

# *WATER SYSTEM CAPACITY ANALYSIS*

## *Scatchet Head Water District*

*PWS ID: 76470 X  
Clinton, WA 98236*

*February 2018*

*Owner:*

*Scatchet Head Water District  
7906 Guemes Ave  
Clinton, WA 98236  
Contact: Edward Schoeler  
Phone: (360) 578-7044*

*For Submittal to:  
Northwest Regional Office  
of Drinking Water  
Washington State  
Department of Health  
Kent, WA*

**CERTIFICATE OF ENGINEER**

The technical material and data contained within this report has been prepared by or under the direction of the following registered professional engineer(s), licensed in accordance with the laws of the State of Washington to practice in the State of Washington.



**QUICK REFERENCE PROJECT INFORMATION**

**General Project Information**

<b>Water System Name</b>	Scatchet Head Water District
<b>Project Description</b>	Capacity Analysis to Support additional connections
<b>Well #2/Well #3 &amp; Pumphouse</b>	Parcel # S8110-00-12018-2 8070 George Dr, Clinton, WA 98236
<b>Reservoir #1</b>	Parcel # S8110-00-05013-0 Guemes Ave, Clinton, WA 98236
<b>Reservoir #2</b>	Parcel # S6413-00-0000C-0 Maple Point Drive, Clinton, WA 98236
<b>System Operator</b>	Sandra V. Bodamer, King Water Company
<b>System Engineer</b>	Jeff Tasoff, P.E., Davido Consulting Group, Inc.

**Project Summary**

<b>System Capacity</b>	597 Equivalent Residential Units (ERUs)
<b>System Design Values</b>	Average Day Demand = 200 gpd/ERU (Summer) Maximum Day Demand = 425 gpd/ERU Peak Hour Demand = 366 gpm
<b>Source Production &amp; Submersible Pumps</b>	S01- Well #1 - Emergency use only S02- Well #2 - 125 gpm, 30 HP pump, Goulds Model 160CLC030, 12 stage, 3450 rpm, 480/277 VAC, three phase (1980) S03- Well #3 - 66 gpm, Goulds Model 70J15, 15 HP, 13 stages, 3450 rpm, 480/277 VAC, three phase (1995)
<b>Water Rights</b>	G1-23621C: S02, Priority Date: June 11, 1980 $Q_i = 125 \text{ gpm} \ \& \ Q_a = 140.4 \text{ Ac-Ft/year}$ G11-20574P: S03, Priority Date: April 29, 1973 $Q_i = 90 \text{ gpm} \ \& \ Q_a = 101 \text{ Ac-Ft/year}$ Total: $Q_i = 215 \text{ gpm} \ \& \ Q_a = 241.4 \text{ Ac-Ft/year}$
<b>Treatment</b>	Chlorination, Aeration & Filtration
<b>Storage</b>	#1 – 300,000 gallon Guemes Avenue Reservoir: 24.0' diameter x 85' tall #2 – 120,000 gallon Maple Point Drive Reservoir: 14.6' diameter x 95.0' tall
<b>Booster Pumps</b>	(4) Aurora Series 340 / 360, 7.5 HP, 3500 RPM – 200 gpm at 45 psi (260 gpm at 30 psi)
<b>Horizontal Pneumatic Tanks</b>	2,120 gallon Canal Boiler Works 66" diameter x 10' horizontal
<b>Pump Controls</b>	All pumps off 55 psi Lead pump on 37 psi Lag pump on 35 psi Fire pumps on 32 psi
<b>Hydraulic Zones (elevation above sea level)</b>	Zone 1 (Low): 150 HGL ~ 60 ERUs Zone 2 (Intermediate): 285 HGL ~ 79 ERUs Zone 3 (High): 445 HGL ~ 353 ERUs

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## **1. PROJECT DESCRIPTION**

### **1.1 General Description of Proposal**

This project report provides an analysis of the existing capacity of Scatchet Head Water District's water system to support an increase in the approved number of connections up to 597 ERUs. This report also includes a brief description of future system needs.

### **1.2 Existing Configuration**

The water system is currently served by two groundwater wells (Well #2 and Well #3) with 30 and 15 HP submersible pumps, respectively. Well #2, installed in 1980, is capable of providing 125 gpm and Well #3, installed in 1995, provides 66 gpm. The Water Facilities Inventory (WFI) lists the production of these wells at 150 gpm and 80 gpm. Please see APPENDIX A for existing system information including copies of the well logs and the WFI. Water Right limitations set the maximum withdrawal rate from both wells at 215 gpm. See APPENDIX C for a copy of the system's water right.

Source water from the system's wells are treated by an oxidation/filtration system. The treatment system consists of pre-chlorination, aeration, contact time in retention vessel (contact tank) and pressure filtration utilizing Birm<sup>®</sup> media. The treatment system was designed to reduce the levels of iron and manganese to less than 50 percent of the Maximum Contamination Levels (MCL). The pre-chlorination is provided to mitigate fouling of the treatment media by iron and sulfate-reducing bacteria. The water treatment system discharges directly to the top of the adjacent 300,000 gallon reservoir.

The reservoir located adjacent to the treatment/booster pump building is referred to as the Guemes Avenue Reservoir (or Reservoir #1). The Guemes Avenue Reservoir (Reservoir #1), installed in 1994, is 24' in diameter and 85' tall with storage capacity of approximately 300,000 gal. The system has a second supplemental reservoir, located at the end of Maple Point Drive. The Maple Pt. Dr. Reservoir (Reservoir #2) was installed in 1997 and serves as a standby storage. It is 14.5' in diameter and 95' tall with storage capacity of approximately 119,000 gallons. The Guemes Avenue and Maple Point Drive reservoirs are located at an elevation of 365 feet and 350 feet, respectively. Float level switches in the Guemes Avenue reservoir control the operation of the well pumps. An altitude valve maintains the water level in the Maple Point Reservoir.

A booster pump station located within the treatment/pump house building provides pressurized water to the distribution system. The booster pump system is composed of four booster pumps with automated alternate operation. These identical booster pumps are Aurora Series 340 / 360, 7.5 HP, 3500 RPM. Each pump is capable of supplying 200 gpm at 45 psi (260 gpm at 30 psi). A 2,120 gallon hydropneumatic tank provides pump protection.

The main pressure distribution system is a combination of 4, 6 and 8-inch diameter polyvinyl chloride pipes (PVC). The distribution system is divided into three pressure zones. The high zone maintains a hydraulic grade line (HGL) of 445'. The intermediate zone has HGL of 280' and low

zone has a HGL of 150'. There are 353, 79 and 60 lots in the high, intermediate and low zones, respectively. These areas are separated pressure reducing valves along Periwinkle Street, Fidalgo Street and Driftwood Drive. The booster pumps are located at an elevation of 365 feet with minimum pressure of 35 psi or 80 feet which equates to the 445' HGL. The elevations of the intermediate pressure reducing valves are approximately 180' and have a downstream pressure of 45 psi. This equates to 285' HGL, The Driftwood Drive PRV has a downstream pressure of 55 psi which equates to 150 HGL. The locations of the existing wells, pump house and reservoirs and the pressures zones are highlighted in FIGURE 1, below.

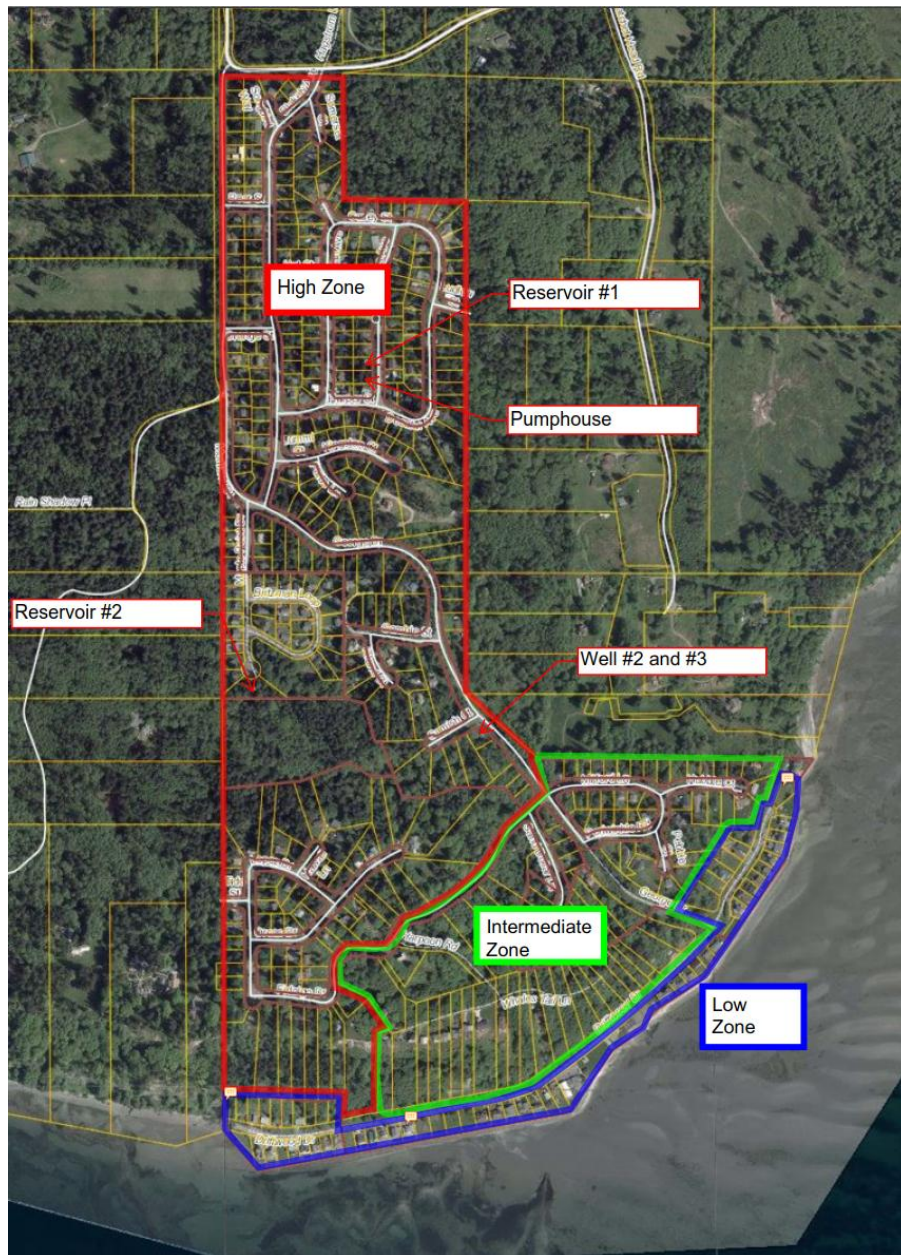


FIGURE 1 Service Area Map

**2. PLANNING**

This report was created to analyze the existing capacity of the system to confirm that the system has adequate capacity to serve the anticipated demand with the existing approved service area and to see if additional connections may be available to support the expansion of the service area. Based on the following analysis, the existing system does have excess capacity that could be utilized to expand the service area to adjacent parcels.

**2.1 Service Area**

There are currently a total of approximately 492 lots within the service area. The existing service area is shown in FIGURE 1 above and as indicated in APPENDIX A. The District does not have a proposed service area currently identified in their planning documents.

**2.2 Local Requirements**

The Public Water System Coordination Act (WAC 248-57-500) required Washington State Department of Health (DOH) to develop fire flow performance standards and implementation means to assure communities meet a minimum level of fire protection. The Island County Code, Chapter 13.03A, also specifies minimum fire flow rates and durations which are equivalent to the DOH requirements. The required fire flow is summarized in Table 1 below.

**Table 1 - Fire Flow Requirements**

<b>Land Use</b>	<b>Fire Flow Rate (gpm)</b>	<b>Residual Pressure (psi)</b>	<b>Duration (minutes)</b>
Residential	500	20	30

The installed booster pump capacity as shown in Section 4.3 below is adequate to meet the fire flow requirements.

**3. WATER QUALITY, QUANTITY AND WATER RIGHTS**

**3.1 Water Quality Test Results**

Past water quality testing indicates compliance of raw water with water quality standards except for manganese which exceeds the maximum contaminant level (MCL). An oxidation filtration system is currently installed to reduce the manganese concentration in the distribution system to below the MCL. The current performance of the treatment system was not investigated as part of this analysis. It is recommended that investigative samples be taken after treatment to determine the efficiency of the treatment system and for long term planning efforts. See APPENDIX E for past water quality test results. The Seawater Intrusion (SWI) risk rating for both wells is classified as low risk, as shown in APPENDIX A.

**3.2 Pump Test Results**

The well information is provided in in APPENDIX A and summarized in Table 2 below

**Table 2 - Well Parameters**

<b>Parameter</b>	<b>Well 2</b>	<b>Well 3</b>
Source (WFI)	S02	S03
Drill Date	May 1980	Oct 1995
Well Tag ID #	ABR417	ABW832
Current Well Production (gpm)	125	66
Water Right Qi (gpm)	125	90
WFI Listed Capacity (gpm)	150	80
Completed Depth	295'	246'
Casing Diameter	10"	8"
Well Head Elevation (estimated)	210'	210'
Perforated Interval	242'-246'	231'-234'
Static Water Level	190'	193'
Pump Test (gpm)	250	66
Drawdown (feet)	40	23
Yield (gpm/foot of drawdown)	6.25	2.87

### 3.3 Water Usage & System Design Values

Water usage from the last seven years was analyzed to determine current design values for the system. The water use data for these periods is provided in APPENDIX B. The annual average day demand (ADD) water usage was 120 gpd/ERU for this period. The summer (June-September) ADD value for the last 3 years is approximately 200 gpd/ERU. For a conservative analysis the summer ADD will be used as the system ADD.

The maximum day demand (MDD) could not be determined from actual water use data due to lack of daily source meter readings. Therefore, a multiplier of 1.7 is used to estimate MDD from maximum monthly average day demand (MADD). The design MADD is 250 gpd/ERU which equates to MDD value of 425 gpd/ERU.

### 3.4 Water Rights

Water Right number G1-23621C (Priority Date June 11, 1980) and G1-20574P (Priority Date April 29, 1973) have been granted to Well #2 and #3, respectively. A copy of the water right certificate for well #2 is provided in APPENDIX C. A copy of the water right certificate for well #3 is not available on the Department of Ecology website and a screenshot of this information is also provided in APPENDIX C. The combined water rights for these wells allow for total instantaneous withdrawal of 215 gpm and an annual withdrawal of 241.4 ac-ft/yr.

**4. DESIGN CRITERIA & SYSTEM ANALYSIS**

**4.1 Limiting Component**

An analysis of the system components, water rights and well capacities was performed to determine which item provided the system’s connection limit. The calculations for this analysis are provided in APPENDIX D and are summarized in Table 3.

**Table 3 – Connection Limiting Factors**

<b>Components</b>	<b>Maximum Value</b>	<b>Potential Connections</b>
Instantaneous Water Right Q <sub>i</sub>	215 gpm	672
Annual Water Right Q <sub>a</sub>	241 ac-ft/year	1,077
Source Capacity	191 gpm	597
Treatment System	240 gpm	751
Booster Pumps	540 gpm	965

The source capacity was determined to be the limiting factor. The water system storage was not included in the initial analysis, but once the assumed connection limit was obtained, the storage reservoir components were analyzed to ensure that the existing storage did not provide any additional system limitations.

**4.2 Peak Hour Demand**

The “*Water System Design Manual*”, Equation 5-3, was used to obtain the estimated Peak Hour Demand (PHD) based upon the available source capacity. The equation uses the MDD and the number of potential connections to determine the PHD flowrate.

$$PHD = \frac{MDD[(C)(N) + F] + 18}{1440}$$

- N = number of potential connections
- C = coefficient based on system size
- F = coefficient based on system size
- MDD = 425 gpd/ERU

The coefficients that are utilized in the above formula are dependent upon the number of connections served. The coefficients are listed in the Table 4.

**Table 4 - Peak Hour Demand Calculation Coefficients**

Range of ERUs	C	F
15-50	3.0	0
51-100	2.5	25
101-250	2.0	75
251-500	1.8	125
501-1,000,000	1.6	225

The total system peak hour demand (PHD) is calculated to be 366 gpm as shown in APPENDIX D.

Based upon the number of potential connections within each pressure zone, the peak flow requirements for each zone are provided in Table 5.

**Table 5 – HGL Zone Flow Requirements**

Pressure Zone	Maximum ERUs	PHD (gpm)
445 HGL	353	242
210 HGL	79	84
130 HGL	60	70

The lower pressure zones are gravity fed and not dependent upon the booster pumps to provide peak flow or fire flow requirements. However, the booster pump capacity is analyzed with the assumption that it will supply the pressure to the entire distribution system.

#### 4.3 Source Capacity Adequacy

The well pumping capacity for Well #2 & Well #3 (125 gpm & 66 gpm) was determined to be the limiting factor for the water system. This calculation was based upon the well pumps being in service for only 55.4 minutes per hour to account for the downtime associated with filter backwashing. The calculations are shown in APPENDIX D.

$$= \frac{191 \text{ gal/min}}{1 \text{ hour}} \times \frac{55.4 \text{ minutes of runtime}}{60 \text{ minutes}} \times \frac{24 \text{ hours}}{1 \text{ day}} \times \frac{\text{ERU}}{425 \text{ gpd}} = 597 \text{ ERUs}$$

#### 4.4 Treatment System Capacity Adequacy

The treatment system capacity of 240 gpm exceeds the combined well pumping capacity for Well #2 & Well #3 (125 gpm & 66 gpm) of 191 gpm. Therefore, the treatment system is capable of meeting the system's anticipated maximum day demand as shown in the calculations provide in APPENDIX D. The currently installed treatment system is capable of meeting the anticipated maximum day demand at full buildout.

#### 4.5 Water Rights

The combined water rights for Well #2 & 3 allow for total instantaneous withdrawal of 215 gpm and an annual withdrawal of 241.4 ac-ft/yr.

The annual water usage at full build-out is estimated by the following equation:

$$\text{ADD} \times \# \text{ of ERUs} \times 365 \text{ days} = \text{Annual Withdrawal}$$

Based upon the ADD value of 200 gpd/ERU and the maximum potential ERU of 597, the estimated annual withdrawal is:

$$\frac{200 \text{ gpd/ERU} \times 597 \text{ ERUs} \times 365 \text{ days}}{43,560 \text{ ft}^2/\text{acre} \times 7.48 \text{ gallons/ft}^3} = 133.8 \text{ ac-ft/year}$$

The estimate annual withdrawal is less than the current water right limit of 241.4 ac-ft/year. The system well's currently have a combined capacity of 191 gpm. The district appears to be in compliance with the instantaneous withdrawal rate of 215 gpm. Compliance with the water right limits is highlighted in the water right self-assessment provided in APPENDIX C.

#### **4.6 Booster Pumps**

The booster pump station is needed to supply pressure to the entire distribution system. The system has a redundant pumping system composed of four Aurora Series 340 / 360 Pumps, 7.5 HP, 3500 RPM. These pumps are capable of providing 220 gpm at 40 psi during normal operation. The pumps provide the capacity to meet both the PHD and the fire flow demands of the system. The installed pumps have a capacity of approximately 260 gpm at 30 psi. 30 psi is the minimum pressure at the pump house to ensure that 20 psi is maintained throughout the distribution system when both peak demand and fireflow is needed.

The fire flow requirement in rural Island County is 500 gpm, while maintaining a minimum system residual pressure of 20 psi in all parts of the distributions system. The remaining booster pump capacity after accounting for fire flow is 540 gpm. The booster pump capacity is summarized in Table 6 below.

**Table 6 - Booster Pump Capacity**

<b>Capacity</b>	<b>flowrate</b>
Total 4 Pumps	1040 gpm
Fireflow	500 gpm
Remaining Capacity for Domestic Flow	540 gpm

#### **4.7 Pressure Tank**

Pressure tank is already installed for pump protection. The pneumatic tank sizing equation for a horizontally oriented tank is provided as Equation 11-1:

$$\text{Total Volume Required: } V_T = \frac{[(P_1 + 14.7)] \times 15 Q_p (\text{MF})}{[P_1 - P_2] N_c}$$

Where:

$V_T$  = Total Volume Required (gallons)

$P_1$  = pump off pressure (55 psi)

$P_2$  = pump on pressure (35 psi)

$Q_p$  = pump capacity (gpm) at the midpoint (45 psi) (200 gpm).

$N$  = number of pump starts per hour. Since a quadruplex alternating pumping system is being specified, a total of 24 starts will be allowed per hour (6 starts for each pump).

MF = Multiplying Factor from Table 11-2 (66" diameter = 1.05)

Based upon the above parameters, a total volume of 460 gallon of storage is needed. The system currently provides 2,120 gallons of storage which is adequate.

#### 4.8 Storage

The system capacity was analyzed using only the Guemes Avenue reservoir, since the Maple Point Drive only provide standby storage capacity. Reservoir #1 is 85' tall round concrete reservoir with an inside diameter of 24 feet. The total capacity is 288,000 gallons or 3,400 gallon/foot of height. The reservoir provides the following storage components:

- Operational Storage (OS)
- Equalizing Storage (ES),
- Stand-by Storage (SBS) and
- Dead Storage (DS)

Operational storage is the height difference between where the well pumps are turned on and off. Equalizing storage is defined as the volume of storage needed to supplement the sources when the peak hourly demand exceeds the total source pumping capacity. Stand-by storage is defined as the volume of stored water available for use during a loss of well production, such as from a power interruption, well pump failure, or similar short-term emergency. Dead storage is the portion of the reservoir that is not usable for storage. Dead storage includes the volume at the top that is needed for installation of the overflow pipe and the offset at the bottom of the tank that is used for silt accumulation.

Operational Storage (OS) is the amount of volume that is needed to supply the system when the well pumps are off. This prevents the excess cycling of well pumps, in a similar manner that bladder tanks provide pump protection. It is assumed that one foot of elevation difference exists between the well pump on and off signals.

$$OS = 1 \text{ foot} \times 3,400 \text{ gallons/foot} = 3,400 \text{ gallons}$$

$$3,400 \text{ gallons} / 191 \text{ gpm (well production)} = 18 \text{ minutes of runtime}$$

The pumps will be running for at least 15 minutes after each start. Therefore, the submersible well pumps will not have more than four starts per hour. The OS is adequate to minimize the number of pump starts per hour.



Equalizing Storage (ES) is the volume of water that is needed to meet the peak demand period for the water system. From Equation 9-1:

$$ES \text{ (gallons)} = (PHD - Q_s) \times 150 \text{ minutes}$$

Where:

PHD = peak hour demand 366 gpm (section 4.2 above);

Q<sub>s</sub> = well pump capacity, 191 gpm;

$$ES = (366 - 191) \text{ gpm} \times 150 \text{ minutes} = 26,300 \text{ gallons (or 7.8 feet)}$$

Dead Storage (DS) is the unusable volume at the top and bottom of the tank. Approximately six inches (6") is provided at the top for the overflow pipe (freeboard) and additional six inches (6") at the bottom of the tank. Therefore, a total of twelve inches (12") or one foot (1.0') of dead storage is provided.

$$DS = 1.0 \text{ foot} \times 3,400 \text{ gallons/foot} = 3,400 \text{ gallons}$$

The amount of water available as standby storage can be assumed to be the amount of storage not already utilized.

$$SB \text{ Storage} = \text{Total Reservoir capacity} - OS - ES - DS$$

$$SB \text{ Storage} = 287,700 - 3,400 - 26,300 - 3,400 = 254,600 \text{ gallons (or 75.2 feet)}$$

Standby storage (SB) is the volume of water that would be needed to supply the system in case of a problem with the source. The minimum recommended volume is 200 gallons per ERU.

$$SB \text{ storage (desired)} = (2)(ADD)(N) - t_m(Q_s - Q_L)$$

$$SB \text{ storage (desired)} = (2) (200 \text{ gpd/ERU}) (597 \text{ ERUs}) - 1,329 \text{ min} (191 \text{ gpm} - 125 \text{ gpm}) \\ = 151,000 \text{ gallons (or 44.6 feet)}$$

The existing reservoir provides approximately 254,600 gallons of stand-by storage (or 420 gallons per ERU). This exceeds the ADD and is more than 2 times (or two days of storage) during the typical summer demand.

The reservoir was also analyzed to determine fire flow capability of the system. As noted above, residential fire flow requirement is 500 gpm for 30 minutes of 15,000 gallons of storage. Accounting for the fire flow storage, there will be a remaining SB storage of 239,600 gallons, which is still higher than the recommended value for standby storage volume.

The provided storage volumes are summarized in the Table 7 below.

**Table 7 - Storage Components**

<b>Component</b>	<b>Volume (gallons)</b>	<b>Equivalent Height (feet)</b>
Overflow Dead Volume	1,700	0.5
Operational Storage	3,400	1.0
Equalizing Storage	26,300	7.8
Standby Storage	254,600	75.2
Fire Suppression (nested with SB)	(15,000)	(4.4)
Bottom Dead Storage	1,700	0.5
<b>Total</b>	<b>287,700</b>	<b>85.0</b>

#### 4.9 Water Age

Water age may sometimes become a problem in storage reservoirs, especially when the system is not at its maximum design capacity. The average age of the water in the reservoir is calculated based upon the lowest recorded average day demand of 83 gpd/ERU recorded in 2011. Based upon the existing 410 ERUs this equates to 34,000 gallons. See water use data is provided in APPENDIX B.

$$\text{Water Age} = \frac{\text{Storage Volume}}{\text{ADD} \times \text{ERUs}} = \frac{288,000 \text{ gallons}}{34,000 \text{ gallons per day}} = 8.5 \text{ days}$$

It is recommended that complete turnover of water should occur at least every three to five days. The water in the reservoir does not have adequate turnover during winter months. If the system receives complaints, an aeration system or recirculation pump may be needed.

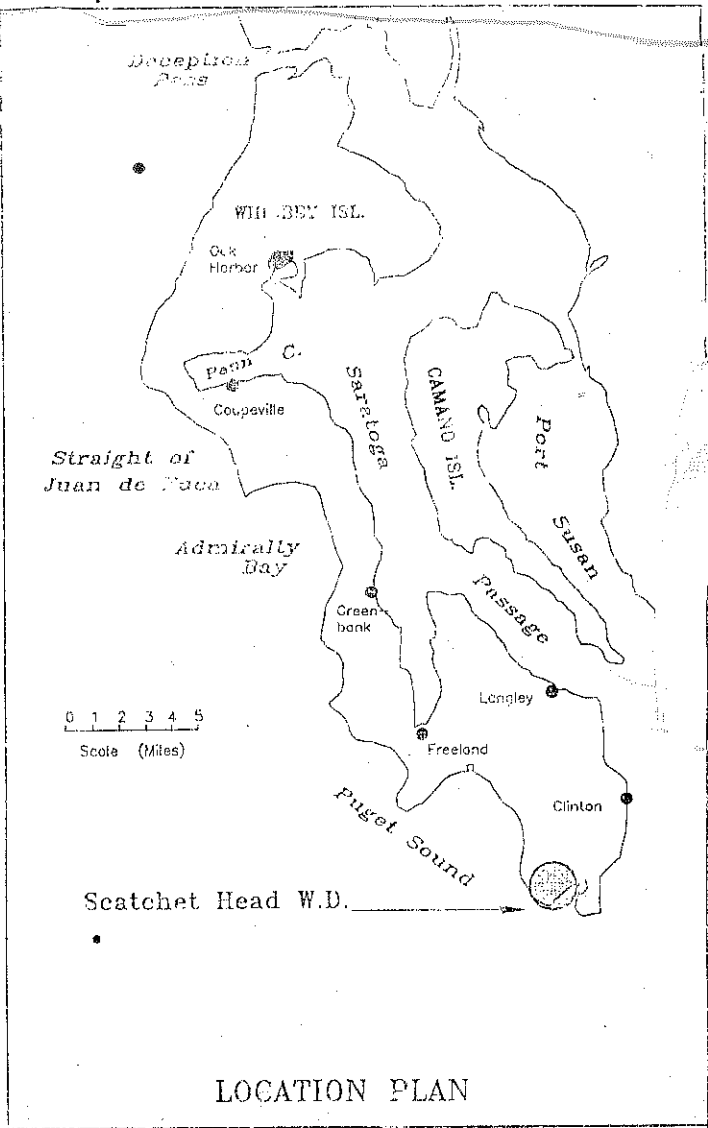
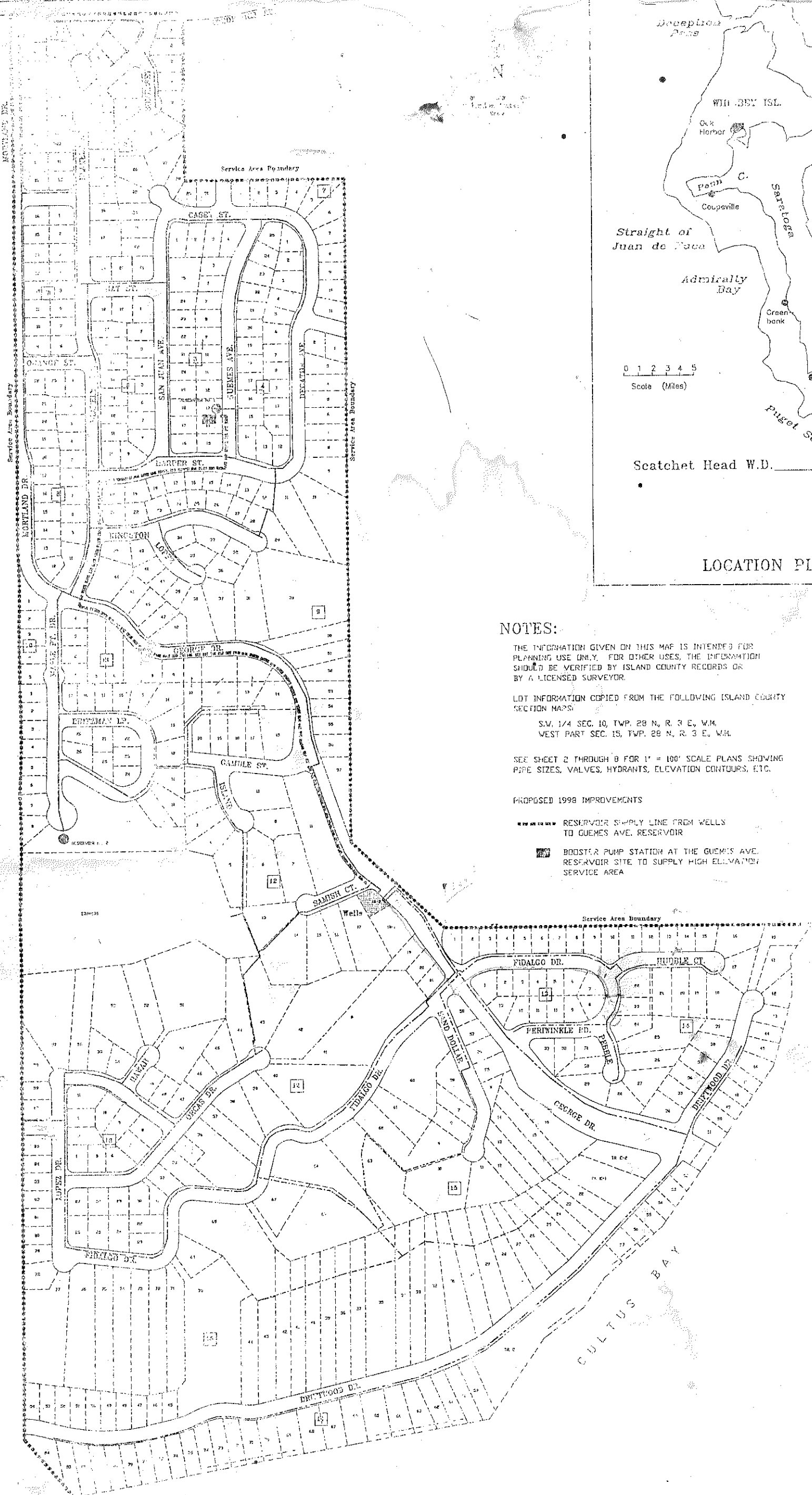
### 5. FUTURE IMPROVEMENT NEEDS

A list of future improvements is being provided to help the system plan for future upgrades.

- If expansion of the system is desired the approved service area on file with Island County will need to be amended. An updated Water System plan is likely needed to support a system expansion.
- An expansion of the water system will need to include a minimum of six-inch distribution mains and fire hydrants as required by Island County.
- The Operations and Maintenance Manual (O&M Manual) should be updated to reflect the current conditions and operational profile.
- Well #3 has a listed capacity of 90 gpm but currently operates at 66 gpm. This well appears to have additional capacity based upon the water rights and past pumping information. If additional capacity is desired a pump test should be performed to determine if a larger pump may be installed.
- The static and dynamic water level should be obtained for Well #2 and #3 to determine their current status. If the results suggest deterioration in capacity, installation of new wells may be necessary.

- Water quality testing should be performed on the two sources before and after treatment to verify the current water chemistry and to aid in the development of any potential water quality mitigation or control strategies.
- The water in the reservoir does not have adequate turnover during winter months when the water usage is the lowest. If water quality complaints are noted an aeration system may be installed or the reservoir float position may be modified to decrease the functional storage volume.

## **APPENDIX A Existing System Information**



**NOTES:**

THE INFORMATION GIVEN ON THIS MAP IS INTENDED FOR PLANNING USE ONLY. FOR OTHER USES, THE INFORMATION SHOULD BE VERIFIED BY ISLAND COUNTY RECORDS OR BY A LICENSED SURVEYOR.

LOT INFORMATION COPIED FROM THE FOLLOWING ISLAND COUNTY SECTION MAPS:

S.W. 1/4 SEC. 10, TWP. 28 N., R. 3 E., W.M.  
 WEST PART SEC. 15, TWP. 28 N., R. 3 E., W.M.

SEE SHEET 2 THROUGH 8 FOR 1" = 100' SCALE PLANS SHOWING PIPE SIZES, VALVES, HYDRANTS, ELEVATION CONTOURS, ETC.

**PROPOSED 1998 IMPROVEMENTS**

- RESERVOIR SIMPLY LINE FROM WELLS TO GUEMES AVE. RESERVOIR
- BOOSTER PUMP STATION AT THE GUEMES AVE. RESERVOIR SITE TO SUPPLY HIGH ELEVATION SERVICE AREA

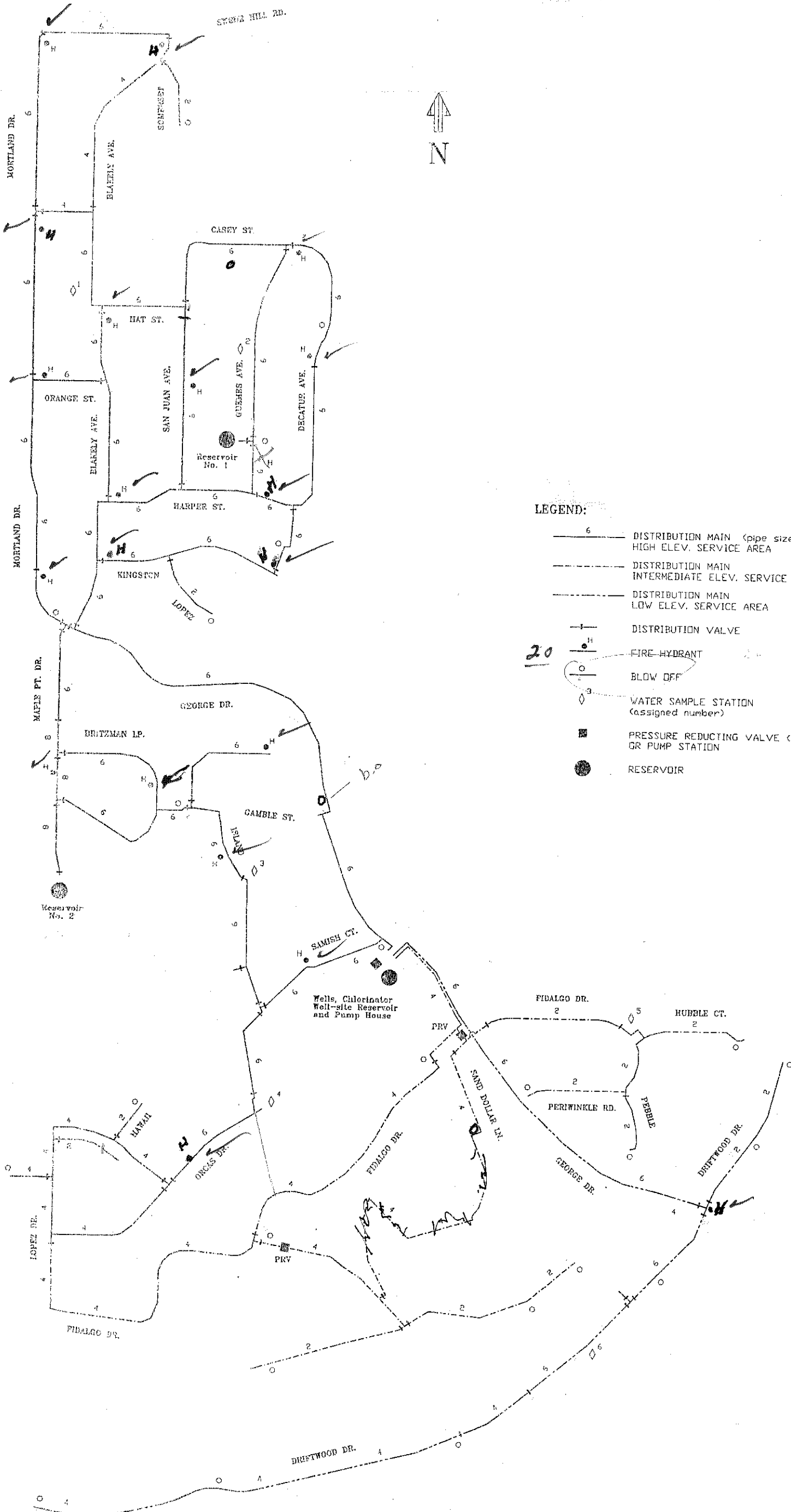
LATEST REVISION: 1/23/98

SCATCHET HEAD WATER DISTRICT  
 3792 EAST HUBLE COURT  
 Clinton, Washington 98293

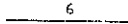

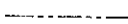


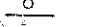



WATER DISTRIBUTION SYSTEM  
 COMPREHENSIVE MAP  
 Water Service Area  
 Proposed 1998 Improvements

SCHAEFER & BRATTON, ENGINEERS  
 P. O. Box 607  
 Coupeville, Washington 98239  
 Job 287 November, 1997

3792 East Humble Court  
 Clinton, WA 98293



**LEGEND:**

-  DISTRIBUTION MAIN (pipe size shown)  
HIGH ELEV. SERVICE AREA
-  DISTRIBUTION MAIN  
INTERMEDIATE ELEV. SERVICE AREA
-  DISTRIBUTION MAIN  
LOW ELEV. SERVICE AREA
-  DISTRIBUTION VALVE
-  FIRE-HYDRANT
-  BLOW OFF
-  WATER SAMPLE STATION  
(assigned number)
-  PRESSURE REDUCING VALVE (PRV)  
OR PUMP STATION
-  RESERVOIR

SCATCHET HEAD WATER DISTRICT  
3002 EAST HUBBLE COURT  
Clinton, Washington 98238

WATER DISTRIBUTION SYSTEM  
COMPREHENSIVE MAP

SCHAEFER & BRATTON, ENGINEERS  
P. O. Box 607  
Coupeville, Washington 98239  
Job 297 November, 1967

# WATER WELL REPORT

STATE OF WASHINGTON

Application # ABR417 Well 2

Permit No. ....

(1) OWNER: Name Dept. of Natural Resources Address Olympia, Wa.

(2) LOCATION OF WELL: County Inland Co. Sec. 15 T. 28 N. R. 2E 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) 2  
 New well  Method: Dug  Bored   
 Deepened  Cable  Driven   
 Reconditioned  Rotary  Jetted

(5) DIMENSIONS: Diameter of well 10 inches.  
 Drilled 295 ft. Depth of completed well 295 ft.

**(6) CONSTRUCTION DETAILS:**

Casing installed: 10" Diam. from ±3 ft. to 287 ft.  
 Threaded  " Diam. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
 Welded  " Diam. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

Perforations: Yes  No   
 Type of perforator used 10"  
 SIZE of perforations 1/4 in. by 2 in.  
70 perforations from 242 ft. to 246 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? 34 ft.  
 Material used in seal  Bentonite & cement   
 Did any strata contain unusable water? Yes  No   
 Type of water?  blackish  Depth of strata  10   
 Method of sealing strata off  pressure grout

(7) PUMP: Manufacturer's Name \_\_\_\_\_  
 Type: \_\_\_\_\_ HP \_\_\_\_\_

(8) WATER LEVELS: Land-surface elevation  192  ft. above mean sea level.  
 Static level  190  ft. below top of well Date  5-5-80   
 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  If yes, by whom  Mauldin   
 Yield:  250  gal./min. with  40  ft. drawdown after  6  hrs.  
 "  250  " " " "  6  "  
 " " " " " " " "

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
3:30	230	3:33	200	3:34	190

Date of test  4-30-80   
 Bailor test  10  gal./min. with  0  ft. drawdown after  3  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 Fill	0	5
Silty Clay & Sand	5	10
Blackish water		
Blue Clay & Sand	10	18
Blue Clay, Sand, Small Boulders	18	20
Blue Clay hard Small Gravel	20	72
Blue Clay Med. Sand & Gravel	72	163
Brown Clay, Med. Gravel	163	165
Brown Clay	165	180
Brown Clay Small Gravel	180	210
Rock w/ Quartz, Green & Black water	210	213
Cemented Sand w/ Blue Clay	213	220
Sand w/ Gravel	220	225
water		
Blue Clay, Med. Gravel	225	233
Black Sandy Clay	233	241
Gravel, Sand, Gray Clay	241	241 1/2
Sandy Blue Gray Clay	241 1/2	242
Large Gravel	242	246
water		
Heaving Sand & gravel	246	246 1/2
Cemented Sandy Clay	246 1/2	247
Cemented Sand Med. Gravel	247	250
Large Gravel w/ Sand	250	251
Small Layers Cemented sand & Med to large gravel	251	270
Hard Brown Shale	270	272
Cemented Sand & Gravel	272	295
Caving Cemented Sand & Gravel	287	295

Work started  4-1-80 , 19\_\_\_\_ Completed  5-5-80 , 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  Martel Well Drilling, Inc.   
 (Person, firm, or corporation) (Type or print)

Address  P.O. Box 905, Friday Harbor, Wa.

[Signed]  [Signature]   
 (Well Driller)

License No.  0292  Date  May 8 , 19 80

(USE ADDITIONAL SHEETS IF NECESSARY)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

ENTERED

ABW832 Well 3

WATER WELL REPORT

Start Card No. W067766
Unique Well I.D. # ABW832
Water Right Permit No.

STATE OF WASHINGTON

(1) OWNER: Name SCATCHET HEAD WATER DIST. Address 4010 STONE WAY NORTH SEATTLE, WA 98103-

(2) LOCATION OF WELL: County King - SE 1/4 NW 1/4 Sec 15 T 28N N., R 3E WM
(2a) STREET ADDRESS OF WELL (or nearest address) CLINTON, WA.-ISLAND CO.,

(3) PROPOSED USE: DOMESTIC

(10) WELL LOG

28-3E-15F

(4) TYPE OF WORK: Owner's Number of well
NEW WELL (If more than one)
Method: ROTARY

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 in formation.

(5) DIMENSIONS: Diameter of well 8 inches
Drilled 403 ft. Depth of completed well 246 ft.

Table with columns: MATERIAL, FROM, TO. Lists geological layers such as BROWN SAND AND GRAVEL, SANDY GRAY CLAY, etc., with depth ranges.

(6) CONSTRUCTION DETAILS:

Casing installed: 8" Dia. from +1.5 ft. to 403 ft.
WELDED CASING " Dia. from ft. to ft.
" Dia. from ft. to ft.

Perforations: YES
Type of perforator used AIR PERFORATOR
SIZE of perforations 3/8 in. by 1 in.
24 perforations from 231 ft. to 234 ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: NO
Manufacturer's Name
Type Model No.
Diam. slot size from ft. to ft.
Diam. slot size from ft. to ft.

Gravel packed: NO
Gravel placed from ft. to ft.
Size of gravel

Surface seal: YES To what depth? 15 ft.
Material used in seal BENTONITE
Did any strata contain unusable water? NO
Type of water? Depth of strata ft.
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 10/24/95
Artesian Pressure lbs. per square inch Date
Artesian water controlled by

RECEIVED

NOV 29 1999

Department of Ecology

Work started 10/02/95 Completed 10/24/95

(9) WELL TESTS: Drawdown is amount water level is lowered below static level.

Was a pump test made? NO If yes, by whom?
Yield: gal./min with ft. drawdown after hrs.

Recovery data
Time Water Level Time Water Level Time Water Level

Date of test / /
Bailer test gal/min. ft. drawdown after hrs.
Air test gal/min. w/ stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? NO

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 INC.
(Person, firm, or corporation) (Type or print)

ADDRESS SE 170 BALLEW PARK RD

[SIGNED] License No. 2053

Contractor's
Registration No. ARCADDI098K1 Date 08/12/96



## SCATCHET HEAD WATER DISTRICT

The pump test was performed by Arcadia Drilling Inc. on November 11, 1995. Test notes indicate that a simultaneous pump test was conducted on Wells 2 & 3. Arcadia records, however, only reflect the drawdown and subsequent recovery for Well 3. Considering that Wells 2 & 3 utilize the same source aquifer and that they are located within close proximity (approximately 55 feet), it can be concluded that the drawdown and recovery characteristics for Well 2 will be similar if not the same as those recorded for Well 3.

## SCATCHET HEAD WATER DISTRICT

### PUMP TEST ANALYSIS

#### DRAWDOWN:

- Starting Level = -196.7 ft (from ground surface)
- Pump Rate = 66 gpm
- Drawdown Level = -219.7 ft ( 23 ft in 10 hours )
- Stabilizing Level = -219.7 ft ( stabilized for 14 hours )

#### RECOVERY:

- Starting Level = -219.7 ft (from ground surface)
- Pump Rate = 0 gpm
- Recovery Level = -193.1 ft ( 26.6 ft in 1 hour )
- Stabilizing Level = -193.1 ( stabilized for 1 hour )

**\*\*Drawdown test was conducted with Wells 2 & 3 both running. Well 2 was started 20 minutes prior to starting Well 3. There was a 42.5" drop in Well 3 relating to the 20 minutes Well 2 ran alone.**

## SCATCHET HEAD WATER DISTRICT

### DRAWDOWN DATA

TIME	GPM	READING	LEVEL
0	66	196.7	-196.7
1	66	209.1	-209.1
2	66	210.2	-210.2
3	66	210.6	-210.6
4	66	210.9	-210.9
5	66	211.1	-211.1
6	66	211.6	-211.6
7	66	211.7	-211.7
8	66	212.4	-212.4
9	66	212.5	-212.5
10	66	212.6	-212.6
11	66	212.7	-212.7
12	66	212.8	-212.8
13	66	213.1	-213.1
14	66	213.1	-213.1
15	66	213.2	-213.2
16	66	213.2	-213.2
17	66	213.2	-213.2
18	66	213.3	-213.3
19	66	213.2	-213.2
20	66	213.2	-213.2
21	66	213.3	-213.3
22	66	213.3	-213.3
23	66	213.3	-213.3
24	66	213.3	-213.3
25	66	213.3	-213.3
26	66	213.4	-213.4
27	66	213.4	-213.4
28	66	213.4	-213.4
29	66	213.4	-213.4
30	66	214.2	-214.2
35	66	215.8	-215.8
40	66	215.9	-215.9
45	66	215.9	-215.9
50	66	216.1	-216.1
55	66	216.1	-216.1
60	66	216.1	-216.1

### DRAWDOWN DATA

TIME	GPM	READING	LEVEL
65	66	216.3	-216.3
70	66	216.4	-216.4
75	66	216.5	-216.5
80	66	216.5	-216.5
85	66	216.5	-216.5
90	66	216.5	-216.5
95	66	216.5	-216.5
100	66	216.5	-216.5
105	66	216.5	-216.5
110	66	216.5	-216.5
120	66	216.5	-216.5
150	66	217.4	-217.4
180	66	217.4	-217.4
210	66	217.4	-217.4
270	66	217.8	-217.8
300	66	218.1	-218.1
330	66	218.3	-218.3
360	66	218.4	-218.4
390	66	218.7	-218.7
420	66	218.7	-218.7
480	66	219.1	-219.1
540	66	219.3	-219.3
600	66	219.4	-219.4
660	66	219.7	-219.7
720	66	219.7	-219.7
780	66	219.7	-219.7
840	66	219.7	-219.7
900	66	219.7	-219.7
960	66	219.7	-219.7
1020	66	219.7	-219.7
1080	66	219.7	-219.7
1140	66	219.7	-219.7
1200	66	219.7	-219.7
1260	66	219.7	-219.7
1320	66	219.7	-219.7
1380	66	219.7	-219.7
1440	66	219.7	-219.7

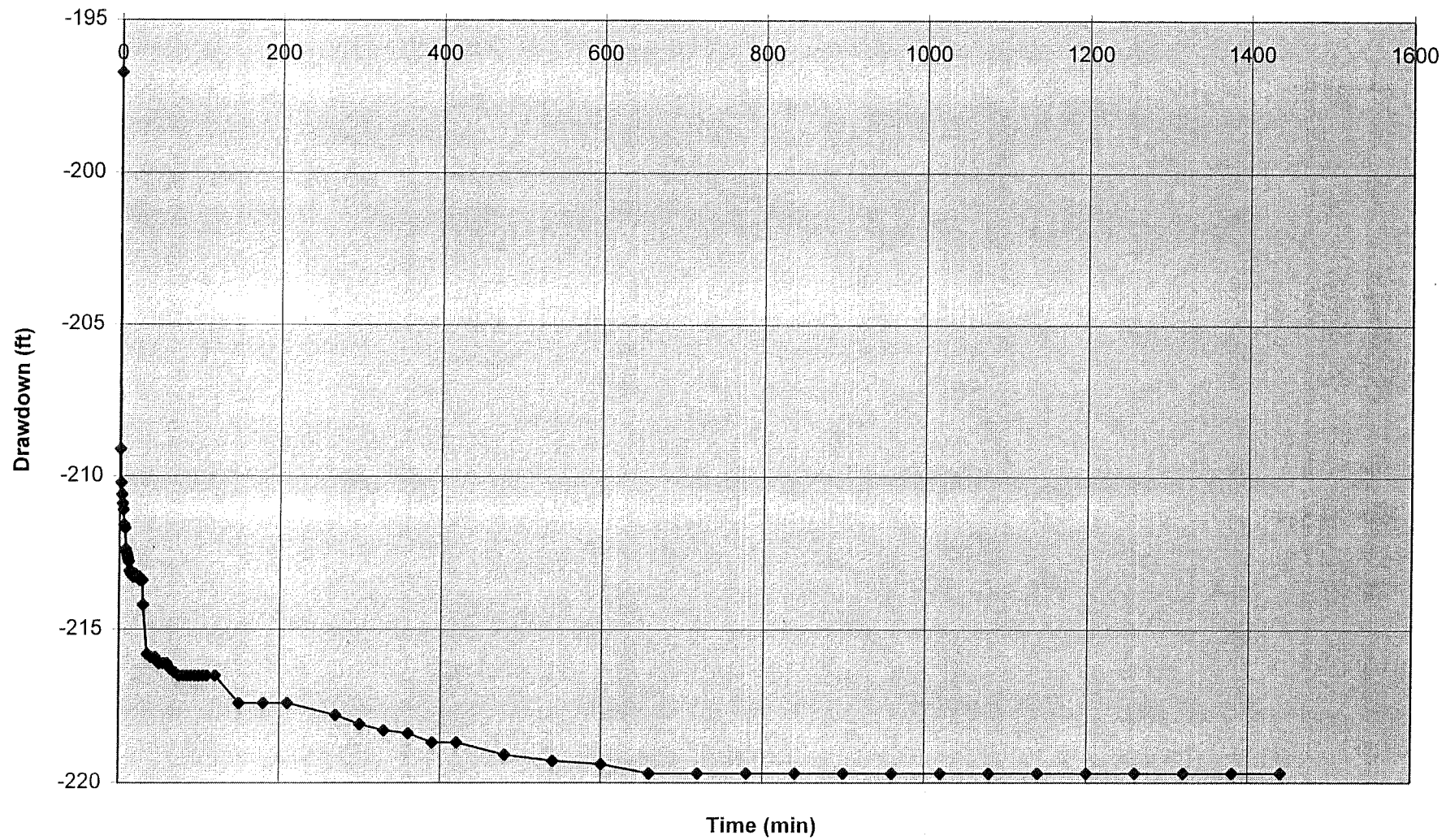
# SCATCHET HEAD WATER DISTRICT

## RECOVERY DATA

TIME	GPM	READING	LEVEL
0	0	219.7	-219.7
1	0	208.3	-208.3
2	0	202.2	-202.2
3	0	198.6	-198.6
4	0	197.2	-197.2
5	0	196.1	-196.1
6	0	195.9	-195.9
7	0	195.7	-195.7
8	0	195.5	-195.5
9	0	195.4	-195.4
10	0	195.3	-195.3
20	0	194.5	-194.5
30	0	193.9	-193.9
60	0	193.1	-193.1
90	0	193.1	-193.1
120	0	193.1	-193.1

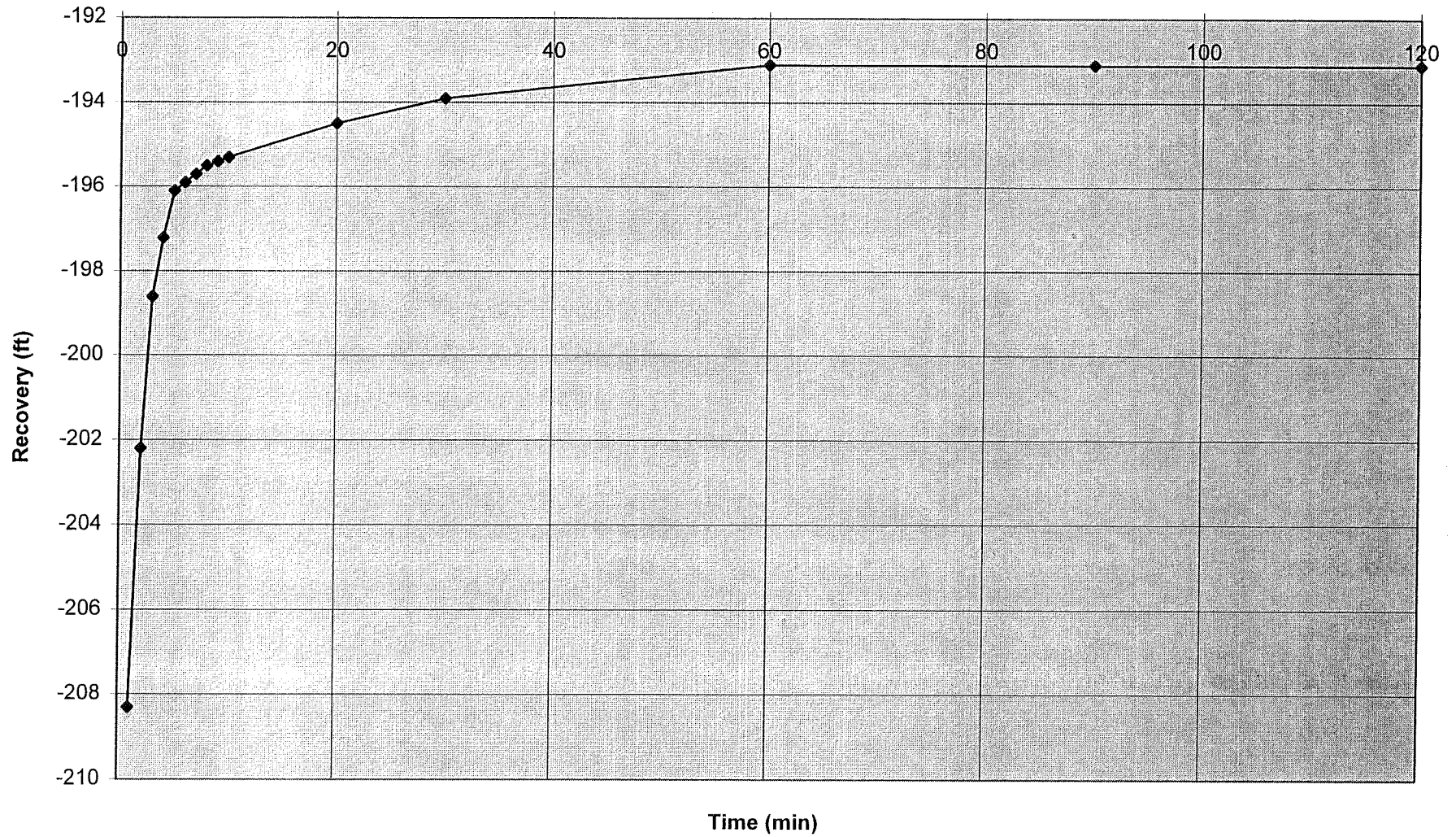
SCATCHET HEAD WATER DISTRICT

WELL 3 - AQUIFER PROFILE (DRAWDOWN)



SCATCHET HEAD WATER DISTRICT

WELL 3 - AQUIFER PROFILE (RECOVERY)





Click this image to view system in DOH Sentry

**System Name**  
**Scatchet Head Water District**

**Contact**

Name: Sandra V Bodamer  
 Title: Contact  
 Phone: (360) 678-5336  
 Address1: King Water Co  
 Address2:  
 Address3: PO Box 2243  
 City: Oak Harbor  
 State: WA  
 ZipCode: 98277

**Owner**

Name: Scatchet Head Water Distric  
 Phone: (360) 578-7044  
 Address1:  
 Address2: 7906 GUEMES AVE  
 Address3:  
 City: CLINTON  
 State: WA  
 ZipCode: 98277

**PWS ID**    **Sufx**    **Grp**  
 76470    X    A

**ResConn**    **ResPop**  
 410    900

**ApprvdConn**    **TotalConn**  
 451    410

**Last WFI Update**  
 7/5/2016

**System Effective**  
 1/1/1970

**Sources**

<b>Src #</b>	<b>Well Key Type</b>	<b>Name</b>	<b>Tnshp</b>	<b>Rng</b>	<b>Section</b>	<b>Depth</b>	<b>Cap</b>	<b>SWI Risk Rating</b>
01	FPP WELL	InAct 02/21/1997 ABANDONED	28N	03E	SW NW 10	100	125	Low
02	4WG WELL WITHIN A WELL FIELD	ABR417 Well 2	28N	03E	NE NW 15	242	150	Low
03	4WH WELL WITHIN A WELL FIELD	ABW832 Well 3	28N	03E	NE NW 15	231	80	Low
04	9YB WELL FIELD	Wells 2 & 3 WF	28N	03E	NE NW 15	231	230	Low





# WATER FACILITIES INVENTORY (WFI) FORM

Quarter: 2  
Updated: 07/05/2016  
Printed: 9/11/2017

ONE FORM PER SYSTEM

WFI Printed For: On-Demand

Submission Reason: No Change

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

<b>1. SYSTEM ID NO.</b> 76470 X		<b>2. SYSTEM NAME</b> SCATCHET HEAD WATER DISTRICT			<b>3. COUNTY</b> ISLAND			<b>4. GROUP</b> A		<b>5. TYPE</b> Comm																		
<b>6. PRIMARY CONTACT NAME &amp; MAILING ADDRESS</b>  SANDRA V. BODAMER [CONTACT] KING WATER CO PO BOX 2243 OAK HARBOR, WA 98277					<b>7. OWNER NAME &amp; MAILING ADDRESS</b>  SCATCHET HEAD WATER DISTRICT EDWARD SCHOELER 7906 GUEMES AVE CLINTON, WA 98236					<b>8. OWNER NUMBER: 005171</b>  COMMISSIONER																		
<b>STREET ADDRESS IF DIFFERENT FROM ABOVE</b> ATTN KING WATER CO. ADDRESS 107 SOUTH MAIN ST. CITY COUPEVILLE STATE WA ZIP 98239					<b>STREET ADDRESS IF DIFFERENT FROM ABOVE</b> ATTN ADDRESS CITY STATE ZIP																							
<b>9. 24 HOUR PRIMARY CONTACT INFORMATION</b>					<b>10. OWNER CONTACT INFORMATION</b>																							
Primary Contact Daytime Phone: (360) 678-5336					Owner Daytime Phone: (360) 578-7044																							
Primary Contact Mobile/Cell Phone: (360) 969-1019					Owner Mobile/Cell Phone:																							
Primary Contact Evening Phone: (xxx)-xxx-xxxx					Owner Evening Phone:																							
Fax: (360) 678-8302		E-mail: xxxxxxxxxxxxxxxxxxxxxx			Fax:		E-mail: xxxxxxxxxxxxxxxxxxxxxx																					
<b>WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.</b>																												
<b>11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)</b>																												
<input type="checkbox"/> Not applicable (Skip to #12) <input type="checkbox"/> Owned and Managed <input checked="" type="checkbox"/> Managed Only <input type="checkbox"/> Owned Only																												
SMA NAME: <u>KING WATER COMPANY</u> SMA Number: 128																												
<b>12. WATER SYSTEM CHARACTERISTICS (mark all that apply)</b>																												
<input type="checkbox"/> Agricultural <input type="checkbox"/> Commercial / Business <input type="checkbox"/> Day Care <input type="checkbox"/> Food Service/Food Permit <input type="checkbox"/> 1,000 or more person event for 2 or more days per year <input type="checkbox"/> Hospital/Clinic <input type="checkbox"/> Industrial <input type="checkbox"/> Licensed Residential Facility <input type="checkbox"/> Lodging <input type="checkbox"/> Recreational / RV Park <input checked="" type="checkbox"/> Residential <input type="checkbox"/> School <input type="checkbox"/> Temporary Farm Worker <input type="checkbox"/> Other (church, fire station, etc.):																												
<b>13. WATER SYSTEM OWNERSHIP (mark only one)</b>								<b>14. STORAGE CAPACITY (gallons)</b>																				
<input type="checkbox"/> Association <input type="checkbox"/> City / Town <input type="checkbox"/> County <input type="checkbox"/> Federal <input type="checkbox"/> Investor <input type="checkbox"/> Private <input checked="" type="checkbox"/> Special District <input type="checkbox"/> State								420,000																				
<b>15</b>																												
<b>16 SOURCE NAME</b>		<b>17 INTERTIE</b>	<b>18 SOURCE CATEGORY</b>					<b>19 USE</b>	<b>20</b>		<b>21 TREATMENT</b>		<b>22 DEPTH</b>	<b>23</b>	<b>24 SOURCE LOCATION</b>													
LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456  IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE		INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01 InAct 02/21/1997 ABANDONED			X												X	X						100	125	SW NW	10	28N	03E	
S02 ABR417 Well 2				X								X			Y		X	X			X	242	150	NE NW	15	28N	03E	
S03 ABW832 Well 3				X								X			Y		X	X			X	231	80	NE NW	15	28N	03E	
S04 Wells 2 & 3 WF				X								X					X	X			X	231	230	NE NW	15	28N	03E	

125 215



# WATER FACILITIES INVENTORY (WFI) FORM - Continued

<b>1. SYSTEM ID NO.</b> 76470 X	<b>2. SYSTEM NAME</b> SCATCHET HEAD WATER DISTRICT	<b>3. COUNTY</b> ISLAND	<b>4. GROUP</b> A	<b>5. TYPE</b> Comm
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	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
<b>25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)</b>		410	451
A. Full Time Single Family Residences (Occupied 180 days or more per year)	410		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
<b>26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)</b>			
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		
<b>27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)</b>			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	0	0	0
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	0
<b>28. TOTAL SERVICE CONNECTIONS</b>		410	451

<b>29. FULL-TIME RESIDENTIAL POPULATION</b>
A. How many residents are served by this system 180 or more days per year? <span style="float: right; margin-right: 50px;">900</span>

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?												
B. How many days per month are they present?												

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?												
B. How many days per month is water accessible to the public?												

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?												
B. How many days per month are they present?												

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
* Requirement is exception from WAC 246-290	1	1	1	1	1	1	1	1	1	1	1	1

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

35. Reason for Submitting WFI:

- Update - Change   
  Update - No Change   
  Inactivate   
  Re-Activate   
  Name Change   
  New System   
  Other \_\_\_\_\_

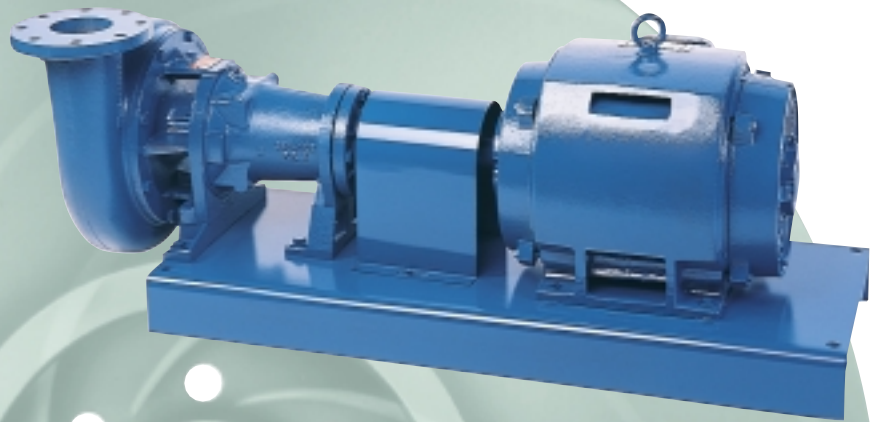
36. I certify that the information stated on this WFI form is correct to the best of my knowledge.	
SIGNATURE: _____	DATE: _____
PRINT NAME: _____	TITLE: _____

# 340A/360A Series Single Stage End Suction Pumps

- Capacities to 4500 G.P.M. (850 M<sup>3</sup>/HR)
- Heads to 370 Feet (78 Meters)
- Temperatures to 300°F (149°C)



*Model 362A*



*Model 344A*



*Model 341A*

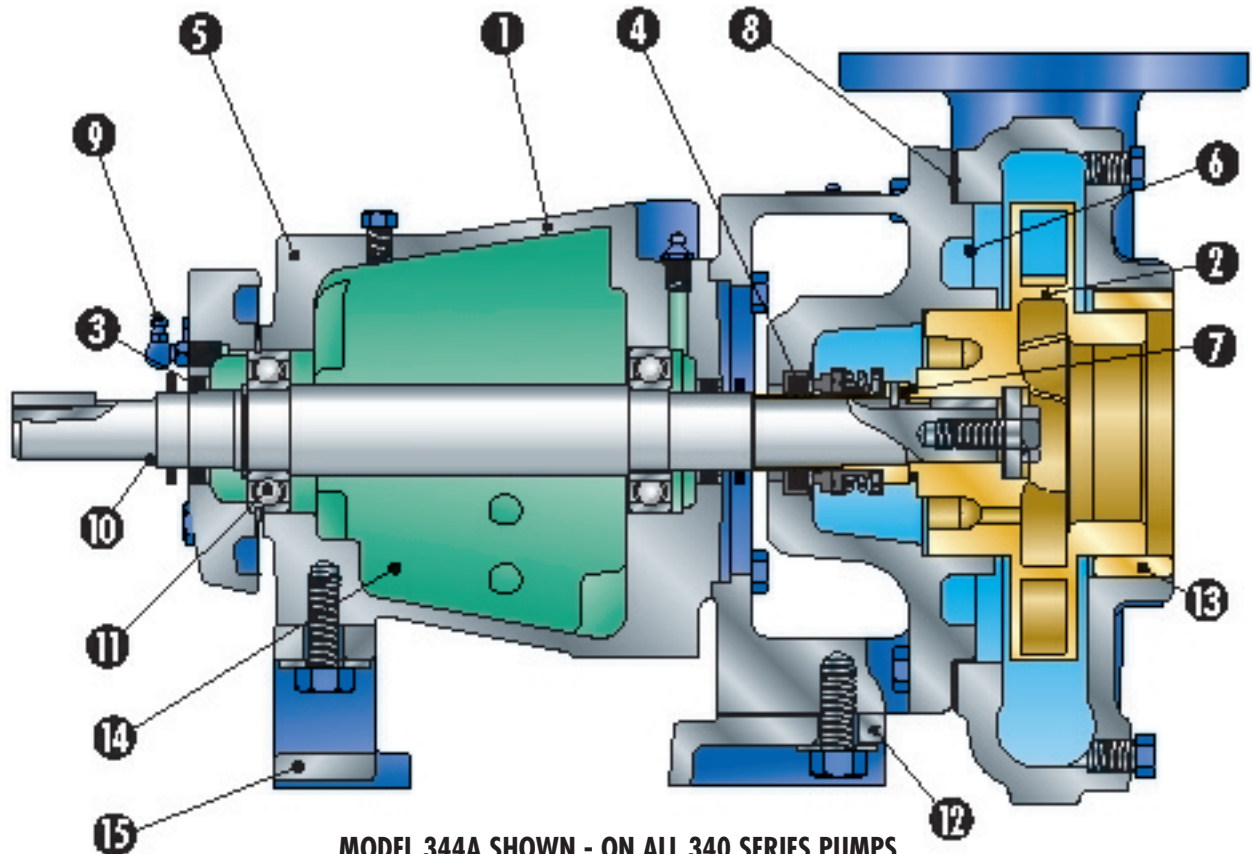
**ap AURORA®**

**PENTAIR PUMP GROUP**

# Aurora 340A/360A Pumps

## Setting New Standards of Efficiency

Liquid handling requirements are much more involved than they were five years ago. The variety of liquids being handled has increased along with temperatures and pressures. Today's installations demand quiet, smooth running pumps with long life. Aurora Pump's 80 years of experience with design, sales and manufacturing of centrifugal pumps has led to the 340A/360A Series. These modern pumps with a clean, straightforward design were developed with maximum interchangeability in mind. Aurora's highly reliable 340A/360A pumps offer an economical solution to your liquid handling problems.



**MODEL 344A SHOWN - ON ALL 340 SERIES PUMPS  
MECHANICAL SEALS ARE STANDARD**

### Standard – 340A and 360A

- Discharge position No. 1
- Regreaseable bearings (Model 344A, 364A)
- Standard JM motor (Model 341A, 342A)
- Standard JP motor (Model 361A, 362A)
- Coupling guard (Model 344A, 364A)

### Standard – 360A Only

- Interchangeable stuffing box
- Graphite impregnated acrylic packing

### Optional – 340A and 360A

Standard 340A and 360A series pumps are designed to meet the requirements of most applications. However, to meet special services, a number of optional features have been made available. For services not handled by the features listed, refer to the factory.

- All iron construction
- 316 stainless steel sleeve
- Stainless steel shaft
- Impeller wearing rings
- Oil lubricated ball bearings (Model 344A, 364A)
- Sealed permanently lubricated ball bearings (power frames No. 1, 2 and 3)

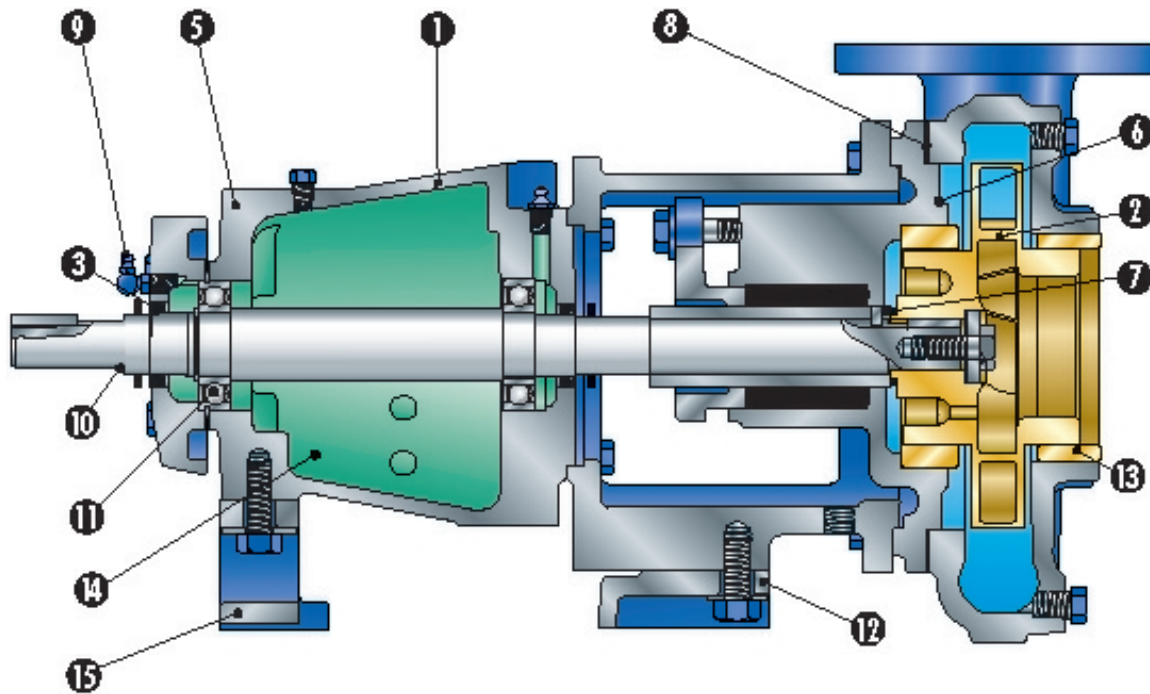
Alternate discharge positions No. 2, 3 and 4 (see pages 12 and 13)

- Fabricated stainless steel drip-rim bases (Model 344A, 364A)
- Formed steel bases (Model 344A, 364A)
- High temperature mechanical seal
- Variety of alternative constructions

### Optional – 360A Only

- All bronze construction
- Hardened shaft sleeve (for packing)
- Various mechanical seal types
- Water jacketed stuffing box
- Semi-open impellers (Model 364A)
- Double row thrust bearings (Model 364A)
- Packing with lantern ring

## Features



**MODEL 364A SHOWN - ON ALL 360 SERIES PUMPS PACKING IS STANDARD, MECHANICAL SEALS ARE OPTIONAL**

- 1 COMPUTER MACHINED major components with 360A degree registered fits to assure concentricity of all pump parts.
- 2 PRECISION CAST, DYNAMICALLY BALANCED, ENCLOSED IMPELLER is keyed to the shaft extension and secured by a capscrew and washer. Gaskets are used to prevent leakage to shaft end.
- 3 OIL SEALS and non-sparking Neoprene rotating slingers protect both bearings during pump operation and pump washdown.
- 4 MECHANICAL SEAL has hot water carbon against Ni-Resist face for optimum hot water performance. Long life is also assured with 303 stainless steel metal parts and "Buna-N" elastomer.
- 5 POWER FRAME provides heavy duty maximum interchangeability for flexible coupled applications.
- 6 HYDROSTATIC TEST of pumps at factory guarantees casting and seal integrity.
- 7 BRONZE SHAFT SLEEVE prevents shaft wear, is slip fit over the shaft, keylocked and extends the full length of seal box to eliminate corrosion of the shaft by the pumped liquid. This cancels the requirement for high cost, special stainless steel or alloy shafts.
- 8 BACK PULL-OUT design simplifies disassembly. The suction and discharge piping is not disturbed at disassembly.
- 9 LUBRICATION FITTINGS are conveniently located for quick accessibility and provides positive bearing lubrication. Oil lubrication optionally available.
- 10 CARBON STEEL SHAFT designed for minimum deflection, not to exceed .002" at the sealing faces at maximum load.
- 11 BEARINGS selected for 3 year minimum life at maximum load. Average bearing life 5 x minimum. Grease lube standard.
- 12 CLOSE COUPLED MOTORS in smaller frame sizes are supported off of the motor bracket for maximum rigidity.
- 13 CASE WEARING RING prevents wear on casing and is easily and inexpensively replaced. Impeller rings are available. Front case wearing rings are standard on all models and size pumps. Rear case wearing rings are standard only on 2" discharge and larger model 360A series pumps. Front impeller wearing rings are optional on all models and size pumps. Rear impeller wearing rings are optional only on 2" discharge and larger model 340A and 360A series pumps.
- 14 LARGE CAPACITY OIL RESERVOIR is provided on power frame Model 344A and 364A pumps for optional oil lube.
- 15 REAR SUPPORT FOOT provides support and simplifies coupling alignment. All supports are slotted to simplify back pull-out of power frame.

# Material of Construction and Design Details

## Material of Construction

Pump Part	Standard Fitted	Bronze Fitted	All-Iron	*All-Bronze
Casing	Cast Iron ASTM A48	Cast Iron ASTM A48	Cast Iron ASTM A48	Bronze ASTM B62
Case Wearing Ring	Bronze ASTM B62	Bronze ASTM B62	Cast Iron ASTM A48	Bronze ASTM B62
Impeller	Cast Iron ASTM A48	Bronze ASTM B584	Cast Iron ASTM A48	Bronze ASTM B584
Motor Bracket	Cast Iron ASTM A48	Cast Iron ASTM A48	Cast Iron ASTM A48	Cast Iron ASTM A48
Shaft	Steel AISI C1045	Steel AISI C1045	Steel AISI C1045	Steel AISI C1045
Sleeve	Bronze ASTM B62	Bronze ASTM B62	Stainless Steel AISI 316	Bronze ASTM B62
Power Frame (344A & 364A)	Cast Iron ASTM A48	Cast Iron ASTM A48	Cast Iron ASTM A48	Cast Iron ASTM A48
Mechanical Seal 340A Series	303 stainless steel metal parts, "Buna-N" elastomer parts, Ni-Resist seat and carbon washer			303 stainless steel metal parts, viton elastomer, ceramic seat, and carbon washer
360A Series (Optional)				
Stuffing Box	Cast Iron ASTM A48	Cast Iron ASTM A48	Cast Iron ASTM A48	Bronze ASTM B62
Packing (Standard) 360A Series Only	Interwoven, graphited fiber diagonally cut			

\* All Bronze optionally available in 361A and 364A pumps only.

## Design Details

Area	Description	Power Frame			
		1	2	3	21
Pump Shaft	Rotation—from driver end	CW	CW	CW	CW
	Diameter at impeller	7/8	1-1/4	1-1/4	1-5/8-12
	Diameter at shaft sleeve	1	1-3/8	1-3/8	2-1/4
	Diameter between bearings	1-3/8	1-15/16	2-3/8	3-1/4
	Diameter at coupling end	7/8	1-1/8	1-1/8	2-3/8
	Coupling key—square	3/16	1/4	1/4	5/8
	Max. deflection at seal face	.002	.002	.002	.002
Ball Bearings	Bearing (inboard radial)	206K	308K	310K	313
	Bearing (outboard thrust)	206KG	308KG	310KG	5313
	Bearing centers	5-11/16	7-11/16	7-11/16	9-5/8
	Bearing type	Ball	Ball	Ball	Ball
	Min B <sub>10</sub> bearing life under maximum load	3 years	3 years	3 years	3 years
Sleeve	Packing size 360A series	3/8	3/8	3/8	7/16
	Outside diameter of sleeve 360A series	1-1/2	1-7/8	1-7/8	2-1/2
	Outside diameter of sleeve 340A series	1-1/8	1-1/2	1-1/2	N/A



# Design Details

## 340A Series

Sealing Method	Temperature °F	
	Close Coupled	Frame Mounted
Standard Mechanical Seal	225	225

## 360A Series

Sealing Method	Temperature °F	
	Close Coupled	Frame Mounted
Standard Mechanical Seal	225	225
W/J Mechanical Seal*	300	300
Standard Packing	225	225
W/J Packing*	275	275
Packing . . . Suction lift requires lantern ring. * 7, 9 and 12 bore pumps only		
340A & 360A Series <b>Case Working Pressure</b> (all or any part can be suction pressure) <b>175 P.S.I.</b>		
Hydrostatic Test Pressure (Maximum) 265 P.S.I		

## Limitations 340A & 360A Series – H.P.

Speed-RPM		3500	1750	1150
Close Coupled	O.D.P.	60	50	30
	T.E. & EX. PR.	50	50	30
Power Frame	1	40	20	15
	2 & 3	125	75	40
	21	N/A	250	150

End suction products such as the flexible coupled horizontal pump seen below are used in offices and high rise buildings for internal environment control. End suction pumps for HVAC installation come in a variety of configurations including close coupled, flexible coupled, horizontal or vertical mounted units.



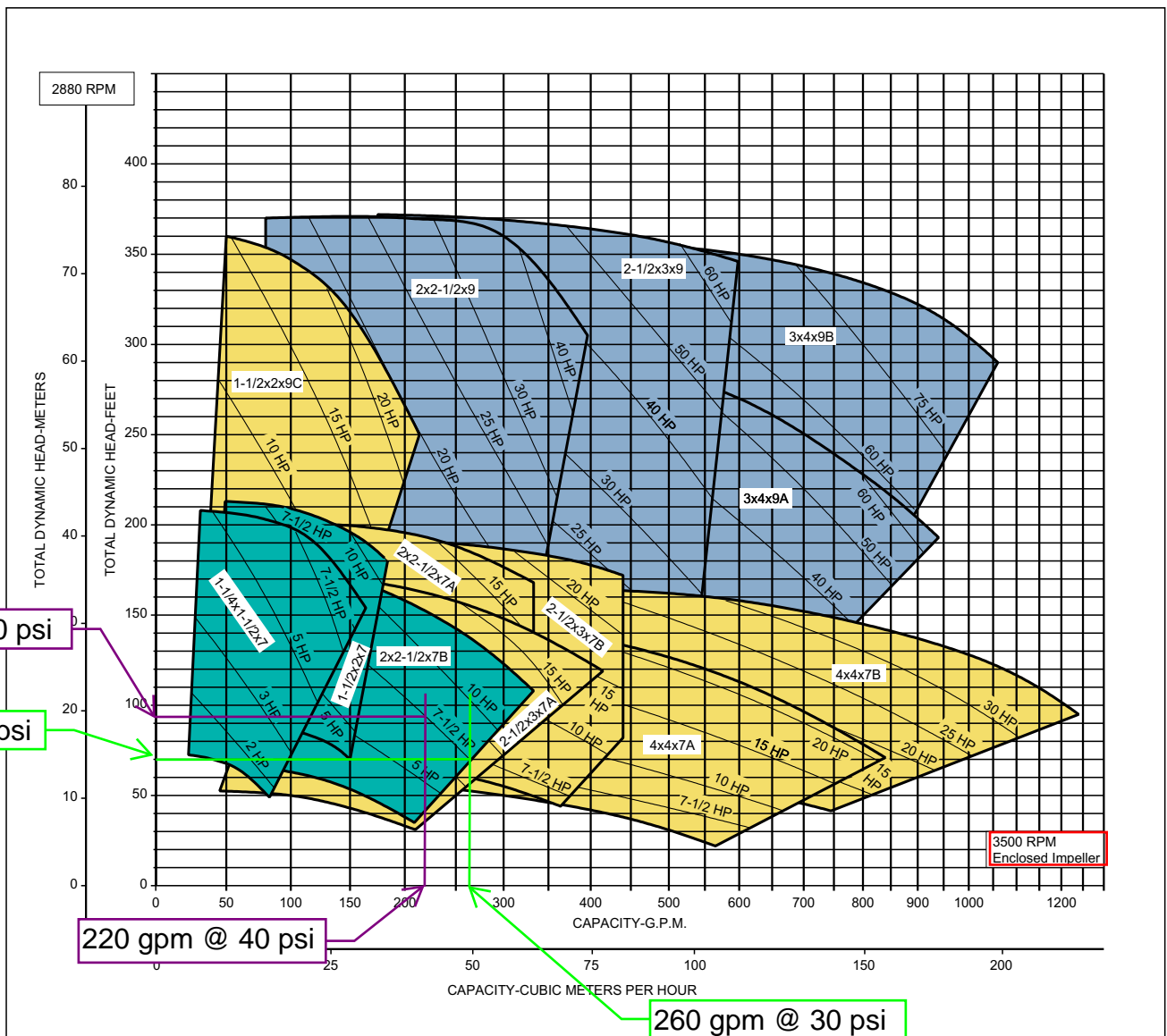
# 340 Range Charts

**3500 RPM**

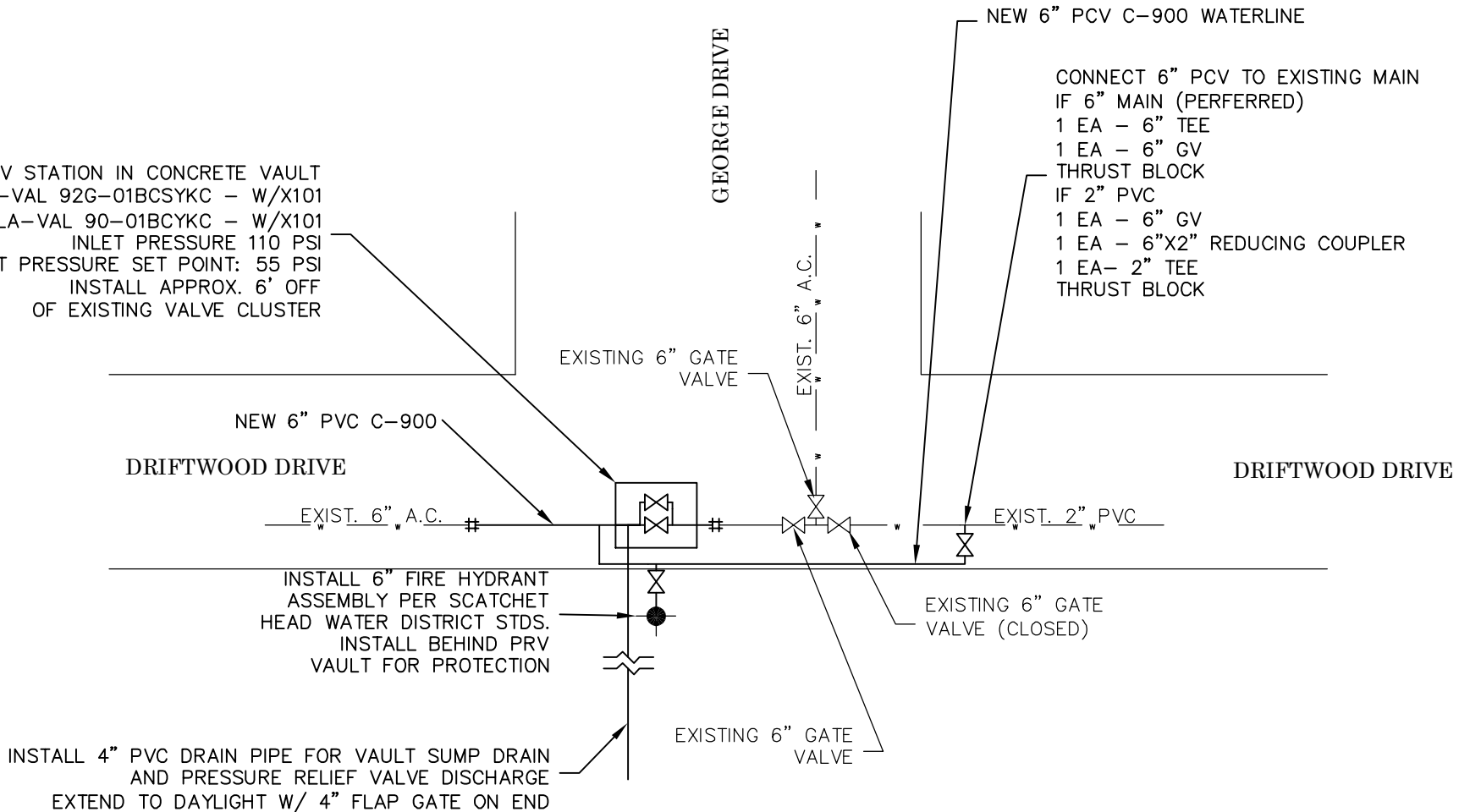
INDIVIDUAL PERFORMANCE CURVES SHOULD BE CHECKED FOR FINAL SELECTION. FOR SELECTIONS NOT SHOWN ON THIS CHART PLEASE REFER TO THE FACTORY.

- POWER FRAME NO. 1
- POWER FRAME NO. 2
- POWER FRAME NO. 3

MAXIMUM HORSEPOWER	CLOSE COUPLED	OPEN DRIP PROOF TE & EX PR	60
	FRAME MOUNTED		50
			100




INSTALL PRV STATION IN CONCRETE VAULT  
 4" CLA-VAL 92G-01BCSYKC - W/X101  
 1½" CLA-VAL 90-01BCYKC - W/X101  
 INLET PRESSURE 110 PSI  
 OUTLET PRESSURE SET POINT: 55 PSI  
 INSTALL APPROX. 6' OFF  
 OF EXISTING VALVE CLUSTER



CONNECT 6" PCV TO EXISTING MAIN  
 IF 6" MAIN (PREFERRED)  
 1 EA - 6" TEE  
 1 EA - 6" GV  
 THRUST BLOCK  
 IF 2" PVC  
 1 EA - 6" GV  
 1 EA - 6"X2" REDUCING COUPLER  
 1 EA- 2" TEE  
 THRUST BLOCK

INSTALL 6" FIRE HYDRANT  
 ASSEMBLY PER SCATCHET  
 HEAD WATER DISTRICT STDS.  
 INSTALL BEHIND PRV  
 VAULT FOR PROTECTION

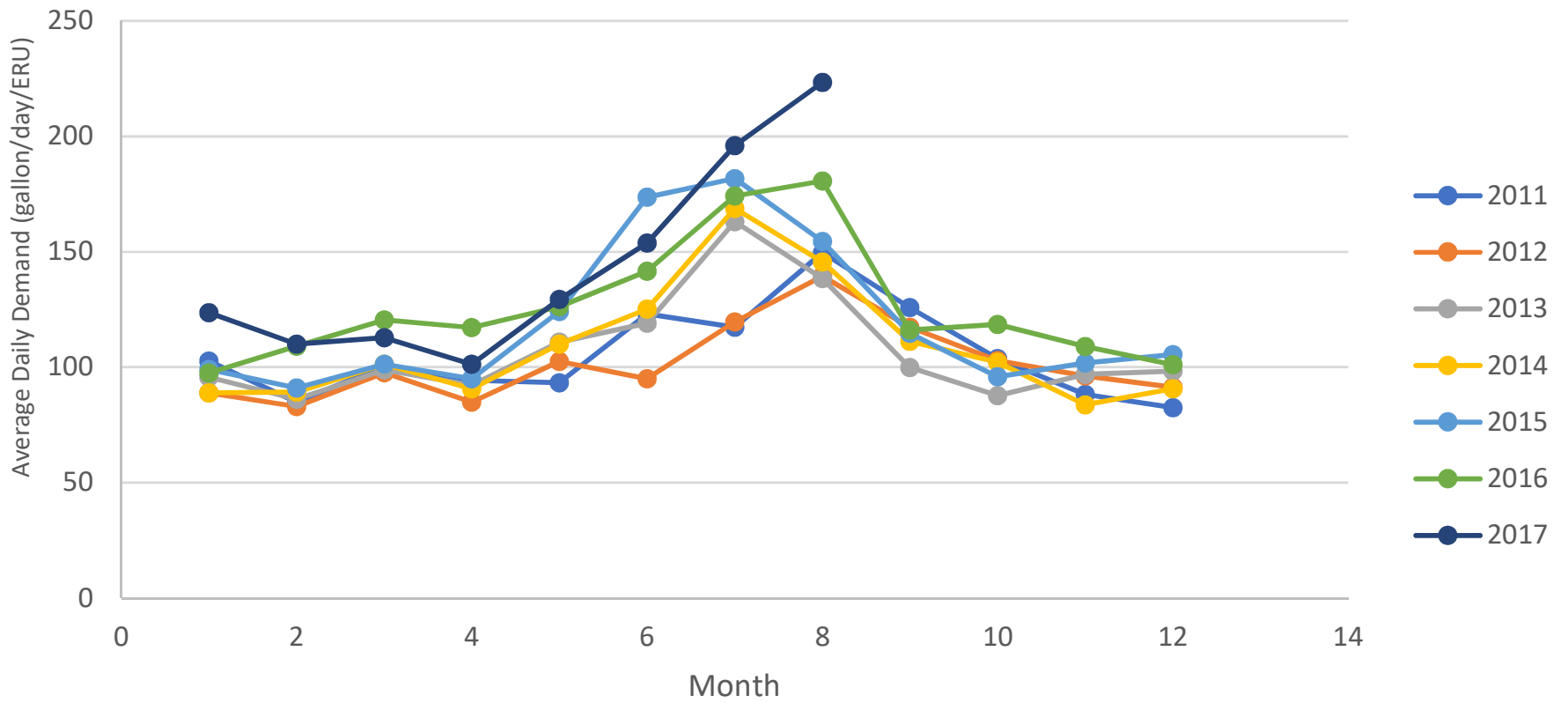
INSTALL 4" PVC DRAIN PIPE FOR VAULT SUMP DRAIN  
 AND PRESSURE RELIEF VALVE DISCHARGE  
 EXTEND TO DAYLIGHT W/ 4" FLAP GATE ON END

 DAVIDO CONSULTING GROUP, INC. CIVIL ENGINEERING SERVICES 8804 ROOSEVELT WAY NE SEATTLE, WA 98115 206.523.0024	P.O. Box 1132 FREELAND, WA 98249 360.331.4131	SCATCHET HEAD WTR. DIST. DRIFTWOOD DRIVE SCHEMATIC PRV INSTALLATION PLAN		DWG NO. <b>C01</b>
		DATE <b>01/26/07</b>	CAD FILE NUMBER: <b>FIGURE 2</b>	REV. <b>C</b>



**APPENDIX B    Water Use Data**

# Historical Monthly Water Usage



Scatchet Head WD

Daily Usage per House

<b>Year</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
<b>Jan.</b>	103	89	96	89	99	97	124
<b>Feb.</b>	85	83	86	89	91	109	110
<b>Mar.</b>	101	98	99	101	101	121	113
<b>Apr.</b>	94	85	92	91	95	117	101
<b>May</b>	93	103	111	110	124	126	129
<b>Jun.</b>	123	95	119	125	174	142	154
<b>Jul.</b>	117	120	163	169	182	174	196
<b>Aug.</b>	150	139	138	146	154	181	223
<b>Sep.</b>	126	117	100	111	115	116	
<b>Oct.</b>	104	103	88	102	96	119	
<b>Nov.</b>	88	96	97	84	102	109	
<b>Dec.</b>	83	91	98	91	106	101	
<b>MMAD</b>	<b>150</b>	<b>139</b>	<b>163</b>	<b>169</b>	<b>182</b>	<b>181</b>	<b>223</b>
<b>MDD</b>	<b>254</b>	<b>237</b>	<b>277</b>	<b>287</b>	<b>309</b>	<b>307</b>	<b>380</b>
<b>ADD</b>	<b>106</b>	<b>102</b>	<b>107</b>	<b>109</b>	<b>120</b>	<b>126</b>	<b>144</b>
<b>ADD (June - Sept)</b>	<b>129</b>	<b>118</b>	<b>130</b>	<b>138</b>	<b>156</b>	<b>153</b>	<b>191</b>
<b>Design ADD</b>							<b>200</b>

**APPENDIX C    Water Right Information**

# Water Right Self-Assessment Form for Small Water System Management Programs and Project Reports

<b>System Name:</b> Scatchet Head Water District	<b>System ID#:</b> 76470 X	<b>Type of System:</b> (Group A Comm, NTNC, TNC, Group B, or New) Group A Community	<b>Proposed Type of System:</b> (if changing) No change
---	-------------------------------	--	--

<u>Water Right Permit, Certificate, Claim # or Exempt</u> <small>*If water right is interruptible, identify limitation in yellow section below</small>	<u>Name on Water Right</u>	<u>FOR NON-MUNICIPAL SUPPLIERS ONLY:</u> Does water right identify a number of connections? If yes, how many?	<u>WFI Source #</u> If a source has multiple water rights, list each water right on separate line	<u>Existing Water Rights</u> <small>Qi = Instantaneous Flow Rate Allowed (GPM or CFS) Qa = Annual Volume Allowed (Acre Feet/Year)</small>			
				<u>Primary Qi</u> Maximum Rate Allowed	<u>Non-Additive Qi</u> Maximum Rate Allowed	<u>Primary Qa</u> Annual Volume Allowed	<u>Non-Additive Qa</u> Annual Volume Allowed
1 G1-23621C	Well (No. 2)		S02	125.0		140.4	
2 G1-20574P	Groundwater		S03	90.0		101.0	
3							
4							
<b>TOTALS =</b>				215.0		<b>241.4</b>	

Column Identifiers for Calculations:

A

B

<u>Current Source Production – Most Recent Calendar Year</u> <small>Qi=Maximum Instantaneous Withdrawal from Source. (GPM or CFS) Qa=Maximum Annual Volume Withdrawn (Acre Feet/Year) This includes wholesale water provided to other systems</small>				<u>Forecasted Source Production at Full System Build Out</u> <small>Projected maximum withdrawal from source at full build out. This includes wholesale water provided to other systems</small>			
<u>Total Qi</u> Instantaneous Flow Rate	<u>Excess or (Deficiency) Qi</u>	<u>Total Qa</u> Annual Volume	<u>Excess or (Deficiency) Qa</u>	<u>Total Qi</u> Instantaneous Flow Rate	<u>Excess or (Deficiency) Qi</u>	<u>Total Qa</u> Annual Volume	<u>Excess or (Deficiency) Qa</u>
125	0			125	0	87.6	52.8
66	24			66	24	46.2	54.8
191	24	58.2	183.2	191	24	133.8	107.6

C

=A-C

D

=B-D

E

=A-E

F

=B-F

<u>Interruptible Water Rights</u> Identify limitations on any water rights listed above that are interruptible	
<u>Permit or certificate #</u>	<u>Time Period of Interruption</u>

**INTERTIES:** Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through interties in the source production columns above.

<u>Name of Wholesaling System Providing Water</u>	<u>Quantities Allowed In Contract</u>		<u>Currently Purchased</u> <small>Quantity currently purchased through intertie</small>				<u>Forecasted Purchase at Full System Build Out</u> <small>Forecasted quantity purchased through intertie</small>			
	<u>Maximum Qi</u>	<u>Maximum Qa</u>	<u>Maximum Qi</u> Instantaneous Flow Rate	<u>Excess or (Deficiency) Qi</u>	<u>Maximum Qa</u> Annual Volume	<u>Excess or (Deficiency) Qa</u>	<u>Maximum Qi</u> Instantaneous Flow Rate	<u>Excess or (Deficiency) Qi</u>	<u>Maximum Qa</u> Annual Volume	<u>Excess or (Deficiency) Qa</u>
<b>TOTALS =</b>										

A

B

C

=A-C

D

=B-D

E

=A-E

F

=B-F

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

- Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)
- Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE June 11, 1980	APPLICATION NUMBER G1-23621	PERMIT NUMBER G1-23621P	CERTIFICATE NUMBER G1-23621C
--------------------------------	--------------------------------	----------------------------	---------------------------------

NAME Scatchet Head Water District - Grover Pell, Chairman			
ADDRESS (STREET) 6203 - 39th N. E.	(CITY) Seattle	(STATE) Washington	(ZIP CODE) 98115

*This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown, but is limited to an amount actually beneficially used.*

PUBLIC WATER TO BE APPROPRIATED

SOURCE Well (No. 2)	TRIBUTARY OF (IF SURFACE WATERS)		
------------------------	----------------------------------	--	--

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 125	MAXIMUM ACRE-FEET PER YEAR 140.4
-------------------------------	-----------------------------------	-------------------------------------

QUANTITY, TYPE OF USE, PERIOD OF USE Community domestic supply - continuously (483 services)
---

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL 850 feet south and 1278 feet west from the N $\frac{1}{4}$ corner of Sec. 15
--

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NE $\frac{1}{4}$ NW $\frac{1}{4}$	SECTION 15	TOWNSHIP N. 28	RANGE, (E. OR W.) W.M. 3E	W.R.I.A. 6	COUNTY Island
--	---------------	-------------------	------------------------------	---------------	------------------

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
-----	-------	------------------------------------

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by Scatchet Head Water District within Sections 10 and 15, T. 28N., R. 3 E., W.M., Island County.



PROVISIONS

Permittee or its successor(s) shall submit in writing to the Department of Ecology, Northwest Regional Office, Redmond, Washington, during the months of April and August each year, the chloride concentration of the water pumped and static water level (pump off) of the well authorized by this permit. Depending on the results of this data collection, the withdrawal of ground water under this permit may be limited, or other appropriate action may be required, by Department of Ecology order, to prevent seawater intrusion into the subject aquifer.


*The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.*

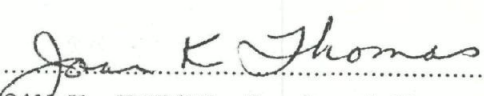
This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Redmond Washington, this 16th day of September, 1985.

Department of Ecology

ENGINEERING DATA

OK 

by 

JOAN K. THOMAS, Regional Manager

FOR COUNTY USE ONLY

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION  
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

- Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)
- Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE June 11, 1980	APPLICATION NUMBER G1-23621	PERMIT NUMBER	CERTIFICATE NUMBER
--------------------------------	--------------------------------	---------------	--------------------

NAME Scatchet Head Water District			
ADDRESS (STREET) 3776 E. Driftwood Drive	(CITY) Clinton	(STATE) Washington	(ZIP CODE) 98236

PUBLIC WATERS TO BE APPROPRIATED

SOURCE Well (No. 2)
TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 125	MAXIMUM ACRE-FEET PER YEAR 140.4
-------------------------------	-----------------------------------	-------------------------------------

QUANTITY, TYPE OF USE, PERIOD OF USE Community domestic supply - continuously (483 services)
---

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL 850 feet south and 1278 feet west from the N $\frac{1}{2}$ corner of Sec. 15
--

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NE $\frac{1}{4}$ NW $\frac{1}{4}$	SECTION 15	TOWNSHIP N. 28	RANGE, (E. OR W.) W.M. 3E	W.R.I.A. 6	COUNTY Island
--	---------------	-------------------	------------------------------	---------------	------------------

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
-----	-------	------------------------------------

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by Scatchet Head Water District within Sections 10 and 15,  
T. 28N., R. 3 E., W.M., Island County.



DESCRIPTION OF PROPOSED WORKS

G1-23621

Well No. 2 (of 2), submersible pump, 2-3000 gallon storage tanks and 4" and 6" mains to place of use.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Complete	Complete	Complete

REPORT

Background:

This application to withdraw 250 gpm from a well located about seven miles south of Clinton on Whidbey Island, for municipal supply, was received on June 11, 1980 from Scatchet Head Water District, Clinton, Washington.

Legal notice was published in the Whidbey Island Record on August 12 and 19, 1980. No protests have been received.

Investigation:

A field examination was conducted on September 24, 1984. The water system at Scatchet Head - consisting of two wells - is complete and in use. It was found as described in the application.

Scatchet Head Community Club has previously made Application G1-20574, with priority date of April 27, 1973, for well No. 1 of the system (the well under instant application is well No. 2). Well No. 1 is located about 1500 feet southeast of well No. 2 in SW $\frac{1}{4}$ N $\frac{1}{2}$ W $\frac{1}{4}$  of Section 15. Well No. 2, in NE $\frac{1}{4}$ N $\frac{1}{2}$ W $\frac{1}{4}$  of Section 15, is located about 850 feet south and 1278 feet west from the N $\frac{1}{4}$  corner of Sec. 15, T. 28N., R. 3E.W.M., Island County.

Mr. Grover Pell, Chairman of the water district, was interviewed by telephone on November 15, 1984 and gave the following information: Wells 1 and 2 are installed to the complete system. Well No. 1 yields 90 gpm and well No. 2 yields 125 gpm to the two 3000 gallon storage tanks. The wells are pumped alternately. Booster pumps supply service pressure from the tanks. There are now about 175 homes using water, with a potential of 483. The system is now called the Scatchet Head Water District. The water from well No. 1 was described as being of bad quality, containing methane, chlorides and other constituents which make the water unacceptable. For this reason, and to provide a greater instantaneous quantity of water, well No. 2 was installed. Water from the two wells is mixed and treated to obtain water that is acceptable to the district. Mr. Peel requested that each well be granted a separate water right.

The water well report for well No. 2 shows that it was installed by Martel Well Drilling Inc., Friday Harbor, Washington. The well is 10 inches in diameter and 295 feet deep. It was completed on May 5, 1980, with a static water level of 190 feet. The well is cased from 3 feet above ground to 287 feet below, and perforated from 242 feet to 246 feet; no screen is indicated. A pump test by the driller on April 30, 1980 yielded 250 gpm with a 40-foot drawdown in 6 hours, with the water level remaining stable at 230 feet for an additional 6 hours. Recovery to 190 feet occurred in 4 minutes.

Well No. 2 is sited at an elevation of about 202 feet above mean sea level. The closest saltwater is Cultus Bay, about 1800 feet to the southeast. The bottom of the well casing is thus about 85 feet below mean sea level and the lowest perforations in the casing about 44 feet below mean sea level.

A report submitted by the applicant shows water taken from well No. 2 on December 16, 1984 was found to contain 14 mg/L of chloride (Lauck's Testing Labs., Seattle, WA).

A review of the Department of Social and Health Services public water supply system listing, dated January 19, 1984, indicates that water usage reported in the applicant's area averages about 0.36 acre-foot per year per service. Since the Department of Ecology's Quantity Allocation Guidelines provide 0.5-1.0 acre-foot per year per service, the 0.5 acre-foot per service will be allocated here. G1-20574 provides 101.1 acre-feet so this well can provide the additional 140.4 acre-feet needed.

Conclusion:

It is concluded that water is available for the beneficial appropriation as requested. Such use will not have an adverse affect on existing rights or be detrimental to the public welfare so long as the well pump intake and withdrawal rate are such that there is no degradation of the aquifer caused by pumping the well. It is also concluded that the requested 250 gpm should be reduced to the pumping rate of 125 gpm. Permit should therefore issue subject to existing rights and indicated provisions.

Recommendation:

It is recommended that a permit be issued for 125 gpm, 140.4 acre-feet per year (in addition to G1-20574), for the community domestic supply - continuously - of 483 services.

Permittee or its successor(s) shall submit in writing to the Department of Ecology, Northwest Regional Office, Redmond, Washington, during the months of April and August each year, the chloride concentration of the water pumped and static water level (pump off) of the well authorized by this permit. Depending on the results of this data collection, the withdrawal of ground water under this permit may be limited, or other appropriate action may be required, by Department of Ecology order, to prevent seawater intrusion into the subject aquifer.

REPORT BY:

Jim Gavin

DATE:

3.27.85

**Map Navigation Menu**

[Search Options](#) [Layers](#) [Selected Record](#)

**Record No. : G1-20574**

**Quantities:**

90.0000 GPM  
101.0000 Acre Feet

**Purposes:**

Domestic Multiple

**Source Names:**

Groundwater

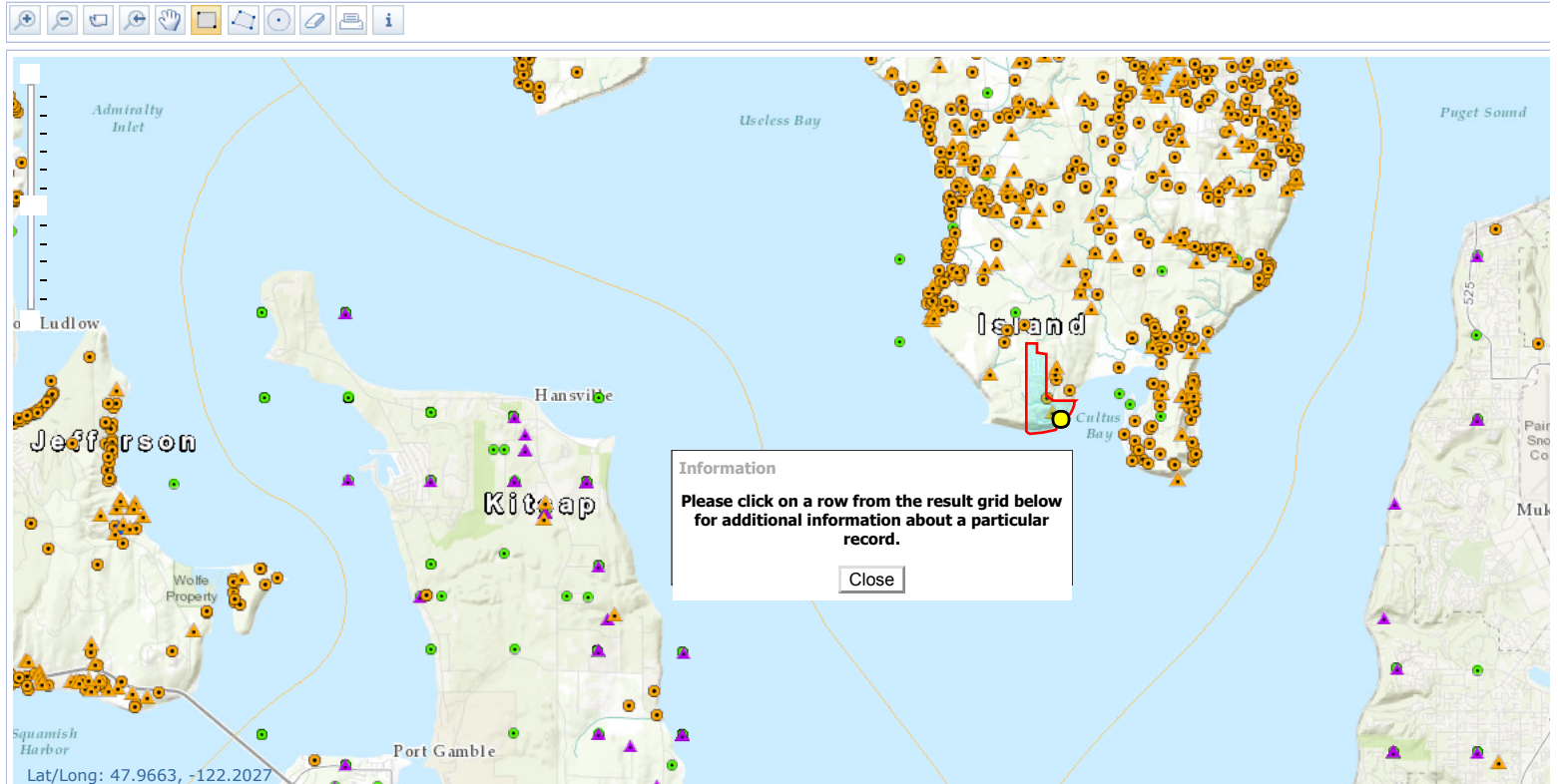
**Source Types:**

Well

No associated well log image at this time.

**Images:**

No associated images.



Record No.	Person or Organization	Priority Date	Record Status	Imaged	Metered	Low Flow Provision	Application No.	Permit No.	Certificate No.	Record Type
G1-144754CL	Ellwanper, Ivan R	...	Active	N	N	N	...	...	...	Claim
S1-137100CL	Nelson, Jo Anne	...	Active	N	N	N	...	...	...	Claim
S1-21348CWRIS	Cydell D E & A M,	03/19/1974	Active	Y	N	N	...	...	S1-21348 C	Certificate
S1-*14315CWRIS	Hagstrom M D,	05/06/1957	Active	Y	N	N	14315	10737	07871	Certificate
G1-23621CWRIS	Scatchet Head Community Club,	06/11/1980	Active	Y	N	N	...	...	G1-23621 C	Certificate
G1-20574	Scatchet Head Water District,	04/29/1973	Active	N	N	N	...	...	...	Superseding Permit

**APPENDIX D    Capacity Analysis**

## WORKSHEET 6-1: ERU Determinations

### Water System Physical Capacity Documentation based on MDD

*Note: Capacity determinations are only for existing facilities that are operational for the water system.*

**Specific Single-Family Residential Connection Criteria (measured or estimated demands)  
(see Chapter 5):**

Average Day Demand (ADD):            200            gpd/ERU

Maximum Day Demand (MDD)        425            gpd/ERU

Water System Service Connections correlated to ERUs			
Service Classification	Total MDD for the classification, gpd	Total # Connections in the classification	ERUs
<b>Residential</b>			
Single-family		<b>410</b>	<b>410</b>
Multifamily			
<b>Nonresidential</b>			
Industrial			
Commercial			
Governmental			
Agricultural			
Recreational			
Other (specify)			
<b>DSL</b>		N/A	
<b>Other (identify)</b>			
<b>Total existing ERUs (Residential + Nonresidential + Non-revenue + Other) =</b>			<b>410</b>

Physical Capacity as ERUs	
Water System Component (Facility)	Calculated Capacity in ERUs for each component
Source(s)	Vd & MDD: 672
Treatment	751
Equalizing Storage	965
Standby Storage	1,006
Distribution	597
Transmission	N/A
Other (specify)	N/A
<b>Water System Physical Capacity (ERUs) = 597</b> (based on the limiting water system component shown above)	

*Note: If multiple-day storage is needed to meet MDD, another approach to estimate the ERU capacity is necessary.*

# AVERAGE DAY DEMAND (ADD) CALCULATION

Date Printed: 2/1/2018

**System:** Scatchet Head Water District  
**ID No.:** 76470 X  
**Location:** Whidbey Island, Island County

Summer ADD is based upon June - September readings

Year	Total Water Usage Gallons	# of Active Connections	Yearly ADD gpd/ERU	Summer ADD gpd/ERU	Total Usage (ac-ft/yr)
2011	15,712,712	410	105	129	48
2012	15,094,191	410	101	118	46
2013	16,076,465	410	107	130	49
2014	16,437,749	410	110	138	50
2015	18,055,748	410	121	156	55
2016	18,976,236	410	127	153	58
2017	14,300,264	410	96	191	44
Average	17,110,749	410	114	167	53
Minimum	14,300,264	410	96	153	44
Maximum	18,976,236	410	127	191	58

<b>ADD based upon maximum Summer ADD (3 years)</b>	=	<b>191</b>	<b>gpd/ERU</b>
<b>Design ADD</b>	=	<b>200</b>	<b>gpd/ERU</b>

# MAXIMUM DAY DEMAND (MDD) CALCULATION

Date Printed: 2/1/2018

**System:** Scatchet Head Water District  
**ID No.:** 76470 X  
**Location:** Whidbey Island, Island County

From DOH Water System Design Manual (Section 5.2.1)

Equation 5-2

$$MDD = (1.7)(MADD)$$

Where:

**MDD** = Maximum Day Demand (gallons/day/ERU)  
**MADD** = Maximum Monthly Average Day Demand (gallons/day/ERU)

Year	MADD	MDD
2011	150	254
2012	139	237
2013	163	277
2014	169	287
2015	182	309
2016	181	307
2017	223	380
Average	195	332
Minimum	181	307
Maximum	223	380
<b>Proposed</b>	250	425

## PEAK HOUR DEMAND (PHD) CALCULATION

**System:** Scatchet Head Water District  
**ID No.:** 76470 X  
**Location:** Whidbey Island, Island County

### From DOH Water System Design Manual (Section 5.2.4)

Equation 5-1: 
$$\text{PHD} = (\text{MDD}/1440)[(\text{C})(\text{N}) + \text{F}] + 18$$

*Where:*

<b>PHD</b>	=	<i>Peak Hourly Demand, (gallons per minute, gpm)</i>
<b>C</b>	=	<i>Coefficient Associated with Ranges of ERUs</i>
<b>N</b>	=	<i>Number of Service Connections, ERUs</i>
<b>F</b>	=	<i>Factor Associated with Ranges of ERUs</i>
<b>MDD</b>	=	<i>Maximum Day Demand, (gpd/ERU)</i>

Range of N (ERUs)		C	F
15	50	3.0	0
51	100	2.5	25
101	250	2.0	75
251	500	1.8	125
501	1,000,000	1.6	225

This is Table 5-1 in DOH Design Manual

Year	N (ERUs)	MDD (gpd/ERU)	C	F	PHD (gpm)
<b>2011</b>	410	254	1.8	125	170
<b>2012</b>	410	237	1.8	125	160
<b>2013</b>	410	277	1.8	125	184
<b>2014</b>	410	287	1.8	125	190
<b>2015</b>	410	309	1.8	125	203
<b>2016</b>	410	307	1.8	125	202
<b>2017</b>	410	380	1.8	125	246
Current	410	425	1.8	125	273
Approved	451	425	1.8	125	294
Proposed	597	425	1.6	225	<b>366</b>



## SYSTEM CAPACITY

**System:** Scatchet Head Water District  
**ID No.:** 76470 X  
**Location:** Whidbey Island, Island County

### WATER RIGHT CALCULATIONS

**Based on Annual Volume & Average Day Demand (Eqn 6-3):**

$N = Va / (365 \cdot ADD)$   
 Where:

N = Number of Service Connections, ERUs  
 Va = Annual Volume of Water Available from Water Right (gallons/year)  
 ADD = Average Daily Demand per ERU (gpd/ERU)

	Va (acre-ft/year)	Va (gal/year)	ADD (gpd/ERU)	N (ERUs)
Potential Connections	241	78,655,072	200	1,077

**Based on Instantaneous Flow & Maximum Day Demand (Eqn 6-4):**

$N = Vd / MDD = (Q_i \cdot td) / MDD$   
 Where:

N = Number of Service Connections, ERUs  
 Vd = Total Volume of Water Available for Maximum Day's Demand (gpd)  
 MDD = Maximum Daily Demand per ERU (gpd/ERU)  
 Q<sub>i</sub> = Instantaneous Maximum Water Right Flow Rate (gpm)  
 td = Time that source operates per day (minutes/day)

	Q <sub>i</sub> (gpm)	td (min/day)	MDD (gpd/ERU)	N (ERUs)	Minutes Pumped/Hr
S02	125	1329	425	391	55
S03	90	1329	425	281	55
Potential Connections	215	1329	425	672	55

### SOURCE CALCULATIONS

**Based on Well Production & Max Day Demand:**

$N = Vd / ADD = (Q_s \cdot td) / ADD$   
 Where:

N = Number of Service Connections, ERUs  
 Vd = Total Volume of Water Available for Average Day's Demand (gpd)  
 MDD = Max Daily Demand per ERU (gpd/ERU)  
 Q<sub>s</sub> = Total Well Production Flow rate (gpm)  
 td = Time that source operates per day (minutes/day)

	Q <sub>s</sub> (gpm)	td (min/day)	MDD (gpd/ERU)	N (ERUs)	Minutes Pumped/Hr
S02	125	1329	425	391	55
S03	66	1329	425	206	55
Potential Connections	191	1329	425	597	55

### BOOSTER PUMP CALCULATIONS

**Based on Well Production & max Day Demand:**

$N = [1440(\text{PHD} - 18) / \text{MDD} \cdot F] / C$   
 Where:

N = Number of Service Connections, ERUs  
 PHD = Peak Hour Demand (gallons/minute) (Booster Pump Capacity)  
 MDD = Maximum Daily Demand per ERU (gpd/ERU)  
 F = PHD Coefficient from Table 5-1 (= 225)  
 C = PHD Coefficient from Table 5-1 (= 1.6)

	Q <sub>b</sub> (gpm)	C	F	MDD (gpd/ERU)	N (ERUs)
Potential Connections	540	1.6	225	425	965

### TREATMENT CALCULATIONS

**Based on Instantaneous Flow & Maximum Day Demand:**

$N = Vd / MDD = (\sum Q_i \cdot td) / MDD$   
 Where:

N = Number of Service Connections, ERUs  
 Vd = Total Volume of Water Available for Maximum Day's Demand (gallons/day)  
 MDD = Maximum Daily Demand per ERU (gpd/ERU)  
 Q<sub>t</sub> = Treatment System Maximum Design Flow Rate (gpm)  
 td = Time that source operates per day (minutes/day)

	Q <sub>t</sub> (gpm)	Minutes Pumped/Hr	td (min/day)	MDD (gpd/ERU)	N (ERUs)
not applicable	240	55	1329	425	751

### Limiting Factors

Condition	Limiting Factor	ERUs
Water Right	Va & ADD	1,077
	Q <sub>i</sub> & MDD	672
Source	Q <sub>s</sub> & MDD	597
Booster Pump	Q <sub>b</sub> & MDD	965
Treatment	Q <sub>t</sub> & MDD	751

System Capacity (#ERUs): 597  
 Condition: Source  
 Limiting Factor: Q<sub>s</sub> & MDD

## Main Reservoir Water System Storage Capacity Calculations

System: Scatchet Head Water District  
 ID No.: 76470 X  
 Location: Whidbey Island, Island County

Equations/Calc's in this spreadsheet are in accordance with the DOH's Group A Public Water System Design Manual

### Source

Wells	Pump Rate (gpm)	Comment
S01	125	water right limited to 30 gpm
emergency	66	
	0	
Qs:	191	Total minus emergency
Qs:	215	water right limited
Q's:	66	Total minus largest

Water right limit source capacity to 215 gpm.

### # of Connections

Year	ERUs (N)	DOH Approved
2017	410	451
Proposed	597	

### Reservoir Specifications

Reservoir	ID	Vol (gal)	Vol (cf)	Height (ft)	Base EI	Top WS	Total Vol.	Vol/VF
Guemes Ave	24.0	287,629	38,453	85.00	360.00	445.00	287,629	3,384
Maple Pt Dr	14.6	119,000	15,909	95.00	350.00	445.00	119,000	1,253
<b>Total:</b>							<b>287,629</b>	<b>3,384</b>

### Top Dead Storage (DS)

Top WS	Dead Storage Depth (ft)	Top Dead Vol (gal)	Top Dead Vol (res. vf)
445.0	0.5	1,692	0.5

Note: Assumed top Dead Storage is 6".

### Operational Storage (OS)

Top WS	Operational Depth (ft)	Oper. Level	Oper. Vol. (gal)	Oper. Vol (res. vf)
444.50	1.00	443.50	3,384	1.0

Based upon assumed probe settings.

### Required Equalizing Storage (ES)

PHD (gpm)	Qs (gpm)	PHD-Qs (gpm)	Ves (gal)	Ves (res. vf.)
366	191	175	26,298	7.8

Ves=(PHD-Qs)\*150 or Zero

### Recommended Standby Storage (SB)

ADD (gpd/ERU)	N	Qs (gpm)	QL (gpm)	tm (min)	Single Source			Greater of SB or FF
					SB (gal) Single Source	SB per ERU (gal/ERU)	SB (res. vf.)	
200	597	191	125	1,329	151,086	253	44.6	SB

Vsb (Single Source) = (2 days)(ADD)(N) or (200)(N) whichever is greater

### Standby Storage (SB) Provided

gallons/ERU	# Conn's	Vsb 2	Vsb (res. vf.)
426	597	254,563	75.2

### Fire Suppression Storage (FSS)

FF (gpm)	tm (minutes)	Vfss (gal)	Vfss (res. vf)
500	30	15,000	4.4

Vfss=FF\*tm

Where:  $FSS = (FF)(t_m)$   
 $FF =$  Required fire flow rate (gpm)  
 $t_m =$  Duration of FF rate (minutes)

### Bottom Dead Storage (DS)

Res. Bot. Elev.	Top of Dead Storage	Dead Vol (gal)	Dead Vol (res. vf)
350.0	350.5	1,692	0.5

Note: Assumed Dead Storage is bottom 6" of reservoir

### Available Storage Summary - Nested FF & Standby Storage

Storage Component	Vol (gal)	Res VF	Top WS	Bot WS	PSI Req/mt	Highest Grav. Service Elev.
Top Dead Storage	1,692	0.5	445.0	444.5		
Operational Storage (OS)	3,384	1.0	444.5	443.5		
Equalizing Storage (ES)	26,298	7.8	443.5	435.7	30	366.4
Standby Storage (SB)	254,563	75.2	435.7	364.9	20	318.7
Fire Suppression Storage (FSS)	15,000	4.4	364.9	360.5	20	314.3
Dead Storage (DS)	1,692	0.5	360.5	360.0		
<b>Totals:</b>	<b>287,629</b>	<b>85.0</b>				

**APPENDIX E    Water Quality Results**



Help

**View Sample Detail - WSID 76470X - SCATCHET HEAD WATER**

**DISTRICT**

Collect Date 8/12/2002  
Lab Number 081  
Lab Name Pace Analytical Services - Seattle  
Sample Number 85309  
Source 02  
Analyte Group IOC-INORGANIC CONTAMINANTS  
Test Panel IOC-COMplete INORGANIC ANALYSIS  
Sample Location well 2  
Sample Type Pre-Treatment / Raw

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant		State Reporting Limit
				Level	Units	
0004	ARSENIC	EQ	0.0070	0.0104	mg/L	0.0010
0020	NITRATE-N	LT	0.5000	10.0000	mg/L	0.2000
0021	CHLORIDE	LT	20.0000	250.0000	mg/L	20.0000
0114	NITRITE-N	LT	0.5000	1.0000	mg/L	0.2000
0161	TOTAL NITRATE/NITRITE	LT	0.5000		mg/L	0.5000

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**View Sample Detail - WSID 76470X - SCATCHET HEAD WATER**

**DISTRICT**

Collect Date 4/1/2002  
 Lab Number 081  
 Lab Name Pace Analytical Services - Seattle  
 Sample Number 82554  
 Source 02  
 Analyte Group IOC-INORGANIC CONTAMINANTS  
 Test Panel IOC-COMplete INORGANIC ANALYSIS  
 Sample Location #4  
 Sample Type Post-Treatment / Finished

Analyte		Result		Maximum		State Reporting
DOH	Analyte Name	Range	Quantity	Contaminant	Units	Limit
0010	MANGANESE	EQ	0.0630	0.0500	mg/L	0.0100
0008	IRON	LT	0.1000	0.3000	mg/L	0.1000

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**View Sample Detail - WSID 76470X - SCATCHET HEAD WATER**

**DISTRICT**

Collect Date 4/1/2002  
 Lab Number 081  
 Lab Name Pace Analytical Services - Seattle  
 Sample Number 82553  
 Source 02  
 Analyte Group IOC-INORGANIC CONTAMINANTS  
 Test Panel IOC-COMPLETE INORGANIC ANALYSIS  
 Sample Location at whd - raw water  
 Sample Type Pre-Treatment / Raw

<b>Analyte DOH</b>	<b>Analyte Name</b>	<b>Result Range</b>	<b>Result Quantity</b>	<b>Maximum Contaminant Level</b>	<b>Units</b>	<b>State Reporting Limit</b>
0008	IRON	EQ	0.3500	0.3000	mg/L	0.1000
0010	MANGANESE	EQ	0.2400	0.0500	mg/L	0.0100
0020	NITRATE-N	LT	0.5000	10.0000	mg/L	0.2000
0114	NITRITE-N	LT	0.5000	1.0000	mg/L	0.2000
0161	TOTAL NITRATE/NITRITE	LT	0.5000		mg/L	0.5000

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**View Sample Detail - WSID 76470X - SCATCHET HEAD WATER**

**DISTRICT**

Collect Date 5/7/2001  
Lab Number 081  
Lab Name Pace Analytical Services - Seattle  
Sample Number 76151  
Source 02  
Analyte Group IOC-INORGANIC CONTAMINANTS  
Test Panel IOC-COMplete INORGANIC ANALYSIS  
Sample Location WELL  
Sample Type Pre-Treatment / Raw

Analyte		Result		Maximum		State Reporting
DOH		Range	Quantity	Contaminant	Units	Limit
Num	Analyte Name			Level		
0020	NITRATE-N	LT	0.5000	10.0000	mg/L	0.2000
0021	CHLORIDE	LT	20.0000	250.0000	mg/L	20.0000
0022	SULFATE	LT	10.0000	250.0000	mg/L	50.0000

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**DISTRICT**

Collect Date 10/8/2001  
 Lab Number 081  
 Lab Name Pace Analytical Services - Seattle  
 Sample Number 79192  
 Source 02  
 Analyte Group IOC-INORGANIC CONTAMINANTS  
 Test Panel IOC-COMplete INORGANIC ANALYSIS  
 Sample Location WHD  
 Sample Type Pre-Treatment / Raw

Analyte		Result		Maximum		State Reporting
DOH		Range	Quantity	Contaminant	Units	Limit
Num	Analyte Name	Result Range	Quantity	Level	Units	Limit
0010	MANGANESE	EQ	0.2500	0.0500	mg/L	0.0100
0008	IRON	EQ	0.2800	0.3000	mg/L	0.1000
0020	NITRATE-N	EQ	0.6000	10.0000	mg/L	0.2000
0021	CHLORIDE	LT	20.0000	250.0000	mg/L	20.0000

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**View Sample Detail - WSID 76470X - SCATCHET HEAD WATER DISTRICT**

Collect Date 3/30/1992  
 Lab Number 081  
 Lab Name Pace Analytical Services - Seattle  
 Sample Number 23096  
 Source 02  
 Analyte Group VOC-VOLATILE ORGANIC CONTAMINANTS  
 Test Panel VOC1-VOLATILE ORGANIC  
 Sample Location  
 Sample Type Unknown

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level		State Reporting Limit
				Level	Units	
0027	CHLOROFORM	LT	0.5000		ug/L	0.5000
0028	BROMODICHLOROMETHANE	LT	0.5000		ug/L	0.5000
0029	DIBROMOCHLOROMETHANE	LT	0.5000		ug/L	0.5000
0030	BROMOFORM	LT	0.5000		ug/L	0.5000
0045	VINYL CHLORIDE	LT	0.5000	2.0000	ug/L	0.5000
0046	1,1 DICHLOROETHYLENE	LT	0.5000	7.0000	ug/L	0.5000
0047	1,1,1 TRICHLOROETHANE	LT	0.5000	200.0000	ug/L	0.5000
0048	CARBON TETRACHLORIDE	LT	0.5000	5.0000	ug/L	0.5000
0049	BENZENE	LT	0.5000	5.0000	ug/L	0.5000
0050	1,2 DICHLOROETHANE	LT	0.5000	5.0000	ug/L	0.5000
0051	TRICHLOROETHYLENE	LT	0.5000	5.0000	ug/L	0.5000
0052	1,4 DICHLOROBENZENE	LT	0.5000	75.0000	ug/L	0.5000
0053	CHLOROMETHANE	LT	0.5000		ug/L	0.5000
0054	BROMOMETHANE	LT	0.5000		ug/L	0.5000
0055	CHLOROETHANE	LT	0.5000		ug/L	0.5000
0056	METHYLENE CHLORIDE (DICHLOROMETHANE)	LT	0.5000	5.0000	ug/L	0.5000
0057	TRANS- 1,2 DICHLOROETHYLENE	LT	0.5000	100.0000	ug/L	0.5000
0058	1,1 DICHLOROETHANE	LT	0.5000		ug/L	0.5000
0059	2,2 DICHLOROPROPANE	LT	0.5000		ug/L	0.5000
0060	CIS- 1,2 DICHLOROETHYLENE	LT	0.5000	70.0000	ug/L	0.5000
0062	1,1 DICHLOROPROPENE	LT	0.5000		ug/L	0.5000
0063	1,2 DICHLOROPROPANE	LT	0.5000	5.0000	ug/L	0.5000
0064	DIBROMOMETHANE	LT	0.5000		ug/L	0.5000
0065	CIS- 1,3 DICHLOROPROPENE	LT	0.5000		ug/L	0.5000
0066	TOLUENE	LT	0.5000	1000.0000	ug/L	0.5000

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**View Sample Detail - WSID 76470X - SCATCHET HEAD WATER DISTRICT**

Collect Date 9/13/1993  
 Lab Number 081  
 Lab Name Pace Analytical Services - Seattle  
 Sample Number 11429  
 Source 02  
 Analyte Group VOC-VOLATILE ORGANIC CONTAMINANTS  
 Test Panel VOC1-VOLATILE ORGANIC  
 Sample Location  
 Sample Type Unknown

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level		State Reporting Limit
				Level	Units	
0027	CHLOROFORM	LT	0.5000		ug/L	0.5000
0028	BROMODICHLOROMETHANE	LT	0.5000		ug/L	0.5000
0029	DIBROMOCHLOROMETHANE	LT	0.5000		ug/L	0.5000
0030	BROMOFORM	LT	0.5000		ug/L	0.5000
0045	VINYL CHLORIDE	LT	0.5000	2.0000	ug/L	0.5000
0046	1,1 DICHLOROETHYLENE	LT	0.5000	7.0000	ug/L	0.5000
0047	1,1,1 TRICHLOROETHANE	LT	0.5000	200.0000	ug/L	0.5000
0048	CARBON TETRACHLORIDE	LT	0.5000	5.0000	ug/L	0.5000
0049	BENZENE	LT	0.5000	5.0000	ug/L	0.5000
0050	1,2 DICHLOROETHANE	LT	0.5000	5.0000	ug/L	0.5000
0051	TRICHLOROETHYLENE	LT	0.5000	5.0000	ug/L	0.5000
0052	1,4 DICHLOROBENZENE	LT	0.5000	75.0000	ug/L	0.5000
0053	CHLOROMETHANE	LT	0.5000		ug/L	0.5000
0054	BROMOMETHANE	LT	0.5000		ug/L	0.5000
0055	CHLOROETHANE	LT	0.5000		ug/L	0.5000
0056	METHYLENE CHLORIDE (DICHLOROMETHANE)	LT	0.5000	5.0000	ug/L	0.5000
0057	TRANS- 1,2 DICHLOROETHYLENE	LT	0.5000	100.0000	ug/L	0.5000
0058	1,1 DICHLOROETHANE	LT	0.5000		ug/L	0.5000
0059	2,2 DICHLOROPROPANE	LT	0.5000		ug/L	0.5000
0060	CIS- 1,2 DICHLOROETHYLENE	LT	0.5000	70.0000	ug/L	0.5000
0062	1,1 DICHLOROPROPENE	LT	0.5000		ug/L	0.5000
0063	1,2 DICHLOROPROPANE	LT	0.5000	5.0000	ug/L	0.5000
0064	DIBROMOMETHANE	LT	0.5000		ug/L	0.5000
0065	CIS- 1,3 DICHLOROPROPENE	LT	0.5000		ug/L	0.5000
0066	TOLUENE	LT	0.5000	1000.0000	ug/L	0.5000

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Help

**View Sample Detail - WSID 76470X - SCATCHET HEAD WATER DISTRICT**

Collect Date 9/16/1991  
 Lab Number 081  
 Lab Name Pace Analytical Services - Seattle  
 Sample Number 12144  
 Source 02  
 Analyte Group VOC-VOLATILE ORGANIC CONTAMINANTS  
 Test Panel VOC1-VOLATILE ORGANIC  
 Sample Location  
 Sample Type Unknown

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level		State Reporting Limit
				Level	Units	
0027	CHLOROFORM	LT	0.5000		ug/L	0.5000
0028	BROMODICHLOROMETHANE	LT	0.5000		ug/L	0.5000
0029	DIBROMOCHLOROMETHANE	LT	0.5000		ug/L	0.5000
0030	BROMOFORM	LT	0.5000		ug/L	0.5000
0045	VINYL CHLORIDE	LT	0.5000	2.0000	ug/L	0.5000
0046	1,1 DICHLOROETHYLENE	LT	0.5000	7.0000	ug/L	0.5000
0047	1,1,1 TRICHLOROETHANE	LT	0.5000	200.0000	ug/L	0.5000
0048	CARBON TETRACHLORIDE	LT	0.5000	5.0000	ug/L	0.5000
0049	BENZENE	LT	0.5000	5.0000	ug/L	0.5000
0050	1,2 DICHLOROETHANE	LT	0.5000	5.0000	ug/L	0.5000
0051	TRICHLOROETHYLENE	LT	0.5000	5.0000	ug/L	0.5000
0052	1,4 DICHLOROBENZENE	LT	0.5000	75.0000	ug/L	0.5000
0053	CHLOROMETHANE	LT	0.5000		ug/L	0.5000
0054	BROMOMETHANE	LT	0.5000		ug/L	0.5000
0055	CHLOROETHANE	LT	0.5000		ug/L	0.5000
0056	METHYLENE CHLORIDE (DICHLOROMETHANE)	LT	0.5000	5.0000	ug/L	0.5000
0057	TRANS- 1,2 DICHLOROETHYLENE	LT	0.5000	100.0000	ug/L	0.5000
0058	1,1 DICHLOROETHANE	LT	0.5000		ug/L	0.5000
0059	2,2 DICHLOROPROPANE	LT	0.5000		ug/L	0.5000
0060	CIS- 1,2 DICHLOROETHYLENE	LT	0.5000	70.0000	ug/L	0.5000
0062	1,1 DICHLOROPROPENE	LT	0.5000		ug/L	0.5000
0063	1,2 DICHLOROPROPANE	LT	0.5000	5.0000	ug/L	0.5000
0064	DIBROMOMETHANE	LT	0.5000		ug/L	0.5000
0065	CIS- 1,3 DICHLOROPROPENE	LT	0.5000		ug/L	0.5000
0066	TOLUENE	LT	0.5000	1000.0000	ug/L	0.5000

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