NWS has been assigned as the primary point of contact for the system. Steve Wheaton (WDM-1, CCS) is directly employed by the Lake Limerick Country Club and performs many of the day-to-day operations of the water system under the oversight of NWS.

6.2 Operator Certification

Lake Limerick Country Club has a population of approximately 1,600. The Washington Administrative Code requires systems with populations between 1,500 and 15,000 to be managed by a Water Distribution Manager with a Level 2 certification (WDM-2). NWS provides Lake Limerick with operators holding WDM-3, several WDM-2, Cross Connection Control Specialists, and professional engineering services.

6.3 Routine Operations and Maintenance

Most routine operations are performed by the onsite operator, Mr. Wheaton, who takes daily source meter readings, reservoir checks, equipment inspections, and the monthly service meter readings. Mr. Wheaton responds to concerns regarding leaks, high and low pressure issues, and performs system maintenance. Mr. Wheaton will be qualified to take the test to become a WDM-2 level operator in the summer of 2013. Billing issues are addressed by the Lake Limerick Country Club Operations Supervisor, Sheila Hedlund. If field work is required, such as confirmation of a meter reading, it is completed by Mr. Wheaton.

NWS prepares schedules of major system tasks, coordinats sampling, maintenance, system operations and responds to after-hours emergencies. NWS provides on average one to two days per week of on-site support in managing and administrating the system. NWS has coordinated work to revise and implement cross connection control program, has assisted in correcting several problems with the Supervisory Control and Data Acquisition (SCADA) system that coordinates the 6 well sites, and now provides emergency notification for the community. NWS provides an elastic supply of management expertise to the community, allowing Lake Limerick to make full use of Mr. Wheaton while having

sufficient technical and personnel resources to complete tasks requiring more in-depth expertise or a larger work-force.

The regular maintenance program is shown in Table 6-1, showing the task and frequency. Tasks that are generally completed by Mr. Wheaton are noted as 'LLCC' responsibilities; those performed by NWS are noted. Those listed with both parties are done jointly, or by either party. NWS assists with other tasks as necessary. Some functions have also been taken over by the SCADA system, such as pump runtime, pressure, and tank level monitoring. Routine maintenance is coordinated using a calendar and coding system developed for the system. A card file is maintained with instructions for performing various routine tasks, and is sorted by code. A calendar located in the water office is marked with these codes. On any particular day that a code is marked with a code sequence, the code may be looked up and the card-file used to provide instructions for performing the task required.

Table 6-1: O&M Schedule

Task	Scheduled Frequency	Lead Party
Record Pump Hour Meters	Realtime, SCADA	Automatic
Record Reservoir Levels	Realtime, SCADA	Automatic
Record of System Pressures	Realtime, SCADA	Automatic
Read Source Meters	Daily	LLCC
Visual Inspection of stations	Daily	LLCC
Prepare Report to Water Committee	Monthly	NWS
Read Service Meters	Monthly	LLCC
Water use Calculations	Monthly	NWS / LLCC
Billing	Monthly	LLCC
Clean / Sweep Pumphouses	Monthly, as needed	LLCC
Check Pressure Tank Pre-charges	Semi-Annual	LLCC
Inspect / Clean Generators	Quarterly	LLCC/NWS
Flushing	Quarterly	LLCC/NWS
Exercising Valves	Quarterly	LLCC/NWS
Hydrant inspection and testing	Quarterly	LLCC/NWS
Rotate Logbooks	Annual	LLCC/NWS
Air Release Valve Inspection	Annual	NWS
Clean Reservoirs	Annual	NWS Coordinates
Check Static Water Levels	Annual	LLCC
Cross-Connection Control:	Annual assembly testing, surveys performed on 5-year cycle	NWS
Budget Evaluation	Annual	NWS / LLCC
Send Consumer Confidence Report	Annual	NWS
Prepare WUE report	Annual	NWS
WSP Updates	6-Year – Next update 2019	LLCC Initiates
Renew Radio License	Every 10-years, next renewal 2015	NWS

6.4 Water Quality Sampling Procedures & Program

Mr. Wheaton and Northwest Water Systems coordinates sampling from day to day based on availability. Two coliform samples are taken every month, except in the event of a failure, when the coliform monitoring plan is used to determine the location and number of repeat samples to be taken. The system is sampled in accordance with its Water Quality Monitoring Report (WQMR). The current (2012) WQMR lists the sample schedule shown in Table 6-2.

Table 6-2: Sampling Schedule

Monitoring Group	Test Panel	Sample Location	Schedule/Status
Coliform	Coli	Distribution	Monthly
Dioxin	Dioxin	All Sources	Waiver until Dec. 2013
Endothall	Endo	All Sources	Waiver until Dec. 2013
EDB and other soil Fumigants	Fumigant	All Sources	Waiver until Dec. 2013
Glyphosphate	Glyphs	All Sources	Waiver until Dec. 2013
Herbicides	Herbs	S02 - S07	Sampled April through May of 2012
Herbicides	Herbs	S08	Waiver Until Dec. 2013
Insecticides	Insect	All Sources	Waiver Until Dec. 2013
Inorganic Contaminants	IOC	All Sources	IOC sampled in 2012, next set due after Dec. 2019
Lead / Copper	LCR	Distribution	10 samples taken once every 3 years
Nitrate	NIT	All Sources	Annual
General Pesticides	Pest1	All Sources	Waiver Until Dec. 2013
Diquat	Diquat	All Sources	Waiver Until Dec. 2013
Volatile Organic Contaminants	VOC	S01 through S07	Sample Required by Dec. 2013
Volatile Organic Contaminants	VOC	S08	Sample Taken 4/12/2012

6.5 Coliform Monitoring Plan and Map

The coliform monitoring plan was prepared by the system operator and the Satellite Management Agency. The coliform monitoring can be found in Chapter 10-11. The system takes two routine samples per month from the distribution. If there are any failures, repeat distribution samples and a source sample are taken per this plan. See the Coliform Monitoring Plan for details.

6.6 Emergency program

Northwest Water Systems is the primary contact for after-hours water emergencies. NWS has prepared a comprehensive emergency response program which is included in Section 10-18. NWS main phone number may be called 24/7 to report any water emergency. In the event of a call NWS evaluates the nature of the call and determines a best course of action. Emergency contact information is included in

all NWS communications with the community, including Consumer Confidence Reports and Cross Connection Control Surveys. The contact list for the system is shown in Table 6-3.

Lake Limerick has enrolled in an emergency call system called the Rapid Notification System that is capable of delivering hundreds of notices per hour. This automated dialer will contact individuals on the system, assess whether a live person or answering machine has been reached, and plays back a recorded message prepared by water system personnel. The system provides detailed reporting of who has and has not been reached, whether a person answered the phone or not, and whether the message was heard in its entirety. Water system personnel are trained in the use of the Rapid Notification System and can access the system to issue urgent notices at any time.

Table 6-3: Water System Contacts

Emergency contact	Phone number(s)	Emergency contact	Phone number(s)
Mason County Fire/Police/Medical	911	Electrician: Arcadia Drilling	888-426-3395
Mason County emergency services	911	DOH regional engineer	360- 236-3035
County environmental health contact	426-9670x293	DOH emergency After hours #	877-481-4901
Department of Ecology Spill Response SW Regional Office	360-407-6300	Water Committee Chairperson (Contact LLCC Office for contact details)	360-426-4563
Engineering consultant Northwest Water	360-876-0958	Water Master: Steve Wheaton	360-490-1627
Electric utility: Mason Co. PUD 3	800-544-4223	Management Agency: NWS	360-876-0958
Pump service: Arcadia Drilling	888-426-3395	Water Office	360-426-4563
DOH Coliform Monitoring and Water Quality: Sandy Brentlinger	360- 236-3044	LLCC Operations Supervisor: Shiela Hedlund	360-426-3581

6.6.1 Vulnerability Assessment

Earthquake - No practical degree of protection against catastrophic earthquakes can be supplied; however, the system has numerous redundant sources, a large volume of water storage, control valves to disable sections of the system, and on-site backup power facilities at 3 of its sites. The system is therefore expected to be able to withstand typical minor earthquake events. After an earthquake has occurred, the system shall be carefully inspected and an inventory of all damages shall be made. Additional water quality testing will be performed in consultation with the WSDOH.

Fire - In the event of a fire in a pumphouse, 911 shall be notified. Once the emergency responders have deemed the area safe to enter, the site is to be disabled during inspection. If it is found to be safe after inspection, the site may be re-enabled. If minor repairs are necessary Arcadia drilling will be contacted for a service call. The system will operate without problem with any of the 6 sites offline, down-time at

any single site can be tolerated for extended periods for repairs. If extensive damage has been done and the site must be replaced, the system may take the opportunity to re-engineer the site if damage from the fire could have been averted through practical measures.

Flood – The system is located surrounding a lake; however, none of the streams are of sufficient size to indicate a likely flood risk. Primary risks from flooding would be washed out culverts, which could cause a waterline break. In the event of a flood related break, the area would be disabled by valve, the waterline repaired and chlorinated, and the system may be placed on precautionary boil water advisory while the extent of potential contamination from surface water is evaluated.

Power Outages – The system's 2 primary sites with backup power will prevent power outages from disabling the community sources or pressure systems.

Vandalism/Terrorism - Small water systems are potential targets of vandalism and terrorism. Fortunately, most small water systems also attract little attention. Both wellheads and the pumphouse are to be secured with locks. Any evidence of vandalism shall be investigated and water quality samples shall be taken if there appears to be any evidence of tampering with the wellheads, pumphouse, or other point at which contaminants could enter the system. After-hours security patrols are aware of the locations of water sources and provide a deterrent for vandals.

Volcanic Activity - Because of the system's location, vulnerability to volcanic activity is very low. The most likely impact of volcanic activity would be ash fallout from a regional event. This fallout could potentially impact water quality of open reservoirs; however, all of the reservoirs serving Lake Limerick are concrete silos with enclosed roofs, locked sealed lids, and downward facing screened vents. Volcanic ash is therefore unlikely to present any problem for the system.

6.7 Cross Connection Control

The system has an adopted Cross Connection Control Program that is being implemented by their SMA. The cross connection control policy, program, and sample surveys can be found in chapter 10-12.

6.8 Record Keeping

The system generates a number of different types of records that must be kept. The water system maintains these records. The records and the periods over which records are maintained are shown in Table 6-5.

Table 6-4: Billing Records

Type of Record	Time Kept	Reporting
Utility Billing Records	3 years	n/a
Receipts	3 years	n/a
Power Bills	3 years	n/a
Check Registers	3 years	n/a
Taxes and Financial Reports	7 years	n/a

Table 6-5: Planning and Administrative Records Maintained

Type of Record	Time Kept	Reporting
System Planning Documents	Until Irrelevant	As Requested
Engineering Drawings	Indefinitely	As Requested
WFI	Current	Annually
Contracts	as necessary	n/a
Work Orders	3 years	n/a
Operating Permit	Current	n/a
Correspondence with Customers	3 years	Upon Request
Correspondence with Government	3 years	n/a
Correspondance RE: Sanitary Surveys	10 years	Upon Request
Record of Action to Correct Violations	3 years	Upon Request
Misc. Correspondence	3 years	Upon Request
Consumer Confidence Reports	3 years	Annually
Site Visit Reports	1 year	Upon Request
Record of Public Notices	3 Years	Upon Request

Table 6-6: Water Quality Records

Type of Record	Time Kept	Reporting
Bacteriological Tests	1 year	Monthly
Coliform Monitoring Plans	5 years after retirement	As Requested
CCC Documents	3 years	Upon request
Exemptions and Variances	5 years after expiration	As Requested
Nitrate Tests	5 years	Annually
IOC	Indefinitely	Upon testing
VOC/SOC	Indefinitely	Upon testing
Radionuclide	5 years	Upon testing
Lead and Copper	12 years	Upon testing
Other Water Quality	5 years	Upon testing
Backflow Testing	1 year	Upon request
Site Visit Reports	1 year	upon request
Work Orders	3 years	n/a
Water Well Reports	Indefinitely	Upon request
Drawdown Tests	Indefinitely	Upon request
Static Water Levels	20 years	Upon request
Source Meter Readings	3 years	Upon request

6.9 O&M Deficiencies

The system analysis finds no significant operations and management deficiencies. The system has sufficient capacity to provide water service through full build-out of the community, including the possible eventuality of all the homes becoming full time residences. The system has excellent water

quality, and water use efficiency efforts have yielded significant savings for the community. At the time of this writing the only items that may require review over the next 6 years are the distribution of instantaneous water rights and the SCADA control system.

6.9.1 Water Rights Distribution

The system currently has more than adequate annual withdrawal rights. No site is expected to ever approach or exceed its limiting annual withdrawal; however, individual instantaneous well capacity is poorly matched to the allotted instantaneous water right.

The Department of Ecology was contacted in preparation of this water system plan for comment concerning the best course of action with regard to the water rights miss-alignment. Ecology is of the opinion that the community should consider filing an application that would permit the same total instantaneous and annual withdrawal, but with greater flexibility concerning the point of withdrawal. This change application would request up to 890 gpm be taken from any combination of the system's sources, up to an amount not to exceed 446 acre-feet per year. This application could be submitted to Ecology at any time, and could be accelerated through the certification process using the cost-reimbursement program if necessary.

6.9.2 SCADA Maintenance and Replacement

The existing SCADA management system was designed and installed between 2004 and 2006. At that time wireless standards and other technologies were in transition. The primary core of the system was installed using licensed 460 mhz radio links permitting communication of the DirectLogic™ Programmable Logic Controllers (PLCs) at sites 1 through 5. The 6th site was instead installed using an Allen Bradley PLC control system managing Asea Brown Boveri (ABB) variable speed drives, and an unlicensed 900 mhz radio system. The Allen Bradley system requires very expensive software to program, and cannot be readily managed by the rest of the SCADA system. Although a very high quality, flexible, and advanced unit, the Allen Bradley system is significantly more complex than appropriate for the system.

When the ABB system reaches its end of life and requires replacement or major repair, it should not be replaced like-for-like, as it is incompatible with the rest of the system and quite expensive. Instead, the system should at that time evaluate whether the ProLogic systems are working well enough to continue operation and switch it to that equipment, or replace all of the SCADA system with more simple and much less expensive internet-aware equipment.

Chapter 7 Distribution Design and Construction Standards

7.1 Design and Constructions

All construction of new or replacement facilities shall be subject to the following specifications:

- The current Standard Specifications of the Washington State Department of Transportation
- American Water Works Association (AWWA) standards
- Applicable standards adopted under Washington Administrative Code
- Mason County road and utility installation standards
- Standard plans and details adopted by the Lake Limerick Water System.

The system will require plans and specifications for any new project not described here to be prepared in writing under the supervision of a registered professional engineer and approved by the State Department of Health prior to construction. Future reports prepared and stamped by a licensed professional engineer may modify these standards. All projects shall be reviewed and certified by the design engineer. These standards and details supersede the corresponding details and standards from the 2007 Water System Plan.

The system desires exemption from project report submittal per WAC 246-290-125 for distribution system projects. All distribution replacements upgrades and modifications shall comply with the standards and details contained herein. The Water System Service Area Maps are available in Chapter 10-1 as they exist in March of 2013. In requesting these exemptions, the Lake Limerick Water System will:

- Maintain an approved water system plan with the Department of Health
- Amend the Water System Plan to indicate any further capital improvements not included in the capital improvement program, and request exception designated in WAC 246-290-125 in writing.
- Maintain a project summary file and construction documentation for each system improvement under this exception. This summary file will be available to the Department of Health upon request, and will include as-built drawings and engineering certification of completion.

The community shall upgrade waterlines as they are replaced. At this time no large single project is proposed. The community instead intends to replace sections of lines as they begin to fail. The system plans to replace all of its waterline over the course of 30 years, and then to begin a program of preventative replacement on a 60 to 80 year schedule after the initial phase of replacement is completed. As it is replaced, the distribution system shall be resized to support fire flow. All looped waterline shall be replaced with 6” PVC, and all dead-ends over 300 feet in length shall be replaced by 8” waterline.

Chapter 8 Improvement Program

8.1 Prioritizing Improvements

Improvements are prioritized according to the following criteria listed from highest to lowest in importance:

1. Public Health Risks
2. Adequate Supply
3. WSDOH Operation and Design Standards
4. Achieving Conservation Goals
5. Regularly Scheduled Improvements
6. Aesthetic and Optional Improvements

8.2 Prioritized List of Improvements

1. Replacement of pumpstation roofs
2. Re-plumbing Reservoirs with Common Intake and Outlet
3. Replace Well 5 pump
4. Upgrade to support fire flow

8.3 Assessment of Alternatives

There are no upgrades at this time necessary to address any of the highest three criteria. The system has no significant public health risks, has more than adequate supply, and meets or exceeds all WSDOH guidelines for operation and design standards. Only two significant improvements are recommended, one long term, and one short term.

8.3.1 Roof Replacement

The structures housing the critical system components have been evaluated and roof replacement has been proposed. The structures are sound at this time and the replacement is proposed as a preventative maintenance action. Although the replacement is not absolutely necessary at this time, it is a prudent use of the water system's resources as it ensures that the eventual failure of the roofs does not compromise critical system equipment.

8.3.2 Re-plumbing Reservoirs with Common Intake and Outlet

Reservoir 4 currently operates using a common reservoir fill and discharge line. Water from well 4 is pumped up through the mud-ring into the bottom of the reservoir, and suctioned back out by booster pumps. This configuration leads to water stagnation problems in the reservoir, as water at the top of the column does not get cycled very often. An improved configuration is to have a dedicated fill line installed from the well that discharges water to the top of the reservoir, which improves circulation within the tank. Drawings showing the plumbing and pipe supports necessary to achieve this are included in Chapter 10-18.

8.3.3 Well 5 pump replacement

Water is pumped from Well 5 by a 10-HP well pump designed for operation above 150 gpm. At higher pressure the pump delivers lower flows rates at reduced efficiency. The well pump is rated for efficiencies above 65%, but is likely operating at just 30% efficiency as configured. Since the well pump only delivers approximately 10 to 15% of total production, upgrading purely for the sake of improved efficiency is financially unviable. The pump should be reviewed by an engineer, and a more appropriately sized pump should be specified prior to replacement. Pump replacement is not anticipated within the 6-year planning horizon.

8.3.4 Distribution Line Replacement

The community is currently served by over 78,000 feet of waterline, almost all of which is asbestos cement. Most of the waterline was installed in the 1960s and 1970s, and is likely nearing the end of its useful life. The waterline will likely require significant portions or even complete replacement within the next 30 years. The community should plan to begin a capital reserve program that will be capable of replacing the waterlines within that time frame. The total value of the distribution system is anticipated to be approximately $3,850,000 in present day dollars.

30 years is only a best estimate of the remaining useful life of the waterline. It is possible that the distribution system will develop significant leak problems and require replacement before this period. It is also possible that the system could out-live this estimate. The most likely outcome is that portions of the system will require replacement sooner than others and that work may be spread over several projects performed over a number of years.

Since there is no practical way to know ahead of time where replacements will be required first, the community should set a reserve budget that can accommodate the complete replacement of the system in 30 years. With these funds on hand system can conduct regular evaluations of the waterline condition and use these capital reserves to replace the system as necessary. If at any time, the need to replace exceeds the community's financial capacity, federal, state and private loan programs are available that could be used to complete the project.

8.4 Selection of Alternatives

The community will perform all of the upgrades proposed in section 8.3. Only the rooftop replacement and dedicated feed lines to the reservoirs are anticipated within the next 6 years. The rooftop replacement is planned for the summer of 2013. The reservoir fill lines are planned for 2015; however, may be delayed if other higher-priority work is necessary. The other two upgrades are not anticipated within the 6-year planning period; however, the financial program shall be prepared to include fully funding the well pump replacement, and to provide sufficient capital to start the distribution replacement.

8.5 Improvement Schedule

Table 8-2 provides an overview of the likely schedule for capital improvements projects. See Chapter 9 for details of the financial program.

Table 8-1: Improvement Schedule

Improvement	Cost (2013 dollars)	Schedule	Source of Funds
1. Reroofing pumpstations	$15,000	2013	Reserves
2. Reservoir Reconfiguration	$5,000	2015	Reserves
3. Well 5 Pump Replacement	$15,000	2033	Reserves
4. Distribution Replacement	$3,850,000	2038	Reserves[1]

[1] Capital reserve program shall be established to provide sufficient funds to replace the distribution system in 30 years, should replacement become necessary prior to this time, one time community assessment, or loans through federal and state programs may be used to supplement the reserves as necessary.

Chapter 9 Financial Program

The Lake Limerick water system is operated as a financial subcomponent of the broader Lake Limerick Country Club. The system collects revenue from metered water rates, unmetered lots (ready to serve fees), locked meter fees, disconnection charges, excessive use charges, new connection fees, and interest from long term investments. Rates are as follows (per user):

Table 9-1: Customer Rate Structure

Base Usage (up to 10,000 gallons per month)	$27.00/month
Excessive Use (Over 10,000 gallons in a month)	$2.00/1,000 gallons
Unmetered Lot	$10.00/month
Locked Meter	$15.00/month
Connection Fee	$2,000 one time

The financial analysis in this chapter has been prepared upon the assumption of 3% ongoing annual inflation. It has been assumed that the community will invest its long term replacement reserves in accounts earning 0.5% greater than inflation. The model is prepared using estimated life spans shown in the system inventory in Section 10-5.

9.1 Income

The fee structure described above is anticipated to result in approximately $413,000 of system revenue this year. The system should increase its rates in accordance with its actual annual increases in operating expense; it is assumed that 3% annual rate increases will be sufficient to meet this need. The projected revenue based on 3% growth in expenses for the system over the next 6 years is shown in Table 9-2. Actual growth in expenses will be monitored on an annual basis and adjusted by the water committee.

Table 9-2: Lake Limerick Water System Revenue

	2013	2014	2015	2016	2017	2018
Water Rates - Metered	$364,000	$374,900	$386,100	$397,700	$409,600	$421,900
Water Rates - Unmetered	$22,200	$22,900	$23,600	$24,300	$25,000	$25,800
Disconnect, Lockout, and Locked Meter fees	$10,270	$10,600	$10,900	$11,200	$11,500	$11,800
Excessive Use Fees	$10,000	$10,300	$10,600	$10,900	$11,200	$11,500
Miscellaneous revenue	$500	$500	$500	$500	$500	$500
New connection fees	$2,000	$2,100	$2,200	$2,300	$2,400	$2,500
Interest Earned	$4,000	$7,500	$11,100	$15,000	$19,100	$23,300
Total	**$412,970**	**$428,800**	**$445,000**	**$461,900**	**$479,300**	**$497,300**

9.2 Expenses

Table 9-3 shows the operating expenses anticipated by the system over the next 6 years. Fees are assumed to increase at 3% per year in accordance with inflation, except sampling and permitting which is increased at 5%. Sampling, and engineering expenses tend to be quite variable, for example over a

decade most of the engineering fees will be incurred during preparation of the Water System Plan; and IOC sample expenses incurred when taken from all wells; however, in any individual year there may only be coliform sampling, which will cause specific years to deviate from the average. The amortized average annual cost for these variable fees has been included in the table rather than making specific provisions for any specific year or project.

Table 9-3: System Expenses

	2013	2014	2015	2016	2017	2018
Accounting Assistance	$4,000	$4,120	$4,244	$4,371	$4,502	$4,637
Bank Service Charges	$400	$412	$424	$437	$450	$464
Credit Card Service Charges	$2,500	$2,575	$2,652	$2,732	$2,814	$2,898
Dues and Subscriptions	$800	$824	$849	$874	$900	$927
Employee Expenses	$69,580	$71,667	$73,817	$76,032	$78,313	$80,662
Engineering	$17,000	$5,000	$5,150	$5,305	$5,464	$5,628
Equipment Rent	$1,000	$1,030	$1,061	$1,093	$1,126	$1,159
Insurance	$9,600	$9,946	$10,304	$10,675	$11,059	$11,457
Legal Fees	$1,500	$1,545	$1,591	$1,639	$1,688	$1,739
License and Permits	$1,500	$1,575	$1,654	$1,736	$1,823	$1,914
Newsletter Expense	$1,500	$1,545	$1,591	$1,639	$1,688	$1,739
Office Expense	$3,500	$3,605	$3,713	$3,825	$3,939	$4,057
Postage	$6,500	$6,695	$6,896	$7,103	$7,316	$7,535
Professional Services	$48,000	$50,400	$52,920	$55,566	$58,344	$61,262
Security Services	$6,400	$6,592	$6,790	$6,993	$7,203	$7,419
Service Contracts	$1,500	$1,545	$1,591	$1,639	$1,688	$1,739
Supplies	$5,000	$5,150	$5,305	$5,464	$5,628	$5,796
Taxes - Property	$2,500	$2,625	$2,756	$2,894	$3,039	$3,191
Taxes-Washington State Excise	$19,200	$19,776	$20,369	$20,980	$21,610	$22,258
Telephone	$2,000	$2,060	$2,122	$2,185	$2,251	$2,319
Utilities	$20,000	$20,600	$21,218	$21,855	$22,510	$23,185
Vehicle Expense	$6,000	$6,180	$6,365	$6,556	$6,753	$6,956
Water Testing	$3,000	$3,150	$3,308	$3,473	$3,647	$3,829
Debt payments (loan principal and interest)	$18,000	$18,000	$18,001	$18,002	$18,003	$18,004
Short-lived asset replacements	$28,000	$28,840	$29,705	$30,596	$31,514	$32,460
Total Operating Expenses and Payments	**$222,980**	**$217,777**	**$224,986**	**$232,471**	**$240,244**	**$248,315**

9.3 Reserve Accounts

Reserve budgets are shown in Table 9 3. Note that payments to the emergency reserve are designed to allow it to grow with inflation, while payments to the short lived replacements reserve are set so that they meet the anticipated need, and are not shown in the table below. Capital reserve payments are made such that all waterline replacements may be performed out of pocket after 30 years.

Table 9-4: Reserve Accounts

Reserve	2013	2014	2015	2016	2017	2018
Operating reserve beginning balance	$27,510	$30,510	$29,939	$30,921	$31,941	$32,999
Contribution to operating reserve	$3,000	-$571	$982	$1,020	$1,058	$1,098
Operating reserve ending balance	$30,510	$29,939	$30,921	$31,941	$32,999	$34,097
Emergency reserve beginning balance	$100,000	$103,515	$107,154	$110,920	$114,819	$118,855
Contribution to emergency reserve	$3,000	$3,105	$3,215	$3,328	$3,445	$3,566
Withdrawal from emergency reserve	$0	$0	$0	$0	$0	$0
Emergency reserve ending balance	$103,000	$106,620	$110,368	$114,248	$118,263	$122,420
Long-lived asset reserve beginning balance	$30,000	$195,000	$364,125	$538,324	$718,794	$905,760
Contribution to long-lived asset reserve	$165,000	$169,125	$174,199	$180,470	$186,967	$193,698
Withdrawal from long-lived asset reserve	$0	$0	$0	$0	$0	$0
Long-lived asset reserve ending balance	$195,000	$364,125	$538,324	$718,794	$905,760	$1,099,458

9.4 Affordability

The per-user financial obligation to the water system is shown over the next 6 years. Because of the lack of treatment, solid planning practices, and high density of services relative to waterline, the system is relatively affordable in comparison to many systems in Washington State. The Washington State Department of Health recommends that water rates not exceed 1.5% of median household income. The average rate charged for the system is projected to be less than 0.9% of the median household income for Mason County.

Table 9-5: End User Average Water Rates

Year	2013	2014	2015	2016	2017	2018
Annual Rate	$354.19	$364.82	$375.77	$387.04	$398.65	$410.61
Monthly Rate	$29.52	$30.40	$31.31	$32.25	$33.22	$34.22

Chapter 10 Miscellaneous Documents

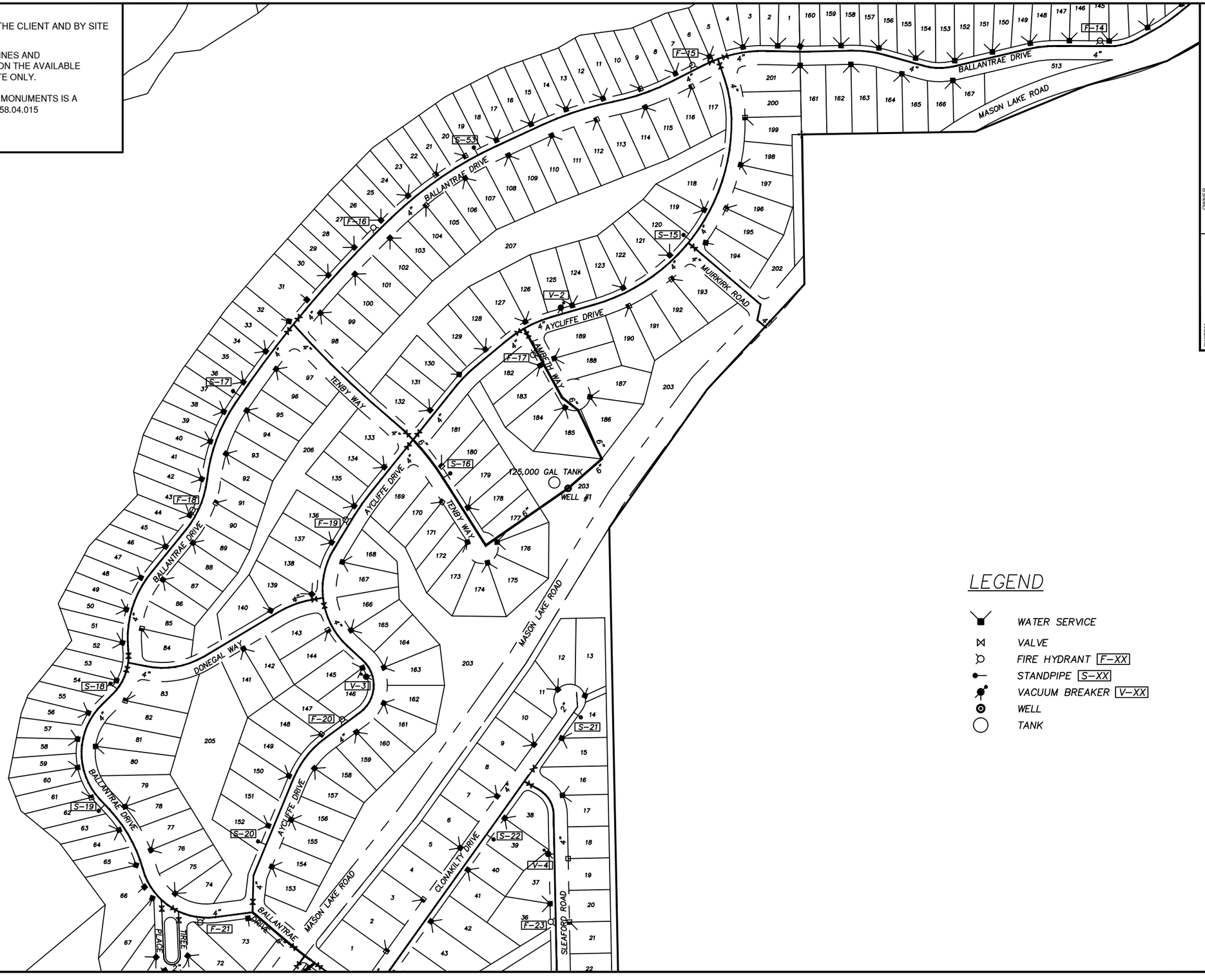
Supporting Documents Include:

Chapter 10-1	Site Plans and Hydraulic Analysis
Chapter 10-2	Emergency Response Plan
Chapter 10-3	Well Logs and Pumping Equipment
Chapter 10-4	Booster Pump Curves
Chapter 10-5	System Inventory
Chapter 10-6	Meter Data
Chapter 10-7	Water Facilities Inventory
Chapter 10-8	Zoning Maps
Chapter 10-9	Water Rights
Chapter 10-10	Wellhead Contamination Susceptibility Assessments
Chapter 10-11	Coliform Monitoring Program and Public Notices
Chapter 10-12	Cross Connection Control Program
Chapter 10-13	Articles and Bylaws
Chapter 10-14	DOH Budget Table
Chapter 10-15	2012 consumer confidence report
Chapter 10-16	2008 Sanitary Survey
Chapter 10-17	Consistency Statements
Chapter 10-18	Reservoir Redesign

SITE INFORMATION PROVIDED BY: THE CLIENT AND BY SITE INSPECTION

THIS IS NOT A SURVEY. PROPERTY LINES AND ELEVATIONS SHOWN ARE BASED UPON THE AVAILABLE INFORMATION AND ARE APPROXIMATE ONLY.

DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015



LEGEND

- WATER SERVICE
- VALVE
- FIRE HYDRANT [F-XX]
- STANDPIPE [S-XX]
- VACUUM BREAKER [V-XX]
- WELL
- TANK

SYSTEM: LAKE LIMERICK
FILE NO.: 120805
DATE: MARCH 12, 2013

OWNER: LAKE LIMERICK COUNTRY CLUB
FILE NAME: SITE PLAN
SCALE: 1" = 300'
SHEET NO.: DIV 1

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958

SITE INFORMATION PROVIDED BY: THE CLIENT AND BY SITE INSPECTION

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DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

LEGEND

- WATER SERVICE
- VALVE
- FIRE HYDRANT F-XX
- STANDPIPE S-XX
- VACUUM BREAKER V-XX
- WELL
- TANK

4" SIPHON FROM LAKE

WELL #2

WELL #5

WELL #3A

WELL #3B

150,000 GAL TANK

150,000 .GAL TANK

WELL #6

BLENHEIM PLACE

CONNEMARA WAY

ST. ANDREWS DRIVE

SHAMROCK DRIVE

PENZANCE ROAD

ROAD OF TRALEE

MASON LAKE ROAD

DALKEITH ROAD

DUNVEGAN ROAD

DARTMOOR DRIVE

DUNOON PLACE

BARNSBY PLACE

ANGUS COURT

BALBRIGGAN ROAD

ERRIGAL PLACE

COUNTY ROAD No. 150

SYSTEM: LAKE LIMERICK	OWNER: LAKE LIMERICK COUNTRY CLUB
FILE NO.: 120805	FILE NAME: SITE PLAN
SHEET NO.: DIV. 2	
DATE: MARCH 12, 2013	SCALE: 1" = 300'

NORTHWEST WATER SYSTEMS, INC.
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P.O. BOX 123
PORT ORCHARD, WA 98366
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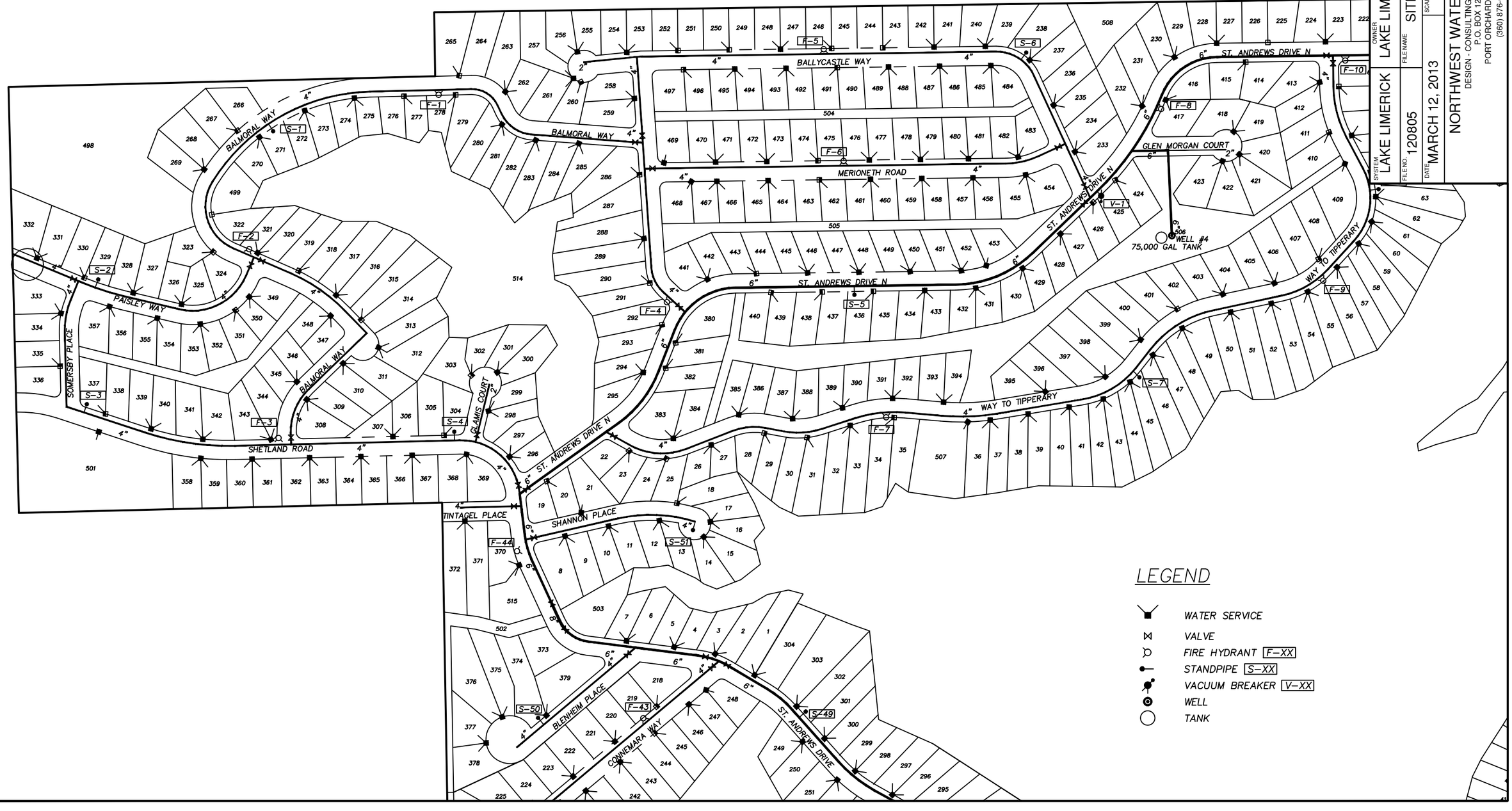

LEGEND

- WATER SERVICE
- VALVE
- FIRE HYDRANT F-XX
- STANDPIPE S-XX
- VACUUM BREAKER V-XX
- WELL
- TANK

OWNER: LAKE LIMERICK COUNTRY CLUB

SYSTEM: LAKE LIMERICK

FILE NO.: 120805

FILE NAME: SITE PLAN

SHEET NO.: WEST DIV 3

SCALE: 1" = 300'

DATE: MARCH 12, 2013

NORTHWEST WATER SYSTEMS, INC.
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P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958

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DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

ST. ANDREWS DRIVE N

STERLING COURT

CARDIGAN COURT

WAY TO TIPPERARY

BALLANTRAE DRIVE

MASON LAKE ROAD

AYCLIFFE DRIVE

MUIRKIRK ROAD

LAMBETH WAY

TENBY

F-9 F-10 F-11 F-12 F-13 F-14 F-15 F-16 F-17

S-8 S-9 S-10 S-11 S-12 S-13 S-14 S-15 S-17 S-53

V-2

LEGEND

- WATER SERVICE
- VALVE
- FIRE HYDRANT F-XX
- STANDPIPE S-XX
- VACUUM BREAKER V-XX
- WELL
- TANK

SYSTEM: LAKE LIMERICK
OWNER: LAKE LIMERICK COUNTRY CLUB
FILE NO.: 120805
FILE NAME: SITE PLAN
SHEET NO.: EAST DIV 3
DATE: MARCH 12, 2013
SCALE: 1" = 300'

NORTHWEST WATER SYSTEMS, INC.
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P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958

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CL U.S. NAVY RAILROAD

CL U.S. RAILROAD

DUNOON PLACE

ROAD OF TRALEE

COUNTY ROAD No. 150

MASON LAKE ROAD

BARNSBY PLACE

ANGUS COURT

BALBRIGGAN ROAD

ERRIGAL PLACE

OLDE LYME ROAD

CROMARTY COURT

PEEBLES COURT

KILMARNOCK ROAD

ST. ANDREWS DRIVE

DALKEITH ROAD

DUNVEGAN ROAD

DARTMOOR DRIVE

150,000 GAL TANK

WELL #3A

WELL #3B

150,000 GAL TANK

WELL #6

LEGEND

- WATER SERVICE
- VALVE
- FIRE HYDRANT F-XX
- STANDPIPE S-XX
- VACUUM BREAKER V-XX
- WELL
- TANK

OWNER: LAKE LIMERICK COUNTRY CLUB

SYSTEM: LAKE LIMERICK

FILE NAME: SITE PLAN

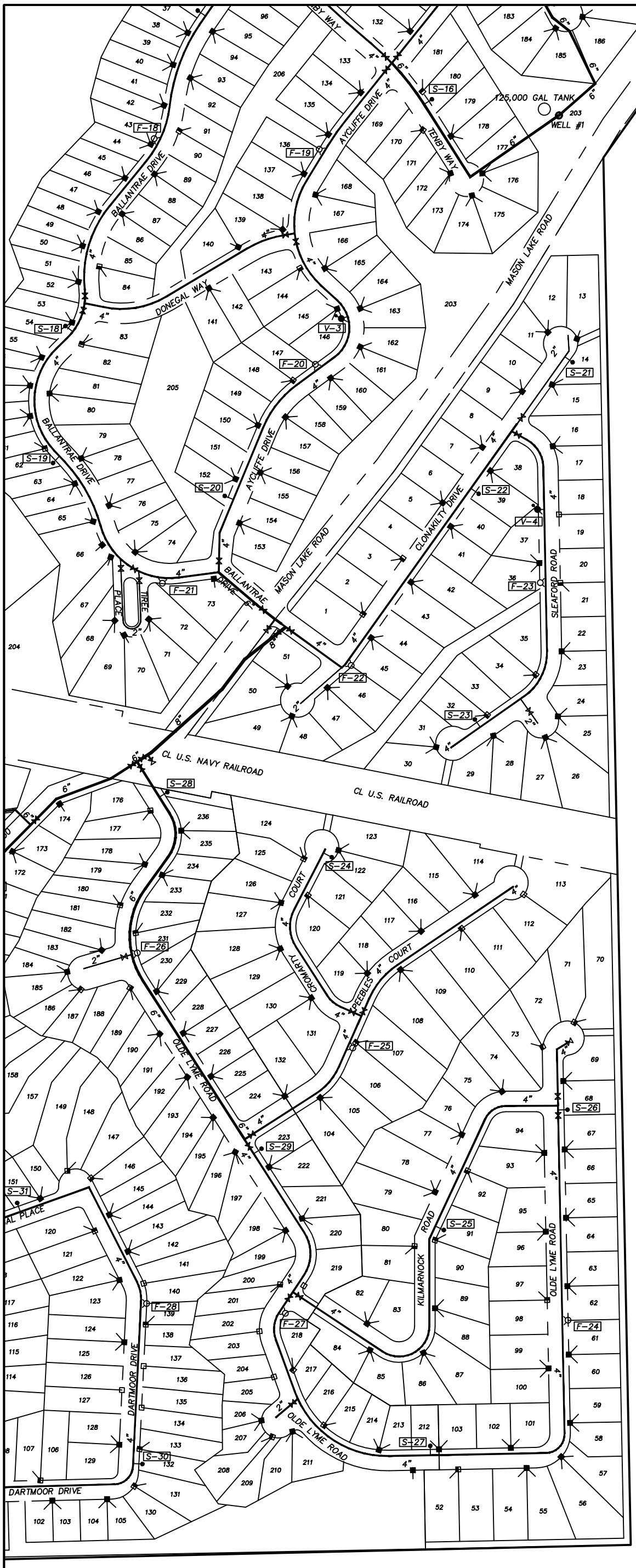
SHEET NO.: DIV 4

FILE NO.: 120805

SCALE: 1" = 300'

DATE: MARCH 12, 2013

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958



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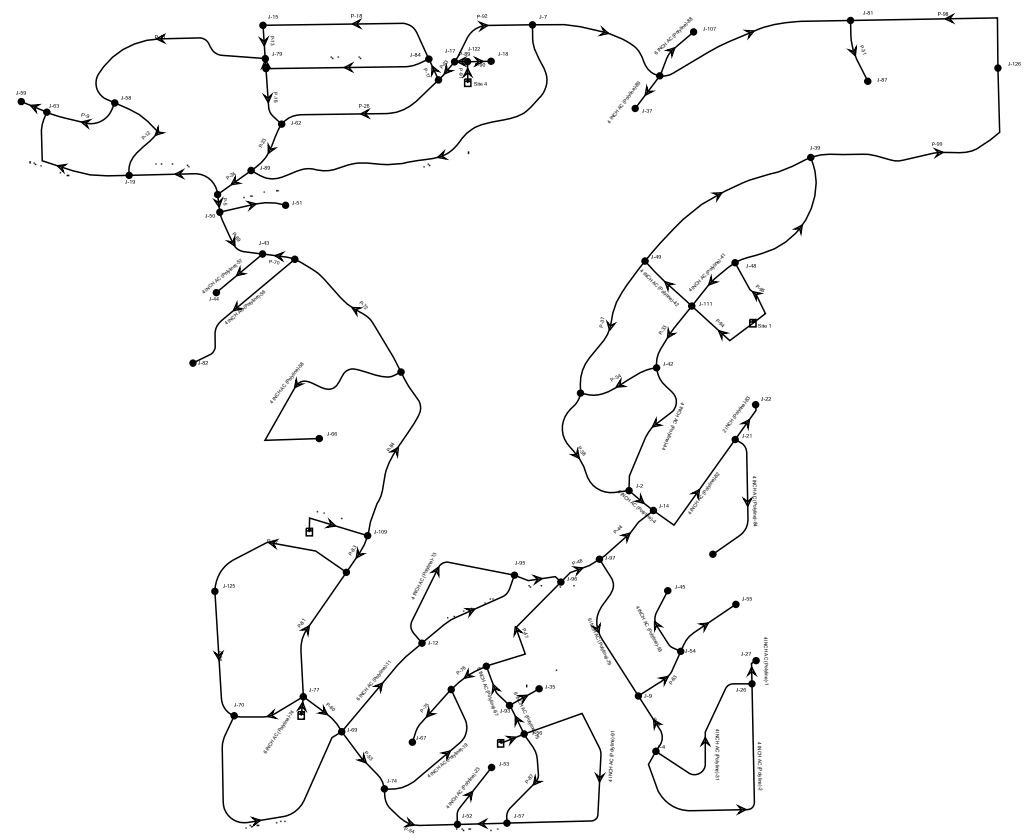
DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

LEGEND

- WATER SERVICE
- VALVE
- FIRE HYDRANT F-XX
- STANDPIPE S-XX
- VACUUM BREAKER V-XX
- WELL
- TANK

SYSTEM: LAKE LIMERICK	OWNER: LAKE LIMERICK COUNTRY CLUB	
FILE NO.: 120805	FILE NAME: SITE PLAN	SHEET NO.: DIV. 5
DATE: MARCH 12, 2013	SCALE: 1" = 300'	

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958



FlexTable: Junction Table (Hydro.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
151	J-77	295.00	0	444.00	64.5
45	J-12	290.00	0	444.00	66.6
136	J-69	285.00	0	444.00	68.8
137	J-70	285.00	0	444.00	68.8
161	J-82	285.00	0	444.00	68.8
167	J-86	285.00	0	444.00	68.8
53	J-17	280.00	0	444.00	71.0
54	J-18	280.00	0	444.00	71.0
164	J-84	280.00	0	444.00	71.0
331	J-122	280.00	0	444.00	71.0
365	J-125	278.34	0	444.00	71.7
95	J-44	275.00	0	444.00	73.1
101	J-48	275.00	0	444.00	73.1
56	J-19	270.00	0	444.00	75.3
67	J-26	270.00	0	444.00	75.3
68	J-27	270.00	0	444.00	75.3
81	J-35	270.00	0	444.00	75.3
152	J-78	270.00	0	444.00	75.3
162	J-83	270.00	0	444.00	75.3
217	J-111	270.00	0	444.00	75.3
60	J-22	265.00	0	444.00	77.4
119	J-59	265.00	0	444.00	77.4
127	J-63	265.00	0	444.00	77.4
133	J-67	265.00	0	444.00	77.4
146	J-74	265.00	0	444.00	77.4
147	J-75	265.00	0	444.00	77.4
59	J-21	260.00	0	444.00	79.6
70	J-28	260.00	0	444.00	79.6
108	J-52	260.00	0	444.00	79.6
109	J-53	260.00	0	444.00	79.6
115	J-56	260.00	0	444.00	79.6
116	J-57	260.00	0	444.00	79.6
118	J-58	260.00	0	444.00	79.6
125	J-62	260.00	0	444.00	79.6
184	J-95	260.00	0	444.00	79.6
50	J-15	255.00	0	444.00	81.8
78	J-33	255.00	0	444.00	81.8
92	J-42	255.00	0	444.00	81.8
94	J-43	255.00	0	444.00	81.8
131	J-66	255.00	0	444.00	81.8
181	J-93	255.00	0	444.00	81.8
97	J-45	250.00	0	444.00	83.9
105	J-50	250.00	0	444.00	83.9
112	J-54	250.00	0	444.00	83.9
113	J-55	250.00	0	444.00	83.9
134	J-68	250.00	0	444.00	83.9
154	J-79	250.00	0	444.00	83.9

FlexTable: Junction Table (Hydro.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
165	J-85	250.00	0	444.00	83.9
172	J-89	250.00	0	444.00	83.9
213	J-109	250.00	0	444.00	83.9
30	J-2	245.00	0	444.00	86.1
38	J-7	245.00	0	444.00	86.1
210	J-107	245.00	0	444.00	86.1
396	J-131	244.30	0	444.00	86.4
48	J-14	240.00	0	444.00	88.3
86	J-38	240.00	0	444.00	88.3
88	J-39	240.00	0	444.00	88.3
103	J-49	240.00	0	444.00	88.3
159	J-81	240.00	0	444.00	88.3
368	J-126	240.00	0	444.00	88.3
85	J-37	235.00	0	444.00	90.4
106	J-51	235.00	0	444.00	90.4
156	J-80	235.00	0	444.00	90.4
192	J-100	235.00	0	444.00	90.4
169	J-87	230.00	0	444.00	92.6
185	J-96	220.00	0	444.00	96.9
33	J-4	215.00	0	444.00	99.1
188	J-97	215.00	0	444.00	99.1
41	J-9	210.00	0	444.00	101.2

FlexTable: Junction Table (Hydro.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
151	J-77	295.00	13.83	427.79	57.5
45	J-12	290.00	13.83	427.01	59.3
161	J-82	285.00	13.83	426.76	61.3
167	J-86	285.00	13.83	426.97	61.4
136	J-69	285.00	13.83	427.47	61.6
137	J-70	285.00	13.83	427.57	61.7
54	J-18	280.00	13.83	426.64	63.4
164	J-84	280.00	13.83	426.70	63.5
53	J-17	280.00	0.00	427.17	63.7
331	J-122	280.00	0.00	427.46	63.8
365	J-125	278.34	13.83	427.57	64.6
95	J-44	275.00	13.83	426.76	65.7
101	J-48	275.00	13.83	427.74	66.1
68	J-27	270.00	13.83	423.71	66.5
67	J-26	270.00	13.83	423.74	66.5
56	J-19	270.00	13.83	426.15	67.6
162	J-83	270.00	13.83	426.97	67.9
81	J-35	270.00	13.83	427.37	68.1
217	J-111	270.00	13.83	427.55	68.2
152	J-78	270.00	13.83	427.79	68.3
60	J-22	265.00	13.83	422.97	68.3
119	J-59	265.00	13.83	426.05	69.7
127	J-63	265.00	0.00	426.09	69.7
133	J-67	265.00	13.83	426.91	70.1
147	J-75	265.00	13.83	427.00	70.1
146	J-74	265.00	13.83	427.46	70.3
59	J-21	260.00	13.83	424.42	71.1
118	J-58	260.00	13.83	426.11	71.9
184	J-95	260.00	13.83	426.30	72.0
70	J-28	260.00	0.00	426.66	72.1
125	J-62	260.00	13.83	426.66	72.1
109	J-53	260.00	13.83	427.41	72.4
108	J-52	260.00	13.83	427.50	72.5
116	J-57	260.00	13.83	427.60	72.5
115	J-56	260.00	13.83	427.84	72.6
78	J-33	255.00	13.83	424.23	73.2
50	J-15	255.00	13.83	426.39	74.2
92	J-42	255.00	13.83	426.40	74.2
94	J-43	255.00	0.00	426.85	74.3
181	J-93	255.00	13.83	427.41	74.6
131	J-66	255.00	13.83	427.47	74.6
97	J-45	250.00	13.83	423.93	75.2
113	J-55	250.00	13.83	423.93	75.2
112	J-54	250.00	13.83	424.03	75.3
154	J-79	250.00	13.83	426.39	76.3
165	J-85	250.00	13.83	426.43	76.3
172	J-89	250.00	13.83	426.66	76.4

FlexTable: Junction Table (Hydro.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
105	J-50	250.00	13.83	426.67	76.4
134	J-68	250.00	13.83	427.01	76.6
213	J-109	250.00	13.83	427.82	76.9
30	J-2	245.00	13.83	425.80	78.2
210	J-107	245.00	13.83	426.28	78.4
38	J-7	245.00	13.83	426.71	78.6
396	J-131	244.30	0.00	427.80	79.4
48	J-14	240.00	0.00	425.77	80.4
159	J-81	240.00	13.83	425.81	80.4
368	J-126	240.00	13.83	425.92	80.4
86	J-38	240.00	13.83	426.29	80.6
88	J-39	240.00	13.83	426.80	80.8
103	J-49	240.00	13.83	426.85	80.8
85	J-37	235.00	13.83	426.24	82.7
156	J-80	235.00	13.83	426.30	82.8
106	J-51	235.00	13.83	426.58	82.9
192	J-100	235.00	13.83	427.79	83.4
169	J-87	230.00	13.83	425.72	84.7
185	J-96	220.00	13.83	426.23	89.2
33	J-4	215.00	13.83	424.03	90.4
188	J-97	215.00	13.83	425.77	91.2
41	J-9	210.00	13.83	424.69	92.9

FlexTable: Pipe Table (Hydro.wtg)

Current Time: 0.000 hours

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-86	170	Site 4	J-122	6.0	Asbestos Cement	140.0	197.06	2.24
P-14	105	J-17	J-122	6.0	Asbestos Cement	140.0	-183.23	2.08
P-36	259	J-56	J-93	6.0	Asbestos Cement	140.0	136.72	1.55
P-84	152	Site 3	J-77	6.0	Asbestos Cement	140.0	124.85	1.42
P-15	335	J-21	J-22	2.0	PVC	150.0	13.83	1.41
P-83	190	J-122	J-18	2.0	PVC	150.0	13.83	1.41
P-37	204	J-56	Site 6	8.0	PVC	150.0	-214.17	1.37
P-74	368	J-96	J-97	6.0	Asbestos Cement	140.0	117.98	1.34
P-80	586	J-111	J-42	4.0	Asbestos Cement	140.0	52.08	1.33
P-111	153	Site 2	J-131	6.0	Ductile Iron	130.0	113.07	1.28
P-46	376	J-68	J-93	6.0	Asbestos Cement	140.0	-109.06	1.24
P-13	196	J-17	J-86	6.0	Asbestos Cement	140.0	105.00	1.19
P-68	186	J-86	J-84	4.0	Asbestos Cement	140.0	44.43	1.13
P-110	938	J-131	J-83	6.0	Asbestos Cement	140.0	98.37	1.12
P-75	1,265	J-97	J-9	6.0	Asbestos Cement	140.0	96.81	1.10
P-30	524	J-49	J-111	4.0	Asbestos Cement	140.0	-42.40	1.08
P-11	1,053	J-14	J-21	4.0	Asbestos Cement	140.0	41.49	1.06
P-6	514	J-9	J-4	4.0	Asbestos Cement	140.0	41.49	1.06
P-7	515	J-9	J-54	4.0	Asbestos Cement	140.0	41.49	1.06
P-54	424	J-77	J-69	6.0	Asbestos Cement	140.0	90.44	1.03
P-47	1,074	J-68	J-96	6.0	Asbestos Cement	140.0	89.04	1.01
P-82	648	Site 1	J-111	6.0	Asbestos Cement	140.0	86.78	0.98
P-4	783	J-7	J-17	6.0	Asbestos Cement	140.0	-78.23	0.89
P-28	1,210	J-48	J-39	4.0	Asbestos Cement	140.0	31.48	0.80
P-26	265	J-43	J-83	6.0	Asbestos Cement	140.0	-70.71	0.80
P-8	967	J-12	J-69	6.0	Asbestos Cement	140.0	-70.43	0.80
P-9	961	J-12	J-95	4.0	Asbestos Cement	140.0	30.79	0.79
P-87	610	Site 1	J-48	6.0	Asbestos Cement	140.0	66.84	0.76
P-17	804	J-28	J-19	4.0	Asbestos Cement	140.0	28.30	0.72
P-21	1,183	J-38	J-7	6.0	Asbestos Cement	140.0	-60.32	0.68
P-72	1,332	J-95	J-12	4.0	Asbestos Cement	140.0	-25.81	0.66

FlexTable: Pipe Table (Hydro.wtg)

Current Time: 0.000 hours

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-59	81	J-79	J-85	4.0	Asbestos Cement	140.0	-25.48	0.65
P-31	540	J-50	J-43	6.0	Asbestos Cement	140.0	-56.88	0.65
P-1	1,174	J-2	J-42	4.0	Asbestos Cement	140.0	-25.16	0.64
P-85	603	Site 5	J-109	6.0	Asbestos Cement	140.0	54.69	0.62
P-66	490	J-85	J-62	4.0	Asbestos Cement	140.0	-24.08	0.61
P-29	1,216	J-49	J-80	4.0	Asbestos Cement	140.0	23.56	0.60
P-39	846	J-57	J-56	6.0	Asbestos Cement	140.0	-52.58	0.60
P-60	1,168	J-80	J-2	4.0	Asbestos Cement	140.0	22.82	0.58
P-89	2,108	J-126	J-39	4.0	Asbestos Cement	140.0	-22.66	0.58
P-38	400	J-57	J-52	6.0	Asbestos Cement	140.0	49.80	0.57
P-81	499	J-111	J-48	4.0	Asbestos Cement	140.0	-21.53	0.55
P-52	1,209	J-74	J-75	4.0	Asbestos Cement	140.0	21.48	0.55
P-55	601	J-77	J-70	4.0	Asbestos Cement	140.0	20.92	0.53
P-67	1,383	J-86	J-62	6.0	Asbestos Cement	140.0	46.74	0.53
P-73	403	J-95	J-96	6.0	Asbestos Cement	140.0	42.77	0.49
P-61	1,639	J-81	J-38	4.0	Asbestos Cement	140.0	-18.83	0.48
P-3	1,375	J-4	J-26	4.0	Asbestos Cement	140.0	15.54	0.40
P-64	1,505	J-84	J-15	4.0	Asbestos Cement	140.0	15.37	0.39
P-65	1,326	J-84	J-85	4.0	Asbestos Cement	140.0	15.23	0.39
P-10	254	J-14	J-2	6.0	Asbestos Cement	140.0	-34.15	0.39
P-16	208	J-26	J-27	4.0	Asbestos Cement	140.0	13.83	0.35
P-71	274	J-93	J-35	4.0	Asbestos Cement	140.0	13.83	0.35
P-20	330	J-37	J-38	4.0	Asbestos Cement	140.0	-13.83	0.35
P-25	486	J-43	J-44	4.0	Asbestos Cement	140.0	13.83	0.35
P-27	602	J-45	J-54	4.0	Asbestos Cement	140.0	-13.83	0.35
P-32	540	J-50	J-51	4.0	Asbestos Cement	140.0	13.83	0.35
P-33	554	J-52	J-53	4.0	Asbestos Cement	140.0	13.83	0.35
P-19	1,104	J-33	J-21	4.0	Asbestos Cement	140.0	-13.83	0.35
P-77	1,909	J-100	J-66	4.0	Asbestos Cement	140.0	13.83	0.35
P-63	1,231	J-82	J-83	4.0	Asbestos Cement	140.0	-13.83	0.35

FlexTable: Pipe Table (Hydro.wtg)

Current Time: 0.000 hours

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-44	223	J-63	J-59	4.0	Asbestos Cement	140.0	13.83	0.35
P-69	519	J-87	J-81	4.0	Asbestos Cement	140.0	-13.83	0.35
P-34	596	J-54	J-55	4.0	Asbestos Cement	140.0	13.83	0.35
P-45	536	J-67	J-75	4.0	Asbestos Cement	140.0	-13.83	0.35
P-88	1,314	J-125	J-78	4.0	Asbestos Cement	140.0	-13.72	0.35
P-58	1,823	J-79	J-58	4.0	Asbestos Cement	140.0	13.19	0.34
P-24	668	J-42	J-80	4.0	Asbestos Cement	140.0	13.09	0.33
P-18	144	J-28	J-50	6.0	Asbestos Cement	140.0	-29.22	0.33
P-57	343	J-78	J-109	6.0	Asbestos Cement	140.0	-27.89	0.32
P-2	2,179	J-4	J-26	4.0	Asbestos Cement	140.0	12.12	0.31
P-35	2,112	J-56	J-57	4.0	Asbestos Cement	140.0	11.05	0.28
P-51	757	J-74	J-52	6.0	Asbestos Cement	140.0	-22.14	0.25
P-62	1,589	J-81	J-126	4.0	Asbestos Cement	140.0	-8.83	0.23
P-43	1,118	J-63	J-19	4.0	Asbestos Cement	140.0	-7.68	0.20
P-48	2,166	J-69	J-70	4.0	Asbestos Cement	140.0	-6.98	0.18
P-40	869	J-58	J-19	4.0	Asbestos Cement	140.0	-6.79	0.17
P-109	340	J-100	J-131	6.0	Asbestos Cement	140.0	-14.70	0.17
P-53	343	J-75	J-68	4.0	Asbestos Cement	140.0	-6.18	0.16
P-41	643	J-58	J-63	4.0	Asbestos Cement	140.0	6.15	0.16
P-22	459	J-38	J-107	6.0	Asbestos Cement	140.0	13.83	0.16
P-49	582	J-69	J-74	6.0	Asbestos Cement	140.0	13.17	0.15
P-79	1,464	J-109	J-100	6.0	Asbestos Cement	140.0	12.96	0.15
P-23	1,611	J-39	J-49	4.0	Asbestos Cement	140.0	-5.01	0.13
P-5	3,160	J-7	J-89	4.0	Asbestos Cement	140.0	4.08	0.10
P-42	458	J-62	J-89	6.0	Asbestos Cement	140.0	8.83	0.10
P-76	589	J-97	J-14	8.0	PVC	140.0	7.34	0.05
P-12	269	J-15	J-79	4.0	Asbestos Cement	140.0	1.54	0.04
P-70	333	J-89	J-28	6.0	Asbestos Cement	140.0	-0.92	0.01
P-56	1,114	J-77	J-78	6.0	Asbestos Cement	140.0	-0.34	0.00
P-50	1,050	J-70	J-125	4.0	Asbestos Cement	140.0	0.11	0.00

FlexTable: Junction Table (Hydro.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
151	J-77	295.00	18.74	427.63	57.4
45	J-12	290.00	18.74	426.27	59.0
161	J-82	285.00	18.74	425.83	60.9
167	J-86	285.00	18.74	426.19	61.1
136	J-69	285.00	18.74	427.07	61.5
137	J-70	285.00	18.74	427.25	61.5
54	J-18	280.00	18.74	425.61	63.0
164	J-84	280.00	18.74	425.72	63.0
53	J-17	280.00	0.00	426.54	63.4
331	J-122	280.00	0.00	427.05	63.6
365	J-125	278.34	18.74	427.25	64.4
68	J-27	270.00	18.74	420.46	65.1
67	J-26	270.00	18.74	420.52	65.1
95	J-44	275.00	18.74	425.83	65.3
101	J-48	275.00	18.74	427.54	66.0
60	J-22	265.00	18.74	419.17	66.7
56	J-19	270.00	18.74	424.75	67.0
162	J-83	270.00	18.74	426.20	67.6
81	J-35	270.00	18.74	426.89	67.9
217	J-111	270.00	18.74	427.20	68.0
152	J-78	270.00	18.74	427.63	68.2
119	J-59	265.00	18.74	424.58	69.0
127	J-63	265.00	0.00	424.64	69.1
133	J-67	265.00	18.74	426.09	69.7
147	J-75	265.00	18.74	426.25	69.8
59	J-21	260.00	18.74	421.71	70.0
146	J-74	265.00	18.74	427.05	70.1
118	J-58	260.00	18.74	424.69	71.3
184	J-95	260.00	18.74	425.02	71.4
70	J-28	260.00	0.00	425.65	71.7
125	J-62	260.00	18.74	425.65	71.7
78	J-33	255.00	18.74	421.39	72.0
109	J-53	260.00	18.74	426.96	72.2
108	J-52	260.00	18.74	427.12	72.3
116	J-57	260.00	18.74	427.30	72.4
115	J-56	260.00	18.74	427.71	72.6
50	J-15	255.00	18.74	425.18	73.6
92	J-42	255.00	18.74	425.19	73.6
97	J-45	250.00	18.74	420.85	73.9
113	J-55	250.00	18.74	420.85	73.9
94	J-43	255.00	0.00	425.97	74.0
112	J-54	250.00	18.74	421.03	74.0
181	J-93	255.00	18.74	426.97	74.4
131	J-66	255.00	18.74	427.07	74.4
154	J-79	250.00	18.74	425.18	75.8
165	J-85	250.00	18.74	425.25	75.8
172	J-89	250.00	18.74	425.65	76.0

FlexTable: Junction Table (Hydro.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
105	J-50	250.00	18.74	425.67	76.0
134	J-68	250.00	18.74	426.27	76.3
213	J-109	250.00	18.74	427.69	76.9
30	J-2	245.00	18.74	424.14	77.5
210	J-107	245.00	18.74	424.98	77.9
38	J-7	245.00	18.74	425.74	78.2
396	J-131	244.30	0.00	427.65	79.3
48	J-14	240.00	0.00	424.09	79.6
159	J-81	240.00	18.74	424.15	79.7
368	J-126	240.00	18.74	424.35	79.8
86	J-38	240.00	18.74	425.00	80.0
88	J-39	240.00	18.74	425.90	80.4
103	J-49	240.00	18.74	425.97	80.5
85	J-37	235.00	18.74	424.91	82.2
156	J-80	235.00	18.74	425.01	82.2
106	J-51	235.00	18.74	425.51	82.4
192	J-100	235.00	18.74	427.63	83.3
169	J-87	230.00	18.74	423.99	83.9
185	J-96	220.00	18.74	424.89	88.6
33	J-4	215.00	18.74	421.03	89.1
188	J-97	215.00	18.74	424.09	90.5
41	J-9	210.00	18.74	422.19	91.8

FlexTable: Pipe Table (Hydro.wtg)

Current Time: 0.000 hours

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-86	170	Site 4	J-122	6.0	Asbestos Cement	140.0	267.02	3.03
P-14	105	J-17	J-122	6.0	Asbestos Cement	140.0	-248.28	2.82
P-36	259	J-56	J-93	6.0	Asbestos Cement	140.0	185.25	2.10
P-84	152	Site 3	J-77	6.0	Asbestos Cement	140.0	169.18	1.92
P-15	335	J-21	J-22	2.0	PVC	150.0	18.74	1.91
P-83	190	J-122	J-18	2.0	PVC	150.0	18.74	1.91
P-37	204	J-56	Site 6	8.0	PVC	150.0	-290.21	1.85
P-74	368	J-96	J-97	6.0	Asbestos Cement	140.0	159.86	1.81
P-80	586	J-111	J-42	4.0	Asbestos Cement	140.0	70.57	1.80
P-111	153	Site 2	J-131	6.0	Ductile Iron	130.0	153.21	1.74
P-46	376	J-68	J-93	6.0	Asbestos Cement	140.0	-147.77	1.68
P-13	196	J-17	J-86	6.0	Asbestos Cement	140.0	142.28	1.61
P-68	186	J-86	J-84	4.0	Asbestos Cement	140.0	60.20	1.54
P-110	938	J-131	J-83	6.0	Asbestos Cement	140.0	133.29	1.51
P-75	1,265	J-97	J-9	6.0	Asbestos Cement	140.0	131.18	1.49
P-30	524	J-49	J-111	4.0	Asbestos Cement	140.0	-57.46	1.47
P-11	1,053	J-14	J-21	4.0	Asbestos Cement	140.0	56.22	1.44
P-6	514	J-9	J-4	4.0	Asbestos Cement	140.0	56.22	1.44
P-7	515	J-9	J-54	4.0	Asbestos Cement	140.0	56.22	1.44
P-54	424	J-77	J-69	6.0	Asbestos Cement	140.0	122.55	1.39
P-47	1,074	J-68	J-96	6.0	Asbestos Cement	140.0	120.65	1.37
P-82	648	Site 1	J-111	6.0	Asbestos Cement	140.0	117.58	1.33
P-4	783	J-7	J-17	6.0	Asbestos Cement	140.0	-106.01	1.20
P-28	1,210	J-48	J-39	4.0	Asbestos Cement	140.0	42.66	1.09
P-26	265	J-43	J-83	6.0	Asbestos Cement	140.0	-95.81	1.09
P-8	967	J-12	J-69	6.0	Asbestos Cement	140.0	-95.43	1.08
P-9	961	J-12	J-95	4.0	Asbestos Cement	140.0	41.72	1.07
P-87	610	Site 1	J-48	6.0	Asbestos Cement	140.0	90.58	1.03
P-17	804	J-28	J-19	4.0	Asbestos Cement	140.0	38.35	0.98
P-21	1,183	J-38	J-7	6.0	Asbestos Cement	140.0	-81.74	0.93
P-72	1,332	J-95	J-12	4.0	Asbestos Cement	140.0	-34.97	0.89

FlexTable: Pipe Table (Hydro.wtg)

Current Time: 0.000 hours

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-59	81	J-79	J-85	4.0	Asbestos Cement	140.0	-34.52	0.88
P-31	540	J-50	J-43	6.0	Asbestos Cement	140.0	-77.07	0.87
P-1	1,174	J-2	J-42	4.0	Asbestos Cement	140.0	-34.09	0.87
P-85	603	Site 5	J-109	6.0	Asbestos Cement	140.0	74.10	0.84
P-66	490	J-85	J-62	4.0	Asbestos Cement	140.0	-32.63	0.83
P-29	1,216	J-49	J-80	4.0	Asbestos Cement	140.0	31.93	0.82
P-39	846	J-57	J-56	6.0	Asbestos Cement	140.0	-71.25	0.81
P-60	1,168	J-80	J-2	4.0	Asbestos Cement	140.0	30.93	0.79
P-89	2,108	J-126	J-39	4.0	Asbestos Cement	140.0	-30.70	0.78
P-38	400	J-57	J-52	6.0	Asbestos Cement	140.0	67.48	0.77
P-81	499	J-111	J-48	4.0	Asbestos Cement	140.0	-29.18	0.74
P-52	1,209	J-74	J-75	4.0	Asbestos Cement	140.0	29.10	0.74
P-55	601	J-77	J-70	4.0	Asbestos Cement	140.0	28.35	0.72
P-67	1,383	J-86	J-62	6.0	Asbestos Cement	140.0	63.33	0.72
P-73	403	J-95	J-96	6.0	Asbestos Cement	140.0	57.95	0.66
P-61	1,639	J-81	J-38	4.0	Asbestos Cement	140.0	-25.52	0.65
P-3	1,375	J-4	J-26	4.0	Asbestos Cement	140.0	21.06	0.54
P-64	1,505	J-84	J-15	4.0	Asbestos Cement	140.0	20.83	0.53
P-65	1,326	J-84	J-85	4.0	Asbestos Cement	140.0	20.63	0.53
P-10	254	J-14	J-2	6.0	Asbestos Cement	140.0	-46.28	0.53
P-16	208	J-26	J-27	4.0	Asbestos Cement	140.0	18.74	0.48
P-71	274	J-93	J-35	4.0	Asbestos Cement	140.0	18.74	0.48
P-20	330	J-37	J-38	4.0	Asbestos Cement	140.0	-18.74	0.48
P-25	486	J-43	J-44	4.0	Asbestos Cement	140.0	18.74	0.48
P-27	602	J-45	J-54	4.0	Asbestos Cement	140.0	-18.74	0.48
P-32	540	J-50	J-51	4.0	Asbestos Cement	140.0	18.74	0.48
P-33	554	J-52	J-53	4.0	Asbestos Cement	140.0	18.74	0.48
P-19	1,104	J-33	J-21	4.0	Asbestos Cement	140.0	-18.74	0.48
P-77	1,909	J-100	J-66	4.0	Asbestos Cement	140.0	18.74	0.48
P-63	1,231	J-82	J-83	4.0	Asbestos Cement	140.0	-18.74	0.48

FlexTable: Pipe Table (Hydro.wtg)

Current Time: 0.000 hours

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-44	223	J-63	J-59	4.0	Asbestos Cement	140.0	18.74	0.48
P-69	519	J-87	J-81	4.0	Asbestos Cement	140.0	-18.74	0.48
P-34	596	J-54	J-55	4.0	Asbestos Cement	140.0	18.74	0.48
P-45	536	J-67	J-75	4.0	Asbestos Cement	140.0	-18.74	0.48
P-88	1,314	J-125	J-78	4.0	Asbestos Cement	140.0	-18.59	0.47
P-58	1,823	J-79	J-58	4.0	Asbestos Cement	140.0	17.87	0.46
P-24	668	J-42	J-80	4.0	Asbestos Cement	140.0	17.74	0.45
P-18	144	J-28	J-50	6.0	Asbestos Cement	140.0	-39.59	0.45
P-57	343	J-78	J-109	6.0	Asbestos Cement	140.0	-37.80	0.43
P-2	2,179	J-4	J-26	4.0	Asbestos Cement	140.0	16.42	0.42
P-35	2,112	J-56	J-57	4.0	Asbestos Cement	140.0	14.97	0.38
P-51	757	J-74	J-52	6.0	Asbestos Cement	140.0	-30.00	0.34
P-62	1,589	J-81	J-126	4.0	Asbestos Cement	140.0	-11.96	0.31
P-43	1,118	J-63	J-19	4.0	Asbestos Cement	140.0	-10.41	0.27
P-48	2,166	J-69	J-70	4.0	Asbestos Cement	140.0	-9.46	0.24
P-40	869	J-58	J-19	4.0	Asbestos Cement	140.0	-9.20	0.23
P-109	340	J-100	J-131	6.0	Asbestos Cement	140.0	-19.91	0.23
P-53	343	J-75	J-68	4.0	Asbestos Cement	140.0	-8.38	0.21
P-41	643	J-58	J-63	4.0	Asbestos Cement	140.0	8.33	0.21
P-22	459	J-38	J-107	6.0	Asbestos Cement	140.0	18.74	0.21
P-49	582	J-69	J-74	6.0	Asbestos Cement	140.0	17.84	0.20
P-79	1,464	J-109	J-100	6.0	Asbestos Cement	140.0	17.57	0.20
P-23	1,611	J-39	J-49	4.0	Asbestos Cement	140.0	-6.79	0.17
P-5	3,160	J-7	J-89	4.0	Asbestos Cement	140.0	5.53	0.14
P-42	458	J-62	J-89	6.0	Asbestos Cement	140.0	11.97	0.14
P-76	589	J-97	J-14	8.0	PVC	140.0	9.94	0.06
P-12	269	J-15	J-79	4.0	Asbestos Cement	140.0	2.09	0.05
P-70	333	J-89	J-28	6.0	Asbestos Cement	140.0	-1.24	0.01
P-56	1,114	J-77	J-78	6.0	Asbestos Cement	140.0	-0.47	0.01
P-50	1,050	J-70	J-125	4.0	Asbestos Cement	140.0	0.15	0.00

Fire Flow Node FlexTable: Fire Flow Report (Hydro.wtg)

Current Time: 0.000 hours

Label	Satisfies Fire Flow Constraints?	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)
J-22	False	123.28	1,007.29	130.57	20.0	54.0	J-77
J-18	False	170.04	1,007.29	177.33	20.2	54.1	J-77
J-33	False	291.29	1,007.29	298.58	20.0	39.2	J-22
J-66	False	326.15	1,007.29	333.44	20.1	54.0	J-77
J-27	False	338.11	1,007.29	345.40	20.0	25.9	J-26
J-82	False	346.01	1,007.29	353.30	20.0	54.0	J-77
J-26	False	366.95	1,007.29	374.24	20.1	20.0	J-27
J-45	False	388.28	1,007.29	395.57	20.0	41.8	J-55
J-55	False	389.17	1,007.29	396.46	20.0	41.7	J-45
J-21	False	397.17	1,007.29	404.46	22.4	20.0	J-22
J-87	False	448.56	1,007.29	455.85	20.0	40.1	J-81
J-4	False	476.18	1,007.29	483.47	43.8	20.0	J-27
J-59	False	483.50	1,007.29	490.79	20.0	32.0	J-63
J-54	False	527.50	1,007.29	534.79	20.0	20.0	J-45
J-67	False	534.24	1,007.29	541.53	20.0	53.9	J-77
J-126	False	547.70	1,007.29	554.99	20.0	44.3	J-81
J-63	False	571.06	1,000.00	571.06	20.0	20.0	J-59
J-81	False	571.57	1,007.29	578.86	20.0	24.3	J-87
J-44	False	584.49	1,007.29	591.78	20.0	53.8	J-82
J-53	False	605.63	1,007.29	612.92	20.0	53.9	J-77
J-51	False	667.56	1,007.29	674.85	20.0	54.0	J-82
J-58	False	689.85	1,007.29	697.14	20.0	22.1	J-59
J-19	False	702.53	1,007.29	709.82	20.0	25.3	J-59
J-125	False	710.95	1,007.29	718.24	20.0	48.8	J-70
J-37	False	714.20	1,007.29	721.49	20.0	52.0	J-107
J-35	False	842.55	1,007.29	849.84	20.0	53.9	J-77
J-9	False	871.78	1,007.29	879.07	46.1	20.0	J-27
J-15	False	952.54	1,007.29	959.83	20.0	44.9	J-84
J-39	False	986.37	1,007.29	993.66	20.0	39.5	J-126
J-107	False	998.61	1,007.29	1,005.90	20.0	35.2	J-38
J-70	True	1,027.04	1,007.29	1,034.33	20.0	38.7	J-125
J-75	True	1,129.86	1,007.29	1,137.15	20.0	20.0	J-67
J-38	True	1,160.41	1,007.29	1,167.70	22.2	20.0	J-107
J-79	True	1,262.08	1,007.29	1,269.37	20.0	22.4	J-15
J-84	True	1,279.67	1,007.29	1,286.96	20.0	45.1	J-15
J-80	True	1,297.10	1,007.29	1,304.39	20.0	48.4	J-42
J-85	True	1,342.69	1,000.00	1,342.69	20.0	23.6	J-79
J-42	True	1,352.78	1,007.29	1,360.07	20.0	52.1	J-27
J-49	True	1,364.31	1,007.29	1,371.60	20.0	54.0	J-77
J-12	True	1,590.53	1,007.29	1,597.82	20.0	51.2	J-69
J-14	True	1,684.08	1,000.00	1,684.08	31.2	20.0	J-22
J-97	True	1,710.89	1,007.29	1,718.18	44.1	20.0	J-27
J-2	True	1,758.66	1,007.29	1,765.95	20.3	20.0	J-22
J-7	True	1,812.34	1,007.29	1,819.63	20.0	21.1	J-107
J-83	True	1,849.42	1,007.29	1,856.71	26.5	20.0	J-82
J-43	True	1,876.39	1,000.00	1,876.39	28.7	20.0	J-44
J-95	True	1,876.60	1,007.29	1,883.89	20.0	32.9	J-27
J-28	True	2,012.73	1,000.00	2,012.73	20.0	20.0	J-19
J-62	True	2,046.50	1,007.29	2,053.79	20.0	29.8	J-19
J-50	True	2,088.15	1,007.29	2,095.44	20.0	20.5	J-19
J-96	True	2,092.59	1,007.29	2,099.88	39.5	20.0	J-27
J-89	True	2,129.26	1,007.29	2,136.55	20.0	21.7	J-19
J-86	True	2,389.84	1,007.29	2,397.13	20.0	23.9	J-84
J-52	True	2,428.30	1,007.29	2,435.59	20.0	20.0	J-53

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Fire Flow Node FlexTable: Fire Flow Report (Hydro.wtg)

Current Time: 0.000 hours

Label	Satisfies Fire Flow Constraints?	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)
J-48	True	2,476.41	1,007.29	2,483.70	20.0	54.0	J-77
J-17	True	2,500.00	1,000.00	2,500.00	33.8	32.6	J-86
J-56	True	2,500.00	1,007.29	2,507.29	64.0	53.6	J-77
J-57	True	2,500.00	1,007.29	2,507.29	25.6	35.0	J-53
J-68	True	2,500.00	1,007.29	2,507.29	32.4	33.3	J-67
J-69	True	2,500.00	1,007.29	2,507.29	34.0	36.1	J-12
J-74	True	2,500.00	1,007.29	2,507.29	25.3	43.6	J-12
J-77	True	2,500.00	1,007.29	2,507.29	44.3	50.3	J-12
J-78	True	2,500.00	1,007.29	2,507.29	33.8	43.5	J-125
J-93	True	2,500.00	1,007.29	2,507.29	44.7	38.2	J-35
J-100	True	2,500.00	1,007.29	2,507.29	45.8	37.1	J-66
J-109	True	2,500.00	1,007.29	2,507.29	52.1	49.4	J-78
J-111	True	2,500.00	1,007.29	2,507.29	29.4	47.8	J-42
J-122	True	2,500.00	1,000.00	2,500.00	41.9	40.9	J-86
J-131	True	3,500.00	500.00	3,500.00	50.9	39.4	J-82

Fire Flow Node FlexTable: Fire Flow Report (Hydro.wtg)

Current Time: 0.000 hours

Label	Satisfies Fire Flow Constraints?	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)
J-27	True	1,172.27	1,010.36	1,182.63	20.0	21.7	J-26
J-26	True	1,198.69	1,010.36	1,209.05	20.0	20.0	J-27
J-87	True	1,481.31	1,010.36	1,491.67	20.0	22.3	J-81
J-81	True	1,514.91	1,010.36	1,525.27	20.0	24.3	J-87
J-59	True	1,547.88	1,010.36	1,558.24	20.0	23.1	J-63
J-82	True	1,559.54	1,010.36	1,569.90	20.0	43.7	J-83
J-126	True	1,572.25	1,010.36	1,582.61	20.0	37.5	J-81
J-4	True	1,572.44	1,010.36	1,582.80	43.8	20.0	J-27
J-45	True	1,574.12	1,010.36	1,584.48	20.0	27.4	J-27
J-55	True	1,575.51	1,010.36	1,585.87	20.0	27.3	J-27
J-63	True	1,607.21	1,000.00	1,607.21	20.0	20.0	J-59
J-107	True	1,609.44	1,010.36	1,619.80	20.0	29.0	J-38
J-33	True	1,609.54	1,010.36	1,619.90	20.0	32.0	J-22
J-37	True	1,711.29	1,010.36	1,721.65	20.0	21.1	J-107
J-38	True	1,731.37	1,010.36	1,741.73	22.2	20.0	J-107
J-54	True	1,739.41	1,010.36	1,749.77	20.0	20.0	J-45
J-9	True	1,746.57	1,010.36	1,756.93	46.0	20.0	J-27
J-22	True	1,765.14	1,010.36	1,775.50	20.0	28.1	J-21
J-66	True	1,807.03	1,010.36	1,817.39	20.0	54.0	J-77
J-19	True	1,867.14	1,010.36	1,877.50	20.0	24.9	J-59
J-58	True	1,883.59	1,010.36	1,893.95	20.0	21.0	J-59
J-21	True	1,904.37	1,010.36	1,914.73	22.2	20.0	J-22
J-44	True	1,950.35	1,010.36	1,960.71	20.0	32.2	J-82
J-125	True	2,150.97	1,010.36	2,161.33	20.0	48.4	J-70
J-83	True	2,176.12	1,010.36	2,186.48	26.5	20.0	J-82
J-12	True	2,215.97	1,010.36	2,226.33	20.0	41.9	J-95
J-43	True	2,273.50	1,000.00	2,273.50	28.7	20.0	J-44
J-67	True	2,290.38	1,010.36	2,300.74	20.0	35.2	J-75
J-53	True	2,352.23	1,010.36	2,362.59	20.0	36.5	J-52
J-51	True	2,466.56	1,010.36	2,476.92	20.0	31.1	J-50
J-15	True	2,490.82	1,010.36	2,501.18	20.0	35.9	J-84
J-2	True	2,500.00	1,010.36	2,510.36	37.5	35.5	J-22
J-7	True	2,500.00	1,010.36	2,510.36	32.6	38.6	J-107
J-14	True	2,500.00	1,000.00	2,500.00	37.2	26.4	J-22
J-17	True	2,500.00	1,000.00	2,500.00	53.4	51.4	J-86
J-18	True	2,500.00	1,010.36	2,510.36	30.0	53.7	J-86
J-28	True	2,500.00	1,000.00	2,500.00	30.3	30.6	J-19
J-35	True	2,500.00	1,010.36	2,510.36	36.1	51.8	J-93
J-39	True	2,500.00	1,010.36	2,510.36	29.4	42.7	J-126
J-42	True	2,500.00	1,010.36	2,510.36	38.0	47.8	J-22
J-48	True	2,500.00	1,010.36	2,510.36	42.6	53.7	J-12
J-49	True	2,500.00	1,010.36	2,510.36	45.7	50.9	J-111
J-50	True	2,500.00	1,010.36	2,510.36	30.1	31.3	J-44
J-52	True	2,500.00	1,010.36	2,510.36	32.7	32.7	J-53
J-56	True	2,500.00	1,010.36	2,510.36	64.4	53.9	J-77
J-57	True	2,500.00	1,010.36	2,510.36	42.1	48.6	J-53
J-62	True	2,500.00	1,010.36	2,510.36	34.6	41.2	J-19
J-68	True	2,500.00	1,010.36	2,510.36	49.9	47.0	J-67
J-69	True	2,500.00	1,010.36	2,510.36	45.0	47.1	J-12
J-70	True	2,500.00	1,010.36	2,510.36	32.6	45.5	J-125
J-74	True	2,500.00	1,010.36	2,510.36	42.7	49.7	J-12
J-75	True	2,500.00	1,010.36	2,510.36	29.8	29.8	J-67
J-77	True	2,500.00	1,010.36	2,510.36	51.1	54.5	J-12
J-78	True	2,500.00	1,010.36	2,510.36	47.5	51.8	J-125

Fire Flow Node FlexTable: Fire Flow Report (Hydro.wtg)

Current Time: 0.000 hours

Label	Satisfies Fire Flow Constraints?	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)
J-79	True	2,500.00	1,010.36	2,510.36	34.9	35.0	J-15
J-80	True	2,500.00	1,010.36	2,510.36	41.3	47.2	J-22
J-84	True	2,500.00	1,010.36	2,510.36	29.1	38.8	J-86
J-85	True	2,500.00	1,000.00	2,500.00	36.9	37.7	J-84
J-86	True	2,500.00	1,010.36	2,510.36	37.4	40.3	J-84
J-89	True	2,500.00	1,010.36	2,510.36	37.9	38.2	J-19
J-93	True	2,500.00	1,010.36	2,510.36	51.8	45.3	J-35
J-95	True	2,500.00	1,010.36	2,510.36	26.4	22.2	J-12
J-96	True	2,500.00	1,010.36	2,510.36	55.2	36.0	J-12
J-97	True	2,500.00	1,010.36	2,510.36	48.6	24.7	J-27
J-100	True	2,500.00	1,010.36	2,510.36	50.4	41.8	J-66
J-109	True	2,500.00	1,010.36	2,510.36	65.4	53.7	J-77
J-111	True	2,500.00	1,010.36	2,510.36	47.8	52.2	J-48
J-122	True	2,500.00	1,000.00	2,500.00	55.8	53.7	J-86
J-131	True	3,500.00	500.00	3,500.00	53.2	43.2	J-82

LAKE LIMERICK WATER SYSTEM

EMERGENCY RESPONSE PROCEDURES

1.0 INTRODUCTION

Safe and reliable drinking water is vital to every community. Preparing for emergencies is a vital step in protecting the water supply and a high priority for the Lake Limerick (LLCC). LLCC has identified the following goals in emergency preparedness:

- Understand and organize a communication network
- Determine the possible emergencies and likelihood of occurrence
- Establish appropriate levels of security
- Evaluate alternative sources of water and the viability of each.

When LLCC is notified of an emergency situation at a water system, emergency procedures will be implemented to ensure that the situation is handled appropriately and with as little risk to public safety as possible. The purpose of this Emergency Response Plan is to document the procedures LLCC will implement in responding to emergency situations.

The Emergency Response Plan includes the following information:

2.0 Personnel Responsible for Emergency Response
3.0 Contacting LLCC Regarding an Emergency
4.0 LLCC Emergency Assessment
5.0 Emergency Response Quick Reference Lists
6.0 Notifying Regulators
Appendix – Templates

This document should be accessible to all LLCC personnel responsible for emergency management at all times. In the event that the information below should change or become dated, i.e. contact names and numbers, this emergency plan will be updated.

2.0 PERSONNEL RESPONSIBLE FOR EMERGENCY RESPONSE

At LLCC, the staff member responsible for the emergency response plan is:

Water Master:	Steve Wheaton

Within LLCC, the following chain-of-command or lines of authority exist:

LLCC Board of Directors:	Esther Springer-Johannesen
Water Committee:	Phyllis Antonsen
Supervisor:	Sheila Hedlund
Water System Management:	Northwest Water Systems (NWS)

All NWS personnel can be contacted at the following 24-hour phone number: (360) 876-0958.

3.0 CONTACTING LLCC REGARDING AN EMERGENCY

In an emergency situation, often the water system customers will be aware of a problem with their water system before LLCC is aware of the problem. All customers served by LLCC are provided with the LLCC Water Department and Office phone number. All emergency calls are directed to one of these locations.

During business hours (9:00 AM to 5:00 PM Monday through Friday, except holidays), phones at the LLCC office will be answered in person. Emergency calls will be routed to the Water Master cell phone. If the Water Master is not available, NWS is contacted by cell phone and informed of the emergency.

After hours, phone calls to the Water Office are directed to an automated message directing phone calls to the Water Master and NWS representative cell phones. Should the Water Master not be available the following NWS protocol is followed;

From Monday through Thursday, after hours calls are directed to a voice mail system which includes an emergency voice mail box. If a message is left in the emergency voice mail box, the phone system automatically contacts the on-call NWS staff person (either the President/CEO or the Operations Supervisor).

From Friday at 5:00 PM through Monday at 8:00 AM, all phone calls to the NWS office number are directed to a call center. Phone calls to the call center are answered in person by call center staff. The call center staff obtains information from the caller and then contacts the weekend on-call NWS staff person via email and text messages to cell phones. The weekend on-call NWS staff person is either the Operations Supervisor or a Field Technician.

4.0 LLCC EMERGENCY ASSESSMENT

After LLCC identifies an emergency or is notified of an emergency situation, the Water Master will determine whether the emergency requires an on-site presence by NWS. If needed, the Water Master will contact NWS and provide instructions for an on-site evaluation.

In assessing an emergency situation, the Water Master and/or NWS will analyze the type and severity of the emergency.

> **Level I: Normal (Routine) Emergency** - Minor failure which can be repaired within 24 hours. Water quality is not affected. Examples may include, but are not limited to: Distribution line breaks, short power outage, minor mechanical failure in pump house.
>
> **Level II: Minor Emergency (Alert Status)** – Minor disruption in supply or indication of possible contamination. Public health may be jeopardized. Minor emergencies can usually be resolved within 72 hours. Examples may include, but are not limited to: Disruption in supply such as a transmission line break, pump failure with a potential for backflow or loss of pressure; an initial unconfirmed positive fecal coliform or E. coli sample; an initial primary chemical contaminant sample.
>
> **Level III: Significant Emergency** – The system experiences significant mechanical or contamination problems where disruption in supply is inevitable and issuance of a health advisory is needed to protect public health. Major emergencies should be reported to DOH as soon as possible. Examples may include, but are not limited to: 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, loss of a source or reservoir, a major line break or other system failure resulting in a water shortage or requiring system shutdown, surface water contamination, or an immediate threat to public health of the customers requiring a health advisory.
>
> **Level IV: Catastrophic Disaster** – The system experiences major damage or contamination form a natural disaster, an accident or an act of terrorism. These incidents usually require immediate notification of local law enforcement and local emergency management services. Immediate issuance of health advisories and declaration of water supply emergencies are critical to protect public health.

The Water Master will contact the Water Committee and Board of Directors and communicate the recommended action. In the event of a public health emergency, if the Water Committee cannot be contacted, the Water Master will take action as necessary to protect the health of residents on the water system experiencing the emergency.

5.0 NOTIFYING RESIDENTS OR CUSTOMERS

Notify any residents or customers that may be affected as a result of the emergency situation. Depending on the type of emergency and the area affected, phone calls or door-to-door notification may be used to provide information quickly and effectively to the public.

Once the problem is resolved, the same notification procedures will be used to inform the public that the situation has passed and they can resume normal water use procedures.

The following are templates for notifications that may be needed in an emergency situation:

Acute Coliform Failure Public Notice

Non-acute Coliform Failure Public Notice

Emergency Well Use – Boil Water

Emergency Well Use – Boil Water Rescinded

Emergency Well Disconnect – Return to Normal Operations

Copies of these templates are included in an appendix to the Emergency Response Plan.

6.0 NOTIFYING REGULATORS

In the event of a Level I or Level II emergency during which a drinking water system exceeds the Maximum Contaminant Level (MCL) for coliform and in all Level III and Level IV emergencies, LLCC will notify the Washington State Department of Health Office of Drinking Water (ODW). The local health jurisdiction will also be notified; however, many of the local health jurisdictions do not have after hours emergency response numbers. ODW can assist in determining the proper notification process.

Emergency contact	**Phone number(s)**	**Emergency contact**	**Phone number(s)**
Mason County Fire/Police/Medical	911	Electrician: Arcadia Drilling	800-426-3395
Mason County emergency services	911	DOH regional engineer	360- 236-3035
County environmental health contact	426-9670-293	DOH emergency After hours #	877-481-4901
Department of Ecology Spill Response SW Regional Office	360-407-6300	Water Committee: Phyllis Antonsen	360-426-2295
Engineering consultant Northwest Water	360-876-0958	Water Master: Steve Wheaton	360-490-1627
Electric utility: Mason Co. PUD 3	800-544-4223	System engineer: Northwest Water	360-876-0958
Pump service: Arcadia Drilling	800-426-3395	Management Agency: NWS	360-876-0958
DOH Coliform Monitoring and Water Quality: Sandy Brentlinger	360- 236-3044	Water Office	360-426-4563
Operations Supervisor: Shiela Hedlund	360-426-3581		

POWER OUTAGE

1. Contact the power company and get an estimate when power will be restored.
2. Inspect system generators for proper operation and fuel level. Monitor system pressures and reservoir levels.
3. If the time estimate for power restoration is such that it exceeds the fuel available for the emergency generators, then do the following:
   a. Contact any critical water users on the system
   b. Contact emergency personnel and notify them of the situation
   c. Secure a source of fuel and a means of delivering it to the generators
   d. Notify the public to minimize water usage
   e. If depressurization is expected to occur, follow the depressurization policy

WATER MAIN BREAK

1. Evaluate the break-can it be prepared under pressure? If not and depressurization will (or has) occurred, do the following;
   a. Contact critical water users on the system
   b. Contact emergency personnel and notify them of the situation
   c. Notify the public in the affected area
2. Contact the work personnel needed to proceed with repairing the break. For small breaks this may be system employees. For larger breaks, a contractor may be required.
3. Reference the system map and locate the nearest system valves to isolate the break.
4. Evaluate break and determine whether immediate isolation is necessary.
5. Make an inventory of the parts necessary to repair the break and order parts.
6. Contact the DOH Regional Engineer and reference the AWWA Manual to determine necessary precautions to take during repairs.
7. Swab the interior of the pipe and fittings used to make repairs with a 1% hypochlorite solution before they are installed.
8. Make repairs to the water main.
9. Apply liberal quantities of hypochlorite tablets to the open trench area to lessen the danger from pollution.
10. Flush the water main after repairs are made to remove contamination introduced during repairs. If hydrant locations permit, flush toward the work location from both directions. Continue flushing for 5 minutes after all discoloration has cleared.
11. Where practical, the section of water main shall be isolated, all service connections shut off, and the section flushed and chlorinated to 300 ppm and left for a minimum of 15 minutes. After the waiting period, the main shall be flushed until no noticeable chlorine smell is noted.
12. Bacteria samples shall be taken after repairs are completed on either side of the break. If positive samples are recorded, then the situation shall be evaluated for corrective action. Daily sampling shall be continued until two consecutive negative samples are recorded.

CHEMICAL CONTAMINATION

1. Attempt to determine the specific chemical which has caused the contamination and its hazard classification. There are four broad classifications of contamination as follows:

Hazard Type	Description
Pollution Hazard	A condition through which an aesthetically objectionable or degrading material NOT dangerous to health may enter the public water system or a consumer's potable water system.
System Hazard	A condition, device, or practice posing an actual or potential threat of damage to the physical properties of the public water system or a consumer's potable water system, but will not cause an adverse health effect
Health Hazard	Any condition, device, or practice in a water supply system or its operation that creates, or may create a danger to the health and wellbeing of others.
Severe Hazard	Any health hazard that could reasonably be expected to result in significant morbidity or death

2. Determine the following information:
    - Who made the first observation?
    - What is their phone number and location?
    - When did it happen?
    - What is it?
    - What are the qualities-color/taste/smell?
    - Is an MSDS (material safety data sheet) available?
    - How much of it entered the water system?
    - Where did it enter the water system?
    - Where is it now?
    - Is it isolated to one area or is it wide spread?
    - What area and population are affected?
    - Can it be isolated?
    - Can depressurization and or flushing of the affected area be done quickly and without serious consequences?
3. If the contamination is classified as either a health hazard or a severe hazard do the following:
    a. Issue a no-use water advisory immediately. A boil advisory will not be adequate for most chemical contamination-boiling the water may only serve to concentrate the contaminant.
    b. If the contaminant could cause serious illness or death, can you isolate the water supply from users?
4. If a water advisory will be issued, contact the critical water users and notify them of situation
5. Immediately contact emergency personnel and agencies and notify them of situation.
6. If possible, determine the cause and source of contamination-eliminate the source. Consider the possibility that the cause may be due to a cross-connection, backflow, or back siphonage.
7. Begin flushing the distribution system to eliminate the contaminant from the public water supply.

BACTERIOLOGICAL CONTAMINATION

1. Should any routine bacteriological sample be unsatisfactory a total of three repeat samples are required within 24 hours from the following locations:
   a. The same tap as the original sample
   b. An active service within five active connections upstream of the original sample
   c. An active service within five active connections downstream of the original sample
2. Should any repeat sample be unsatisfactory or any sample indicates the presence of fecal or E. coli; the Department of Health shall be notified.
3. Take the actions under the direction of DOH which will include, but are not limited to, and investigation of possible sources of contamination and shock chlorinating the system. System users must be notified within 24 hours of detection.
4. The month after a positive coliform sample, the water system will take five routine samples. This will include the two sites scheduled for that month, the site that tested positive the previous month, and one or more of the repeat sample sites associated with a positive result.

DISTRIBUTION SYSTEM STORAGE FAILURE

1. Isolate the reservoir from the system
2. After the reservoir is removed from the system;
   a. Open the reservoir by-pass valve and operate the submersible well pump(s) to discharge directly to the distribution system.
   b. Drain the reservoir and determine cause of failure.
   c. Make repairs, clean reservoir as needed and return to normal operation.

SUSPECTED CROSS-CONNECTION

1. Isolate suspected source of backflow
2. Sample to determine the system has become contaminated
3. Contact DOH for guidance
4. Attempt to determine the degree of health hazard based on classifications found in the contamination procedure.
5. Refer to appropriate procedure(s) based on the results of the sample analysis.
6. Complete a “Backflow Incident Response Form” to document the occurrence.

SOURCE FAILURE

The storage and well capacity of the Lake Limerick Water system allows for the loss of several sources without adversely affecting the system’s ability to serve the community. Should a source be determined to not be usable it shall be disconnected from the distribution system. The source shall be evaluated by an experienced well driller to determine if recondition or replacement is the best option.

SUSPECTED TAMPERING AT SYSTEM FACILITIES

Tampering may range from simple defacement of property to the introduction of biological or chemical agents into the water supply. These actions can be divided into several categories:

Action	Description
Vandalism	Actions that cause physical damage to property and structures, such as cutting fences to gain access to secure areas, breaking windows, and damaging or removing locks from doors or wells.
Malicious Action	Actions that, intentional or not, introduce or threaten to introduce foreign substances into a portion of the distribution system or cause damage to a portion of the public water systems infrastructure. These acts range from pranks that “go too far” to actions intended to cause a disruption to the public water supply or the introduction of toxic substances into the distribution system
Terrorism	Intentional actions introduce or threaten to introduce foreign substances into a portion of the treatment or distribution system or cause damage to a portion of the public water systems infrastructure. These acts are meant to cause harm to individuals and cause unease or panic in the general public.

1. Immediately
    a. Treat the area as a crime scene. Minimize disturbance of area to preserve evidence. Document the observed conditions, with photographs or video if possible.
    b. Contact law enforcement agencies and work with them to determine the extent of the damage.
    c. Notify system users
    d. Isolate the affected portion of the system
    e. Contact DOH and local health district.
2. Soon After
    a. If there is evidence of contamination, perform a physical check of the system and inspect structural integrity.
    b. Contact laboratories to determine if they are capable of analyzing for unknown substances
    c. If tampering resulted in probable introduction of chemical or biological contaminants into the system, proper precautions must be taken during sampling to prevent exposure to the contaminant
    d. With the consent of law enforcement, begin to repair all points of entry and facilities.

PRECAUTIONARY HEALTH ADVISORY

Lake Limerick Water
ID #44150 T - Mason County

A water leak was reported at approximately 1:30 PM on Wednesday February 15th, 2012 at 2220 St. Andrews Drive North. 30 homes had to be taken out of water to repair the water line associated with this leak.

Any time there is a loss of pressure in a non-chlorinated system a 'precautionary boil water advisory' is issued. Effective immediately, Lake Limerick Water is advising the homes that were affected by this water loss to boil their water before consumption. Those home affected have been issued this notice.

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. Bring all water to a boil. Let it boil 1 minute at a rolling boil and let 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. If you are experiencing illness symptoms, it is recommended that you see your health care provider.

This advisory is a based on the following:

- The system lost pressure due to necessary repairs at 2220 St. Andrews Drive N.
- A water sample will be collected after the repairs are completed and the users of the 30 affected properties will be notified when the results of these water samples are available. This is expected to be Friday afternoon, February 17th, 2012 at approximately 3:30 PM.

Follow-up will include the following:

- The water system will be disinfected and then flushed until no chlorine remains in the water system.
- Water samples will then be collected and tested.
- This advisory will not be rescinded until water sample tests have satisfactory results.
- Lake Limerick Water is working closely with the State Department of Health and will continue to do so until satisfactory samples are collected.

This advisory will remain in effect until lifted by Lake Limerick Water in consultation with the Washington State Department of Health, Office of Drinking Water.

Jon Wiley WDM 2, Lake Limerick Water

Date: February 15, 2012

PRECAUTIONARY HEALTH ADVISORY IS HEREBY RESCINDED

Lake Limerick Water
ID #44150 T - Mason County

The boil water advisory issued on Wednesday February 15th is hereby rescinded. Two investigative water samples were taken at and near the leak on the water system, and all of those samples have come back **free of any bacteria.** You no longer need to boil your water before consumption.

If you have any questions concerning this matter, please call the water office at 360.426.4563.

Bill Bernier WDM 2, Lake Limerick Water
360.265.7382 Cell

Date: February 23, 2012

505
Well #1

WATER WELL REPORT
STATE OF WASHINGTON

File Original and First Copy with the Division of Water Resources
Second Copy — Owner's Copy
Third Copy — Driller's Copy

Application No. _____
Permit No. _____

(1) OWNER:
Name Lake Limerick Associates
Address 1132 No. 128th St
Seattle, Wn. 98133

(2) LOCATION OF WELL:
County King (Owner's number, if any) -
NE ¼ NE ¼ Section 27 T 25N R 5 W.M. W.M.
Bearing and distance from section or subdivision corner

(3) TYPE OF WORK (check):
New Well [X] Deepening [ ] Reconditioning [ ] Abandoned [ ]
If abandonment, describe material and procedure in Item 11

(4) PROPOSED USE (check):
Domestic [ ] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(5) TYPE OF WELL:
Rotary [ ] Driven [ ]
Cable [X] Jetted [ ]
Dug [ ] Bored [ ]

(6) CASING INSTALLED: Threaded [ ] Welded [X]
10 " Diam. from 0 ft. to 116 ft. Gage .279
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) PERFORATIONS: Perforated? [ ] Yes [ ] No
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(8) SCREENS: Well screen installed [X] Yes [ ] No
Manufacturer's Name Edward E. Johnson Inc.
Type Stainless steel Model No.
Diam. 10" Slot size .050 Set from 69' ft. to 96' ft.
Diam. 10" Slot size .020 Set from 99 ft. to 114 ft.

(9) CONSTRUCTION:
Was well gravel packed? [X] Yes [ ] No Size of gravel
Gravel placed from ft. to ft.
Was a surface seal provided? [ ] Yes [X] No To what depth? ft.
Material used in seal Drill cuttings
Did any strata contain unusable water? [ ] Yes [X] No
Type of water? Depth of strata
Method of sealing strata off

(10) WATER LEVELS:
Static level 51 ft. below land surface Date 3/25/66
Artesian pressure lbs. per square inch Date
Water is controlled by (Cap, valve, etc.)

(11) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? [X] Yes [ ] No If yes, by whom? Driller
Yield: 35 gal./min with 61 ft. drawdown after 6 hrs.
" " " " " "
" " " " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level
3:10	62	3:30	72' 4"
3:15	79	3:35	71
3:20	75	3:40	70' 6"
3:25	73' 6"	3:45	69' 6"

Date of test 3/25/66
Bailer test gal./min with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? [X] Yes [ ] No

(12) WELL LOG: Diameter of well 10 inches.
Depth drilled 116 ft. Depth of completed well 114 ft.
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sand, clay & gravel	0	6
Hardpan	6	27
Gravel - dry	1	28
Hardpan	20	48
Gravel	3	51
Hardpan	6	60
Gravel - some water	10	78
Sand & gravel	10	88
" " " - water bearing	13	101
Sand	5	106
" & gravel	2	108
Sand	8	116
Muddy sand & gravel		116

Work started 19 Completed 19

(13) PUMP:
Manufacturer's Name
Type H.P.

Well driller's Statement:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Ivan Well Drilling Co.
(Person, firm, or corporation) (Type or print)
Address Division Tacoma Pump & Drilling Co. Inc
P.O. Box 3, Kitsap 30
[Signed] (Well Driller)
License No. Date 3/28/66 19

USE ADDITIONAL SHEETS IF NECESSARY

OK/WR

S02
Well 2

WATER WELL REPORT
STATE OF WASHINGTON

File Original and First Copy with the Division of Water Resources
Second Copy — Owner's Copy
Third Copy — Driller's Copy

Application No. 8833
Permit No.

(1) OWNER:
Name LAKE LIMERICK COUNTRY CLUB, INCORPORATED
Address 5122 25th N.E.
SEATTLE, WN.

(2) LOCATION OF WELL:
County MASON Owner's number, if any- 2
SE ¼ NW ¼ Section 27 T 21N R 3W W.M.
Bearing and distance from section or subdivision corner
~~NE~~ SOUTH & ~~NW~~ EAST OF
NW Cor. SECTION 27
1405 1585'

(3) TYPE OF WORK (check):
New Well X Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable X Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED: Threaded ☐ Welded ☐
10" Diam. from 1 ft. to 103 ft. Gage
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) PERFORATIONS: Perforated? ☐ Yes X No
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(8) SCREENS: Well screen installed X Yes ☐ No
Manufacturer's Name JOHNSON
Type STAINLESS STEEL Model No.
Diam. 10" Slot size 35 Set from 103 ft. to 121 ft.
Diam. Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Was gravel packed? ☐ Yes X No Size of gravel
Gravel placed from ft. to ft.
Was surface seal provided? ☐ Yes ☐ No To what depth? ft.
Material used in seal
Did any strata contain unusable water? ☐ Yes X No
Type of water? Depth of strata
Method of sealing strata off

(10) WATER LEVELS:
Static level 11' ft. below land surface Date 7-Nov-67
Artesian pressure lbs. per square inch Date
Water level controlled by (Cap, valve, etc.)
OK/PE

(11) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? X Yes ☐ No If yes, by whom? Russell Drilling
Yield: 200 gal./min. with 84 ft. drawdown after 4 hrs.
" " " " "
" " " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level

Date of test 6/17/67
Bailer test 132 gal./min. with 24 ft. drawdown after 4 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? ☐ Yes ☐ No

(12) WELL LOG: Diameter of well 10" inches.
Depth drilled 121 ft. Depth of completed well 121 ft.
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top Soil & Gravel	0	2
Cemented Gravel	2	10
Cemented Gravel	10	40
Cemented Gravel & clay	40	50
Cemented Gravel & clay	50	75
Clay Blue & Gray	75	78
Broken clay & Gravel	78	85
" " "	85	95
Blue clay & sand	95	100
Blue clay & sand (water bearing)	100	104
Sand & Gravel Small stream of water	104	121

Work started May 3 1967 Completed May 8 1967

(13) PUMP:
Manufacturer's Name
Type: H.P.

Well Driller's Statement:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Russell Well Drilling Co.
(Person, firm, or corporation) (Type or print)
Address P.O. Box 433 Shelton Wash
[Signed] Wallace J. Russell
(Well Driller)
License No. 223-01-5124 Date June 19, 1967

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7336—(Rev. 5-62)—8-62—25M 75108

503

Well 3A

WATER WELL REPORT
STATE OF WASHINGTON

File Original and First Copy with the Division of Water Resources
Second Copy — Owner's Copy
Third Copy — Driller's Copy

Application No 5834
Permit No. ....

(1) OWNER:
Name LAKE LIMERICK COUNTRY CLUB, INCORPORATED
Address 5125 25th N.E.
Seattle, Wn.

(2) LOCATION OF WELL: #3
County MASON Owner's number (if any)
SW ¼ SW ¼ Section 27 T 21N. R 3W. W.M.
Bearing and distance from section or subdivision corner
~~1200~~ 1165' NORTH, ~~650~~ 520' EAST OF S.W. Cor. Sec. 27
E. 240' ±

(3) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED: Threaded ☐ Welded ☐
10" Diam. from 1 ft. to 148 ft. Gage
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) PERFORATIONS: Perforated? ☐ Yes ☒ No
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(8) SCREENS: Well screen installed? ☐ Yes ☐ No
Manufacturer's Name JOHNSON
Type STAINLESS STEEL Model No.
Diam. 10" Slot size 30 Set from 131 ft. to 146 ft.
Diam. Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Was well gravel packed? ☐ Yes ☒ No Size of gravel
Gravel placed from ft. to ft.
Was a surface seal provided? ☐ Yes ☐ No To what depth? ft.
Material used in seal
Did any strata contain unusable water? ☐ Yes ☐ No
Type of water? Depth of strata
Method of sealing strata off

(10) WATER LEVELS:
Static level 50 ft. below land surface Date June 20-67
Artesian pressure lbs. per square inch Date
Water is controlled by (Cap, valve, etc.)
OK/PE

(11) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Russell Drilling
Yield 90 gal./min. with 79 ft. drawdown after 4 hrs.
" " " "
" " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level

Date of test June 17-1967
Bailer test 80 gal./min. with 60 ft. drawdown after 4 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? ☐ Yes ☐ No

(12) WELL LOG: Diameter of well 10 inches.
Depth drilled 148 ft. Depth of completed well 148 ft.
Formation. Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Fill	0	3
Coarse Gravel	3	72
Gravel, Sand (water)	72	77
Coarse Gravel	77	79½
Sand & Gravel (water)	79½	80½
Coarse Sand	80½	92
Coarse Gravel	92	110
Gravel & Sand	110	111
Coarse Gravel	111	112
Gravel Sand	112	113
Coarse Gravel	113	126
Coarse Gravel	126	128
Sand & Gravel	128	148

Work started June 19 Completed 19

(13) PUMP:
Manufacturer's Name
Type H.P.

Well Driller's Statement:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Russell Drilling Co. (Person, firm, or corporation) (Type or print)
Address P.O. Box 433 Shelton Wash
[Signed] William J. Russell (Well Driller)
License No 223-01-5124 Date June 19, 1967

(USE ADDITIONAL SHEETS IF NECESSARY)

U.S.F. No. 1336—(Rev. 9-62)—8-62—3M—751(w)

506, Well 36

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. _____
Permit No. _____

(1) OWNER: Name Lake Limerick Address 90 St. Andrews Dr. Shelton, Wash.

(2) LOCATION OF WELL: County Mason #36 - SW ¼ SW ¼ Sec. 27 T. 21 N. R. 3W W.M.
¼ and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☑
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .... X (OLD #3)
New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☑ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled X 177 ft. Depth of completed well 177 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8 " Diam. from 0 ft. to 177 ft.
Threaded ☐ _____ " Diam. from _____ ft. to _____ ft.
Welded ☑ _____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☑
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☑ No ☐ Manufacturer's Name Johnson SS 10"
Type #100 slot Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☑ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☑ No ☐ To what depth? 18 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land surface elevation above mean sea level 180 ft.
Static level 61 ft. below top of well Date 5/4/81
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☑ If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test 210 gal./min. with 118 ft. drawdown after 1 hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☑

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Shot clay	0	3'
Hard pan	3	72'
Gravel & sand	72	77'
hard pan	77	81'
Gravel & sand	81	95'
Hard pan	95	112'
Gravel & sand	112	120'
Cemented gravel	120	134'
Sand, gravel & water	134	150'
Hard pan	150	161'
Gravel & water	161	177'

Work started 4/28 19 Completed 5/4/81 19

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Bedell Pump & Drilling Co.
(Person, firm, or corporation) (Type or print)
Address 1583 E. Dickinson St. Shelton, Wash.

[Signed] Vern L Bedell
(Well Driller)

License No. 0032 Date 5/26/81 19

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

SO 4, Well 4

File Original and First Copy with the Division of Water Resources
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. 9889
Permit No. 9218

(1) OWNER: Name Lake Isabella Address

(2) LOCATION OF WELL: County Mason E 1/2 SE 1/4 SW 1/4 Sec. 22 T. 21 N., R. 3W W.M.
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)
New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 10 inches. Drilled 111 ft. Depth of completed well 111 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 10" Diam. from 1 ft. to 111 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☐
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type S.S. Steel Model No.
Diam. 10 Slot size from 91 ft. to 111 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☐ No ☐ To what depth? ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level
Static level 54 ft. below top of well Date 8-1-68
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 8-1
Bailer test 93 gal./min. with 8 ft. drawdown after 4 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top Soil	1	2
Sm Gravel	2	10
" "	10	35
" "	35	49
Sm. Gr (Blue)	49	50
" " "	50	58
Gr + Sand	58	60
Brown Clay Gr	60	70
" " "	70	78
Blue Clay & Sand	78	88
Brown Clay	88	92
Gr Sand	92	95
" "	95	106
" "	106	111

Work started , 19 Completed , 19

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Russell Drilling Co. (Person, firm, or corporation) (Type or print)
Address P.O. Box 433 Shelton, Wash
[Signed] William J. Russell (Well Driller)
License No. 225-5144 Date 11-12, 19 69

OK/WRR

S. F. No. 1336-4 (Rev. 5/68)—3-69—5M: 4516.

(USE ADDITIONAL SHEETS IF NECESSARY)

507
Well 5

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No 62-2715

(1) OWNER: Name Lake Limerick Address E. 740 St. Andrews Drive

(2) LOCATION OF WELL: County Mason NW¼ SW¼ Sec 27 T 21 N. R 3 W.M.
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (If more than one) 5
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 10 inches.
Drilled 130 ft. Depth of completed well 130 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 10" Diam. from 0 ft. to 130 ft.
Threaded ☐ ____" Diam. from ____ ft. to ____ ft.
Welded ☒ ____" Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type S.S. Model No.
Diam. 5 Slot size 30 from 110 ft. to 130 ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 22 ft.
Material used in seal Neat Cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level 500 ft.
Static level 48 ft. below top of well Date 10-30-86
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal/min. with ft. drawdown after hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 120 gal/min. with 2 ft. drawdown after 4 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Brown Clay & Gravel	0	27
Sand	27	59
Brown Clay & Sand	59	74
Brown Clay & Gravel	74	109
Gravel & Water	109	120

RECEIVED
NOV 10 1986
WATER RESOURCES

Work started 10-23 19 86 Completed 10-30 1986

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Arcadia Drilling
(Person, firm, or corporation) (Type or print)
Address 170 SE Walker Pk Dr

[Signed] Willis M. Nail Jr
(Well Driller)

License No. 1455 Date 11-3 1986

(USE ADDITIONAL SHEETS IF NECESSARY)

12

Well 6
508
pg 1 of 2

Page 1

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

Start Card No. 219587

WATER WELL REPORT

STATE OF WASHINGTON

Water Right Permit No. _____

(1) OWNER: Name Lake Limerick Country Club. Address _____

(2) LOCATION OF WELL: County MASON SE ¼ SW ¼ Sec 27 T 21 N. R 3W W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) _____

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater ☐ Industrial ☐ Test Well ☒ Municipal ☐ Other

(4) TYPE OF WORK: Owner's number of well (if more than one) #6

Abandoned ☐ New well ☒ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☐ Rotary ☒ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches. Drilled 499 feet. Depth of completed well 494 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 5/16 " Diam. from 0 ft. to 284' ft.
Welded ☒
Liner installed ☐ 6" Diam. from 71' ft. to 339 ft.
Threaded ☐ " Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☒ No ☐
Manufacturer's name Johnson
Type _____ Model No. _____
Diam. 7" Slot size 80 from 329 ft. to 334 ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 284 ft.
Material used in seal BENTONITE
Did any strata contain unusable water? Yes ☒ No ☐
Type of water? HEAVY IRON SALTS Depth of strata 175'
Method of sealing strata off CASED OFF

(7) PUMP: Manufacturer's name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 189 ft. below top of well Date _____
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? ARCADIA
Yield: 110 gal./min. with 57 ft. drawdown after 4 hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
8:1 Am	199	9:05	172	9:41	189
9:25 Am	134	10:36	137	11:20	232
12:15	132	1:05	193		

Date of test 12/5 / 88

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airlift _____ gal./min. with _____ ft. drawdown after _____ hrs.
Artesian flow _____ G.P.M. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formations: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the materials in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
FILL	0'	1'
~~BROWN SAND~~	~~1'~~	~~5'~~
ROCKY SAND	1'	5'
BROWN HARDPAN	5'	16'
BROWN SANDY CLAY	16'	22'
BROWN ROCKY CLAY	22'	27'
BROWN HARDPAN	27'	45'
BROWN ROCKY CLAY	45'	50'
BROWN HARDPAN W/LARGE ROCK	50'	58'
BROWN ROCKY CLAY	58'	64'
BROWN SANDY CLAY	64'	71'
SANDY GRAVEL - H2O	71'	72'
BROWN HARDPAN	72'	82'
BROWN ROCKY CLAY	82'	89'
BROWN HARDPAN	89'	108'
BROWN ROCKY CLAY	108'	120'
BROWN SANDY CLAY	120'	138'
GRAVELLY SAND H2O	138'	140'
BROWN HARDPAN	140'	145'
BROWN ROCKY CLAY	145'	151'
BLUE CLAY	151'	161'
BLUE HARDPAN W/ORGANICS	161'	168'
GRAY CEMENTED GRAVEL W/H2O	168'	166'
SANDY GRAVEL	166'	175'
BLUE SHALE	175'	178'
GRAY GRAVELLY CLAY	178'	189'
GRAY GUMMY CLAY	189'	196'
BLACK SILTY CLAY	196'	198'
BLACK ROCKY CLAY	198'	205'
BLACK HARDPAN	205'	219'
BLUE CLAY	219'	225'
BLACK SILTY CLAY	225'	232'
GRAY GRAVELLY CLAY	232'	239'
GRAY HARDPAN	239'	243'

Work started 10/01 19 88 Completed 10/03/88 19

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME ARCADIA Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address SE 171 WAIKe-PK Shelton

(Signed) Jack Watkins (WELL DRILLER) License No. 1465

Contractor's Registration No. ARCADI*147K1 Date 12-5-88 19

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) (1329)

13

Well 6
308
Pg 2 of 2

Start Card

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 19887

Water Right Permit No. ______

(1) OWNER: Name Lake Limerick Country Club Address ______

(2) LOCATION OF WELL: County Mason SE ¼ SW ¼ Sec. 22 T. 21 N., R. 3 W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) ______

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☐ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ______
Abandoned ☐ New well ☐ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☐ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well ______ inches.
Drilled ______ feet. Depth of completed well ______ ft.

(6) CONSTRUCTION DETAILS:
Casing installed: Welded ☐ Liner installed ☐ Threaded ☐ ______" Diam. from ______ ft. to ______ ft.
Perforations: Yes ☐ No ☐
Type of perforator used ______
SIZE of perforations ______ in. by ______ in.
______ perforations from ______ ft. to ______ ft.
Screens: Yes ☐ No ☐
Manufacturer's Name ______
Type ______ Model No. ______
Diam. ______ Slot size ______ from ______ ft. to ______ ft.
Gravel packed: Yes ☐ No ☐ Size of gravel ______
Gravel placed from ______ ft. to ______ ft.
Surface seal: Yes ☐ No ☐ To what depth? ______ ft.
Material used in seal ______
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ______ Depth of strata ______
Method of sealing strata off ______

(7) PUMP: Manufacturer's Name ______
Type: ______ H.P. ______

(8) WATER LEVELS: Land-surface elevation above mean sea level ______ ft.
Static level ______ ft. below top of well Date ______
Artesian pressure ______ lbs. per square inch Date ______
Artesian water is controlled by ______ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? ______
Yield: ______ gal./min. with ______ ft. drawdown after ______ hrs.
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)
Time Water Level Time Water Level Time Water Level
Date of test ______
Bailer test ______ gal./min. with ______ ft. drawdown after ______ hrs.
Airtest ______ gal./min. with stem set at ______ ft. for ______ hrs.
Artesian flow ______ g.p.m. Date ______
Temperature of water ______ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
SANDY CLAY W/SOME GRAVEL - H2O	263'	287'
BROWN CLAY	287'	298'
GRAY SANDY CLAY	298'	306'
BROWN HARDPAN	306'	309'
GRAVELLY SANDY CLAY	309'	312'
BROWN HARDPAN	312'	316'
BROWN SANDY CLAY	316'	320'
BRAWN HARDPAN	320'	324'
BROWN GRAVELLY CLAY	324'	340'
BROWN SANDY CLAY	340'	412'
BROWN HARDPAN	412'	420'
SANDY GRAVEL - H2O	420'	454'
BROWN CLAY	454	

Work started 10/01/88, 19 Completed 10/03/88, 19

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Arcadia Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address SE 170 Walker Park, Shelton

(Signed) [signature] (WELL DRILLER) License No. 1465

Contractor's Registration No. ARCADDH177K Date 10/5/88, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

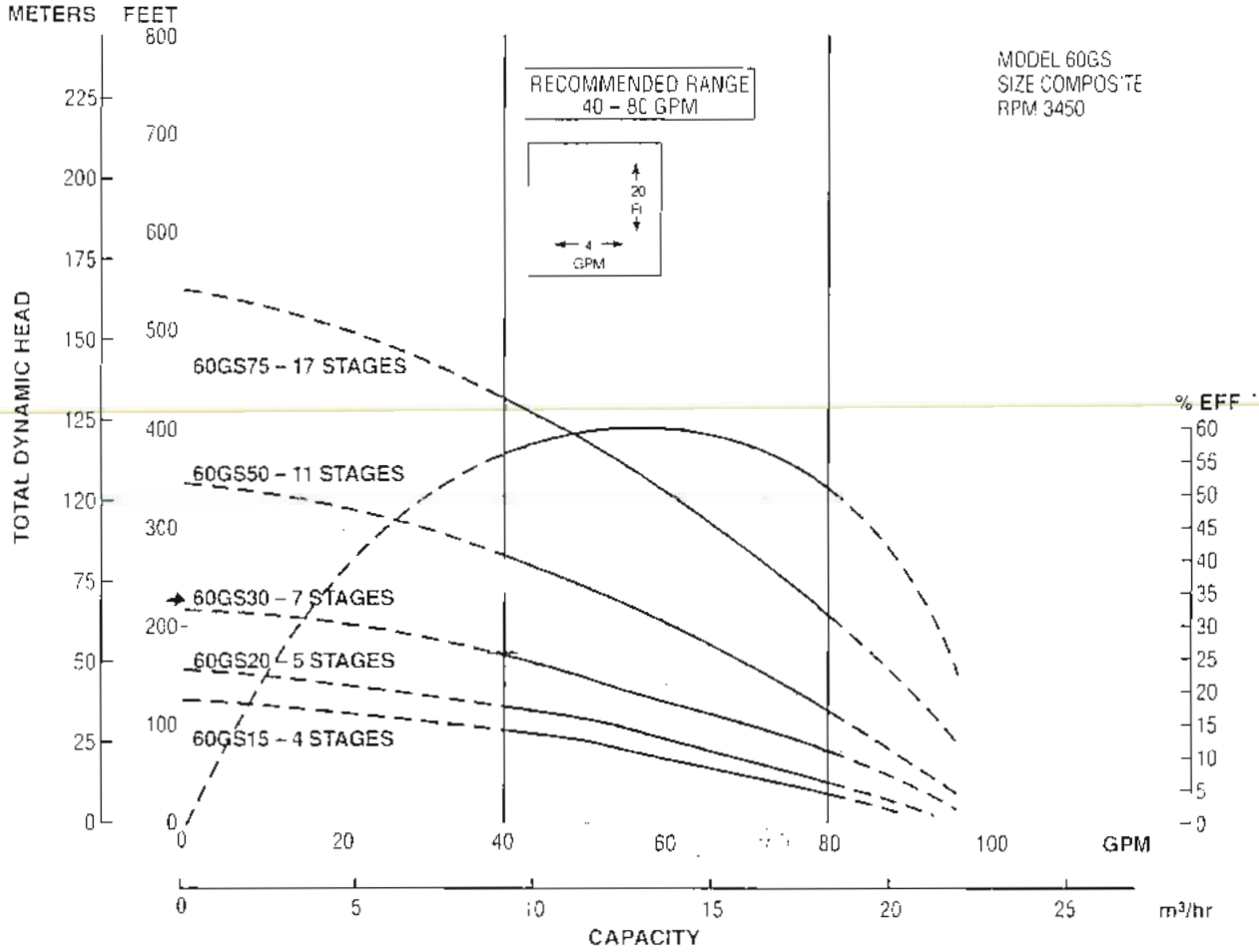
ECY 050-1-20 (10/87) -1879-

Well 1

Model 60GS

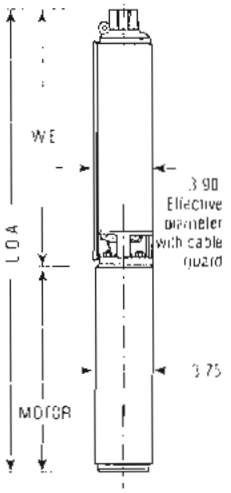
Well #1

GOULDS PUMPS



DIMENSIONS AND WEIGHTS

HP	Stages	W.E. Order No.	Motor Order No.	PH	Motor Volts	Motor Length	W.E.[1] Length	L.O.A.[2]	W.E. and Motor Weight
1½	4	60GS15	S07940	1	230	13.6	15.0	28.6	35.6
			S07978	3	200	11.8	15.0	26.8	30.6
			S07970		230				
			S07975		460				
			S07979*		575				
2	5	60GS20	S08940	1	230	15.1	17.1	32.2	38.5
			S08978	3	200	13.6	17.1	30.7	36.5
			S08970		230				
			S08975		460				
			S08979		575				
3	7	60GS30	S09940	1	230	23.5	21.2	44.7	62.2
			S09978	3	200	20.6	21.2	41.8	53.2
			S09970		230				
			S09975		460				
			S09979		575				
5	11	60GS50	S10940	1	230	29.5	30.9	60.4	83.2
			S10978	3	200	23.6	30.9	54.5	67.2
			S10970		230				
			S10975		460				
			S10979*		575				
7½	17	60GS75	S119784	3	200	29.6	43.2	72.8	95.2
			S119704		230				
			S119754		460				



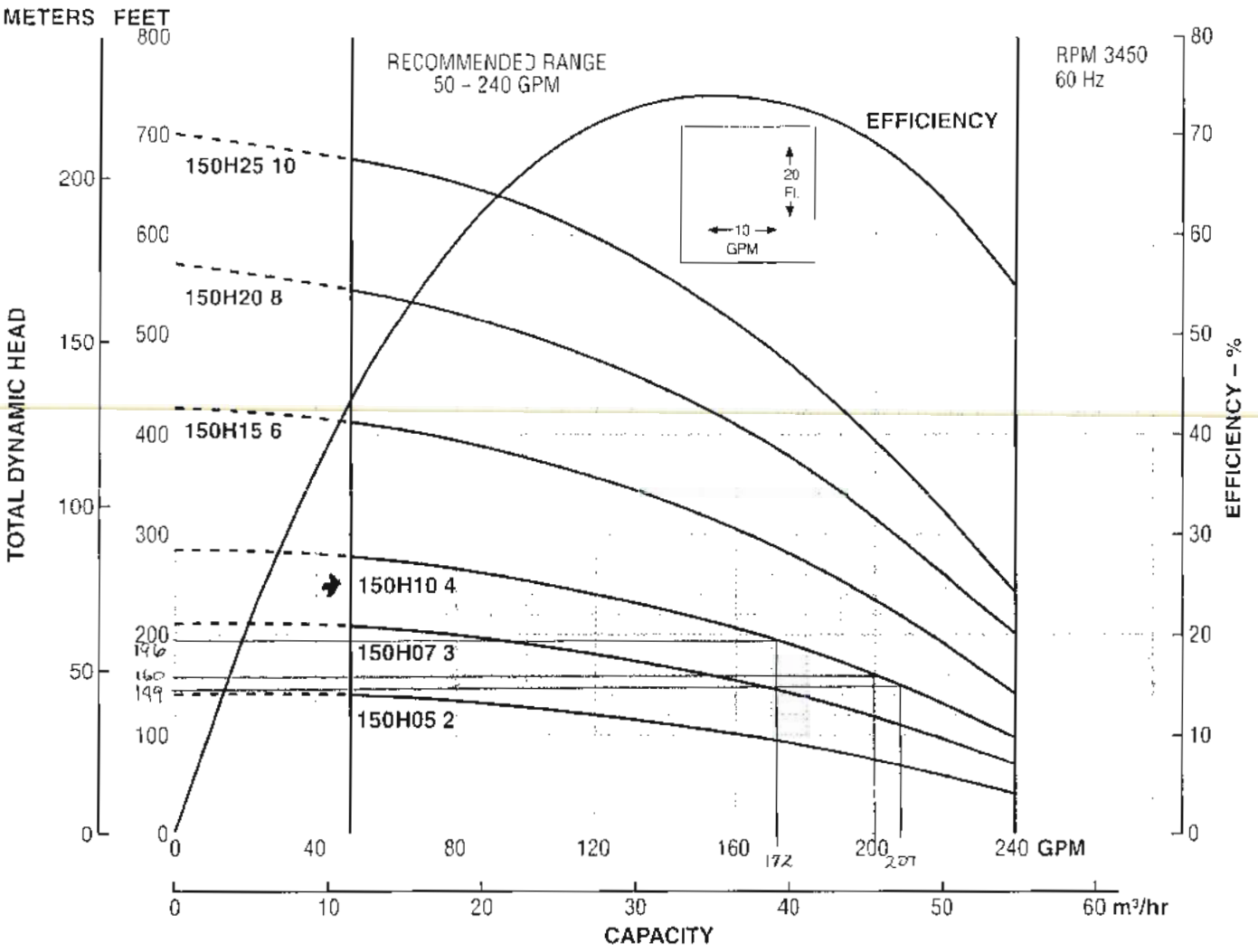
NOTES:
For complete pump, order water end and motor
[1] W.E. = water end or pump without motor
[2] L.O.A. = length of assembly – complete pump – water end and motor
* Non-stock motors have a 6 week lead time.

Well 2

Model 150H

Well #2

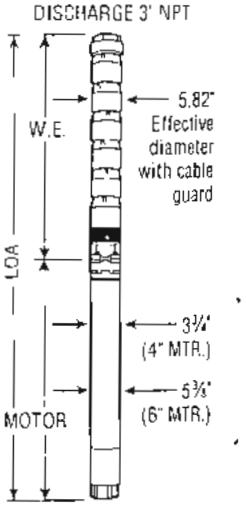
GOULDS PUMPS



Curve Reference SU 507

DIMENSIONS AND WEIGHTS

HP	Stages	W.E. Order No.	Motor Order No.	PH	Motor Volts	Motor Lgth.	W.E. Lgth.	LOA	Wt. (lbs.)
5	2	150H05 2	S10940	1	230	29.5	18.0	47.5	95
			S10978 S10970 S10975 S10979	3	200 230 460 575	23.5	18.0	41.5	95
7.5	3	150H07 3	S11970	1	230	28.0	24.3	52.3	185
			S11978 S11971 S11972 *S11979	3	200 230 460 575	24.2	24.3	48.5	160
10	4	150H10 4	S12970	1	230	30.6	29.3	59.9	215
			S12978 S12971 S12972 *S12979	3	200 230 460 575	25.5	29.3	54.8	185
15	6	150H15 6	S13970	1	230	33.1	39.3	72.4	255
			S13978 S13971 S13972 *S13979	3	200 230 460 575	28.0	39.3	67.3	229
20	8	150H20 8	S14978 S14971 S14972 *S14979	3	200 230 460 575	30.6	49.3	79.9	274
25	10	150H25 10	S15978 S15971 S15972 *S15979	3	200 230 460 575	33.2	59.3	92.5	316



(All dimensions are in inches and weights in lbs. Do not use for construction purposes.)
*Non-stock motors have a six (6) week lead time.

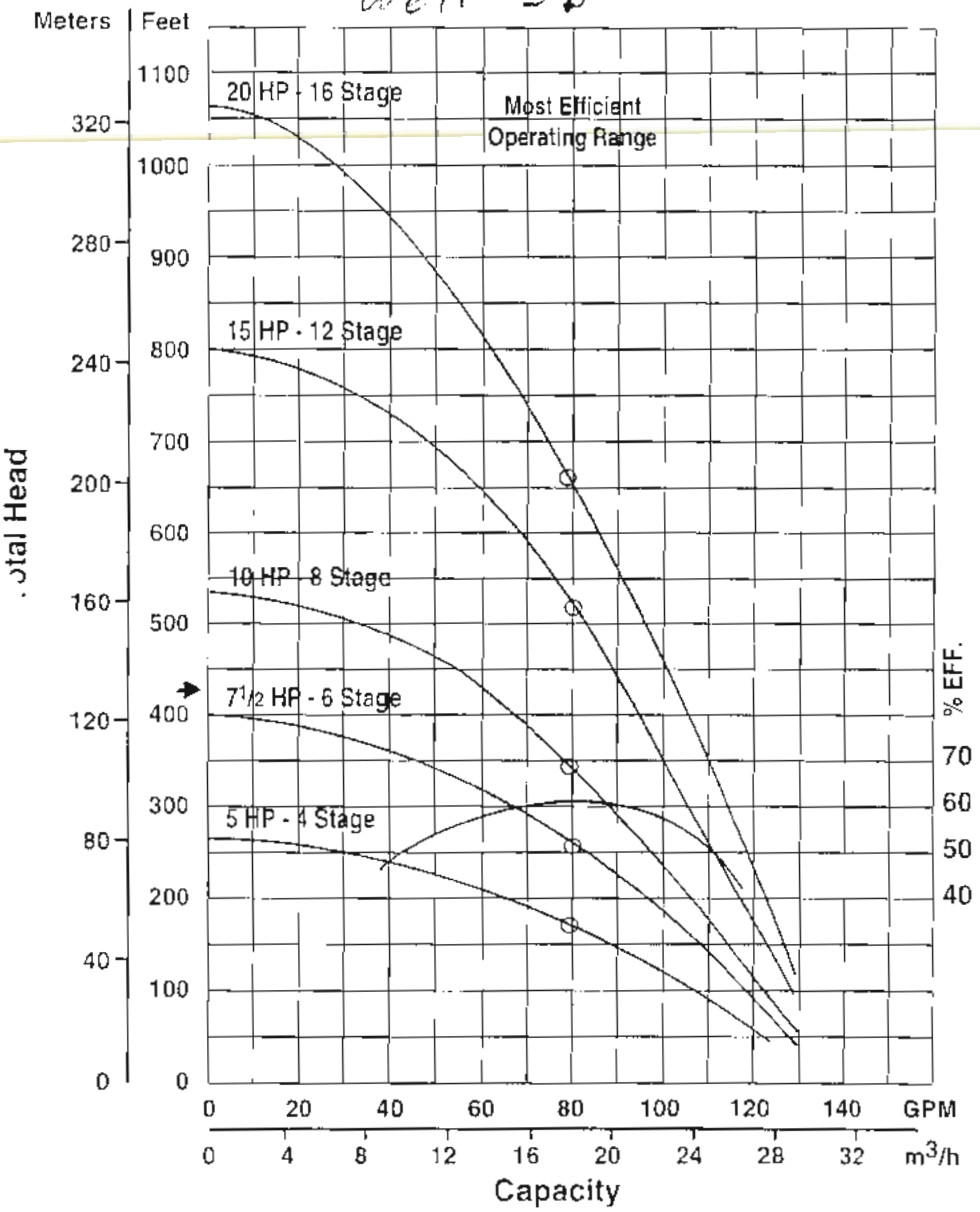
Water end and motor must be ordered separately and are packaged separately.

Well 3B

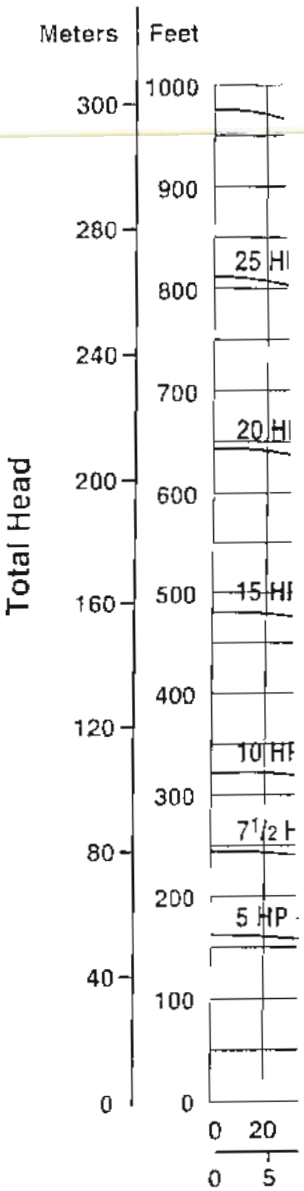
Composite Performance Curves
Minimum Well Size 6″ ID

80 GPM • 5 thru 20 HP • 3450 RPM • 60 Hz • 6P

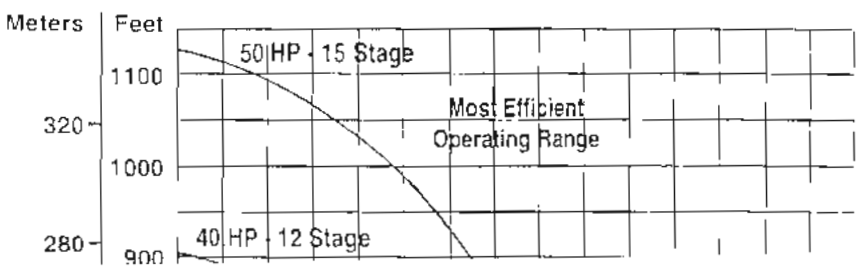
Well 3b



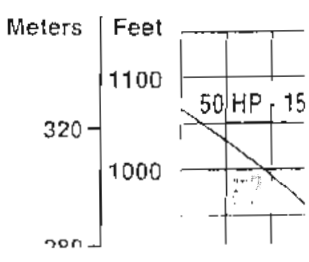
120 GPM • 5 thru



200 GPM • 5 thru 50 HP • 3450 RPM • 60 Hz • 6T



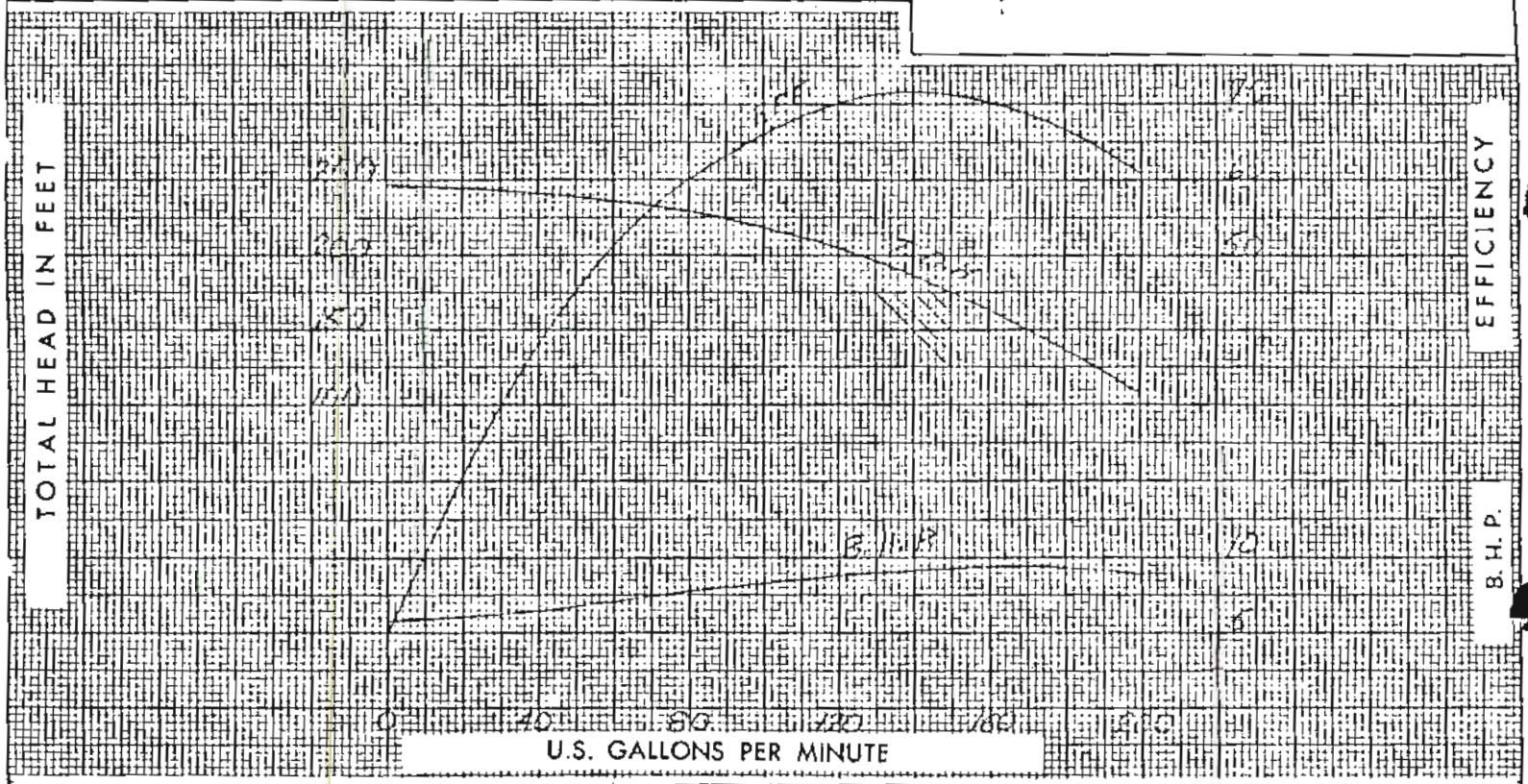
250 GPM • 5 thru



We114

85' SETTING

10 HP DEEP WELL TURBINE PUMP



VALLEY PUMP SERVICE
1408 18TH AVENUE N. W.
PUYALLUP, WASHINGTON

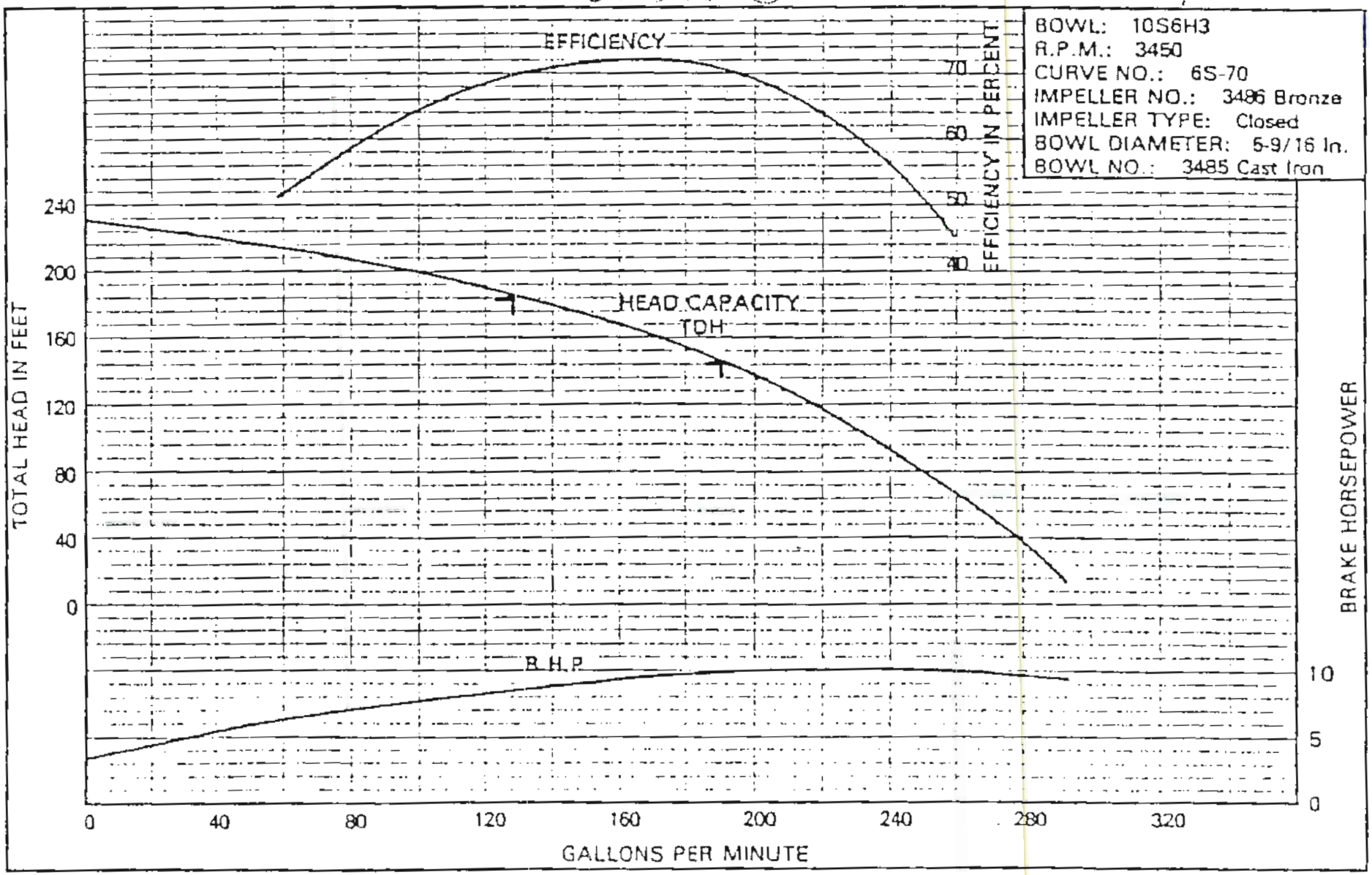
FLOWAY PUMPS, INC., FRESNO, CALIF.

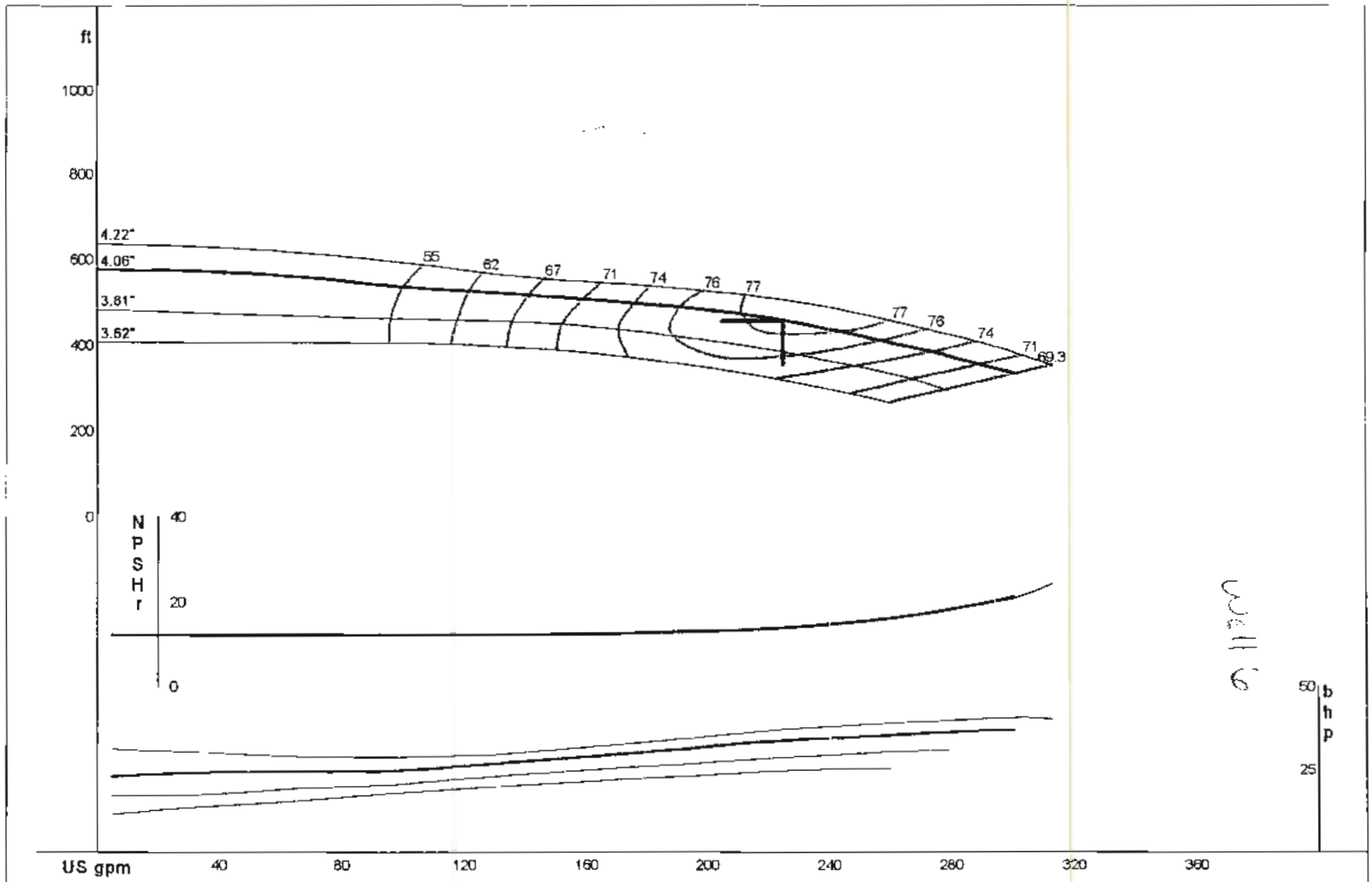
TYPE 6 JOLL
NO. OF STAGES 4
R.P.M. 3475
PUMP SERIAL NO. 68-3977

WELL NO. 4

DWN. BY D. Z. DATE 1-11-73

Jacuzzi


BOWL: 10S6H3
R.P.M.: 3450
CURVE NO.: 6S-70
IMPELLER NO.: 3486 Bronze
IMPELLER TYPE: Closed
BOWL DIAMETER: 5-9/16 In.
BOWL NO.: 3485 Cast Iron
EFFICIENCY
HEAD CAPACITY
TDH
B.H.P.
TOTAL HEAD IN FEET
EFFICIENCY IN PERCENT
BRAKE HORSEPOWER
GALLONS PER MINUTE
0
40
80
120
160
200
240
280
320
70
60
50
40
10
5

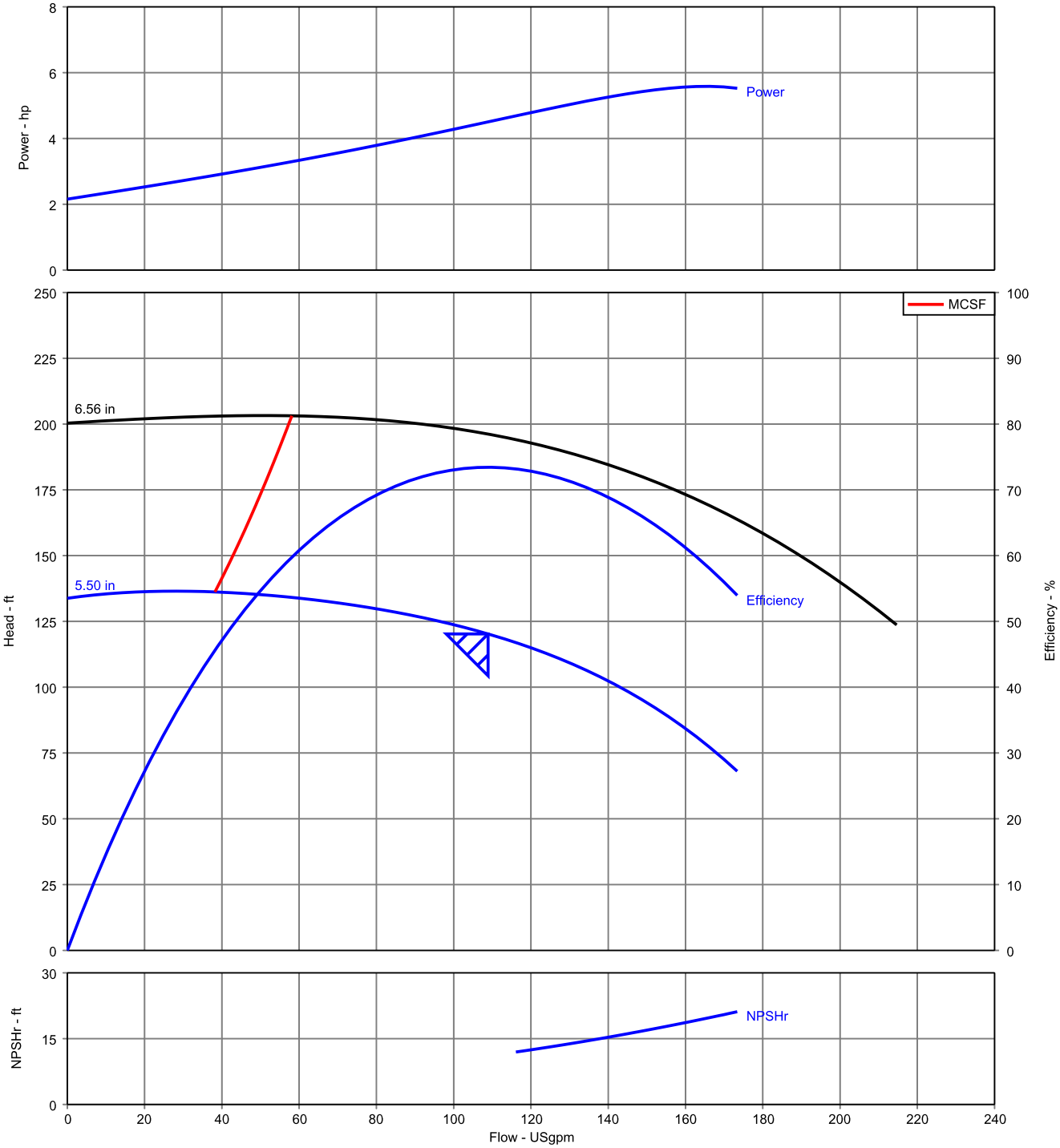


Well 6

Arcadia Drilling	Turbine ~~60 Hz~~ 50.2 Hz	TURBINE - 3600
	Catalog: SUB60.MPC, vers 2.01	Size: 6CHC; - 7 Stg
08/06/04	Curve: 3016	Speed: 3450 rpm
Selection file: (untitled)	Design Point: 225 US gpm, 456 ft	Impeller: 4.06 in

Well 6

Pump Performance Curve



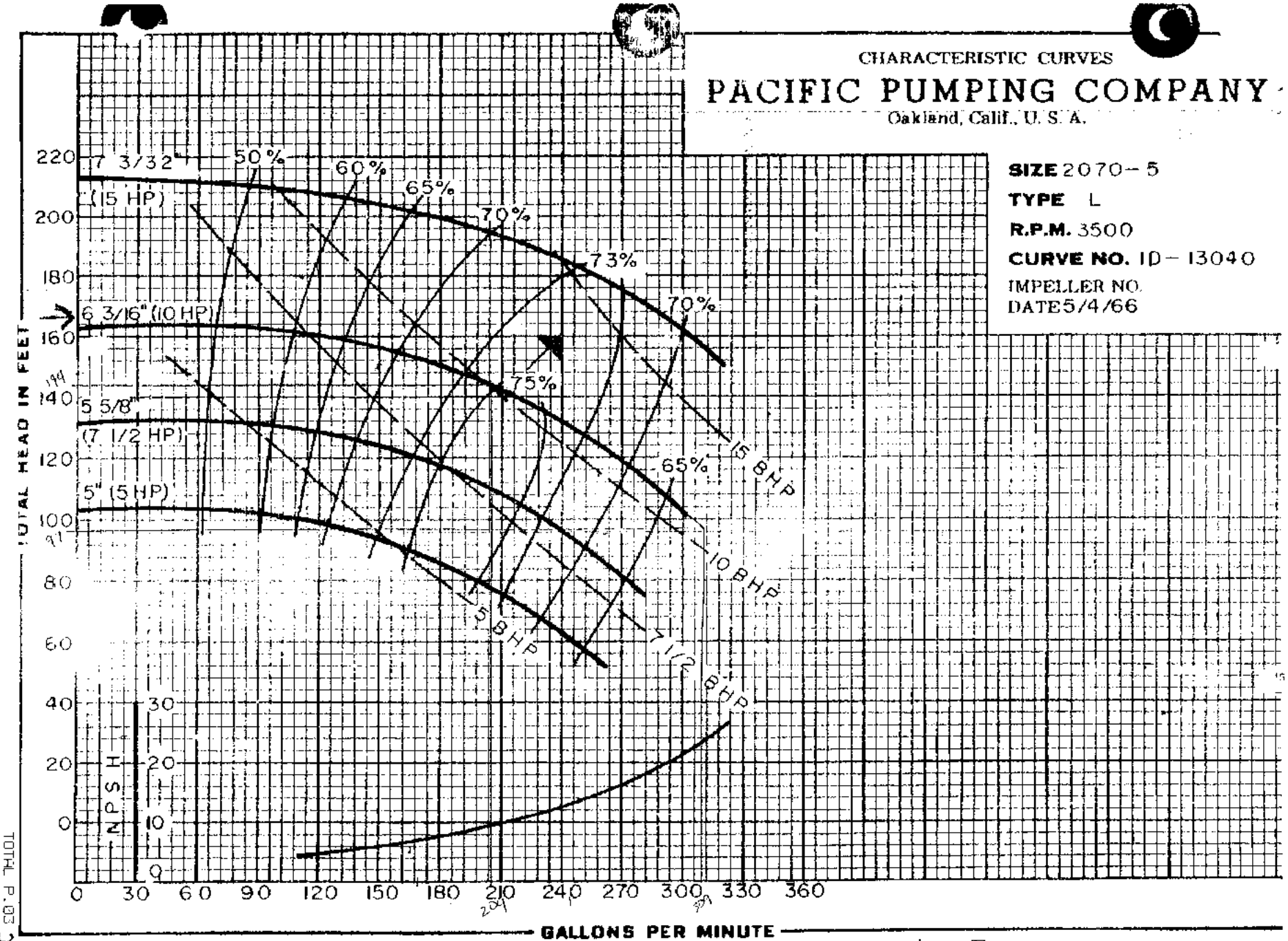
Customer	:	Size	: 1-1/2 x 2 x 6 M (B1-1/2TPM)
Customer reference	:	Stages	: 1
Item number	: Default	Speed, rated	: 3,450 rpm
Service	:	Based on curve number	: 8888
Quantity	: 1	Efficiency	: 73.43 %
Quote number	:	Power, rated	: 4.50 hp
Date last saved	: 27 Mar 2013 12:33 PM	NPSH required	: - ft
Flow, rated	: 108.9 USgpm	Viscosity	: 1.00 cP
Differential head / pressure, rated	: 120.2 ft	Cq/Ch/Ce [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00
Fluid density, rated / max	: 1.000 / 1.000 SG		

CHARACTERISTIC CURVES

PACIFIC PUMPING COMPANY

Oakland, Calif., U. S. A.

SIZE 2070–5
TYPE L
R.P.M. 3500
CURVE NO. ID–13040
IMPELLER NO.
DATE 5/4/66

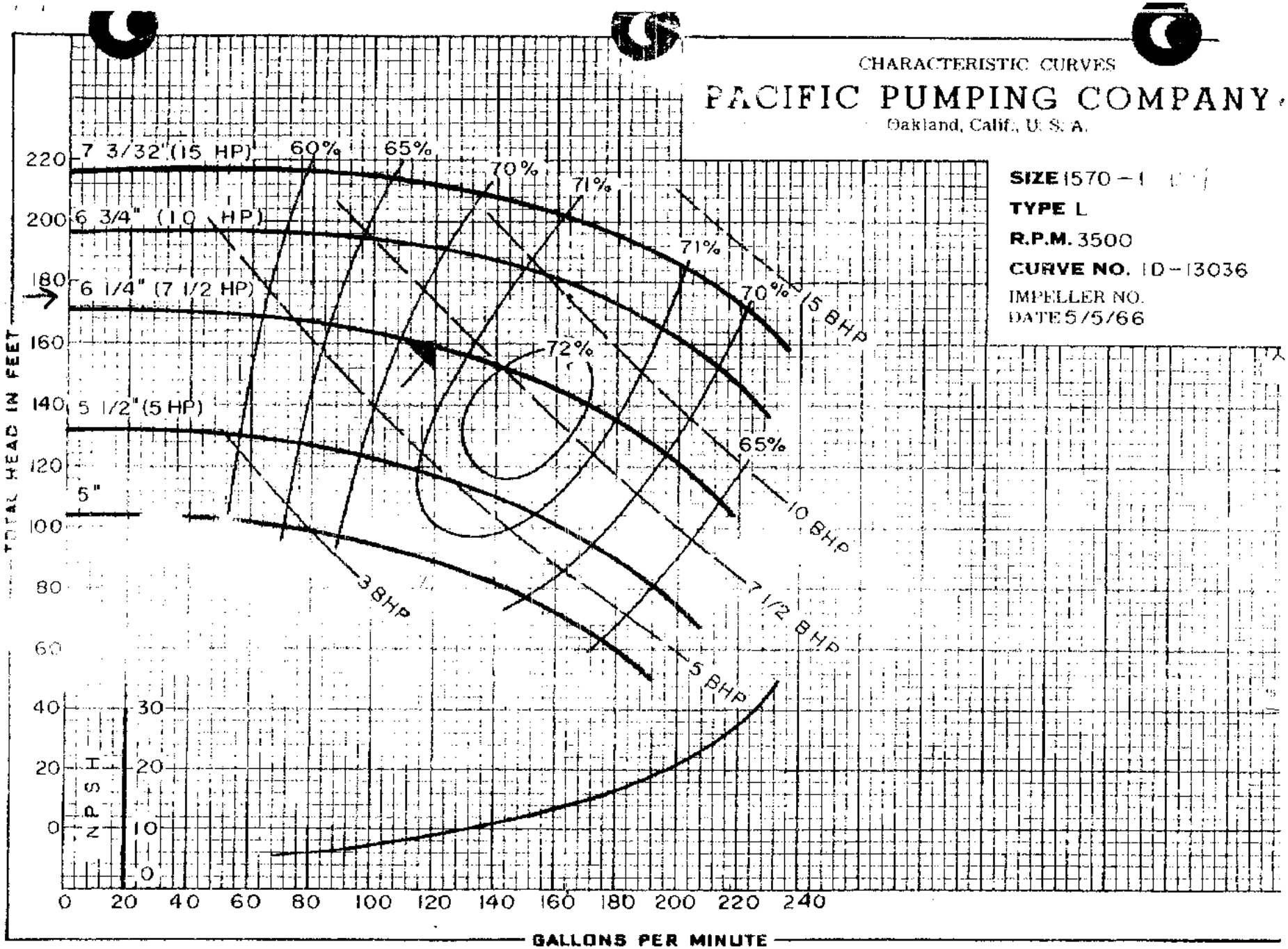


240 @ 162'

MAIN Pumps

Booster Pumps

Form RB448 2/54

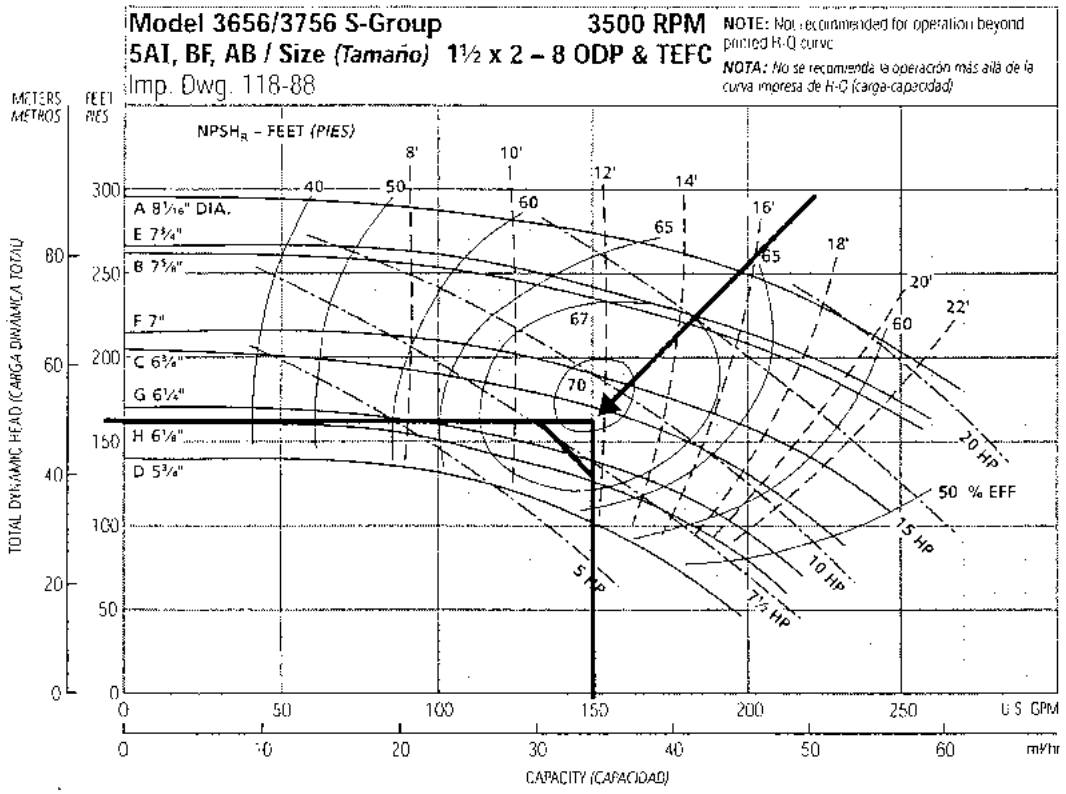


Form R8448 2/59

120@162' Lead Pump

Booster Pump

Performance Curves – 60 Hz, 3500 RPM
Curvas de desempeño – 60 Hz, 3500 RPM



Optional Impeller *Impulsor optativo*	
Ordering Code *Código de pedido*	**Dia.** *Diá.*
A	8 1/16"
E	7¾"
B	7⅝
F	7
C	6¾
G	6¼
H	6⅛
D	5¾

NOTE: Pump will pass a sphere to 5/16" diameter.

Lake Limerick, P1,2, 150 GPM @ 163' TDH, 70%, 10 hp
9/1/04 FJT

Component	Service Life	Install Year	Age	**Life**	**Estimated Year to be Replaced**	Unit Price	Units	Replacement Cost
Well 1, 10" x 116'	80	1967	46	**34**	**2047**	$15,000	1	$15,000
Well 2, 10" x 103'	80	1968	45	**35**	**2048**	$15,000	1	$15,000
Well 3A, 10" x 148'	80	1968	45	**35**	**2048**	$21,000	1	$21,000
Well 3B, 10" x 177'	80	1982	31	**49**	**2062**	$25,000	1	$25,000
Well 4, 10" x 110'	80	1969	44	**36**	**2049**	$15,000	1	$15,000
Well 5, 10" x 130'	80	1987	26	**54**	**2067**	$18,000	1	$18,000
Well 6, 10" x 434'	80	1989	24	**56**	**2069**	$60,000	1	$60,000
Well 1 Pump, 3-HP	30	1998	15	**15**	**2028**	$4,500	1	$4,500
Well 2 Pump, 10-HP	30	2002	11	**19**	**2032**	$12,500	1	$12,500
Well 3A Pump, 7.5HP assumed	30	2010	3	**27**	**2040**	$9,000	1	$9,000
Well 3B Pump, 7.5 HP	30	2003	10	**20**	**2033**	$9,000	1	$9,000
Well 4 Pump, 10-HP	30	1998	15	**15**	**2028**	$12,500	1	$12,500
Well 5 Pump, 10-HP	30	2004	9	**21**	**2034**	$12,500	1	$12,500
Well 6 Pump, 25hp motor, 400' drop pipe	30	2004	9	**21**	**2034**	$40,000	1	$40,000
Booster S1-1	30	2004	9	**21**	**2034**	$5,000	1	$5,000
Booster S3-1	30	2002	11	**19**	**2032**	$10,000	1	$10,000
Booster S3-2	30	1991	22	**8**	**2021**	$10,000	1	$10,000
Booster S4-1	30	1999	14	**16**	**2029**	$7,500	1	$7,500
Booster S6-1	30	2004	9	**21**	**2034**	$15,000	1	$15,000
Booster S6-2	30	2004	9	**21**	**2034**	$15,000	1	$15,000
Site 1 Bldg, Appurtenances	75	1985	28	**47**	**2060**	$10,000	1	$10,000
Site 2 Bldg, Appurtenances	75	1967	46	**29**	**2042**	$15,000	1	$15,000
Site 3 Bldg, Appurtenances	75	1981	32	**43**	**2056**	$15,000	1	$15,000
Site 4 Bldg, Appurtenances	75	1968	45	**30**	**2043**	$20,000	1	$20,000
Site 5 Bldg, Appurtenances	75	1968	45	**30**	**2043**	$10,000	1	$10,000
Site 6 Bldg, Appurtenances	75	2004	9	**66**	**2079**	$25,000	1	$25,000
125 kgal Reservoir, Site 1	100	1986	27	**73**	**2086**	$206,000	1	$206,000
150 kgal Reservoir, Site 3	100	1992	21	**79**	**2092**	$247,000	1	$247,000
75 kgal Reservoir, Site 4	100	1983	30	**70**	**2083**	$125,000	1	$125,000
150 kgal Reservoir, Site 6	100	2004	9	**91**	**2104**	$247,000	1	$247,000
Site 3 Generator	50	1998	15	**35**	**2048**	$25,000	1	$25,000
Site 6 Generator	50	2004	9	**41**	**2054**	$25,000	1	$25,000
Site 1 Fence	100	2000	13	**87**	**2100**	$10,000	1	$10,000
Site 3 Fence	100	1998	15	**85**	**2098**	$10,000	1	$10,000
Site 4 Fence	100	2004	9	**91**	**2104**	$10,000	1	$10,000
Site 5 Fence	100	2001	12	**88**	**2101**	$5,000	1	$5,000
Site 6 Fence	100	2001	12	**88**	**2101**	$15,000	1	$15,000
8" Waterline	75	1967	46	**29**	**2042**	$65	15076	$979,940
6" Waterline	75	1967	46	**29**	**2042**	$55	58550	$3,220,250
8" Distribution Valves	50	1967	46	**4**	**2017**	$800	26	$20,800
6" Distribution Valves	50	1967	46	**4**	**2017**	$600	75	$45,000
Existing Hydrants	70	1970	43	**27**	**2040**	$4,000	54	$216,000
Service Meters	10	2013	0	**10**	**2023**	$350	1199	$419,650
Air Vacuum Release Assy	50	1970	43	**7**	**2020**	$1,500	7	$10,500
Standpipe Blowoffs	50	1970	43	**7**	**2020**	$1,500	54	$81,000
SCADA System*	20	2004	9	**11**	**2024**	$25,000	1	$25,000

*SCADA Sytem original price was over $100,000; however, newer SCADA technology will significantly reduce the cost of future replacement.

Days	System ADD (gpd)	FT	PT	SB	ERU	gpd/conn	gpd/ERU		Date	Gal/Month
31	155265	774	351	0	809	442.4	191.9		Jan-08	4,813,226
29	149075	774	351	0	809	424.7	184.2		Feb-08	4,621,316
31	159018	774	351	0	809	453.0	196.5		Mar-08	4,611,520
30	161994	774	351	24	833	432.4	194.5		Apr-08	5,021,817
31	209137	774	351	47	856	525.0	244.2		May-08	6,274,104
30	452138	774	351	71	880	1071.4	513.7		Jun-08	14,016,290
31	356113	774	351	71	880	843.9	404.6		Jul-08	10,683,378
31	253411	774	351	71	880	600.5	287.9		Aug-08	7,855,726
30	225229	774	351	47	856	565.4	263.0		Sep-08	6,982,100
31	145313	774	351	47	856	364.8	169.7		Oct-08	4,359,400
30	98587	774	351	0	809	280.9	121.8		Nov-08	3,056,200
31	116157	774	351	0	809	330.9	143.6		Dec-08	3,484,697
31	145352	774	351	0	809	414.1	179.6		Jan-09	4,505,900
28	144177	774	351	0	809	410.8	178.2		Feb-09	4,469,500
31	174631	774	351	0	809	497.5	215.8		Mar-09	4,889,661
30	164169	774	351	24	833	438.2	197.1		Apr-09	5,089,239
31	218545	774	351	47	856	548.6	255.2		May-09	6,556,362
30	343238	774	351	71	880	813.4	390.0		Jun-09	10,640,392
31	427097	774	351	71	880	1012.1	485.3		Jul-09	12,812,902
31	261723	774	351	71	880	620.2	297.4		Aug-09	8,113,400
30	183574	774	351	47	856	460.9	214.3		Sep-09	5,690,800
31	142783	774	351	47	856	358.5	166.7		Oct-09	4,283,500
30	97421	774	351	0	809	277.6	120.4		Nov-09	3,020,041
31	103070	774	351	0	809	293.6	127.4		Dec-09	3,092,105
31	150299	774	351	0	809	428.2	185.8		Jan-10	4,659,265
28	126997	774	351	0	809	361.8	157.0		Feb-10	3,936,900
31	179389	774	351	0	809	511.1	221.7		Mar-10	5,022,900
30	197526	774	351	24	833	527.2	237.2		Apr-10	6,123,300
31	185120	774	351	47	856	464.7	216.2		May-10	5,553,600
30	266734	774	351	71	880	632.1	303.1		Jun-10	8,268,768
31	354175	774	351	71	880	839.3	402.4		Jul-10	10,625,237
31	275070	774	351	71	880	651.8	312.5		Aug-10	8,527,167
30	147942	774	351	47	856	371.4	172.7		Sep-10	4,586,200
31	136673	774	351	47	856	343.1	159.6		Oct-10	4,100,200
30	133968	774	351	0	809	381.7	165.6		Nov-10	4,153,000
31	141126	774	351	0	809	402.1	174.4		Dec-10	4,233,772
31	146281	774	351	0	809	416.8	180.8		Jan-11	4,534,707
28	128021	774	351	0	809	364.7	158.2		Feb-11	3,968,661
31	155850	774	351	0	809	444.0	192.6		Mar-11	4,363,800
30	125735	774	351	24	833	335.6	151.0		Apr-11	3,897,800
31	130507	774	351	47	856	327.6	152.4		May-11	3,915,200
30	182579	774	351	71	880	432.7	207.5		Jun-11	5,659,936
31	223943	774	351	71	880	530.7	254.5		Jul-11	6,718,278
31	261535	774	351	71	880	619.8	297.2		Aug-11	8,107,600
30	212868	774	351	47	856	534.4	248.6		Sep-11	6,598,900
31	156207	774	351	47	856	392.2	182.4		Oct-11	4,686,200
30	128584	774	351	0	809	366.3	158.9		Nov-11	3,986,100
31	130030	774	351	0	809	370.5	160.7		Dec-11	3,900,900
31	128406	774	351	0	809	365.8	158.7		Jan-12	3,980,600
29	121965	774	351	0	809	347.5	150.7		Feb-12	3,780,900
31	123657	774	351	0	809	352.3	152.8		Mar-12	3,586,060
30	113099	774	351	24	833	301.9	135.8		Apr-12	3,506,080
31	162459	774	351	47	856	407.8	189.7		May-12	4,873,763
30	151700	774	351	71	880	359.5	172.4		Jun-12	4,702,704
31	226426	774	351	71	880	536.6	257.3		Jul-12	6,792,779
31	272868	774	351	71	880	646.6	310.0		Aug-12	8,458,901
30	209590	774	351	47	856	526.2	244.7		Sep-12	6,497,295
31	162584	774	351	47	856	408.2	189.8		Oct-12	4,686,200
30	117969	774	351	0	809	336.1	145.8		Nov-12	3,986,100
31	118702	774	351	0	809	338.2	146.7		Dec-12	3,900,900

	Well #1	Well #2	Well #3a	Well #3b	Well #4	Well #5	Well #6	Monthly Production
Jan-08	302126	0	504300	1010500	1289100	1222600	484600	4,813,226
Feb-08	302416	0	493000	1103400	1120300	870100	732100	4,621,316
Mar-08	300020	0	498800	1110100	1123600	1000100	578900	4,611,520
Apr-08	320817	0	440200	1003600	1488200	1066700	702300	5,021,817
May-08	82504	0	540200	1002300	1502800	1844700	1301600	6,274,104
Jun-08	1181990	0	3844900	6406900	1756000	190700	635800	14,016,290
Jul-08	195378	166500	2720100	5466000	1912900	209300	13200	10,683,378
Aug-08	102326	0	1890300	2940100	890600	135200	1897200	7,855,726
Sep-08	0	0	1163700	2211400	1940200	653300	1013500	6,982,100
Oct-08	0	0	1117800	1910300	369400	0	961900	4,359,400
Nov-08	0	0	701200	1511800	389600	41300	412300	3,056,200
Dec-08	66497	0	855400	1699200	301600	147200	414800	3,484,697
Jan-09	0	0	1089600	2180700	682300	120200	433100	4,505,900
Feb-09	-	-	940100	1940200	850300	80000	658900	4,469,500
Mar-09	-	-	860097	1570205	1043749	583247	832363	4,889,661
Apr-09	-	-	895,203	1,634,295	1086351	607053	866337	5,089,239
May-09	89162	0	889400	1314200	1502400	1587000	1174200	6,556,362
Jun-09	143392	0	2102400	4001300	1680200	1300200	1412900	10,640,392
Jul-09	335702	0	2740200	4842200	2043500	1714700	1136600	12,812,902
Aug-09	0	0	1808400	2921600	1521600	840800	1021000	8,113,400
Sep-09	0	0	915700	1865300	1179400	680200	1050200	5,690,800
Oct-09	0	0	922000	1886700	0	547200	927600	4,283,500
Nov-09	22141	0	673300	1754200	0	266200	304200	3,020,041
Dec-09	16905	22700	901600	1123200	0	522800	504900	3,092,105
Jan-10	13165	8800	1487500	2747200	0	326800	75800	4,659,265
Feb-10	0	7200	1824300	2105400	0	0	0	3,936,900
Mar-10	0	7900	1019600	3520500	0	308300	166600	5,022,900
Apr-10	0	0	1238400	2993700	643900	400100	847200	6,123,300
May-10	0	0	968500	1887200	898400	566400	1233100	5,553,600
Jun-10	-	-	1,395,136	2617664	1695584	604768	1955616	8,268,768
Jul-10	1,581,272	-	1,525,930	2863070	1854545	661465	2138955	10,625,237
Aug-10	-	-	1,438,734	2699466	1748571	623667	2016729	8,527,167
Sep-10	-	-	-	1047700	1279400	770900	1488200	4,586,200
Oct-10	-	-	-	789200	1300100	488500	1522400	4,100,200
Nov-10	0	0	170000	516800	1554200	950000	962000	4,153,000
Dec-10	26172	0	375200	1218500	1050400	1404300	159200	4,233,772
Jan-11	383507	0	558200	1325900	954600	1305400	7100	4,534,707
Feb-11	5161	0	767400	1687300	514100	994700	0	3,968,661
Mar-11	0	52400	1159600	1531800	888800	700600	30600	4,363,800
Apr-11	0	20000	1068900	1367000	839700	554300	47900	3,897,800
May-11	0	44100	1049000	1372500	510800	938300	500	3,915,200
Jun-11	98736	0	1613800	2201600	612300	1075200	58300	5,659,936
Jul-11	8078	0	1279300	2227300	1076300	1110600	1016700	6,718,278
Aug-11	0	0	1561700	2093300	1318700	1436300	1697600	8,107,600
Sep-11	0	0	1397100	2334700	842000	1183400	841700	6,598,900
Oct-11	0	0	1454600	2023400	729800	70000	408400	4,686,200
Nov-11	0	0	1419600	1910500	196100	53500	406400	3,986,100
Dec-11	0	0	1454700	1940400	129800	169200	206800	3,900,900
Jan-12	0	0	1412900	1854800	32200	66200	614500	3,980,600
Feb-12	15600	0	450000	614400	1166200	276600	1258100	3,780,900
Mar-12	6160	0	701900	1105400	956300	224400	591900	3,586,060
Apr-12	9280	0	369200	705000	558500	136400	1727700	3,506,080
May-12	24013	0	260700	571700	575200	1784250	1657900	4,873,763
Jun-12	54604	0	431000	616700	1366200	1522800	711400	4,702,704
Jul-12	92079	0	867300	1317500	1650800	1589800	1275300	6,792,779
Aug-12	410801	0	1130600	1902100	2565800	1617300	832300	8,458,901
Sep-12	188495	0	569800	856000	2357500	1160900	1364600	6,497,295
Oct-12	97,015	0	1,056,500	1,929,000	1,432,400	0	362,600	4,877,515
Nov-12	192,025	0	297,400	875,500	758,400	200	1,533,500	3,657,025
Dec-12	266,064	0	132,300	382,100	826,700	0	1,953,900	3,561,064

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: 02/02/2012
Printed: 11/15/2012
WFI Printed For: On-Demand
Submission Reason: SMA Update

RETURN TO: Southwest Regional Office, PO Box 47823, Olympia, WA, 98504

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
44150 T	LAKE LIMERICK WATER	MASON	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. Owner Number 003162
KELLY N. ALSIN [MANAGER] NORTHWEST WATER SYSTEMS PO BOX 123 PORT ORCHARD, WA 98366	LAKE LIMERICK COUNTRY CLUB INC SHEILA HEDLUND 790 EAST ST. ANDREWS DRIVE SHELTON, WA 98584	TITLE: GENERAL MANAGER
STREET ADDRESS IF DIFFERENT FROM ABOVE	**STREET ADDRESS IF DIFFERENT FROM**	
ATTN ADDRESS 7245 BETHEL BURLEY CITY PORT ORCHARD STATE WA ZIP 98367	ATTN ADDRESS CITY STATE ZIP	

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 876-0958	Owner Daytime Phone: (360) 426-3581
Primary Contact Mobile/Cell Phone: (360) 801-1326	Owner Mobile/Cell Phone:
Primary Contact Evening Phone: (xxx) xxx-xxxx	Owner Evening Phone: (xxx) xxx-xxxx
Fax:(360) 876-4196 | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

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

SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☒ Managed Only
- ☐ Owned Only

SMA NAME: Northwest Water Systems, Inc. SMA Number: 119

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)				14. STORAGE CAPACITY (gallons)
☐ Association	☐ County	☐ Investor	☐ Special District	
☐ City / Town	☐ Federal	☒ Private	☐ State	320,000

- SEE NEXT PAGE FOR A COMPLETE LIST OF SOURCES -

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
44150 T	LAKE LIMERICK WATER	MASON	A	Comm

	16 SOURCE NAME	17 INTERTIE	18 SOURCE CATEGORY									19 USE			20	21 TREATMENT					22 DEPTH	23	24 SOURCE LOCATION			
Source Number	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 SPRING FIELD	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
S02	WELL # 2 AHA978		X										X		Y	X					103	200	NE NW	27	21N	03W
S03	WELL # 3A AHA976		X									X			Y	X					110	144	NW SW	27	21N	03W
S04	WELL # 4 AHA973		X									X			Y	X					92	74	SE SW	22	21N	03W
S05	WELL #1 AHA974		X									X			Y	X					89	49	NE NE	27	21N	03W
S06	WELL #3B AHA975		X									X			Y	X					167	194	SW SW	27	21N	03W
S07	WELL #5 AHA977		X									X			Y	X					110	35	NW SW	27	21N	03W
S08	WELL #6		X									X			Y	X					429	248	SE SW	27	21N	03W

S02	200
S03	144
S04	74
S05	49
S06	194
S07	35
S08	248

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
44150 T	LAKE LIMERICK WATER	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?)	0	797	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	~~797~~ 771		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	~~0~~ 71		
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)	~~451~~ 354	451	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	~~2~~ 3	2	
28. TOTAL SERVICE CONNECTIONS		1250	

29. FULL-TIME RESIDENTIAL POPULATION	
A. How many residents are served by this system 180 or more days per	~~1594~~ 1,915

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?	0	0	0	48	96	142	142	142	47	47	0	0
B. How many days per month are they present?	30	30	30	30	30	30	30	30	30	30	30	30
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?	900 1200	900 1200	900 1200	3000 1200	6000 1600	6000 1600	9000 1600	9000 1600	6000 1200	6000 1200	900 1200	900 1200
B. How many days per month is water accessible to the public?	30	30	30	30	30	30	30	30	30	30	30	30
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?	21	28	29	30	34	33	34	29	29	26	27	22
B. How many days per month are they present?	30	30	30	30	30	30	30	30	30	30	30	30

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	2	2	2	2	2	2	2	2	2	2	2	2

35. Reason for Submitting WFI:

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

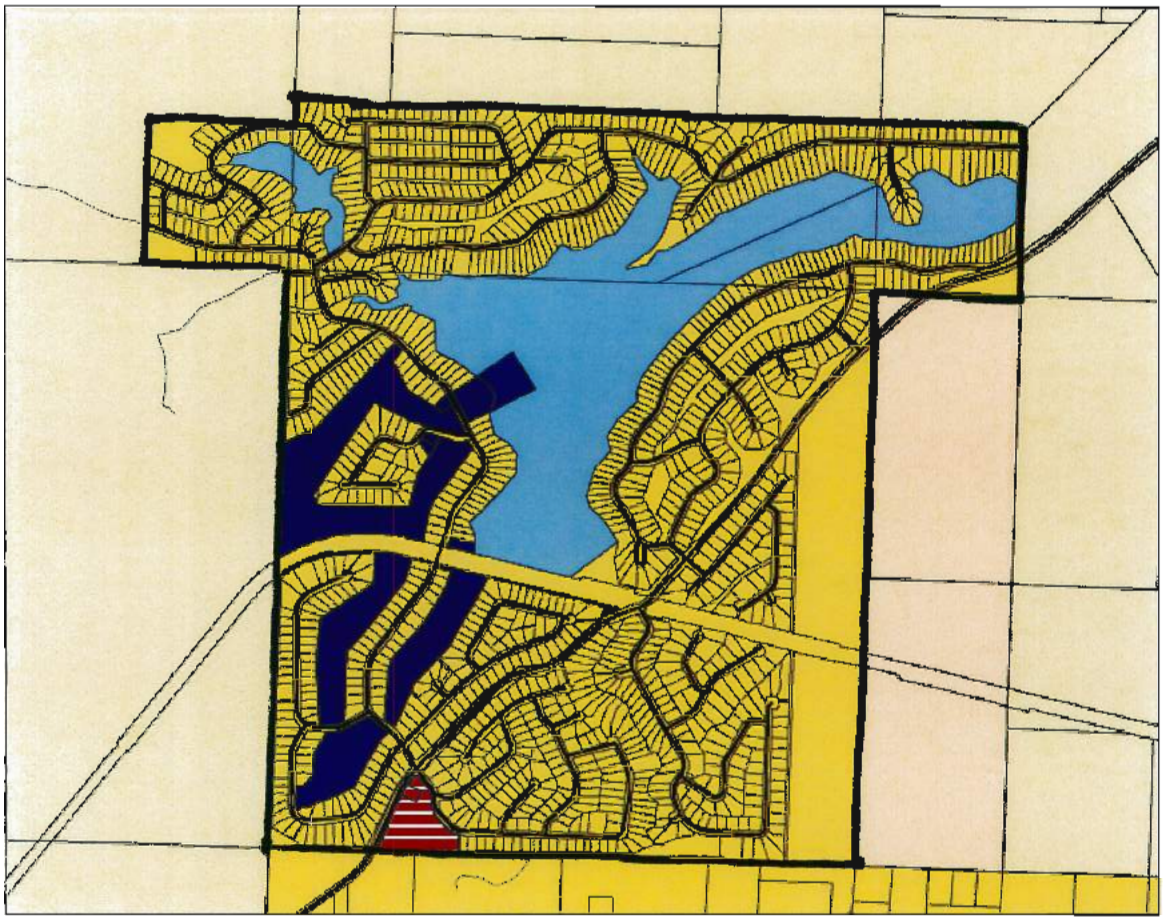
36. I certify that the information stated on this WFI form is correct to the best of my knowledge.

SIGNATURE: _____

DATE: _____

PRINT NAME: _____

TITLE: _____



Zoning within the Lake Limerick Country Club as shown on the Mason County Development Areas Map, Panel 5, April 27, 2009..

Zoning within the Lake Limerick Country Club includes rural residential, rural tourist (golf course), and rural commercial development areas.

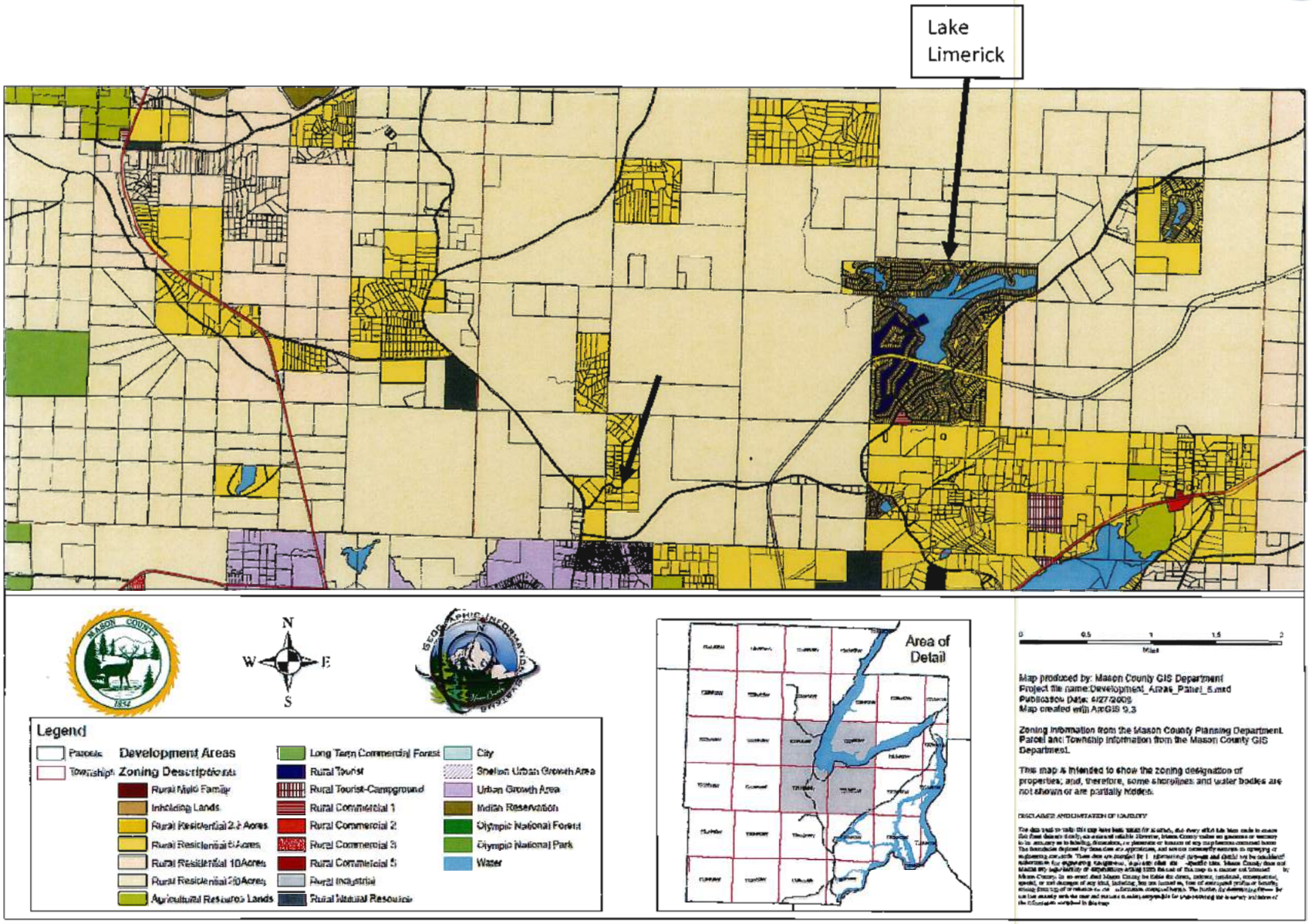
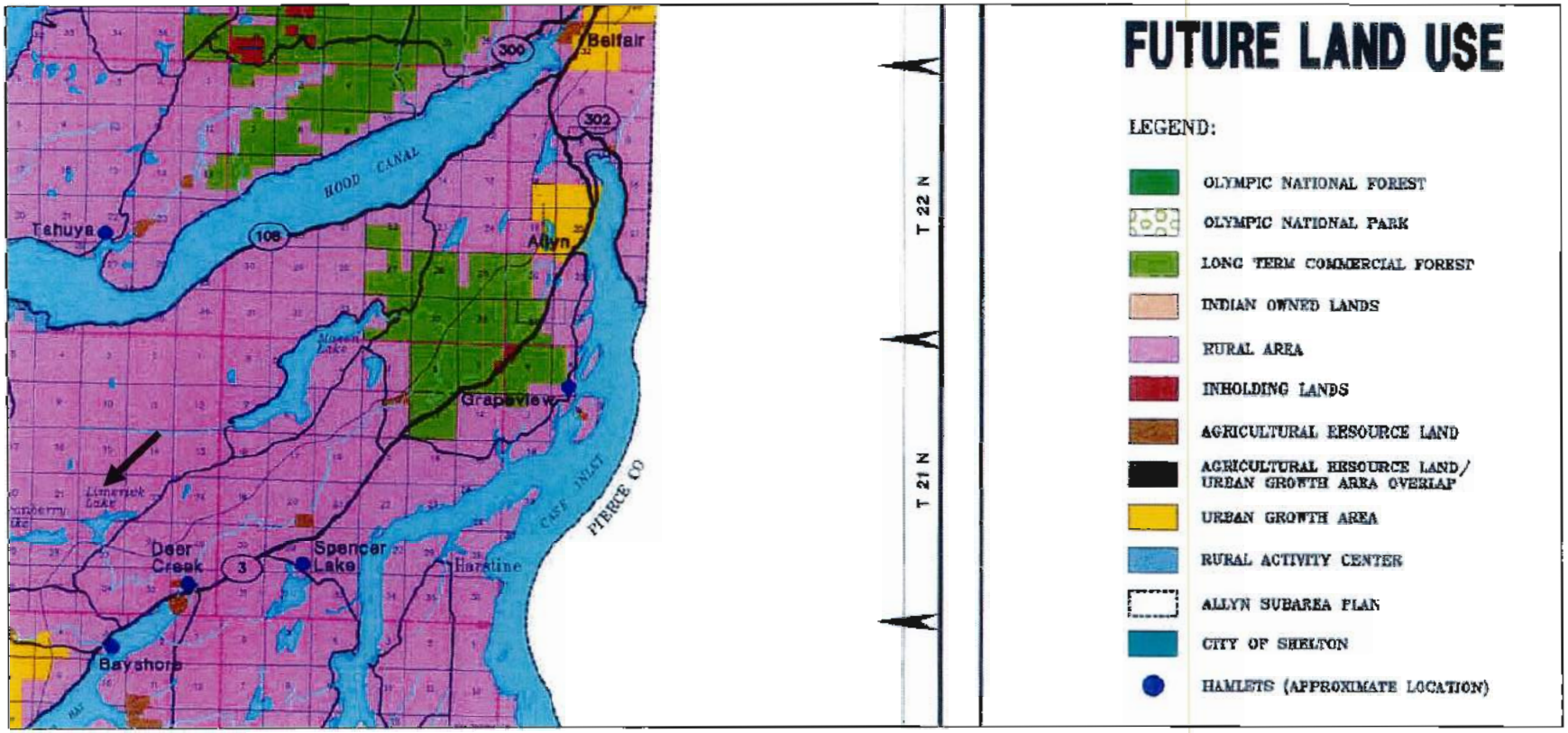


Figure ____. Lake Limerick zoning descriptions as shown on the Mason County Development Areas Map, Panel 5, April 27, 2009.



Mason County Comprehensive Plan – April 1996 (Revised 2005), Future land use map.

6-MO, 1-YR, 5-YR AND 10-YEAR GROUNDWATER TRAVEL TIME RADII

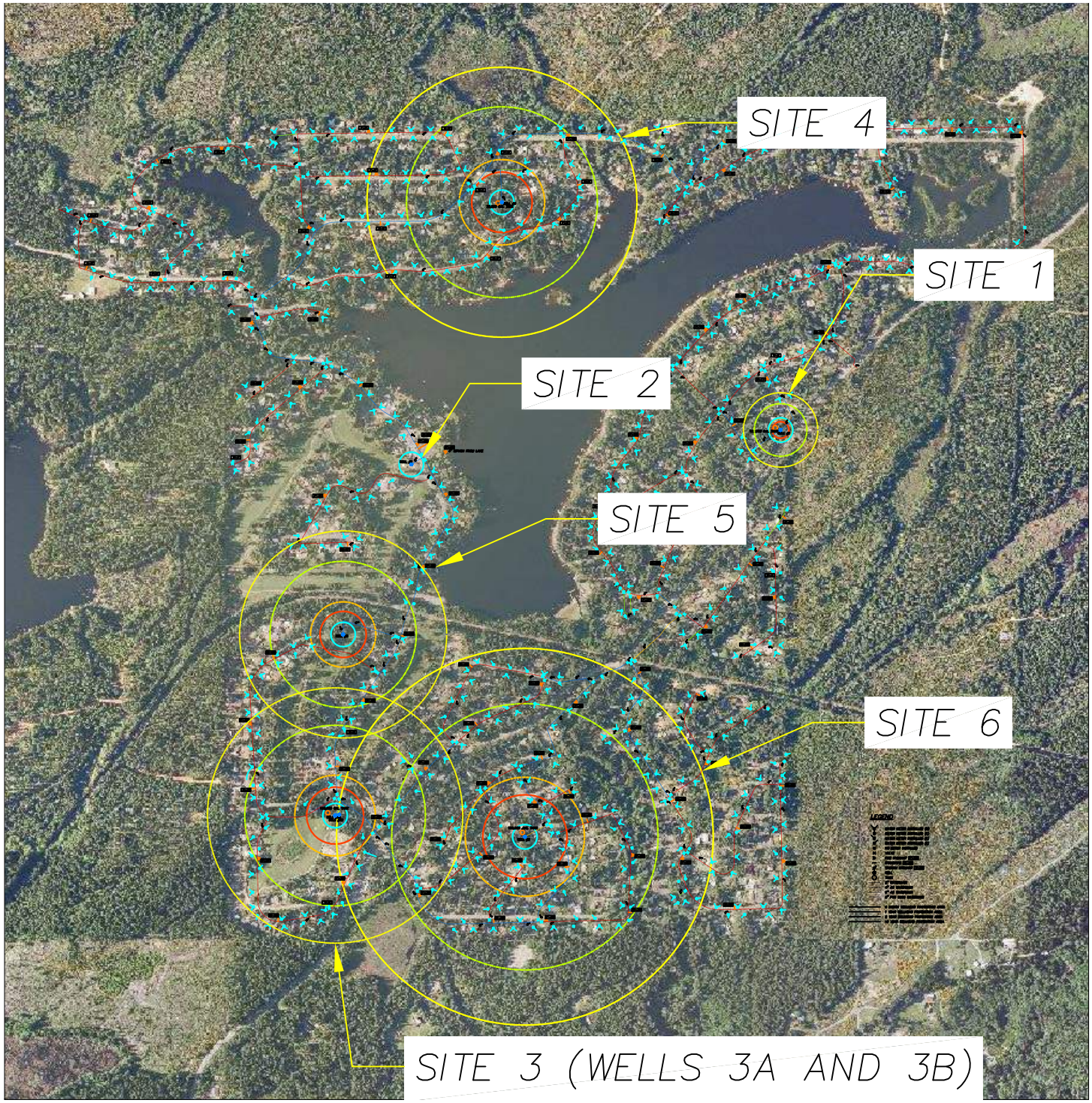
100' RADIUS

6-MO TRAVEL TIME RADIUS

1-YR TRAVEL TIME RADIUS

5-YR TRAVEL TIME RADIUS

10-YR TRAVEL TIME RADIUS



Well 1

Groundwater Contamination Susceptibility Assessment Form

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2

Important! Please complete one form for each ground water source (well, well field, spring) used in your system. Photocopy as necessary.

Part I: System Information

Well Owner:	**Lake Limerick Country Club**	Well Manager:	**Northwest Water Systems**
Water System Name:	**Lake Limerick**	Water System Number:	**44150-T**
County:	**Mason**	1/4, 1/4, Sec, T, R:	**NENE S27, 21N, 3W**
Source Name:	**Well 1**	WA well ID tag number:	**AHA 974**
Source Number:	**S05**	Well Depth:	**116 ft**
Number of Connections:	**1199**	Population Served:	**1594**

Latitude: **47.284N** Longitude: **123.039W**

How was lat/long determined?

- [ ] GPS device
- [ ] survey
- [X] topographic map
- [ ] other

*Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

Part II: Well Construction and Source Information

1) Date well originally constructed: **3/25/1966** last reconstructed: **n/a**

2) Well Driller: Tyee Well Drilling Co. Inc
P.O. Box 30
Allyn, Wa 98524

3) Type of Well:

- [X] Drilled: **cable** (rotary, bored, cable, dug)
- [ ] Other: (spring, lateral collection, driven, jetted, other)

Comments:

4) Well Report Available? **Yes** yes/no

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets. Engineering reports, well reconstruction logs.

5) Average pumping rate: **49** gpm

Source of information: **Metered**

If not documented, how was the pumping rate determined?

6) Is this source treated? **No** yes/no (disinfection, filtration, carbon filter, airstripper, other)

If so, what type of treatment:

purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is chlorinated, is a chlorine residual maintained? **N/A** yes/no

Residual level (at point closest to source): **N/A** ppm

Part III: Hydrogeologic Information

1) Depth to top of open interval: **89** ft

2) Depth to groundwater (static water level):
51 ft
[ ] flowing artesian well/spring
How was the water level determined: Sonic Sounder

3) If the source is a flowing well or spring, what is the confining pressure?
N/A psi **N/A** ft

4) If the source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source:
[ ] yes/no

5) Wellhead elevation (height above mean sea level): **283** ft
how was elevation determined?
[X] topographic map
[ ] drilling/well log
[ ] altimeter
[ ] other

6) Confining layers: (This can be completed only for those sources with a drilling log, well log, or geologic report describing subsurface conditions. Please refer to assistance package for example.)
[Yes] (yes/no) Is there evidence of a confining layer in the well log?

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the bottom of the lowest confining layer?
[No] (yes/no)

7) Sanitary setback: **120** ft (If less than 100 feet, describe the site conditions):

8) Wellhead Construction:
[X] in wellhouse
[ ] in doghouse
[ ] outside
[ ] controlled access:
[ ] other uses for wellhouse:

9) Surface seal:
[ ] 18 ft
[ ] >18 ft
[ ] <18 ft (no DOE approval)
[ ] <18 ft (with DOE approval, include documentation)
[X] no surface seal
[ ] unknown

10) Annual rainfall:
[ ] <10 in/yr
[ ] 10-25 in/yr
[X] >25 in/yr

Part IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: **181,787** Cubic Feet

How was this determined?

[X] Metered

[ ] Estimated — pumping rate: **49** gpm

pumping capacity: **49** gpm

[ ] Other: aquifer/screen **25** ft

2) "Calculated Fixed Radius" estimate of groundwater movement: (see Instruction Packet)

groundwater travel time;	6 mo.	**68** ft
groundwater travel time;	1 yr.	**96** ft
groundwater travel time;	5 yr.	**215** ft
groundwater travel time;	10 yr.	**304** ft
length of screened/open interval:		**25** ft

$r = [(Q*t)/(\pi*\eta H)]^{0.5}$

where: r = radius (ft)

Q = flow (ft^3/yr)

t = time (yr)

η = porosity (0.25 assumed)

H = screen/aquifer height (ft)

3) Is there a river, lake, pond, stream, or other surface water body within the six month travel boundary?

[No] yes/no (if yes, identify on a map and describe below)

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the six month time of travel boundary? (if yes, identify on a map and describe below)

No

Part V: Assessment of Water Quality

1) Regional sources of risk to groundwater:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 mo.	1 yr	5 yr	unknown
likely pesticide application			**No**	
stormwater injection wells				**X**
other injection wells				**X**
abandoned ground water well				**X**
landfills, dumps, disposal areas			**No**	
known hazardous materials clean-up site			**No**	
water systems with water quality problems			**No**	
population density >1 house/acre			**Yes**	
residences commonly having septic tanks			**Yes**	
wastewater treatment lagoons			**No**	
sites used for land application of waste			**No**	

Identify on a map all of the risks listed above which are located within the six month time of travel boundary. (Please include a map of the wellhead and time of travel areas within this form. Please indicate any of the following.) If other potential sources of groundwater contamination exist within the ten year time of travel circular zone around your supply, please describe:

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on the assessment, MCLs are listed in assistance package.)

	MCL/detection	level >MCL?
A. Nitrate:	10 mg/l	**0.8**
B. VOCs:	5 ug/l	**No Detect**
C. EDB:	0.05 ug/l	**No Detect**
D. DBCP:	0.2 ug/l	**No Detect**
E. Other SOC	(detectable)	**No Detect**

If any SOC's in addition to EDB/DBPC were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list methods here:

n/a

F. Bacterial Contamination:

Are any bacteriological test samples available	**Yes**	yes/no
Any bacterial detection from the source within past 3 years:	**No**	yes/no
Any bacterial detection in the distribution system and attributed to the source within the past 3 years:	**No**	yes/no

Part VI: Geographic or Hydrologic Factors contributing to a non-Circular Zone of Contribution

The following questions will help identify those groundwater systems which may not be accurately represented by the calculated field radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the ten year time of travel zone of the CFR? (does the largest circle extend over a stream, river, lake, or up a steep hillside, mountain or ridge?)

No yes/no if yes, describe with references to the map produced in Part IV:

2) Aquifer Material

A) Does the drilling, well, or other geologic/engineering report identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

No yes/no

B) Does the drilling, well, or other geologic/engineering report identify that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

No yes/no

3) Is the source located in an aquifer with a high horizontal flow rate?

(These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

No yes/no

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gpm within:

- [ ] 6 mo. travel time
- [ ] 1 yr. travel time
- [ ] 5 yr. travel time
- [**No**] 10 year travel time

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within:

- [ ] 6 mo. travel time
- [ ] 1 yr. travel time
- [ ] 5 yr. travel time
- [**No**] 10 year travel time

5) Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the contribution zone for this source. Reference them to locations on the map in Part IV.

None

505
Well #1

WATER WELL REPORT
STATE OF WASHINGTON

File Original and First Copy with the Division of Water Resources
Second Copy — Owner's Copy
Third Copy — Driller's Copy

Application No. _____
Permit No. _____

(1) OWNER:
Name Lake Limerick Associates
Address 1132 No. 128th St
Seattle, Wn. 98133

(2) LOCATION OF WELL:
County King — Owner's number, if any —
NE ¼ NE ¼ Section 27 T 26N R 5 E W.M.
Name and address from section or subdivision corner

(3) TYPE OF WORK (check):
New Well [X] Deepening [ ] Reconditioning [ ] Abandon [ ]
If abandonment, describe material and procedure in Item 11

(4) PROPOSED USE (check):
Domestic [ ] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(5) TYPE OF WELL:
Rotary [ ] Driven [ ]
Cable [X] Jetted [ ]
Dug [ ] Bor'd [ ]

(6) CASING INSTALLED: Threaded [ ] Welded [X]
10" Diam. from 0 ft. to 116 ft. Gage .2.279
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) PERFORATIONS: Perforated? [ ] Yes [ ] No
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(8) SCREENS: Well screen installed [X] Yes [ ] No
Manufacturer's Name Edward E. Johnson Inc.
Type Stainless steel Model No.
Diam. 10" Slot size .050 Set from 86' ft. to 96' ft.
Diam. 10" Slot size .020 Set from 99 ft. to 114 ft.

(9) CONSTRUCTION:
Was well gravel packed? [ ] Yes [ ] No Size of gravel
Gravel placed from ft. to ft.
Was a surface seal provided? [ ] Yes [X] No To what depth? ft.
Material used in seal Drill cuttings
Did any strata contain unusable water? [ ] Yes [X] No
Type of water? Depth of strata
Method of sealing strata off

(10) WATER LEVELS:
Static level 51 ft. below land surface Date 3/25/55
Artesian pressure lbs. per square inch Date
Water is controlled by (Cap, valve, etc.)

(11) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? [X] Yes [ ] No If yes, by whom? Driller
Yield: 95 gal./min. with 41 ft. drawdown after 6 hrs.
" " " " " "
" " " " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level
3:10	72	3:30	72' 6"
3:15	79	3:35	71
3:20	75	3:40	70' 6"
3:25	73' 6"	3:45	69' 6"

Date of test 3/25/55
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? [X] Yes [ ] No

(12) WELL LOG: Diameter of well 10 inches.
Depth drilled 116 ft. Depth of completed well 116 ft.
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sand, clay & gravel	0	6
Hardpan	6	27
Gravel - dry	1	28
Hardpan	20	48
Gravel	3	51
Hardpan	6	60
Gravel - some water	10	78
Sand & gravel	10	88
" " " - water bearing	13	101
Sand	5	106
" & gravel	2	108
Sand	8	116
Muddy sand & gravel		116

Work started 19 Completed 19

(13) PUMP:
Manufacturer's Name
Type H.P.

Well driller's Statement:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Ivan Well Drilling Co.
(Person, firm or corporation) (Type or print)
Address P.O. Box 3, Ariyn, Wn.

[Signed] [illegible]
(Well Driller)

License No. Date 3/28/55, 19

USE ADDITIONAL SHEETS IF NECESSARY)

CK/WRS

Well 2

Groundwater Contamination Susceptibility Assessment Form

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2

Important! Please complete one form for each ground water source (well, well field, spring) used in your system. Photocopy as necessary.

Part I: System Information

Well Owner:	**Lake Limerick Country Club**	Well Manager:	**Northwest Water Systems**
Water System Name:	**Lake Limerick**	Water System Number:	**44150-T**
County:	**Mason**	1/4, 1/4, Sec, T, R:	**NENW S27, 21N, 3W**
Source Name:	**Well 2**	WA well ID tag number:	**AHA 978**
Source Number:	**S02**	Well Depth:	**121**
Number of Connections:	**1199**	Population Served:	**1594**

Latitude: **47.283N** Longitude: **123.051W**

How was lat/long determined?

- [ ] GPS device
- [ ] survey
- [X] topographic map
- [ ] other

*Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

Part II: Well Construction and Source Information

1) Date well originally constructed: **5/8/1967** last reconstructed: **n/a**

2) Well Driller: Russell Well Drilling
PO Box 433
Shelton, WA 98584

3) Type of Well:

- [X] Drilled: **Cable** (rotary, bored, cable, dug)
- [ ] Other: (spring, lateral collection, driven, jetted, other)

Comments:

4) Well Report Available? **Yes** yes/no

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets. Engineering reports, well reconstruction logs.

5) Average pumping rate: **200** gpm

Source of information: **Metered**

If not documented, how was the pumping rate determined?

6) Is this source treated? **No** yes/no (disinfection, filtration, carbon filter, airstripper, other)

If so, what type of treatment:

purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is chlorinated, is a chlorine residual maintained? **N/A** yes/no

Residual level (at point closest to source): **N/A** ppm

Part III: Hydrogeologic Information

1) Depth to top of open interval: **103** ft

2) Depth to groundwater (static water level):
11 ft
[ ] flowing artesian well/spring
How was the water level determined: Sonic Sounder

3) If the source is a flowing well or spring, what is the confining pressure?
N/A psi **N/A** ft

4) If the source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source:
[ ] yes/no

5) Wellhead elevation (height above mean sea level): **240** ft
how was elevation determined?
[X] topographic map
[ ] drilling/well log
[ ] altimeter
[ ] other

6) Confining layers: (This can be completed only for those sources with a drilling log, well log, or geologic report describing subsurface conditions. Please refer to assistance package for example.)
[Yes] (yes/no) Is there evidence of a confining layer in the well log?

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the bottom of the lowest confining layer?
[Yes] (yes/no)

7) Sanitary setback: **60** ft (If less than 100 feet, describe the site conditions):
Well located within a well-house at the corner of Shamrock and East Andrews drive. Small parking area located adjacent to wellhead (down hill from the well), and the tee box for one of the courses fairways is located 80' North west.

8) Wellhead Construction:
[X] in wellhouse
[ ] in doghouse
[ ] outside
[ ] controlled access:
[ ] other uses for wellhouse:

9) Surface seal:
[ ] 18 ft
[ ] >18 ft
[ ] <18 ft (no DOE approval)
[ ] <18 ft (with DOE approval, include documentation)
[X] no surface seal
[ ] unknown

10) Annual rainfall:
[ ] <10 in/yr
[ ] 10-25 in/yr
[X] >25 in/yr

Part IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: **0** Cubic Feet

How was this determined?

[X] Metered

[ ] Estimated — pumping rate: **200** gpm

pumping capacity: **200** gpm

[ ] Other: aquifer/screen **18** ft

2) "Calculated Fixed Radius" estimate of groundwater movement: (see Instruction Packet)

groundwater travel time;	6 mo.	**0** ft
groundwater travel time;	1 yr.	**0** ft
groundwater travel time;	5 yr.	**0** ft
groundwater travel time;	10 yr.	**0** ft
length of screened/open interval:		**18** ft

$r = [(Q*t)/(\pi*\eta H)]^{0.5}$

where: r = radius (ft)

Q = flow (ft^3/yr)

t = time (yr)

η = porosity (0.25 assumed)

H = screen/aquifer height (ft)

3) Is there a river, lake, pond, stream, or other surface water body within the six month travel boundary?

[No] yes/no (if yes, identify on a map and describe below)

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the six month time of travel boundary? (if yes, identify on a map and describe below)

No

Part V: Assessment of Water Quality

1) Regional sources of risk to groundwater:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 mo.	1 yr	5 yr	unknown
likely pesticide application			**No**	
stormwater injection wells			**No**	
other injection wells			**No**	
abandoned ground water well			**No**	
landfills, dumps, disposal areas			**No**	
known hazardous materials clean-up site			**No**	
water systems with water quality problems			**No**	
population density >1 house/acre			**No**	
residences commonly having septic tanks			**No**	
wastewater treatment lagoons			**No**	
sites used for land application of waste			**No**	

Identify on a map all of the risks listed above which are located within the six month time of travel boundary. (Please include a map of the wellhead and time of travel areas within this form. Please indicate any of the following.) If other potential sources of groundwater contamination exist within the ten year time of travel circular zone around your supply, please describe:

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on the assessment, MCLs are listed in assistance package.)

	MCL/detection	level >MCL?
A. Nitrate:	10 mg/l	**No Detect**
B. VOCs:	5 ug/l	**No Detect**
C. EDB:	0.05 ug/l	**No Detect**
D. DBCP:	0.2 ug/l	**No Detect**
E. Other SOC	(detectable)	**No Detect**

If any SOC's in addition to EDB/DBPC were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list methods here:

n/a

F. Bacterial Contamination:

Are any bacteriological test samples available	**No**	yes/no
Any bacterial detection from the source within past 3 years:	**N/A**	yes/no
Any bacterial detection in the distribution system and attributed to the source within the past 3 years:	**N/A**	yes/no

Part VI: Geographic or Hydrologic Factors contributing to a non-Circular Zone of Contribution

The following questions will help identify those groundwater systems which may not be accurately represented by the calculated field radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the ten year time of travel zone of the CFR? (does the largest circle extend over a stream, river, lake, or up a steep hillside, mountain or ridge?)

No yes/no if yes, describe with references to the map produced in Part IV:

2) Aquifer Material

A) Does the drilling, well, or other geologic/engineering report identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

No yes/no

B) Does the drilling, well, or other geologic/engineering report identify that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

No yes/no

3) Is the source located in an aquifer with a high horizontal flow rate?

(These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

No yes/no

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gpm within:

- [ ] 6 mo. travel time
- [ ] 1 yr. travel time
- [ ] 5 yr. travel time
- [**No**] 10 year travel time

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within:

- [ ] 6 mo. travel time
- [ ] 1 yr. travel time
- [ ] 5 yr. travel time
- [**No**] 10 year travel time

5) Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the contribution zone for this source. Reference them to locations on the map in Part IV.

None

S02
Well 2

WATER WELL REPORT
STATE OF WASHINGTON

Application No. 8833
Permit No.

File Original and First Copy with the Division of Water Resources
Second Copy — Owner's Copy
Third Copy — Driller's Copy

(1) OWNER:
Name LAKE LIMERICK COUNTRY CLUB, INCORPORATED
Address 5125 25th N.E.
SEATTLE, WN.

(2) LOCATION OF WELL: #2
County MASON Owner's number, if any
SE ¼ NW ¼ Section 27 T 21N R 3W W.M.
Bearing and distance from section or subdivision corner
~~1450~~ SOUTH & ~~1550~~ EAST OF NW Cor. SECTION 27
1405 1555
15 1/2 330

(3) TYPE OF WORK (check):
New Well X Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable X Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED: Threaded ☐ Welded ☐
10" Diam. from 1 ft. to 103 ft. Gage
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) PERFORATIONS: Perforated? ☐ Yes X No
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(8) SCREENS: Well screen installed X Yes ☐ No
Manufacturer's Name JOHNSON
Type STAINLESS STEEL Model No.
Diam. 10" Slot size 35 Set from 103 ft. to 121 ft.
Diam. Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Was gravel packed? ☐ Yes X No Size of gravel
Gravel placed from ft. to ft.
Was a surface seal provided? ☐ Yes ☐ No To what depth? ft.
Material used in seal
Did any strata contain unusable water? ☐ Yes X No
Type of water? Depth of strata
Method of sealing strata off

(10) WATER LEVELS:
Static level 11' ft. below land surface Date JUNE 17-67
Artesian pressure lbs. per square inch Date
Water level controlled by (Cap, valve, etc.)
OK/PE

(11) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? X Yes ☐ No If yes, by whom? Russell Drilling
Yield 200 gal./min. with 84 ft. drawdown after 4 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level

Date of test 6/17/67
Bailer test 133 gal./min. with 24 ft. drawdown after 4 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? ☐ Yes ☐ No

(12) WELL LOG: Diameter of well 10" inches.
Depth drilled 121 ft. Depth of completed well 121 ft.
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top Soil & Gravel	0	2
Cemented Gravel	2	10
Cemented Gravel	10	40
Cemented Gravel & clay	40	50
Cemented Gravel & clay	50	75
Clay - Blue & Gray	75	78
Broken clay & Gravel	78	85
" " "	85	92
Blue clay & sand	92	100
Blue clay & sand water bearing	100	104
Sand & gravel Small stuck of blue clay	104	121

Work started May 3 19 67 Completed May 8 19 67

(13) PUMP:
Manufacturer's Name
Type: H.P.

Well Driller's Statement:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Russell Well Drilling Co. (Person, firm, or corporation) (Type or print)
Address P.O. Box 433 Shelton Wash
[Signed] Wallace J. Russell (Well Driller)
License No. 223-01-5124 Date June 19, 1967

(USE ADDITIONAL SHEETS IF NECESSARY)

B. F. No. 733 — Rev. 5-62 / 4-63 — 551 75108

Well 3A

Groundwater Contamination Susceptibility Assessment Form

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2

Important! Please complete one form for each ground water source (well, well field, spring) used in your system. Photocopy as necessary.

Part I: System Information

Well Owner:	**Lake Limerick Country Club**	Well Manager:	**Northwest Water Systems**
Water System Name:	**Lake Limerick**	Water System Number:	**44150-T**
County:	**Mason**	1/4, 1/4, Sec, T, R:	**NWSW S27, 21N, 3W**
Source Name:	**Well 3A**	WA well ID tag number:	**AHA 976**
Source Number:	**S03**	Well Depth:	**148 ft**
Number of Connections:	**1199**	Population Served:	**1594**

Latitude: **47.276N** Longitude: **123.054W**

How was lat/long determined?

- [ ] GPS device
- [ ] survey
- [X] topographic map
- [ ] other

*Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

Part II: Well Construction and Source Information

1) Date well originally constructed: **6/19/1967** last reconstructed: **n/a**

2) Well Driller: Russell Drilling Co.
PO Box 433
Shelton, WA 98584

3) Type of Well:

- [X] Drilled: **Unknown** (rotary, bored, cable, dug)
- [ ] Other: (spring, lateral collection, driven, jetted, other)

Comments:

4) Well Report Available? **Yes** yes/no

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets. Engineering reports, well reconstruction logs.

5) Average pumping rate: **144** gpm

Source of information: **Metered**

If not documented, how was the pumping rate determined?

6) Is this source treated? **No** yes/no (disinfection, filtration, carbon filter, airstripper, other)

If so, what type of treatment:

purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is chlorinated, is a chlorine residual maintained? **N/A** yes/no

Residual level (at point closest to source): **N/A** ppm

Part III: Hydrogeologic Information

1) Depth to top of open interval: **131** ft

2) Depth to groundwater (static water level):
56 ft
[ ] flowing artesian well/spring
How was the water level determined: Well Log

3) If the source is a flowing well or spring, what is the confining pressure?
N/A psi **N/A** ft

4) If the source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source:
[ ] yes/no

5) Wellhead elevation (height above mean sea level): **290** ft
how was elevation determined?
[X] topographic map
[ ] drilling/well log
[ ] altimeter
[ ] other

6) Confining layers: (This can be completed only for those sources with a drilling log, well log, or geologic report describing subsurface conditions. Please refer to assistance package for example.)
[Yes] (yes/no) Is there evidence of a confining layer in the well log?

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the bottom of the lowest confining layer?
[No] (yes/no)

7) Sanitary setback: **70** ft (If less than 100 feet, describe the site conditions):
East Andrews and East Penzance roads pass nearby. No other significant sources of contamination exist within 100 feet.

8) Wellhead Construction:
[X] in wellhouse
[ ] in doghouse
[ ] outside
[ ] controlled access:
[ ] other uses for wellhouse:

9) Surface seal:
[ ] 18 ft
[ ] >18 ft
[ ] <18 ft (no DOE approval)
[ ] <18 ft (with DOE approval, include documentation)
[X] no surface seal
[ ] unknown

10) Annual rainfall:
[ ] <10 in/yr
[ ] 10-25 in/yr
[X] >25 in/yr

Part IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: **2,735,898** Cubic Feet

How was this determined? Combined Well 3A and 3B

[X] Metered

[ ] Estimated pumping rate: **144** gpm

pumping capacity: **144** gpm

[ ] Other: aquifer/screen **32** ft

2) "Calculated Fixed Radius" estimate of groundwater movement: (see Instruction Packet)

groundwater travel time;	6 mo.	**233** ft
groundwater travel time;	1 yr.	**330** ft
groundwater travel time;	5 yr.	**738** ft
groundwater travel time;	10 yr.	**1043** ft
length of screened/open interval:		**17** ft

$r = [(Q*t)/(\pi*\eta H)]^{0.5}$

where: r = radius (ft)

Q = flow (ft^3/yr)

t = time (yr)

η = porosity (0.25 assumed)

H = screen/aquifer height (ft)

3) Is there a river, lake, pond, stream, or other surface water body within the six month travel boundary?

[No] yes/no (if yes, identify on a map and describe below)

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the six month time of travel boundary? (if yes, identify on a map and describe below)

No

Part V: Assessment of Water Quality

1) Regional sources of risk to groundwater:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 mo.	1 yr	5 yr	unknown
likely pesticide application	**X**			
stormwater injection wells				**X**
other injection wells				**X**
abandoned ground water well				**X**
landfills, dumps, disposal areas			**No**	
known hazardous materials clean-up site			**No**	
water systems with water quality problems			**No**	
population density >1 house/acre	**X**			
residences commonly having septic tanks	**X**			
wastewater treatment lagoons			**No**	
sites used for land application of waste			**No**	

Identify on a map all of the risks listed above which are located within the six month time of travel boundary. (Please include a map of the wellhead and time of travel areas within this form. Please indicate any of the following.) If other potential sources of groundwater contamination exist within the ten year time of travel circular zone around your supply, please describe:

A fairway is located to the south of the well is the source of the pesticide application, residences located in the vicinity have septic tanks and lots smaller than 1 acre.

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on the assessment, MCLs are listed in assistance package.)

	MCL/detection	Reported	Level > MCL?
A. Nitrate:	10 mg/l	**0.48**	No
B. VOCs:	5 ug/l	**None Detected**	No
C. EDB:	0.05 ug/l	**None Detected**	No
D. DBCP:	0.2 ug/l	**None Detected**	No
E. Other SOC	(detectable)	**None Detected**	No

If any SOC's in addition to EDB/DBPC were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list methods here:

N/A

F. Bacterial Contamination:

Are any bacteriological test samples available	**Yes**	yes/no
Any bacterial detection from the source within past 3 years:	**No**	yes/no
Any bacterial detection in the distribution system and attributed to the source within the past 3 years:	**No**	yes/no

Part VI: Geographic or Hydrologic Factors contributing to a non-Circular Zone of Contribution

The following questions will help identify those groundwater systems which may not be accurately represented by the calculated field radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the ten year time of travel zone of the CFR? (does the largest circle extend over a stream, river, lake, or up a steep hillside, mountain or ridge?)

No yes/no if yes, describe with references to the map produced in Part IV:

2) Aquifer Material

A) Does the drilling, well, or other geologic/engineering report identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

No yes/no

B) Does the drilling, well, or other geologic/engineering report identify that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

No yes/no

3) Is the source located in an aquifer with a high horizontal flow rate?

(These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

No yes/no

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gpm within:

- [ ] 6 mo. travel time
- [ ] 1 yr. travel time
- [ ] 5 yr. travel time
- [x] **No** 10 year travel time

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within:

- [ ] 6 mo. travel time
- [ ] 1 yr. travel time
- [ ] 5 yr. travel time
- [x] **No** 10 year travel time

5) Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the contribution zone for this source. Reference them to locations on the map in Part IV.

None

503

Well 3A

WATER WELL REPORT
STATE OF WASHINGTON

File Original and First Copy with the Division of Water Resources
Second Copy — Owner's Copy
Third Copy — Driller's Copy

Application No. 5834

Permit No. .....

(1) OWNER:
Name LAKE LIMERICK COUNTRY CLUB, INCORPORATED
Address 5125 25th N.E.
Seattle, Wn.

(2) LOCATION OF WELL: #3
County MASON
SW ¼ SW ¼ Section 27 T 21N. R 3W. W.M.
Bearing and distance from section or subdivision corner:
~~1200~~ 1165' NORTH & ~~600~~ 520' EAST OF S.W. Cor. Sec. 27
E. 240' ±

(3) TYPE OF WORK (check):
New Well [X] Deepening [ ] Reconditioning [ ] Abandon [ ]
If abandonment, describe material and procedure in Item 11

(4) PROPOSED USE (check):
Domestic [ ] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(5) TYPE OF WELL:
Rotary [ ] Driven [ ]
Cable [X] Jetted [ ]
Dug [ ] Bored [ ]

(6) CASING INSTALLED: Threaded [ ] Welded [X]
10" Diam. from 1 ft. to 148 ft. Gage
Diam. from ft. to ft. Gage
Diam. from ft. to ft. Gage

(7) PERFORATIONS: Perforated? [ ] Yes [X] No
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(8) SCREENS: Well screen installed? [X] Yes [ ] No
Manufacturer's Name JOHNSON
Type STAINLESS STEEL Model No.
Diam. 10" Slot size 30 Set from 131 ft. to 145 ft.
Diam. Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Was well gravel packed? [ ] Yes [X] No Size of gravel
Gravel placed from ft. to ft.
Was a surface seal provided? [ ] Yes [ ] No To what depth? ft.
Material used in seal
Did any strata contain unusable water? [ ] Yes [ ] No
Type of water? Depth of strata
Method of sealing strata off

(10) WATER LEVELS:
Static level 5.0 ft. below land surface Date June 17-67
Artesian pressure lbs. per square inch Date
Water is controlled by
(Cap, valve, etc.)
OK/PE

(11) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? [X] Yes [ ] No If yes, by whom? Russell Drilling
Yield 90 gal./min. with 79 ft. drawdown after 4 hrs.
" " " " "
" " " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level

Date of test June 17-1967
Bailer test 80 gal./min. with 60 ft. drawdown after 4 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? [ ] Yes [ ] No

(12) WELL LOG: Diameter of well 10 inches.
Depth drilled 148 ft. Depth of completed well 148 ft.

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Fill	0	3
Clay & Gravel	3	72
Gravel & Sand (water)	72	77
Clay & Gravel	77	79½
Sand & Gravel (water)	79½	86½
Gravel & Sand	86½	92
Clay & Gravel	92	110
Gravel & Sand	110	111
Clay & Gravel	111	112
Gravel & Sand	112	113
Clay & Gravel	113	126
Clay & Gravel	126	128
Sand & Gravel	128	148

Work started June 2 19 Completed 19

(13) PUMP:
Manufacturer's Name
Type: H.P.

Well Driller's Statement:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Russell Drilling Co. (Person, firm, or corporation) (Type or print)
Address P.O. Box 433 Shelton Wash
[Signed] William J. Russell (Well Driller)
License No. 223-01-5124 Date June 19, 1967

(USE ADDITIONAL SHEETS IF NECESSARY)

Well 3B

Groundwater Contamination Susceptibility Assessment Form

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2

Important! Please complete one form for each ground water source (well, well field, spring) used in your system. Photocopy as necessary.

Part I: System Information

Well Owner:	**Lake Limerick Country Club**	Well Manager:	**Northwest Water Systems**
Water System Name:	**Lake Limerick**	Water System Number:	**44150-T**
County:	**Mason**	1/4, 1/4, Sec, T, R:	**NWSW S27, 21N, 3W**
Source Name:	**Well 3B**	WA well ID tag number:	**AHA 975**
Source Number:	**S06**	Well Depth:	**177 ft**
Number of Connections:	**1199**	Population Served:	**1594**

Latitude: **47.276N** Longitude: **123.054W**

How was lat/long determined?

- [ ] GPS device
- [ ] survey
- [X] topographic map
- [ ] other

*Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

Part II: Well Construction and Source Information

1) Date well originally constructed: **5/4/1981** last reconstructed: **n/a**

2) Well Driller: Bedell Pump and Drilling Co
1583 E. Dickinson St.
Shelton, WA 98584

3) Type of Well:

- [X] Drilled: **Rotary** (rotary, bored, cable, dug)
- [ ] Other: (spring, lateral collection, driven, jetted, other)

Comments:

4) Well Report Available? **Yes** yes/no

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets. Engineering reports, well reconstruction logs.

5) Average pumping rate: **194** gpm

Source of information: **Metered**

If not documented, how was the pumping rate determined?

6) Is this source treated? **No** yes/no (disinfection, filtration, carbon filter, airstripper, other)

If so, what type of treatment:

purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is chlorinated, is a chlorine residual maintained? **N/A** yes/no

Residual level (at point closest to source): **N/A** ppm

Part III: Hydrogeologic Information

1) Depth to top of open interval: **167** ft

2) Depth to groundwater (static water level):
61 ft
[ ] flowing artesian well/spring
How was the water level determined: Well Log

3) If the source is a flowing well or spring, what is the confining pressure?
N/A psi **N/A** ft

4) If the source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source:
[ ] yes/no

5) Wellhead elevation (height above mean sea level): **290** ft
how was elevation determined?
[X] topographic map
[ ] drilling/well log
[ ] altimeter
[ ] other

6) Confining layers: (This can be completed only for those sources with a drilling log, well log, or geologic report describing subsurface conditions. Please refer to assistance package for example.)
[Yes] (yes/no) Is there evidence of a confining layer in the well log?

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the bottom of the lowest confining layer?
[No] (yes/no)

7) Sanitary setback: **70** ft (If less than 100 feet, describe the site conditions):
East Andrews and East Penzance roads pass nearby. No other significant sources of contamination exist within 100 feet.

8) Wellhead Construction:
[X] in wellhouse
[ ] in doghouse
[ ] outside
[ ] controlled access:
[ ] other uses for wellhouse:

9) Surface seal:
[X] 18 ft
[ ] >18 ft
[ ] <18 ft (no DOE approval)
[ ] <18 ft (with DOE approval, include documentation)
[ ] no surface seal
[ ] unknown

10) Annual rainfall:
[ ] <10 in/yr
[ ] 10-25 in/yr
[X] >25 in/yr

Part IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: **2,735,898** Cubic Feet

How was this determined? Combined Well 3A and 3B

[X] Metered

[ ] Estimated — pumping rate: **194** gpm

pumping capacity: **194** gpm

[ ] Other: aquifer/screen **32** ft

2) "Calculated Fixed Radius" estimate of groundwater movement: (see Instruction Packet)

groundwater travel time;	6 mo.	**233** ft
groundwater travel time;	1 yr.	**330** ft
groundwater travel time;	5 yr.	**738** ft
groundwater travel time;	10 yr.	**1043** ft
length of screened/open interval:		**10** ft

$r = [(Q*t)/(\pi*\eta H)]^{0.5}$

where: r = radius (ft)

Q = flow (ft^3/yr)

t = time (yr)

η = porosity (0.25 assumed)

H = screen/aquifer height (ft)

3) Is there a river, lake, pond, stream, or other surface water body within the six month travel boundary?

[No] yes/no (if yes, identify on a map and describe below)

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the six month time of travel boundary? (if yes, identify on a map and describe below)

No

Part V: Assessment of Water Quality

1) Regional sources of risk to groundwater:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 mo.	1 yr	5 yr	unknown
likely pesticide application	**X**			
stormwater injection wells				**X**
other injection wells				**X**
abandoned ground water well				**X**
landfills, dumps, disposal areas			**No**	
known hazardous materials clean-up site			**No**	
water systems with water quality problems			**No**	
population density >1 house/acre	**X**			
residences commonly having septic tanks	**X**			
wastewater treatment lagoons			**No**	
sites used for land application of waste			**No**	

Identify on a map all of the risks listed above which are located within the six month time of travel boundary. (Please include a map of the wellhead and time of travel areas within this form. Please indicate any of the following.) If other potential sources of groundwater contamination exist within the ten year time of travel circular zone around your supply, please describe:

A fairway is located to the south of the well is the source of the pesticide application, residences located in the vicinity have septic tanks and lots smaller than 1 acre.

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on the assessment, MCLs are listed in assistance package.)

	MCL/detection	Leve >MCL?	Level > MCL?
A. Nitrate:	10 mg/l	**No Detect**	No
B. VOCs:	5 ug/l	**No Detect**	No
C. EDB:	0.05 ug/l	**No Detect**	No
D. DBCP:	0.2 ug/l	**No Detect**	No
E. Other SOC	(detectable)	**No Detect**	No

If any SOC's in addition to EDB/DBPC were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list methods here:

N/A

F. Bacterial Contamination:

Are any bacteriological test samples available	**Yes**	yes/no
Any bacterial detection from the source within past 3 years:	**No**	yes/no
Any bacterial detection in the distribution system and attributed to the source within the past 3 years:	**No**	yes/no

Part VI: Geographic or Hydrologic Factors contributing to a non-Circular Zone of Contribution

The following questions will help identify those groundwater systems which may not be accurately represented by the calculated field radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the ten year time of travel zone of the CFR? (does the largest circle extend over a stream, river, lake, or up a steep hillside, mountain or ridge?)

No yes/no if yes, describe with references to the map produced in Part IV:

2) Aquifer Material

A) Does the drilling, well, or other geologic/engineering report identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

No yes/no

B) Does the drilling, well, or other geologic/engineering report identify that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

No yes/no

3) Is the source located in an aquifer with a high horizontal flow rate?

(These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

No yes/no

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gpm within:

- [ ] 6 mo. travel time
- [ ] 1 yr. travel time
- [ ] 5 yr. travel time
- [x] **No** 10 year travel time

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within:

- [ ] 6 mo. travel time
- [ ] 1 yr. travel time
- [ ] 5 yr. travel time
- [x] **No** 10 year travel time

5) Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the contribution zone for this source. Reference them to locations on the map in Part IV.

None

306, Well 315

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No. .....

(1) OWNER: Name Lake Limerick Address 90 St. Andrews Dr. Shelton, Wash.

(2) LOCATION OF WELL: County Mason #36 - SW ¼ SW ¼ Sec 27 T 21 N. R 3W W.M.
& and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☑
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one).... #3 (OLD #3)
New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☑ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 177 ft. Depth of completed well 177 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8 " Diam. from 0 ft. to 177 ft.
Threaded ☐ ." Diam. from ft. to ft.
Welded ☑ ." Diam. from ft. to ft.

Perforations: Yes ☐ No ☑
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☑ No ☐
Manufacturer's Name Johnson SS 10'
Type #100 slot Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☑ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☑ No ☐ To what depth? 18 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land surface elevation above mean sea level.... 360 ft.
Static level 61 ft. below top of well Date 5/4/81
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☑ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 210 gal./min. with TSTR ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☑

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Shot clay	0	3'
Hard pan	3	72'
Gravel & sand	72	77'
hard pan	77	81'
Gravel & sand	81	95'
Hard pan	95	112'
Gravel & sand	112	120'
Cemented gravel	120	134'
Sand, gravel & water	134	150'
Hard pan	150	161'
Gravel & water	161	177'

Work started 4/28 19.... Completed 5/4/81 19....

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Bedell Pump & Drilling Co.
(Person, firm, or corporation) (Type or print)
Address 1583 E. Dickinson St. Shelton, Wash.

[Signed] Vern L Bedell
(Well Driller)

License No. 0032 Date 5/26/81 19....

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

Well 4

Groundwater Contamination Susceptibility Assessment Form

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2

Important! Please complete one form for each ground water source (well, well field, spring) used in your system. Photocopy as necessary.

Part I: System Information

Well Owner:	**Lake Limerick Country Club**	Well Manager:	**Northwest Water Systems**
Water System Name:	**Lake Limerick**	Water System Number:	**44150-T**
County:	**Mason**	1/4, 1/4, Sec, T, R:	**SESW S27, 21N, 3W**
Source Name:	**Well 4**	WA well ID tag number:	**AHA 973**
Source Number:	**S04**	Well Depth:	**111 ft**
Number of Connections:	**1199**	Population Served:	**1594**

Latitude: **47.289N** Longitude: **123.049W**

How was lat/long determined?

- [ ] GPS device
- [ ] survey
- [X] topographic map
- [ ] other

*Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

Part II: Well Construction and Source Information

1) Date well originally constructed: **5/4/1981** last reconstructed: **n/a**

2) Well Driller: Russel Drilling
PO Box 433
Shelton, WA 98584

3) Type of Well:

- [X] Drilled: **Rotary** (rotary, bored, cable, dug)
- [ ] Other: (spring, lateral collection, driven, jetted, other)

Comments:

4) Well Report Available? **Yes** yes/no

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets. Engineering reports, well reconstruction logs.

5) Average pumping rate: **74** gpm

Source of information: **Metered**

If not documented, how was the pumping rate determined?

6) Is this source treated? **No** yes/no (disinfection, filtration, carbon filter, airstripper, other)

If so, what type of treatment:

purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is chlorinated, is a chlorine residual maintained? **N/A** yes/no

Residual level (at point closest to source): **N/A** ppm

Part III: Hydrogeologic Information

1) Depth to top of open interval: **91** ft

2) Depth to groundwater (static water level):
54 ft
[ ] flowing artesian well/spring
How was the water level determined: Well Log

3) If the source is a flowing well or spring, what is the confining pressure?
N/A psi **N/A** ft

4) If the source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source:
[ ] yes/no

5) Wellhead elevation (height above mean sea level): **290** ft
how was elevation determined?
[X] topographic map
[ ] drilling/well log
[ ] altimeter
[ ] other

6) Confining layers: (This can be completed only for those sources with a drilling log, well log, or geologic report describing subsurface conditions. Please refer to assistance package for example.)
[Yes] (yes/no) Is there evidence of a confining layer in the well log?

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the bottom of the lowest confining layer?
[No] (yes/no)

7) Sanitary setback: **110** ft (If less than 100 feet, describe the site conditions):

8) Wellhead Construction:
[X] in wellhouse
[ ] in doghouse
[ ] outside
[ ] controlled access:
[ ] other uses for wellhouse:

9) Surface seal:
[ ] 18 ft
[ ] >18 ft
[ ] <18 ft (no DOE approval)
[ ] <18 ft (with DOE approval, include documentation)
[X] no surface seal
[ ] unknown

10) Annual rainfall:
[ ] <10 in/yr
[ ] 10-25 in/yr
[X] >25 in/yr

Part IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: **1,909,678** Cubic Feet

How was this determined?

[X] Metered

[ ] Estimated — pumping rate: **74** gpm

pumping capacity: **74** gpm

[ ] Other: aquifer/screen **20** ft

2) "Calculated Fixed Radius" estimate of groundwater movement: (see Instruction Packet)

groundwater travel time;	6 mo.	**247** ft
groundwater travel time;	1 yr.	**349** ft
groundwater travel time;	5 yr.	**780** ft
groundwater travel time;	10 yr.	**1103** ft
length of screened/open interval:		**20** ft

$r = [(Q*t)/(\pi*\eta H)]^{0.5}$

where: r = radius (ft)

Q = flow (ft^3/yr)

t = time (yr)

η = porosity (0.25 assumed)

H = screen/aquifer height (ft)

3) Is there a river, lake, pond, stream, or other surface water body within the six month travel boundary?

[No] yes/no (if yes, identify on a map and describe below)

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the six month time of travel boundary? (if yes, identify on a map and describe below)

No

Part V: Assessment of Water Quality

1) Regional sources of risk to groundwater:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 mo.	1 yr	5 yr	unknown
likely pesticide application				**X**
stormwater injection wells				**X**
other injection wells				**X**
abandoned ground water well				**X**
landfills, dumps, disposal areas			**No**	
known hazardous materials clean-up site			**No**	
water systems with water quality problems			**No**	
population density >1 house/acre	**X**			
residences commonly having septic tanks	**X**			
wastewater treatment lagoons			**No**	
sites used for land application of waste			**No**	

Identify on a map all of the risks listed above which are located within the six month time of travel boundary. (Please include a map of the wellhead and time of travel areas within this form. Please indicate any of the following.) If other potential sources of groundwater contamination exist within the ten year time of travel circular zone around your supply, please describe:

Homes are located within 200 feet of the wellhead

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on the assessment, MCLs are listed in assistance package.)

	MCL/detection	Leve >MCL?	Level > MCL?
A. Nitrate:	10 mg/l	**No Detect**	No
B. VOCs:	5 ug/l	**No Detect**	No
C. EDB:	0.05 ug/l	**No Detect**	No
D. DBCP:	0.2 ug/l	**No Detect**	No
E. Other SOC	(detectable)	**No Detect**	No

If any SOC's in addition to EDB/DBPC were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list methods here:

N/A

F. Bacterial Contamination:

Are any bacteriological test samples available	**Yes**	yes/no
Any bacterial detection from the source within past 3 years:	**No**	yes/no
Any bacterial detection in the distribution system and attributed to the source within the past 3 years:	**No**	yes/no

Part VI: Geographic or Hydrologic Factors contributing to a non-Circular Zone of Contribution

The following questions will help identify those groundwater systems which may not be accurately represented by the calculated field radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the ten year time of travel zone of the CFR? (does the largest circle extend over a stream, river, lake, or up a steep hillside, mountain or ridge?)

No yes/no if yes, describe with references to the map produced in Part IV:

2) Aquifer Material

A) Does the drilling, well, or other geologic/engineering report identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

No yes/no

B) Does the drilling, well, or other geologic/engineering report identify that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

No yes/no

3) Is the source located in an aquifer with a high horizontal flow rate?

(These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

No yes/no

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gpm within:

- [ ] 6 mo. travel time
- [ ] 1 yr. travel time
- [ ] 5 yr. travel time
- [x] **No** 10 year travel time

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within:

- [ ] 6 mo. travel time
- [ ] 1 yr. travel time
- [ ] 5 yr. travel time
- [x] **No** 10 year travel time

5) Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the contribution zone for this source. Reference them to locations on the map in Part IV.

None

S04, Well 4

File Original and First Copy with the Division of Water Resources
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. 7889
Permit No. 7218

(1) OWNER: Name Lake Limerick Address

(2) LOCATION OF WELL: County Mason E/2 SE ¼ SW ¼ Sec. 22 T. 21 N. R. 3W W.M.
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 10 inches.
Drilled 111 ft. Depth of completed well 111 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 10" Diam. from 1 ft. to 111 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☐
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type S.S. Steel Model No.
Diam. 10" Slot size from 91 ft. to 111 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☐ No ☐ To what depth? ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level
Static level 54 ft. below top of well Date 8-1-68
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 93 gal./min. with 8 ft. drawdown after 4 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

OK/WPR

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top Soil	1	2
Sm Gravel	2	10
" "	10	35
" "	35	49
Sm. Gr (Blue)	49	50
" " "	50	58
Gr + Sand	58	60
Brown Clay Gr	60	70
" " "	70	78
Blue Clay + Sand	78	88
Brown Clay	88	92
Gr + Sand	92	95
" "	95	106
" "	106	111

Work started 19 Completed 19

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Russell Drilling Co (Person, firm, or corporation) (Type or print)
Address P.O. Box 433 Shelton, Wash
[Signed] William J. Russell (Well Driller)
License No. 225-5144 Date 11-12 19 69

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7156-7 Rev. (3-67)—2-6—5M. 4510.

Well 5

Groundwater Contamination Susceptibility Assessment Form

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2

Important! Please complete one form for each ground water source (well, well field, spring) used in your system. Photocopy as necessary.

Part I: System Information

Well Owner:	**Lake Limerick Country Club**	Well Manager:	**Northwest Water Systems**
Water System Name:	**Lake Limerick**	Water System Number:	**44150-T**
County:	**Mason**	1/4, 1/4, Sec, T, R:	**NWSW S27, 21N, 3W**
Source Name:	**Well 5**	WA well ID tag number:	**AHA 977**
Source Number:	**S07**	Well Depth:	**130 ft**
Number of Connections:	**1199**	Population Served:	**1594**

Latitude: **42.280 N** Longitude: **123.054W**

How was lat/long determined?

- [ ] GPS device
- [ ] survey
- [X] topographic map
- [ ] other

*Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

Part II: Well Construction and Source Information

1) Date well originally constructed: **10/30/1986** last reconstructed: **n/a**

2) Well Driller: Arcadia Drilling
170 SE Walker Pk Dr.
Shelton, WA 98584

3) Type of Well:

- [X] Drilled: **Rotary** (rotary, bored, cable, dug)
- [ ] Other: (spring, lateral collection, driven, jetted, other)

Comments:

4) Well Report Available? **Yes** yes/no

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets. Engineering reports, well reconstruction logs.

5) Average pumping rate: **35** gpm

Source of information: **Metered**

If not documented, how was the pumping rate determined?

6) Is this source treated? **No** yes/no (disinfection, filtration, carbon filter, airstripper, other)

If so, what type of treatment:

purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is chlorinated, is a chlorine residual maintained? **N/A** yes/no

Residual level (at point closest to source): **N/A** ppm

Part III: Hydrogeologic Information

1) Depth to top of open interval: **110** ft

2) Depth to groundwater (static water level):
42 ft
[ ] flowing artesian well/spring
How was the water level determined: Well Log

3) If the source is a flowing well or spring, what is the confining pressure?
N/A psi **N/A** ft

4) If the source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source:
[ ] yes/no

5) Wellhead elevation (height above mean sea level): **270** ft
how was elevation determined?
[X] topographic map
[ ] drilling/well log
[ ] altimeter
[ ] other

6) Confining layers: (This can be completed only for those sources with a drilling log, well log, or geologic report describing subsurface conditions. Please refer to assistance package for example.)
[Yes] (yes/no) Is there evidence of a confining layer in the well log?

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the bottom of the lowest confining layer?
[Yes] (yes/no)

7) Sanitary setback: **80** ft (If less than 100 feet, describe the site conditions):
Rail line passes within 80-ft of the wellhead, no other structures or sources of contamination exist within 100-ft

8) Wellhead Construction:
[X] in wellhouse
[ ] in doghouse
[ ] outside
[ ] controlled access:
[ ] other uses for wellhouse:

9) Surface seal:
[ ] 18 ft
[X] >18 ft
[ ] <18 ft (no DOE approval)
[ ] <18 ft (with DOE approval, include documentation)
[ ] no surface seal
[ ] unknown

10) Annual rainfall:
[ ] <10 in/yr
[ ] 10-25 in/yr
[X] >25 in/yr

Part IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: **1,123,170** Cubic Feet

How was this determined?

[X] Metered

[ ] Estimated — pumping rate: **35** gpm

pumping capacity: **35** gpm

[ ] Other: aquifer/screen **20** ft

2) "Calculated Fixed Radius" estimate of groundwater movement: (see Instruction Packet)

groundwater travel time;	6 mo.	**189** ft
groundwater travel time;	1 yr.	**267** ft
groundwater travel time;	5 yr.	**598** ft
groundwater travel time;	10 yr.	**846** ft
length of screened/open interval:		**20** ft

$r = [(Q*t)/(\pi*\eta H)]^{0.5}$

where: r = radius (ft)

Q = flow (ft^3/yr)

t = time (yr)

η = porosity (0.25 assumed)

H = screen/aquifer height (ft)

3) Is there a river, lake, pond, stream, or other surface water body within the six month travel boundary?

[No] yes/no (if yes, identify on a map and describe below)

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the six month time of travel boundary? (if yes, identify on a map and describe below)

No

Part V: Assessment of Water Quality

1) Regional sources of risk to groundwater:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 mo.	1 yr	5 yr	unknown
likely pesticide application	**X**			
stormwater injection wells				**X**
other injection wells				**X**
abandoned ground water well				**X**
landfills, dumps, disposal areas			**No**	
known hazardous materials clean-up site			**No**	
water systems with water quality problems			**No**	
population density >1 house/acre	**X**			
residences commonly having septic tanks	**X**			
wastewater treatment lagoons			**No**	
sites used for land application of waste			**No**	

Identify on a map all of the risks listed above which are located within the six month time of travel boundary. (Please include a map of the wellhead and time of travel areas within this form. Please indicate any of the following.) If other potential sources of groundwater contamination exist within the ten year time of travel circular zone around your supply, please describe:

Homes and two fairways of the golfcourse are located within the 6-month travel boundary of the wellhead

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on the assessment, MCLs are listed in assistance package.)

	MCL/detection	Leve >MCL?	Level > MCL?
A. Nitrate:	10 mg/l	**No Detect**	No
B. VOCs:	5 ug/l	**No Detect**	No
C. EDB:	0.05 ug/l	**No Detect**	No
D. DBCP:	0.2 ug/l	**No Detect**	No
E. Other SOC	(detectable)	**No Detect**	No

If any SOC's in addition to EDB/DBPC were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list methods here:

N/A

F. Bacterial Contamination:

Are any bacteriological test samples available	**Yes**	yes/no
Any bacterial detection from the source within past 3 years:	**No**	yes/no
Any bacterial detection in the distribution system and attributed to the source within the past 3 years:	**No**	yes/no

Part VI: Geographic or Hydrologic Factors contributing to a non-Circular Zone of Contribution

The following questions will help identify those groundwater systems which may not be accurately represented by the calculated field radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the ten year time of travel zone of the CFR? (does the largest circle extend over a stream, river, lake, or up a steep hillside, mountain or ridge?)

No yes/no if yes, describe with references to the map produced in Part IV:

2) Aquifer Material

A) Does the drilling, well, or other geologic/engineering report identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

No yes/no

B) Does the drilling, well, or other geologic/engineering report identify that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

No yes/no

3) Is the source located in an aquifer with a high horizontal flow rate?

(These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

No yes/no

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gpm within:

- [ ] 6 mo. travel time
- [ ] 1 yr. travel time
- [ ] 5 yr. travel time
- [x] **No** 10 year travel time

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within:

- [ ] 6 mo. travel time
- [ ] 1 yr. travel time
- [ ] 5 yr. travel time
- [x] **No** 10 year travel time

5) Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the contribution zone for this source. Reference them to locations on the map in Part IV.

None

507
Well 5

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No 82-2715

(1) OWNER: Name Lake Limerick Address E. 790 St. Andrews Drive

(2) LOCATION OF WELL: County Mason NW¼ SW¼ Sec. 27 T. 21 N. R. 3 W.M.
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 5
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 10 inches.
Drilled 130 ft. Depth of completed well 130 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 10" Diam. from 0 ft. to 130 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Tele-Vault
Type S.S. Model No.
Diam. 5 Slot size 30 from 110 ft. to 130 ft.
Diam. Slot size Diam. ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level 500 ft.
Static level 48 ft. below top of well Date 10-30-86
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 120 gal./min. with 5 ft. drawdown after 4 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Brown Clay & Gravel	0	27
Sand	27	59
Brown Clay & Sand	59	74
Brown Clay & Gravel	74	109
gravel & water	109	130

RECEIVED
NOV 03 1986
WATER RIGHTS
DEPT. OF ECOLOGY

Work started 10-23 19 86 Completed 10-30 19 86

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Arcadia Drilling
(Person, firm, or corporation) (Type or print)
Address 120 SE Walker Pk. Dr.
(Signed) Willis M. Neal IV
(Well Driller)
License No. 1455 Date 11-3 19 86

(USE ADDITIONAL SHEETS IF NECESSARY)

12

Well 6

Groundwater Contamination Susceptibility Assessment Form

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2

Important! Please complete one form for each ground water source (well, well field, spring) used in your system. Photocopy as necessary.

Part I: System Information

Well Owner:	**Lake Limerick Country Club**	Well Manager:	**Northwest Water Systems**
Water System Name:	**Lake Limerick**	Water System Number:	**44150-T**
County:	**Mason**	1/4, 1/4, Sec, T, R:	**NWSW S27, 21N, 3W**
Source Name:	**Well 6**	WA well ID tag number:	**None**
Source Number:	**S08**	Well Depth:	**434 ft**
Number of Connections:	**1199**	Population Served:	**1594**

Latitude: **42.275 N** Longitude: **123.048W**

How was lat/long determined?

- [ ] GPS device
- [ ] survey
- [X] topographic map
- [ ] other

*Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

Part II: Well Construction and Source Information

1) Date well originally constructed: **10/30/1986** last reconstructed: **n/a**

2) Well Driller: Arcadia Drilling
170 SE Walker Pk Dr.
Shelton, WA 98584

3) Type of Well:

- [X] Drilled: **Rotary** (rotary, bored, cable, dug)
- [ ] Other: (spring, lateral collection, driven, jetted, other)

Comments:

4) Well Report Available? **Yes** yes/no

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets. Engineering reports, well reconstruction logs.

5) Average pumping rate: **248** gpm

Source of information: **Metered**

If not documented, how was the pumping rate determined?

6) Is this source treated? **No** yes/no (disinfection, filtration, carbon filter, airstripper, other)

If so, what type of treatment:

purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is chlorinated, is a chlorine residual maintained? **N/A** yes/no

Residual level (at point closest to source): **N/A** ppm

Part III: Hydrogeologic Information

1) Depth to top of open interval: **429** ft

2) Depth to groundwater (static water level):
189 ft
[ ] flowing artesian well/spring
How was the water level determined: Well Log

3) If the source is a flowing well or spring, what is the confining pressure?
N/A psi **N/A** ft

4) If the source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source:
[ ] yes/no

5) Wellhead elevation (height above mean sea level): **280** ft
how was elevation determined?
[X] topographic map
[ ] drilling/well log
[ ] altimeter
[ ] other

6) Confining layers: (This can be completed only for those sources with a drilling log, well log, or geologic report describing subsurface conditions. Please refer to assistance package for example.)
[**Yes**] (yes/no) Is there evidence of a confining layer in the well log?

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the bottom of the lowest confining layer?
[**Yes**] (yes/no)

7) Sanitary setback: **100** ft (If less than 100 feet, describe the site conditions):

8) Wellhead Construction:
[X] in wellhouse
[ ] in doghouse
[ ] outside
[ ] controlled access:
[ ] other uses for wellhouse:

9) Surface seal:
[ ] 18 ft
[X] >18 ft **284 feet**
[ ] <18 ft (no DOE approval)
[ ] <18 ft (with DOE approval, include documentation)
[ ] no surface seal
[ ] unknown

10) Annual rainfall:
[ ] <10 in/yr
[ ] 10-25 in/yr
[X] >25 in/yr

Part IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: **1,861,086** Cubic Feet

How was this determined?

[X] Metered

[ ] Estimated — pumping rate: **248** gpm

pumping capacity: **248** gpm

[ ] Other: aquifer/screen **10** ft

2) "Calculated Fixed Radius" estimate of groundwater movement: (see Instruction Packet)

groundwater travel time;	6 mo.	**344** ft
groundwater travel time;	1 yr.	**487** ft
groundwater travel time;	5 yr.	**1088** ft
groundwater travel time;	10 yr.	**1539** ft
length of screened/open interval:		**10** ft

$r = [(Q*t)/(\pi*\eta H)]^{0.5}$

where: r = radius (ft)

Q = flow (ft^3/yr)

t = time (yr)

η = porosity (0.25 assumed)

H = screen/aquifer height (ft)

3) Is there a river, lake, pond, stream, or other surface water body within the six month travel boundary?

[No] yes/no (if yes, identify on a map and describe below)

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the six month time of travel boundary? (if yes, identify on a map and describe below)

No

Part V: Assessment of Water Quality

1) Regional sources of risk to groundwater:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 mo.	1 yr	5 yr	unknown
likely pesticide application	**X**			
stormwater injection wells				**X**
other injection wells				**X**
abandoned ground water well				**X**
landfills, dumps, disposal areas			**No**	
known hazardous materials clean-up site			**No**	
water systems with water quality problems			**No**	
population density >1 house/acre	**X**			
residences commonly having septic tanks	**X**			
wastewater treatment lagoons			**No**	
sites used for land application of waste			**No**	

Identify on a map all of the risks listed above which are located within the six month time of travel boundary. (Please include a map of the wellhead and time of travel areas within this form. Please indicate any of the following.) If other potential sources of groundwater contamination exist within the ten year time of travel circular zone around your supply, please describe:

Homes with on site septics are located within the 6-month travel boundary of the wellhead

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on the assessment, MCLs are listed in assistance package.)

	MCL/detection	Leve >MCL?	Level > MCL?
A. Nitrate:	10 mg/l	**No Detect**	No
B. VOCs:	5 ug/l	**No Detect**	No
C. EDB:	0.05 ug/l	**No Detect**	No
D. DBCP:	0.2 ug/l	**No Detect**	No
E. Other SOC	(detectable)	**No Detect**	No

If any SOC's in addition to EDB/DBPC were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list methods here:

N/A

F. Bacterial Contamination:

Are any bacteriological test samples available	**Yes**	yes/no
Any bacterial detection from the source within past 3 years:	**No**	yes/no
Any bacterial detection in the distribution system and attributed to the source within the past 3 years:	**No**	yes/no

Part VI: Geographic or Hydrologic Factors contributing to a non-Circular Zone of Contribution

The following questions will help identify those groundwater systems which may not be accurately represented by the calculated field radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the ten year time of travel zone of the CFR? (does the largest circle extend over a stream, river, lake, or up a steep hillside, mountain or ridge?)

No yes/no if yes, describe with references to the map produced in Part IV:

2) Aquifer Material

A) Does the drilling, well, or other geologic/engineering report identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

No yes/no

B) Does the drilling, well, or other geologic/engineering report identify that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

No yes/no

3) Is the source located in an aquifer with a high horizontal flow rate?

(These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

No yes/no

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gpm within:

- [ ] 6 mo. travel time
- [ ] 1 yr. travel time
- [ ] 5 yr. travel time
- [x] **No** 10 year travel time

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within:

- [ ] 6 mo. travel time
- [ ] 1 yr. travel time
- [ ] 5 yr. travel time
- [x] **No** 10 year travel time

5) Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the contribution zone for this source. Reference them to locations on the map in Part IV.

None

Well 6
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pg 1 of 2

page 1

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 219887

Water Right Permit No. _____

(1) OWNER: Name Lake Limerick Country Club, Address _____

(2) LOCATION OF WELL: County Mason SE ¼ SW ¼ Sec 27 T. 21 N. R. 3W W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) _____

(3) PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☒ ☐ Irrigation ☐ DeWater ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) #6

Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches. Drilled 439 feet. Depth of completed well 439 ft.

(6) CONSTRUCTION DETAILS:

Casing Installed: 10" Diam. from 0' ft. to 284' ft.
Welded ☒ 8" Diam. from +1' ft. to 439 ft.
Liner installed ☐
Threaded ☐ Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type _____ Model No. _____
Diam. 7" Slot size .80 from 429 ft. to 434 ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 284 ft.
Material used in seal BENTONITE
Did any strata contain unusable water? Yes ☒ No ☐
Type of water? MEAVY IRON SALTS Depth of strata 175'
Method of sealing strata off CASED OFF

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 189 ft. below top of well Date _____
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? ARCADIA
Yield: 110 gal./min. with 57 ft. drawdown after 4 hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)					
Time	Water Level	Time	Water Level	Time	Water Level
8:00 AM	199	9:05	232	9:01	189
5:25 AM	134	12:36	197	11:00	232
12:50	232	1:05	193		

Date of test 12/10/77

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airlift _____ gal./min. with steam set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formations: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
FILL	0'	1'
~~BROWN SAND~~	~~1'~~	~~5'~~
ROCKY SAND	1'	5'
BROWN HARDPAN	5'	16'
BROWN SANDY CLAY	16'	22'
BROWN ROCKY CLAY	22'	27'
BROWN HARDPAN	27'	45'
BROWN ROCKY CLAY	45'	50'
BROWN HARDPAN W/LARGE ROCK	50'	58'
BROWN ROCKY CLAY	58'	64'
BROWN SANDY CLAY	64'	71'
SANDY GRAVEL - H₂O	71'	72'
BROWN HARDPAN	72'	82'
BROWN ROCKY CLAY	82'	89'
BROWN HARDPAN	89'	108'
BROWN ROCKY CLAY	108'	120'
BROWN SANDY CLAY	120'	138'
GRAVELLY SAND H₂O	138'	140'
BROWN HARDPAN	140'	145'
BROWN ROCKY CLAY	145'	151'
BLUE CLAY	151'	161'
BLUE HARDPAN W/ORGANICS	161'	165'
GRAY CEMENTED GRAVEL W/H₂O	165'	166'
SANDY GRAVEL	166'	173'
BLUE SHALE	173'	178'
GRAY GRAVELLY CLAY	178'	185'
GRAY GUMMY CLAY	185'	190'
BLACK SILTY CLAY	190'	198'
BLACK ROCKY CLAY	198'	205'
BLACK HARDPAN	205'	219'
BLUE CLAY	219'	225'
BLACK SILTY CLAY	225'	232'
GRAY GRAVELLY CLAY	232'	239'
GRAY HARDPAN	239'	263'

Work started 10/01 19 77 Completed 10/07 19 77

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME ARCADIA Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address SE 176 WAIKE-PK Shelton

(Signed) Jack Watkins (WELL DRILLER) License No. 1463

Contractor's Registration No. ARCADD* 141KI Date 10-5-88

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1320-

13

Well 6
308
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Page 2

Start Card

WATER WELL REPORT

Start Card No. 28887

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

STATE OF WASHINGTON

Water Right Permit No.

(1) OWNER: Name Lake Limerick Country Club Address

(2) LOCATION OF WELL: County Mason SE ¼ SW ¼ Sec 27 T 21 N., R 3 W.M.

(2a) STREET ADDRESS OF WELL (or nearest address)

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☐ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)
Abandoned ☐ New well ☐ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☐ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well ______ inches.
Drilled ______ feet. Depth of completed well ______ ft.

(6) CONSTRUCTION DETAILS:
Casing installed: ______ " Diam. from ______ ft. to ______ ft.
Welded ☐ ______ " Diam. from ______ ft. to ______ ft.
Liner installed ☐ ______ " Diam. from ______ ft. to ______ ft.
Threaded ☐

Perforations: Yes ☐ No ☐
Type of perforator used
SIZE of perforations ______ in. by ______ in.
______ perforations from ______ ft. to ______ ft.
______ perforations from ______ ft. to ______ ft.
______ perforations from ______ ft. to ______ ft.

Screens: Yes ☐ No ☐
Manufacturer's Name
Type ______ Model No.
Diam. ______ Slot size ______ from ______ ft. to ______ ft.
Diam. ______ Slot size ______ from ______ ft. to ______ ft.

Gravel packed: Yes ☐ No ☐ Size of gravel
Gravel placed from ______ ft. to ______ ft.

Surface seal: Yes ☐ No ☐ To what depth? ______ ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ______ Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: ______ H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ______ ft.
Static level ______ ft. below top of well Date
Artesian pressure ______ lbs. per square inch Date
Artesian water is controlled by ______ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: ______ gal./min. with ______ ft. drawdown after ______ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test ______ gal./min. with ______ ft. drawdown after ______ hrs.
Airtest ______ gal./min. with stem set at ______ ft. for ______ hrs.
Artesian flow ______ g.p.m. Date
Temperature of water ______ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
SANDY CLAY W/SOME GRAVEL - H2O	263'	287'
BROWN CLAY	287'	298'
GRAY SANDY CLAY	298'	306'
BROWN HARDPAN	306'	309'
GRAVELLY SANDY CLAY	309'	312'
BROWN HARDPAN	312'	316'
BROWN SANDY CLAY	316'	320'
BROWN HARDPAN	320'	324'
BROWN GRAVELLY CLAY	324'	340'
BROWN SANDY CLAY	340'	412'
BROWN HARDPAN	412'	420'
SANDY GRAVEL - H2O	420'	434'
BROWN CLAY	434'	

Work started 10/01/88, 19 Completed 10/03/88, 19

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME ARCADIA Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address SE 170 Walker Park Shelton

(Signed) [signature] License No. 1465
(WELL DRILLER)

Contractor's Registration No. ARCADDI*117KD Date 10/5/88, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

IMPORTANT NOTICE ABOUT YOUR WATER SYSTEM
Coliform Maximum Contaminant Level (MCL) Exceeded: Non-acute MCL

The Lake Limerick water system, ID# 44150-T in Mason County routinely monitors for the presence of total coliform bacteria and in _____ this type of bacteria was detected. Although this incident was not an emergency, as our customer, you have a right to know what happened and what we did or are doing to correct the situation.

Coliforms are bacteria which are naturally present in the environment and are used as indicators that other potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems. The samples that showed the presence of coliform were further tested to see if other bacteria of greater concern, such as fecal coliform or *E.coli* were present. **None of these bacteria were found.**

You do not need to boil your water. People with severely compromised immune systems, infants, and some elderly may be at an increased risk. These people should seek advice from their health care provider.

What happened? What is the suspected or known source of contamination?

_____

_____

_____

At this time:

☐ The problem is resolved. Additional samples collected were found to be free of coliform bacteria.
☐ We anticipate resolving the problem by ____ / ____ / ____.
☐ Other _____.

For more information, contact _____ at ( )____-_____ or at _____.
(owner or operator) (phone number) (address)

Please share this notice with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is sent to you by _____ Date Distributed ____ / ____ / ____.

Coliform Non-acute Public Notice Certification Form

The purpose of this form (below) is to provide documentation to the department that public notice was distributed. Please check the appropriate box and fill in the date that the notice was distributed:

☐ Notice was mailed to all water customers on ____ / ____/____.
☐ Notice was hand delivered to all water customers on ___ / ___ /___.
☐ Notice was posted (*with department approval*) at:
_____ on ___ / ___ /____.

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

_____ _____ _____
Signature of owner or operator Position Date

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

Send copy of completed notification and certification to:

☐ Northwest Drinking Water
Department of Health
20435 72nd Ave S, Suite 200
Kent, WA 98032-2358
Phone: (253) 395-6750
Fax: (253) 395-6760

☒ Southwest Drinking Water
Department of Health
PO Box 47823
Olympia, WA 98504-7823
Phone: (360) 236-3030
Fax: (360) 664-8058

☐ Eastern Drinking Water
Department of Health
16201 E Indiana Ave, Suite 1500
Spokane Valley, WA 99216
Phone: (509) 329-2100
Fax: (509) 329-2104

AVISO IMPORTANTE ACERCA DEL SISTEMA DE SUMINISTRO DE AGUA

Las bacterias coliformes rebasaron el Nivel Máximo de Contaminación: NMC no agudo

El sistema de suministro de agua _____, número (ID#) _____ en el condado de _____ monitorea rutinariamente la presencia de bacterias coliformes totales. En la fecha _____, se encontró este tipo de bacteria. Aunque este incidente no es considerado una emergencia, como consumidor, Usted tiene el derecho a saber que pasó y que se ha hecho o se esta haciendo para corregir esta situación.

Las bacterias coliformes se encuentran naturalmente en el medio ambiente y se usan como indicador de la posible presencia de otras bacterias que pueden causar daño a la salud. En las muestras tomadas, las bacterias se encontraron en mayor número que el permitido y esto es una indicación de posibles problemas. Las muestras con bacterias coliformes se analizaron con más detalle en el laboratorio para ver si bacterias coliformes fecales o E. Coli pudieran también haber estado presentes. Estas bacterias causan daño a la salud de las personas. **No se encontró ninguna de estas bacterias.**

No es necesario que usted hierva el agua. Personas con un sistema inmunológico severamente comprometido, los recién nacidos y algunas personas de edad avanzada pueden tener mas riesgo de salud y deberían llamar a algún personal médico para mayor información.

¿Qué fue lo que pasó? ¿Cuál es la fuente de contaminación de la que se sabe o sospecha?

En este momento:

- ☐ El problema esta resuelto. En muestras adicionales que se colectaron no se encontraron bacterias coliformes.
- ☐ Anticipamos resolver el problema el día ____/____/____.
- ☐ Otro _____.

Para mayor información comuníquese con _____ al teléfono ( ) _____-__ _____ o con

_____	_____	_____
(dueño u operador)	(teléfono)	(dirección)

Pase esta información a todas las personas pudieran tomar agua de este suministro, especialmente aquellas personas que no hayan recibido este aviso (por ejemplo, personas que vivan en apartamentos, asilos de ancianos, escuelas y negocios.) Usted puede hacer esto colocando este aviso en un lugar público donde se pueda leer claramente o distribuyendo copias en persona o enviándolas por correo.

Este aviso es enviado a Usted por el Sistema de Suministro de Agua_____ fecha ___/___/____.

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 our regional office. 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 us. *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: **Lake Limerick Water System** ID # **44150-T** County: **Mason**

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

If you need this publication in an alternate format, call (800) 525-0127 or for TTY/TDD call (877) 833-6341.

Northwest Regional Office:
20435 72nd Ave S Suite 200
Kent WA 98032
(253) 395-6775
Fax: (253) 395-6760

Southwest Regional Office:
PO Box 47823
Olympia WA 98504-7823
(360) 236-3030
Fax (360) 664-8058

Eastern Regional Office:
16201 E Indiana Ave Suite 1500
Spokane Valley WA 99216
(509) 329-2100
Fax: (509) 329-2104

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: Lake Limerick
I.D.: 44150-T
County: Mason
Contact: _____
Telephone: _____
Date notice distributed: _____

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 compromised 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.

Vea al reverso para la versión en Español.

October 2008

ADVERTENCIA:
¡No tome el agua de la llave sin antes hervirla!

☐ **Bacteria coliforme fecal**
☐ **Bacteria E. coli**
☐ **Otra: _____**

fueron encontradas en su sistema de agua:
(el día)_____.

Hervir el agua mata a las bacterias y otros organismos en el agua:

- **Ponga el agua en la estufa hasta que hierva y deje hervir el agua por un minuto**
- **Deje enfriar el agua antes de usarla**

Para evitar posibles enfermedades y hasta nuevo aviso: use agua hervida o agua potable embotellada para tomar, hacer hielo, limpiarse los dientes, lavar los platos y para preparar comidas.

Hable con su doctor si usted tiene uno o más de los siguientes síntomas: náusea, dolor estomacal, diarrea, ictericia, dolores de cabeza y/o cansancio. La gente con enfermedades crónicas, bebés y personas mayores de edad, pueden estar en situación de alto riesgo y deben consultar con su médico o proveedores de servicios médicos.

Sistema de agua: Lake Limerick
I.D.: 44150-T
Condado: Mason
Contacto: _____
Teléfono: _____
Fecha de notificación: _____

¿Qué son las bacterias coliforme fecal y E. coli?

Coliformes fecales o E. coli son bacterias cuya presencia indica que el agua esta contaminada con desechos humanos o de animales. Microbios de esos desechos pueden causar diarrea, dolor estomacal, náusea, dolores de cabeza u otros síntomas. Pueden representar un peligro para la salud de bebés, niños y niñas de corta edad y personas con sistemas inmunológicos en alto riesgo.

¿Por cuánto tiempo va a estar en efecto esta advertencia?

Vamos a consultar con el Departamento de Salud del estado de Washington acerca de este incidente. Le vamos a notificar cuando ya no sea necesario hervir el agua.

See reverse side for English version.

Planning • Management • Engineering
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LAKE LIMERICK WATER
CROSS-CONNECTION CONTROL PROGRAM

A. Requirement for Program

Lake Limerick Water (44150 T), hereinafter referred to as "the Purveyor", has the responsibility to protect the public water system from contamination due to cross connections. A cross connection may be defined as *"any actual or potential physical connection between a potable water line and any pipe, vessel, or machine that contains or has a probability of containing a non-potable gas or liquid, such that it is possible for a non-potable gas or liquid to enter the potable water system by backflow."*

All public water systems are required to develop and implement cross-connection control (CCC) programs. The CCC requirements are contained in Washington Administrative Code (WAC) 246-290-490 of the Group A Drinking Water Regulations. The minimum required elements of a CCC program are:

1. Establishment of legal authority and program policies;
2. Evaluation of premises for cross-connection hazards;
3. Elimination and/or control of cross connections;
4. Provision of qualified personnel;
5. Inspection and testing of backflow prevention assemblies;
6. Quality control of testing process;
7. Response to backflow incidents;
8. Public education for consumers;
9. Record keeping for CCC program; and
10. Special requirements for reclaimed water use.

Other CCC program requirements include:

1. Coordination with the Authority Having Jurisdiction (AHJ) (*fka: Local Administrative Authority*), i.e., the local building or plumbing official regarding CCC activities;
2. Prohibition of the return of used water into the public water system (PWS) distribution system; and
3. Inclusion of a written CCC Program in a Water System Plan (WSP) or Small Water System Management Program (SWSMP).

B. Program Objectives

The objectives of the CCC program are to:

1. Reasonably reduce the risk of contamination of the public water distribution system; and
2. Reasonably reduce the Purveyor's exposure to legal liability arising from the backflow of any contaminant originating from the customer's plumbing system and then supplied to other customers.

C. Summary of Program Decisions

The following table summarizes the major policy and program decisions adopted for the **Lake Limerick Water System**. The items in the table represent CCC Program areas that have more than one acceptable approach or option.

CCC Program Decision Summary Table for the Lake Limerick Water

Decision Item	Decision
1. Type of Program [General, WAC 246-290-490(2)(e)]	
a. Premises isolation only	
b. Premises isolation and in-premises protection (combination program)	**X**
2. Extent of Coordination with the AHJ [WAC 246-290-490(2)(d)]	
a. Information exchange	**X**
b. Interaction	
c. Joint program	
3. Relationship with Customer [Element 1]	
a. Signed service agreement or contract	
b. Ordinance/resolution; implied service agreement	**X**
4. Enforcement of Corrective Action [Element 1]	
a. Rely upon shut-off of water service	**X**
b. Rely upon purveyor-installed premises isolation	**X**
5. Assessment and Re-assessment of Hazard [Element 2]	
a. By purveyor's staff or equivalent	**X**
b. By cross-connection control specialist (CCS) contracted by purveyor; report reviewed by purveyor's CCS	**X**
6. Location/ Ownership of Premises Isolation Backflow Prevention Assembly [Element 3]	
a. On purveyor's service line	**X**
b. On customer's service line	**X**
7. CCS Option – Purveyor's Program Management [Element 4]	
a. Purveyor's staff member certified	**X**
b. Inter-agency agreement or use other agency's CCS	
c. Contract with consultant CCS	**X**
8. Testing of Backflow Prevention Assemblies [Element 5]	
a. By purveyor's staff or purveyor-contracted backflow assembly tester (BAT)	**X**
b. By customer-employed (contractor) BAT	**X**
9. Cost Recovery [WAC 246-290-100(4)(h) and –105(4)(p)]	
a. Borne by all customers (general water rates)	**X**
b. Assessed to specific class (commercial meters)	
c. Each customer directly bears cost	**X**

D. Required Elements of Program

The **Washington State Department of Health (DOH)** drinking water regulations for Group A public water systems, WAC 246-290, require CCC programs to include certain minimum elements. The elements are listed in WAC 246-290-490(3). This section describes how the water system intends to comply with each of the required program elements. Elements are numbered the same as they appear in the WAC.

Element 1: *Adoption of a written legal instrument authorizing the establishment and implementation of a CCC program.*

Lake Limerick Country Club, Inc. has adopted a cross-connection control policy, which authorizes the Purveyor to implement a CCC program. The policy also authorizes the system to take corrective action when customers do not comply with the CCC program requirements. The primary method for protection of the distribution system will be the installation of a backflow prevention assembly by the Purveyor.

Legal Instrument Status	***Schedule***
Preparation of proposed legal instrument	*03/05/2012*
Adoption of legal instrument	*03/21/2012*
Legal instrument becomes effective	*03/21/2012*

Element 2: *Development and implementation of procedures and schedules for evaluating new and existing service connections to assess the degree of hazard.*

Initial Cross-Connection Hazard Surveys

The procedures for evaluating the backflow prevention requirements for new and existing customers are as follows:

1. For all ***new services***, the Purveyor will require that the customer either submit an on-site CCC Hazard Field Survey report completed by a customer employed, DOH-certified CCS; or allow access of the Purveyor employed/contracted DOH-certified CCS to complete an on-site CCC Hazard Field Survey of the possible hazard(s) posed by the proposed plumbing system(s). Cost of the survey to be borne by the customer.
2. For all ***existing services***, the Purveyor will require the customer to submit to the Purveyor, within 30 days of notification, a completed and signed CCC Hazard Survey form.
3. For all existing services, should the customer fail to supply a correctly completed and signed CCC Hazard Survey form, the Purveyor may require an on-site CCC Hazard Field Survey conducted by a DOH-certified CCS acceptable to the Purveyor, require the installation of an RPBA for premises isolation, or take other such actions consistent with the previously stated policy and bill the customer for the associated costs.

Cross-Connection Hazard Survey Schedule for Initial Hazard Assessments

The schedule for initial hazard assessment is outlined in the following table. The schedule starts from the date the CCC program is established.

Initial Assessment Task	Schedule
Assessment of all new connections	Within 30 days of issue
Identification and assessment of high-hazard premises which are listed on Table 9 of Washington Administrative Code (WAC) 246-290-490	Within 6 months
Identification and assessment of hazardous premises supplemental to Table 9 of WAC 246-290-490	Within 9 months
Identification of residential connections with special plumbing facilities and/or water use on the premises	Within 12 months

Cross-Connection Hazard Survey Schedule for Subsequent Hazard Re-Assessments

For subsequent cross-connection hazard surveys, procedures for evaluating the backflow prevention requirements are:

1. For **Single Family/Duplex Residential & Non-residential Recreational** ***(private campsites/RV sites)*** **Connections,** the Purveyor will require the customer to submit to the Purveyor, within 30 days of purveyor notification, a completed "CCC Hazard Survey form". The procedure used for evaluating the hazard re-assessment and the potential change in the required backflow prevention will be the same as used for the initial hazard assessment. The frequency of hazard re-assessments will be every 3 years.
2. For all **Other Non-residential Connections** ***(commercial, business, schools, daycares, churches, institutional, agricultural, medical, industrial, food service/processing, etc.)***, the Purveyor will require the customer to submit to the Purveyor, within 30 days of purveyor notification, a customer completed pre-survey form and an on-site CCC Hazard Field Survey conducted by a DOH-certified CCS. The frequency of the hazard re-assessments will be every 2 years.

With an accumulation of data and an aggressive customer education program the time interval for re-surveys may be lengthened or shortened as deemed necessary and acceptable to the Purveyor, CCS, and DOH.

The Purveyor will inform the customer that the Purveyor's survey of a customer's premises (whether by a representative of the Purveyor or through the evaluation of a questionnaire completed by the customer) is for the sole purpose of establishing the Purveyor's minimum requirements for the protection of the public water supply system, and that the required backflow protection will be commensurate with the Purveyor's assessment of the degree of hazard.

The Purveyor will also inform the customer or any regulatory agencies that the Purveyor's survey, requirements for the installation of backflow prevention assemblies, lack of requirements for the installation of backflow prevention assemblies, or other actions by the purveyor's personnel or agent do not constitute an approval of the customer's plumbing system or an assurance to the customer or any regulatory agency of the absence of cross connections.

Element 3: *Development and implementation of procedures and schedules for elimination and/or control of cross-connections.*

Backflow Prevention Assembly Requirements

The following service policy shall apply to all new and existing customers:

1. The Purveyor will utilize a "multiple-barrier" approach to protect the public water system from contamination via cross-connections commonly experienced by Group A – Community systems with predominantly residential connections. The approach consists of **Primary** and **Secondary** protection measures as described herein.
2. As **Primary** protection measures the Purveyor will require all **Single Family/Duplex Residential & Non-residential Recreational** ***(private campsites/RV sites)*** **Connections** with facilities of the type described in Table 9 of WAC 246-290-490 to be isolated with an RPBA. All other residential customers with special plumbing or water use on the premises will be isolated with a DCVA. "Special plumbing" includes, but is not limited to, the following:
   a. A lawn irrigation system;
   b. A solar heating system;
   c. An auxiliary source of supply, e.g., a private well or creek;
   d. Piping for livestock watering, hobby farming, etc.;
   e. Residential fire sprinkler system (except for a Flow-through fire system or a Combination fire system); and
   f. Property containing a small boat moorage.
3. As **Primary** protection measures the Purveyor will require that water service to all **Other Non-residential Connections** with facilities of the type described in Table 9 of WAC 246-290-490 to be isolated with an RPBA. For facilities of the type identified as Severe Health Hazard (wastewater treatment plants, radioactive material processing plants, nuclear reactors) the Purveyor will require that either an approved air gap is installed for premises isolation or an approved RPBA is installed for premises isolation in conjunction with an in plan approved air gap. For customers within this classification and that do not have facilities or water use of the type described in Table 9, the Purveyor shall require protection commensurate with the assessed degree of hazard.
4. As **Secondary** protection measures the Purveyor has installed DOH-approved DCVAs at each bi-connection take off point (the system distribution/customer connection design consists of 'Y' connection points off of the main distribution line which feeds two residential service lines – one on each arm of the 'Y'). The backflow prevention assemblies have been installed on the leg of the 'Y', downstream of the connection take-off point and upstream of the split to the two individual residential service lines. The purpose of these backflow prevention assemblies is to provide a secondary layer of protection to the distribution system.
5. All backflow prevention assemblies relied upon by the Purveyor to protect the public water system shall meet the definition of "approved backflow prevention assembly" as contained in WAC 246-290-010. The Purveyor's CCS will obtain and maintain a current list of backflow prevention assemblies approved for installation in Washington State from the DOH Office of Drinking Water.

   All backflow prevention assemblies will be installed in:

   - The orientation for which they are approved;

- A manner and location that facilitates their proper operation, maintenance, and testing or inspection;
- A manner that will protect them from weather-related conditions such as flooding and freezing; and
- Compliance with applicable safety regulations.

Installation standards contained in the most recently published edition of the Pacific Northwest Section, American Water Works Association (PNWS-AWWA) *CCC Manual* or the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research (USCFCCCHR) *CCC Manual* shall be followed.

The Purveyor has no regulatory responsibility or authority over the installation and operation of the customer's plumbing system. The customer is solely responsible for compliance with all applicable regulations and for prevention of contamination of his/her plumbing system from sources within his/her premises. Any action taken by the Purveyor to survey plumbing, inspect or test backflow prevention assemblies, or to require premises isolation (installation of DCVA or RPBA on service) is solely for the purposes of reducing the risk of contamination of the Purveyor's distribution system.

Except for easements containing the Purveyor's distribution system, the Purveyor will not undertake work on the customer's premises unless the customer has provided written request and signed authorization.

6. The following table shows the schedule that the Purveyor will follow for installation of backflow prevention assemblies when they are required (based on a hazard evaluation).

Type of Service	Schedule
New connections with cross-connection hazards	Before service is initiated
Existing connections with Table 9-type hazards and other high cross-connection hazards	Within 30 days after notification
Existing connections with other than Table 9 of WAC 246-290-490 or high cross-connection hazards	Within 90 days after notification
Existing fire protection systems using chemicals or supplied by unapproved auxiliary water source	Within 30 days after notification
Existing fire protection systems (except Flow-through & Combination fire systems) not using chemicals and supplied by purveyor's water	Within 90 days after notification

Element 4: *Provision of qualified personnel, including at least one person certified as a CCS, to develop and implement the CCC program.*

1. **Program Administration:** The responsibility for administration of the CCC Program rests with the Purveyor. General policy direction and risk management decisions are established by **the Purveyor's DOH-certified CCS**.

2. The Purveyor will employ, or otherwise have on staff, at least one DOH-certified CCS to develop and implement the CCC program. As an alternative, or when no employees or other staff members are properly qualified, the Purveyor may retain a DOH-certified CCS on contract to provide the necessary expertise and services.

3. The following cross-connection related tasks will be performed by or under the direction of the Purveyor's DOH-certified CCS (on staff or under contract):

   - Preparation of and recommendations regarding changes to the CCC program;
   - Performance of and/or reviews of CCC hazard evaluations;

- Recommendations on the type of backflow prevention assembly to be installed;
- Inspections of backflow prevention assemblies for proper application and installation;
- Reviews of backflow prevention assembly inspection and test reports;
- Recommendations and/or the granting of exceptions to mandatory premises isolation;
- Participation in or cooperation with other water utility staff in the investigation of backflow incidents and other water quality problems;
- Completion of Backflow Incident Reports; and
- Completion of CCC Activity and Program Summary Reports.

The following table identifies the current CCS retained on contract by the Purveyor to manage the Purveyor's CCC Program and/or act as the CCC technical resource for the Purveyor:

Name of CCS	Linda Martin, Northwest Water Systems, Inc.
Address	P. O. Box 123
City, State, Zip	Port Orchard, WA 98366
Telephone Number	(360) 876-0958
CCS Certification Number	012810

Element 5: *Development and implementation of procedures to ensure that approved backflow prevention assemblies are inspected and/or tested (as applicable).*

1. Inspection and Testing of Backflow Prevention Assemblies

All backflow prevention assemblies that the Purveyor relies upon for protection of the water system will be subject to inspection and, if applicable, testing. Inspection and testing of backflow prevention assemblies will be as follows:

- The Purveyor's DOH-certified CCS will inspect backflow prevention assemblies for proper application (i.e., to ensure that backflow prevention assemblies installed are commensurate with the assessed degree of hazard).
- Either a DOH-certified CCS or backflow assembly tester (BAT) will perform inspections of backflow prevention assemblies for correct installation.
- A DOH-certified backflow assembly tester will test all backflow prevention assemblies the Purveyor relies upon to protect the public water system.

2. Frequency of Inspection and Testing

Inspection and/or testing of backflow prevention assemblies for **Primary** protection will be conducted:

- At the time of installation;
- Annually after installation;
- After a backflow incident; and
- After repair, reinstallation, relocation, or re-plumbing.

The Purveyor may require a backflow prevention assembly to be inspected and/or tested more frequently than once a year, when it protects against a high-health hazard or when it repeatedly fails tests or inspections.

Inspection and/or testing of backflow prevention assemblies for **Secondary** protection will be conducted in accordance with all testing requirements established in WAC 246-290-490 with the exception of frequency as follows:

- Backflow prevention assemblies relied upon as Secondary protection measures shall be inspected periodically throughout the year and tested on a triennial (every 3 year) basis; and
- If a backflow prevention assembly fails a periodic inspection it shall be tested within 10 working days; and
- If a backflow prevention assembly fails a regularly scheduled triennial test it shall be repaired or replaced and retested within 10 working days and placed on an annual testing schedule until it has passed (without any failures) for two consecutive years. The requirement for annual testing may be extended as deemed necessary by the Purveyor and CCS.

3. Responsibility for Inspection and Testing

The Purveyor will be responsible for inspection and testing of all purveyor-owned backflow prevention assemblies.

The Purveyor will provide inspection and testing of backflow prevention assemblies owned by the customer. The customer must provide written authorization for the Purveyor or Purveyor's employees, staff or contracted service providers to enter the premises for the purpose of conducting inspection and/or testing of backflow prevention assemblies. The customer may terminate their authorization in writing. When a customer declines Purveyor's offer of inspection and testing of backflow prevention assemblies, the customer shall be required to employ, at customer expense, a DOH-certified BAT to conduct the inspection and test within the time period specified in the testing notice sent by the Purveyor. The test report shall be completed and signed by the customer and BAT and returned to the Purveyor's CCS, before the due date specified by the Purveyor.

4. Approved Test Procedures

The Purveyor will require that all backflow prevention assemblies relied upon to protect the public water system be tested in accordance with DOH-approved test procedures as specified in WAC 246-290-490(7)(d). Any proposal to use alternate test procedures must be approved by the Purveyor's CCS.

5. Notification of Inspection and/or Testing

For customers who own backflow prevention assemblies that are relied upon to protect the public water system and have declined Purveyor's offer to provide inspection and testing, the Purveyor will notify the customer in writing to have their backflow prevention assembly(ies) inspected and/or tested. Notices will be sent out not less than 30 days before the due date of the inspection and/or test. The notice will also specify the date by which the properly completed inspection/test report must be received by the Purveyor.

6. Enforcement

When a customer fails to send in the inspection/test report within 45 days after the notification date, and the Purveyor has not approved an extension to the due date, the Purveyor will take the following enforcement action:

- The Purveyor will send a second notice giving the customer an additional 15 days to send in the report. The notice will also inform the customer that failure to satisfactorily respond to this notice will result in water service shut-off.
- The Purveyor will send copies of the second notice to the owner(s) and occupant(s) of the premises (if different from the customer).

- If the owner and/or occupant have not responded satisfactorily to the Purveyor within 15 days of the due date specified in the second notice, the Purveyor will implement water service shut-off procedures.

Element 6: *Development and implementation of a backflow prevention assembly testing quality assurance/quality control program.*

The Purveyor will maintain a list of local, DOH-certified BATs that are pre-approved by the Purveyor to perform the following activities:

- Backflow prevention assembly inspection for proper installation; and
- Backflow prevention assembly testing.

The list will be compiled of individual testers who have requested to work in the system's area, who have previously submitted properly completed test reports, or are listed on the DOH list of certified testers.

Quality Assurance

The Purveyor's CCS will review backflow prevention assembly inspection/test report forms within 30 days of receipt.

The Purveyor's CCS will provide follow-up on test reports that are deficient in any way. The Purveyor's CCS will report incidences of fraud or gross incompetence on the part of any BAT or CCS to DOH Operator Certification program staff.

Element 7: *Development and implementation (when appropriate) of procedures for responding to backflow incidents.*

1. **Backflow Incident Response Plan**

The Purveyor's CCS will participate in developing a backflow incident response plan that will be part of the water system's emergency response program as required by WAC 246-290-415(2). The incident response plan will include, but will not be limited to:

- Notification of affected population;
- Notification and coordination with other agencies, such as DOH, the AHJ, and the local health jurisdiction;
- Identification of the source of contamination;
- Isolation of the source of contamination and the affected area(s);
- Cleaning, flushing, and other measures to mitigate and correct the problem; and
- Apply corrective action to prevent future backflow occurrences.

2. **Technical Resources**

The Purveyor will use the most recently published edition of the manual, *Backflow Incident Investigation Procedures*, published by the PNWS-AWWA as a supplement to the Backflow Incident Response Plan for **Lake Limerick Water**.

Element 8: *Development and implementation of a cross-connection control public education program.*

1. Customer Education

The Purveyor will distribute at regular intervals (every non-survey year), public education brochures to system customers. For residential customers, such brochures will describe the cross-connection hazards in homes and the recommended backflow prevention assemblies or devices that should be installed by the homeowner to reduce the hazard to the public water system. The education program will emphasize the responsibility of the customer in preventing the contamination of the public water supply. The Purveyor's staff will produce the public education brochures or the Purveyor will obtain brochures from national backflow associations, such as PNWS-AWWA, Spokane Regional Cross-Connection Control Committee (SRC4), Western Washington Cross-Connection Prevention Professionals Group (The Group), USC FCCCHR, the American Backflow Prevention Association (ABPA), and/or Other water utilities. The information distributed by the Purveyor will include, but not be limited to, the following subjects:

- Cross-connection hazards in general;
- Irrigation system hazards and corrective actions;
- Fire sprinkler cross-connection hazards;
- Importance of annual inspection and/or testing of backflow prevention assemblies; and
- Thermal expansion in hot water systems when backflow prevention assemblies are installed for premises isolation.

Element 9: *Development and maintenance of cross-connection control records.*

1. Types of Records and Data to be Maintained

The Purveyor will maintain records of the following types of information required by WAC 246-290-490:

- Service connections/customer premises information including:
  - Assessed degree of hazard; and
  - Required backflow prevention assembly to protect the public water system.
- Backflow prevention assembly inventory and information including:
  - Air gap (AG) location, installation and inspection dates, inspection results and person conducting inspection;
  - Backflow prevention assembly location, assembly description (type, manufacturer, make, model, size, and serial number), installation, inspection and test dates, test results and data, and person performing test; and
  - Information on atmospheric vacuum breakers (AVB) used for irrigation system applications, including manufacturer, make, model, size, dates of installation and inspections, and person performing inspections.

The Purveyor will maintain records on all backflow prevention assemblies that protect the public water system from contamination. At a minimum, the Purveyor will maintain records on all premises isolation backflow prevention assemblies required to protect the public water system.

2. Reports to be Prepared and Submitted to DOH

The Purveyor will prepare the following reports required by WAC 246-290-490 including:

- Cross-connection control program activities report for the calendar year, to be sent to DOH when requested;
- Cross-connection control program summary information, when required, or when there are significant policy changes;
- Backflow incident reports to DOH (and voluntarily to the PNWS-AWWA CCC Committee); and
- Documentation when exceptions to mandatory premises isolation are granted.

At a minimum, the Purveyor's CCS will prepare and sign the exceptions reports.

Element 10: *Additional cross-connection control requirements for reclaimed water.*

At this time **Lake Limerick Water** does not receive or distribute reclaimed water. In the event that reclaimed water use is proposed within the PWS's service area, the Purveyor will make all cross-connection control requirements mandated by the Permitting Authority in accordance with Chapter 90.46 RCW part of the written CCC program plan and comply with such additional requirements.

E. Other Provisions

Coordination With the Authority Having Jurisdiction (AHJ): Both WAC 246-290-490 and the Uniform Plumbing Code (as amended for Washington) require coordination between Purveyors and the Authority Having Jurisdiction (*fka Local Administrative Authority*) in all matters concerning cross-connection control.

a. Identification of the Authority Having Jurisdiction (AHJ) - the AHJ that enforces the plumbing code for the premises served by the Purveyor is **Mason County, Department of Community Development, Building Department, Attn: Mark Core, 426 W Cedar Street (PO Box 186), Shelton, WA 98584, (360) 427-9670**.

b. Coordination with the Authority Having Jurisdiction (AHJ) - A letter indicating that this cross-connection control program has been implemented has been provided on 03/30/2012.

c. Description of Coordination with the AHJ - The Purveyor coordinates with the AHJ as follows: **Coordination consists of information sharing only**. However, the Purveyor requests the opportunity to review any plumbing plans for new or existing connections to the water system when permits are applied for.

d. Delineation of Responsibilities - The Purveyor and the AHJ are responsible for the following CCC activities within the **Lake Limerick Water System**. AHJ reviews new construction drawings; the Purveyor is responsible for all other Cross-Connection Control evaluations, tests, inspections, and record keeping.

e. Notification of the Authority Having Jurisdiction - The Purveyor will inform the AHJ when there is a:

- Reported change in plumbing that requires a plumbing permit;
- Reported change in the use of any part of the premises that alters the cross-connection hazard level;
- Backflow incident; or
- Service connection shut-off scheduled due to customer non-compliance with CCC regulations.

F. Relationship to Other Planning and Operations Program Requirements

The Purveyor will consider the requirements and consequences of the CCC program on the utility's planning and operations requirements. Such considerations include, but are not limited to ensuring:

- And promoting adequate communication between CCC program personnel and other water utility staff;
- That adequate training is provided to all staff to recognize potential cross-connection control problems;
- That cross-connection issues be considered in water quality investigations;
- That the design of the water distribution system makes adequate provisions for expected head losses incurred through the installation of backflow prevention assemblies;
- That CCC program personnel be consulted in the design of water and wastewater treatment facilities and when proposals are made to receive or distribute reclaimed water;
- That operations under normal and abnormal conditions do not result in excessive pressure losses; and
- That adequate financial and administrative resources are available to carry out the CCC program.

LAKE LIMERICK WATER
CROSS-CONNECTION CONTROL POLICY

Finding of Fact

Whereas it is the responsibility of a water purveyor to provide water to the customer at the meter that meets Washington state water quality standards;

Whereas it is the water purveyor's responsibility to prevent the contamination of the public water system from the source of supply (i.e., to the customer's connection to the service pipe or meter);

Whereas it is a requirement of the Washington State Department of Health (DOH) for the Purveyor to establish a cross-connection control program satisfactory to DOH;

Whereas cross-connections within the customer's plumbing system may pose a potential source for the contamination of the public water supply system;

Now be it resolved that Lake Limerick Country Club, Inc., hereinafter referred to as the Purveyor, establishes the following cross-connection control policy to protect this purveyor-owned water system from the risk of contamination. For public health and safety, this policy shall apply equally to all new and existing customers.

Definitions

Unless otherwise defined, all terms used in this policy pertaining to cross-connection control have the same definitions as those contained in WAC 246-290-010 (Definitions, abbreviations, and acronyms) of the Group A Drinking Water Regulations.

Implementation of the Cross-Connection Control Policy

The Purveyor will implement a cross-connection control program that relies on premises isolation and in-premises protection as defined in WAC 246-290-010.

The Purveyor will employ or engage the services of a DOH-certified Cross-connection Control Specialist (CCS) to develop, implement, and be in responsible charge of **Lake Limerick Water's** cross-connection control program.

The Purveyor will ensure the written cross-connection control program is consistent with this policy and complies with the requirements contained in WAC 246-290-490 (Cross-connection control) of the Group A Drinking Water Regulations.

The Purveyor will ensure the most recent editions of the following publications are used as references and technical aids for cross-connection control program development and implementation:

1. *Cross-Connection Control Manual, Accepted Procedures and Practice*, published by the Pacific Northwest Section, American Water Works Association, or latest edition thereof.
2. *Manual of Cross-Connection Control*, published by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, or latest edition thereof.
3. *Cross-Connection Control Guidance Manual for Small Water Systems*, published by the DOH Office of Drinking Water.

The Purveyor will ensure coordination with the authority having jurisdiction (*f.k.a., Local Administrative Authority*) in all matters concerning cross-connection control. Documentation and description of the coordination, including delineation of responsibilities, shall be provided in the written cross-connection control program.

The Purveyor will incorporate the written cross-connection control program into the Water System Plan required under WAC 246-290-100 or the Small Water System Management Program required under WAC 246-290-105.

The Purveyor retains the authority to make reasonable decisions related to cross-connections in cases and situations not provided for in this policy or the written program.

Technical Provisions - Prevention of Contamination

The Purveyor will ensure that periodic hazard surveys (administered through a customer completed CCC Hazard Survey form and/or performed on-site through a CCC Hazard Field Survey) of the customer's plumbing system(s) and water usage are conducted and evaluated by the CCS as follows:

> **Single Family/Duplex Residential & Non-residential Recreational Connections (*private campsites/RV sites*):** Surveys shall be conducted on a triennial basis (every three years). Normal method of survey shall be through a customer completed/self-reporting CCC Hazard Survey form. An on-site Field Survey may be required under special or unusual circumstances. If an on-site Field Survey is required, the customer must sign the completed Field Survey Report and a copy is provided to them.
>
> **All Other Non-residential (commercial, business, schools, daycares, churches, institutional, agricultural, medical, industrial, food service/processing, etc.)** surveys shall be conducted on a biennial basis (every other year). Normal method of survey shall be through a customer completed pre-survey form and an on-site Field Survey. The owner or authorized representative must sign the Field Survey Report and a copy is provided to them.

With an accumulation of data and an aggressive customer education program the time interval for re-surveys may be lengthened or shortened as deemed necessary and acceptable to the Purveyor, CCS, and DOH.

Survey of a customer's plumbing system(s) and water usage is for the sole purpose of establishing the minimum requirements for the protection of the public water supply system.

Technical Provisions – Backflow Prevention Assemblies

The Purveyor will utilize a 'multiple-barrier' approach to protect the public water system from contamination via cross-connections commonly experienced by *Group A - Community* systems with predominantly residential connections. This approach consists of **Primary** and **Secondary protection measures** as follows:

Primary protection measures: The Purveyor, in conjunction with the CCS's assessment, will ensure that cross-connections between a customer's water system(s) and/or water usage and the public water system are eliminated or controlled by the appropriate method of backflow protection as follows:

1. The Purveyor will ensure compliance with the premises isolation requirements specified in WAC 246-290-490 § (4)(b); and
2. May reduce premises isolation requirements and rely on in-premises protection for premises other than the type addressed in WAC 246-290-490 § (4)(b), only when the following conditions are met:
    (a) The in-premises backflow preventer provides a level of protection commensurate with the assessed degree of hazard;

(b) Backflow preventers which provide the in-premises backflow protection meet the definition of 'approved backflow preventers' as described in WAC 246-290-010;

(c) The approved backflow preventers are installed, inspected, tested (at least annually), maintained, and repaired in accordance with WAC 246-290-490 § (6) & (7);

(d) Records of the backflow preventers are maintained in accordance with WAC 246-290-490 § (3)(j) & (8); and

(e) The Purveyor and designated CCS have reasonable access to the customer's premises to conduct periodic hazard (re)evaluations to determine whether the in-premises protection is adequate to protect the Purveyor's distribution system.

Secondary protection measures: The system distribution design consists of 'Y' connection points off of the main distribution line which feeds two residential service lines (one on each arm of the 'Y'). The Purveyor has installed DOH-approved Double Check Valve Assemblies (DCVAs) on the tail of the 'Y' connection points (e.g., downstream of the main distribution line connection and upstream of the split to the individual residential service lines.) The purpose of these DCVAs is to provide a secondary layer of protection to the distribution system. The Purveyor owns these assemblies and ensures:

(a) The approved backflow preventers are installed, inspected, maintained and repaired or replaced in accordance with WAC 246-290-490; and

(b) Records of the backflow preventers are maintained in accordance with WAC 246-290-490 § (3)(j) & (8); and

(c) The approved backflow preventers shall be tested in accordance with all testing requirements established in WAC 246-290-490 with the exception of frequency as follows:

(i) Assemblies relied upon as Secondary protection measures shall be inspected periodically throughout the year and tested on a triennial (every 3 years) basis; and

(ii) If an assembly fails a periodic inspection it shall be tested within 10 working days; and

(iii) If an assembly fails a regularly scheduled triennial test it shall be repaired or replaced and retested within 10 working days and placed on an annual testing schedule until it has passed (without any failures) for two consecutive years. The requirement for annual testing may be extended as deemed necessary by the Purveyor and CCS.

Technical Provisions – Backflow Incidence

A Backflow Incidence Response Plan (BIRPlan) is created as part of the CCC Program. The CCS will act as the system coordinator in the event of an incident. The CCS will generate a Backflow Incident Report form and file it with the Department of Health (DOH) and/or Authority Having Jurisdiction (AHJ) in accordance with WAC 246-290-490 regulations.

Administrative Provisions

The Purveyor will take the appropriate corrective action(s) when:

1. A cross-connection exists that is not controlled commensurate to the degree of hazard assessed;
2. A customer fails to comply with WAC 246-290-490 requirements regarding the survey of a customer's water system(s) and/or water usage; or

3. A customer fails to comply with WAC 246-290-490 requirements regarding the installation, inspection, testing, maintenance or repair of a required backflow preventer.

The Purveyor‘s corrective action(s) may include, but are not limited to:

1. Denying or discontinuing water service to a customer’s premises until the customer returns a completed CCC Hazard Survey form and/or a CCC Hazard Field Survey is conducted and appropriately completed report is submitted;
2. Denying or discontinuing water service to a customer’s premises until the identified cross-connection hazard is eliminated or controlled to the satisfaction of the Purveyor;
3. Requiring the customer to install an approved backflow preventer for premises isolation commensurate with the assessed degree of hazard; or.
4. The Purveyor installing an approved backflow preventer for premises isolation commensurate with the assessed degree of hazard.

Except in the event of an emergency, the Purveyor or CCS shall notify the Authority Having Jurisdiction prior to denying or discontinuing water service to a customer’s premises.

The Purveyor, in conjunction with the CCS, shall provide pertinent and up-to-date educational materials and/or programs each non-survey year.

The Purveyor or CCS shall complete all annual and/or periodic reports required under WAC 246-290-490. If the Purveyor completes the reports the CCS shall review them prior to submission to the Department of Health or Authority Having Jurisdiction.

The Purveyor shall maintain all records and data pertinent to the Cross-Connection Control Program (CCCP) and will provide electronic or paper copies of such CCCP related records or information as requested by the Washington State Department of Health and/or Authority Having Jurisdiction.

The Purveyor prohibits the intentional return of used water to the Purveyor’s distribution system. Used water includes, but is not limited to, water used for heating, cooling, or other purposes within the customer’s water system.

The Purveyor’s requirements contained within this cross-connection control policy and the written program do not constitute an approval of the customer’s plumbing system, compliance of the customer’s plumbing system with the Uniform Plumbing Code or an absolute assurance of the absence of cross-connections within the customer’s plumbing system or through their water usage.

If any provision in this policy or in the written cross-connection control program is found to be less stringent than or inconsistent with the Group A Drinking Water Regulations (Chapter 246-290 WAC), or other Washington state statuettes or rules, the more stringent state statue, rule or regulation shall apply.

Policy Adopted: _____

Effective Date: _____

Signatures: _____

_____

Planning • Management • Engineering
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Backflow Incidence Response Plan for Lake Limerick Water

A. General

This Backflow Incident Response Plan should be considered a supplement to the water system's Emergency Plan.

Purveyors should immediately begin a backflow incident investigation whenever the initial evaluation of a water quality complaint indicates that:

1. A backflow incident has occurred (i.e., drinking water supply has been contaminated) or may have occurred; or
2. The complaint can't be explained as a "normal" aesthetic problem.

Also, whenever a water main break (or power outage for pumped systems) causes a widespread loss of water pressure in the system (creating backsiphonage conditions), purveyors should initiate a check of distribution system water quality as a precursor to the need for a backflow incident investigation.

WAC 246-290-490 requires purveyors to notify DOH, the Local Administrative Authority and local health jurisdiction as soon as possible, but no later than the end of the next business day when a backflow incident contaminates the potable water supply (in the distribution system and/or in the customer's plumbing system). Purveyors should include a list of emergency contact telephone numbers at the beginning of the water system's O & M Manual, so that the information is readily available when an incident occurs.

Purveyors can get more detailed guidance on how to respond to a backflow incident from the manual, *Backflow Incident Investigation Procedures*, published by the Pacific Northwest Section, American Water Works Association (PNWS-AWWA).

B. Short List of Tasks

Small water system purveyors can use the following short list of tasks as initial guidance for dealing with backflow incidents. Purveyors should consult the most recently published edition of the PNWS-AWWA *Backflow Incident Investigation Procedures Manual* referenced above for greater detail as soon as possible after learning of a possible or confirmed backflow incident. Note: the water system is referred to as the Purveyor in the short task list.

1. Customer Notification

a. As soon as possible, the Purveyor will notify customers not to consume or use water.
b. The Purveyor will start the notification with the customers nearest in location to the assumed source of contamination (usually the customer(s) making the water quality complaint).
c. The Purveyor will inform the customer about the reason for the backflow incident investigation and the Purveyor's efforts to restore water quality as soon as possible. The Purveyor will let the

customer know that customers will be informed when they may use water, the need to boil water used for consumption until a satisfactory bacteriological test result is obtained from the lab, etc.

d. Where a customer cannot be contacted immediately, the Purveyor will place a written notice on the front door handle, and a follow-up visit will be made to confirm that the customer received notice about the possible contamination of the water supply.
e. When dealing with a backflow incident, the Purveyor will let customers know that it could take several days to identify the source and type of contaminant(s) and to clean and disinfect the distribution system.

2. Identification of Source of Contamination

a. The Purveyor will give consideration to the distribution system as a potential source of the contaminant (e.g., air valve inlet below ground).
b. The Purveyor will not start flushing the distribution system until the source of contamination is identified (flushing may aggravate the backflow situation, and will likely remove the contaminant before a water sample can be collected to fully identify the contaminant).
c. The Purveyor will conduct a house-to-house survey to search for the source of contamination and the extent that the contaminant has spread through the distribution system. Note: a check of water meters may show a return of water (meter running backward) to the distribution system.
d. When the cross connection responsible for the system contamination is located, the Purveyor should discontinue water service to that customer, until the customer completes the corrective action ordered by the Purveyor.

3. Isolation of Contaminated Portion of System

a. The Purveyor will isolate the portions of the system that are suspected of being contaminated by closing isolating valves; leave one valve open to ensure that positive water pressure is maintained throughout the isolated system.
b. The Purveyor will be sure to notify all affected customers in the isolated area first and then notify other customers served by the system.

4. Public Health Impacts

a. The Purveyor will seek immediate input from and work with state and local health agencies to accurately communicate and properly mitigate potential health effects.
b. If appropriate, the Purveyor will refer customers that may have consumed the contaminant or had their household (or commercial) plumbing systems contaminated to public health personnel and Local Administrative Authorities (plumbing inspectors).

5. Cleaning/Disinfecting the Distribution System

a. The Purveyor will develop and implement a program for cleaning the contaminated distribution system consistent with the contaminant(s) identified.
b. Where both chemical and bacteriological contamination has occurred, the Purveyor will disinfect the system after the removal of the chemical contaminant.
c. Where any bacteriological contamination is suspected, the Purveyor will provide field disinfection.

C. Additional Information on Cleaning/Disinfecting the Distribution System

Most chemical or physical contaminants can be flushed from the water distribution system or customer's plumbing system with adequate flushing velocity. However, this may not be the case in systems where scale and corrosion deposits (e.g., tuberculation on old cast iron mains) provide a restriction to obtaining adequate flushing velocity, or where chemical deposits or bacteriological slimes (biofilm) are present (on which the chemical contaminant may adhere).

To remove a chemical or physical contaminant from the distribution system, purveyors may need to:

1. Physically clean the affected area using foam swabs (pigs); and/or
2. Alter the form of the chemical contaminant (e.g., through oxidation using chlorination or addition of detergents).

When adding any chemical (including chlorine) to remove a contaminant from the distribution system, it is essential that the Purveyor fully understand the chemistry of the contaminant. **Adding the wrong chemical could make the contaminant more toxic to customers and/or more difficult to remove from the distribution system.**

Purveyors should contact the appropriate DOH regional office to discuss proposed approaches to contaminant removal and disinfection prior to taking corrective action.

Water Department Bylaws

WATER COMMITTEE OPERATING PROCEDURES

PURPOSE AND SCOPE

LAKE LIMERICK WATER SYSTEM

The Water System is charged with the responsibility of the operation and maintenance of the water system. To fulfill that responsibility, the Board of Trustees created a six member Water Committee in 1976. Two members are to be elected to three-year terms at each Annual Membership Meeting.

The actions of the Committee are accountable to the Board of Directors.

In order to retain the private water system classification with the Washington State Utilities and Transportation Commission it is required that the Lake Limerick Water System supply water only to Lake Limerick property and members in good standing.

Monies collected by the Water System are to be used solely for operation, maintenance, and improvement of the Lake Limerick Water System.

COMMITTEE STRUCTURE AND RESPONSIBILITIES

Officers of the Committee are to be Chairperson, Treasurer, and Secretary. Officers are to be elected following the Lake Limerick Country Club annual elections in April of each year.

The Chairperson will conduct the meetings and cause an agenda to be prepared for each meeting. All items of importance are to be approved by a vote of the Committee. The Chairperson will not vote unless there is a tie, in which event that vote will be the deciding vote.

In the absence of the Chairperson the Water Committee Secretary will assume the duties of the Chairperson. If the Secretary is also to be absent, then the Treasurer will assume the duties of the Chairperson.

The Treasurer will be responsible for the monies collected and for the distribution of such monies. All checks issued shall require signatures of two individuals, who have signed a bank authorization document. They may be the Chairperson, Secretary or Treasurer of the Water Committee. Office staff as designated by the Water Committee Treasurer may also sign checks.

The Water Committee Treasurer shall supervise the office staff individual(s) who are designated responsible for the Water System financial record keeping.

The Water Committee may request the Board of Directors to cause to be prepared an audit of any or all of the financial accounts or affairs of the Water System at any time, and to what extent, it deems appropriate. In addition, at least annually, the Board of Directors 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 of Directors.

By a majority vote of the Water Committee a member may be recommended for removal with cause. This recommendation must be sent to the Board of Directors for action. The Board of Directors will then appoint or approve a new member recommended by the Water Committee to fill the un-expired term of the removed member.

MEETINGS

Regular meetings of the Water Committee shall be established after the annual election in April by vote of the committee. Special meetings may be called by the chairperson or a vote of the committee. All meetings shall be open to Lake Limerick members in good standing.

A quorum of four (4) members need to be present to conduct business.

AMENDMENTS

These procedures may be amended by a majority vote of the Water Committee followed by approval of the Board of Directors.

These Water Committee Procedures replace the Water Committee Bylaws.

These procedures adopted by the Water Committee the 11th day of October 2006.

These procedures adopted by the Board of Directors the 21st day of October 2006.

Recording date December 15, 2005
Mason Co. Auditor Recording No. 1856085

BYLAWS OF LAKE LIMERICK COUNTRY CLUB

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ARTICLE I

GENERAL PROVISIONS

A. Name. The name of the Association is Lake Limerick Country Club.

B. Jurisdiction. This Association has jurisdiction over all land within the Lake Limerick development ("Lake Limerick Country Club"), legally described as:

> Lots one (1) to two hundred seven (207), both inclusive, Lake Limerick Division No. One, Volume 6 of Plats, pages 34 to 37, both inclusive, records of Mason County, Washington; Parcel Nos. 32127-50-00001 to 32127-50-00207;
>
> Lots one (1) to three hundred four (304), both inclusive, Lake Limerick Division No. Two, Volume 6 of Plats, pages 73 to 79, both inclusive, records of Mason County, Washington; Parcel Nos. 32127-51-00001 to 32127-51-00906;
>
> Lots one (1) to five hundred fifteen (515), both inclusive, Lake Limerick Division No. Three, Volume 6 of Plats, pages 118 to 128, both inclusive, records of Mason County, Washington; Parcel Nos. 32122-50-00001 to 32122-50-00900;
>
> Lots one (1) to two hundred forty (240), both inclusive, Lake Limerick Division No. Four, Volume 6 of Plats, pages 190 to 195, both inclusive, records of Mason County, Washington; Parcel Nos. 32127-53-00001 to 32127-53-90015;
>
> Lots one (1) to one hundred thirty-nine (139), both inclusive, Lake Limerick Division No. Five, Volume 7 of Plats, pages 16 to 22, both inclusive, records of Mason County, Washington; Parcel Nos. 32127-54-00001 to 32127-54-00139; and
>
> Lots one (1) to thirty-seven (37), both inclusive, Replat of Lot 2, Lake Limerick Division No. 2, Volume 9 of Plats, pages 199, 200 and 201, records of Mason County, Washington; Parcel Nos. 32127-52-00001 to 32127-52-00900;

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 Lake Limerick Country Club a better place in which to live and enjoy life, for the benefit of members and their

families**;** and 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 Lake Limerick is vested in the Association. Such common areas are for the exclusive use and enjoyment of members in good standing, their families and their guests; and those invited by the Association to use said common areas, including holders of easements, licenses, associate memberships, and other rights granted by the Association, if any. Unless invited as specified by the Association, through its Board of Directors, tenants are not authorized to use any of said common areas. 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, as well as with respect to the entire Lake Limerick development. The Association is responsible for paying taxes and assessments on the common areas, and to operate and maintain the same, and pay the costs associated therewith. The Association may also own any other property, real or personal.

E. Authorities. This Association is subject to the applicable recorded Protective Covenants of Lake Limerick Country Club, as well as any other applicable recorded documents; its Articles of Incorporation; these Bylaws; other Association governing documents; other 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.

F. Definitions. As used in these Bylaws, the following have the specified meanings:

1. Common Areas. These include property owned by the Association, such as beaches, the lake, parks, boat launches, the pro shop, the golf course, the Inn, green belts, water systems and facilities, and any other property currently owned by the

Association, as well as any property later acquired by the Association.

2. Family Members. For the purposes of these Bylaws, these include the spouses of members, and their dependents who live with them.

3. Guests. Guests are those whom a member invites to use the member's property. Tenants are not guests. Family members other than those defined above may be guests, depending on the circumstances.

4. Member. A member is the owner or contract purchaser of a Lake Limerick lot.

5. Members in Good Standing. These are members with no current substantial Protective Covenant or other rule violations; and those who are no more than 90 days delinquent in the payment of any amount due to the Association, unless a repayment agreement has been reached and is complied with.

6. Tenants. Tenants (renters) are those who compensate a member in some way for the right to live on or use a Lake Limerick lot.

ARTICLE II
MEMBERSHIP

A. General. Although the Board of Directors acts in most instances on behalf of the Association, the primary authority of Lake Limerick Country Club rests with its members. Members are the legal owners or contract purchasers of residential lots within the jurisdiction of Lake Limerick Country Club. Members elect directors to the Board of Directors, approve or disapprove the annual budget and further financial proposals, and vote on initiatives or referenda. Members are responsible for complying with all Association requirements, including paying in a timely manner all assessments due to the Association, and respecting the covenants and other applicable rules. Membership is appurtenant to

ownership of each lot in Lake Limerick Country Club. 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; all pursuant to Lake Limerick Country Club's reasonable rules and regulations. Each member in good standing also has the right to apply for approval of permits for building and other plans and/or activities, to participate in Association activities, and serve on the Association Board of Directors and its committees.

Failure to comply with Lake Limerick Country Club's covenants and other rules, including the obligation to pay assessments, may result in loss of status as a member in good standing, as set forth in Article II(C) below, and therefore loss of the rights to use such property and facilities, including the Lake Limerick Country Club water system; to make such applications; and to participate in such activities and serve on such Board of Directors and committees. This loss of status will apply to the members personally as well as their rights with respect to each of their lots.

Each member is personally responsible for the actions of himself or herself, and all guests, family members and tenants, as they relate to the facilities and operations of the Association, its governing documents, and other Association rules and regulations and other requirements. Each member also has all of the rights and responsibilities conferred by Lake Limerick Country Club covenants and governing documents and other Association rules and regulations, as well as state law.

B. Voting Rights. Only members in good standing are eligible voters. A member in good standing who is an owner or purchaser of a lot may cast one vote. Multiple owners of any lot shall designate who shall cast the vote for said lot. One vote may be cast for each lot. Any one member may only cast one vote, regardless of the number of lots owned. For example, a husband and wife who own three lots may cast one vote each, or a total of two votes.

C. Members in Good Standing. Members shall not lose their status as members in good standing unless the Board of Directors acts to change their status, after notice and an opportunity to be heard at a Board of Directors meeting; or they are more than 90 days delinquent in their payments, unless a repayment agreement has been reached, and is complied with.

D. Meetings.

1. Annual Membership Meeting. There shall be a general annual membership meeting of the Association in April of each year. There shall also be an annual membership meeting in October of each year, to address the Association's budget.

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 members having ten percent of the total votes of the Association.

3. Notice. Notice of all membership meetings shall be delivered, 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 Lake Limerick Inn, or, if the Inn is not available, at such other place as may be designated by the Board.

5. Agenda. The notice of any membership meeting shall include the agenda for the meeting, as set by the Board of Directors. The agenda for membership meetings may include elections and approval of a budget and/or other financial proposals. The agenda may also include referenda, which are issues submitted to the general membership by the Board of Directors, either for binding vote, or guidance; and initiatives, which are issues submitted by the signatures of members in good standing representing ten percent of the total votes of the Association. It may also include provision for discussion of particular issues.

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, which shall also be included in the agenda.

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 ten percent of the total number of votes of eligible voters, voting either in person, or by proxy.

7. Ballots. A member may cast his or her vote in person or by proxy, according to procedures established by the Board of Directors. Votes cast by proxy shall be specific as to each particular issue. The Notice of any general membership meeting shall include a proxy ballot, which shall be identical in all significant respects to the ballot provided to members voting in person.

8. Majority. Actions of the membership shall be taken by a majority vote of the members in good standing, voting at a meeting with a quorum, except as otherwise provided by law or Lake Limerick governing documents. An example of such an exception is set out at Article V(H) below, having to do with Washington State law about how budgets are adopted.

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
ASSOCIATE MEMBERSHIPS

The Board of Directors may provide for one or more categories of associate

memberships in its discretion, including provision for rights and responsibilities of the same. Associate members are not Lake Limerick Country Club members, and are not entitled to vote as such.

ARTICLE IV
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 Lake Limerick Country Club governing documents and rules and regulations in ways that, in their individual and collective judgments, best serve the purposes of the Association, and are fair and reasonable.

B. Membership Participation. The Board of Directors shall keep the membership informed of significant current and prospective issues. The Board of Directors shall define such 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 of Directors 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 of Directors shall, when necessary and appropriate, develop rules and regulations to support the purposes of the Association, and to provide procedures for its operation.

ARTICLE V

BOARD OF DIRECTORS

GENERAL

A. Number. There shall be nine 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.

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 of Directors 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 reasonable cause, as determined by the Board of Directors.

E. Vacancies. If a Director is removed, becomes 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. Meetings.

1. Where and When. The Board of Directors shall meet at the office of the Association, unless otherwise necessary, at least monthly.

2. Notice. Notice of regular Director meetings shall be given by general reference in mailings to the membership, by electronic communication, and/or by posting at the office and/or clubhouse. Notice of special Board of Directors meetings shall be given, when reasonably possible, to the Directors at least 24 hours prior to the meeting, by personal communication, or reasonable alternate means best calculated to be received. Notice of special Board of Directors meetings shall also be given to the general members at least 24

hours prior to the meeting, when reasonably possible, by posting notice at the office and/or clubhouse.

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, subject to all other meeting requirements as set forth herein.

G. 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.

H. 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, as well as special or amended budgets for the same, when needed. Any such budget shall be submitted to the membership as provided by Washington State law. Consideration by the membership may take place at the Association's annual general or budget meeting, or at any special membership meeting. If at any time state law no longer specifies the procedure for adoption of budgets, any general, special or amended budget adopted by the Board of Directors for assessment and other income, as well as expenses and/or reserves, shall be submitted to the membership for its approval or rejection pursuant to the most recent applicable state law, until these Bylaws are or may be amended to provide otherwise.

I. Budget Reports. The Board of Directors will make available to the members

budget reports, specifying performance in light of the budget.

ARTICLE VI
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 qualified.

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.

C. President and Vice-President. The President shall preside at all meetings of the Directors and members, shall sign as President on all agreements, contracts 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 generally 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 books, records, and papers.

E. Treasurer. The Treasurer shall be generally responsible for keeping safely all money, 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 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 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, in the absence of the President; and Secretary or Treasurer, in the absence of the Secretary; 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, contractors, agents and volunteers.

ARTICLE VII
COMMITTEES

A. General. The Board of Directors may form committees at any time for such purposes as it may deem necessary. The Board of Directors shall adopt a Resolution establishing each such committee, addressing its makeup, authority and operating procedures. The Board of Directors may delegate, pursuant to law, its authority to take action to any committee that is composed entirely of Directors. The actions of any committee shall be subject to the ratification or disapproval of the Board of Directors.

B. Executive Committee. The Executive Committee shall be composed of the President, Vice-President, Secretary and Treasurer of the Board of Directors, and a non-voting representative from the Water Committee. The Executive Committee shall act pursuant to procedures established by the Board of Directors by Resolution.

C. 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 of Directors by Resolution. Any Association member may also nominate any such candidate.

D. Hearing Committee. The President of the Board of Directors shall appoint, with the consent of the Board of Directors, at least three Hearing Committee members. The Hearing Committee is responsible for adjudicating claims that a member has violated any provisions of Lake Limerick governing documents or other rules.

The Hearing Committee will perform its duties pursuant to procedures as developed by the Board of Directors by Resolution, which procedures shall include provisions for appeal to the Board of Directors of any determination made by the Hearing Committee.

E. Water Committee. The Water Committee shall be elected by the general membership. It shall be responsible for ensuring the provision of water to lots within Lake Limerick, including the maintenance, repair and replacement of facilities, compliance with controlling federal, state and local laws, rules and regulations, and the administration of the same. It may adopt for its purposes its own Bylaws, and other rules of procedure, as well as other regulations regarding the provision of water.

ARTICLE VIII
CODE OF ETHICS

A. Standard of Care. All Directors, Officers, committee members, agents, contractors, employees, volunteers and others performing services for or on behalf of the Association, shall do so in a manner they believe 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 specified by law.

C. Open Records. Except as otherwise specified by law, the minutes of any membership, Board, or committee 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 of Directors. Reasonable expense reimbursement is not considered compensation. Compensation may be paid for services performed as an employee, agent or contractor, subject to conflict of interest limitations set forth below.

E. Conflict of Interest. No member of the Board of Directors, or of any Board of Directors 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. Loyalty. All members, including Directors, are encouraged to share their views and opinions. Constructive dissent can be a very valuable resource to a Board of Directors. Directors may vote in the minority on issues, and they are not required to personally endorse any Board of Directors decision or action. They may discuss their opinions freely and openly with anyone. But by accepting a Board of Directors position, each Director agrees to work within the Association processes and systems to advance his or her views or positions, and not to either individually, or in collaboration with others, intentionally sabotage or subvert the work of the Board of Directors.

G. Confidentiality. All members, including Board members, as well as volunteers, employees, agents, and contractors, shall maintain confidentiality with respect to any information they become aware of having to do with any matters involving personnel, consultation or communications with legal counsel, likely or pending litigation, possible violations of the governing documents, or involving the possible liability of a member to the Association, insofar as such matters may be discussed in any closed session meeting of the Board of Directors.

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

I. Audit. The Board of Directors may cause to be prepared 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 of Directors 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 of Directors.

J. Accounts. The funds of the Association shall be kept in accounts in its name, and shall not be commingled with the funds of any other Association, the President of the Association, or any other person responsible for custody of such funds.

ARTICLE IX
ASSESSMENTS

A. Each member, by accepting an ownership interest in any lot within the development, agrees to pay all assessments imposed by the Association.

B. Assessments as defined herein shall constitute a personal obligation of each member. 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 Lake Limerick Country Club. The effective date of each such lien shall be the date of recordation of the applicable protective covenant.

C. Members have the obligation to pay assessments, but the Association recognizes that individual members often face financial difficulties. The Association shall diligently collect all accounts. When an account becomes delinquent, the Association shall make reasonable efforts to work with the member to bring the account current, including readily accepting reasonable payment plans, supported by a promissory note, where such plans provide for payment in full of all delinquencies, and specify that all future assessments will be paid on time.

D. When reasonable collection efforts are not successful, and if appropriate in the judgment of the Association, assessment liens may be foreclosed, in the general manner of foreclosure of real property mortgages, with adaptations where reasonable in the judgment of the Board of Directors; provided, that a revised deficiency judgment may be entered after confirmation of sale, crediting the sale proceeds, and any payments or other credits, and debiting any post-judgment assessments, costs and attorney fees; the member may stay the proceedings at any time, prior to sale, by payment to Lake Limerick of the full amount due, as defined below; and if a lot has been improved and abandoned, as defined by state law, upon request, a court may order no redemption period as well as a deficiency judgment.

E. The lien of Lake Limerick Country Club 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 notice of the same. However, as to any lot, this 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 sole purpose of purchase of the lot, construction (or remodeling) of improvements to the lot, 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 delivered

personally, evidenced by a receipt for the same, or sent by certified or registered mail; and received at the office of Lake Limerick Country Club within sixty days of its execution. The burden of proving receipt is on the lender.

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

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

1. General Annual Assessment and/or Dues. The Association shall impose a general annual assessment and/or dues on each lot or member within the development, which assessment or dues shall be imposed as specified in these Bylaws as specified in Article V(H) above.

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, cart shed rental, trail fees, the use of recreational facilities, retail sales items, and lien filing;

b. Remediation expenses. The Board of Directors may charge to a member any lot condition remediation expenses incurred by the Association, as specified in the recorded Covenants, either before or after any Sheriff's sale;

c. Fines. Any fines, pursuant to a system for the imposition of fines for violation of Lake Limerick Country Club covenants and/or rules, as adopted by the Board of Directors;

d. Late Fees and Interest. The Association may add reasonable

late fees, as well as interest of not more than 12% per annum, compounded annually, to any delinquent account and all assessments related thereto; and

e. Expenses and Fees. 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 assertion of or defense to any claims regarding the authority, jurisdiction or exercise of any of the powers of the Association; the correction of any violation of Lake Limerick Country Club covenants and/or rules; or with regard to any other 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.

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 member accepts Association governing documents and rules and regulations as they exist now and may be lawfully amended in the future, 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 Association 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 undertaken in order to correct violations of Lake Limerick covenants and/or rules, and/or to respond to claims against the Association. The Association itself may bring actions to correct such violations or, where the rule violated is a recorded restrictive covenant, any individual members may also do so. A corrective action, other claim, or response to a claim 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 mistakes made reasonably and in good faith regarding the approval or failure to approve building or other lot improvement plans.

E. Indemnification. The Association may indemnify current or former directors or Officers, or any other person, to the maximum extent pursuant to law.

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

G. Non-Waiver. Failure of the Association 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; (3) as the abandonment of the right to enforce the same or any other rule; or (4) to constitute any other defense to enforcement in any particular case. No member may rely on any such failure to enforce for any purpose.

H. Application. The provisions of these Bylaws shall apply to all circumstances

existing at the time of their adoption, except where to do so would seriously impair an existing vested right or interest, where the owner of that interest would be entitled to assert an equitable claim regarding the same.

I. Amendments. Amendments to these Bylaws may be submitted to the membership by the Board of Directors, or by a petition of members in good standing to the Board of Directors representing twenty percent of the total votes of the Association. These Bylaws may be amended by the majority vote of the members in good standing voting at a meeting with a quorum. The effective date of each amendment shall be as specified therein.

ARTICLE XI
CERTIFICATION OF AMENDMENT

A. Certification. We, the President and Secretary of Lake Limerick Country Club, certify that the above stated Bylaws were properly adopted according to all requirements as an amendment to the Bylaws of Lake Limerick Country Club.

B. Effective Date. The effective date of these Amended Bylaws shall be and is the _____ day of _____, 20___.

By our signatures hereto, we so certify.

_____	_____	_____
Signature	Typed Name	Date
President, Board of Directors		

_____	_____	_____
Signature	Typed Name	Date
Secretary, Board of Directors		

STATE OF WASHINGTON)
) ss.
COUNTY OF MASON)

On this _____ day of _____ , 20___, personally appeared before me _____ , personally known to me or provided to me on the basis of satisfactory evidence to be the President of Lake Limerick Country 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 he/she is authorized to execute the said instrument.

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

Affiant Known ☐
Affiant produced ID ☐
Type of ID _____
_____

_____
PRINT NAME:_____
NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON, residing in _____
My commission expires:_____

STATE OF WASHINGTON)
) ss.
COUNTY OF MASON)

On this _____ day of _____ , 20___, personally appeared before me _____ , personally known to me or provided to me on the basis of satisfactory evidence to be the Secretary of Lake Limerick Country 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 he/she is authorized to execute the said instrument.

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

Affiant Known ☐
Affiant produced ID ☐
Type of ID _____
_____

_____
PRINT NAME:_____
NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON, residing in _____
My commission expires: _____

The Articles of Incorporation are filed with the State of Washington and provide the basic legal framework for the Club, as a corporation.

STATE OF WASHINGTON | DEPARTMENT OF STATE

1, BRUCE K. CHAPMAN, Secretary of State of the State of Washington and custodian of its seal,

Hereby certify that according to the records on file in my office LAKE LIMERICK COUNTRY CLUB, INC.

A Washington non−profit, Non−stock Corporation, was incorporated March 8, 1966; and I further certify that the Above−named Corporation is in good standing on the records of this office, having complied with the filing provisions of the non-profit statute.

In witness whereof I have signed and have

Affixed the seal of the State of Washington to

This certificate at Olympia, the State Capitol

September 12, 1975

BRUCE K.
CHAPMAN

SECRETARY
OF STATE

ARTICLES OF INCORPORATION

of

LAKE LIMERICK COUNTRY CLUB, INC.

KNOW ALL MEN BY THESE PRESENTS: That we, Mark J.Antoncich, Kenneth W. Engel, John W. Osberg and W. J. Pierce, and Allan F. Osberg,/residing in the State of Washington, and being citizens of the United States, each being over the age of twenty-one years, and being desirous of forming a corporation under Title 24, Revieed Code of Washington relating to non-profit corporations, do hereby associate ourselves together for the purpose of forming a non-profit corporation, and make, subscribe, execute and adopt, in triplicate, the following Articles of Incorporation, and certify as follows:

ARTICLE I

The name of the corporation shall be Lake Limerick Country Club, Inc.

The purposes for which this corporation is formed are:

1. To purchase or otherwise acquire, construct, improve, develop, repair, maintain, operate, care for and/or dispose of streets, roadways, easements, parkways, playgrounds, open spaces and recreational areas, tennis courts, beaches, boat landings, mooring basins, floats, piers, clubhouses, swimming pools and/or swimming areas, bathhouses, places of amusement, community buildings, community clubhouses and in general community facilities appropriate for the use and benefit of its members, and/or for the improvement and development of the property hereinafter referred to.

2. To build, improve and maintain roadways, culverts, bridges and drainage area. and to provide for the improving, cleaning and sprinkling of streets, and for collection and disposal of the street sweepings, garbage, ashes, rubbish and the like; to prevent and suppress fires, to provide police protection, and to make and collect charges to cover the costs and expenses therefore.

3. To improve, light and/or maintain streets, roads, alleys, courts, walks, gateways, fences and ornamental features now existing or

hereafter to be created or erected, and shelters, comfort stations and/or buildings and improvements ordinarily appurtenant to any of the foregoing; to improve, plant and maintain grass plots and other areas, trees and plantings within the lines of the street immediately adjoining or within the property hereinafter described or referred to.

4. So far as it can legally do so, to grant franchises rights of way and easements for public utilities or other purposes upon, over, and/or under any of said property.

5. To acquire by gift, purchase, lease or otherwise, and to own, hold, enjoy, operate, *maintain* and to convey, sell, lease, transfer, mortgage and otherwise encumber, dedicate for public use and/or otherwise dispose of, real and/or personal property and interest therein wherever situate.

6. To enforce assessments, liens, charges, restrictions, conditions and covenants existing upon and/or created for the benefit of parcels of real property in the plat or added to the plat of Lake Limerick Country Club, Inc., Section 27, T21N, R3W, W.M. and the S1/2 S1/2 Section 22, T21N, R3W, W.M. and SE1/4 SE1/4 Section 21 T21N, R3W. W.M. and SW1/4 SW1/4 of Section 23, T21N, R3W.W.M. (all of the foregoing in Mason County, Washington) to which said parcels may be subject, and to pay all expenses incidental thereto.

7. To pay the taxes and assessments which may be levied by any public authority upon any of the said property now or hereafter used or set apart for roadway, easements, parks, parkways, play-grounds, open areas, tennis courts, beaches, boat landings, mooring basins, community clubhouses, community club buildings, places of amusement and/or recreation areas, or upon such other recreation spaces wherever situate as may be *maintained* for the general benefit and use of the owners of lots in said property: to pay taxes and assessments levied by any public authority upon any property which may be held in trust for said corporation.

8. To exercise such powers of control, interpretation, construction, consent, decision, determination, modification, amendment, cancellation, annulment and/or enforcement of covenants, reservations, restrictions, liens and charges imposed upon said property, and as may be vested in, delegated to, or assigned to said corporation and such duties with respect thereto as may be assigned to and assumed by said corporation.

9. To appropriate, purchase, divert, acquire, and store water from streams, water courses, wells or any other source, and to distribute the water so appropriated and acquired to its members for use upon the lands of said members and for domestic purposes: to acquire, own, construct, hold, possess, use and maintain such pumping plants, tanks, pipe lines, reservoirs, ditches, buildings, roads, trails and appliances, and such other property, including water rights and shares of stock in other corporations as said corporation may from time to time desire to acquire or purchase for furnishing and supplying water to its members; provided that this corporation shall not use or dispose of such water as a public utility, but solely for the use and benefit of its members and for the irrigation of lands and domestic and other useful and beneficial purposes.

10. To fix, establish, levy and collect annually such charges and/or assessment. as may be necessary in the judgment of the board of trustees, to carry out any or all of the purposes for which this corporation is formed, but not in excess of the maximum from time to time fixed by the By-Laws.

11. To expend the moneys collected by said corporation from assessments and charges and other sums received for the payment and discharge of costs, expenses and obligations incurred by said corporation in carrying out any or all of the purposes for which said corporation is formed.

12. Generally, to do any and all lawful things which may be advisable, proper, authorized and/or permitted to be done by said corporation under or by virtue of any restrictions, conditions, *and/or* covenants or laws affecting said property, or any portions thereof (including areas now or hereafter dedicated to public use); and to do and perform any and all acts which may be either necessary for, or incidental to, the exercise of any of the foregoing powers or for the peace, health, comfort, safety, and/or general welfare of owners of said property, or portions thereof, or residents thereon.

13. To borrow money and mortgage, pledge or hypothecate any or all of the real or personal property of said corporation as security for money borrowed or debts incurred; and to do any *and* all things that a corporation organized under esad laws of the State of Washington may lawfully do when operating for the benefit of its members or the property of its members, and without profit to said corporation.

14. Generally, to do and perform any and all acts which may be either necessary or proper for or incidental to the exercise of any of the foregoing powers and such powers granted by the provisions of Title 24,

Revised Code of Washington, and other laws of the State of *Washington* relating to non-profit corporations.

15. Nothing contained in these Articles of Incorporation shall be construed as authorizing or permitting said corporation to own, manage or operate any real or personal property for profit. It is the *intention* and purpose that the business of said corporation shall not be carried on for profit either to itself or for the benefit of its members, and wherever it is authorized to collect charges or assessments it shall have no power or authority to use said charges or assessments except as necessary to cover the actual cost or expense of the act, duty, power, or transaction performed.

16. All of the foregoing purposes and powers are to be exercised and carried into effect for the purpose of doing, serving and applying the things above set forth for the benefit of all property situated in the plat or added to the plat of Lake Limerick Country Club, Inc., Section 27, T21N, R3W, W.M. and the S1/2 S1/2 Section 22, T21N, R3W, W.M. and SE1/4 SE1/4 Section 21 T21N, R3W, W.M. and SW1/4 SW1/4 of Section 23, T21N, R3W.W.M. (all of the foregoing in Mason County, Washington).

ARTICLE II.

The corporation shall at all times hereafter be a joint and mutual association of the above named incorporators, and such other persons as may hereafter be admitted to membership in accordance with the By-Laws of the corporation. Membership and certificates evidencing the same shall be inseparably appurtenant to tracts or division of tracts owned by the members, and upon transfer of ownership or contract for sale of any such tract, membership and certificate of membership shall ipso facto be deemed to be transferred to the grantee or contract purchaser. No membership or certificate of membership may be transferred, assigned, or conveyed in any manner other than in the manner herein set forth. In the event of the death of a member the membership or certificate of membership of such deceased member shall be and become the property of the personal representative of such deceased member upon appointment and qualification as such in a judicial proceeding and such personal representative shall have all of the rights, privileges and liabilities of such member until title shall be transferred or contracted to be transferred. The property in possession of this corporation shall be managed by the board of trustees hereinafter mentioned and only alienated and disposed of in accordance with the By-Laws of the corporation. The interest of each incorporator or member shall be equal to that of any other and no incorporator or member can acquire any interest *which* will entitle him to any greater voice, vote, authority or interest in the corporation than any other member.

ARTICLE III.

The number of trustees of this corporation shall not be less than three (3) nor more than ten (10). The names of trustees who shall manage the affairs of the corporation for not

4.

more than six (6) months until the trustees are elected by the members are:

NAME	ADDRESS
Mark J. Antoncich Seattle, Wash.	7001 - 31st N. E.,
Kenneth W. Engel Redmond, Wash	8010 - 208th N. E.,
John W. Osberg Seattle, Wash.	1132 North 128th,
Allan F. Osberg Seattle, Wash.	1132 North 128th,
W. J. Pierce Seattle, Wash.	1132 North 128th,

ARTICLE IV.

The time of the existence of this corporation shall be perpetual.

ARTICLE V.

The registered office and post office address of this corporation shall be 5125 – 25th Ave NE, Seattle, WA 98105

ARTICLE VI.

The qualifications of the members of said corporation, the property, voting and other rights and privileges, and the liabilities to charges and assessments of the members, shall be set forth in the By-Laws of the corporation.

IN WITNESS WHEREOF, we, the undersigned, the incorporators of this corporation have this 28th day of February, 1966, hereunto set our hands and seals in triplicate, and state that our first meeting was this day.

John W. Osberg
. W J Pierce
Allan F. Osberg
Mark J. Antoncich
Kenneth W Engel

STATE OF WASHINGTON) SS

COUNTY−OF K I N G)

THIS IS TO CERTIFY THAT on the 28 day of February 1966, before me, the undersigned, a Notary Public in *and* for the State of Washington, duly commissioned and sworn, personally appeared

W.J. Pierce and John W. Osberg, Mark J. Antoncich, Kenneth W. Engel, and Allan F. Osberg, /to me known to be the individuals described in and who executed the within and foregoing instrument and acknowledged to me that they signed and sealed the same as their free and voluntary act and deed, for the uses and purposes therein mentioned.

WITNESS BY HAND AND OFFICIAL SEAL, the day and year in this certificate first above written.

Notary Public in and for the State of Washington, residing at Seattle.

Form 3.3 - Budget Table (From WSDOH SWSMP Guidance)						
Cash Balance Carried Forward	$50,000	$27,990	$25,137	$23,349	$23,179	$24,596
Income and Revenue						
	2013	2014	2015	2016	2017	2018
Water Rates - Metered	$364,000	$374,920	$386,168	$397,753	$409,685	$421,976
Water Rates - Unmetered	$22,200	$22,866	$23,552	$24,259	$24,986	$25,736
Disconnect, Lockout, and Locked Meter fees	$10,270	$10,578	$10,895	$11,222	$11,559	$11,906
Excessive Use Fees	$10,000	$10,300	$10,609	$10,927	$11,255	$11,593
Miscellaneous revenue	$500	$515	$530	$546	$563	$580
New connection fees	$2,000	$2,060	$2,122	$2,185	$2,251	$2,319
Interest earned on bank deposits	$4,000	$7,509	$11,147	$15,041	$19,075	$23,254
Total Revenue	$412,970	$428,748	$445,024	$461,934	$479,375	$497,363
Total Income and Revenue and Balance	$462,970	$456,738	$470,161	$485,283	$502,554	$521,959
Operating Expenses and Payments						
Accounting Assistance	$4,000	$4,120	$4,244	$4,371	$4,502	$4,637
Bank Service Charges	$400	$412	$424	$437	$450	$464
Credit Card Service Charges	$2,500	$2,575	$2,652	$2,732	$2,814	$2,898
Dues and Subscriptions	$800	$824	$849	$874	$900	$927
Employee Expenses	$69,580	$71,667	$73,817	$76,032	$78,313	$80,662
Engineering	$17,000	$5,000	$5,150	$5,305	$5,464	$5,628
Equipment Rent	$1,000	$1,030	$1,061	$1,093	$1,126	$1,159
Insurance	$9,600	$9,946	$10,304	$10,675	$11,059	$11,457
Legal Fees	$1,500	$1,545	$1,591	$1,639	$1,688	$1,739
License and Permits	$1,500	$1,575	$1,654	$1,736	$1,823	$1,914
Newsletter Expense	$1,500	$1,545	$1,591	$1,639	$1,688	$1,739
Office Expense	$3,500	$3,605	$3,713	$3,825	$3,939	$4,057
Postage	$6,500	$6,695	$6,896	$7,103	$7,316	$7,535
Professional Services	$48,000	$50,400	$52,920	$55,566	$58,344	$61,262
Security Services	$6,400	$6,592	$6,790	$6,993	$7,203	$7,419
Service Contracts	$1,500	$1,545	$1,591	$1,639	$1,688	$1,739
Supplies	$5,000	$5,150	$5,305	$5,464	$5,628	$5,796
Taxes - Property	$2,500	$2,625	$2,756	$2,894	$3,039	$3,191
Taxes-Washington State Excise	$19,200	$19,776	$20,369	$20,980	$21,610	$22,258
Telephone	$2,000	$2,060	$2,122	$2,185	$2,251	$2,319
Utilities	$20,000	$20,600	$21,218	$21,855	$22,510	$23,185
Vehicle Expense	$6,000	$6,180	$6,365	$6,556	$6,753	$6,956
Water Testing	$3,000	$3,150	$3,308	$3,473	$3,647	$3,829
Debt payments (loan principal and interest)	$18,000	$18,000	$18,001	$18,002	$18,003	$18,004
Short-lived asset replacements (Repairs and Repl.)	$28,000	$28,840	$29,705	$30,596	$31,514	$32,460
Total Operating Expenses and Payments	$222,980	$217,777	$224,986	$232,471	$240,244	$248,315
Operating Reserve - Target Value (1/8th, of Annual Operating expenses, less short lived assets and Engineering)						
Operating reserve beginning balance	$27,510	$30,510	$29,939	$30,921	$31,941	$32,999
Contribution to operating reserve	$3,000	-$571	$982	$1,020	$1,058	$1,098
Operating reserve ending balance	$30,510	$29,939	$30,921	$31,941	$32,999	$34,097
Emergency Reserve						
Emergency reserve beginning balance	$100,000	$103,515	$107,154	$110,920	$114,819	$118,855
Contribution to emergency reserve	$3,000	$3,105	$3,215	$3,328	$3,445	$3,566
Withdrawal from emergency reserve	$0	$0	$0	$0	$0	$0
Emergency reserve ending balance	$103,000	$106,620	$110,368	$114,248	$118,263	$122,420
Short-lived Asset Reserve						
Short-lived asset reserve beginning balance	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
Contribution to short-lived asset reserve	$28,000	$28,840	$29,705	$30,596	$31,514	$32,460
Withdrawal from short-lived asset reserve	$28,000	$28,840	$29,705	$30,596	$31,514	$32,460
Short-lived asset reserve ending balance	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
Long-lived Asset Reserve						
Long-lived asset reserve beginning balance	$30,000	$193,000	$375,450	$557,374	$752,062	$953,760
Contribution to long-lived asset reserve	$178,000	$182,450	$187,924	$194,689	$201,698	$208,959
Withdrawal from long-lived asset reserve	$15,000	$0	$6,000	$0	$0	$0
Long-lived asset reserve ending balance	$193,000	$375,450	$557,374	$752,062	$953,760	$1,162,718
Long-lived Asset Replacement Funding						
Loan	$0	$0	$0	$0	$0	$0
Grant	$0	$0	$0	$0	$0	$0
Long-lived asset reserve	$15,000	$0	$6,000	$0	$0	$0
Special capital improvement assessment	$0	$0	$0	$0	$0	$0
Total funding for long-lived asset replacement	$15,000	$0	$6,000	$0	$0	$0
Ending Cash Balance for Current Year *Does not include reserve account balances.*	$27,990	$25,137	$23,349	$23,179	$24,596	$27,561

Lake Limerick Water System 2012 Consumer Confidence Report

Is my water safe?

We are pleased to present this year's Annual Water Quality Report (Consumer Confidence Report) as required by the Safe Drinking Water Act (SDWA). This report is designed to provide details about where your water comes from, what it contains, and how it compares to standards set by regulatory agencies. This report is a snapshot of last year's water quality. We are committed to providing you with information because informed customers are our best allies. Yes your drinking water is safe! The Lake Limerick Water System continues to meet or exceed all Federal, State, and Local drinking water standards without having to use water treatment practices.
If you wish to learn more about quality, water conservation, or any aspect of your water system; please call or stop by the office.

Do I need to take special precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Water Drinking Hotline (800-426-4791).

Where does my water come from?

The Lake Limerick Water System receives its water from 7 wells in various locations around the lake. The depth of the wells range from 111-430 feet.

Source water assessment and its availability

A wellhead protection program was developed in the System's Water System Plan. This is important because it identifies the origins of contaminants within our area and indicates the susceptiblity of our water system to them. The sources have a low susceptibility to contamination.

Why are there contaminants in my drinking water?

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's (EPA) Safe Drinking Water Hotline (800-426-4791).
The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity:
microbial contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife; inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, or farming; pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses; organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems;

and radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities. In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

How can I get involved?

The Lake Limerick Board of Directors and Water Committee hold monthly meetings and the entire community has an annual meeting. All members are welcome to attend. Please visit the community website or call the main office for scheduling.

Water Conservation Tips

Did you know that the average U.S. household uses approximately 400 gallons of water per day or 100 gallons per person per day? Luckily, there are many low-cost and no-cost ways to conserve water. Small changes can make a big difference – try one today and soon it will become second nature.

- Take short showers - a 5 minute shower uses 4 to 5 gallons of water compared to up to 50 gallons for a bath.
- Shut off water while brushing your teeth, washing your hair and shaving and save up to 500 gallons a month.
- Use a water-efficient showerhead. They're inexpensive, easy to install, and can save you up to 750 gallons a month.
- Run your clothes washer and dishwasher only when they are full. You can save up to 1,000 gallons a month.
- Water plants only when necessary.
- Fix leaky toilets and faucets. Faucet washers are inexpensive and take only a few minutes to replace. To check your toilet for a leak, place a few drops of food coloring in the tank and wait. If it seeps into the toilet bowl without flushing, you have a leak. Fixing it or replacing it with a new, more efficient model can save up to 1,000 gallons a month.
- Adjust sprinklers so only your lawn is watered. Apply water only as fast as the soil can absorb it and during the cooler parts of the day to reduce evaporation.
- Teach your kids about water conservation to ensure a future generation that uses water wisely. Make it a family effort to reduce next month's water bill!
- Visit www.epa.gov/watersense for more information.

Source Water Protection Tips

Protection of drinking water is everyone's responsibility. You can help protect your community's drinking water source in several ways:

- Eliminate excess use of lawn and garden fertilizers and pesticides – they contain hazardous chemicals that can reach your drinking water source.
- Pick up after your pets.
- If you have your own septic system, properly maintain your system to reduce leaching to water sources or consider connecting to a public water system.
- Dispose of chemicals properly; take used motor oil to a recycling center.
- Volunteer in your community. Find a watershed or wellhead protection organization in your community and volunteer to help. If there are no active groups, consider starting one. Use EPA's Adopt Your Watershed to locate groups in your community, or visit the Watershed Information Network's How to Start a Watershed Team.
- Organize a storm drain stenciling project with your local government or water supplier.

Stencil a message next to the street drain reminding people “Dump No Waste - Drains to River” or “Protect Your Water.” Produce and distribute a flyer for households to remind residents that storm drains dump directly into your local water body.

Additional Information for 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. Lake Limerick 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. The water system completed a series of lead and copper sampling in 2011 and had no results that exceeded the action level for these contaminants.

Water Quality Data Table

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of contaminants in water provided by public water systems. The table below lists all of the drinking water contaminants that we detected during the calendar year of this report. Although many more contaminants were tested, only those substances listed below were found in your water. All sources of drinking water contain some naturally occurring contaminants. At low levels, these substances are generally not harmful in our drinking water. Removing all contaminants would be extremely expensive, and in most cases, would not provide increased protection of public health. A few naturally occurring minerals may actually improve the taste of drinking water and have nutritional value at low levels. Unless otherwise noted, the data presented in this table is from testing done in the calendar year of the report. The EPA or the State requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not vary significantly from year to year, or the system is not considered vulnerable to this type of contamination. As such, some of our data, though representative, may be more than one year old. In this table you will find terms and abbreviations that might not be familiar to you. To help you better understand these terms, we have provided the definitions below the table.

Contaminants	MCLG or MRDLG	MCL, TT, or MRDL	Your Water	Range Low	Range High	Sample Date	Violation	Typical Source
Inorganic Contaminants								
Nitrate [measured as Nitrogen] (ppm)	10	10	0.3	0.2	0.8	2011	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Microbiological Contaminants								
Total Coliform (positive samples/month)	0	1	1	NA		2011	No	Routine coliform sample failure in january, repeat samples negative.
Radioactive Contaminants								
Alpha emitters (pCi/L)	0	15	3	3	3	2011	No	Erosion of natural deposits
Radium (combined 226/228) (pCi/L)	0	5	1	1	1	2011	No	Erosion of natural deposits

Contaminants	MCLG	AL	Your Water	Sample Date	# Samples Exceeding AL	Exceeds AL	Typical Source
Inorganic Contaminants							
Lead - action level at consumer taps (ppb)	0	15	1	2011	0	No	Corrosion of household plumbing systems; Erosion of natural deposits

Copper - action level at consumer taps (ppm)	1.3	1.3	0.09	2011	0	No	Corrosion of household plumbing systems; Erosion of natural deposits

Unit Descriptions

Term	Definition
ppm	ppm: parts per million, or milligrams per liter (mg/L)
ppb	ppb: parts per billion, or micrograms per liter (µg/L)
pCi/L	pCi/L: picocuries per liter (a measure of radioactivity)
positive samples/month	positive samples/month: Number of samples taken monthly that were found to be positive
NA	NA: not applicable
ND	ND: Not detected
NR	NR: Monitoring not required, but recommended.

Important Drinking Water Definitions

Term	Definition
MCLG	MCLG: Maximum Contaminant Level Goal: 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.
MCL	MCL: Maximum Contaminant Level: 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.
TT	TT: Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.
AL	AL: Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
Variances and Exemptions	Variances and Exemptions: State or EPA permission not to meet an MCL or a treatment technique under certain conditions.
MRDLG	MRDLG: Maximum residual disinfection level goal. 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.
MRDL	MRDL: Maximum residual disinfectant level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MNR	MNR: Monitored Not Regulated
MPL	MPL: State Assigned Maximum Permissible Level

For more information please contact:

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Port Orchard, WA 98366
Phone: 360-876-0958
Fax: 360-876-4196
E-Mail: Bill@nwwatersystems.com
Website: nwwatersystems.com

Sanitary Survey
Lake Limerick Water System
WSID: 44150-T

EXECUTIVE SUMMARY:

The Lake Limerick Water System (DOH ID 44150) had the following deficiencies noted in their last sanitary survey:

Item	Corrected
Provided photos of reservoir vents and hatches	Jan, 2011
Installed Raw Water Sample Tap on Well 6	Feb, 2011
Installed operational PRV on hydropneumatic tanks in service	Pending, anticipated Q2 of 2013

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

December 8, 2010	Lake Limerick Water ID # 44150T	
	County:	Mason
Ken Douglas Lake Limerick Country Club, Inc. East 790 Street Andrews Drive Shelton, Washington 98584	System Type:	Community
	Operating Permit Color:	Green
	Surveyor:	Regina Grimm
	Inspection Date	November 19, 2010

Thank you to Ken Douglas for meeting with me on November 19, 2010, 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.

This report documents the findings of this survey. The following summarizes the deficiencies that need your attention.

OTHER FINDINGS

- The vents and hatches were not inspected during this survey. Photos showing the conditions of the screens and the hatches must be submitted to ODW to verify they are in good condition. The photos of the hatches should show the outside condition and underside of the opened hatch. **Please submit photo documentation no later than February 28, 2011.**
- A raw water sample tap must be installed for sampling Well #6 (S08). This should be installed by the next survey.
- An operational pressure relief valve must be installed at each hydroneumatic tank that is in use. **Please install these and submit photo documentation by February 28, 2011.**

As you complete the items noted above, send me photo verification of the items you have completed. Include the system name, ID number, and the date the deficiencies were corrected. You can e-mail at regina.grimm@doh.wa.gov or our sanitary survey coordinator Denise Miles at SWRO.SanitarySurveys@doh.wa.gov. You can also mail them to me at PO Box 47823, Olympia, Washington 98504-7823.

SYSTEM INFORMATION

This system is approved as a community water system with an unspecified number of connections. This system is approved to serve 1,250 equivalent residential units (ERU). The last water system plan was approved in 2007. There are currently 797 residential connections, 451 recreational connections, and 2 institutional connections. The recreational connections use less than one ERU.

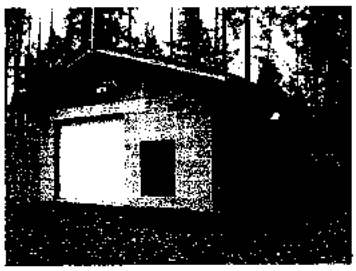
Following is a detail of each individual element and deficiency.

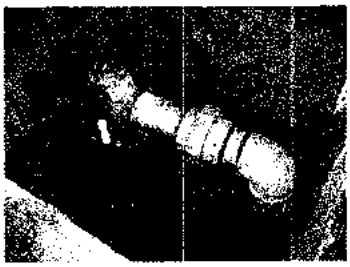
SECTION 1: SOURCE

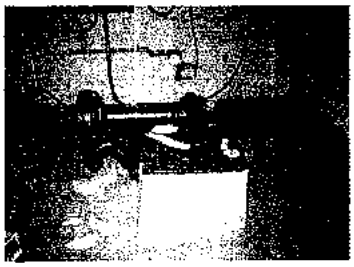
This system has six active sources and one seasonal source.

Source ID #	Name:	Type:	Ecology Tag #	Use:
02	WELL # 2 AHA978	Groundwater	AHA978	Emergency
03	WELL # 3A AHA976 (Not inspected due to well construction.)	Groundwater	AHA976	Permanent
04	WELL # 4 AHA973	Groundwater	AHA973	Permanent
05	WELL #1 AHA974	Groundwater	AHA974	Permanent
06	WELL #3B AHA975	Groundwater	AHA975	Seasonal
07	WELL #5 AHA977	Groundwater	AHA977	Permanent
08	WELL #6	Groundwater		Permanent

WELLHEAD	Source ID # 02		Source ID # 04		Source ID # 05		Source ID # 06		Source ID # 07		Source ID # 08	
	Yes	No	Yes	No	Yes	No	Yes	No	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	Monthly		Monthly		Monthly		Monthly		Monthly		Monthly	
Frequency of source meter reading	Daily		Daily		Daily		Daily		Daily		Daily	







WELL PUMP EQUIPMENT	Source ID # 02		Source ID # 04		Source ID # 05		Source ID # 06		Source ID # 07		Source ID # 08	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Pump type	Submer.		Submer.		Submer.		Submer. w/ pitless		Submer.		Submer.	
Pumping capacity (gpm)	200		92		75		210		200		200	
Functional pump controls	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
Generator available	☒	☐	☐	☒	☐	☒	☐	☒	☐	☒	☒	☐
Generator has automatic startup	Yes										Yes	
Type of generator provided	Deisel										Propane	

BUILDINGS/ENCLOSURE	Source ID # 02		Source ID # 04		Source ID # 05		Source ID # 06		Source ID # 07		Source ID # 08	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Structure locked	☒	☐	☒	☐	☒	☐	☐	☐	☒	☐	☒	☐
Facility in good condition	☒	☐	☒	☐	☒	☐	☐	☐	☒	☐	☒	☐

Well #6 must have a source sample tap to comply with the Ground Water Rule.

Most sources do not have pressure gauges and some do not have pressure release valves. These should be installed wherever there is the potential for pressure buildup in case of pump control failure.

SECTION 2: DISINFECTION

This system does not have disinfection treatment.

SECTION 3: OTHER TREATMENTS

This system does not have treatment.

SECTION 4: DISTRIBUTION SYSTEM

Th majority of the distribution system is 4-inch to 6-inch AC pipe. It was installed in 1964/1965 when the development was constructed. The condition of the distribution system is good. Pressures are adequate and there is low distribution leakage. Eventually this system plans to replace the distribution with 6-inch to 8-inch pipe to provide fire flow.

FEATURES	Yes	No
Service area and facility map	☒	☐
Minimum pressure requirements met	☒	☐
Service meters (reading frequency is monthly)	☒	☐
Leak detection program	☒	☐
Water system leakage (%)	4-8%	
Adequate valving for flushing and pipe repair	☐	☒
Blow-offs on dead ends	☒	☐
Routine flushing (frequency is 2 times per year)	☒	☐
Routing valve exercise (frequency is once per year)	☒	☐

CROSS CONNECTION CONTROL (Community Systems)	Yes	No
Enabling authority	☒	☐
High hazards identified and protected	☒	☐
Annual testing	☐	☒
Hazard inspections	☒	☐
Proper installation standards	☒	☐

To more efficiently isolate portions of the system for repairing line breaks, there are some locations where more isolation valves should be installed.

The cross connection program is being implemented, but annual testing has not been implemented. This system plans to do its annual testing in-house for customers.

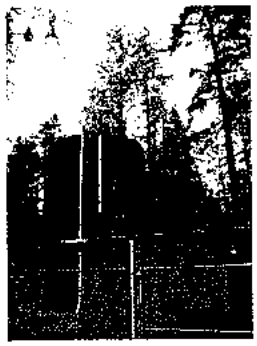
SECTION 5: FINISHED WATER STORAGE

Reservoir	Reservoir Name	Description	Year Built	Total Volume (gal)
1	Reservoir #1	Steel Reservoir		
2	Reservoir #3 (Not inspected)	Mt. Baker Silo Tank	1993	
3	Reservoir #4	Mt. Baker Silo Tank		
4	Reservoir #6	Mt. Baker Silo Tank		

HATCH	Reservoir 1		Reservoir 3		Reservoir 4	
	Yes	No	Yes	No	Yes	No
Locked	☐	☐	☐	☐	☐	☐
Watertight seal or gasket	☐	☐	☐	☐	☐	☐
Over-lapping cover	☐	☐	☐	☐	☐	☐

FEATURES	Reservoir 1		Reservoir 3		Reservoir 4	
	Yes	No	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	All Reservoirs Inspected	
	Yes	No
Frequency of interior inspection	Every 2 years	
Frequency of routine site visit	Quarterly	
Exterior in good condition	☒	☐
Clear of excessive vegetation	☒	☐



The vents and hatches were not inspected during this survey. Photos showing the conditions of the screens and the hatches must be submitted to ODW to verify they are in good condition. The photos of the hatches should show the outside condition and underside of the opened hatch.

SECTION 6: PRESSURE TANKS

This system has several pressure tanks, but they are not all going to be used or currently being used.

Site	Location	# of Hydropneumatic Tanks	# of Bladder Tanks
1	Well #1	1	
2	Well #2 (Not in operation and to be removed)	1	
3	Well #3A &B (Not inspected due to construction)	1	
4	Well #4		1
5	Well #5	1	

HYDROPNEUMATIC	Site: 1		Site: 5	
	Yes	No	Yes	No
Pressure Relief Valve	☐	☒	☒	☐
Pressure Gauge	☒	☐	☒	☐
Water Level Sight Glass	☒	☐	☒	☐
Can be Isolated	☒	☐	☒	☐
Air Compressor	☒	☐	☒	☐

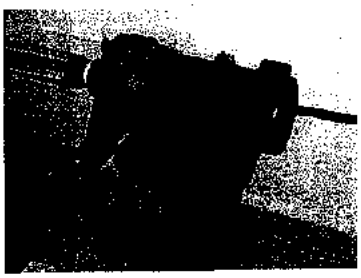
BLADDER	Site: 4	
	Yes	No
Isolation Valve	☒	☐
Pressure Relief Valve	☐	☒
Pressure Gauge	☒	☐

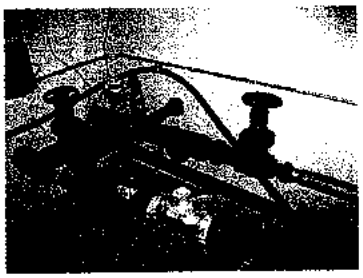
An operational pressure relief valve must be installed for each hydroneumatic tank and bladder tank that is in use.

SECTION 7: BOOSTER PUMPS AND FACILITIES

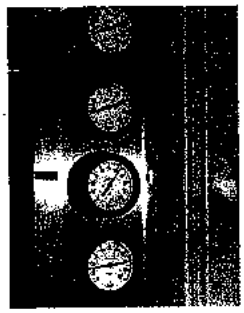
Facility	Name	Description	Total Capacity (gpm)
1	Well #1 Booster	Located at Well #1 well site.	100
2	Well #3A&B Booster	Located at Well #3&B well site (Was not inspected).	
3	Well #4 Booster	Located at Well #4 well site.	100 to 150
4	Well #6 Booster	Located at the Well #5 well site.	400 to 450

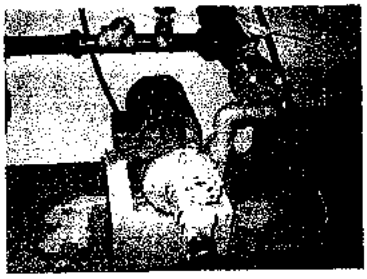
BOOSTER PUMPS	Facility 1		Facility 3		Facility 4	
	Yes	No	Yes	No	Yes	No
Number of pumps	1		2		4	
Frequency of routine site visit						
Redundant pumps	☐	☒	☒	☐	☒	☐
Protected from flooding	☒	☐	☒	☐	☒	☐
Facility is secure	☒	☐	☒	☐	☒	☐
Structure in good condition	☒	☐	☒	☐	☒	☐
Equipment in good condition	☒	☐	☒	☐	☒	☐

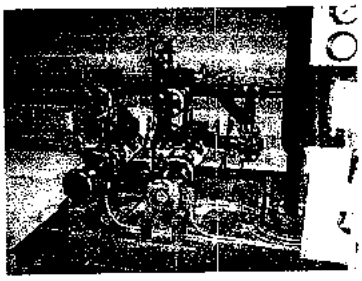


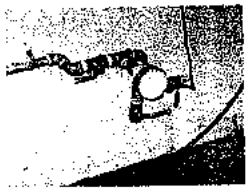


APPURTENANCES	Facility 1		Facility 2		Facility 3	
	Yes	No	Yes	No	Yes	No
Isolation valves	☒	☐	☒	☐	☒	☐
Pressure gauge(s)	☒	☐	☒	☐	☐	☒
Pressure relief valve	☐	☒	☐	☒	☒	☐
Pump failure alarm	☒	☐	☒	☐	☒	☐
Control systems functional	☒	☐	☒	☐	☒	☐









SECTION 8: WATER QUALITY MONITORING AND REPORTING

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

CHEMICAL	All Active Sources	
	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/Action Level exceedance(s) ☐ Secondary MCL exceedance(s) ☐ Organic detections ☐

COLIFORM	Yes	No
Monitoring adequate	☒	☐
Monitoring plan adequate	☒	☐
Monitoring plan followed	☒	☐
# of violations since last survey	1	

SECTION 9: SYSTEM MANAGEMENT AND OPERATIONS

This system is operated very well and maintained in good condition. During this survey, work was being done on Well 3A to replace the well pump. Also, a new SCADA system is being installed.

PROJECT/PLANNING	Yes	No
System approved	☒	☐
Current WSP/SWSMP	☒	☐
Year WSP/SWSMP approved	2007	
Distribution main submittal exemption	☒	☐
Water Use Efficiency or Conservation plan	☒	☐
Emergency response plan	☒	☐

REPORTING	Yes	No
WFI reviewed and updated with purveyor	☒	☐
Consumer confidence report	☒	☐
Water use efficiency report	☒	☐
Cross connection control annual report (> 1000 conn)	☒	☐

OPERATOR CERTIFICATION

This system is required to have a WDM2 as its certified operator.

Name of Operator	Certification Number	Certifications	Mandatory Operator
Kenneth Douglas	006766	WDM2	☒

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

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 and documented	☒	☐
# of complaints recorded at ODW (since last survey)	None	
Operation and maintenance program	☒	☐
Previous survey deficiencies corrected	☒	☐

CLOSING

Regulations establishing a schedule of fees, including fees for sanitary surveys, were adopted August 3, 2007 (WAC 246-290-990). The total cost of this survey is $1,836.

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

Sincerely,

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

cc: Mason County Public Health

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

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

TO: KENNETH DOUGLAS
LAKE LIMERICK WATER
E 790 ST ANDREWS DR
SHELTON WA 98584

ATTN: ACCOUNTS PAYABLE DEPT

Invoice Number	SW173
Invoice Date	December 8, 2010
Billing Period	30 days SW

DATE	DESCRIPTION	QTY	COST	AMOUNT
12/8/2010	SURVEY FEE LAKE LIMERICK WATER MASON COUNTY PWS ID 44150 DATE OF SURVEY: 11/19/2010	1	1	$1,836.00
	DOH Share			$0.00
	Total			$1,836.00
	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

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

NAME	LAKE LIMERICK WATER
INVOICE NUMBER	SW173
INVOICE DATE	December 8, 2010 SW
AMOUNT	$1.836.00

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

DOH Form #331-332

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

Local Government Consistency Review Checklist

Water System Name: **Lake Limerick Country Club** PWS ID: **44150 T**

Planning/Engineering Document Title: **Water System Plan** Plan Date: **December 2012**

Local Government with Jurisdiction: **Mason County**

WAC 246-290-108 Consistency with local plans and regulations:
Consistency with local plans and regulations applies to planning and engineering documents under WAC 246-290-106, 246-290-107, and 246-290-110(4)(b)(ii).

1) Municipal water suppliers must include a consistency review and supporting documentation in its planning or engineering document describing how it has addressed consistency with **local plans and regulations**. This review must include specific elements of local plans and regulations. This review must include specific elements of local plans and regulations, as they reasonable relate to water service as determined by Department of Health (DOH). Complete the table below and see instructions on back.

Local Government Consistency Statement	Page(s) in Planning Document	Yes – No – Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the applicable service area.	**Section 1.5, 1.6, maps in Section 10.7**	
b) The six-year growth projection used to forecast water demand is consistent with the adopted city/county's population growth projections. If a different growth project is used, provide an explanation of the alternative growth projection and methodology.	**Section 2.3**	
c) Applies to cities and towns that provide water service: All water service area policies of the city or town are consistent with the utility service extension ordinances of the city or town.	**Not applicable**	
d) Service area policies for new service connections are consistent with the adopted local plans and adopted development regulations of all jurisdictions with authority over the service area {City(ies), County(ies)].	**Sections 1.8, 1.9**	
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable: Coordinated Water System plans, Regional Wastewater plans, Reclaimed Water plans, Groundwater Area Management plans, and Capital Facilities Element of Comprehensive plans.	**Section 1.4**	

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 Date

Printed Name, Title and Jurisdiction

Consistency Review Guidance
For Use by Local Governments and Municipal Water Suppliers

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the retail service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place of use. If no water right place of use expansion is requested, a consistency review is not required.

For **engineering documents**, a consistency review is required for areas where a municipal water supplier wants to expand its water right's place of use (water system plan amendment is required). For non-community water systems, a consistency review is required when requesting a place of use expansion. All engineering documents must be submitted with a service area map per WAC 246-290-110(4)(b)(ii).

A) Documenting Consistency: Municipal water suppliers must document all of the elements in a consistency review per WAC 246-290-108.

1 a) Provide a copy of the adopted land use/zoning map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that are related to water supply planning.

1 b) Include a copy of the six-year growth projections that corresponds to the service area. If the local population growth rate projections are not used, provide a detailed explanation on why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.

1c) Include water service area policies and show that they are consistent with the utility service extension ordinances within the city or town boundaries. This applies to cities and towns only.

1 d) Include all service area policies for how new water service will be provided to new customers.

1 e) Other relevant elements related to water supply planning as determined by the department (DOH). See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and provide direction on how this inconsistency can be resolved.

C) Documenting Lack of Consistency Review by Local Government: Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for their review. Please include: name of contact, date, and efforts made (letters, phone calls, and e-mails). In order to self-certify, please contact the DOH Planner.

Planning • Management • Engineering
P.O. Box 123 • Port Orchard, WA 98366 • 888-881-0958 • 360-876-0958

DATE

Mason County Community Development, MS-36
c/o Barbara Adkins, Director
PO Box 279
Shelton, WA 98584

Re: Lake Limerick Country Club – Water System Plan
Local Government Consistency Review Checklist

Dear Ms. Adkins:

The Lake Limerick Country Club (DOH System ID 44150-T) has completed an update to the Water System Plan. Northwest Water Systems prepared the planning document on behalf of Lake Limerick and seeks your review and concurrence in regard to the required Local Government Consistency Review Checklist.

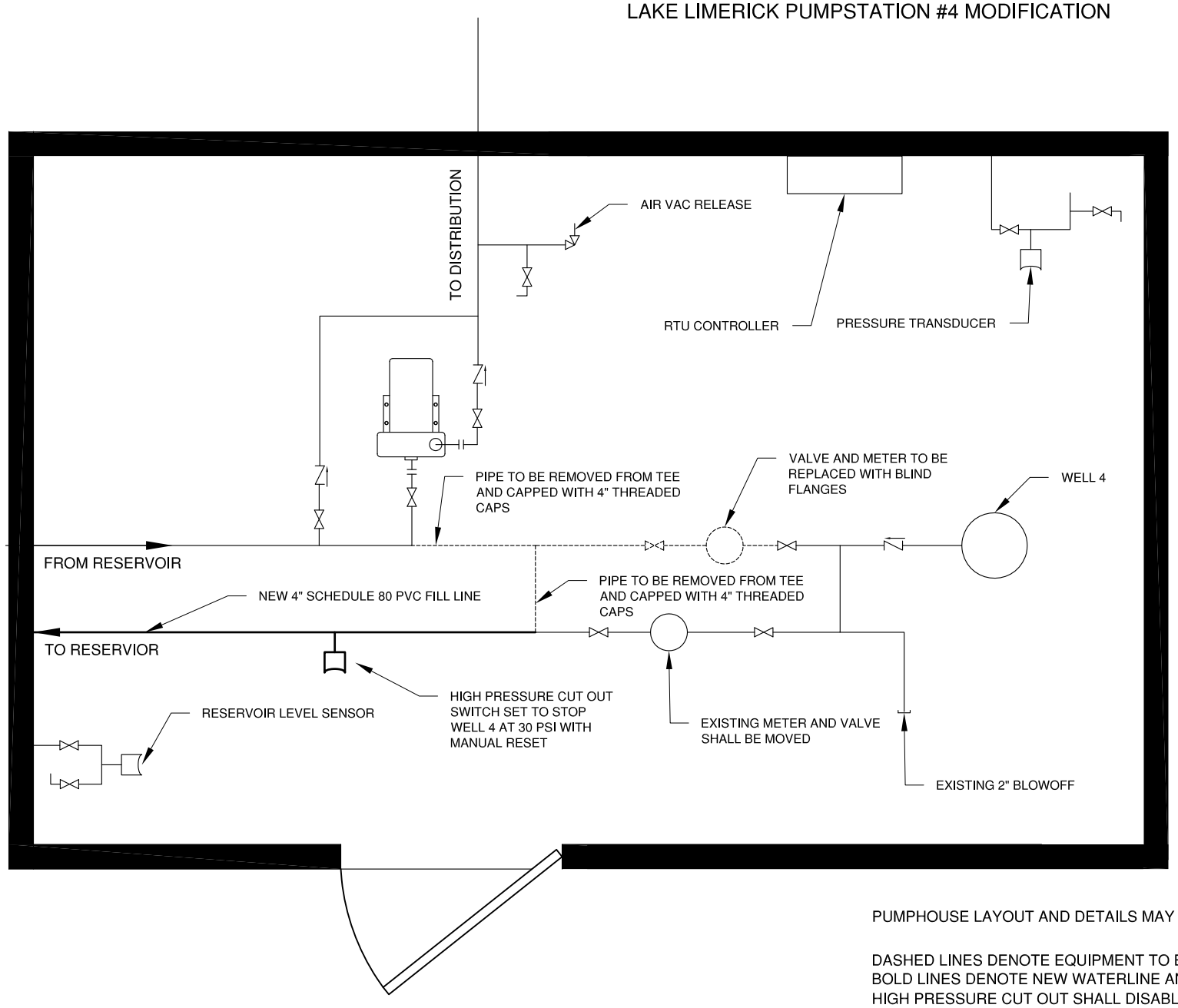
Please find enclosed relevant portions of the Water System Plan for your review. A copy of the DOH's Local Government Consistency Review Checklist is also enclosed. If you have any questions or need any other information, please call me at 360-876-0958, extension 108, or email jester@nwwatersystems.com.

Sincerely

Jester Purtteman
NORTHWEST WATER SYSTEMS, INC.

enclosure

LAKE LIMERICK PUMPSTATION #4 MODIFICATION



UNION

GATE VALVE

SAMPLE TAP / TANK DRAIN

CHECK VALVE

PUMPHOUSE LAYOUT AND DETAILS MAY VARY AS LONG AS THE INTENT OF THE DESIGN IS MET.

DASHED LINES DENOTE EQUIPMENT TO BE MOVED OR REMOVED.
BOLD LINES DENOTE NEW WATERLINE AND EQUIPMENT
HIGH PRESSURE CUT OUT SHALL DISABLE WELL PUMP AND TRIGGER ALARM ON RTU
ALL NEW PLUMBING SHALL BE 4" SCHEDULE 80 PVC
ALL WATERLINE INSTALLED BETWEEN PUMP-STATION AND RESERVOIR SHALL MEET THE STANDARDS OF THE WATERLINE INSTALLATION DETAIL. WATERLINE SHALL BE FROST PROTECTED IF IT EXITS THE BUILDING LESS THAN 18" BELOW GRADE

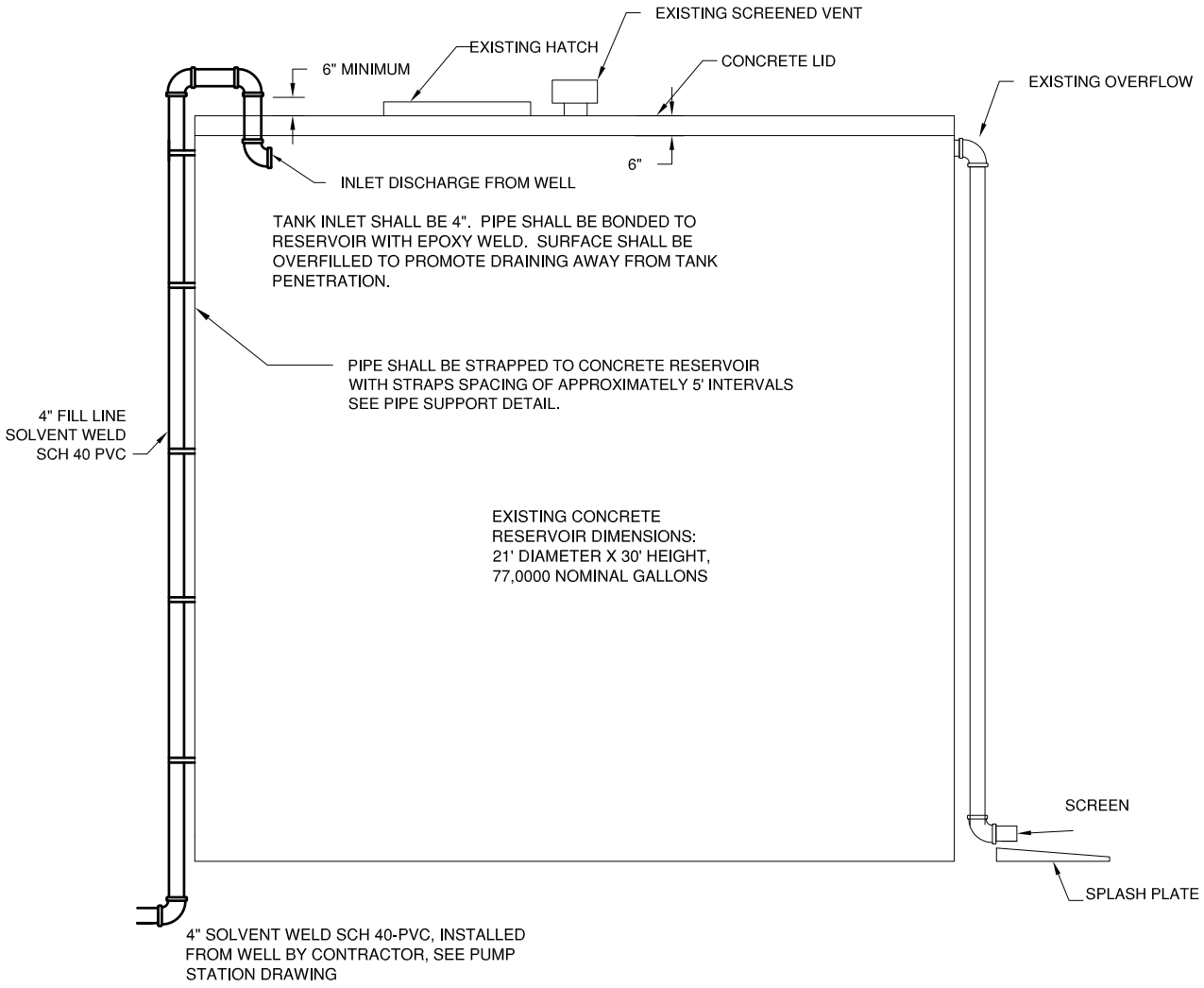
REVISION	
DESCRIPTION	DATE

TITLE: LAKE LIMERICK PUMPSTATION #4

FILE NO.	FILE NAME	SHEET NO.
120805	PUMPHOUSE	OF
DATE: MARCH 18, 2013	SCALE: 1/2" = 1'	

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958

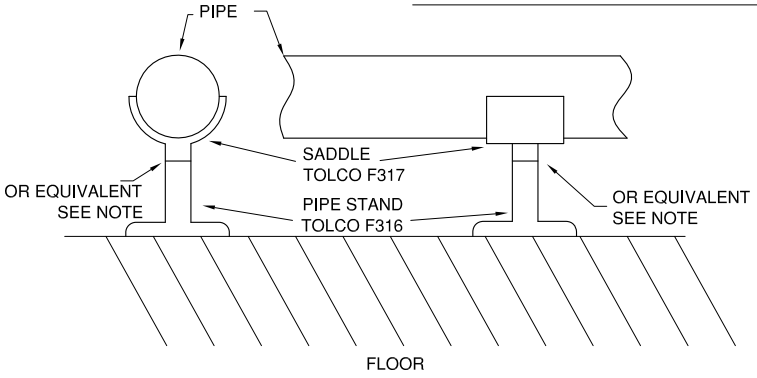
TANK #4 CROSS SECTION

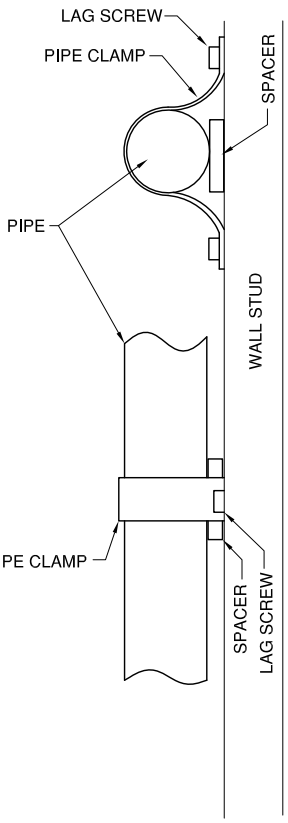


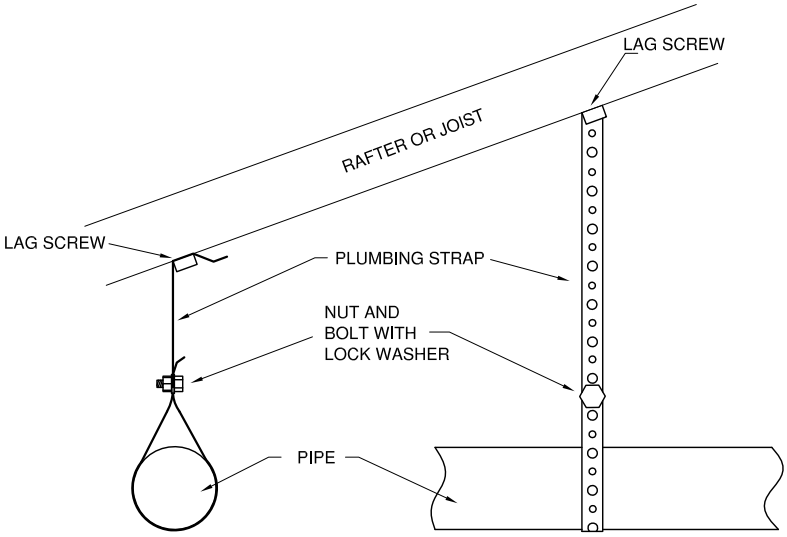
TITLE: LAKE LIMERICK TANK #4 CROSS SECTION		
FILE NO.: 120805	FILE NAME: TANK SECTION	SHEET NO.: OF
DATE: MARCH 18, 2013	SCALE: NO SCALE	

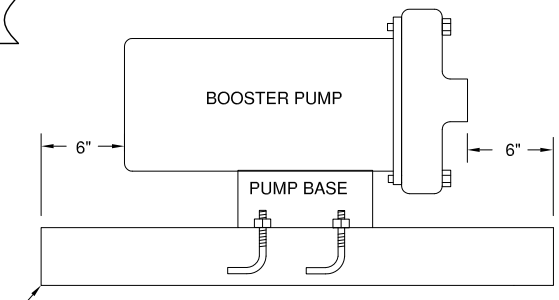
NORTHWEST WATER SYSTEMS
DESIGN–CONSULTING–MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876–0958

ANCHORING DETAILS









POURED CONCRETE BASE WITH 1/2"-ANCHOR BOLTS (4 MINIMUM). BASE HEIGHT 3.5" EXTENDING A MINIMUM OF 6" PAST LENGTH AND WIDTH OF PUMP

DRILLED HOLES AND CONCRETE ANCHOR LAGS INSTALLED INTO PUMPHOUSE FLOOR MAY BE SUBSTITUTED FOR CONCRETE BASE

NOTES:

PIPE SUPPORTS SHALL BE SPACED AT A MINIMUM OF EVERY FOUR FEET

BOOSTER PUMPS AND CHEMICAL FEED PUMPS SHALL BE SECURED USING MASONARY OR WOOD LAGS AS APPROPRIATE AND PUMP BRACKETS SUPPLIED BY THE MANUFACTURER

ALL PIPE SUPPORTS SHALL SUPPORT THE WEIGHT OF THE PIPE AND WATER. SUPPORTS SHALL BE CONFIGURED IN SUCH A WAY AS TO PROTECT THE PIPES FROM PHYSICAL DAMAGE.

ALL SUPPORTS SHALL BE CONSTRUCTED OF MATERIAL THAT RESISTS CORROSION.

EQUIVALENT SUPPORTS (MASONARY BLOCKS, PIPE RACKS, COMPRESSION CLAMPS, U-CHANNEL, ETC.) MAY BE USED AS SUPPORTS AND ANCHORS AS LONG AS THEY FOLLOW GENERALLY ACCEPTED INDUSTRY STANDARDS AND WSDOH GUIDELINES.

DRAWING: ANCHORING DETAILS		
FILE NO.: DETAILS	FILE NAME: ANCHORING	SHEET NO.
DATE: MARCH 18, 2013	SCALE: NTS	

NORTHWEST WATER SYSTEMS
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P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876–0958