

PACIFIC groundwater **GROUP**

**SAN JUAN COUNTY
ANNUAL GROUNDWATER
MONITORING REPORT 2008**

DECEMBER 2008

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ANNUAL GROUNDWATER MONITORING REPORT
2008**

Prepared for:

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SIGNATURE

This report, and Pacific Groundwater Group's work contributing to this report, were reviewed by the undersigned and approved for release.



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1.0 SUMMARY OF FINDINGS

San Juan County has established a well network to monitor groundwater quality and elevation. The networks are currently focused on the East-sound and Lopez Village areas.

The monitoring network currently includes 17 groundwater quality and groundwater elevation monitoring wells on Lopez Island and the East-sound area of Orcas Island.

Groundwater quality samples were collected on April 23 and April 24, 2008 and again on October 21 and 22, 2008. Data loggers were initially installed on January 29 and 30, 2008 and downloaded during groundwater sampling events. Further data loggers have been installed during subsequent download events.

The following findings may be drawn from this report:

- In the Eastsound region, groundwater generally flows towards town from the two bedrock uplands east and west of town.
- All groundwater concentrations were below their respective Ground Water Quality Criteria (WAC173-200) in the Eastsound monitoring network except for sodium. Sodium concentrations were above the GWQC (20 mg/L) in six of the ten wells monitored. The concentrations ranged from 10.7 to 52.7 mg/L and are within the range of naturally occurring sodium.
- In the Eastsound monitoring network, elevated nitrate concentrations were detected in the Curtis (5 and 4.7 mg/L), School (1.3 mg/L), and EWUA #1R (2.5 and 2.4 mg/L) wells. All concentrations were below the GWQC (10 mg/L).
- All groundwater concentrations were below their respective GWQCs in the Lopez Village monitoring network except for sodium and specific conductance.
- Sodium concentrations were above the GWQC of 20 mg/L in all Lopez wells. So-

dium was above background concentrations in the Langenbach (145 mg/L) and Greene (84.5 and 87.8 mg/L) wells. The source of the elevated sodium concentration in the Greene well is likely saltwater intrusion since this well is also elevated in chloride. The source of elevated chloride in the Langenbach well is unknown.

- Specific conductance was above the GWQC (700 mg/L) in four of the seven Lopez Village wells: Greene (1320 and 1280 mg/L), Roberts (898 and 872 mg/L), Langenbach (846 and 768 mg/L) and Meng's Arena (747 and 735 mg/L).

2.0 INTRODUCTION

San Juan County's water resources are provided by local rainfall only and are characterized by the rain shadow created by the Olympic Mountains to the south and Vancouver Island to the west, by predominantly steep terrain and bedrock geology, by small watershed catchment areas, and by extensive shoreline. These conditions result in low rainfall, limited groundwater storage, and extensive runoff and discharge to the sea. Key issues for San Juan County include:

- Very low recharge to aquifers,
- Seawater intrusion,
- Water right allocations by the state that exceed water available,
- Areas where current use of water exceeds aquifer capacity,
- Water development that is occurring primarily via exempt wells,
- Failure of many individual and community wells during summer months,
- Lack of capacity to serve areas designated by the county's GMA process for growth,
- A gap in responsibility and authority between state and county agencies,
- Lack of comprehensive monitoring and assessment of water resource capacity, and

- Lack of coordinated, cooperative resource management.

Recommendations in the recently adopted San Juan County Water Resources Management Plan include a program to develop local management of the water resource. Future management of water resources in San Juan County will require careful, on-going assessment of the availability of fresh water; groundwater monitoring is an essential component of this effort.

Sound Hydrogeology produced a Quality Assurance Project Plan in December 2007 that outlines procedures to be used in the monitoring program.

2.1 MONITORING SYSTEM DESCRIPTION

San Juan County has developed a groundwater monitoring network to collect groundwater elevation and quality data. These data are used in management of the County's groundwater resources. Specific technical uses of the data are diverse and include:

- Seawater intrusion evaluation
- Groundwater elevation trend analysis
- Groundwater flow model calibration
- Water quality sampling

The monitoring network currently includes 17 groundwater quality groundwater elevation monitoring wells in the vicinity of Lopez Village on Lopez Island and the Eastsound area of Orcas Island. These two locations were selected because they are currently experiencing the most population growth and associated water quantity and quality issues. Network wells are presented in Table 1 and Figures 1 and 2.

All wells are screened in the primary aquifer. The monitoring locations were selected based on availability, access, spatial distribution, and availability of prior sampling data. Additional

wells areas will be selected as part of this program based on the same criteria.

The Eastsound, monitoring network currently includes the Clark, Curtis, EWUA#1, EWUA #4, EWUA #5, Fischer, Greer, NAPA, Pearson, and School wells (Figure 1). The Lopez Island monitoring network currently includes the Aiken, Grant, Greene, Langenbach, Lopez Village Park, Mengs Arena, Roberts, and Top of the World wells (Figure 2).

Each monitoring location records a time-series of water level and, in some cases, water quality measurements with dedicated transducers (Table 1). Monitoring wells in the Eastsound network have Solinst Levellogger transducers which record water level and temperature on an hourly basis. All monitored wells on Lopez Island except for Top of the World are outfitted with CTD Divers which also measure electrical conductivity. The Top of the World well is monitored with a Levellogger. Barometric dataloggers (Barologger) are installed in the Village Park well on Lopez Island and EWUA #5 on Orcas for barometric compensation of transducer water level measurements.

It is anticipated that the network will gradually be expanded to cover most areas of the County, with an emphasis on areas experiencing higher rates and/or densities of growth, and areas experiencing groundwater quality and/or quantity issues. The network will utilize domestic water wells as sampling locations for collection of water level and groundwater quality data.

2.2 WELLHEAD SURVEY SOURCES

Domestic wells included in the Lopez Village monitoring system were surveyed by the County in 2002 as part of the Lopez Village Saltwater Intrusion Modeling Project. The Aiken well was not included in this survey so the elevation was estimated from the Digital Elevation Model of the County. Eastsound wells were surveyed by the County in 2008 as part of this project. All elevations were surveyed in NGVD 29. Mean

Sea Level is approximately 0.1 feet above the surveyed 0 elevation.

3.0 FIELD NARRATIVE

Groundwater monitoring tasks were completed during four field mobilizations including:

- January 29 and 30, 2008: transducer installation at Eastsound and Lopez Island locations
- April 23 and 24, 2008: groundwater sampling and transducer data downloads at Eastsound and Lopez Island locations
- May 12, 2008: transducer maintenance at Lopez Island locations
- October 21 and 22, groundwater sampling and transducer data downloads at Eastsound and Lopez Island locations

San Juan County installed Solinst Leveloggers in nine Eastsound wells on January 29, 2008. The County installed a specially constructed well cap with a 2-inch PVC riser and cap in wells that were not easily accessible for water level measurements and transducer installation. Transducers were hung from direct-read cables and started in the field with a Solinst Leveloader.

CTD Divers were installed in seven Lopez Island wells on January 30, 2008. CTD Divers were calibrated for conductivity and set to record on an hourly basis on the previous evening. Transducers were hung from direct read cables. All wells were outfitted with the specially constructed well caps with 2-inch PVC risers. The Grant well was outfitted with a Solinst Levelogger.

Groundwater samples were collected at Eastsound wells on April 23, 2008. No pumps were installed at the Beemer or EWUA #4 wells so no samples were collected. When the data was downloaded from the Clark, Pearson, Greer, Beemer/Minnis, and NAPA transducers, it was noted that the time-interval had been incorrectly set to record at too high a rate, resulting in filling of the memory cache in less than two days.

Transducers were reset to record on an hourly basis.

Groundwater samples were collected at Lopez Island wells on April 24, 2008. When water level and conductivity data were downloaded from the CTD Divers, the Leveloader reported low battery levels in the transducers.

San Juan County returned to Lopez Island on May 12, 2008 to replace the transducers which indicated low voltages. Because it was believed that the hourly sampling rate was drawing down the battery, the sampling rate in replacement transducers was set to once every four days. A Solinst Levelogger was also placed in each well and set to record water levels once every two hours. A CTD Diver was not installed in the Top of the World well because of the difficulty in feeding transducers past the discharge piping and wiring.

When the CTD Divers pulled from the Lopez Island wells were connected directly to a computer via optical reader they reported nearly full batteries. The Leveloader does not appear to report accurate battery levels when connected to CTD Divers via direct read cable.

Readings in the EWUA #4 logger were all above 8000 feet after June 26. This logger is slated for replacement.

Insufficient bottles during the October sampling event prevented analysis of all constituents for the Eastsound network.

3.1 GROUNDWATER SAMPLING ANALYTES

Samples were analyzed for total alkalinity, bicarbonate alkalinity, carbonate, dissolved calcium, chloride, fluoride, hydroxide, nitrate, specific conductance, sulfate, magnesium, potassium, and sodium by Analytical Resources Incorporated of Tukwila, WA.

4.0 MONITORING RESULTS

Groundwater elevation and quality data were collected for the Eastsound and Lopez Village monitoring networks. Results for each network are described below.

4.1 EASTSOUND WELLS

Groundwater elevation contours for the Eastsound monitoring system on October 21, 2008 are presented in Figure 1. This date was selected because the greatest number of data points was available. The water level in the Napa well was likely pumping at the time of measurement and therefore was estimated based on the measurement collected during April, 2008.

Groundwater generally flows towards Eastsound from the three bedrock uplands to the north, south east and south west. The current groundwater flow directions indicated by the contours may be due to the limited number of monitoring points and may change as further points are added to the network.

Figure 3 presents time series plot of groundwater elevations. Groundwater elevation data for the Clark, Pearson, Greer, Beemer/Minnis, School, and NAPA wells are not presented on time series plots because of data issues (see Section 3). All wells indicate influences of pumping except for the Fisher well. EWUA #1, #4, and #5 are high capacity production wells and show long-term pumping and recovery cycles. The groundwater time series plot for the Curtis well indicates short pumping periods with rapid recovery. The Fisher well is apparently not pumped. The time series plots for Curtis and EWUA #2, and EWUA #5 indicate seasonal groundwater elevation change with peak groundwater elevations occurring in February.

Groundwater concentration results for April 23 and October 21, 2008 are presented in Tables 2 and 3. Groundwater concentrations were compared to their respective Ground Water Quality Standards (GWQCs) from WAC-173-200. All concentrations were below their respective

GWQCs except for sodium. Chloride concentrations were not elevated and are not indicative of saltwater intrusion.

Nitrate concentrations (Figure 4) were all below the detection limit of 0.1 mg/L except for three wells: Curtis (5 mg/L and 4.7 mg/L), School (1.3 mg/L), and EWUA #1R (2.5 mg/L, 2.5 mg/L). All of the detections are below the groundwater quality criteria (GWQC) of 10 mg/L. The elevated nitrate concentrations are not likely from the same source given their locations relative to the groundwater flow directions. Sources of nitrate contamination are discussed in more detail in (PGG, 2008).

Sodium concentrations in the Eastsound wells were above the GWQC (20 mg/L) in six of the ten wells monitored. The concentrations ranged from 10.7 to 52.7 mg/L and are within the range of naturally occurring sodium.

Figure 5 presents a trilinear diagram for the Eastsound water quality sampling results from the first quarter of 2008. Eastsound wells plot as a calcium carbonate water type, with the exception of the Pearson well, which has a relatively elevated sodium concentration. None of the wells show any indications of seawater intrusion.

The analytes required for trilinear diagram generation were not available for the Eastsound fourth quarter sampling round. For those parameters that were sampled for in the fourth quarter, no significant deviations were found in comparison with the first quarter results, with the exception of EWUA #13 which showed a significant drop in sulfate concentrations (9.5 mg/l in Q1 to 3.1 mg/l in Q4). Average chloride concentrations dropped slightly between the first and fourth quarters. Additional rounds of sampling will need to be collected before a statistically valid evaluation of trends in water quality can be made.

4.2 LOPEZ ISLAND WELLS

There are currently insufficient data points to present a groundwater contour map of the Lopez Island monitoring system. However, groundwater elevations from January 30, 2008 are presented in Figure 2. The anomalous elevations in the Greene and Aiken wells are likely due to inconsistent survey results or the effects of tidal influence on non-synchronous spot groundwater elevation measurements. Further data collection will allow for average groundwater elevations to be presented.

Figure 6 presents a groundwater elevation time series plot for monitored wells on Lopez Island. Groundwater elevation data for the Aiken well are not presented on time series plots because of the anomalous results discussed above. Village Park is the closest well to the shore and indicates tidal influence. The Greene well also suggests some variability that may be tidally derived. The Greene well water level record indicated an anomalous 7+ foot water level rise over a two hour period on January 31, 2008. A correction has been applied but the source of the rise is unknown.

All wells indicate some degree of seasonal variability except for Top of the World. Peak water levels occurred in February and declined until August in all wells in 2008.

Tables 4 and 5 present the groundwater quality results collected from the Lopez Island monitoring wells on April 24 and October 22, 2008. All concentrations were below their respective GWQCs except for sodium and specific conductance.

Chloride concentrations in all Lopez wells were below the GWQC of 250 mg/L as indicated in Table 3 and Figure 7. Generally, chloride concentrations were near background concentrations except for the Greene well which had a chloride concentration of 186 mg/L in April and 172 mg/L in October. Chloride concentrations in the Greene well have been elevated since it was first monitored in 2002.

Sodium concentrations were above the GWQC of 20 mg/L in all Lopez wells for both sampling events. Sodium was above background concentrations in the Langenbach (145 mg/L) and Greene (84.5 and 87.8 mg/L) wells. The source of the elevated sodium concentration in the Greene well is likely saltwater intrusion since this well is also elevated in chloride. The source of elevated chloride in the Langenbach well is unknown.

Specific conductance was above the GWQC (700 mg/L) in four of the seven wells: Greene (1320 and 1280 mg/L), Roberts (898 and 872 mg/L), Langenbach (846 and 768 mg/L) and Meng's Arena (747 and 735 mg/L).

Trilinear diagrams are useful in evaluating the degree of salt water intrusion in wells. Figures 8 and 9 present trilinear diagrams for the 2008 Q1 and 2008 Q3 sampling events at Lopez Island. In general, the effect of seawater intrusion is to move the plotted location of the datapoint in the upper diamond of the piper diagram from the background water quality location (in this case, Aiken, Lopez Village Park, and Top of the World wells) upward and then to the right. It is not uncommon for intruded wells to improve during the wetter, lower water use months only to re-intrude the following summer.

The results from the first quarter of 2008 (Figure 8) plot as a calcium carbonate water type, with the exception of the Langenbach water sample. The Langenbach sample has very low to non-detectable levels of potassium, calcium and magnesium, and relatively elevated levels of sodium. This combination of results is indicative of water that has been treated by an ion-exchange water softener, so it is possible that this sample was collected from a faucet that provided softened / treated water.

The Aiken, Lopez Village Park, and Top of the World wells appear to be unaffected by seawater intrusion during the first quarter 2008 sampling event. The Langenbach, Roberts, and Meng's Arena wells have slightly elevated chloride concentrations, with both the Roberts and Meng's Arena wells showing shifts in relative chemistry

indicative of the early onset of seawater intrusion (relative to the unaffected wells). Because of the apparent softening of the Langenbach sample, relative chemistry cannot be evaluated. The Greene well has significantly elevated chloride concentrations, and shows shifts in relative chemistry indicative of seawater intrusion.

Figure 9 shows a trilinear plot for the Lopez Island water quality sampling results from the fourth quarter of 2008. As with the first quarter sampling, the fourth quarter water quality from the Greene well indicated elevated chloride and shifts in relative chemistry indicative of seawater intrusion. In general water quality between the first round and fourth round did not vary significantly (with the exception of the Langenbach softened and un-softened samples). Average chloride concentrations dropped slightly between the first and fourth quarters. Additional rounds of sampling will need to be collected before a statistically valid evaluation of trends in water quality can be made.

4.3 PRECIPITATION

Precipitation is monitored at three stations:

- Eastsound by Paul Kamin of EWUA
- Lopez Village at 818 Cross Road by Scott Rozenbaum
- Lopez Island at 1412 Bakerview Road by Jack Giard

Precipitation data for 2008 are presented in Figure 10. Eastsound showed greater precipitation for 2008 as consistent with published isohyetal maps. For 2008, the increased precipitation in Eastsound generally fell during the winter months.

5.0 RECOMMENDATIONS

The following recommendations are made based on the findings of this report:

- Expand the Eastsound groundwater monitoring network towards north to include wells between Greer and EWUA #4, the School well, and wells east of Beemer-Minnis.
- Expand the Lopez groundwater monitoring network by adding previously surveyed monitoring points including Stephens, Duncan, Carter, Bennett, Marsh, Erisman, Horn, Arnold, Normandy Heights, Mariner Hill, Galley, Cormorant, and Harbor.
- Survey the measuring point of the Aiken, Greene, and Lopez Village wells so they can be included in groundwater elevation contouring.

6.0 REFERENCES

Sound Hydrogeologic, 2008. *Quality Assurance Project Plan, Ambient Groundwater Monitoring, San Juan County, Washington*. Consultants report prepared for San Juan County Community Planning Services.

Pacific Groundwater Group, 2008. *Interim Aquifer Protection Report, Eastsound, San Juan County, Washington*. Consultant's Report to the San Juan County Department of Health and Community Services.

Table 1. Groundwater Monitoring Network Configuration

San Juan County, Washington

Well	Ecology ID	Transducer	Measuring Point Elevation	Data Logger	Groundwater Sample Collected
<i>Eastsound</i>					
Beemer-Minnis	AAH 572	23915		Levelogger	
Clark	ALQ 041	24080	85.7	Levelogger	X
Curtis	AGQ 153	20775	51.4	Levelogger	X
EWUA #1	AER 014	23835	38.6	Levelogger	X
EWUA #4	AER 004	24575	12.5	Levelogger	
EWUA #5	Not Listed	20774	101.1	Levelogger	X
Fisher	AEC 764	24568	86.5	Levelogger	X
Greer	AGA 330	23841	98.3	Levelogger	X
NAPA	ACW 193	23827	80.1	Levelogger	X
Pearson	AHH 533	20769	30.8	Levelogger	X
School	ALQ 042	31023847	66.1	Levelogger	X
<i>Lopez Island</i>					
Aiken	AFJ 405	62083/20779	16.4	CTD Diver	X
Grant	AEC 760	62086/23909	93.69	CTD Diver	
Greene	ABO 736	85138/24574	127.33	CTD Diver	X
Langenbach		85176/23850	128.11	CTD Diver	X
Lopez Village Park	AAB 776	85170/24573	25.33	CTD Diver/Baro	X
Mengs Arena	ABO 733	85173	145.66	CTD Diver	X
Roberts	AAE 786	85137/20911	112.23	CTD Diver	X
Top Of The World	ACJ 942	23845	277.85	Levelogger	X

System configuration as of October 24, 2008.

Survey Datum = NGVD 29

Table 2. Eastsound Groundwater Concentrations, April 23, 2008

San Juan County, Washington

Constituent	Units	GWQC ¹	Clark	Curtis	EWUA #1R	EWUA #3R	EWUA #5	Fischer	Greer	NAPA	Pearson	School
Inorganic Parameters												
Alkalinity as CaCO ₃ , Total	mg/L CaCO ₃		152	94.8	119	167	173	170	232	166	144	127
Alkalinity, Bicarbonate	mg/L CaCO ₃		142	94.8	119	163	173	170	232	166	137	127
Carbonate	mg/L		10.2	1U	1U	4.2	1U	1U	1U	1U	7.6	1U
Calcium, Dissolved	mg/L		13.7	24.4	49.7	28.4	42.2	34.2	52.8	27.3	14.8	53.2
Chloride	mg/L	250	33.8	26.7	18	29.1	25.1	29.5	25.1	18.4	27.4	14.5
Fluoride	mg/L	2	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.2	0.1U
Hydroxide	mg/L		1U	1U	1U	1U	1U	1U	1U	1U	1U	1U
Nitrate as N	mg/L as N	10	0.1U	5	2.5	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	1.3
Specific Conductance @ 25C	umhos/cm	700	423	378	369	418	484	413	523	377	356	376
Sulfate	mg/L	250	8.1	33.6	31.4	9.5	38.4	10.1	19.5	6.7	0.1	38.2
Metals												
Magnesium	mg/L	--	18.5	18.4	7.39	17.3	19.7	18.4	23.8	13.8	5.56	7.85
Potassium	mg/L	--	4.2	2	0.8	4.1	3	2.2	3.4	5	3.2	0.7
Sodium	mg/L	20 ²	29.6	19	12.7	30.4	26.9	22.8	18.6	26.1	52.7	10.8

Bolded values are above their corresponding GWQC

¹ Ground water quality criteria (GWQC) as reported in WAC 173-200, also includes maximum contaminant levels reported in WAC 246-290-310.

² The EPA has established a recommended level of 20 mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets.

U = Compound not detected

Note: EWUA Well 3R is also referred to as EWUA 13.

Table 3. Eastsound Groundwater Concentrations, October 21, 2008

San Juan County, Washington

Constituent	Units	GWQC¹	Curtis	EWUA #1R	EWUA #3R	EWUA #5	Greer	Pearson
Chloride	mg/L	250	25.2	18	25.1	25.9	22.2	26.2
Fluoride	mg/L	4	0.1U	0.1U	0.1U	0.1U	0.1U	0.2
Nitrate as N	mg/L as N	10	4.7	2.4	0.1U	0.1U	0.1U	0.1U
Sulfate	mg/L	500	31.4	30.6	3.1	40.7	14.5	0.1U

¹ Ground water quality criteria (GWQC) as reported in WAC 173-200, also includes maximum contaminant levels reported in WAC 246-290-310.

U = Compound not detected

Note: EWUA Well 3R is also referred to as EWUA 13.

Table 4. Lopez Island Groundwater Concentrations, April 24, 2008

San Juan County, Washington

Constituent	Units	GWQC ¹	Aiken	Greene	Langenbach	Lopez Village Park	Mengs Arena	Roberts	Top Of The World
Inorganic Parameters									
Alkalinity as CaCO ₃ , Total	mg/L CaCO ₃		218	417	351	267	339	397	266
Alkalinity, Bicarbonate	mg/L CaCO ₃		218	417	351	267	339	397	266
Carbonate	mg/L		1U	1U	1U	1U	1U	1U	1U
Calcium, Dissolved	mg/L		48.7	88.2	0.05U	45.1	75.8	75.3	58.2
Chloride	mg/L	250	25.2	186	45.7	20.1	38.3	37.8	24
Fluoride	mg/L	2	0.1U	0.1U	0.1U	0.1	0.1U	0.1	0.1U
Hydroxide	mg/L		1U	1U	1U	1U	1U	1U	1U
Nitrate as N	mg/L as N	10	0.1U	0.1U	0.1U	0.3	0.1U	0.1U	0.3
Specific Conductance @ 25C	umhos/cm	700	494	1320	846	534	747	898	556
Sulfate	mg/L	250	15	76.8	38.2	8.3	35.1	71.8	10
Metals									
Magnesium	mg/L		18.4	76.7	0.05U	24.4	36.7	53.9	22.5
Potassium	mg/L		2.8	12.4	0.6	3.9	6.8	8.1	5.3
Sodium	mg/L	20 ²	23.9	84.5	145	37.1	32.9	36.1	25

Bolded values are above their corresponding GWQC

¹ Ground water quality criteria (GWQC) as reported in WAC 173-200, also includes maximum contaminant levels reported in WAC 246-290-310.

² The EPA has established a recommended level of 20 mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets.

U = Compound not detected

Table 5. Lopez Island Groundwater Concentrations, October 22, 2008

San Juan County, Washington

Constituent	Units	GWQC ¹	Lopez Village					
			Aiken	Greene	Langenbach	Park	Mengs Arena	Roberts
Inorganic Parameters								
Alkalinity as CaCO ₃ , Total	mg/L CaCO ₃		214	403	346	265	336	392
Alkalinity, Bicarbonate	mg/L CaCO ₃		214	403	346	265	336	392
Calcium, Total	mg/L		52.9	90.5	82	46.8	76.8	80
Carbonate	mg/L		1U	1U	1U	1U	1U	1U
Chloride	mg/L	250	24.3	172	45	17.8	39.2	37.2
Conductivity	umhos/cm	700	505	1280	768	535	735	872
Fluoride	mg/L	4	0.1U	0.1U	0.1U	0.1U	0.1U	0.1
Hydroxide	mg/L		1U	1U	1U	1U	1U	1U
Nitrate as N	mg/L as N	10	0.1U	0.2	0.1U	0.3	0.1U	0.1U
Sulfate	mg/L	500	14.5	76.8	39.7	7.7	36.1	69.5
Total Dissolved Solids	g/L		0.282	0.796	0.474	0.306	0.454	0.554
Metals								
Magnesium, Total	mg/L		19.9	77.5	38	24.9	36.2	55.7
Potassium, Total	mg/L		2.8	12.5	6.7	4	6.7	8.5
Sodium, Total	mg/L	20 ²	24.4	87.8	32	36.6	31.4	36.2

Bolded values are above their corresponding GWQC

¹ Ground water quality criteria (GWQC) as reported in WAC 173-200, also includes maximum contaminant levels reported in WAC 246-290-310.

² The EPA has established a recommended level of 20 mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets.

Figure 1
 Eastsound
 Groundwater Elevations
 October 21, 2008

Monitoring Report



- Greer 45.4 Well Locations
- Groundwater Elevation Contours
(Dashed where inferred)

Note:
 The NAPA well appeared to be pumping during measurement so the reading from 4/24/08 was substituted.

Elevations in NGVD29

0 Feet 2,000



2006 NRCS Orthophoto



East Sound



● Current Monitoring Well Locations

Note:

The elevation at the Aiken has not been surveyed and was therefore determined from the less accurate digital elevation model.

MSL/Tidal Elevation Conversion

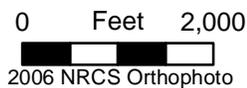


Figure 2
Lopez Island
Groundwater Elevations
January 30, 2008

JS0713



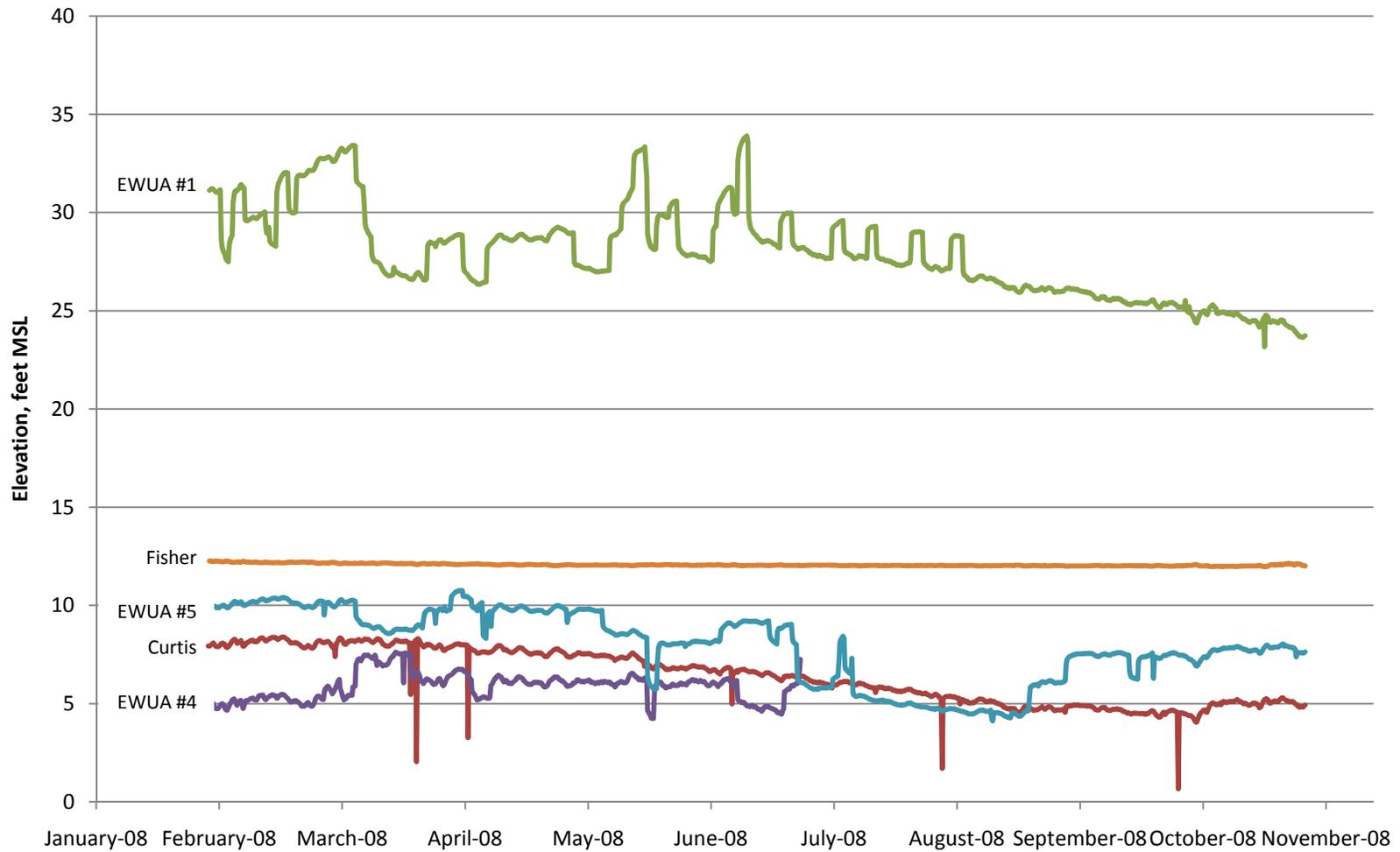


Figure 3. Eastsound Groundwater Elevation Time Series Plot



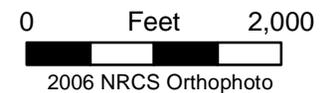
Figure 4
 Eastsound
 Nitrate Concentrations

SAN JUAN COUNTY
 MONITORING REPORT
 JS0713



EWUA #1R
 2.5
 2.4

● Current Monitoring Well Locations
 Nitrate Concentration, mg/L - April 2008
 Nitrate Concentration, mg/L - October 2008



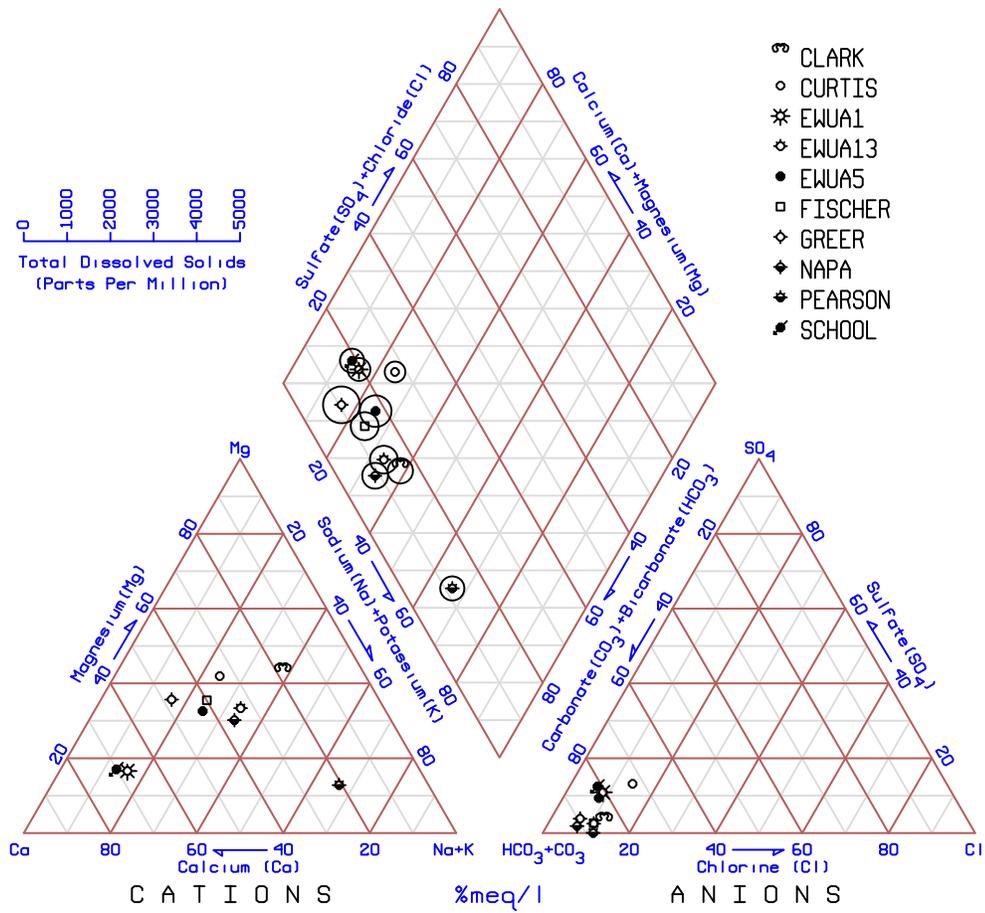
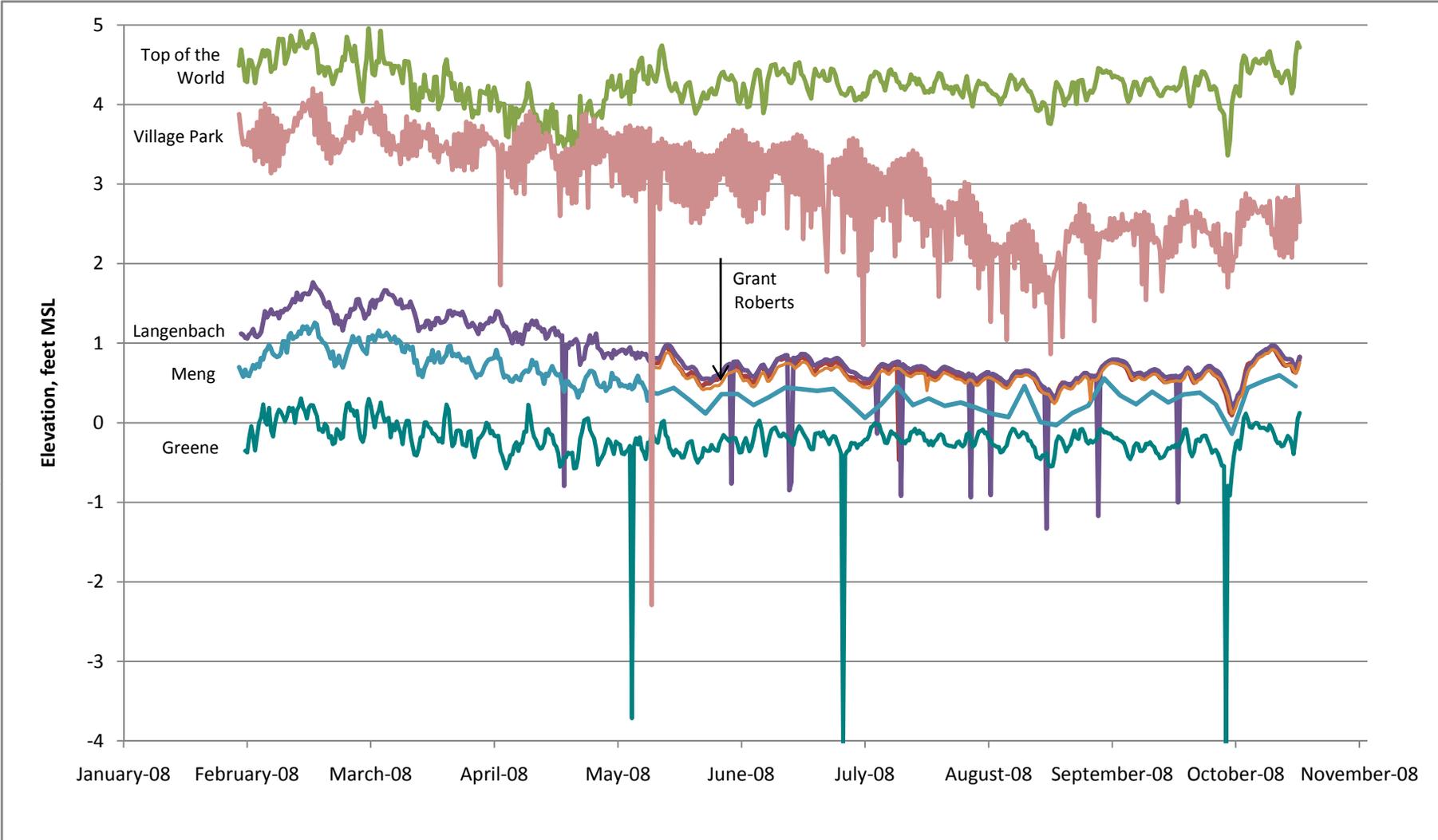


Figure 5.
Eastsound Trilinear Diagram
April, 2008



- Lopez- Grant
- Lopez- Meng
- Lopez- Greene
- Lopez- Village Park
- Lopez- Langenbach
- Lopez- Roberts
- Lopez- Top of World

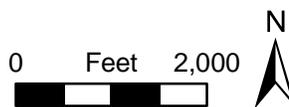
Figure 6. Lopez Groundwater Elevation Time Series Plot





Aiken  **Current Monitoring Well Locations**
 25.2 Chloride Concentration, mg/L - April 2008
 24.3 Chloride Concentration, mg/L - October 2008

Figure 7
Lopez Island
Chloride Concentrations



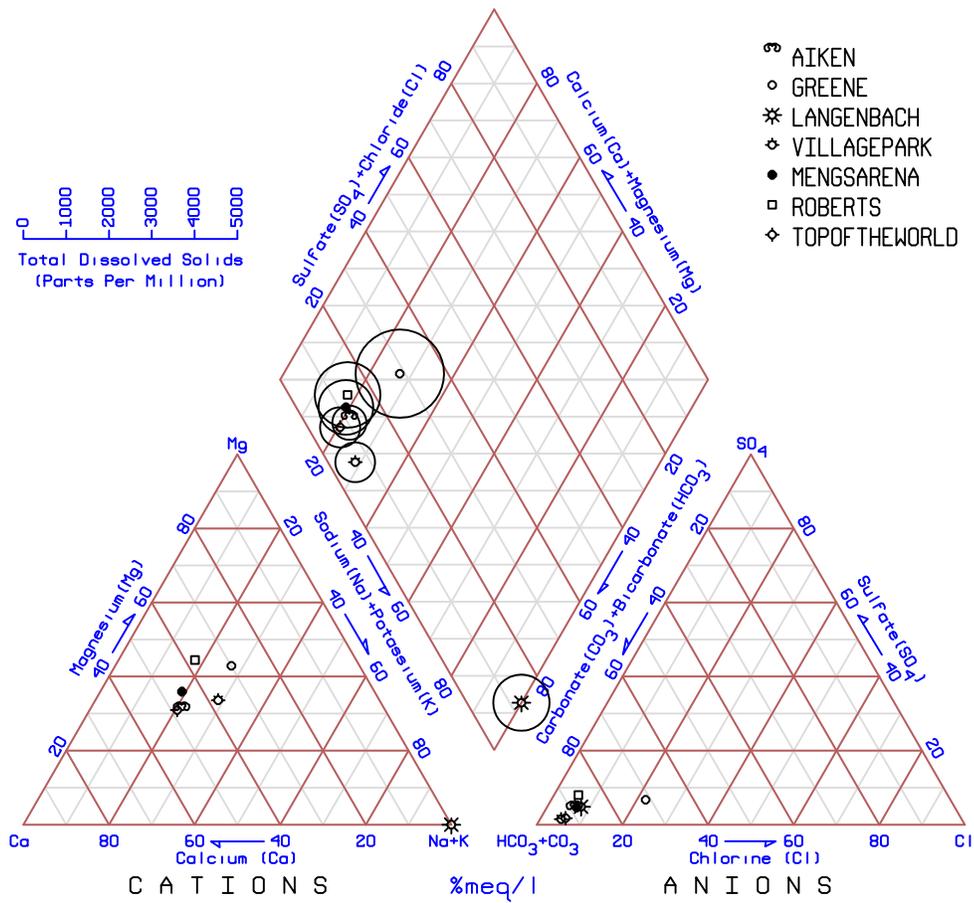


Figure 8.
Lopez Island Trilinear Diagram
April, 2008



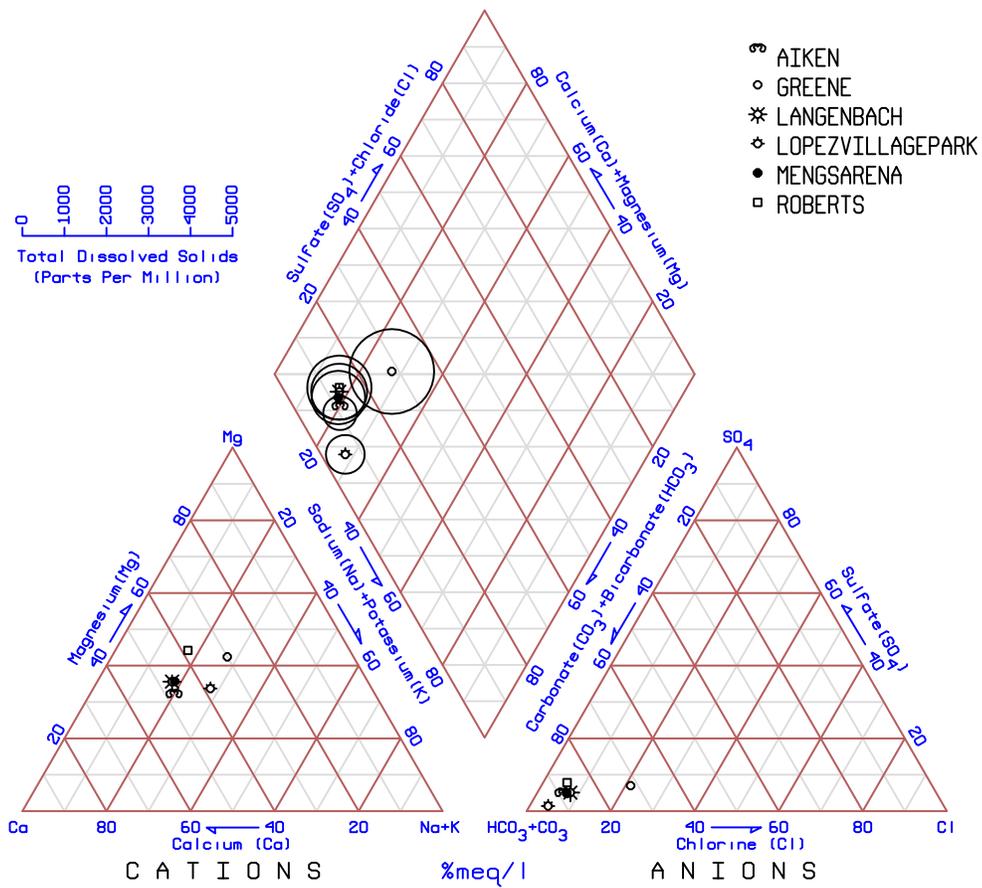
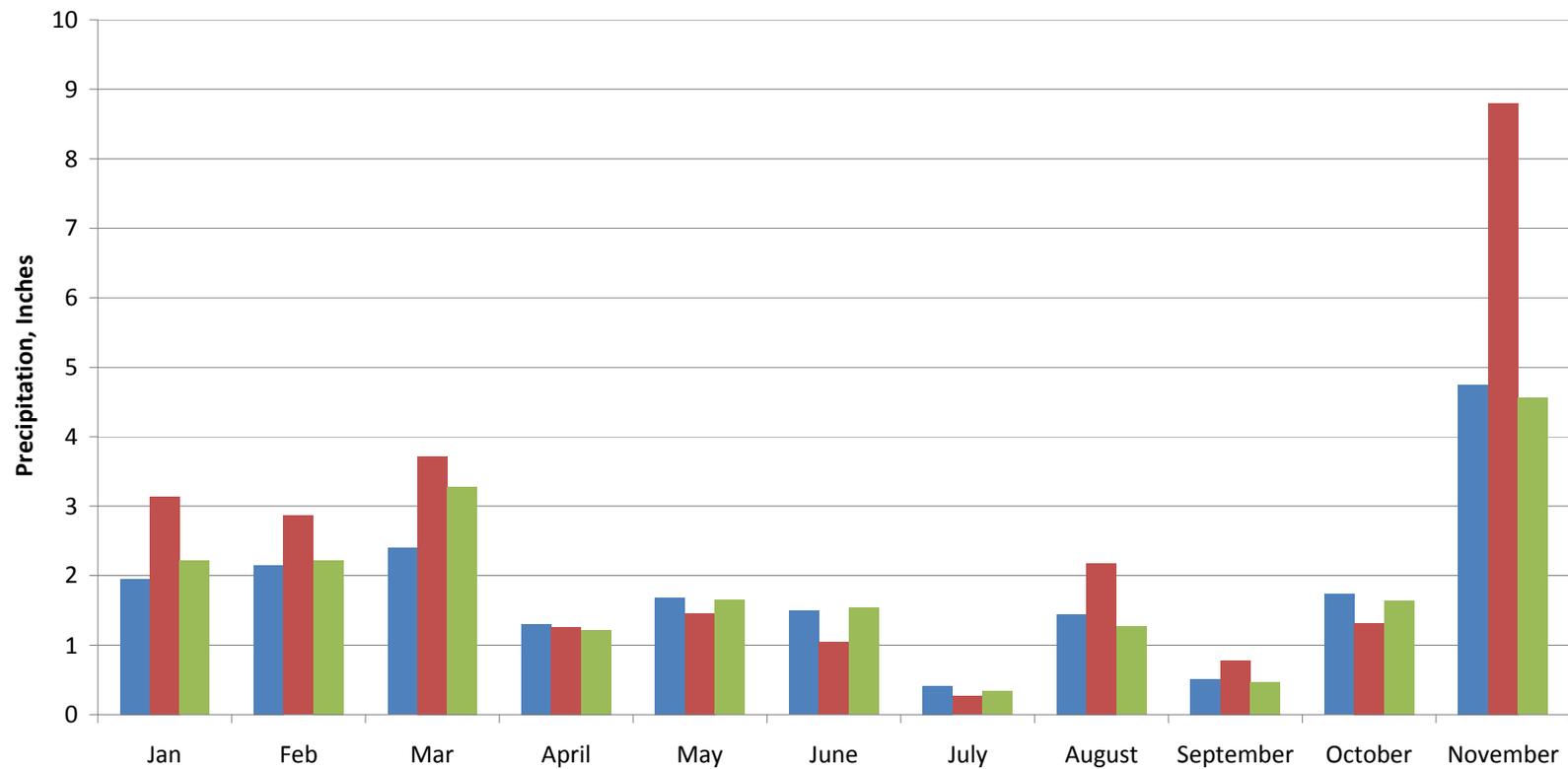


Figure 9.
Lopez Island Trilinear Diagram
October, 2008



- Cross Rd
- Eastsound
- Giard

Figure 10.
Lopez and Eastsound Precipitation Comparison, 2008

San Juan Monitoring Report



APPENDIX A
EASTSOUND MONITORING NETWORK WELL LOGS

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

37-2W-11R



185345 WATER WELL REPORT

Original & 1st copy - Ecology, 2nd copy - owner, 3rd copy - driller

Construction/Decommission ("x" in circle)
 Construction
 Decommission ORIGINAL INSTALLATION Notice of Intent Number _____

CURRENT
Notice of Intent No. W2189956
Unique Ecology Well ID Tag No. ALQ041
Water Right Permit No. Supplemental to all EWUA GW Rights
Property Owner Name Gary Clark
Well Street Address Mt Baker Road & Deye Ln
City Eastsound County San Juan
Location SE 1/4-1/4 SE 1/4 Sec 11 Twn 37 R 2 EWM or WWM circle one
Lat/Long (s, t, r) Lat Deg _____ Lat Min/Sec _____
Still REQUIRED) Long Deg _____ Long Min/Sec _____
Tax Parcel No. 271144004

PROPOSED USE: DeWater Domestic Industrial Municipal Irrigation Test Well Other _____

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

DIMENSIONS: Diameter of well 12 inches, drilled 234 ft.
 Depth of completed well 230 ft.

CONSTRUCTION DETAILS
 Casing Welded 12 " Diam. from +5 ft. to 130 ft.
 Installed: Liner installed 8 " Diam. from +2 ft. to 140 ft.
 Threaded _____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes No
 Type of perforator used _____
 SIZE of perfs _____ in. by _____ in. and no. of perfs from _____ ft. to _____ ft.

Screens: Yes No K-Pac Location _____
 Manufacturer's Name Johnson
 Type 304 SS Model No. _____
 Diam. 8-inch Slot size 30 from See Attached ft. to _____ ft.
 Diam. _____ Slot size _____ from Comp. Design ft. to _____ ft.

Gravel/Filter packed: Yes No Size of gravel/sand _____
 Materials placed from 230 ft. to 86 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 _____

PUMP: Manufacturer's Name _____
 Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level approx 80 ft.
 Static level 73.80 ft. below top of well Date 5/14/05
 Artesian pressure _____ lbs. per square inch Date _____
 Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
 Was a pump test made? Yes No If yes, by whom? CR Hydrogeo.
 Yield: 87 gal./min. with 17.35 ft. drawdown after 24 hrs.
 Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
 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
1	78.80	15	76.35	120	74.35
5	77.20	30	75.60	180	74.06
10	76.84	00	74.88	1445	73.76

Date of test 5/15/05 - 5/16/05
 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 51 F Was a chemical analysis made? Yes No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Topsoil	0	1
Brn Silty Sand, some Gravel	1	3
Glacial Till (hardpan)	3	112
Gry. Sandy Silt	112	126
v. fine Gry. Sand, WB (dirty)	126	136
v. fine Gry. Sand with cemented layers	136	149
v. fine - fine Gry. Sand, WB	149	156
Gry. Silty Sand, WB, (tight)	156	163
v. fine to fine Gry. Sand, WB	163	213
fine to med Gry. Sand with Shell Fragments, WB	213	227
Gry. Silt	227	234

LOG FOR EWUA - Clark Production Well
 Prepared by CR Hydrogeologic Consulting

RECEIVED
 JUL 28 2005
 DEPT OF ECOLOGY

Start Date 4/19/05 Completed Date 5/16/05

WELL CONSTRUCTION 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.

Driller Engineer Trainee Name (Print) Randy Holt
 Driller/Engineer/Trainee Signature _____
 Driller or trainee License No. 1099

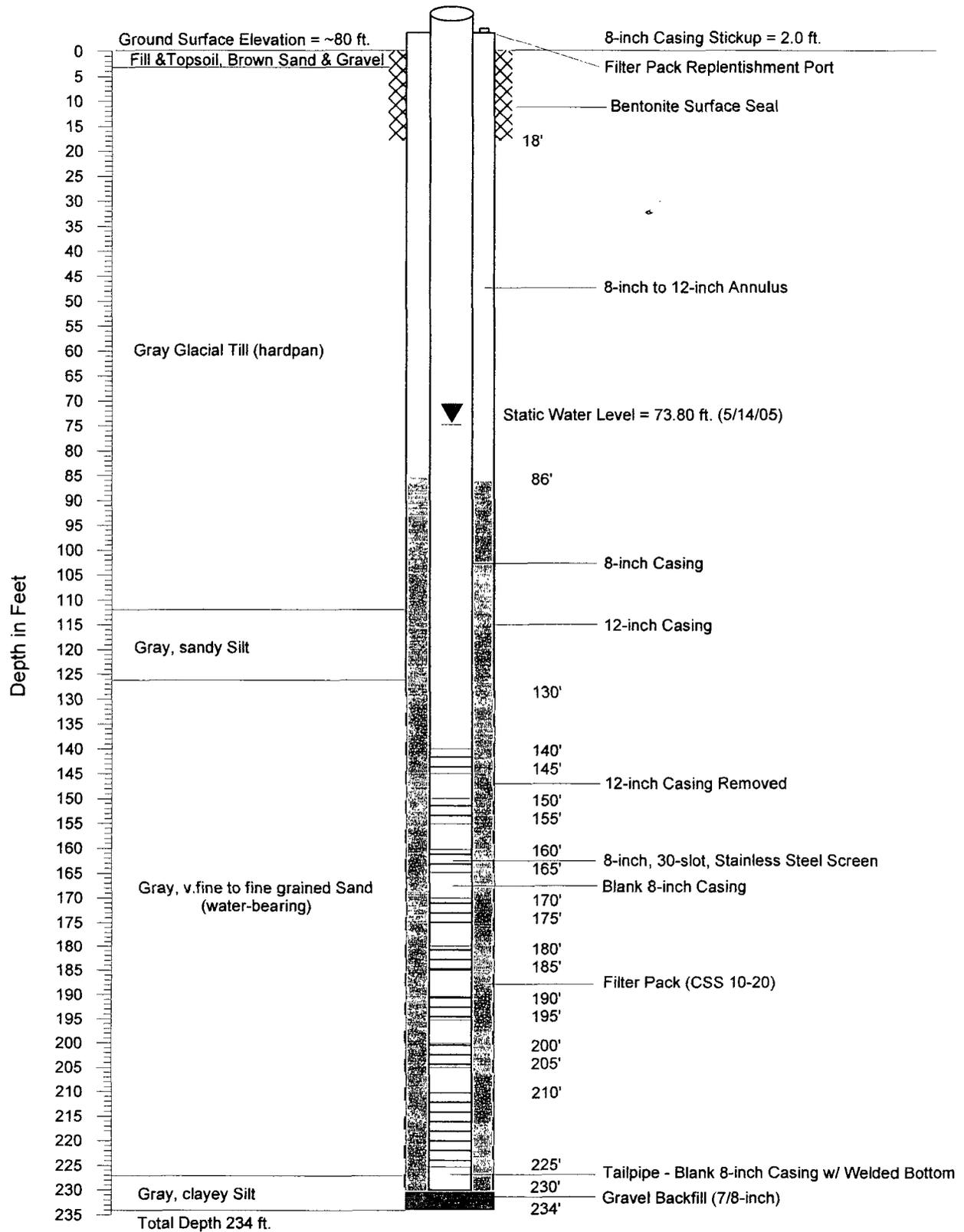
Drilling Company Holt Drilling / Boart Longyear
 Address Po Box 1890
 City, State, Zip Milton WA 98354

IF TRAINEE,
 Driller's Licensed No. _____
 Driller's Signature _____

Contractor's
 Registration No. BoartLC05SPZ Date 7-20-05
 Ecology is an Equal Opportunity Employer.

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

EWUA - Clark Production Well Lithologic Log and Completion Design



CR

EWUA
 Clark Production Well
 c:\clark\clarklog&design\grf

EWUA - Clark Production Well
 Lithologic Log and Completion Design

Figure 2

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

121665

WATER WELL REPORT

STATE OF WASHINGTON

37-2W-112

Start Card No WE00536
Well ID No AGQ153
Water Permit No _____
Tax Parcel No 271157004

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

1 OWNER Name BARTON & SHELLEY CURTIS Address 125 SEAVIEW STREET, EASTSOUND, WA 98245
2 LOCATION OF WELL County SAN JUAN NE 1/4 SW 1/4 Sec 11 T 37 N, R 2 W M
2a STREET ADDRESS OF WELL (or nearest address) BLANCHARD ROAD, EASTSOUND, WA 98245

3 PROPOSED USE Domestic Industrial Municipal
 Irrigation Test Well Other
 DeWater

10 WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION
Formation Describe 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

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

MATERIAL	FROM	TO
BROWN SILTY SAND & PEBBLES	0	5
BROWN SANDY SILT	5	28
BROWN FINE SAND	28	43
BROWN CLAYEY SAND	43	61
BROWN FINE SAND (WATER BEARING)	61	72
BROWN FINE TO MEDIUM SAND (H2O BEARING)	72	84
BROWN CLAY	84	-

RECEIVED
OCT 21 2002
DEPT OF ECOLOGY

5 DIMENSIONS Diameter of Well 6 inches
Drilled 84 feet Depth of completed well 84 ft

6 CONSTRUCTION DETAILS
Casing installed 6" Diam from +1 ft to 69 ft
Welded _____" Diam from _____ ft to _____ ft
Liner installed _____" Diam from _____ ft to _____ ft
Threaded _____" Diam from _____ ft to _____ ft

Perforations Yes No
Type of perforator used _____
SIZE of perforations _____ in by _____ in
_____ perforation from _____ ft to _____ ft
_____ perforation from _____ ft to _____ ft
_____ perforation from _____ ft to _____ ft

Screens Yes No
Manufacturer's Name JOHNSON
Type STAINLESS Model No _____
Diam 6 Slot size 0 008 from 69 ft to 74 ft
Diam 6 Slot size 0 010 from 74 ft to 84 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 CHIPS
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 _____ HP

8 WATER LEVELS Land surface elevation _____
above mean sea level 60 ft
Static level 47 ft below top of well Date 8/16/02
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 10 ft drawdown after 15 hrs
Airtest 90 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

Work Started 8/3/02 Completed 8/16/02

WELL CONSTRUCTION CERTIFICATION
I constructed and/or accept responsibility for construction of this well and it's compliance with all Washington Well construction standards Materials used and the information reported above are true to my best knowledge and belief
NAME MARTEL WELL DRILLING
(Person, Firm, or Corporation) (Type or Print)
Address P O BOX 905, FRIDAY HARBOR, WA 98250
(Signed) David Yester License No 2438
Contractor's Registration Number MARTEWD044PA Date 8/23/02

(USE ADDITIONAL SHEETS IF NECESSARY)

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

File Original with
Department of Ecology
Second Copy - Owner's Copy
Third Copy - Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Notice of Intent W10Z548
UNIQUE WELL I.D.# AER 014
Water Right Permit No. G1 * 03683C

(1) OWNER: Name East sound water users Assoc Address P.O. Box 115 East Sound wa. 98245

(2) LOCATION OF WELL: County San Juan NW 1/4 NE 1/4 Sec 13 T 37 N.R. 2W WM

(2a) STREET ADDRESS OF WELL: (or nearest address) Corner of terril Beach Rd & Mt Bahr Rd.
TAX PARCEL NO.: 271350025 37-2W-13B

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

(4) TYPE OF WORK: Owner's number of well (if more than one) 1R
 New Well Method: Dug Bored
 Deepened Cable Driven
 Reconditioned Rotary Jetted
 Decommission

(5) DIMENSIONS: Diameter of well 12 x 8 inches
Drilled 55 feet. Depth of completed well 55 feet.

(6) CONSTRUCTION DETAILS
Casing Installed: Welded 12 : Diam. from 1.5 ft. to 36 ft.
 Liner installed 8 : Diam. from 3 ft. to 36 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.

Screens: Yes No K-Pac Location welded to pipe
Manufacturer's Name Johnson
Type _____ Model No. _____
Diam. 7 Slot Size .20 from 31 ft. to 36 ft.
Diam. _____ Slot Size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: Yes No Size of gravel/sand .10-20
Material placed from 54 ft. to 24 ft.

Surface seal: Yes No To what depth? 35 ft.
Material used in seal Went cement 50% Benbrink
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 39 ft.
Static level 1 ft. below top of well Date 7-14-2000
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.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
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 36 gal./min. with 22 ft. drawdown after 20 min
Airtest _____ 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 DECOMMISSIONING PROCEDURE DESCRIPTION
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. Indicate all water encountered.

MATERIAL	FROM	TO
Sand, Brn, med.	0	5
Tan clay Rocks & Gravel	5	15
Blue clay, 1316 Rocks	15	36
Silty Sand - Brn.		
Becoming slight by coarse with Deftn -	36	49
Sand coarse Gravel,		
Small Rocks - Gray	49	55
Silt Band or cemented		

RECEIVED

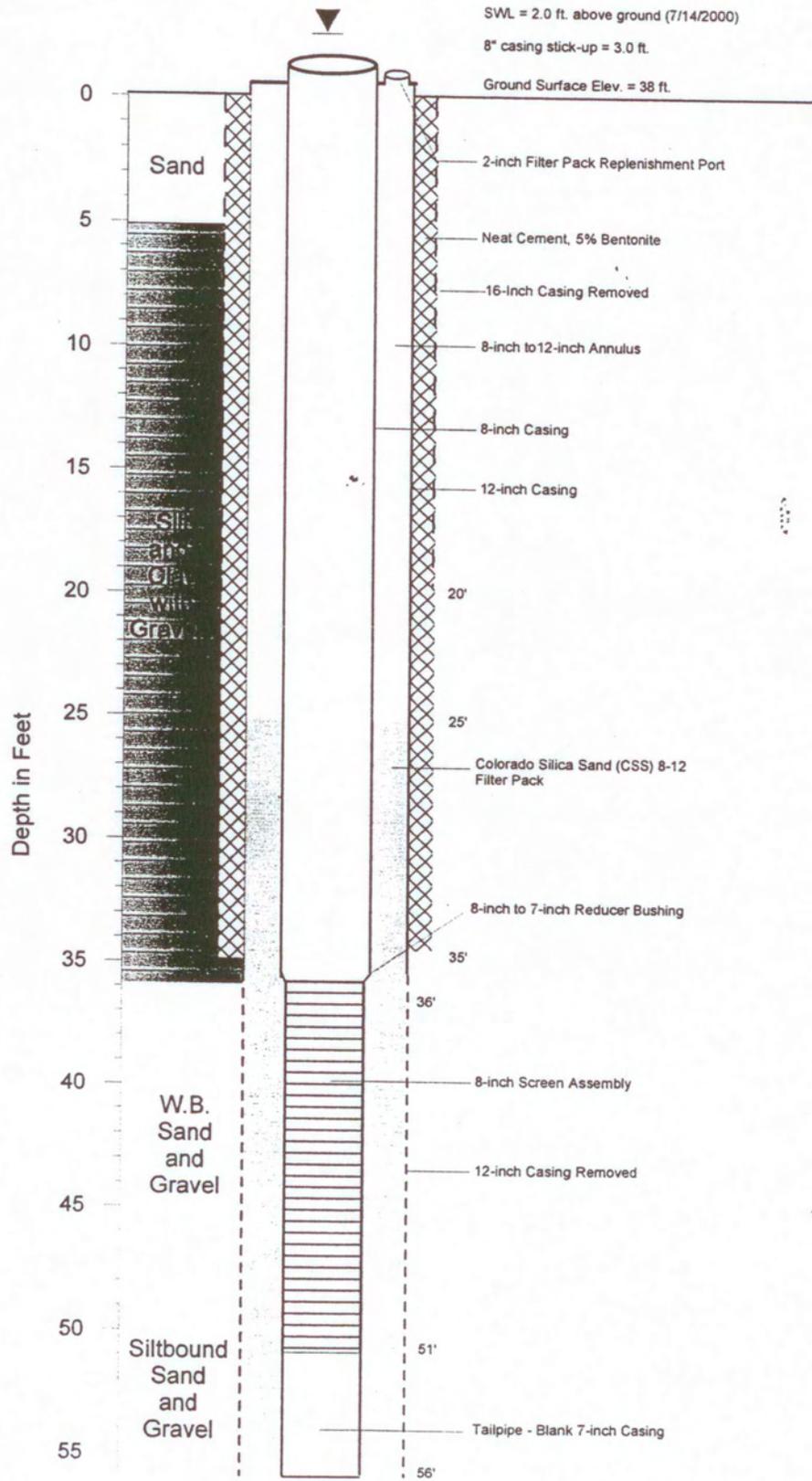
JUL 20 2000

Department of Ecology

Work Started 8-16-99 Completed 7-16-2000

WELL CONSTRUCTION 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.
Type or Print Name Mark Sawyer License No. 2461
(Licensed Driller/Engineer)
Trainee Name _____ License No. _____
Drilling Company M. Sawyer Drilling & Pump Serv Inc
(Signed) Mark Sawyer License No. 2461
(Licensed Driller/Engineer)
Address 621 abstraction pass Rd Olga wa.
Contractor's Registration No. MSAWY05055NB Date 7-17-2000
(USE ADDITIONAL SHEETS IF NECESSARY)

Well 1R



WATER WELL REPORT

STATE OF WASHINGTON

Applic. No. 10780
Permit No. 10570

(1) OWNER: Name EAST SOUND WATER USER Address EAST SOUND WOOD 9824

(2) LOCATION OF WELL: County SAN JUAN - SE 1/4 N 1/2 Sec. 11 T. 37 N. R. 26 W. M

Bearing and distance from section or subdivision corner 240' NORTH AND 500 FEET EAST FROM CORNER OF SEC 11

(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: Dig Bored
Deepened Cable Driven
Reconditioned Rotary Jetted

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 250 ft. Depth of completed well 35 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8" diam. from 0 ft. to 63 ft.
Threaded " diam. from _____ ft. to _____ ft.
Welded " diam. from _____ ft. to _____ ft.

Perforations: Yes No
Type of perforator used _____
SIZE of perforations 1 in. by 1/4 in.
perforations from _____ ft. to _____ ft.
perforations from _____ ft. to _____ ft.
perforations from _____ ft. to _____ ft.

Screens: Yes No
Manufacturer's Name Johnson
Type Stainless Steel Model No _____
Diam. 8 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 unconsolidated water? Yes No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(10) WELL LOG: SEE CENTER

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 Gravel	0	5
Clay	5	63
Rock	63	187
No Water in Bank	63	250

Well was pulled back to 63 feet and perforated at 35 feet in sand. Used Gravel Rock Hole was filled with sand and gravel.

SWL = 6

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

(8) WATER LEVELS: Land-surface elevation _____ ft. above mean sea level.
Static level 6 ft. below top of well Date April 1972
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 when as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level

Date of test _____
Pump test 25 gal./min. with 11 ft. drawdown after 4 hrs.
Artesian flow _____ g.p.m. Date March 20 1972
Temperature of water _____ Was a chemical analysis made? Yes No

Work started March 15 1972 completed April 1 1972

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

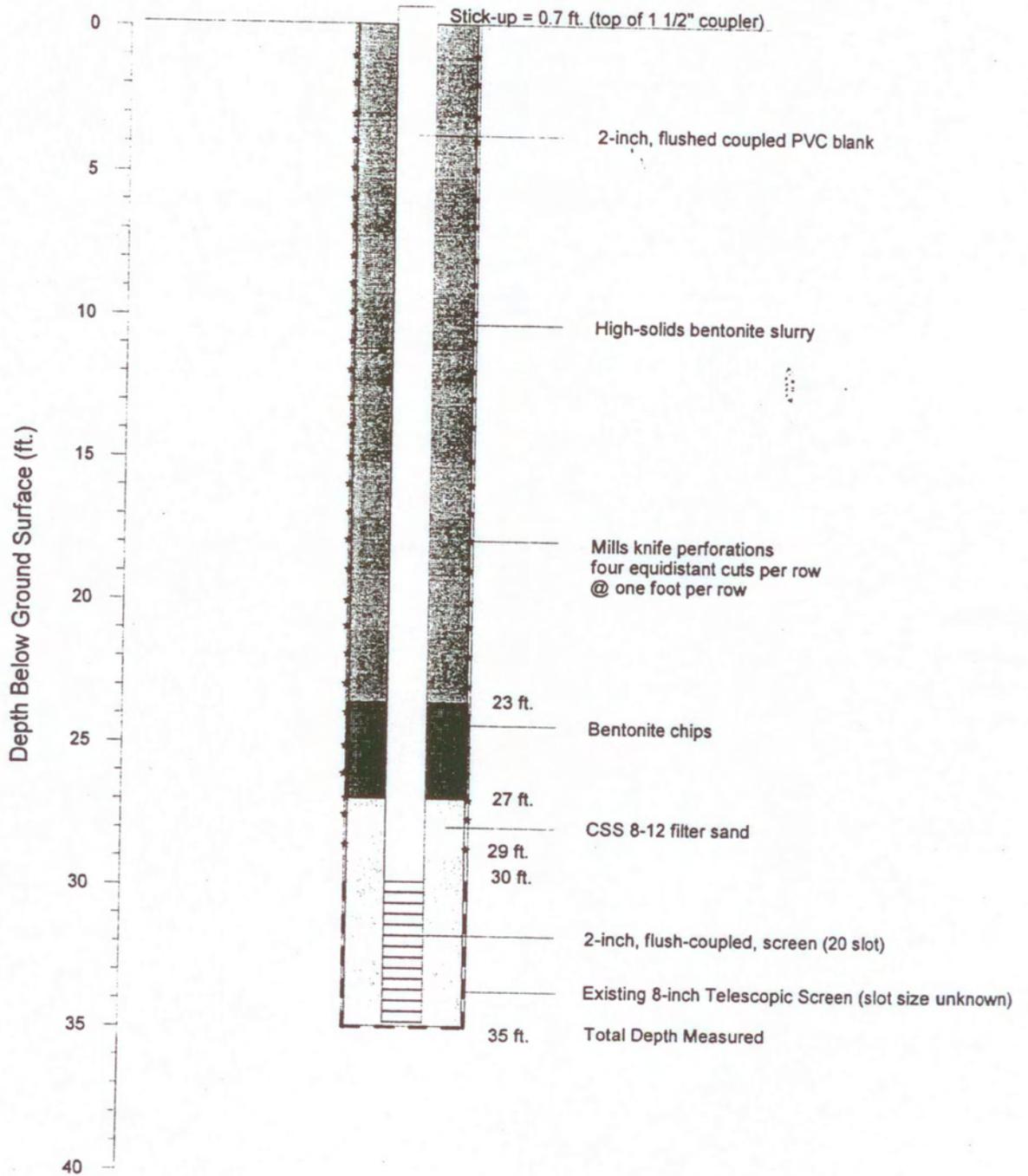
GEORGE H. BROWN
Well Drilling
NAME _____ (Type or print)
(Person: _____)

Address _____

[Signed] George H. Brown
(Well Driller)

License No. _____ Date Mar 25 1972

EWUA Well 4 Conversion Construction Details



(1) OWNER: Name EAST SOUND WATER DEP. Address ORCAS, WASHINGTON 98245

(2) LOCATION OF WELL: County San Juan (Buena Vista Hts.) site 14 1/4 Sec. T. N. R. W.M.

Bearing and distance from section or subdivision corner SE 1/4 SW 1/4 Sec 11, T 37N, R 2W

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

(4) TYPE OF WORK: Owner's number of well (if more than one) 5-7A
New well Method: Dug Bored
Deepened Cable Driven
Reconditioned Rotary Jetted

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 120 ft. Depth of completed well 115 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8" Diam. from 7.2 ft. to 10.5 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 Coak
Type Model No.....
Diam. 8" Slot size 80 from 10.5 ft. to 11.5 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes No Size of gravel:
Gravel placed from 11.8 ft. to 11.5 ft.

Surface seal: Yes No To what depth? 20 ft.
Material used in seal Portland 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 10.5 ft.
Static level 9.0 ft. below top of well Date 8/26/74
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 W. Martel
Yield: gal./min. with ft. drawdown after hrs.

" 65 " 20 " 8 "

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.....
Ballor test..... 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:

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
Sandy top soil	0	2
sand & small rocks	2	6
brown clay & sand	6	90
blue clay	90	107
thin layer of gravel on clay		
3 to 5 gpm		
water bearing sand	107	114
clay	114	118
water & fine sand	118	120

Work started 7/11 1974 Completed 8/27 1974

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 Wanted Well Drilling Inc.
(Person, firm, or corporation) (Type or print)

Address Box 53, Buckley, WA 98250

[Signed] Wanted Well Drilling Inc.
(well driller)

License No. 0292 Date 9/4 1974

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

ENTERED

WATER WELL REPORT

UNIQUE WELL I.D. # REC 764

STATE OF WASHINGTON

Water Right Permit No. 37-2W-11R

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

(1) OWNER: Name Ed Sullivan Address P.O. Box 1018 East Sound wa 98245

(2) LOCATION OF WELL: County SAN Juan SWE 1/4 S4E 1/4 Sec 11 T. 37 N. R. 2W W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) Mt Baker Hwy. SE SE

(3) PROPOSED USE: [X] Domestic [] Industrial [] Municipal []
[] Irrigation [] Test Well [] Other []
[] DeWater []

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 130 feet. Depth of completed well 127 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6" diam. from +1.5 ft. to 120 ft.
Welded [X]
Liner installed []
Threaded []

Perforations: Yes [] No [X]
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 [X] No []
Manufacturer's Name Johnson
Type Model No.
Diam. 5 Slot size .04 from 117 ft. to 127 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes [] No [X] Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes [X] No [] To what depth? 18 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes [] No [X]
Type of water? Depth of strata
Method of sealing strata of

(7) PUMP: Manufacturer's Name Arco meter
Type: T5-12 H.P. 1/2

(8) WATER LEVELS: Land-surface elevation 90
Static level 80 ft. below top of well Date 11-12-98
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 [X] 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

Bailer test gal./min. with ft. drawdown after hrs.
Airtest 15 gal./min. with stem set at 126 ft. for 2 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes [] No [X]

(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.

Table with columns: MATERIAL, FROM, TO. Entries include TOP Soil, Sand & Gravel, Tan clay, Blue clay, Silty Blue clay, Fine Grey Sand.

RECEIVED

FEB 23 1999

DEPT OF ECOLOGY

Work Started 11-6 19. Completed 11-9 19 98

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 M. Sawyer Drilling & Pump Service Inc
Address HL Box 160 Olga wa 98279
(Signed) Mark Sawyer License No. 24161

Contractor's Registration No. MSAW4DSOSSND Date 12-20 19 98

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (206) 407-6600. The TDD number is (206) 407-8008.

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

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

WATER WELL REPORT 37/2/125

File Original and First Copy with Department of Ecology Second Copy-Owner's Copy Third Copy-Drillier's Copy

STATE OF WASHINGTON

Start Date No: 024901 Water Permit No: _____

1. OWNER : Name: HARRY GREER Address: P.O. BOX 136, EASTSOUND, WA 98245.

2. LOCATION OF WELL : County SAN JUAN NE 1/4 SE 1/4 Sec 12 T 37 N., R 2 W.M.

2a. STREET ADDRESS OF WELL (or nearest address) ANDERSEN ROAD

3. PROPOSED USE: [X] Domestic Industrial Municipal [] Irrigation Test Well [] DeWater

4. TYPE OF WORK: Owner's number of well (if more than one) Abandoned [] New Well [X] Method: Duo [] Cable [X] Driven [] Rotary [] Jetted

5. DIMENSIONS: Diameter of well 6 inches. Drilled 101 feet. Depth of completed well 101 ft.

6. CONSTRUCTION DETAILS: Casing installed: 5" Dia. from +1 ft. to 91 ft. Welded [X] " Dia. from ft. to ft. Liner installed " Dia. from ft. to ft. Threaded " Dia. from ft. to ft.

Perforations: Yes [] No [X] Type of perforator used _____ SIZE of perforations in. by in. perforation from ft to ft. perforation from ft to ft. perforation from ft to ft.

Screens: Yes [X] No [] Manufacturer's Name JOHNSON Type STAINLESS Model No _____ Diam 6 Slot size 18 from 91 ft. to 101 ft. Diam Slot size from ft. to ft.

Gravel packed: yes [] No [X] Size of gravel _____ Gravel placed from ft. to ft.

Surface Seal: Yes [X] No [] To what depth? 18 ft. Material used in seal BENTONITE Did any strata contain unusable water? Yes [] No [X] 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 60 ft Static level 56 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 _____

Boiler test 12.0 gal./min. with 2 ft. drawdown after 1 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 []

RECEIVED JUN 18 1993

DEPT. OF ECOLOGY

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
LIGHT BROWN SAND	0	1
LIGHT BROWN CLAYEY SILTY GRAVEL	1	36
GREY SILT	36	90
GREY MEDIUM SAND & SMALL GRAVEL	90	101

Work started : MAY 16, 1993. Completed : MAY 19, 1993.

WELL CONSTRUCTION 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 : MARTEL WELL DRILLING INC. (Person, Firm, Or Corporation) (Type Or Print)

Address : P.O. BOX 905, FRIDAY HARBOR, WA 98250.

(Signed) [Signature] License No. : 0541 (Well Driller)

Contractor's Registration Number : MARTEWD12102 Date : MAY 19, 1993

(USE ADDITIONAL SHEETS IF NECESSARY)

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

WATER WELL REPORT

37/2/12J

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

STATE OF WASHINGTON

Start Card No. Water Permit No.

1. OWNER : Name: HARRY GREER Address: P.O. BOX 136, EASTSOUND, WA 98245.

2. LOCATION OF WELL : County SJ, NE 1/4 SE 1/4 Sec 12 T 37 N., R 2 W.M. 2a. STREET ADDRESS OF WELL (or nearest address) NORTH BEACH, ORCAS ISLAND.

3. PROPOSED USE: X Domestic Industrial Municipal Irrigation Test Well Other DeWater 10. WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

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

5. DIMENSIONS: Diameter of well 6 inches. Drilled 89 feet. Depth of completed well 89 ft

6. CONSTRUCTION DETAILS: Casing installed: 6" Diam. from +1 ft. to 84 ft. Welded X 8" Diam. from ft. to ft. Liner installed " Diam. from ft. to ft. Threaded " Diam. from ft. to 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 information.

Table with columns MATERIAL, FROM, TO. Rows: BROWN SILTY SAND & GRAVEL (0-8), BROWN CLAYEY SAND & GRAVEL (8-38), GREY CLAYEY SILT (38-82), GREY COARSE SAND & SMALL GRAVEL (82-89)

RECEIVED DEC 21 1992 DEPT. OF ECOLOGY

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

Screens: Yes X No Manufacturer's Name SMITH Type STAINLESS Model No Diam 6 Slot size 20 from 84 ft. to 89 ft.

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

Surface Seal: Yes X 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 70 ft Static level 52 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 12.0 gal./min. with 1 ft. drawdown after 2 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

Work started : NOVEMBER 29, 1992. Completed : DECEMBER 4, 1992.

WELL CONSTRUCTION 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 : MARTEL WELL DRILLING INC. (Person, Firm, Or Corporation) (Type Or Print)

Address : P.O. BOX 905, FRIDAY HARBOR, WA 98250.

(Signed) Al Mauldi License No. : 1923 (Well Driller)

Contractor's Registration Number : MARTEWD1210Z Date : DECEMBER 4, 1992.

(USE ADDITIONAL SHEETS IF NECESSARY)

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

WATER WELL REPORT

ENTERED

Start Card No. W106233
Well ID No. ACW193
Water Permit No. _____
Tax Parcel No. _____

1. OWNER: Name: PERRY & MARY PUGH Address: P.O. BOX 92, EASTSOUND, WA 98245
2. LOCATION OF WELL: County SAN JUAN SE 1/4 SW 1/4 Sec 11 T 37 N., R 2 W.M.

37-2E-11P

2a. STREET ADDRESS OF WELL (or nearest address) MT BAKER RD
3. PROPOSED USE: Domestic Industrial Municipal
 Irrigation Test Well Other
 DeWater

10. WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe 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.

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

MATERIAL	FROM	TO
BROWN SILTY CLAYEY SAND & GRAVEL	0	6
BROWN SILTY SAND	6	14
GRAY SANDY CLAY	14	39
GRAY TILL	39	65
GRAY SILTY SAND (SMALL AMT H2O)	65	92
GRAY ROCK	92	97

5. DIMENSIONS: Diameter of Well 6 inches.
Drilled 97 feet. Depth of completed well 91 ft.

(HOLE BACKFILLED TO 91 FT WITH BENTONITE CHIPS)

6. CONSTRUCTION DETAILS:

Casing installed: 6" Diam. from +1 ft. to 86 ft.
Welded " Diam. from _____ ft. to _____ ft.
Liner installed _____ " Diam. from _____ ft. to _____ ft.
Threaded _____ " Diam. from _____ ft. to _____ ft.

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

Screens: Yes No
Manufacturer's Name JOHNSON
Type STAINLESS Model No. _____
Diam. 6 Slot size 12 from 86 ft. to 91 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 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 82 ft.
Static level 60 ft. below top of well Date: 3/23/99
Artesian pressure _____ lbs. Per square inch Date: _____
Artesian water is controlled by _____
(cap, valve, etc.)

SALINITY TEST _____ PPM

Work Started: 3/11/99 Completed: 3/23/99

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 _____

WELL CONSTRUCTION CERTIFICATION:

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

NAME : MARTEL WELL DRILLING
(Person, Firm, or Corporation) (Type or Print)

Address : P.O. BOX 905, FRIDAY HARBOR, WA 98250

(Signed) Dave Egento License No. : 2483
Contractor's

Registration Number : MARTEWD044PA Date: _____

(USE ADDITIONAL SHEETS IF NECESSARY)

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

37-2W-14A

WATER WELL REPORT

Original & 1st copy Ecology 2nd copy owner, 3rd copy driller

Construction/Decommission (circle)
 Construction **149033**
 Decommission ORIGINAL CONSTRUCTION Notice of Intent Number _____

CURRENT
Notice of Intent No W175758
Unique Ecology Well ID Tag No AHH 533
Water Right Permit No _____

Property Owner Name Steve Pearson
Well Street Address Enchanted Forest Rd
City Eastsound County San Juan
Location NE 1/4 1/4 NW 1/4 Sec 14 Twn 37 R 2 EWM circle one
Lat/Long (s,t,r still REQUIRED) Lat Deg _____ Lat Min/Sec _____
Long Deg _____ Long Min/Sec _____
Tax Parcel No 271412007

PROPOSED USE Domestic Industrial Municipal
 DeWater Irrigation Test Well Other _____

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

DIMENSIONS Diameter of well 6 inches drilled 380 ft
Depth of completed well 62 ft

CONSTRUCTION DETAILS
Casing Welded 6 Diam from +2 ft to 102 ft
Installed Liner installed Diam from _____ ft to _____ ft
 Threaded PVC 4 Diam from +1 ft to 62 ft

Perforations Yes No
Type of perforator used _____
SIZE of perms _____ in by _____ in and no of perms _____ from _____ ft to _____ ft

Screens Yes No K Pac Location _____
Manufacturer's Name _____
Type _____ Model No _____
Diam 4 Slot Size 10 from 52 ft to 42 ft
Diam _____ Slot Size _____ from _____ ft to _____ ft

Gravel/Filter packed Yes No Size of gravel/sand 10-20
Materials placed from 25 ft to 62 ft

Surface Seal Yes No To what depth? 20 ft
Materials used in seal Bentomile
Did any strata contain unusable water? Yes No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

PUMP Manufacturer's Name _____
Type _____ HP _____

WATER LEVELS Land-surface elevation above mean sea level 54 ft
Static level 0 ft below top of well Date _____
Artesian pressure _____ lbs per square inch Date _____
Artesian water is controlled by CAP
(cap valve etc)

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
Yield _____ gal/min with _____ ft drawdown after _____ hrs
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
Artest 1.4 gal/min with stem set at _____ ft for _____ hrs
Artesian flow 0.3 gpm Date _____
Temperature of water _____ Was a chemical analysis made? Yes No

CONSTRUCTION OR DECOMMISSION PROCEDURE
Formation Describe by color character size of material and structure and the kind and nature of the material in each stratum penetrated with at least one entry for each change of information Indicate all water encountered (USE ADDITIONAL SHEETS IF NECESSARY)

MATERIAL	FROM	TO
Fill	0	1
Pete	1	3
Blue clay	3	48
Self & Blue clay	48	52
Rock soft	52	160
Caving -		
Sand Stone	160	380

Hydrofractured &
Well cased in 2 days
later casing cut at
63' ~~bottom~~ Bottom at
Hole Abandoned with
Bentomile - 4" PVC installed
with 10 ft of screen &
Gravel Packed - steel casing
Pulled to 25'

RECEIVED
MAY 13 2004
DEPT OF ECOLOGY

Start Date 2-5-04 Completed Date 4-12-04

WELL CONSTRUCTION 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
 Driller Engineer Trainee Name (Print) Mark Sawyer
Driller/Engineer/Trainee Signature Mark Sawyer
Driller or Trainee License No 2461

Drilling Company M Sawyer Drilling & Pump Service
Address 621 obstruction Pass Rd
City, State, Zip Olga wa 98279
Contractor's Registration No W15AWYD5052W Date 5-11-04
Ecology is an Equal Opportunity Employer ECY 050 1 20 (Rev 4/01)

If trainee, licensed driller's Signature and License no _____

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

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

37-2W-13D



181460
WATER WELL REPORT

Original & 1st copy - Ecology, 2nd copy - owner, 3rd copy - driller

Construction/Decommission ("x" in circle)

- Construction
 Decommission ORIGINAL INSTALLATION Notice of Intent Number _____

PROPOSED USE: DeWater Domestic Irrigation Industrial Test Well Municipal Other _____

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

DIMENSIONS: Diameter of well 6 inches, drilled 158 ft.
 Depth of completed well 146 ft.

CONSTRUCTION DETAILS
 Casing Welded 6" Diam. from +2 ft. to 110 ft.
 Installed: Liner installed " Diam. from ft. to ft.
 Threaded " Diam. from ft. to ft.

Perforations: Yes No
 Type of perforator used _____
 SIZE of perfs _____ in. by _____ in. and no. of perfs from ft. to ft.

Screens: Yes No K-Pac Location _____
 Manufacturer's Name Johnson
 Type 304 SS Model No. _____
 Diam. 6" PS Slot size 6 from 110 ft. to 120 ft.
 Diam. 6" PS Slot size 4 from 120 ft. to 140 ft.

Gravel/Filter packed: Yes No Size of gravel/sand _____ ft.
 Materials 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 _____

PUMP: Manufacturer's Name _____
 Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level approx 60 ft.
 Static level 53.63 ft. below top of well Date 6/14/05
 Artesian pressure _____ lbs. per square inch Date _____
 Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
 Was a pump test made? Yes No If yes, by whom? CR Hydrogeo.
 Yield: 73 gal./min. with 26.98 ft. drawdown after 24 hrs.
 Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
 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
1	78.80	15	76.35	120	74.35
5	77.20	30	75.60	180	74.06
10	76.84	00	74.88	1445	73.76

Date of test 6/14/05 - 6/15/05
 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 51 F Was a chemical analysis made? Yes No

CURRENT

Notice of Intent No. WEO3427

Unique Ecology Well ID Tag No. ALQ042

Water Right Permit No. Supplemental to all EWUA GW Rights

Property Owner Name Eastsound School District

Well Street Address Mt Baker Road @ Buck Park

City Eastsound County San Juan

Location NW1/4-1/4 NW1/4 Sec 13 Twn 37 R 2 EWM circle or WWM one

Lat/Long (s, t, r) Lat Deg _____ Lat Min/Sec _____

Still REQUIRED) Long Deg _____ Long Min/Sec _____

Tax Parcel No. P271322002

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Brn. Silty Clay	0	17
Brn. Silty Sand	17	75
Brn. fine to med. Sand	75	118
Gry. v. fine to fine Sand	118	158

LOG FOR EWUA - Eastsound School Well

Prepared by CR Hydrogeologic Consulting

RECEIVED

JUL 28 2005

DEPT OF ECOLOGY

Start Date 5/10/05

Completed Date 6/15/05

WELL CONSTRUCTION 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.

Driller Engineer Trainee Name (Print) Bryan Holt
 Driller/Engineer/Trainee Signature [Signature]
 Driller or trainee License No. 1099

Drilling Company Holt Drilling / Boart Longyear
 Address Po Box 1890
 City, State, Zip Milton WA 98354

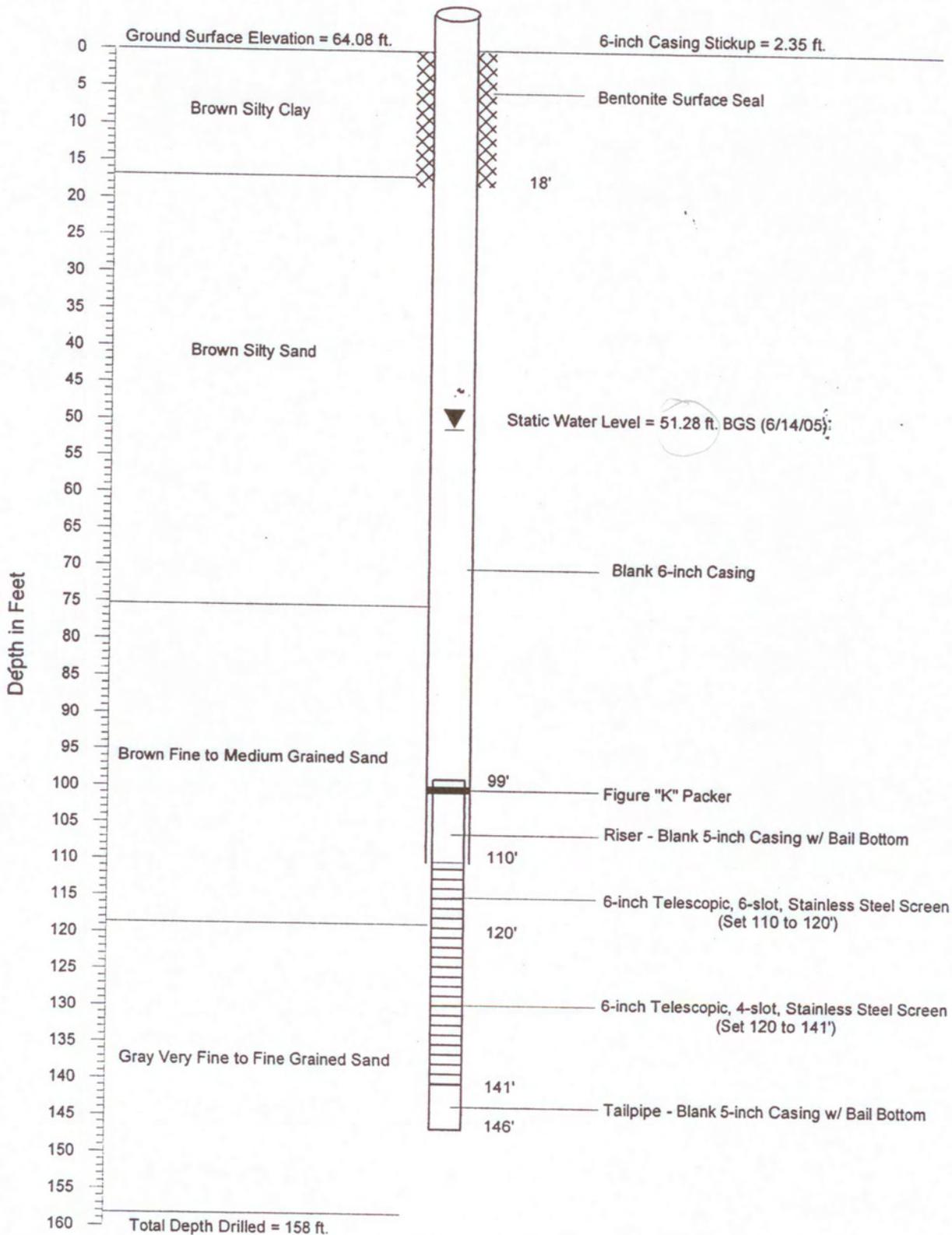
IF TRAINEE,
 Driller's Licensed No. _____
 Driller's Signature _____

Contractor's
 Registration No. BOARTL2055PZ Date 7-20-05

Ecology is an Equal Opportunity Employer.

School Well
ALB ody

Eastsound School Well Lithologic Log and Completion Design



APPENDIX B
LOPEZ ISLAND MONITORING NETWORK WELL LOGS

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

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

WATER WELL REPORT

ENTERED

STATE OF WASHINGTON 35-2^W-15/B

Start Card No : W054185
Well IP No _____
Water Permit No _____

1. OWNER : Name: RON & JENNIFER MENG Address: P.O. BOX 88, LOPEZ, WA 98261

2. LOCATION OF WELL : County SAN JUAN NW 1/4 NE 1/4 Sec 15 T 35 N. R 2 W.M.

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

3. PROPOSED USE: Domestic Industrial Municipal Irrigation Test Well Other DeWater

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

5. DIMENSIONS: Diameter of well 6 inches.
Drilled 150 feet. Depth of completed well 150 ft

6. CONSTRUCTION DETAILS:
Casing installed: 6" Diam. from +1 ft. to 150 ft.
Welded " Diam. from _____ ft. to _____ ft.
Liner installed _____ " Diam. from _____ ft. to _____ ft.
Threaded _____ " Diam. from _____ ft. to _____ ft.

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

Surfact 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 120 ft
Static level 113 ft below top of well Date 9/21/95
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 7 gal./min. with 17 ft. drawdown after 1 hrs
Airstest _____ 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 of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
BROWN SANDY LOAM	0	1
BROWN SANDY GRAVEL	1	4
BROWN SANDY SILT	4	38
BROWNISH GRAY TILL	38	137
BROWNISH GRAY TILL (MORE GRAVEL)	137	147
BROWN MEDIUM GRAVEL (H2O)	147	150

RECEIVED
OCT 05 1995
DEPT. OF ECOLOGY

Work started : SEPTEMBER 15, 1995. Completed : SEPTEMBER 21, 1995

WELL CONSTRUCTION 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 : MARTEL WELL DRILLING INC.
(Person, Firm, Or Corporation) (Type Or Print)

Address : P.O. BOX 905, FRIDAY HARBOR, WA 98250.

(Signed) [Signature] License No. : 2153
(Well Driller)

Contractor's Registration Number : MARTRWD12107 Date : SEPTEMBER 26, 1995.

(USE ADDITIONAL SHEETS IF NECESSARY)

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

WATER WELL REPORT

Barbara Grant STATE OF WASHINGTON

Water Right Permit No. _____

OWNER: Name LARRY MORROW Address P.O. Box 446 Lopez wa. 98261-0446

LOCATION OF WELL: County SAN JUAN SW 1/4 SW 1/4 Sec 14 T. 35N N.R. 2W W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) Fishermans Bay Rd. 2514

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

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

(5) DIMENSIONS: Diameter of well 6" inches.
Drilled 125' feet. Depth of completed well 125 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6" Diam. from +2 ft. to -120 ft.
Welded Liner installed Diam. from _____ ft. to _____ 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 Jonsson
Type _____ Model No. _____
Diam. 5 Slot size 12 from 120 ft. to 125 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 Bentolite
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 96 ft.
Static level 90 ft. below top of well Date 7-10-98
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 _____
Ballor test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airstest 5+ gal./min. with stem set at 124 ft. for 2 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 loam	1	-2
Tan clay	2	45
BRW sand	45	47
Blue clay	47	51
Blue sand	51	52
Blue clay	52	69
Blue clay (blue)	69	83
Blue sand	83	87
Blue clay	87	120
Water bearing coarse gravel	120	125

Work Started July 6, 19. Completed July 10, 1998

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 M. Sawyer Drilling & Pump Svc. Inc.
(PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address HC1 Box 160 Olja wa 98279

(Signed) M. Sawyer License No. 2305
(WELL DRILLER)

Contractor's Registration No. MSAW4DSC55NB Date 8-2, 1998

(USE ADDITIONAL SHEETS IF NECESSARY)

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