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SNOHOMISH COUNTY
GROUNDWATER
CHARACTERIZATION STUDY

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Prepared for

SNOHOMISH COUNTY

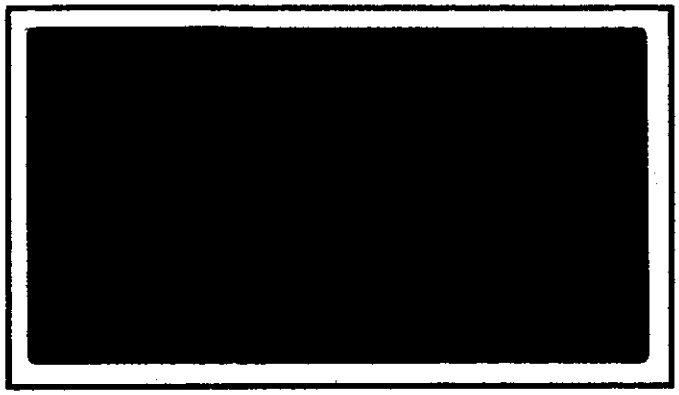
July, 1991

Prepared by

ECONOMIC AND ENGINEERING SERVICES, INC.

In Association With

SWEET-EDWARDS/EMCON, INC.



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ECONOMIC AND
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July 22, 1991

File #: 41160

Mr. Tom Niemann
Snohomish County Planning Department
County Administration Building
Everett, WA 98201

Subject: Snohomish County Groundwater Characterization Study

Dear Mr. Niemann:

Economic and Engineering Services, Inc. (EES) is pleased to submit the final report under the Snohomish County Groundwater Characterization Study. This report is the product of a joint effort of EES and Sweet-Edwards/EMCON, Inc., working in cooperation with you, your staff, and the North Snohomish County Water Utility Coordinating Committee.

Snohomish County is to be commended for its progressive program directed to managing groundwater as a resource. This program now includes your County Policy for Protection of Groundwater, adopted in August 1990; designation of Snohomish County as a Ground Water Management Planning Area pursuant to Chapter 90.44 RCW; and the preparation of this Groundwater Characterization Study as a pre-groundwater management planning activity. The framework is in place for interim groundwater protection as you move into the ambitious process of developing the Ground Water Management Plan.

This study also provided important input to the North Snohomish County Coordinated Water System Plan (CWSP) and your planning responsibilities under the Growth Management Act. Although the study period was short in order to meet the CWSP schedule, the overview of groundwater quality and quantity and identification of critical aquifer recharge areas provides baseline information for your long-term management program.

It has been a pleasure working with you on this study. Please don't hesitate to contact me if you have questions or need further assistance.

Sincerely,

Robert L. Wubbena, P.E.
President

RW:db:11

Enclosure

CONTENTS

Table of Contents (cont.)

TABLES AND FIGURES

APPENDICES

ECONOMIC AND
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GLOSSARY OF TERMS AND ACRONYMS

Alluvium	Sediment such as clay, silt, sand, gravel, or other similar material deposited by running water.
Aquifer	A body of rock or sediment that is able to store and conduct significant quantities of groundwater.
Aquitard	A layer of rock or sediment that retards the flow of groundwater to or from an adjacent layer of rock or sediment.
Arsenic	A naturally occurring element that may be toxic in certain compounds and concentrations.
Artesian	An adjective referring to groundwater confined under hydrostatic pressure.
Bedrock	A term for the solid rock that underlies soil or uncompacted sediments.
Benzene	A colorless, volatile, highly flammable, toxic compound commonly associated with industrial or petroleum industries.
Braided Stream	A stream that divides into an interlacing network of channels typically found in areas of heavy erosion.
Coliform Bacteria	Coliform bacteria comprises all aerobic, gram-negative, non-spore-forming, rod shaped bacteria that ferment lactose with gas formation within forty-eight hours at 35° C. They include bacteria of fecal origin and those that live in the soil.
Confined	A condition of an aquifer that is bounded above and below by lower permeability rock or sediment layers.
Contaminant	A naturally occurring or man-made compound that is undesirable or injurious and found in groundwater.
Cross-Section	A schematic representation of geologic layers as seen in a side view.

Dangerous Waste	Washington State regulated man-made materials that are potentially ignitable, corrosive, reactive, or toxic.
Discharge	Groundwater that flows out of an aquifer into an adjacent aquifer or the surface into a spring or river.
DOH	Department of Health.
Drift	A general term applied to all rock material transported by glacial action.
Drinking Water Standards	Federal water quality regulations that limit the contaminant levels of certain compounds for drinking water.
Ecology	Department of Ecology.
EIS	Environmental Impact Statement.
EPA	Environmental Protection Agency.
Erosion	The physical and chemical processes that remove and transport natural materials at the surface.
Ethylene Dibromide	A man-made chemical used in the agricultural industry as a pesticide.
Geology	The study of earth materials, processes, and history.
gpm	Gallons per minute.
GMA	Groundwater Management Act.
Groundwater	All water that is located below the surface, more specifically subsurface water below the water table.
GWMA	Groundwater Water Management Area.
GWMP	Ground Water Management Program.
Hazardous Waste	Federally regulated man-made waste that is ignitable, corrosive, reactive, or toxic.
Hydraulic Conductivity	The rate of flow of water through an area of permeable material at a constant pressure.

Hydraulic Connection	The condition in which two water bearing layers or bodies may freely transmit water between them.
Hydrogeologic	Pertaining to subsurface water and water-bearing rock or sediment layers.
Hydrostratigraphy	The assemblage of layers of aquifers and aquitards.
Igneous	A type of rock solidified from molten material.
Impermeable	A condition that prevents the flow of water through a rock or sediment.
Infiltration	The downward movement of rain water or surface water into soil.
Mesozoic	A broad period of Earth's history estimated to be 225 to 65 million years ago.
Metamorphic	A rock that has been physically and/or chemically changed from an original texture and/or composition, usually by very high temperatures or pressures below the Earth's surface.
mg/l	Milligrams per liter; a unit of concentration in water equivalent to a part per million or 0.0001 percent.
mgd	Million gallons per day.
Nitrate	A compound commonly associated with domestic and agricultural waste.
Outwash	Layered sediments removed or washed out from a glacier by melt water streams deposited in front of a glacier.
Peat	A non-compacted deposit of organic material commonly developed from bogs or swamps.
Pentachlorophenol	A man-made chemical commonly used as a wood preservative.
Permeable	The condition under which water may be transmitted through rock or sediment.
Pleistocene	A period of Earth's history estimated to be 2 million to 10,000 years ago.

ppm	Part per million. A unit of concentration equivalent to 0.0001 percent.
Recent	Less than 10,000 years ago in Earth's history.
Recharge	The process of absorption and addition of water to a layer of soil, rock, or sediment.
Saltwater Intrusion	The displacement of groundwater into an aquifer by saline or sea water.
SDWA	Safe Drinking Water Act.
Sedimentary	A rock type that has been formed from fragments of weathered natural material.
SEPA	State Environmental Protection Agency.
Stade	A substage of glacial advancement during a major glacial stage.
Stratigraphic	Pertaining to the composition and position of layers of rock or sediment.
Tertiary	A period of Earth's history estimated to have occurred between 2 and 65 million years ago.
Till	A complex non-layered mixture of clay, silt, sand, and gravel deposited directly by and underneath an active glacier.
Topographic	Pertaining to the general configuration of a land surface.
Transmissivity	The rate at which groundwater flows through a certain thickness of aquifer under a certain pressure.
Unconfined	The condition at which groundwater in an aquifer is not covered by an impermeable layer.
Water Table	The surface between the zone of saturation with groundwater and the zone of aeration.
Weathering	The destructive process(es) by which the atmosphere and surface water chemically changes the character of a rock.

SECTION I

ECONOMIC AND
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SECTION I

INTRODUCTION

1. PURPOSE

The purpose of this study is to characterize the nature and extent of groundwater in western Snohomish County; to develop a concept for a Data Management Program; to identify current groundwater protection programs and aquifer protection strategies which may be appropriate for Snohomish County; to discuss the relationships to the Growth Management Act (GMA); and to make recommendations concerning future actions necessary to achieve comprehensive groundwater management in Snohomish County. This study provides geologic and hydrogeologic information for location of groundwater, estimation of extraction volumes and rates of high quality groundwater, and the potential for contamination at recharge areas from man-made and naturally occurring sources. The information presented in this report will ultimately be used for short- and long-term planning purposes regarding water supply. It is emphasized, however, that this study has limitations - it relies solely on evaluation of previous studies and existing available data.

2. SCOPE OF WORK

The scope of work included the following tasks:

- Literature search for previous geologic, hydrogeologic, and water supply studies
- Compilation of index map and references of previous work
- Preparation of a geologic map, geologic cross-sections, aquifer and recharge maps, and groundwater flow maps for hydrogeologic characterization
- Search of State records for groundwater rights
- Snohomish County record search for locations of contaminated groundwater wells, and assessment of nature and extent of groundwater contamination in Snohomish County
- Research and discussion of groundwater management protection programs

- o Research of the GMA requirements, particularly as it relates to aquifer recharge areas

- o Preparation of report summarizing all findings of the study

3. APPROACH

A. General

The approach in preparation of this report has been to first present the description of the study area (Section II) and background information sources along with a discussion of the general geology of the area and an identification of the various geologic units (Section III).

This is followed in Section IV with 1) a discussion of the major hydrostratigraphic units in Snohomish County, the occurrence of groundwater in such units, and the general aquifer parameters; 2) existing groundwater right information; and 3) an identification of critical aquifer recharge areas as required under the Growth Management Act.

The critical aquifer recharge areas were then categorized as to their vulnerability to contamination; high, moderate, or low (Section V), with Section VI being a discussion of groundwater quality, including the arsenic problem in Snohomish County. In Section VII, 15 principal aquifer systems have been identified and categorized by degree of significance as a source of groundwater (i.e., regional, local, or limited). Table VII-1, on page VII-13, presents an overview of specific characteristics, including, among others, the yield potential, potential quality problems, and recharge potential of each of the principal aquifer systems.

The data management program is discussed in Section VIII.

Section IX is a discussion of the existing groundwater protection programs that may have some applicability in Snohomish County. Section X is directed toward an evaluation of each of the programs to identify the best strategy for groundwater protection of the Snohomish County aquifer system. Because development of a comprehensive groundwater management program for the entire county evolved as the best strategy, specific strategies for each of the principal aquifers were not developed. These would be formulated through the groundwater management program development process.

Section XI covers the conclusions and recommendations resulting from the study. This includes general findings, identification of data

deficiencies, and strategies relating to compliance with the Growth Management Act.

B. Presentation of Key Information

Snohomish County identified a number of key informational areas that were addressed in the groundwater characterization study. For purposes of indexing data and information contained in the report to these informational areas, the following table is provided:

INDEX OF KEY INFORMATION

Subject	Report Section
Aquifers of regional significance	VII
Aquifers of local significance	VII
Aquifers of only limited significance	VII
Aquifers susceptible to arsenic contamination	VI
Current domestic and agricultural demand of the aquifers	IV
The relative vulnerability of each identified aquifer to man-made contamination	V
The overall water quality of each aquifer	VII
Policies which would be beneficial for protecting the county's groundwater aquifers	IX
Groundwater strategies appropriate for each individual aquifer	X
Recommendations on whether the county should petition the Environmental Protection Agency for additional sole source aquifer designations	IX
Aquifers which warrant further, more detailed, groundwater studies	VII
Strategies which would be beneficial for protection of each of the principal aquifers (i.e., groundwater management areas, wellhead protection zones, etc.)	X
Groundwater protection strategies which fulfill the mandate of SHB 2929	X

SECTION II

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SECTION II

STUDY AREA DESCRIPTION

The study area covers approximately 650 square miles and is characterized by six major topographic plateaus separated by narrow streams and broad river channels several tens to hundreds of feet deep (Figure II-1). The floodplains of the Snoqualmie, Skykomish, Snohomish, and Stillaguamish Rivers form topographic, geologic, and hydrogeologic boundaries between the plateaus. Regional surface drainage is generally westerly towards Possession Sound and Port Susan.

The area receives an average of 30 inches of precipitation at the coast and 60 inches at higher elevations in the east. Winter temperatures average 40^{o}F, with summer temperatures averaging 60^{o}F. Snow falls during the winter at higher elevations, although never deep enough to form a snow pack.

Snohomish County is one of the fastest growing areas in the United States. During the past ten years, county-wide population increased over 27 percent. Land use patterns range from highly urban in the southwest portion of the county to undeveloped forest along the eastern edge of the study area. A number of primary transportation corridors, including Interstate 5 (I-5), Interstate 405 (I-405), Highway 2, and the Burlington Northern Railroad, cross through the study area (Figure II-2). There are 29 active and inactive landfills (municipal, woodwaste, or demolition waste) in the study area. Nine of these landfills, along with fourteen industrial and commercial facilities in the county, are included on the Washington State Department of Ecology (Ecology) list of confirmed or suspected hazardous waste sites. There are, according to Ecology, over 500 registered businesses in the county that are involved in activities that generate, transport, treat, store or dispose of regulated dangerous wastes.

Beneficial uses of Snohomish County's aquifers include residential, commercial, and industrial potable supplies serving an estimated one-third of the County's population. Irrigation is primarily for seasonal yard and lawn watering, but also includes limited agricultural crop irrigation. The quantity of water withdrawn for these purposes is not known.

There are 772 public water supplies in Snohomish County, with 85- to 90-percent using groundwater sources. Additionally, there are hundreds of individual water supplies, with over 90-percent using groundwater sources.

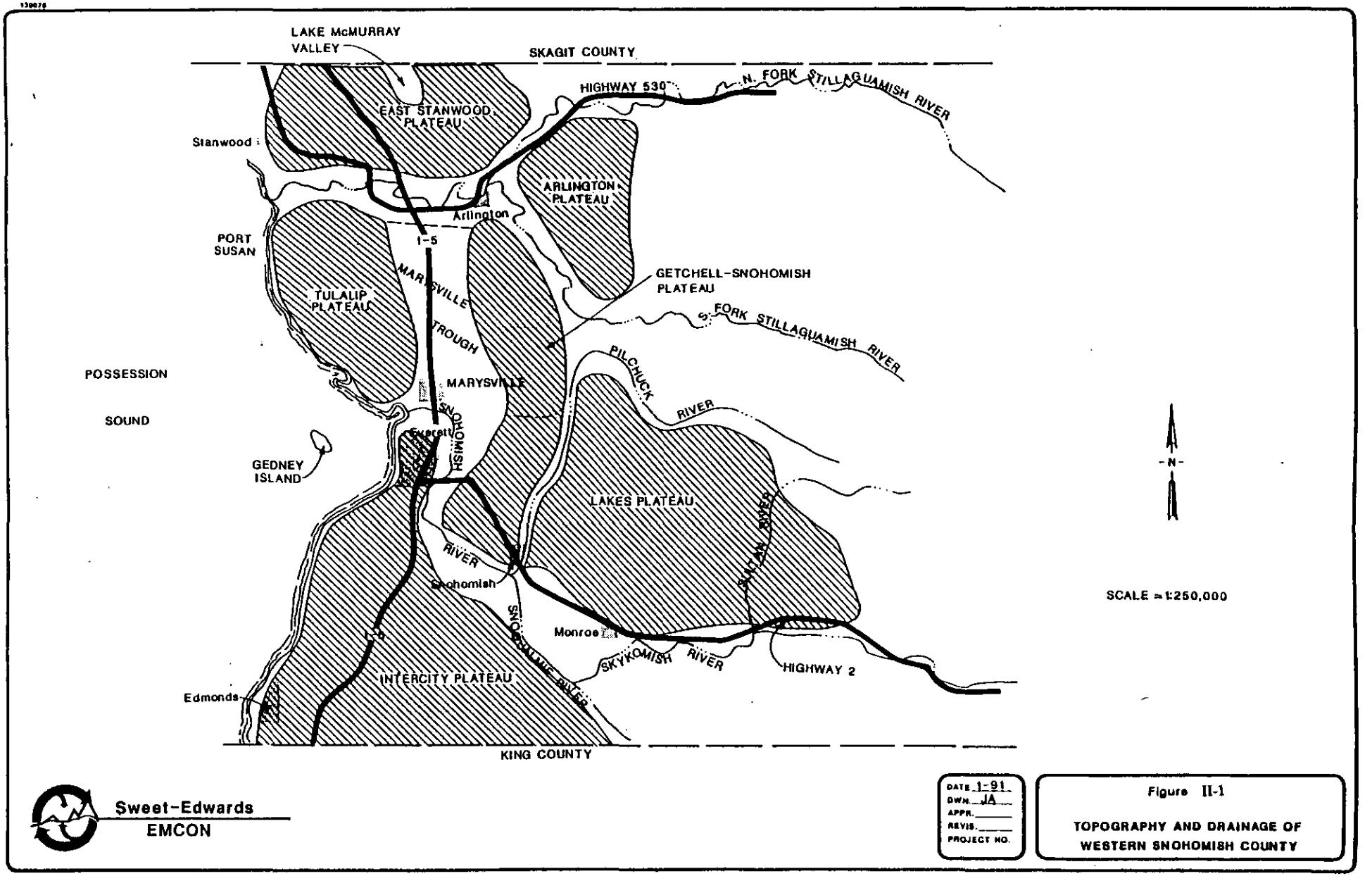
LAKE McMURRAY
VALLEY
SKAGIT COUNTY
HIGHWAY 530
N. FORK STILLAGUAMISH RIVER
EAST STANWOOD
PLATEAU
Stanwood
ARLINGTON
PLATEAU
Arlington
PORT
SUSAN
I-5
MARYSVILLE
TROUGH
GETCHELL-SNOHOMISH
PLATEAU
TULALIP
PLATEAU
S. FORK STILLAGUAMISH RIVER
PILCHUCK
RIVER
POSSESSION
SOUND
MARYSVILLE
SNOHOMISH
RIVER
Everett
GEDNEY
ISLAND
LAKES PLATEAU
SNOHOMISH
RIVER
Snohomish
SNOQUALMIE RIVER
Monroe
SKYKOMISH RIVER
HIGHWAY 2
INTERCITY PLATEAU
Edmonds
KING COUNTY
N
SCALE = 1:250,000
Sweet-Edwards
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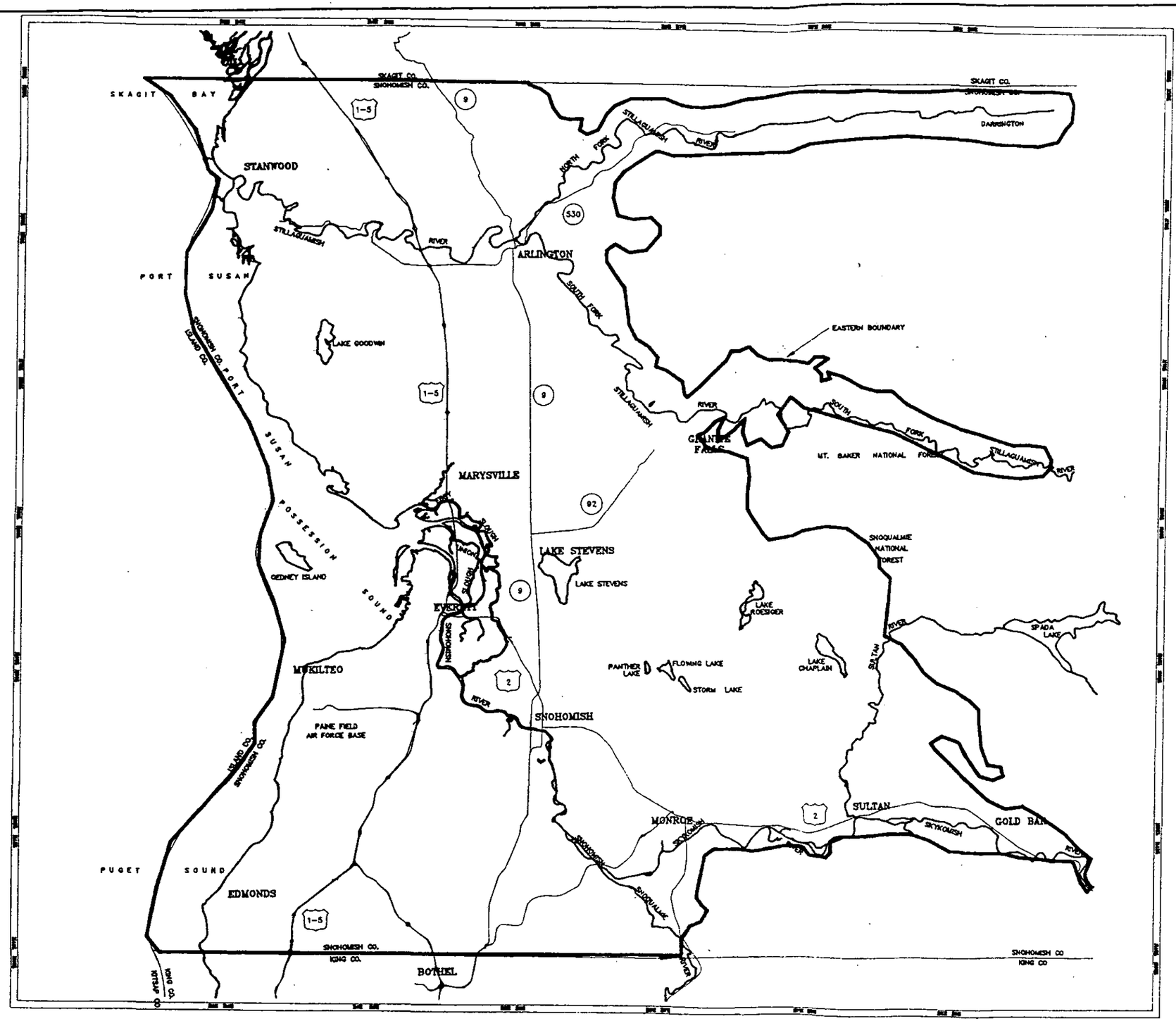
Figure II-1
TOPOGRAPHY AND DRAINAGE OF
WESTERN SNOHOMISH COUNTY



Sweet-Edwards
EMCON

Figure II -2
SNOHOMISH COUNTY
GROUND WATER CHARACTERIZATION
STUDY AREA

SECTION III

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SECTION III

GEOLOGY

1. PREVIOUS STUDIES

Numerous geologic, hydrogeologic, and water supply studies have been completed in the study area. U.S. Geological Survey (USGS) topographic and geologic maps are available for the entire area. A study of the groundwater resources of Snohomish County was completed by R.C. Newcomb in 1952. Since then, several smaller scale studies have become available. Water supply studies completed for water districts and municipalities have included estimates of groundwater resources. All of these studies have been compiled into a reference list and index map (Appendix A). These studies form the framework for the geologic summary of the study area. Primary sources were Newcomb (1952); USGS geologic maps; Booth (1984, 1989); Sweet-Edwards/EMCON (1988); and Pessl, et al. (1989).

2. GENERAL DESCRIPTION AND RELATIONSHIP OF UNITS

The study area contains three basic rock types: Tertiary or older sedimentary and crystalline bedrock, semi- to unconsolidated fluvial, glacial, and marine Pleistocene sediments, and recent alluvium (Figure III-1).

The depth to bedrock in the study area ranges from 0 feet in the east to a maximum depth of 1,600 feet in the vicinity of Everett (Hall & Othberg, 1974). Bedrock outcrops are found in the eastern portions of the study area and locally along stream and river channels. Near-surface bedrock occurs as isolated topographic "highs" in the eastern study area, exposed as outcrop or covered with thin layers of Pleistocene sediments. Buried bedrock exists below thick layers of Pleistocene sediments along the western study area boundary and is noted only in deep borings.

Pleistocene sediments have covered the Puget Sound basin in layers ranging from inches to several hundred feet in thickness. Pleistocene sediments occur throughout the study area. These sediments may be absent at topographic highs or where erosion in river valleys has been significant.

Alluvial sediments occur within river or lake systems as thin flat-lying sediments. Recent alluvium is found along major stream and river channels. Thicknesses range from 0 up to 100 feet. Older alluvium may form benches or terraces above river valleys. Alluvium may be deposited directly onto bedrock where Pleistocene sediments have been eroded.

3. GEOLOGIC HISTORY

The Puget Sound basin has been in existence since Tertiary times when sedimentary and volcanic basement rocks were folded downward between the Olympic and Cascade ranges. The resulting basin provided an avenue for several episodes of piedmont or ice sheet-type glacial flow from southwestern Canada, with concurrent sedimentary deposition during the Pleistocene. Recent post-glacial topographic modifications by erosion and deposition have been minor, occurring primarily along river floodplains.

A minimum of two and perhaps four glacial episodes occurred during the Pleistocene. A maximum of 1,000 feet of glacial, river, lake, and marine sediments were deposited in the study area during the first glacial episodes and interglacial periods (Thorsen, 1983). The final episode of glaciation, termed the Vashon stade, was the most significant geologic influence on the development of ground water in the study area. Approximately 20,000 years ago, the ice sheet was in the vicinity of Vancouver, British Columbia; 18,000 years ago, the ice sheet had reached the Port Townsend area and effectively isolated the Puget Sound Basin from the Strait of Juan de Fuca.

A large lake developed in front of the ice front and thick sequences of fine-grained sediments were deposited in the basin. As the ice advanced and reached the maximum southern limits 14,000 years ago, lateral streams from the Olympic and Cascade ranges were blocked by ice, diverting flow through temporary channels. Thick sequences of coarse sands and gravels flowed from the ice front, spreading over the basin and mixing with river sediments. The ice front overrode the coarse sediments and deposited a veneer of till (a mixture of clay, silt, and fine gravel). The ice reached a maximum thickness of 3,000 feet and an elevation of approximately 5,000 feet above mean sea level (AMSL) in Snohomish County. The weight of the ice compressed the till and depressed the basin. Soon after the glacial maximum, the ice front began to recede as the rate of accumulation of snow and ice became less than the rate of melting. By 12,500 years ago, the ice had retreated from the study area. Isolated lenses of sand and gravel were deposited from the ice margins as the glacier retreated. After the ice had retreated past the lateral streams and into the strait, rivers returned to former channels and marine deposition continued (Thorsen, 1983).

The surficial and subsurficial geologic deposits form distinct layers that are exposed at the surface and in deep borings in the study area. These deposits are presented in geologic maps and geologic cross-sections, some of which are shown in Figures III-2 to III-6. Well logs used to prepare selected cross-sections are presented in Appendix B.

4. BEDROCK

A. Mesozoic Crystalline Rocks

Metamorphic and igneous rocks that were formed during the Mesozoic Era (65 to 250 million years ago) are found along the eastern margins of the study area, and extend into the Cascade Range. These rocks are overlain by Tertiary sedimentary rocks and Pleistocene unconsolidated sediments, and do not contain a significant quantity of ground water in the area (Booth, 1984).

B. Tertiary Sedimentary Rocks

Tertiary sedimentary rocks are exposed in numerous areas in the east and northern portions of the study area (Figure III-2). These rocks are estimated to be approximately 24 to 58 million years in age and are comprised of over 1,500 feet of shale, siltstone, sandstone, and coarse gravel. They are exposed at the surface in stream and river bottoms, along hillslopes, and as isolated erosional remnants on hilltops (Booth, 1984).

5. PLEISTOCENE UNCONSOLIDATED SEDIMENTS

Three episodes of glaciation are believed to have occurred in the study area, depositing sediments called the Vashon drift, the Possession drift and the Double Bluff drift. The glacial sediments and all sediments deposited before and between the glacial episodes are deposited in thicknesses up to 1600 feet in the study area. The sediments associated with the Double Bluff and Possession drifts are found at elevations between -100 and 200 feet above sea level. Surface exposures of these sediments are restricted to coastal cliff faces. The most recent Vashon drift and associated sediments are found extensively from ground surface to depths of 0 to 200 feet above sea level (Thorsen, 1983, Sweet-Edwards/EMCON, 1988).

A. Pre-Double Bluff Drift Sediments

At least 200 feet of sediments occur below the Double Bluff drift. The unit consists mostly of alternating beds of sand, silt, and clay, although peat layers, wood fragments, and gravel are reported at several locations throughout the section. These beds lie entirely below sea level and are primarily found below the Tulalip and Intercity plateaus.

B. Double Bluff Drift

The Double Bluff drift is a glacial till with scattered layers of sand, gravel, silt, clay, and some marine glacial drift. The formation is believed to

underlie the southern and western portions of the study area and may be up to 70 feet thick. It is not exposed at the surface in southern Snohomish County, but elsewhere typically occurs at or near sea level.

C. Whidbey Formation

The Whidbey formation consists of layered, commonly oxidized, medium- to coarse-grained sand. Peat beds and organic clay/silt beds are common in the upper part of the unit. The sediments are representative of river, floodplain, and swamp deposits. The unit may be as thick as 175 feet on Whidbey Island in Island County, although the total thickness and relationship to underlying formations is largely unknown in the study area. The Whidbey formation outcrops in limited areas along the Possession Sound shoreline.

D. Possession Drift

The Possession drift formation is probably present beneath most of the western portion of the study area but may be absent locally due to erosion. Depth to the unit varies with topographic elevation but may be in excess of 400 feet. Typically this unit is a gray, dense, non-sorted till, similar to the Vashon till. The unit measures up to 40 feet thick, and outcrops are common just above sea level along the Possession Sound shoreline.

E. Olympia Gravel

The Olympia gravel formation is likely present beneath the entire western portion of the study area. It is exposed at or near sea level in several localities along the Possession Sound shoreline, and likely occurs as water-bearing sand and gravel layers beneath the Marysville trough and the Snohomish-Snoqualmie and Stillaguamish river floodplains. The Olympia gravels may be the stratigraphically highest aquifer on upland regions where Advanced Outwash sediments associated with the Vashon drift were not deposited or removed by erosion, particularly on the Tulalip or Intercity plateaus. The formation consists predominately of layered, coarse sand and gravels.

F. Transitional Beds

The Transitional beds range in thickness up to 300 feet and are present beneath much of the study area. They consist of layered, medium to dark gray clay, silt, and fine to very fine sand. The units locally change vertically and laterally into coarser sediments of the Advanced Outwash, but may also be eroded by overlying sediments. The compositional features of the unit range from thinly layered clay and silt to thick beds of

clay and silt. Thin layers of sand are scattered throughout the Transitional beds. The unit forms a thick, relatively continuous layer between the underlying Olympia gravels and overlying Advance Outwash. The sediments were likely deposited with the advancement of the Vashon ice front that dammed the Puget Sound basin, forming a large lake. The Transitional beds outcrop on steep slopes along stream valleys and beach cliffs.

G. Vashon Advance Outwash

The advance outwash formation underlies a large portion of study area, particularly in the topographically high plateau regions (Figure III-2). The unit is absent where pre-Vashon topography was too high for deposition or where subsequent erosion by the advancing ice or post-glacial rivers removed the sediments. The advance outwash unit is discontinuous and becomes finer grained and thinner east of Monroe. The sediments may reach up to 350 feet in thickness on the Tulalip and Intercity plateaus.

The unit consists predominantly of gray layered sand overlain by sandy gravel with occasional cobbles. The unit is locally silty and oxidized, particularly where derived from weathered Tertiary sedimentary rocks. The unit typically coarsens upward, from thick fine sand beds near the Transitional beds, through medium to coarse sands in the center, to sand and gravel at the top. The outwash was deposited on moderately flat surfaces of Transitional beds by meltwater flowing into ponded areas and as braided streams in front of the advancing ice stream. Channel deposits occur locally within the unit or the Transitional beds.

H. Vashon Till

The Vashon till is found throughout the study area on plateaus and locally beneath the surface of the Marysville trough (Figure III-2). The till has been plastered to the pre-existing topographic surface to a thickness of 5 to 100 feet. Vashon till consists of a non-sorted, compact mixture of clay, silt, sand, cobbles, and boulders. Layers of silty and sandy sediments occur locally within lower portions of the unit. The Vashon till is a significant impermeable barrier between the underlying advance outwash and the surficial deposits above.

I. Recessional Outwash

The recessional outwash is generally discontinuous and occurs as isolated deposits lying atop Vashon till, as valley fill (Marysville Trough), and as terraces above stream valleys (Arlington Plateau) (Figure III-2). The recessional outwash may also locally lie directly atop and in hydraulic

connection with the advance outwash. The recessional outwash ranges in thickness from a few feet to approximately 100 feet in the study area. Recessional outwash deposits are layered glacial and marine sediments consisting of partly oxidized sand and gravel, and locally contain beds of silt and clay. The recessional outwash is much more permeable than the Vashon till and generally does not form a hydraulic barrier.

6. RECENT ALLUVIUM

Post-glacial depositional and erosional processes modified the glacial landforms and former stream and river valleys. Alluvial sediments are found primarily in stream channels and river basins (Figure III-2). Older alluvium forms terraces composed of sand and gravel above existing floodplains. Younger alluvium has been deposited by existing river and lake systems with sand, silt, and clay in the upper layers of the alluvium. The alluvium becomes increasingly finer grained generally towards the west, closer to the river outlets into Possession Sound and Port Susan. Coarse sand and gravels are found in deeper levels of the alluvium and closer to the stream headwaters. These coarser zones are highly permeable and hydraulically connected to underlying sediments.

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STRATIGRAPHIC SEQUENCE OF GEOLOGIC UNITS

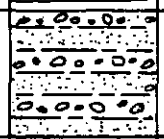
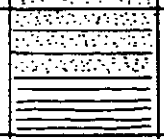
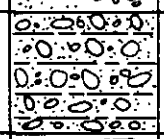
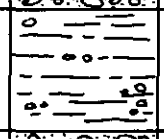
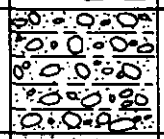
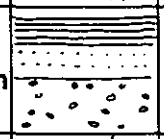
RECENT	Recent 12,000 – 0 years ago		Alluvium Stratified clay, silt, sand and gravel
PLEISTOCENE			Recesssional Outwash Stratified clay, silt, sand and gravel
	Vashon Stade Fraser glaciation		Vashon Till Compacted unsorted clayey, silty sand and gravel
	20,000 – 12,000 years ago		Advance Outwash Stratified clean sand and gravel with few silty beds
			Transitional Beds Thin bedded to massive clay silt and fine sand
	Olympia Interglaciation 40,000 – 20,000 years ago		Olympia Gravel Stratified sandy gravel and sand
	Possession Glaciation 60,000 – 40,000 years ago		Possession Drift Compacted non-sorted clayey, silty sand and gravel
	Pre-Possession Interglaciation 130,000 – 60,000 years ago		Whidbey Formation Stratified clay, silt and sand
	Double Bluff Glaciation >130,000 years ago		Double Bluff Drift Compacted non-sorted till with interbedded stratified sand and gravel
	Pre-Double Bluff 2 million to 1 million years ago		Pre-Double Bluff Sediments Fluvial and lacustrine silts sands and gravels
TERTIARY	Sedimentary Rock 12 million to 11 million years ago		Sedimentary Rocks Shale sandstone and conglomerate
MESOZOIC & PALEOZOIC	Crystalline Bedrock >65 million years ago		Crystalline Rocks Igneous and metamorphic basement

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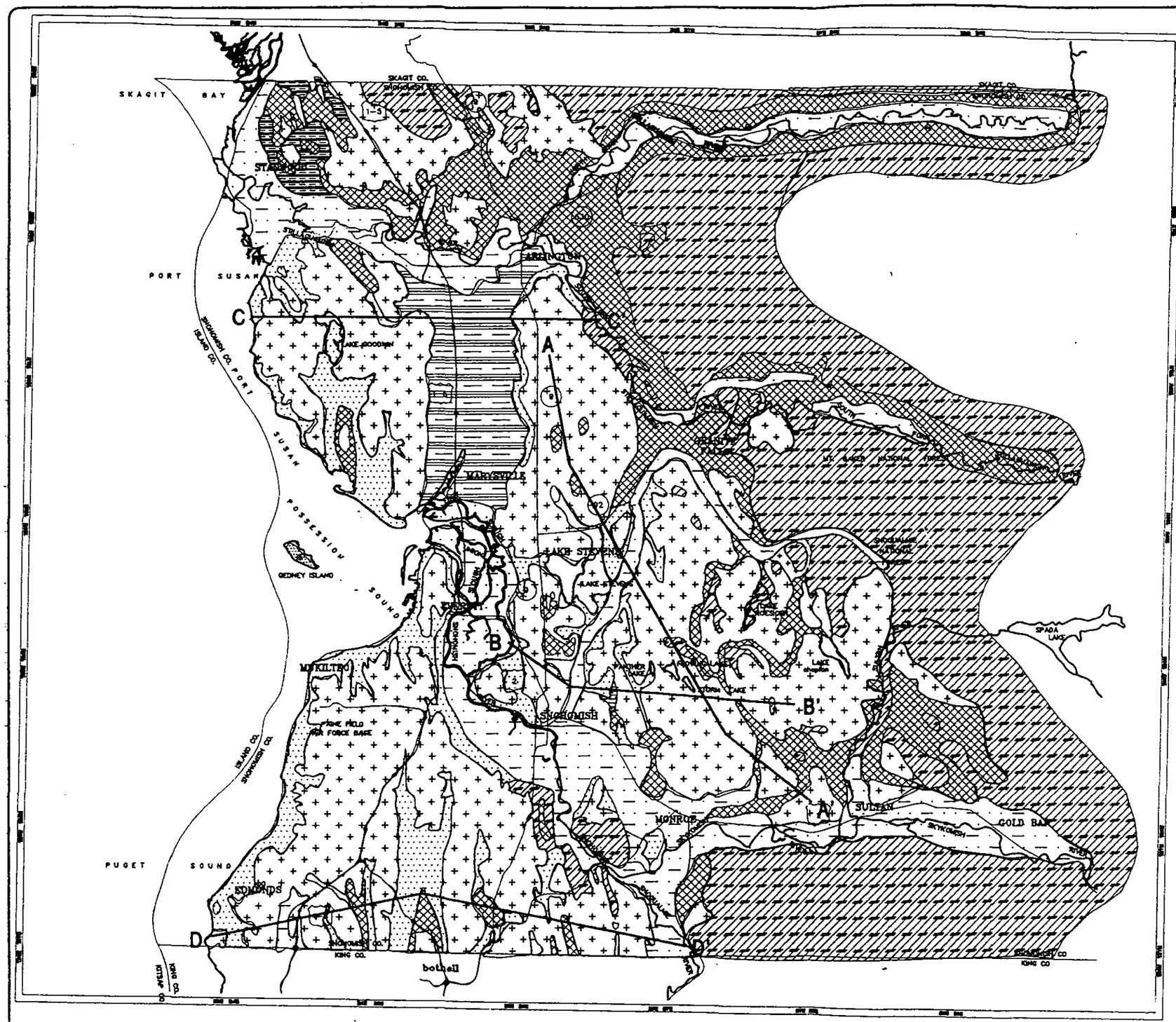
Figure III-1
SNOHOMISH COUNTY GROUND WATER CHARACTERIZATION STUDY
GENERALIZED STRATIGRAPHIC COLUMN



Sweet-Edwards EMCON

Figure III-2
SNOHOMISH COUNTY
GENERALIZED SURFICIAL GEOLOGIC MAP OF WESTERN SNOHOMISH COUNTY

CADD FILE: EES\SNOBA3B\2/7/91

NORTH
A

ELEVATION (ft/msl)

700
600
500
400
300
200
100
0

30/6-7B
30/6-8C
30/6-18A
30/6-17F
30/6-20E
30/6-28M
HWY. 92
30/6-33R
29/6-4A
29/6-4H
29/6-3E
PILCHUCK RIVER
29/6-3N
29/6-11C
29/6-10J
29/6-11F
29/6-10Q
29/6-14D
29/6-14K
29/6-23A
DUBUQUE CREEK
29/6-24M
29/6-24K
29/6-26G
29/6-26K
29/6-25E
29/6-26R
MATCH LINE

BEND IN SECTION

28/7-6C
28/6-1R
28/7-7F
28/7-8E
28/7-17D
28/7-18J
28/7-16N
28/7-21N
28/7-21P
WEST FORK WOODS CREEK
28/7-28A
28/7-28H
28/7-34C
28/7-27J
MATCH LINE

SOUTH
A'

ELEVATION (ft/msl)

LEGEND

28/7-6C Well Location

- Alluvium
- Recessional Outwash
- Vashon Till
- Advance Outwash (Coarse Grained Sediments)
- Advance Outwash (Fine Grained Sediments)
- Transitional Beds
- Bedrock
- Pre-Vashon Outwash

0 2000 4000
SCALE (ft)

VERTICAL EXAGG. 20X

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DATE OF ISSUE		DWN BY		CHK BY		
		DES BY		APP BY		

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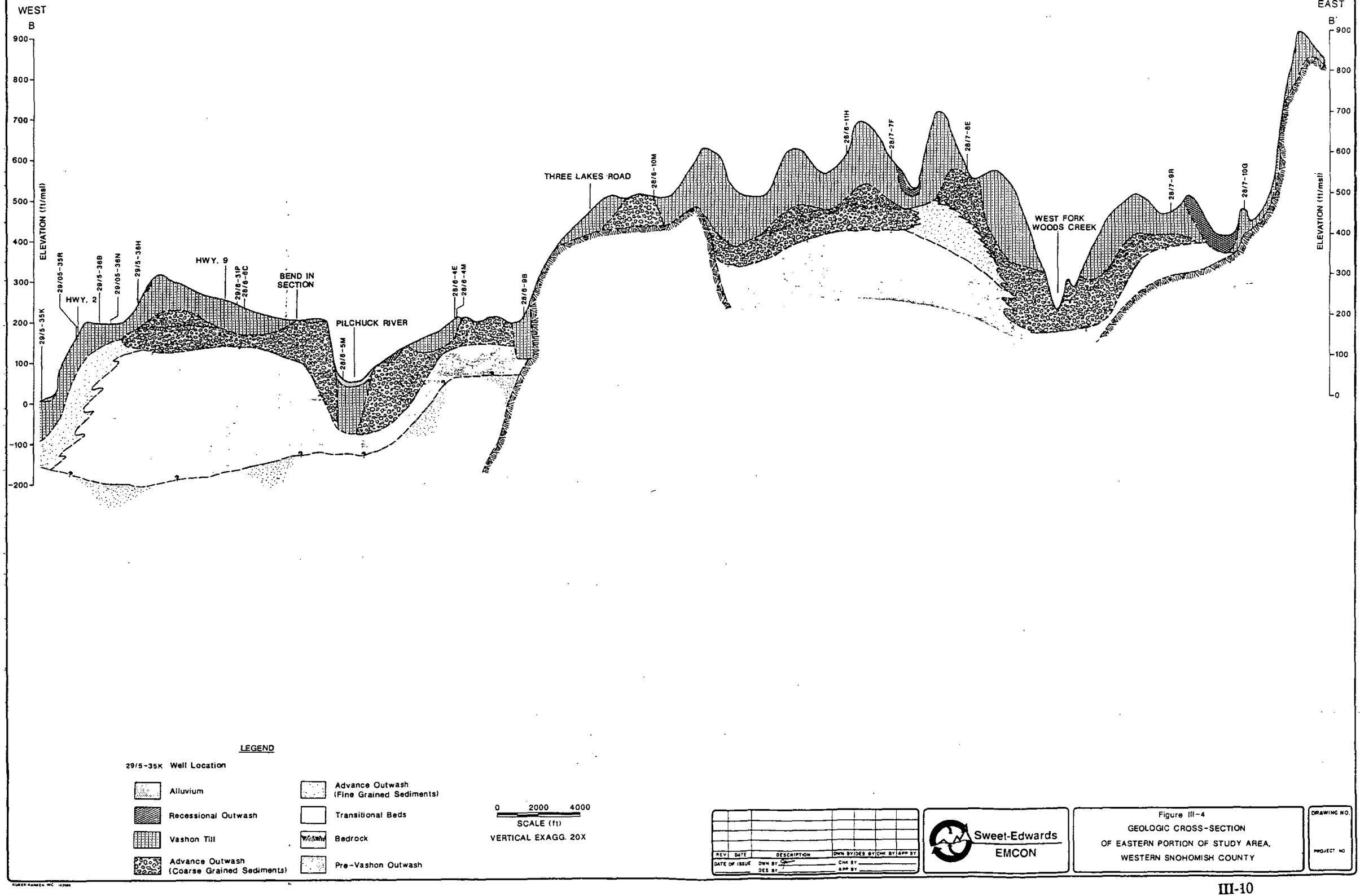
Figure III-3
GEOLOGIC CROSS-SECTION
OF EASTERN PORTION OF STUDY AREA,
WESTERN SNOHOMISH COUNTY

DRAWING NO

PROJECT NO



REV.	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
DATE OF ISSUE		DWN BY		CHK BY		
		DES BY		APP BY		

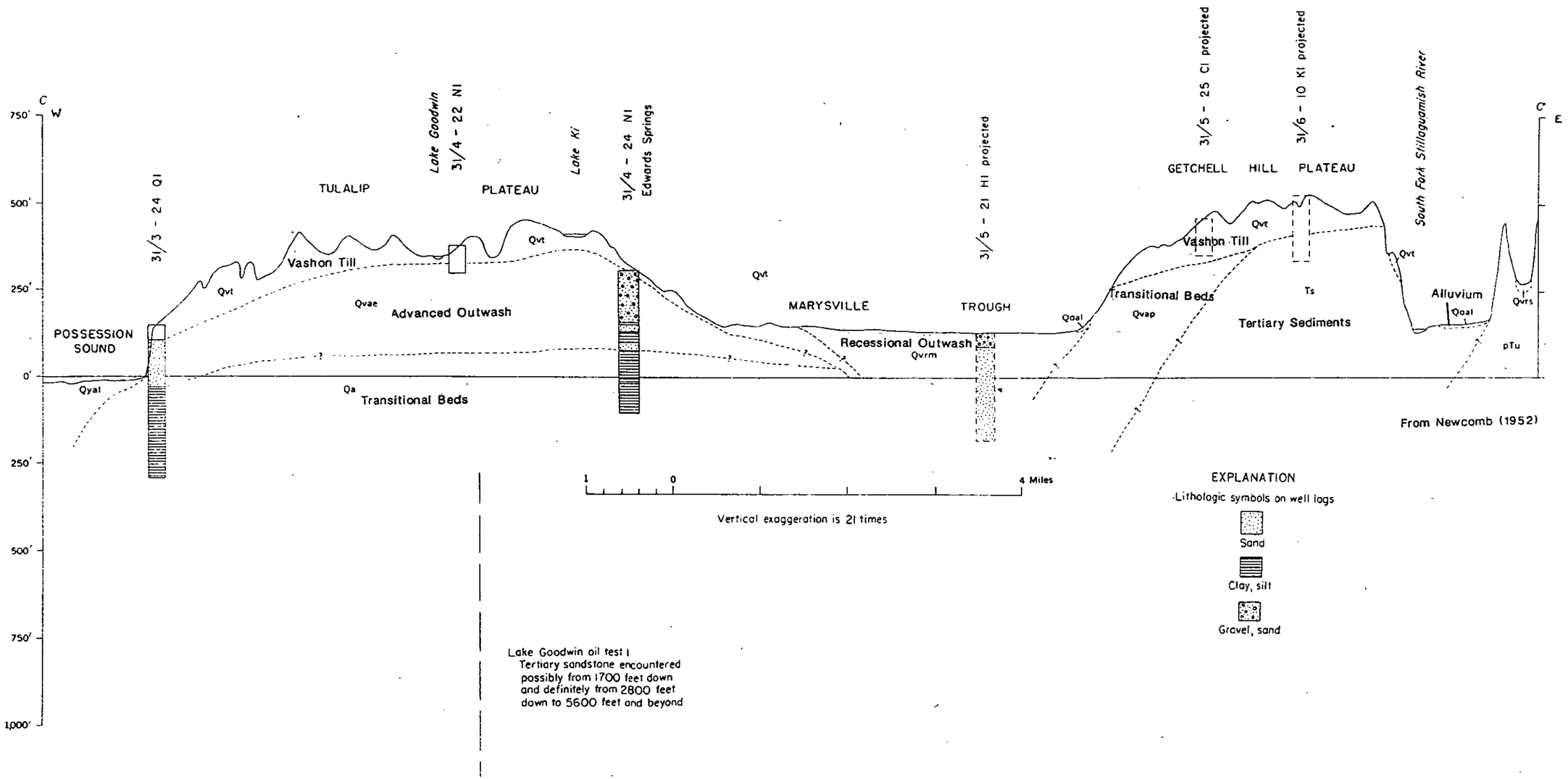
Sweet-Edwards
EMCON

Figure III-4
GEOLOGIC CROSS-SECTION
OF EASTERN PORTION OF STUDY AREA,
WESTERN SNOHOMISH COUNTY

DRAWING NO.

PROJECT NO.

139075



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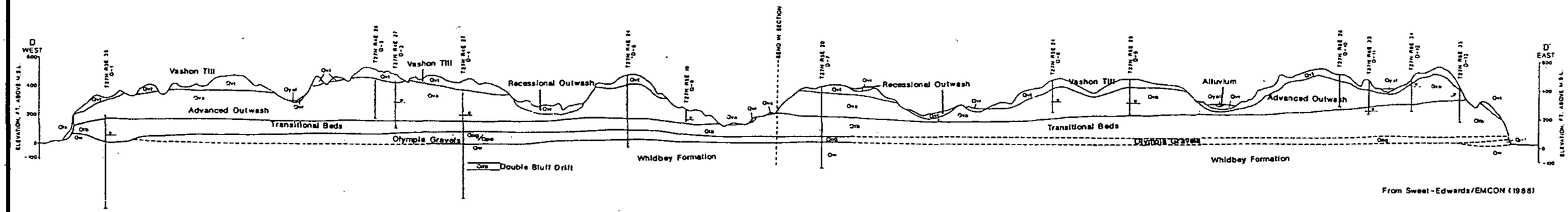
REVIS.
PROJECT NO.

Figure III-5

GEOLOGIC CROSS-SECTION OF TULALIP AND GETCHELL-SNOHOMISH PLATEAUS



From Sweet-Edwards/EMCON (1988)

0 4000 8000
Scale (ft)

Sweet-Edwards
EMCON

DATE 1-91
DWN. JA
APPR.
REVIS.
PROJECT NO.

Figure III-6

GEOLOGIC CROSS-SECTION OF
INTERCITY PLATEAU

SECTION IV

ECONOMIC AND
ENGINEERING
SERVICES, INC.

SECTION IV

GROUNDWATER

This section describes the occurrence, movement, recharge, and discharge of groundwater within the major geologic units in the study area. Although groundwater occurs in all the geologic units discussed in Section III, physical conditions such as permeability and layering determine the role of each unit in the overall groundwater systems.

1. OCCURRENCE OF GROUNDWATER

Geologic materials that are able to store and conduct groundwater are considered to be aquifers. In Snohomish County the major aquifer systems can be divided into shallow, intermediate, and deep groundwater systems. Shallow groundwater systems are restricted to the alluvium, recessional outwash and Vashon till formations. The advance outwash deposits contain the intermediate aquifer systems. Below the advance outwash unit the deeper groundwater systems include aquifers contained in pre-Vashon deposits such as the Olympia gravels.

2. GROUNDWATER FLOW DIRECTIONS

There is insufficient reliable data to draw accurate groundwater flow maps for each aquifer; however, generalizations can be made. In the shallow and intermediate groundwater systems groundwater is expected to flow downslope and perpendicular to topographic contours. In the deep aquifer systems groundwater in the pre-Vashon deposits will flow under regional gradients generally in a westerly direction from the Cascade Range to Puget Sound. Figure IV-1 presents expected groundwater flow paths in the alluvial, recessional outwash, and advance outwash units.

3. MAJOR HYDROSTRATIGRAPHIC UNITS

When evaluating the hydrologic characteristics of geologic units, it is often more appropriate to talk in terms of hydrostratigraphic units. In this context the geologic units can be described in terms of their role in the overall groundwater regime. The major hydrostratigraphic units of western Snohomish County occur within the Pleistocene glacial and pre-glacial sediments. The units may either form barriers to groundwater flow or readily store and transmit groundwater. Table IV-1 lists and summarizes the hydrostratigraphic units.

A. Shallow Groundwater Systems

(1) Alluvium and Recessional Outwash Units

Shallow aquifers contained within these geologic formations are often continuous, spanning geologic boundaries. The aquifers are typically perched upon the upper surface of the underlying till. In places where the underlying glacial till is absent, these aquifers may be hydrogeologically continuous with deeper aquifers.

The geologic formations in which these systems occur are often thin and limited in areal extent. Consequently, the shallow aquifers are seldom used for municipal supply, except in areas where gravelly alluvium is in hydraulic connection with major rivers. For example, yields of 2,000 gpm or greater are recorded from municipal supply wells installed in gravelly alluvium along the Stillaguamish River (City of Stanwood, pers. comm.).

Recharge to these units is primarily through direct precipitation in the upland areas and induced recharge from surface water bodies on the major river valleys during high river stages. Direct recharge potential to these aquifers is generally moderate to high except along the Snohomish and Stillaguamish rivers at their outlets where the silty and clayey sediments prevent infiltration of rain water (Figure IV-2).

(2) Vashon Till

The Vashon till typically forms a low permeability barrier to downward water percolation on the upland surfaces of the study area. Shallow groundwater may occur on the base of the upper 8 feet of weathered till, perching upon the upper surface of the unweathered till. Groundwater is also sometimes found within the unweathered portion of the Vashon till, typically restricted to thin, discontinuous lenses of sand and gravel. These sources of water are occasionally used by older private wells yielding up to 25 gpm but are subject to seasonal fluctuation and may completely dry up during the summer months.

Recharge of rain water to the unweathered Vashon till is slow because of low infiltration capacities, and most water is lost through surface runoff. Increased infiltration occurs in the locally higher permeable zones that have the ability to transmit and store groundwater. Topographic depressions in the upper surface of the unweathered till will trap groundwater that will slowly infiltrate into underlying geologic units and aquifers.

B. Intermediate Groundwater Systems

(1) Advance Outwash

The advance outwash unit constitutes the thickest (up to 350 feet) and most significant aquifer in the study area. The aquifer occurs beneath all the plateau areas, except for limited areas of non-deposition or erosion. The outwash is absent beneath Possession Sound to the west, and is probably absent from the Snoqualmie-Snohomish and Stillaguamish River valleys and the Marysville Trough. The unit decreases in thickness to the east and is absent or only a few feet thick east of Monroe (Booth, 1984).

The advance outwash readily transmits water, particularly in the upper layers of highly permeable gravel and sand. Groundwater percolates downward through these layers to be stored in thick lenses of medium- to coarse-sand.

The advance outwash unit exhibits both confined and unconfined conditions in the study area. The unit is unconfined beneath higher topographic elevations of the plateaus. The water table is typically below the uppermost gravels. The unit is typically confined by the Vashon till along the flanks of the plateaus. Wells completed in these areas contain artesian groundwater with water elevations near the surface (Newcomb, 1952).

The majority of water supply wells in the study area are completed in this aquifer, which typically yields sufficient quantities of water for private, public, and industrial supply.

The advance outwash aquifer is recharged from three sources: (1) direct infiltration from precipitation and surface run-off; (2) groundwater leakage from aquifers contained in, and above, the till; and (3) potential groundwater recharge from underlying aquifer(s) in hydrogeologic connection with the advance outwash aquifer. When the overlying till is eroded, groundwater discharges from the confined aquifer resulting in many streams originating at definable spring lines. The surface recharge potential for the advance outwash aquifer is presented in Figure IV-3.

(2) Transitional Beds

This major hydrostratigraphic unit is an important aquitard separating the advance outwash aquifer from underlying aquifers beneath the entire study area and beyond. The unit consists of fifty to hundreds of feet of continuous fine-grained lake bed

deposits that restrict vertical groundwater movement between aquifers. Scattered isolated layers of sand with the transitional beds are locally capable of supplying less than 100 gpm of water. The transitional beds are recharged from above by advance outwash sediments and from below by Olympia gravels and deeper units.

C. Deep Aquifer Systems

The deeper hydrostratigraphic units include the Olympia gravel, Whidbey formation, Double Bluff drift, Pre-Double Bluff drift, and Tertiary sedimentary rocks. The extent of the deeper aquifer systems beneath the study area is largely unknown because of the scarcity of wells completed in these units. Correlations of geologic formations beneath the transitional beds have been extrapolated between sporadic data points (Figures III-3 to III-6).

The Olympia gravel and Whidbey formations occur very close to sea level, whereas the Double Bluff drift and Pre-Double Bluff aquifers typically occur below sea-level. Saline groundwater has been reported adjacent to Possession Sound; for example, a well on the Intercity plateau penetrated more than 200 feet of Pre-Double Bluff sediments, with salt water reported in the lower 330 feet (Sweet-Edwards/EMCON, 1988).

The Tertiary sedimentary rocks (bedrock) is an important local aquifer near the eastern boundary of the study area. Shallow wells reportedly obtain groundwater from bedrock, although yields are generally only 1 to 10 gpm.

Groundwater flow direction in the deeper aquifers is largely unknown but is believed to be representative of regional flow paths, dominated by a westerly flow toward Possession Sound. This is unsubstantiated because of the scarcity of deeper-aquifer water level data in the area.

Recharge to these deep aquifers is probably via deeper groundwater flow paths that originate east of the study area. Some recharge may occur through leakage from overlying deposits. However, the thick, dense, low permeability transitional beds and other drift units in the section reduce vertical groundwater movement. Groundwater discharge is believed to be to Possession Sound, and possibly Lake Washington and the Snohomish-Snoqualmie river systems.

4. GROUNDWATER RIGHTS

There are approximately 530 active groundwater rights in western Snohomish County, according to Ecology's Water Rights file (Appendix C). The rights

permit and prioritize the extraction of groundwater for domestic, commercial, industrial, irrigation, stock, municipal, fire protection, fish propagation, recreation, landscaping, or heat exchange uses. The instantaneous extraction rates range from 5 to 2,000 gpm; annual extraction rates range from 0.5 to 2400 acre-feet (163,000 to 782 million gallons). Annual domestic appropriated rights account for approximately 20,851 acre-feet (6,795 million gallons) of potential groundwater withdrawal. Municipal, agricultural, and commercial/industrial/ other account for approximately 21,777 acre-feet (7,097 million gallons), 12,998 acre-feet (4,236 million gallons), and 10,869 acre-feet (3,542 million gallons) respectively of potential annual groundwater withdrawal rights. Actual withdrawal quantities are typically much less than the appropriated rights. The locations of the permitted rights exceeding 100 gpm are shown on Figure IV-4. The water rights records do not provide information on the depths of wells or the geologic unit from which groundwater would be extracted.

5. CRITICAL AQUIFER RECHARGE AREAS

Aquifer recharge areas are permeable geologic materials through which water percolates down to the water table and into an aquifer system. Using USGS surficial geologic maps (Minard, 1983; Minard, 1985) and USDA soil maps (Debose and Klungland, 1983), the location of surficial permeable deposits in Snohomish County was determined and mapped. The resulting aquifer recharge areas for the shallow and intermediate aquifer materials are shown on Figures IV-2 and IV-3, respectively. Recharge potential is also indicated as to high, medium, and low probability. The derivation of this information is described below.

A. Recharge Mapping Criteria

Groundwater systems are replenished (recharged) by the addition of water to the zone of saturation (aquifer) through precipitation, runoff, and infiltration from surface water bodies. An area in which water reaches an aquifer by surface infiltration and where there is a downward component of hydraulic head (pressure head), is considered a recharge area. The likelihood that water will infiltrate and pass through the surface materials to recharge the underlying aquifer system (recharge potential) is dependent on a number of relatively static (non-changing) physical conditions. These conditions include:

- Soil permeability
- Surficial geologic materials
- Depth to water
- Topography

For this preliminary study, only existing information was used to evaluate the occurrence of these physical conditions in Snohomish County. Due to the scale of mapping (1 inch = 7 miles) for this study, the depth to water and topography criteria were not used. In addition, only the recharge potential of the uppermost water bearing zone was evaluated. The presence of a downward component of hydraulic head cannot be determined without extensive research on water levels, well completion, and well location data. In order to provide a conservative estimate, a downward component of hydraulic head was assumed to be present in all areas.

The specific approach used to evaluate the physical conditions are described briefly below for each condition (criterion).

(1) Soils

The recharge potential of the surface material (soils) was mapped by grouping soil units as defined by the Soil Conservation Service (SCS) on the general soil map for Snohomish County (Soil Survey of Snohomish County Area 1983), by general recharge potential classifications. These classifications are based on the permeabilities of each soil unit, as defined by the SCS. A summary of the soil map units and their interpreted recharge potential classification is provided in Table IV-2. Because the soil units on the general soil map consist of more than one kind of soil type, each with varying permeabilities, it provides only a broad estimate of the recharge potential of the soil materials in any specific area.

(2) Geologic Materials

Information on the surficial geologic materials was obtained from USGS geologic maps. The relative recharge potential of each major geologic unit in the study area was classified using a conservative approach that assumes internal uniformity of each unit. For example, glacial outwash will have a relatively high recharge potential, even though in some areas, the outwash materials are fine-grained and may not permit a significant amount of recharge. The relative recharge potential of geologic materials in the Snohomish County study area are provided in Table IV-3.

B. Mapping Rationale

Each criterion in a given area was subdivided into a number of potential conditions which are present in the study area. Each condition was

assigned a qualitative rating factor of low, moderate, or high to describe its relative recharge potential. The relative recharge potential of any one area compared to another area was determined qualitatively based on the combined recharge potential rating of the two physical criteria. After the combined rating scores were determined for each portion of the study area, a composite map was prepared which shows the surficial material in Snohomish County with relatively high surface recharge potential (Figure IV-5).

Because of the importance of groundwater to many areas within Snohomish County, and the preliminary nature of the surface recharge potential maps, an additional non-physical criterion (conformance with Sole Source Aquifer criteria) was used to prepare a critical aquifer recharge area map (Figure IV-6). This map incorporates all the high potential recharge areas shown on Figures IV-2 and IV-3 and the areas included in the Cross Valley, Newberg, and Tulalip Sole Source Aquifer petitions.

C. Mapping Limitations

Since the recharge potential maps are based on limited existing and generalized information it is meant for general planning rather than a basis for site specific decisions. No investigation thorough enough to describe all geologic/hydrogeologic conditions of interest in a given study area has been conducted. Actual recharge conditions in a specific area may vary from those shown on Figures IV-5 and IV-6, and such differences will be a result of the limitations of the data, scope of work, and budget for this project.

Table IV-1

Major Hydrostratigraphic Units in Snohomish County

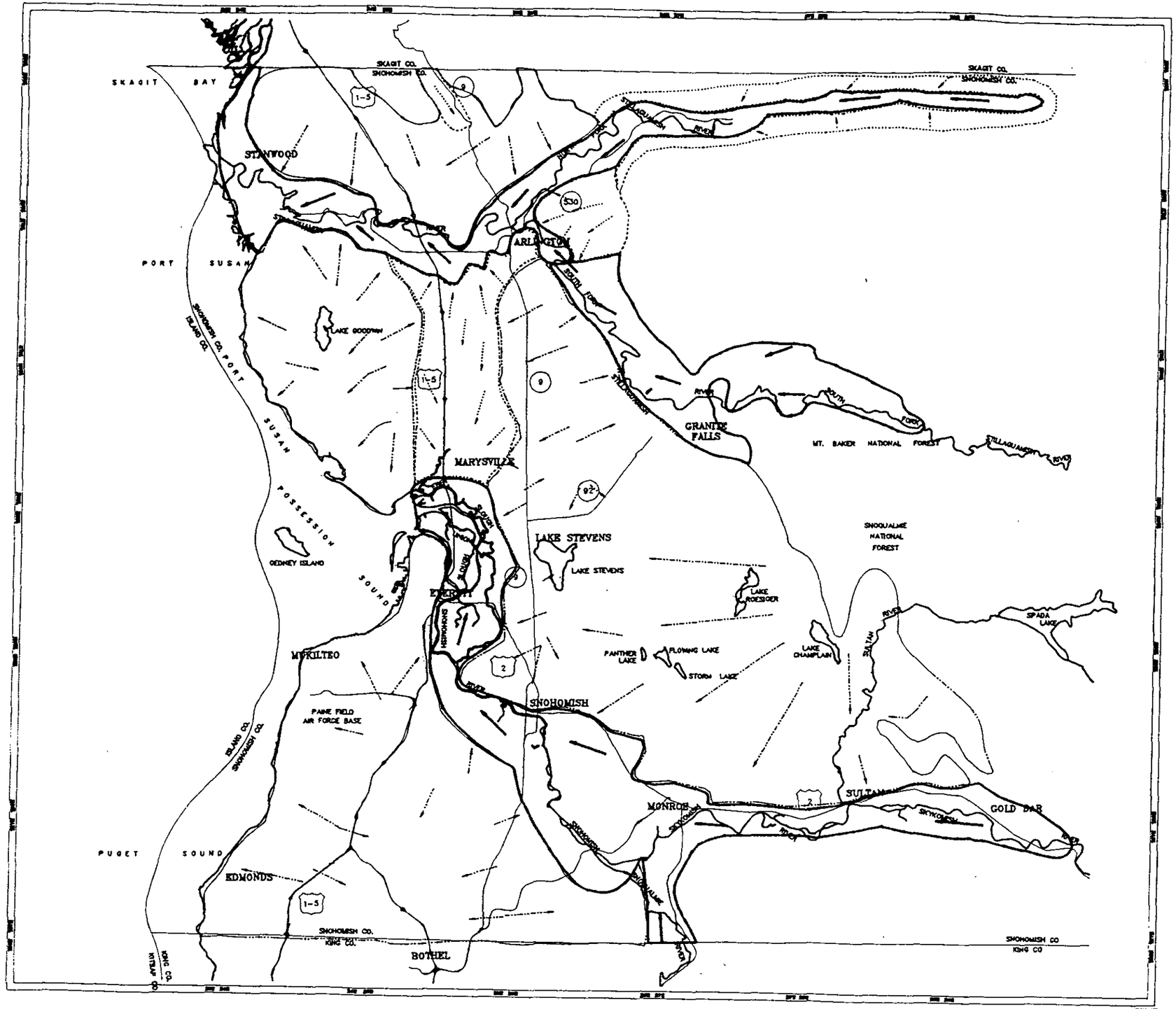
Hydrostratigraphic Unit	Ground Water Conditions
Alluvium and Recessional Outwash	Discontinuous perched aquifers Most vulnerable to contamination Locally significant water supply source
Vashon Till	Generally an aquitard Provides some protection for deeper aquifers
Advance Outwash	Major regional aquifer system Primary water supply source Locally high vulnerability to contamination
Transitional Beds	Aquitard Provides significant protection for deeper aquifers
Olympia Gravel	Minor aquifer Vulnerable to salt water intrusion along coast
Possession Drift	Aquitard
Whidbey Formation	Minor aquifer
Double Bluff Drift	Aquitard
Pre-Double Bluff Sediments	Minor aquifer
Bedrock	Minor aquifer Naturally occurring contamination

TABLE IV-2
SOIL RECHARGE POTENTIAL

Soil Map Units	Relative Recharge Potential
Puget-Sultan-Pilchuck	Low-Moderate
Norma-Lynnwood-Custer	Moderate
Alderwood-Everett	Moderate
Tokul-Pastik	Low-Moderate
Elwell-Olomount-Skykomish	High
Getchell-Oso	Moderate

TABLE IV-3
GEOLOGIC MATERIALS RECHARGE POTENTIAL

Geologic Units	Relative Recharge Potential
Younger Alluvium	High
Recessional Outwash	Moderate-High
Vashon Till	Low
Advance Outwash	High
Bedrock	Low



UPPER AND INTERMEDIATE AQUIFERS

- GROUND WATER DIVIDE
- GROUND WATER FLOW DIRECTION
- ALLUVIAL
- RECESSIONAL OUTWASH
- ADVANCE OUTWASH

NOTE : LOCAL FLOW PATTERNS MAY VARY SIGNIFICANTLY FROM THE REGIONAL FLOW DIRECTIONS

N

0 10000 20000 30000
SCALE (ft)

Sweet-Edwards EMCON

Figure IV - 1
SNOHOMISH COUNTY
GENERALIZED REGIONAL GROUND WATER FLOW DIRECTIONS

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PROJECT NO
w890101

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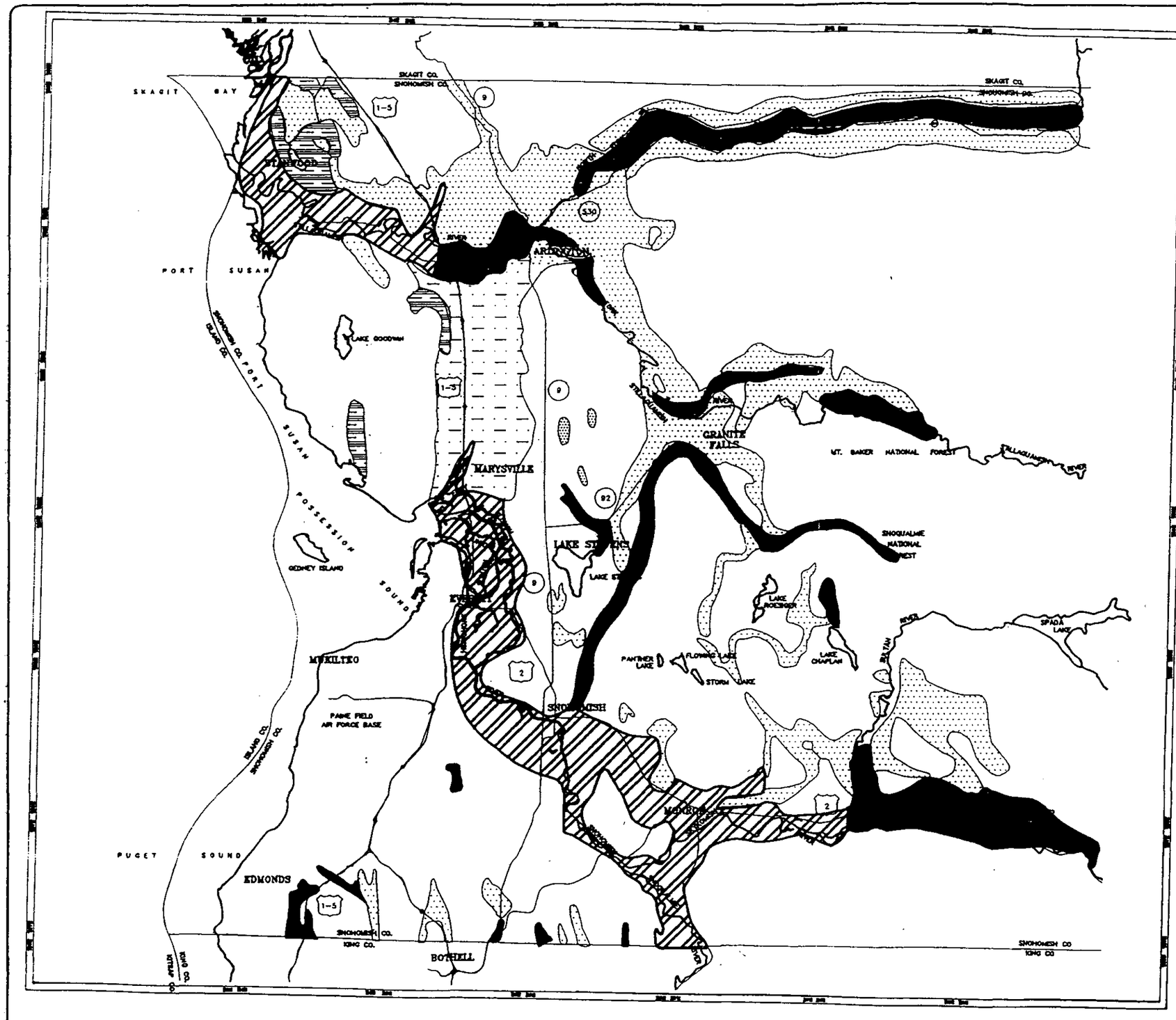
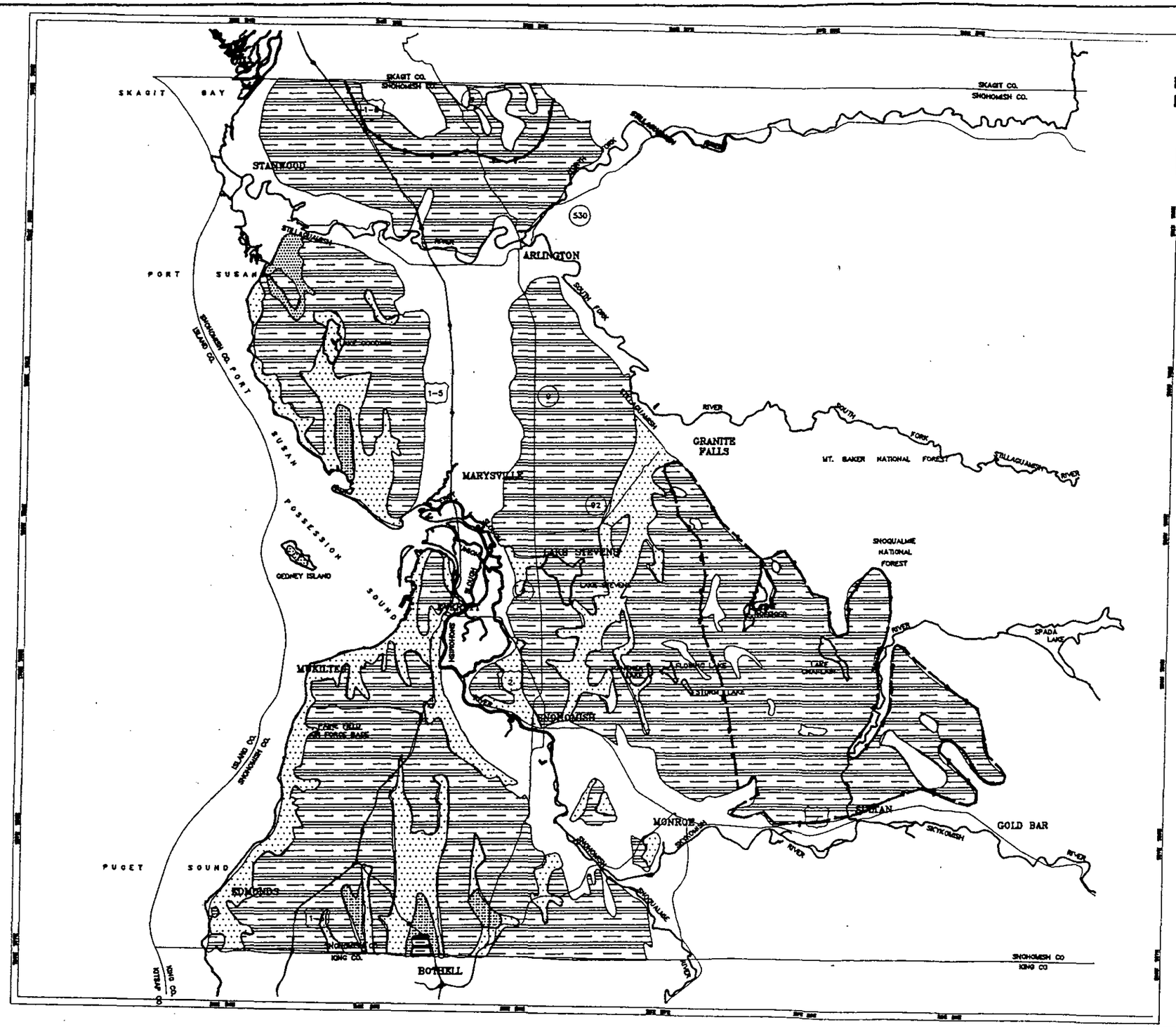


Sweet-Edwards EMCON

Figure IV -2
SNOHOMISH COUNTY
SURFACE RECHARGE POTENTIAL OF SHALLOW AQUIFERS



Sweet-Edwards
EMCON

Figure IV-3
SNOHOMISH COUNTY
SURFACE RECHARGE POTENTIAL
OF INTERMEDIATE
(ADVANCE OUTWASH)
AQUIFERS

CADD FILE: EES\SNOBA4IR\2/13/91

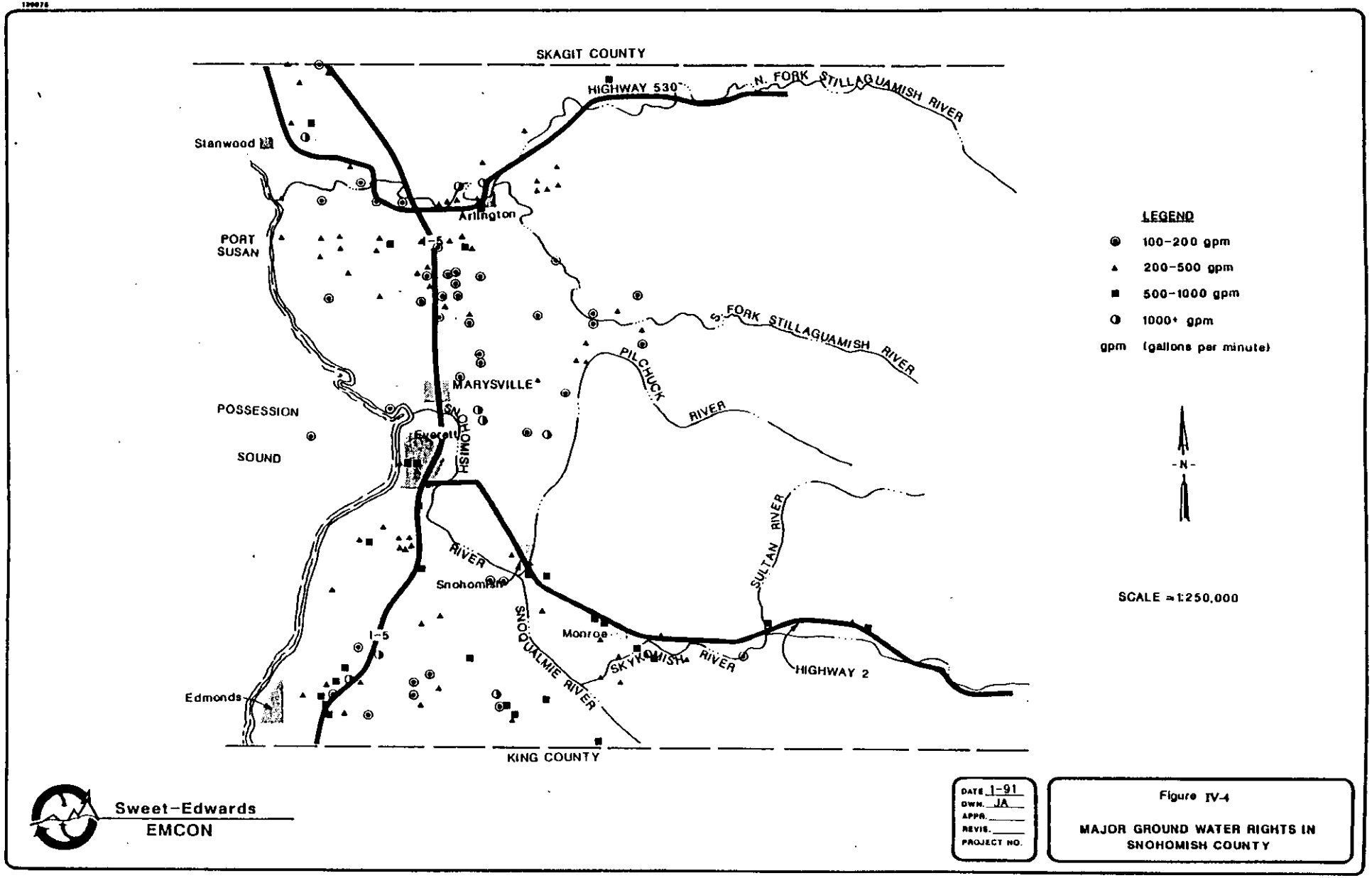


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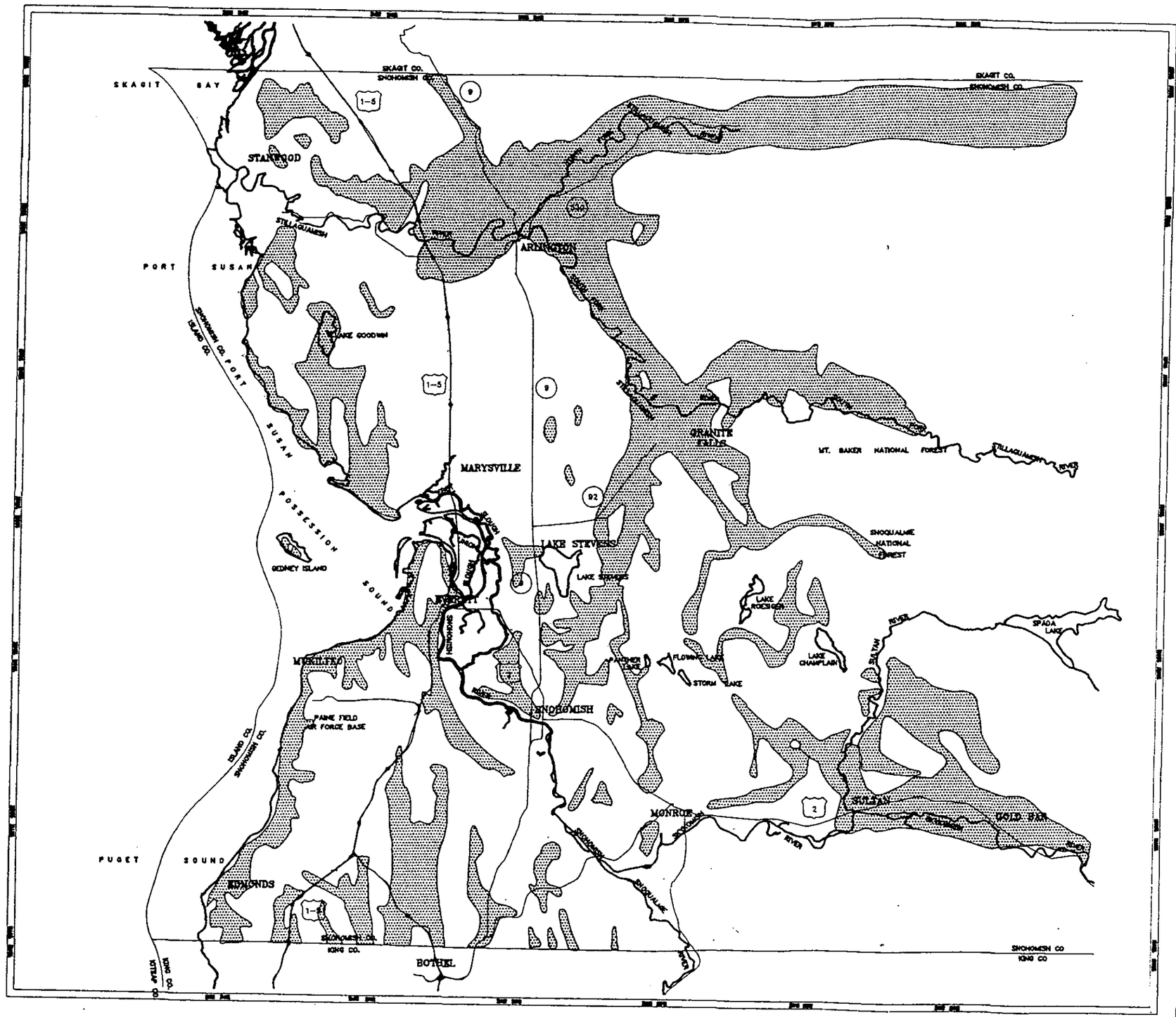
Figure IV-4

MAJOR GROUND WATER RIGHTS IN SNOHOMISH COUNTY

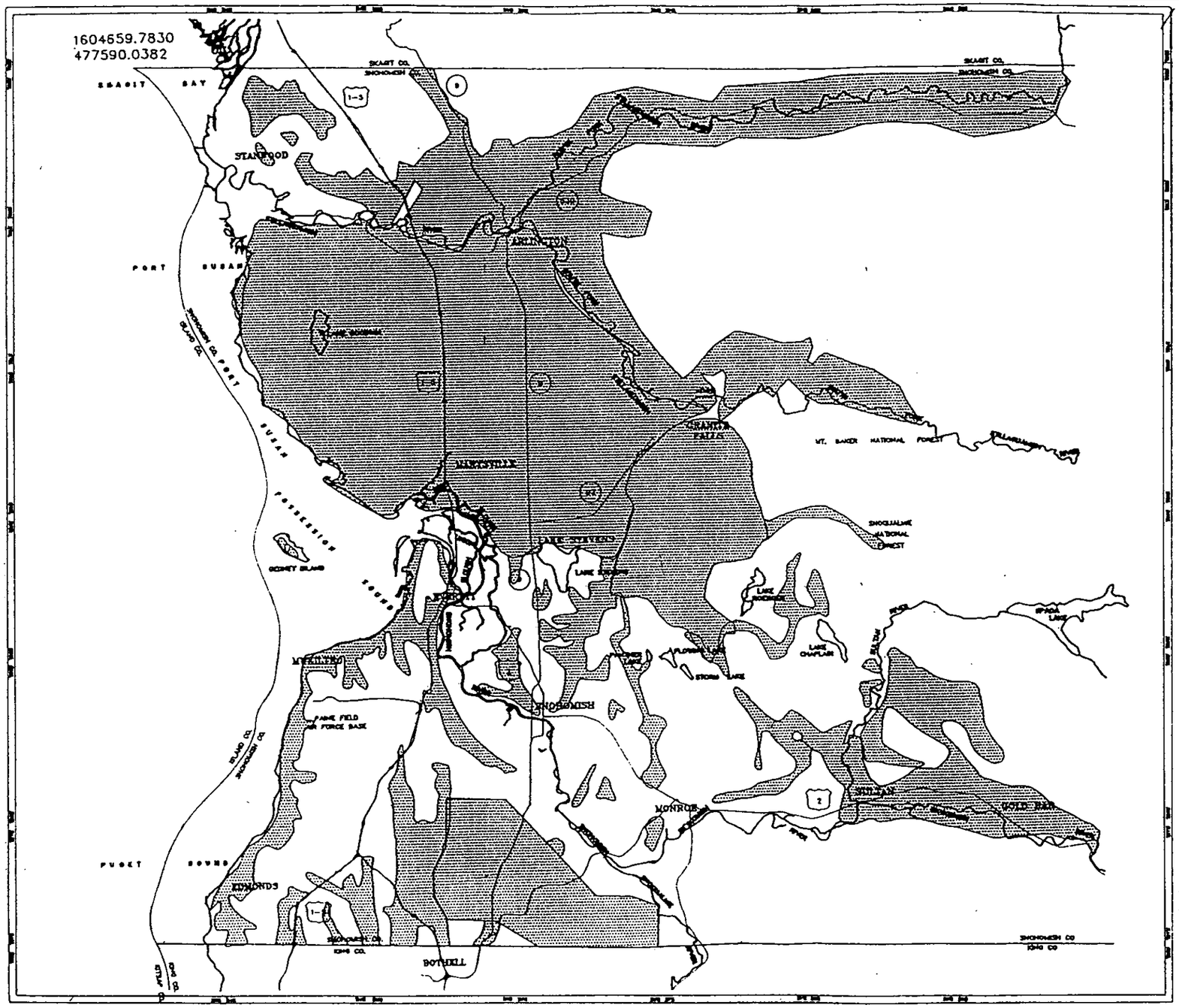


Sweet-Edwards EMCON

Figure IV - 5
SNOHOMISH COUNTY
HIGH SURFICIAL RECHARGE AREAS

139075

1604659.7830
477590.0382



HIGH SURFACE RECHARGE AREAS

N

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DATE 7-91
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REVIS.
PROJECT NO.

Figure IV-6
SNOHOMISH COUNTY
CRITICAL AQUIFER RECHARGE AREAS

SECTION V

ECONOMIC AND
ENGINEERING
SERVICES, INC.

SECTION V

AQUIFER VULNERABILITY

The vulnerability of Snohomish County's groundwater resources to contamination is related to both hydrogeologic conditions and land uses. In order to evaluate the overall risk to groundwater county-wide, Sweet-Edwards/EMCON, Inc. developed a preliminary qualitative aquifer vulnerability rating system.

These criteria were developed to assist Snohomish County staff in evaluating the relative potential risks to groundwater quality from land use activities. For this study, criteria have been applied on a regional scale using existing information and concentrating on those areas considered to have a high recharge potential (Figure IV-5). Since hydrogeologic systems are complex and include a great many interrelated variables, a considerable amount of data and experience are required to properly evaluate hydrogeologic systems and their susceptibility to contamination. These criteria focus solely on basic regional hydrogeologic information and specific land use activities or conditions. They are general guidelines for evaluating aquifer vulnerability county-wide, and should not be construed as:

- Sole and complete grounds for changing or restricting land use activities in a specific area
- Proof that groundwater contamination will or will not occur

Site- or area-specific evaluations should be performed by qualified professionals to verify the applicability of the regional vulnerability classification.

1. CRITERIA DEVELOPMENT

The hydrogeologic land use criteria categories to be considered in evaluating aquifer vulnerability include:

aquifer separation

depth to groundwater

aquifer material

beneficial use of groundwater

waste disposal sites

hazardous waste sites

septic tank density

transportation corridors

land use zoning

Each rating criterion was further subdivided into a number of potential hydrogeologic or land use conditions that may be present in a certain area of the county. These conditions were then assigned a qualitative rating factor from one to five, with one being the lowest risk and five being the highest. In addition, each rating criterion was given a factor multiplier depending on its relative risk importance compared to the other rating categories. The factor multipliers ranged from one to three. Table V-1 shows the rating factors and factor multiplier for each rating criterion. A brief discussion for the rationale of each rating factor is given below.

A. Aquifer Separation

In many areas of Snohomish County, shallow aquifers overlay intermediate or deeper aquifer systems. In many cases aquitards separate the aquifers. Aquitards are geologic units that exhibit sufficiently low permeabilities, preventing the yield of water to wells and inhibiting the flow of water and contaminants between aquifers.

The areal extent of aquitards is often limited and in places may be absent. Where an aquitard is absent, aquifers may be in direct hydraulic connection, increasing the potential vulnerability of the overall aquifer systems. This condition of hydraulic connection between adjacent aquifers, was given the highest rating factor. Where aquitards appear continuous, the potential vulnerability is lower and the rating factor was reduced.

B. Depth to Groundwater

The depth to the water table is proportional to the potential for groundwater contamination. The deeper the groundwater, the greater the opportunity for contaminant attenuation in the unsaturated zone. Contaminants may be decomposed or held fixed in the soils and sediments above the water table, unable to move downward into aquifers.

The water table that is referred to in this category is the regional water table and not groundwater perched seasonally in shallow surficial soils.

C. Aquifer Material

This category addresses the earth materials beneath the site and considers their permeability and the potential for contaminant attenuation. For example, unconsolidated coarse-grained material (e.g., gravel) would have a high permeability and little or no capacity for decomposing or storing attenuating contaminants (e.g., sorption, cation exchange capacity, and so forth). A fine-grained material such as clay or till would retard the downward movement of water and attenuate selected potential contaminants, particularly heavy metals.

D. Beneficial Use

Many areas of Snohomish County are heavily dependent on groundwater for potable water, while other areas obtain their supplies from surface water sources. The dependance of an area on groundwater to meet its water supplies determine the relative importance of an aquifer compared to other areas where alternative supply sources are available. All other risks being equal, an area with no feasible alternative sources of water is much more vulnerable to the potential impacts, particularly economic, from land use activities than is an area like the city of Everett, which has an existing surface water source.

E. Waste Disposal Sites

Certain land use activities carry a much higher risk to groundwater. Solid waste disposal facilities, particularly older ones, have historically been placed in areas where potential impacts to groundwater are high. Today, technology and strict regulatory requirements have greatly reduced the risk to groundwater from new solid waste facilities. The relative aquifer vulnerability from a solid waste facility can be related to such factors as age, construction, and closure conditions. The highest-risk sites were considered to be active or closed unlined and uncapped landfills. The rating factor for each site was applied to the entire area within a one-mile radius of the site.

F. Hazardous Waste Sites

Similar to solid waste facilities, hazardous waste sites pose a relatively high potential threat to groundwater quality. For this evaluation, hazardous waste facilities listed on Department of Ecology (Ecology)'s draft list (November 15, 1989) were used to evaluate aquifer vulnerability. Sites where Ecology has evidence that hazardous substances have been released to the environment (confirmed site) pose the greatest risk to underlying aquifers. As with the solid waste sites, the

rating factor for a hazardous waste site was applied to the entire area within a one-mile radius of the site.

G. Septic System Density

Septic systems present a potential threat to underlying aquifers, particularly in areas where groundwater is shallow and geologic materials favor rapid infiltration and have limited attenuation capacities. For this study, septic tank densities were derived from current land use zoning patterns. Areas zoned as Urban had the potential for the highest septic tank densities. Forested areas had the lowest potential. Since some of the Urban zoned areas are served by sewers, this method is a conservative approach, which is somewhat balanced by the low weighting factor given to this criteria.

H. Transportation Corridors

Traffic accidents involving hazardous waste represent a significant, though infrequent, risk to groundwater quality. State-wide information suggests that approximately 1 in 10,000 reported motor vehicle collisions involve vehicles transporting hazardous waste. Actual accident rates vary from roadway to roadway depending on speed limit, traffic load, and highway conditions. In Snohomish County, highways, roads, and railroads were divided into three categories depending on their relative importance as a transportation route. Roads such as interstates and major state highways were classified as primary transportation corridors; these present the greatest potential risk. Areas served by roads that normally handle only local residential traffic were considered the lowest risk.

I. Land Use

Land use activities can have a significant impact on groundwater quality. As population grows, consumption of groundwater will increase, particularly if alternative sources are not sufficient to meet demands. The risk of contamination of groundwater resources is likely to increase as development densities increase.

Using general zoning information from the Snohomish County Planning Department, aquifer vulnerability factors were assigned to each of the four major land uses. Urban areas were given the highest (greatest risk) rating factor, while forested areas were assigned the lowest rating factor. No attempt was made to evaluate land use activities actually occurring in any of the zoning areas.

2. GENERAL AQUIFER VULNERABILITY CONDITIONS

Applying the vulnerability rating criteria to the critical aquifer recharge areas in the Snohomish County study area resulted in a range of rating scores from 28 to 81 points. The highest possible score was 100. The distribution of scores was evaluated and a population mean (52) and median (52) score calculated. Based on the distribution of the data (Figure V-1) the scores were than placed in one of three vulnerability categories:

Low	< 41
Moderate	41 - 58
High	> 59

The relative aquifer vulnerability for the Snohomish County study area is shown on Figure V-2. The results show general moderate aquifer vulnerabilities on most of the critical aquifer recharge areas. Areas of highest vulnerability occur near Urban areas (Everett, Granite Falls, Arlington, Sultan, and Goldbar) and along Interstate 5.

Again, because of the regional nature of the data used, the results can only be expected to represent an initial attempt at defining aquifer vulnerability in Snohomish County. As more area-specific data are available and can be evaluated, some high-vulnerability areas will likely be delineated in areas shown in this study as having low- or moderate-vulnerability. Conversely, some of the high-vulnerability areas will be determined to be at a lower risk than shown in Figure V-2.

Table V-1

Aquifer Vulnerability Rating Criteria

Rating Criteria Categories	Rating Factor	Factor Multiplier
Aquifer Separation:		x2
None	5	
Discontinuous	3	
Continuous	1	
Depth to Ground Water		x2
0 - 10 feet	5	
10 - 50 feet	4	
50 - 100 feet	3	
100 - 200 feet	2	
200+ feet	1	
Aquifer Material		x2
Coarse sand and gravel	5	
Fine to coarse sand	4	
Fine sand and silt	3	
Bedrock	2	
Beneficial Use		x3
Sole source aquifer	5	
Primary water supply aquifer	4	
Secondary water supply aquifer	3	
Minor water supply aquifer	2	
Waste Disposal Site Present		x2
Active old facility (unlined and uncapped)	1	
Active new facility (lined)	5	
Hazardous Waste Site Present (MTCA Site)		x3
Confirmed site	5	
Potential hazardous waste site	3	
No hazardous waste found	1	
Septic System Density:		x1
3+/acre	5	
1 - 2/acre	3	
1/5+ acre	1	
Transportation Corridors:		x3
Primary	5	
Secondary	3	
Local	1	
Land Use		x2
Urban	5	
Transitional	3	
Rural	2	
Forested	1	

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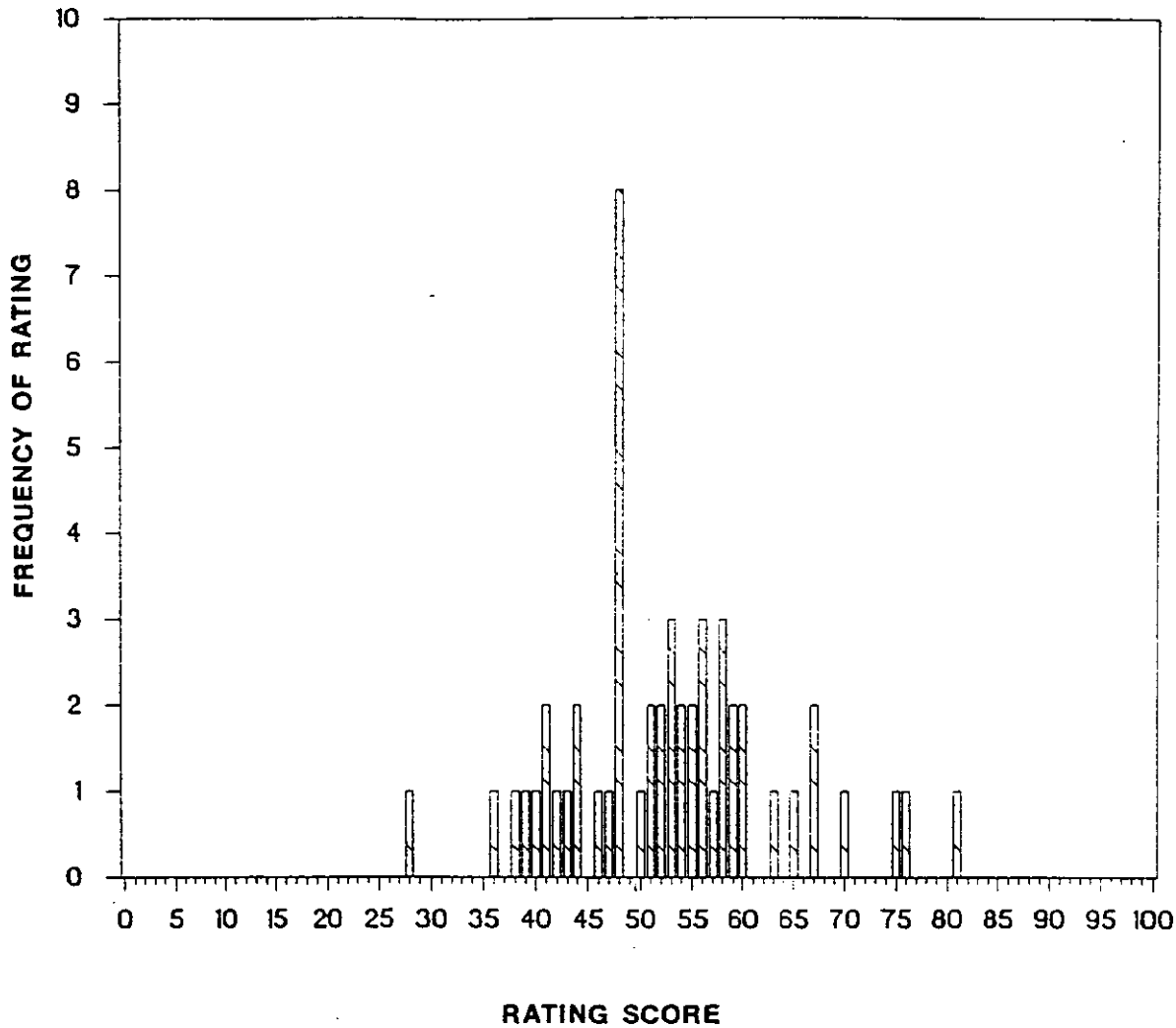

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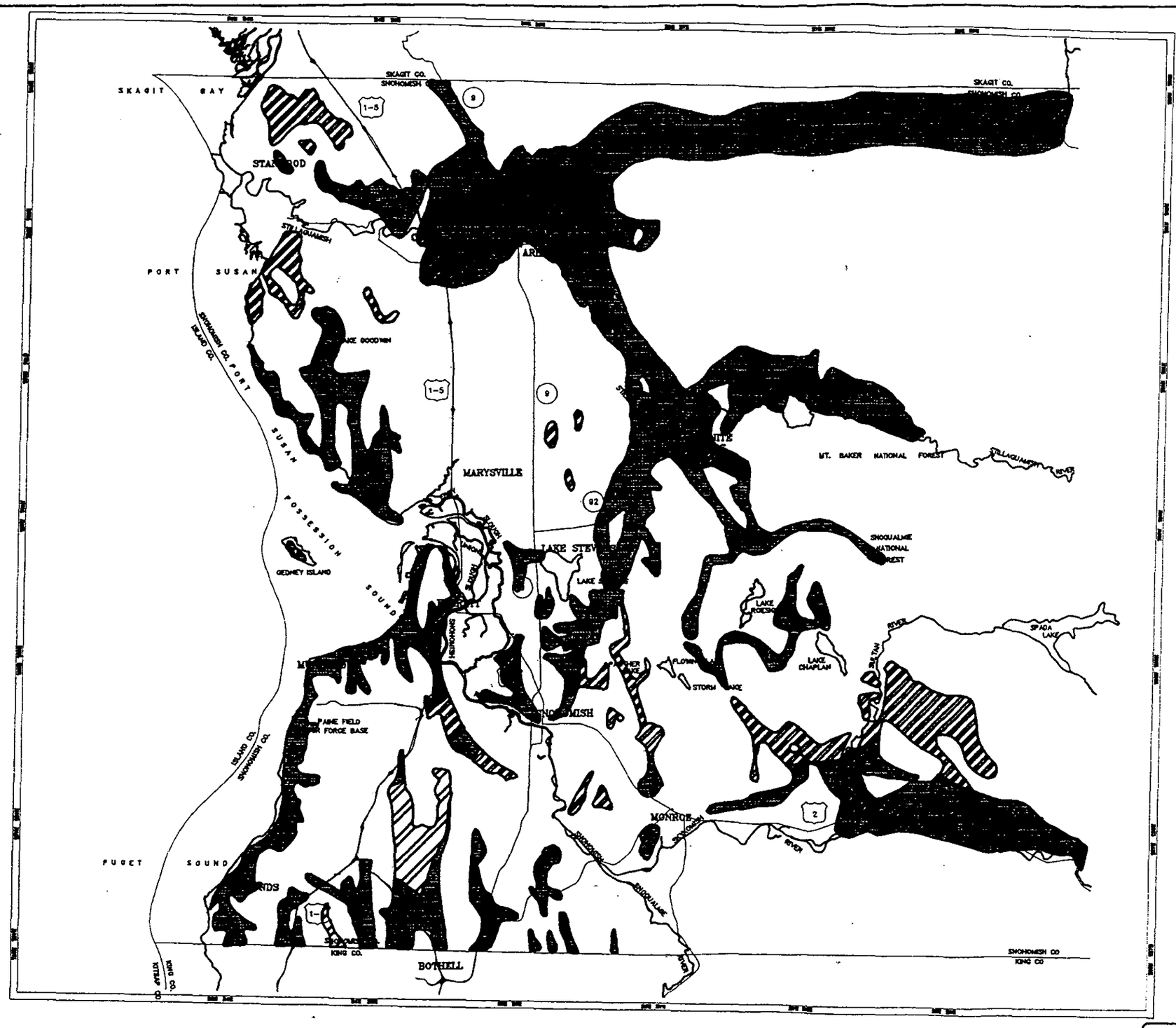
REVIS.
PROJECT NO. W8901.01

Figure V-1

DISTRIBUTION OF AQUIFER VULNERABILITY RATING SCORES



AQUIFER VULNERABILITY RATING

- HIGH
- MODERATE
- LOW
- NOT RATED

N

0 10000 20000 30000
SCALE (ft)

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Figure V-2
SNOHOMISH COUNTY
AQUIFER VULNERABILITY

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SECTION VI

ECONOMIC AND
ENGINEERING
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SECTION VI

GROUNDWATER QUALITY

Overall groundwater quality for the study area is good to excellent. Groundwater quality can be impacted by both natural and man-made constituents. The level of natural constituents can be impacted by both surface and subsurface conditions. Factors which plan an important role in determining the concentration of natural constituents in groundwater include:

- Aquifer permeability
- Amount of precipitation
- Concentration of leachable natural constituents in the soil or rock medium
- Age of groundwater

Natural constituents are widespread, but severely impact the water quality only in selected areas. The natural constituent levels are not expected to change significantly over time or with changing land use.

The manmade constituents are generally restricted to areas of urban, industrial, agricultural, and transportation corridor land uses. Constituent levels and water quality may change with changing land use practices. Natural and man-made constituents in groundwater can affect both the aesthetic and health related aspects of groundwater (Primary and Secondary Drinking Water Standards). Secondary water quality standards regulate the allowable concentration of constituents which can affect the aesthetic quality of water. For instance, iron has a secondary standard because it can affect the taste of water and also stain porcelain fixtures. Manganese tends to precipitate in pipes which reduces their ability to transmit water, also a non-health related property by an undesirable property nevertheless. Primary drinking water standards refer to standards which can impact human health. Two of the most significant naturally occurring contaminants which can potentially impact human health in Snohomish County are arsenic and coliform bacteria. Examples of man- made chemicals found in Snohomish County which can affect human health are benzene, toluene, ethylene dibromide, and pentachlorophenol. Although not man-made, nitrate from agricultural activities and disposal of sewage (septic tanks) is a widespread chemical in Snohomish County which can impact human health.

A complete list of the Primary and Secondary Water Quality Standards for groundwater in Washington State is included in Appendix D.

The advance outwash and Olympia gravels more commonly have naturally elevated concentrations of iron and manganese because of lower pH and dissolved oxygen levels. For instance, 30 percent of wells tapping these aquifers on the Tulalip plateau have levels of iron and manganese that exceed secondary drinking water standards (Appendix D), up to 9.4 and 0.23 mg/l (ppm), respectively (Drost, 1983). Similar conditions may be expected for other wells installed in advance outwash and deeper deposits which occur over large portions of Snohomish County. In Snohomish County, the location of naturally occurring constituents in groundwater can be localized or widespread. For instance, organic material from existing or buried swamps or bogs will contain abundant peat, or organics. This may result in high levels of sulfur, iron, and manganese in groundwater. These compounds are introduced into the groundwater by weak organic acids from decaying organic matter dissolving minerals off soils and rock. Chlorides in groundwater occur in two forms in Snohomish County. One is from saltwater intrusion. Salt water intrusion has not been a major problem in Snohomish County, but may increase as additional withdrawals from new development occurs near the Sound. The other principal source of chlorides is naturally occurring. Chlorides or chloride that are derived from the elements presence in the soil and rock which contains the groundwater. the extent of this problem is not clear, because it primarily affects individual, unregulated water supplies. It is known that a large geographical area, lying between Granite Falls and the county's northern border, is affected by elevated chloride levels. A wide range of other naturally occurring contaminants are present in groundwater in Snohomish County. Although it is not the intent of this investigation to describe each of these conditions, it should be recognized that a regional investigation cannot define the problem given the complexity and number of variables.

Nitrates, sulfur, coliform bacteria, and manmade chemicals can be expected to be found in shallow groundwater such as in the recessional outwash, Vashon till, and alluvial sediments.

Excessively high levels of potentially toxic compounds may be derived from either natural or manmade sources in the study area. The region near Granite Falls is currently dependent on groundwater for domestic supplies. Coincidentally, the alluvial sediments, recessional Vashon till, and advance outwash aquifers occur as thin layers overlying older sedimentary and igneous-metamorphic bedrock. Many wells are completed near or below the contact with underlying bedrock. High levels, many exceeding the primary drinking water standard of 0.05 mg/L, of naturally occurring arsenic are common in the Granite Falls area and have been detected in over 70 wells up to 33 mg/l (ppm) (Figure VI-1). Between February 1988 and January 1989, the Snohomish Health District (SHD), Department of Health (DOH), Ecology, and the EPA collected monthly water samples from 25 domestic wells. The study primarily focused on evaluating the seasonal variability of the observed arsenic levels in groundwater. Results of the sampling study and subsequent statistical analysis of the data indicated that no definite seasonal variability in arsenic concentration was evident. Any variations that did occur showed that the high and low arsenic concentrations did

not occur at the same time of year in all wells (SHD, et. al., 1991). It also appears that the arsenic in groundwater can be correlated with shallow bedrock or bedrock derived sediments. Additional investigation is required before the areal extent of the arsenic contamination can be confirmed.

The potential vulnerability of Snohomish County's groundwater resources to land use activities can be illustrated with just a few of the documented incidents:

A. Coliform Bacteria

The presence of coliform bacteria often serves as an indicator of land use impacts. Although the health risks from coliform bacteria rarely involve more than intestinal discomfort, their occurrence may mean other more high risk contaminants are also present.

During the period from 1978 through 1983, inclusive, the Snohomish Health District found that 526 out of 1,315 (40 percent) of the private water systems they inspected contained coliform bacteria in excess of recommended levels.

B. Nitrates

Excessive nitrates are related to contamination from on-site sewage disposal systems and agricultural fertilizers. In high concentrations nitrate can inhibit the uptake of oxygen by red blood cells which in infants can result in a condition called "Blue Baby Syndrome".

Nitrate contamination of the Sands Mobile Home Park water system has been an ongoing concern over the past ten years. Nitrates have also been found throughout the county in private water supplies. The current levels and extent of nitrate contamination in Snohomish County has not been determined in private wells.

C. Ethylene Dibromide

Groundwater contamination with ethylene dibromide, a cancer causing chemical (carcinogen), occurred in a well in the Marysville area. The contamination may have been from gasoline leakage or from soil fumigation on the property. This water supply was also found to contain excessive levels of coliform bacteria and nitrates.

D. Benzene

Contamination of groundwater with benzene, a carcinogen, resulted in the abandonment of the Wallace River Mobile Home Park wells and the park's connection to the Startup Water District water system at considerable expense.

The contamination was a result of a leak from an upgradient underground storage tank containing hydrocarbons.

E. Pentachlorophenol

In January 1990, 2,000 gallons of pentachlorophenol, a carcinogen, mixed with oil was accidentally spilled at a wood treatment facility in Arlington. The owner of the Airway Mobile Home Park was advised by the Snohomish Health District to abandon their well and get on an alternative source of water. The Airway Mobile Home Park well tapped a shallow water table aquifer directly downgradient from the spill site.

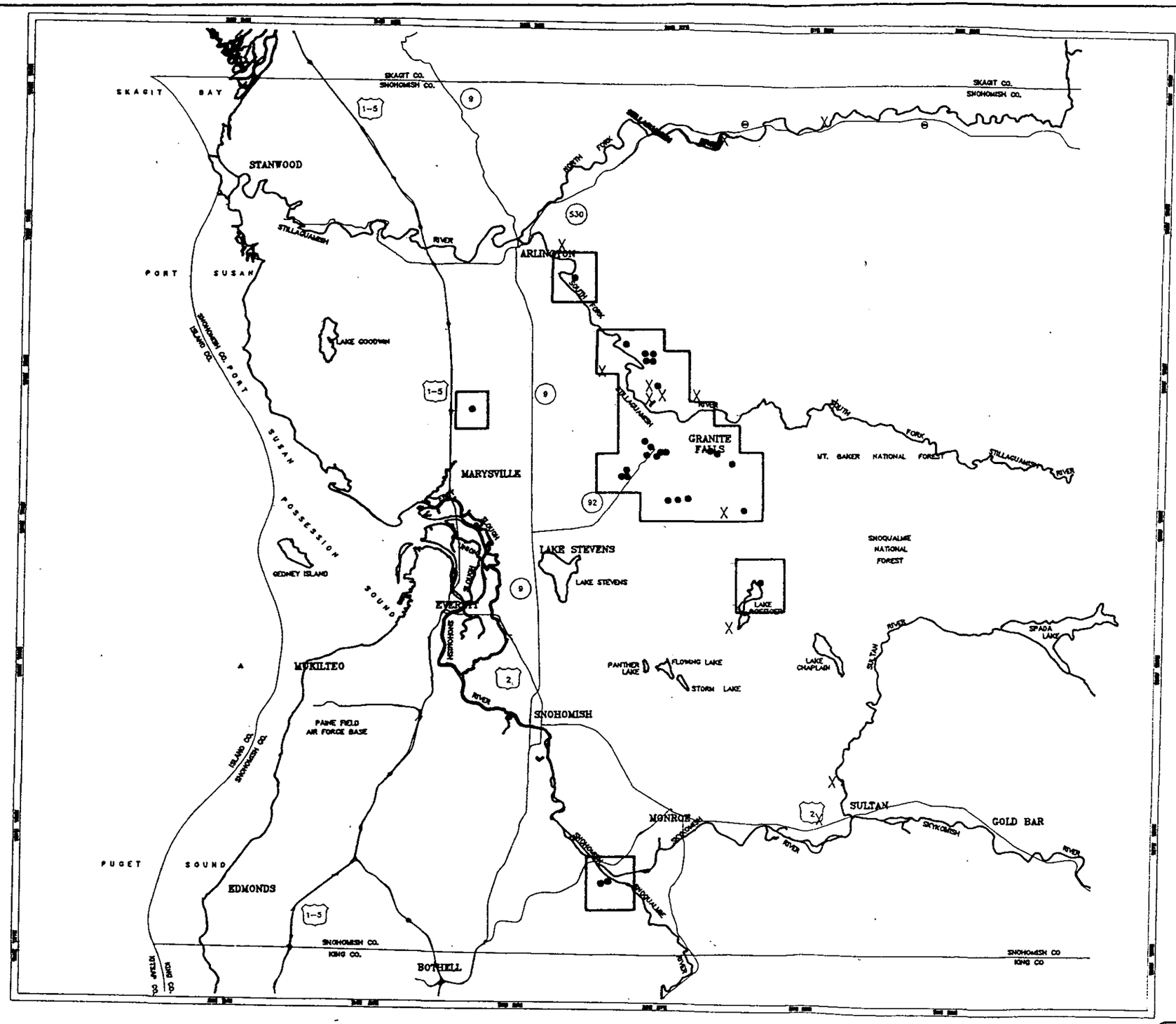

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Figure XI -1
SNOHOMISH COUNTY
ARSENIC IN GROUND WATER

SECTION VII

ECONOMIC AND
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SECTION VII

PRINCIPAL AQUIFER SYSTEMS

The regional hydrostratigraphic and geologic units described earlier in this document contain Snohomish County's principal groundwater resources and can be subdivided for this study into 15 generally distinct although not isolated aquifer systems (Figure VII-1).

1. AQUIFER AND WATER SUPPLY CHARACTERISTICS MATRIX

An aquifer and water supply characteristics matrix was prepared in order to more easily present and compare the various development characteristics of each of the water supply areas, as shown in Table VII-1. The following provides a brief discussion of each of the matrix elements.

- Aquifer significance - This matrix element provides an estimate of the importance of the aquifer as a source for a regional water supply.

- Potential well yield - This matrix element provides an estimated range in well yield for properly designed and developed wells. The potential well yield was estimated from existing well records, water rights, and hydrogeologic conditions.

- Aquifer yield - This matrix element provides an estimate of the total yield of the aquifer. The yield estimates for some aquifer systems are based in part on hydrogeologic investigations and historical monitoring of system performance under groundwater development. For other systems where limited data are available, the yield of the system was evaluated in terms of the yield characteristics of similar hydrogeologic environments. The continuous estimates represent the potential rate of withdrawal that could be developed on a sustained basis without producing significant long-term water level declines.

- Existing development - This matrix element provides an estimate of existing groundwater withdrawal from the water supply area. Groundwater withdrawal was estimated from a water use inventory of the major water purveyors and groundwater rights. The water use estimates reflect average rates of groundwater withdrawal.

- Potential development - This matrix element provides an estimate of the amount of groundwater that is potentially available for development. The estimate generally represents the difference between the total continuous aquifer yield and existing development.

- Natural recharge potential - This matrix element provides a qualitative estimate of the overall recharge to the water supply area. Shallow aquifer systems that occur within valley discharge areas were considered to have a high recharge potential. Deep aquifer systems that occur beneath upland areas were considered to have low recharge potential. The productivity of the water supply areas will be a function of the area's recharge characteristics. Areas with high recharge will generally be able to sustain larger rates of development than areas with low recharge.

- Potential development impacts - This matrix element provides a qualitative measure of the degree to which groundwater development may impact surface water features. Groundwater development from shallow unconfined aquifer systems that lie in proximity to streams, lakes, and wetlands have a high potential for impact (some measurable reduction in stream flow may occur from development). Conversely, development from deep confined aquifer systems that occur at some distances from surface water features will have a lower potential for impact (no measurable reduction in streamflow will likely occur). Impacts are of primary concern in areas where there are instream flow requirements or stream closures. In most cases, groundwater development can be managed to minimize the level of impact to surface water features.

- Water quality - This matrix element provides a qualitative measure of anticipated aquifer water quality as it relates to iron, manganese, and arsenic. Iron and manganese concentrations within Puget lowland aquifers tends to be highly variable and difficult to predict. The probability of encountering iron and manganese concentrations was rated as "high" for areas where a significant percentage of wells exceed state secondary drinking water standards (0.3 mg/l and 0.05 mg/l for iron and manganese, respectively). A "low" rating was given to areas where most wells show concentrations less than the state standards. Areas having limited data or concentrations near the state standard were given a "moderate" rating. Elevated iron and manganese concentrations can in many cases be effectively treated through blending with higher quality sources or using oxidizing agents. Arsenic ratings were based on known contamination levels in wells (Figure VI-1)(Snohomish County Health District, pers. comm.).

Collectively these aquifers supply almost all of the groundwater used for water supply in Snohomish County. Most of these aquifers face increasing threats from land use activities, such as urban growth, transportation accidents, agriculture, and waste disposal. The Intercity and Lakes aquifers contain federally designated sole source aquifers. The Tulalip and a portion of the Marysville Trough aquifers have been petitioned to the Environmental Protection Agency

(EPA) for designation as sole-source status. The EPA has determined that the Tulalip qualifies for sole-source status, but has not made a final decision at the time this document was prepared. In addition to the sole-source areas, three aquifers, The Tatoosh, East Stanwood, and Skykomish aquifers serve as the primary sources of fresh water for people living in that area. A brief description of each aquifer system, emphasizing its relative vulnerability, follows:

A. Intercity Plateau

The Intercity plateau aquifer (IPA) occurs in the advance outwash deposits and extends from just south of the Snoqualmie River into northern King County. The eastern portion of the IPA contains the federally designated Cross Valley sole-source aquifer, which is often quite productive with potential well yields up to 1,000 gpm. The direct surface recharge potential to most of IPA is low to moderate except along the western and northern flanks of the aquifer and in the center of the upland areas directly north of Bothell.

Current developmental stresses to groundwater in the IPA are low. Existing development of the aquifer is estimated at 6 MGD. Potential future aquifer development capacity is estimated to be 10-12 MGD.

Overall groundwater quality of the IPA is considered good. Elevated levels of iron and manganese occur sporadically, particularly in deeper wells, but is not usually a significant problem. Hydrogen sulfide gas may be a problem locally where wells are completed in organic-rich sediments (e.g. peat).

The potential vulnerability of the IPA to contamination from land uses is generally low to moderate except in the extreme north (Everett) and just north of Woodinville where geology and land use activities increase the risk to high. Within the IPA boundaries is the greatest concentration of urban-designated land in Snohomish County. Most of the area east of Interstate 405 and Interstate 5 is zoned Urban, and includes high-density housing (single and multi-family), commercial, and industrial facilities. West of Highway 9 land use is predominantly Rural. A number of important transportation corridors, I-5, I-405, Highway 9, and Highway 522, cross the IPA. Records indicate there are currently two active and nine inactive solid waste landfills on the IPA. Two of the landfill sites are among eleven sites within the IPA boundaries that are listed on the Department of Ecology's (Ecology) list of confirmed or suspected hazardous waste sites. There are also 335 sites in the IPA currently listed on Ecology's dangerous waste notifiers listing (DWNL).

B. Stillaguamish Aquifer

The Stillaguamish aquifer (STA) occurs in alluvial sediments along the Stillaguamish River between Arlington and a point approximately three miles east of Stanwood. The aquifer ranges from 10 to 100 feet in thickness. The estimated transmissivity and hydraulic conductivity range from 50,000 to 300,000 gpd/ft and 1,000 to 1,500 ft/day, respectively. The aquifer is in hydraulic connection with the Stillaguamish River; it receives water from and yields water to the river, depending on the river stage. The aquifer is extremely productive within sands and gravels adjacent to the river and may yield up to 2,000 gpm from large-diameter wells. The direct surface recharge potential to the STA is high.

Current groundwater developmental stresses to the STA are low. Existing development of the aquifer is estimated at 7.5 MGD. Potential future aquifer development capacity is estimated to be 15 MGD. The cities of Arlington and Marysville are currently extracting groundwater from this aquifer for municipal supplies.

Overall groundwater quality of the STA is considered good. Locally elevated levels of iron and manganese may occur. The potential vulnerability of the STA to contamination from land uses is moderate to high depending on the depth of the aquifer below ground surface.

The area has been zoned Rural, indicating low-density housing and some agriculture. One primary (I-5) and one secondary (Highway 530) transportation corridors cross over the aquifer. Records indicate that there are currently no active or inactive landfills overlying the STA. There are no sites currently listed by Ecology as confirmed or suspected hazardous waste sites and no sites on Ecology's DWNL.

C. Skykomish Aquifer

The Skykomish aquifer (SkA) occurs in the Alluvial deposits and extends east-west from Monroe to Goldbar in the Skykomish River valley. Individual wells in the aquifer may yield up to 2,000 gpm; this is an estimate since no known large-capacity wells exist. The aquifer ranges from 10 to 100 feet in thickness. The estimated transmissivity and hydraulic conductivity range from 50,000 to 300,000 gpd/ft and 1000 to 1500 ft/day, respectively. The direct surface recharge potential to most of the SkA is high. Induced recharge from the Skykomish River and other surface water bodies is a significant source of recharge during high river stages. The aquifer discharges water to the river during the summer months. Existing development of the aquifer is estimated to be 6 MGD; potential future development capacity is estimated to be four to 9 MGD.

Overall groundwater quality of the SkA is considered good. Elevated levels of iron and manganese may occur, particularly near or within pockets of organic sediments. Agricultural contaminants (nitrates, pesticides, and so forth) may be a problem locally.

The potential vulnerability of the SkA to contamination from land uses is generally high. The land above most of the SkA has been zoned as Rural. The highest population density occurs near the towns of Monroe, Sultan, and Goldbar, where the land has been zoned Urban. Transportation corridors include Highway 2 and the Burlington Northern Railroad. There are three inactive landfills overlying the SkA. There is one site listed on Ecology's list of confirmed or suspected hazardous waste sites. There are 13 sites listed on Ecology's DWNL.

D. North Stillaguamish Aquifer

The North Stillaguamish aquifer (NSA) occurs in the Alluvial deposits and extends from two miles northeast of Arlington to the vicinity of Darrington. The aquifer ranges from 10 to 100 feet in thickness. The estimated transmissivity and hydraulic conductivity range from 50,000 to 300,000 gpd/ft and 1,000 to 1,500 ft/day, respectively. The direct surface recharge potential to most of the NSA is high. Induced recharge from the North Stillaguamish River and other surface water bodies are a significant source of recharge during high river stages. The NSA discharges groundwater to the river during summer months. Existing development of the aquifer is estimated at 1 MGD. Potential future development capacity is estimated to be 10 MGD.

The overall groundwater quality of the NSA is good. As in other areas of the county elevated levels of iron and manganese may be present in localized areas.

Its potential vulnerability to contamination from land uses is generally high. The highest population density occurs in the town of Darrington. Transportation corridors include Highway 530. There are one active and three inactive landfills overlying the NSA, but no sites overlying the aquifer are listed on Ecology's list of confirmed or suspected hazardous waste sites. There are three sites listed on Ecology's DWNL.

E. South Stillaguamish Aquifer

The South Stillaguamish aquifer (SSA) occurs in alluvial and recessional outwash deposits and extends southeast from Arlington to approximately six miles east of Granite Falls, and ranges from 10 to 100 feet in thickness. The estimated transmissivity and hydraulic conductivity range from 20,000 to 300,000 gpd/ft and 250 to 1,500 ft/day, respectively. The

aquifer may yield up to 2,000 gpm from wells installed adjacent to the South Stillaguamish River in alluvial deposits, and up to 200-300 gpm in recessional outwash deposits. The direct surface recharge potential to most of the SSA is high. Induced recharge from the South Stillaguamish River and other surface water bodies is a significant source of recharge during high river stage. The SSA discharges groundwater to the river during summer months. Existing development of the aquifer is unknown. Potential future development capacity is estimated to be 5 to 10 MGD.

Overall groundwater quality of the SSA is considered good in alluvial deposits near the river. Quality decreases in the recessional outwash deposits. High levels of arsenic (above the drinking water standards) have been measured in numerous wells in the vicinity of Granite Falls. The source of contamination is likely related to natural background arsenic from bedrock.

The potential vulnerability of the SSA to contamination from land uses is generally high. The land above the SSA has been zoned Rural, except for the higher population areas near the town of Granite Falls, which have been zoned Urban. Transportation corridors include Highway 92.

There is one inactive landfill overlying the NSA. There are no sites listed on Ecology's list of confirmed or suspected hazardous waste sites. There are five sites listed on Ecology's DWNL.

F. Getchell-Snohomish Aquifer

The Getchell-Snohomish aquifer (GSA) occurs in the advance outwash deposits and extends from south of Arlington to Snohomish on the Getchell-Snohomish Plateau to the east of the Marysville Trough. The Pilchuck River valley forms the eastern boundary, although there may be some indirect hydraulic connection with the Lakes aquifer below the Pilchuck River. The aquifer ranges from fifty to several hundred feet thick. Transmissivity and hydraulic conductivity range from 25,000 to 100,000 gpd/ft and 50 to 200 ft/day respectively. The aquifer may produce well yields up to 1,200 gpm. The direct surface recharge potential to most of the GSA is low except along the western and southern margins where the advance outwash deposits are exposed at the surface. Induced recharge from surface water bodies are not a significant source of recharge. Overlying till or underlying aquifers are the primary sources of recharge. Existing development of the aquifer is estimated at 0.5 MGD. Potential future development capacity is estimated to be 0.5 to 4.5 MGD.

Overall groundwater quality of the GSA is considered to be good. elevated levels of iron and manganese occur sporadically, at levels that exceed the secondary drinking water standard.

The potential vulnerability of the GSA to contamination from land uses is generally low, except along the southern and western margins where the aquifer is exposed at the surface. The land above the GSA has been zoned Rural to the north, and Urban and Transitional to the south near Lake Stevens and Snohomish. The significant transportation corridors across the aquifer are Highway 9, Highway 92, and Highway 2 along the southern margin. There is one inactive landfill overlying the GSA (Lake Stevens landfill), which is on Ecology's list of confirmed or suspected hazardous waste sites. There are 23 sites listed on Ecology's DWNL.

G. East Stanwood Aquifer

The East Stanwood Aquifer (ESA) occurs in the advance outwash deposits and extends from northeast of Stanwood to northwest of Arlington on the plateau above the Stillaguamish River. The aquifer ranges in thickness from 50 to several hundred feet thick. Transmissivity and hydraulic conductivity range from 25,000 to 100,000 gpd/ft and 50 to 200 ft/day respectively. Individual wells in the aquifer may yield up to 1,000 gpm near the southern margins and less than 50 gpm towards the north. The direct surface recharge potential to most of the ESA is low except along the southern margins where the Advance outwash deposits are exposed at the surface. The overlying till or underlying aquifers are the primary sources of recharge. Existing development of the aquifer is estimated at 3 MDG. Potential future development capacity is estimated to be 3 MGD.

Overall groundwater quality of the ESA is considered to be good with few cases in which it exceeds water quality standards.

The potential vulnerability of the ESA to contamination from land uses is generally low, except along the southern margins where the aquifer is exposed at the surface. The land above the ESA has been zoned Rural, except in the urbanized western area near Stanwood and Cedarhome. Transportation corridors include I-5 and Highway 9. There is one inactive landfill overlying the ESA, which is on Ecology's list of confirmed or suspected hazardous waste sites. There are no sites overlying the aquifer listed on Ecology's DWNL.

H. Tatoosh Aquifer

The Tatoosh Aquifer (TaA) occurs in the recessional outwash and advance outwash deposits and is located in a narrow valley to the north of

Arlington above the North Stillaguamish River, just south of Lake McMurray and the Skagit County border. The aquifer is estimated to be 30 to 100 feet thick. Transmissivity and hydraulic conductivity are estimated at 34,000 gpd/ft and 150 to 350 ft/day, respectively (Snohomish County PUD No. 1, 1989). Individual wells in the aquifer may yield up to 1,000 gpm. The direct surface recharge potential to most of the TaA is moderate to high. Recharge from underlying aquifers is likely to be significant where fractured bedrock may supply water to the lower sediments. Existing development of the aquifer is estimated at 1.5 MGD. Potential future development capacity is estimated to be three to 4 MGD.

Overall groundwater quality of the TaA is considered good.

The potential vulnerability of the TaA to contamination from land uses is moderate. The land above the TaA has been zoned Rural and Forest. Highway 9 is the only significant transportation corridor across the aquifer. Only one inactive landfill overlies the TaA, and no sites overlying the aquifer are listed on Ecology's list of confirmed or suspected hazardous waste sites or the DWNL.

I. Tulalip Aquifer

The Tulalip aquifer (TuA) occurs in the advance outwash deposits and extends from south of Stanwood to northwest of Marysville on the Tulalip Plateau west of the Marysville Trough. The Tulalip aquifer has been studied for designation as a sole-source aquifer. It is estimated to be from fifty to several hundred feet in thickness. Transmissivity and hydraulic conductivity are estimated to range from 25,000 to 100,000 gpd/ft and 50 to 200 ft/day, respectively. The direct surface recharge potential to most of the TuA is low except along the margins where the advance outwash deposits are exposed at the surface. The overlying till or underlying aquifers are the primary sources of recharge. Existing development of the aquifer is estimated at two. Potential future development capacity is estimated to be one to four.

Overall groundwater quality of the TuA is considered to be good. Elevated levels of iron and manganese occur sporadically, at levels of up to 0.5 mg/l and 0.2 mg/l respectively (Drost, 1983).

The potential vulnerability of the TuA to contamination from land uses is generally low, except along the southern margins where the aquifer is exposed at the surface. The land above the TuA has been zoned Rural, except in the semi-urbanized northeastern area near Lake Goodwin. There are no significant transportation corridors across the aquifer. There is one inactive landfill overlying the Tua, which is also on Ecology's

list of confirmed or suspected hazardous waste sites. There does not appear to be any sites listed on Ecology's DWNL.

J. Pilchuck Aquifer

The Pilchuck aquifer (PA) occurs in the Alluvial deposits and extends south from Granite Falls to one mile southeast of Snohomish in the narrow Pilchuck River valley. A portion of the aquifer crosses the Newburg sole source aquifer. The aquifer is estimated to be 10 to 100 feet in thickness. Transmissivity and hydraulic conductivity are estimated at 25,000 to 75,000 gpd/ft and 250 to 1500 ft/day, respectively. Individual wells in the aquifer may yield up to 1,500 gpm, although this is an estimate since no known large-capacity wells exist. The direct surface recharge potential to most of the PA is high. Induced recharge from the Pilchuck River and other surface water bodies may be a significant source of recharge during high river stages. The PA will discharge groundwater to the river during summer months. Recharge from underlying aquifers may be significant where the alluvial deposits are in contact with advance outwash sediments. Existing development of the aquifer is estimated to be 1 MDG. Potential future development capacity is estimated to be 5 MGD.

Overall groundwater quality of the PA is considered good. A moderate-to-high potential for arsenic contamination exists due to the shallow depth to bedrock in some areas.

The potential vulnerability of the PA to contamination from land uses is generally high. The land above PA has been zoned as Rural. The highest population density occurs near the towns of Snohomish, Granite Falls, and Machias. The primary transportation corridor is the Snohomish-Machias Road.

There is one inactive landfill overlying the PA, which is also listed on Ecology's list of confirmed or suspected hazardous waste sites. There are no sites listed on Ecology's DWNL.

K. Marysville Trough Aquifer

The Marysville Trough aquifer (MTA) occurs in the recessional outwash deposits and extends from Arlington and the Stillaguamish River on the north to Marysville and the Snohomish River to the south. The aquifer is bounded on the east and west by the Getchell-Snohomish and Tulalip plateaus, respectively, and range from 10 to 150 feet in thickness. Transmissivity and hydraulic conductivity range from 10,000 to 50,000 gpd/ft and 50 to 200 ft/day, respectively. Individual wells in the aquifer may yield up to 300 gpm. The direct surface recharge potential to most of

the MTA is high except in deeper levels of the aquifer. Induced recharge from surface water bodies is a significant source of recharge at shallow levels during wet months. Recharge from underlying aquifers may be significant along the eastern and western boundaries of the aquifer where sediments are in contact with the advance outwash deposits. Existing development of the aquifer is estimated at 3 MGD. Potential future development capacity is estimated to be 2 MGD.

Overall groundwater quality of the MTA is considered fair. Elevated levels of iron and manganese occur sporadically, particularly in deeper sediments. Elevated levels of chloride may be a problem near the Snohomish River.

The potential vulnerability of the MTA to contamination from land uses is generally high. The land above the MTA has been zoned either Urban, Rural (in the northeast), or Transitional (in the northwest). The population density is highest in the vicinity of Marysville and along I-5. Transportation corridors include I-5 and the Burlington Northern Railroad running across the center of the aquifer. There are one active and five inactive landfills overlying the MTA, with four sites listed on Ecology's list of confirmed or suspected hazardous waste sites. There are 83 sites overlying the aquifer listed on Ecology's DWNL.

L. Lakes Aquifer

The Lakes aquifer (LA) occurs in the advance outwash deposits and extends from south of Granite Falls to Monroe, bordered by the Pilchuck River valley on the west, and extending southeast to Goldbar above the Skykomish River valley. The LA becomes thinner and discontinuous to the east and has an indefinite eastern boundary where depth to bedrock is shallow. There may be some indirect hydraulic connection with the Getchell-Snohomish aquifer below the Pilchuck River. The Newburg sole-source aquifer has been designated for the northern portion of the LA. The aquifer is estimated to be fifty to several hundred feet in thickness. Transmissivity and hydraulic conductivity are estimated at 25,000 to 200,000 gpd/ft and 100 to 500 ft/day, respectively. Wells completed in the aquifer may yield up to 1,200 gpm. The direct surface recharge potential to most of the LA is low except along the western and southern margins where the advance outwash deposits are exposed at the surface. Recharge from the overlying till or underlying aquifers is the primary source of recharge. Existing development of the aquifer is unknown, but is estimated to be 0.25 MGD. Potential future development capacity is estimated to be one to 3 MGD.

Overall groundwater quality of the LA is considered to be good. Elevated levels of iron and manganese occur sporadically at levels above the secondary drinking water standards.

The potential vulnerability of the LA to contamination from land uses is generally low, except along the southern and western margins where the aquifer is exposed at the surface. The land above the LA has been zoned Rural except around the major lakes of the plateau where it is Transitional. Except for Highway 2 along the southern margin there are no significant transportation corridors across the aquifer. Three inactive landfills overlie the LA. There are four DWNL sites overlying the aquifer.

M. North Arlington Aquifer

The North Arlington aquifer (NAA) occurs in the recessional outwash deposits and is located on a terraced upland to the north of Arlington above the North Stillaguamish River. It ranges from 10 to 100 feet in thickness. Transmissivity and hydraulic conductivity range from 10,000 to 50,000 gpd/ft and 50 to 200 ft/day, respectively. Wells completed in the aquifer may yield up to 200 gpm. The direct surface recharge potential to most of the NAA is high. Existing development of the aquifer is estimated at 1.5 MGD, with potential future development capacity estimated to be 1.5 MGD.

Overall groundwater quality of the NAA is not known but is considered good.

The potential vulnerability of the NAA to contamination from land uses is generally high. Land above the NAA has been zoned Rural, except in the vicinity of Bryant. Highway 9 is the only significant transportation corridor across the aquifer. Only one inactive landfill overlies the NAA. There is one site on Ecology's list of confirmed or suspected hazardous waste sites.

N. Arlington Heights Aquifer

The Arlington Heights aquifer (AHA) occurs in the recessional outwash deposits and is located on a terraced upland east of Arlington above the North and South Stillaguamish rivers. The aquifer ranges from 10 to 100 feet in thickness. Transmissivity and hydraulic conductivity range from 10,000 to 50,000 gpd/ft and 50 to 200 ft/day, respectively. Individual wells in the aquifer may yield up to 200 gpm. The direct surface recharge potential to most of the AHA is high. Existing development of the aquifer is estimated at 1.5 MGD, with potential future development capacity estimated to be 1.5 MGD.

Overall groundwater quality of the AHA is considered good.

The potential vulnerability of the AHA to contamination from land surface activities is generally high. The land above the AHA has been zoned Rural. There are no significant transportation corridors across the aquifer, and no active or inactive landfills overlying the AHA.

O. Deep Aquifers

The Deep aquifers (DA) occur in the coarser sediments of the underlying Olympia gravel deposits. Information available on the characteristics of the aquifers is limited to a few deep wells and borings along the coastal margins of the Tulalip and Intercity plateaus. The extent and thickness of the deep aquifers is unknown although it is possibly 100 to 200 feet in thickness. The aquifers may produce well yields up to 200 to 300 gpm. The direct surface recharge potential to most of the DA is low. Existing development of the aquifers is unknown, but is not expected to exceed 0.25 MGD. Potential future development capacity is unknown, but could be in the range of one to 6 MGD.

Table VII-1
Aquifer Characteristics of Western Snohomish County

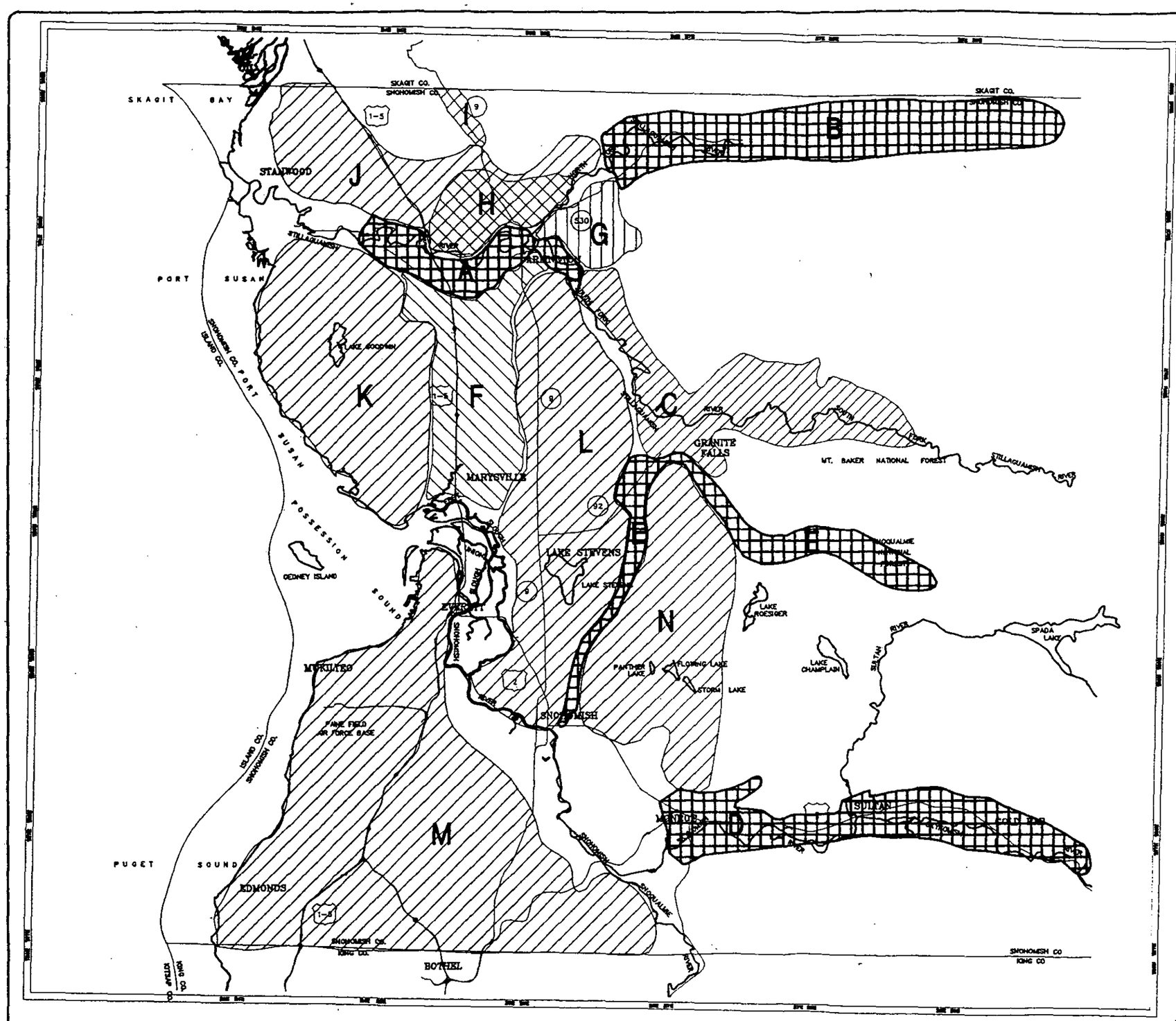
Aquifer	Figure VII-1 Map Symbol	Aquifer Significance	Regional Aquifer System **	Hydrostratigraphic Unit	Depth to Water (feet)	Potential Well Yield (gpm)	Estimated Aquifer Yield (MGD)	Existing Development of Aquifer (MGD)	Potential Development of Aquifer	Natural Recharge Potential	Potential Development Impacts	Potential Quality Fe and Mn	Water Problems Arsenic
Intercity (IPA)	M	Regional	Intermediate	Advance Outwash	50–250	1,200	18	6	12	Low	Mod–Low	Mod	None
Stillaguamish (StA)	A	Regional	Shallow	Alluvial	<50	2,000	15	7.5	7.5	High	Low	Low	None
Skykomish (SkA)	D	Regional	Shallow	Alluvial	<50	2,000?	10–15	6	4–9	High	Mod	Low	Low
North Fork Stillaguamish (NSA)	B	Regional	Shallow	Alluvial	<50	2,000	10	1	9	High	Low	Low	Low
South Fork Stillaguamish (SSA)	C	Regional	Shallow	Alluvial/Recess	<50	1,500–2,000?	5–10?	?	?	High	Low	Low	Mod–High
Getchell–Snohomish (GSA)	L	Regional	Intermediate	Advance Outwash	50–250	1,200	4–8	0.5	3–7	Low	Mod–High	Mod–High	None
East Stanwood (ESA)	J	Regional	Intermediate	Advance Outwash	50–250	300–1,000	6	3	3	Low	Mod	Mod	None
Tatoosh (TaA)	I	Regional	Shallow	Recess–Advance	20–80	1,000	5.5	1.5	3–4	Mod–High	Mod–High	Mod	None
Tulalip (TuA)	K	Local	Intermediate	Advance Outwash	50–250	100–200	3–6	2	1–4	Low	Mod	Mod–High	None
Pilchuck (PA)	E	Local?	Shallow	Alluvial	<50	1,500?	5	1	4–9	High	Mod	Low	Mod–High
Marysville Tr (MTA)	F	Local*	Shallow	Recessional	20–100	200–300	5	3	2	High	Mod	Mod	Low–Mod
Lakes (LA)	N	Limited	Intermediate	Advance Outwash	50–250	100–200	1–3	0.25?	1–3	Low	Mod	Mod–High	None
N. Arlington (NAA)	H	Limited	Shallow	Recessional	<50	200	3?	1.5?	1.5?	High	Mod–High	Mod	None
Arlington Heights (AHA)	G	Limited	Shallow	Recessional	<50	200	3	1.5	1.5	High	Mod–High	Mod	None
Deep Regional (DRA)	–	Limited	Deep	Olympia Gravels	100–400	200–300	?	?	?	Low	Mod	Mod–High	None

Notes:

? = Limited or no information available to assess water yields or quality

* = Lower water quality reduces significance

** = The terms "shallow," "intermediate," and "deep" refer to the relative stratigraphic position of the aquifer



AQUIFERS

A	STILLAGUAMISH
B	NORTH FORK STILLAGUAMISH
C	SOUTH FORK STILLAGUAMISH
D	SKYKOMISH
E	PILCHUCK
F	MARYSVILLE
G	ARLIGTON HEIGHTS
H	NORTH ARLINGTON
I	TATOOSH
J	EAST STANWOOD
K	TULALIP
L	GETCHELL-SNOHOMISH
M	INTERCITY
N	LAKES

Sweet-Edwards
EMCON

Figure VII-1
SNOHOMISH COUNTY
PRIMARY WATER SUPPLY
AQUIFERS

CADD FILE: EES\SNOBA10B\2/7/91

SECTION VIII

ECONOMIC AND
ENGINEERING
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SECTION VIII

DATA MANAGEMENT PROGRAM

1. BACKGROUND

Water resource management is particularly challenging since water resource data are involved in the majority of management and planning programs in Snohomish County. Watersheds and aquifers often cross jurisdictional boundaries. Many of the water resources of the County are not precisely and/or accurately characterized, and access to existing data is limited.

A successful water resource data management program in Snohomish County needs to focus on the following goals:

- o Inter-department data coordination,
- o Water resource data integrity,
- o Dedicated staff and analysis systems, and
- o Ongoing data and system development.

This section characterizes those departments and programs specific to water resource management in Snohomish County, outlines a preliminary data design, and recommends action items for achieving the data management program goals listed above.

2. RELATED COUNTY PROGRAMS

Snohomish County has several ongoing water resource-related programs. These programs maintain varying levels of inter-departmental coordination and have supporting data systems which are often entirely manual. Table VIII-1 shows these programs, responsible agencies, and key data elements existing within Snohomish County.

3. PRELIMINARY DATA DESIGN

The information provided in Table VIII-1 was used to develop a preliminary data design for an ongoing water resource data management program for Snohomish County. The preliminary data design is found in Figure VIII-1. The data design reflects which agency is responsible for the data and provides a preliminary schematic on how water resource-related data need to be organized to promote inter-agency sharing. The physical location of the data is not addressed in this data design. For example, if a centralized GIS system is

developed, the majority of the data may be housed in the County Department of Information Services (DIS). As shown in the data design, a common base/parcel map is a key component for an inter-agency management program.

The other key County agencies included in this analysis are the County Planning Department, County Engineering, County DIS Assessor's Office, the Health District, Department of Community Development, and the Snohomish County Public Utilities District (PUD). The State and Federal databases included are the U.S. Geologic Survey (USGS) WATSTORE data, the U.S. Environmental Protection Agency (EPA) STORET data, the State Department of Health (DOH) Drinking Water data, and the State Department of Ecology (Ecology) Groundwater Management data.

4. RECOMMENDED ACTIONS

Based on the existing management programs in Snohomish County, and the preliminary data design outlined above, a list of recommended actions have been developed. These recommendations are categorized by water resource data management program goal, and are shown in Table VIII-2.

TABLE VIII-1
SUMMARY OF WATER RESOURCE RELATED PROGRAMS, IMPLEMENTING AGENCIES, AND ASSOCIATED DATA

Program	Agency	Section	Data Used
Population Forecast Distribution	Planning	Demographics	Census boundaries, population data
Building Permit System	Planning	Demographics	Water source, assessor, septic data, lot location
Assessor's Land Use Mapping	Planning	Demographics	Assessor land base
Land Development Review	Planning	Water Resources	Permit application data, assessor land base
Stream Inventory	Planning	Water Resources	Stream locations
Wetland Inventory	Planning	Water Resources	Wetland locations
Plants Inventory	Planning	Water Resources	Sensitive plant locations
Water Quality Monitoring	Engineering	Surface Water Management	28 sites, monthly acquisitions
Precipitation Gauge Monitoring	Engineering	Surface Water Management	Gauge data for Silver Lake, Alderwood Water District, and Fire District #12
Stream Gauge Monitoring	Engineering	Surface Water Management	7 stream gauge locations
Watershed Survey	Engineering	Surface Water Management	Future: Quilceda/Allen Creek, French Creek Marshland (some 1:400 scale aerial photos with 5' contours)
Floodplain Survey	Engineering	Surface Water Management	Future: Skykomish, Stillaguamish, Pilchuck, Sauk, and Suiattle
Soil Movement	Engineering	Design Construction	Topographic data
Septic Application System	Health District	-----	USGS Soil Surveys Public system well logs Individual well logs since 7/91 Well locations (to 1/4 1/4 section accuracy)
County Zoning	Community Development	-----	Zoning maps
Property Management Inventory	Information Systems	-----	Assessor land base, building characteristics
Water System Management	PUD	-----	Water system data for two water systems
Parks and Recreation Facilities	Parks and Recreation	-----	Recreational facility data
Drinking Water Program	State Department of Health	-----	Water System Inventory and Water Quality test data
Groundwater Management Program	State Department of Ecology	-----	Groundwater and Well Log data
STORET Water Quality System	U.S. Environmental Protection Agency	-----	Sample station and water quality parameter data

TABLE VIII-2
RECOMMENDED ACTION ITEMS FOR WATER RESOURCE PROGRAM DEVELOPMENT

Goal: Inter-agency Data Coordination

Recommended Action	Implementing Agency
o Establish Memoranda of Understanding for Water Resource Data Development	DIS
o Assign a Water Resource Lead Person on the GIS Policy and Technical Advisory Committees	DIS
o Develop a Common Base Map	DIS
o Utilize Water Quality Data Formats Used in the EPA STORET Database	Engineering - Surface Water Management
o Utilize Wetland Data Formats Utilized by National Wetland Inventory - at a minimum	Planning - Water Resources
o Maintain Stream and Water Data Compatibility with DNR's Stream Type Maps and the State Classification System Defined by WAC 222-16-030	Planning - Water Resources
o Maintain Compatibility with Ecology's Data Reporting Requirements for Well Logs and Construction Information	Health District
o Maintain Compatibility with DOH's Water System Reporting Requirements	PUD/Health District

Goal: Water Resource Data Integrity

Recommended Action	Implementing Agency
o Develop a GPS Ground Control Network for the County	DIS
o Develop a Controlled Base Map from 1:100 Scale Orthophotos	DIS/Engineering
o Assign Well Locations to Existing Well Logs Utilizing the County Base Map	Health District
o Develop Surface Water Monitoring Network Utilizing County Base Map	Engineering - Surface Water Management
o Develop Ground-Controlled Parcel Map	Assessor/DIS
o Collect Digital Water Use and Water Level Data from the Purveyors	PUD/Health District
o Establish Unique Water Source Identification Codes	DIS
o Identify Watershed Boundaries Using 1:100 Scale Orthophoto-Derived Contours	Engineering - Surface Water Management
o Update Comprehensive Resource Data Using Remote Sensing (i.e., Spot or Thematic Mapper satellite data)	Planning - Water Resources

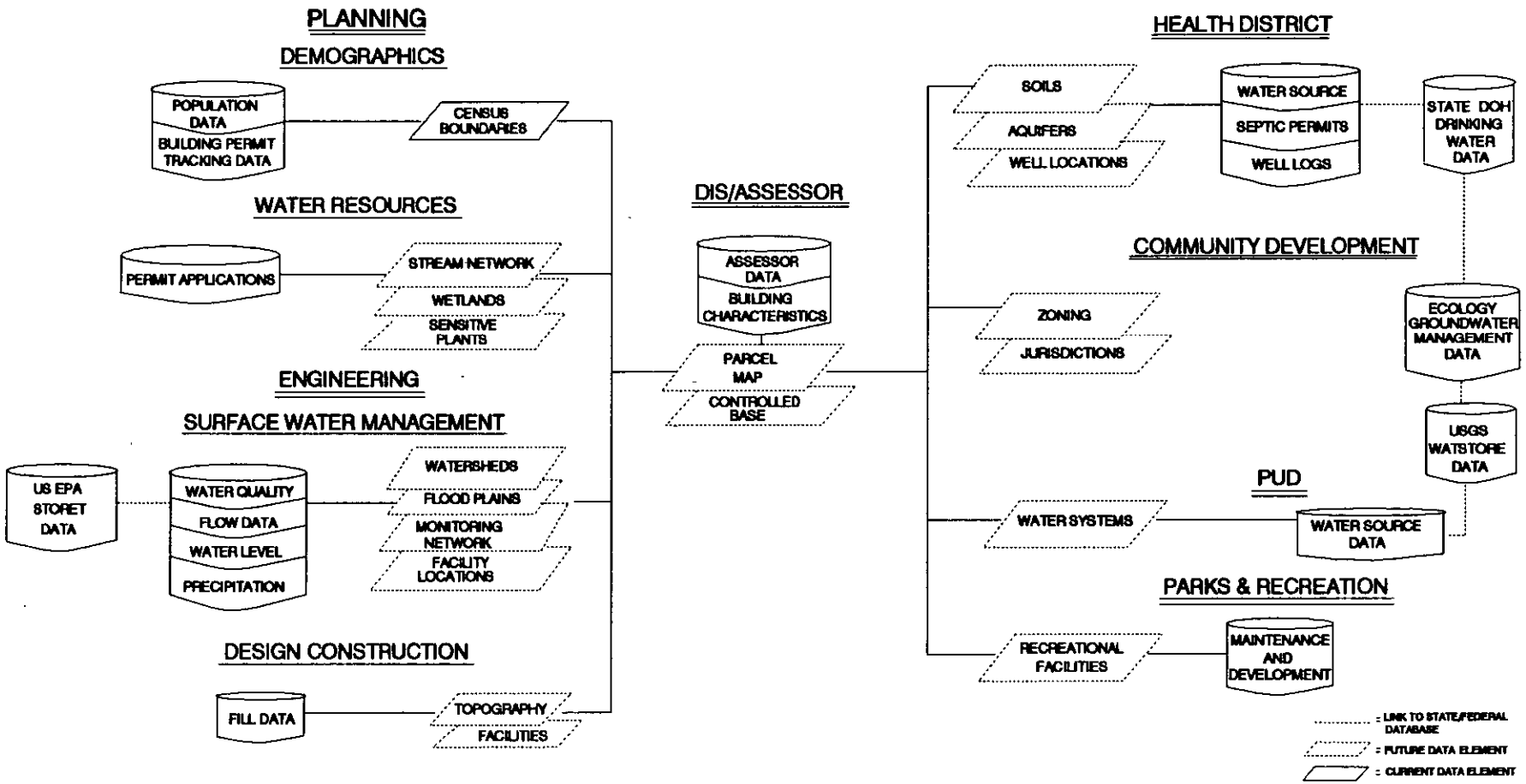
Goal: Dedicated Staff and Analysis Systems

Recommended Action	Implementing Agency
Develop a County-wide GIS that Allows Interactive Water Resource Data Access and Analysis	DIS
o Assign Ownership and Maintenance Responsibilities Among Agencies to Maintain Data Layers/Databases (see data design, Exhibit VIII-1)	Each Agency
o Train Staff as Needed	Each Agency

Goal: Ongoing Data and System Development

Recommended Action	Implementing Agency
o Maintain Active Membership on the GIS Policy and Technical Advisory Committees	DIS
o Develop Data and System Development Cost-Sharing Program	DIS

FIGURE VIII-1
PRELIMINARY DATA DESIGN



SECTION IX

ECONOMIC AND
ENGINEERING
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SECTION IX

GROUNDWATER PROTECTION PROGRAMS

It is important in considering the groundwater protection programs that might be most appropriate to assure groundwater protection now and into the future, that the following be recognized. If all the state and federal laws, rules, and regulations were implemented and enforced to a point of full compliance, the potential for groundwater overdraft or pollution would be very low. Note is made that full implementation often requires local government actions (e.g. solid waste laws).

For background information, Table IX-1 is a listing of pollutant sources along with the controlling state laws and regulations. Table IX-2 is a listing of the Environmental Protection Agency (EPA) regulations and guidances for groundwater protection. These listings are not intended to be all inclusive of the laws and their interrelationship, but rather to show the vast array of existing controls dealing with the various aspects for groundwater protection; and these do not include the authorities of local governments.

Taken together, the laws, rules, and ordinances create a very complex planning, management, and regulatory situation. The laws and regulations are often overlapping, both as to protection goals and jurisdictional authorities for implementation.

As a result of the various laws, there are now a number of programs at the local, state, and federal level that are directed at groundwater protection in the areas of both quantity and quality. The best program, or proper mix of programs, for a given area can vary significantly, depending on, among other things, the existing groundwater data base (e.g., hydrogeology, aquifer characteristics, existing uses, future demands, vulnerability to contamination, and potential sources of contamination); the local awareness of the importance of the groundwater resource, its limitations and its vulnerability; and, the commitment to management of the problem. Following is a description of several of the programs.

1. WELL HEAD PROTECTION PROGRAM

Section 1428 of the 1986 Amendments to the Safe Drinking Water Act (SDWA) established a Wellhead Protection (WHP) Program intended to comprehensively address groundwater resource protection for public water systems. Each state must prepare a WHP Program and submit it to the EPA for review. Local government participation is crucial to effective WHP Programs.

At a minimum, the SDWA requires each state's WHP Program to:

- Specify the roles of state and local governments and public water suppliers.

- o Delineate Wellhead Protection Areas (WHPAs) for each well or wellfield.
- o Identify sources of contaminants within each WHPA.
- o Develop management approaches to protect the water supply within WHPAs from these contaminants.
- o Develop contingency plans for each public water supply system in the event of well or wellfield contamination.
- o Locate new wells properly to minimize the potential of contamination.
- o Ensure public participation in WHP Program development.

The SDWA defines a WHPA as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield."

EPA has identified three general goals as relevant to the process of selecting WHPA delineation criteria:

- o Provide a remedial action zone to protect wells from unexpected contaminant releases.
- o Provide an attenuation zone large enough to bring the concentrations of specific contaminants to acceptable levels before they reach the wellhead.
- o Provide a well or wellfield management zone in all or part of a well or wellfield's existing or potential recharge area.

The boundaries of WHPAs will be established through the use of a number of criteria, including distance of contaminant travel, time of contaminant travel, the extent of aquifer drawdown, flow system boundaries, and the capacity of the aquifer to assimilate or attenuate contaminants.

The Department of Health (DOH) is the agency designated by the Governor to develop the WHP Program for the State of Washington. Because of lack of Federal funds, program development has only recently been initiated (1990), and is scheduled to be completed in late 1992 or early 1993.

As part of the above program development, acceptable methods of delineating WHPAs will be established by the state. EPA has identified six methods of

delineation. These are, in increasing order of cost and sophistication: arbitrary and calculated fixed radii, simplified variable shape, analytical methods, hydrogeologic mapping, and numerical flow/transport models. It is hoped that the state program will have the flexibility to accommodate those public water systems with limited financial resources.

Following WHPA delineation, EPA anticipates the development of strategies for protection of the well or wellfield targeted to three general threats. The first is the direct introduction of contaminants to the area immediately contiguous to the well through improper casing, road runoff, spills, and accidents. A second basic threat is from microbial contaminants such as bacteria and viruses. The third major threat is the broad range of chemical contaminants, including inorganic and naturally occurring or synthetically derived organic chemicals.

The management strategies to control sources of pollution in a WHPA could, among other things, include the implementation (by local and/or state governments) of more stringent zoning ordinances, well construction and abandonment standards, facility design standards and prohibition of certain categories of land use. Additional preventive actions might include the purchase of property or development rights, groundwater monitoring, household hazardous waste collection, and public education.

Notwithstanding the fact that a state WHP Program has not been developed, the need to move ahead with wellhead protection has been recognized by local, state, and federal governmental entities. In Snohomish County, EPA is presently assisting the Seven Lakes Water Association in WHPA delineation. Funding for the development of WHP Programs by local governmental entities is available (up to 50 percent of project costs) through the Centennial Clean Water Fund, administered by the Department of Ecology (Ecology). Several entities (e.g., City of Tacoma, Clark Public Utilities, City of Olympia) have approved grant agreements with Ecology and are now starting the development of WHP Programs.

2. ENVIRONMENTALLY SENSITIVE AREAS

As part of its agency's State Environmental Policy Act (SEPA) procedures (required under WAC 197-11-904), each county/city may, at its option, designate areas within its jurisdiction as "environmentally sensitive areas (ESAs)" (WAC 197-11-908).

The background for this authority arises first from SEPA (RCW 43.21C) which is intended to provide decision makers and the public with sufficient information to evaluate the environmental consequences of proposed land, air, or water-use activities, particularly when those activities involve an action by a governmental agency. Such an action could range from the issuance of a building permit to undertaking a major construction project such as a dam or highway. The

procedural provisions of SEPA attempt to outline a process for distinguishing between actions that are likely to have a significant adverse environmental impact and those that are not. In cases where significant adverse impacts are anticipated, an Environmental Impact Statement (EIS) must be prepared.

Ecology was charged with responsibility to develop rules for the implementation of SEPA. The SEPA rules (chapter 197-11 WAC) were adopted with significant public input. The rules are intended to provide a uniform environmental review process in all political jurisdictions of the state, but there are some flexibilities at the local level. The designation of ESAs is one of these.

Under the SEPA rules, it has been determined that some classes or types of activities, because of their size or nature, are not likely to represent a significant environmental impact and should, under ordinary circumstances, be exempt from SEPA requirements. These categorical exemptions are listed in WAC 197-11-800 and they do include some activities (e.g., installation of impervious underground storage tanks, having a capacity of 10,000 gallons or less) that could potentially represent a significant adverse environmental impact in areas of unusual groundwater sensitivity.

Such areas, where some of the categorically exempt activities could have a significant adverse environmental impact, including but not limited to areas with unstable soils, steep slopes, unusual or unique plants or animals, wetlands, or areas which lie within floodplains can be designated as ESAs. In designating a portion of their jurisdictional area to be environmentally sensitive under SEPA, a county can eliminate many of the categorical exemptions found in WAC 197-11-800, thus causing an environmental review of the proposed activities.

Snohomish County has availed itself of this opportunity (see 23.12.120 Environmentally Sensitive Areas of Title 23). ESAs have been designated to be: 1. All lands designated by the Snohomish County Shoreline Management Program as being rural, conservancy, and natural environment; 2. All lands having twenty-five percent (25%) or greater slope, as designated on the Slopes Maps in the Comprehensive Planning Area Map Series on file with the County Department of Planning and Community Development, or, when such slopes have not been mapped for a comprehensive planning area, contained within landslide hazard areas designated on the Disaster Risk Map on file with the Department of Planning and Community Development; 3. All lands designated agriculture by the Snohomish County Agricultural Preservation Plan and all lands designated sensitive lands, watershed/site sensitive, or environmentally sensitive by adopted Snohomish County Comprehensive Plans.

The county has set aside eleven (11) categorical exemptions, as set forth in WAC 197-11-800, fully and two partially for proposed projects or activities in ESAs.

Additionally, under chapter 23.36, Substantive Authority, the authority to condition or deny permits based upon adverse environmental impacts is set forth in addition to a statement of environmental policies of Snohomish County and an adoption by reference of certain subsections of chapter 197-11 WAC, SEPA Rules.

3. SOLE SOURCE AQUIFERS

The Sole Source Aquifer (SSA) Program was established under Section 1424(e) of the Safe Drinking Water Act (SDWA) of 1974, and is administered by the EPA. The program allows individuals and organizations to petition the EPA to designate aquifers as the "sole or principal" source of drinking water for an area. As a result of such a petition, or on his/her own initiative, the EPA Administrator has the authority to make the determination that an aquifer is the "sole or principal" source of drinking water for an area which, if contaminated, would create a significant hazard to public health. The primary purpose of SSA designation is to provide EPA review of Federal financially assisted projects planned for an area to determine their potential for contaminating the aquifer in the area. Based on this review, no commitment of Federal financial assistance may be made for projects which the EPA Administrator determines may contaminate such an aquifer, although Federal funds may be used to modify projects to ensure that they will not contaminate the aquifer.

In order to qualify under the SSA Program, an aquifer must meet the following basic criteria:

A. The aquifer is needed to supply 50 percent or more of the drinking water for the aquifer service area, and

B. The volume of water which could be supplied by alternative sources is insufficient to replace the petitioned aquifer, should it become contaminated.

An alternative source of drinking water is defined as any surface or groundwater near the aquifer service area which is currently used, or has the potential to be used, as a drinking water source.

There are currently six SSAs in the State of Washington, two being in Snohomish County. The SSAs include: Camano Island (Island County), Cedar Valley (King County), Cross Valley and Newberg (Snohomish County), Spokane Valley/Rathdrum (Spokane County), and Whidbey Island (Island County).

EPA has been petitioned to designate two additional SSAs in the state: the Clover/Chambers Creek Basin (Pierce County), and Tulalip (Snohomish County).

Action toward designation of the Tulalip aquifer as a "Sole Source Aquifer" has been indefinitely suspended by EPA, pending resolution of potential alternative water supply options that are being considered for the area.

There are several potential benefits that result from an SSA designation (other than the primary purpose previously discussed), the most important being its public awareness value. SSA designation helps people realize that an aquifer is unique or valuable and is worthy of protection. The designation can serve as a rallying point around which support for groundwater protection and management efforts can coalesce. Due to the attention that a Sole Source designation draws to an aquifer, new land development projects that may potentially harm underlying groundwater may be more closely scrutinized by the public and government agencies.

SSA designation increases the attention an area might receive from state and Federal agencies. It is specifically referenced as a criterion to be considered in identifying groundwater management areas (see RCW 90.44.100 (2)(e)). Additionally, although formal SSA designation is apparently not a specific prerequisite, the legislature has declared that "...the protection of groundwater aquifers which are the sole drinking water source...shall be of uppermost priority" (see RCW 90.54.140).

SSA designation may also increase opportunities for funding under the Groundwater Activities and Facilities Category of the Centennial Clean Water Fund (administered by Ecology). Extra points in the priority rating system are awarded for proposed projects within an SSA area.

SSA designation can also impact future solid waste landfill siting. Under WAC 173-304-011(2)(b)(ii) of Ecology's Minimum Functional Standards for Solid Waste Handling, chapter 173-304 WAC, "No landfill shall be located over a sole source aquifer..." However, this is not an absolute prohibition; there are variance procedures.

4. AQUIFER PROTECTION AREAS (APAS)

Chapter 36.36 RCW was enacted by the Washington State Legislature in 1985 to "...allow the creation of aquifer protection areas to finance the protection, preservation, and rehabilitation of subterranean water..."

The authority to create APAs is given to the county legislative authority, but APAs can only be created through county ordinance after a public hearing and a simple majority voter approval by the registered voters residing within the proposed APA. An APA may not include territory located within a city or town or land within another county without approval of the appropriate governing body.

The voters, in approving creation of an APA, are also approving a maximum level of fees for water withdrawal, on-site sewage disposal, or both, and the types of activities to be financed by the fees.

RCW 36.36.040 provides that "Aquifer protection areas may impose fees to fund:

"(1) The preparation of a comprehensive plan to protect, preserve, and rehabilitate subterranean water. This plan may be prepared as a portion of a county sewerage and/or water general plan pursuant to RCW 36.94.030;

"(2) The construction of facilities for:

(a) The removal of water-borne pollution;

(b) Water quality improvement;

(c) Sanitary sewage collection, disposal, and treatment; and,

(d) Storm water or surface water drainage collection, disposal, and treatment;

"(3) The proportionate reduction of special assessments imposed by a county, city, town, or special district in the aquifer protection area for any of the facilities described in subsection (2) of this section; and,

"(4) The costs of monitoring and inspecting on-site sewage disposal systems or community sewage disposal systems for compliance with applicable standards and rules, and for enforcing compliance with these applicable standards and rules in aquifer protection areas created after June 9, 1988. (1988 c 258 * 1; 1985 c 425 * 4)."

Presently, the law does not specifically reference the use of fees for day to day management or regulatory programs or the construction of monitoring or water quality monitoring as being authorized expenditures. However, during the 1991 Regular Session of the Legislature, Substitute House Bill 1019, relating to aquifer protection areas, was passed by the Legislature and signed by the Governor with an effective date of July 28, 1991. This new law is an amendment to RCW 36.36.010 and 36.36.040 and expands purposes for which aquifer protection areas may impose fees to include the preparation of groundwater management programs; the construction of public water systems; and the costs of: (a) monitoring the quality and quantity of groundwater and data analyses; (b) implementation of the groundwater management program; (c) enforcing compliance with standards and rules relating to the quality and quantity of

groundwater; and (d) public evaluation relating to protecting, preserving, and enhancing groundwater.

In 1986, an APA was established in Spokane County in order to provide a locally derived dedicated funding source for groundwater protection activities. Water user fees of $1.25 per month per residential equivalent and $1.25 per month for a septic tank user generates in excess of $2,000,000 annually, which is used mostly for sewer construction.

The concept of chapter 36.36 RCW is attractive because establishment of an APA shows local concern and financial commitment to protect an area's groundwater resources. It should enhance the opportunities for attaining state funding for needed planning and construction of water quality protection facilities.

However, there is some risk involved. A defeat of a ballot issue proposing creation of an APA could be a severe setback to groundwater protection activities in an area. Therefore, it is very important that the residents of an area be sufficiently educated concerning the need for such a measure and made aware of the "no action" consequences before such a proposal is pursued beyond the public hearing phase.

5. CRITICAL AREAS

Unlike the other groundwater protection programs, the classification, designation, and ultimate protection of critical areas is not optional for Snohomish County under the "Growth Management Act (GMA)" (Engrossed Substitute House Bill No. 2929, as amended by Free Conference Committee, 1990). Critical areas include:

(a) wetlands;

(b) areas with a critical recharging effect on aquifers used for potable water;

(c) fish and wildlife habitat conservation areas;

(d) frequently flooded areas; and,

(e) geologically hazardous areas.

This discussion is generally limited to a (b)-type critical area which essentially involves the recharge areas for aquifers used as a drinking water source.

The State Department of Community Development was required under Sec. 5 of the GMA to adopt guidelines through the rulemaking process for the

classification of agricultural, forest, and mineral resource lands as well as critical areas. These guidelines are in proposed Chapter 365-190 WAC which are proposed for adoption on or shortly after February 5, 1991.

One goal in the guidelines is that for each critical area, the counties or cities planning under the GMA should define classification schemes and prepare development regulations that govern changes in land uses and new activities in order to protect areas with a critical recharging effect on aquifers used for potable water, from contamination. These areas are where an aquifer that is a source of drinking water is vulnerable to contamination that would affect the certifiable potability of the water.

Under the GMA, preliminary classifications and designations of critical areas must be completed in 1991 with interim "protection" regulations enacted by September 1, 1991. Designation establishes, for planning purposes, the classification scheme and the general distribution, location, and extent of critical areas (e.g., aquifer recharge areas). The guidelines recognize that data and information may be inadequate to readily identify all aquifer recharge areas. In those areas, performance standards or definitions should be developed as criteria for designation, so more specific identification can be made during the processing of a permit or development authorization. Even where aquifer recharge area boundaries are not precisely defined, mapping to the extent possible for informational purposes is recommended.

Guidance relating specifically to aquifer recharge areas is set forth in proposed WAC 365-190-080(2) which reads as follows:

> "(2) Aquifer recharge areas. Potable water is an essential, life-sustaining element. Much of Washington's drinking water comes from groundwater supplies. Once groundwater is contaminated, it is difficult, costly, and sometimes impossible to clean up. Preventing contamination is necessary to avoid exorbitant costs, hardships, and potential physical harm to people.
>
> The quality of groundwater in an aquifer is inextricably linked to its recharge area. Few studies have been done on aquifers and their recharge areas in Washington state. In the cases in which aquifers and their recharge areas have been studied, affected counties and cities should use this information as the base for classifying and designating these areas.
>
> Where no specific studies have been done, counties and cities should use existing soil and surficial geologic information to determine where the recharge areas are. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated.

Counties and cities shall classify recharge areas for aquifers according to the vulnerability of the aquifer. Vulnerability is the combined effect of hydrogeological susceptibility to contamination and the contamination loading potential. High vulnerability is indicated by land uses that contribute contamination that may degrade groundwater, and hydrogeologic conditions that facilitate degradation. Low vulnerability is indicated by land uses that do not contribute contaminants that will degrade groundwater, and by hydrogeologic conditions that do not facilitate degradation.

(a) To characterize hydrogeologic susceptibility of the recharge area to contamination, counties and cities should consider the following physical characteristics:

  (i) Depth to groundwater;

  (ii) Aquifer properties such as hydraulic conductivity and gradients;

  (iii) Soil (texture, permeability, and contaminant attenuation properties);

  (iv) Characteristics of the Vadose Zone, including permeability and attenuation properties; and,

  (v) Other relevant factors.

(b) The following should be considered to evaluate the contaminant loading potential:

  (i) General land use;

  (ii) Waste disposal sites;

  (iii) Agriculture activities;

  (iv) Well logs and water quality test results; and,

  (v) Other information about the potential for contamination.

(c) Classification strategy for recharge areas should be to maintain the quality of the groundwater, with particular attention to recharge areas of high susceptibility. In recharge areas that are highly vulnerable, studies should be initiated to determine whether groundwater contamination

has occurred. Classification of these areas should include consideration of the degree to which the aquifer is used as a potable water source, feasibility of protective measures to preclude further degradation, practicability of treatment measures to maintain potability, and availability of alternative potable water sources.

(d) Examples of areas with a critical recharging effect on aquifers used for potable water may include:

(i) Sole source aquifer recharge areas designated pursuant to the Federal safe drinking water act.

(ii) Areas established for special protection pursuant to a groundwater management program, chapters 90.44 and 90.54 RCW, and chapter 173-100 WAC.

(iii) Areas designated for wellhead protection pursuant to the Federal Safe Drinking Water Act.

(iv) Other areas meeting the definition of "areas with a critical recharging effect on aquifers used for potable water" in these guidelines."

6. GROUND WATER MANAGEMENT AREAS (GWMAS) AND PROGRAMS (GWMPS)

RCW 90.44.400 through 90.44.440, enacted in 1985 by the Washington State Legislature, provides the statutory mechanism for local agencies and groundwater user groups to initiate and develop comprehensive GWMPs. The basic purpose of the law was to identify groundwater management procedures that are consistent with both local needs and state water resource policies and management objectives, including the protection of water quality, assurance of quantity, and efficient management of water resources to meet future needs. The law is administered by Ecology.

Ecology, through the filing of Chapter 173-100 WAC, has set the guidelines for identification and designation of GWMAs and the development of GWMPs. The program is somewhat complex and requires commitment from major user and public interest groups, local governmental entities, state agencies, and tribal interests to be successful. However, with the opportunity for up to 50 percent grant and/or loan assistance from the Centennial Clean Water Fund, numerous GWMP efforts are occurring throughout the state. It is an excellent program to first attain a much better understanding of an area's groundwater system, then to identify existing and potential problems (e.g., quantity or quality), and lastly to

develop the management program to correct problems and provide long-term protection for the groundwater resource.

Figures IX-1 and IX-2 are flow charts (taken from Ecology Guidelines - October, 1986) of the full GWMP process. Figure 1 identifies the steps leading to official designation of a GWMA by Ecology. Designation is a prerequisite for Centennial Clean Water Funding. Of particular importance is the need for local entity coordination, development of a factual report identifying proposed area boundaries and supporting and documenting the need for a GWMA, and the holding of a public meeting prior to requesting designation by Ecology. Some criteria considered by Ecology to be of high value in evaluating requests relate to:

A. Geographic areas where groundwater quality is threatened or is susceptible to contamination. This includes contamination from land use activities and seawater intrusion.

B. Aquifers that are declining due to restricted recharge or overuse. This includes aquifers which have the potential for overuse based on projected future demands.

C. Aquifers that have been over-appropriated and for which adjudications of water rights have not been completed.

D. Aquifers designated as "sole source aquifers" by the EPA.

E. Aquifers identified as the primary source of a public water supply.

F. Aquifers for which an approved coordinated water system plan has identified a need for a groundwater management program.

Figure IX-2 represents the steps to be taken in the actual development of a GWMP after the GWMA is designated by Ecology. The statutory requirements for an adequate GWMP are significant. As set forth in RCW 90.44.110(2), they are:

(a) A description of the specific groundwater area or sub-areas, or separate depth zones within any such area or sub-area, and the relationship of this zone or area to the land use management responsibilities of county government;

(b) A management program based on long-term monitoring and resource management objectives for the area or sub-area;

(c) Identification of water resources and the allocation of the resources to meet state and local needs;

(d) Projection of water supply needs for existing and future identified user groups and beneficial uses;

(e) Identification of water resource management policies and/or practices that may impact the recharge of the designated area or policies that may affect the safe yield and quantity of water available for future appropriation.

(f) Identification of land use and other activities that may impact the quality and efficient use of the groundwater, including domestic, industrial, solid, and other waste disposal, underground storage facilities, or storm water management practices;

(g) The design of the program necessary to manage the resource to assure long-term benefits to the citizens of the state;

(h) Identification of water quality objectives for the aquifer system which recognize existing and future uses of the aquifer and that are in accordance with Ecology and DOH drinking and surface water quality standards;

(i) Long-term policies and construction practices necessary to protect existing water rights and subsequent facilities installed in accordance with the groundwater area or sub-area management programs and/or other water right procedures;

(j) Annual withdrawal rates and safe yield guidelines which are directed by the long-term management programs that recognize annual variations in aquifer recharge;

(k) A description of conditions and potential conflicts and identification of a program to resolve conflicts with existing water rights;

(l) Alternative management programs to meet future needs and existing conditions, including water conservation plans; and,

(m) A process for periodic review of the groundwater management program and monitoring of the implementation of the program.

As can be readily seen, it will take a concerted effort to adequately address the above-listed requirements, but the end product should represent a comprehensive groundwater management plan for a GWMA.

7. GEOLOGICALLY SENSITIVE AREAS (GSA)

The creation of GSAs is not specifically provided for in state or Federal statutes, but it has been a useful interim management tool utilized in Thurston County for protection of the McAllister aquifer. This aquifer is the source of water for approximately 5,800 persons in the aquifer area and is the source for McAllister Springs, which supplies drinking water for almost 50,000 persons. The aquifer is quite susceptible to pollution and is experiencing a trend of increasing nitrate levels.

The Thurston County Board of Health, under its general authorities pursuant to RCW 70.05.060 and WAC 248.96.025, has adopted regulations concerning GSAs. Section 15, Geologically Sensitive Areas, of Article IV of the Thurston County Sanitary Code reads:

> "In an area declared by the Board of Health to be 'geologically sensitive,' the health officer shall require such additional reasonable standards adopted by the Board of Health as are necessary to prevent health hazards and water pollution."

Section 30, McAllister Geologically Sensitive Area, of Article IV creates the area, defines its areal extent, and sets forth specific requirements relating to sewage disposal, agriculture, stormwater, and hazardous materials. The Board of County Commissioners of Thurston County, through Resolution No. 9534, put a temporary moratorium on acceptance of certain subdivision applications for the McAllister GSA.

Note is made that the McAllister GSA is included in an ongoing GWMP for the North Thurston County GWMA, and that the City of Olympia (operator of McAllister Springs water system) is just starting (1991) a WHP Program for the area. The point is that interim controls, such as creation of a GSA, may be appropriate during the course of long-term groundwater management planning.

TABLE IX-1

KEY STATE LAWS AND REGULATIONS - BY POLLUTANT SOURCE

POLLUTANT SOURCE	STATE LAW	STATE REGULATION
Landfills and Dumps	RCW 70.95 Solid Waste Managment RCW 70.105 Hazardous Waste Management RCW 90.48 Water Pollution Control RCW 90.52 Pollution Disclosure	WAC 173-301 Minimum Functional Standards WAC 173-303 Dangerous Waste Regulations WAC 173-216 State Waste Discharge Permits WAC 173-220 NPDES Permits
Surface Impoundments	RCW 90.48 Water Pollution Control RCW 90.52 Pollution Disclosure	WAC 173-216 State Waste Discharge Permits WAC 173-220 NPDES Permits
Subsurface Sewage Disposal and Lakes Application	RCW 90.48 Water Pollution Control RCW 43.20 State Board of Health RCW 70.05, 70.08, 70.46 Local Boards of Health	WAC 173-240 Submission of Plans and Reports for Construction of Wastewater Facilities WAC 248-96 Rules and Regulations of the State Board of Health - On Site Sewage Disposal Systems WAC 372-36 Columbia Basin Irrigation Area - Sewage and Waste
Underground Storage Tanks	RCW 90.48 Water Pollution Control RCW 70.105 Hazardous Waste Management	WAC 173-303 Dangerous Waste Regulations
Accidental Spills	RCW 90.48 Water Pollution Control	
Radioactive Waste	RCW 70.98 Nuclear Energy RCW 70.121 Mill Tailing - Lisc. and Perpetual Care	Title 402 WACs.
Agricultural Wastes	RCW 90.48 Water Pollution Control	WAC 173-220 NPDES Permits WAC 173-216 State Waste Discharge Permits WAC 173-240 Submission of Plans & Reports for Construction of Wastewater Facilities
Salt Water Intrusion	RCW 90.44 Regulation of Public Groundwaters RCW 90.54 Water Resources Act RCW 70.116 Public Water System Coord. Act	WAC 173-590 Reaeration of Water WAC 173-500 Water Resources Management Program WAC 248-56 Water System Coordination Act - Procedural Regulations
Petroleum Exploration/ Development	RCW 78.52 Oil and Gas Conservation	
Injection Wells	RCW 90.48 Water Pollution Control RCW 43.21A Department of Ecology	WAC 173-218 Underground Injection Control Protram
Abandoned Wells, Monitoring Wells, Water Supply Wells	RCW 18.104 Water Well Construction	WAC 173-160 Minimum Standards for Construction and Maintenance
Highway Deicing	RCW 90.48 Water Pollution Control	
Artificial Recharge	RCW 90.48 Water Pollution Control	
Mining Wastes		
Sludge Application	RCW 70.95 Solid Waste Management	WAC 173-301 Minimum Functional Standards

EPA REGULATIONS & GUIDANCE FOR GROUND-WATER PROTECTION

TABLE IX-2

Target	Applicable Law	Regulation or Guidance	Status	Ground-Water Protection
Synthetic Organic Chemicals (SOCs) and Inorganic Chemicals (IOCs)	Safe Drinking Water Act	Phase I - 8 Volatile Organic Chemicals Phase II - 38 Synthetic Organic Chemicals and Inorganic Chemicals	Phase I - Final 1987 Phase II - Proposed 1989	Public well vulnerability assessment of hydrogeology and contaminant migration.
Bacteria-Viruses	Safe Drinking Water Act	Filtration and Disinfection; Turbidity, Giardia Lamblia, Viruses, Legionella, and Heterotrophic Bacteria	Final 1989	Wellhead protection assists in meeting requirements to avoid filtration of public well water.
Total Coliform	Safe Drinking Water Act	Total Coliform, incl. fecal coliform and E. Coli (40 CFR 141)	Final 1989	Wellhead protection is one means to comply with MCL.
Sole Source Aquifer	Safe Drinking Water Act	Sole Source Aquifer Designation Petitioner Guidance	Final 1987	Identifies data necessary to designate a sole source aquifer.
Wellhead Protection Area Delineation	Safe Drinking Water Act	Guidelines for Delineation of Wellhead Protection Areas	Final 1987	Describes methods to use in delineating Wellhead Protection Areas around public water supply wells.
Wellhead Protection Program	Safe Drinking Water Act	Guidance for Applicants for State Wellhead Protection Program Assistance Funds Under the Safe Drinking Water Act	Final 1987	Describes process for States to submit Wellhead Protection Programs for EPA approval.
Injection Wells	Safe Drinking Water Act	40 CFR Parts 124, 144, 145, 146, 147	Final	Specifies controls for injection wells.
Pesticides	Federal Insecticide, Fungicide, and Rodenticide Act as amended (FIFRA) (7 USC 136)	Procedures for Registration of Pesticide	Final 1988	New registration procedures involved ground-water assessment.
Pesticides	FIFRA	Pesticide Registration Procedures; Pesticide Data Requirements (40 CFR parts 152, 153, 156, 158, 162)	Final 1988	Revises procedures for the registration of pesticide products under FIFRA.
Toxic Substances	Toxic Substance Control Act (TSCA) (15 USC 2601)	Procedures for Evaluating Chemicals	Final 1976	TSCA section 4 can be used as testing authority for toxic substances if required.
Toxic Substances	Toxic Substance Control Act	Comprehensive Assessment Information Rule (40 CFR 704)	Final 1988	Can collect data on ground-water contamination if it is a problem.
Sludge	Clean Water Act	Technical Standards for the Use and Disposal of Sewage and Sludge (40 CFR 257-258)	Proposed in the Federal Register, 2/6/89	Sets standards for the concentration of constituents in sludge for monofilling.
Solid Waste	Resource Conservation and Recovery Act	Solid Waste Disposal Facility Criteria (40 CFR 257-258)	Proposed in the Federal Register, 8/30/88	Prohibits location of Municipal Solid Waste Disposal Facilities in sensitive environments; allows states to establish points of compliance based in part on ground-water resource evaluation.
Hazardous Waste	Resource Conservation and Recovery Act	General Ground-Water Monitoring Requirements at Disposal Sites (40 CFR 264)	Final 1987	Specifies ground-water monitoring location and frequency.
Hazardous Waste	Resource Conservation and Recovery Act	Technical Enforcement Guidance Document	Final 1988	Describes in detail monitoring well placement, construction and sampling procedures.
Hazardous Waste	Resource Conservation and Recovery Act	Statistical Analysis of Ground-Water Monitoring Data	Final 1989	Describes how to evaluate RCRA ground-water monitoring data.
Hazardous Waste	Resource Conservation and Recovery Act	Alternate Concentration Limit Guidance	Final 1987	Describes how to establish ground-water protection standards.

EPA REGULATIONS & GUIDANCE FOR GROUND-WATER PROTECTION (Cont'd)

Target	Applicable Law	Regulation or Guidance	Status	Ground-Water Protection
Petroleum and Hazardous Substances	Resource Conservation and Recovery Act	Regulations for Underground Storage Tanks; Technical Requirements and State Program Approval; Final Rules (40 CFR 280-281)	Final 1988	Sets standards for leak detection, leak prevention and corrective action.
Petroleum	Resource Conservation and Recovery Act	Regulations for Underground Storage Tanks Containing Petroleum; Financial Responsibility Requirements and State Program Approval Objective; Final Rule (40 CFR 280-281)	Final 1988	Establishes requirements for demonstrating financial responsiblity for corrective action and third party compensation.
Radioactive Materials	Atomic Energy Act	Regulations for Uranium / Thorium Mill Tailings Active Sites (40 CFR 192)	Final 1983	Provides concentration limits for disposal and cleanups.
General Contaminants	Clean Water Act	Clean Water Act Section 404 Program Definition and Permit Exemptions; Section 404 State Program Regulation (40 CFR Parts 232-233)	Final 1988	Procedures and criteria used in approving, reviewing and withdrawing approval of state 404 programs.
Hazardous Substances	CERCLA	Guidance on Remedial Actions for Contaminated Ground-Water at Superfund Sites (40 CFR 300, Subpart F)	Interim Final 1988	Describes Remedial Action Process for ground water.
Hazardous Substances	CERCLA	Hazard Ranking System (HRS) for Uncontrolled Hazardous Substance Release (40 CFR 300, Subpart F); Appendix A of National Oil and Hazardous Substances Contingency Plan	Proposed 1988	Includes ground-water pathway in preliminary screening and ranking of Superfund sites.
Hazardous Substances	CERCLA	National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300)	Proposed 1989	Establishes process for Superfund Site cleanup.
Hazardous Substances	CERCLA	Corrective Action for Releases to Ground Water from Regulated Waste Units (40 CFR 264, 270)	draft Proposal 1989	Establishes procedures for correcting ground-water contamination at active waste management sites.

FIGURE IX-1

REQUEST FOR GROUND WATER MANAGEMENT AREA DESIGNATION

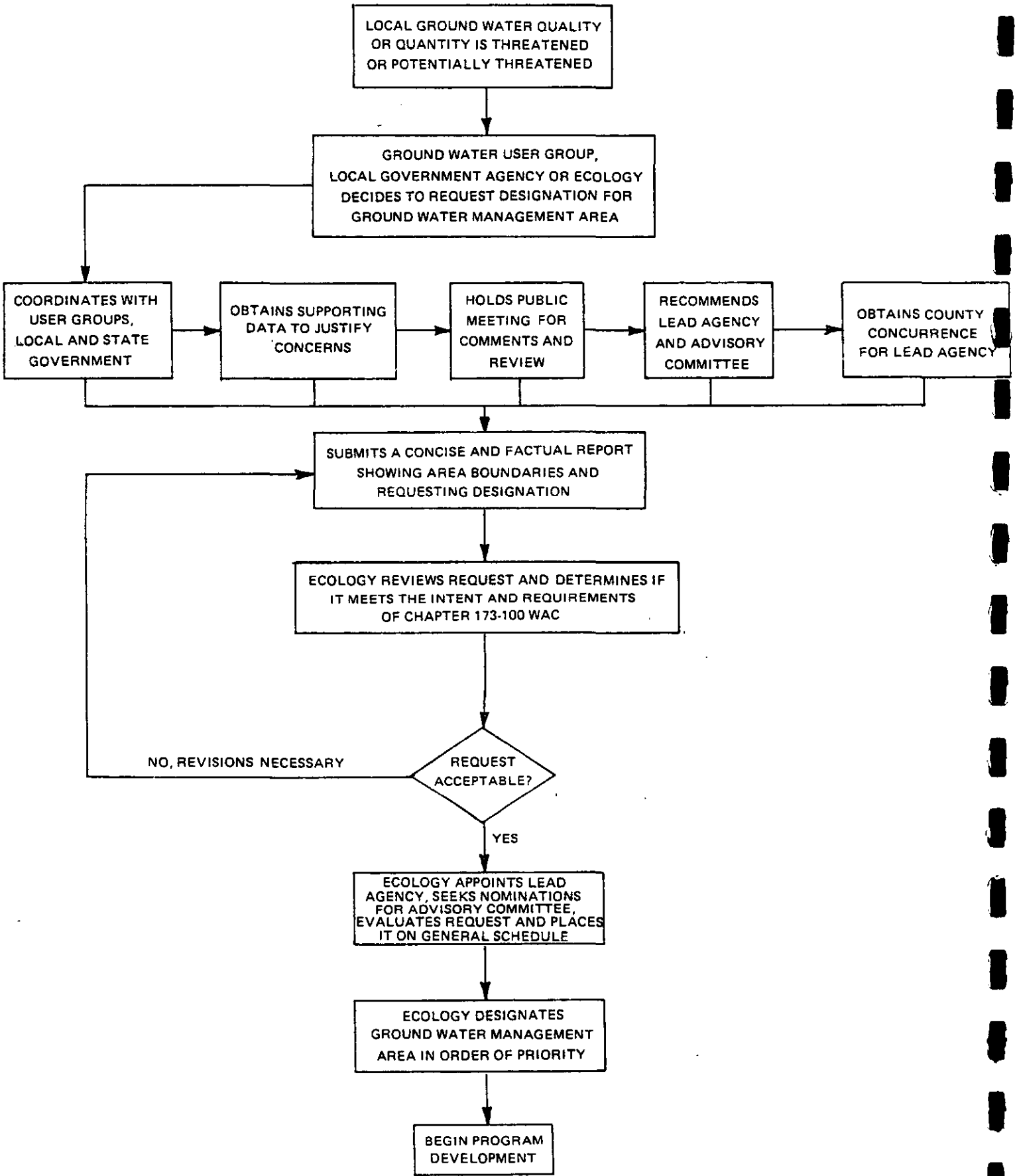
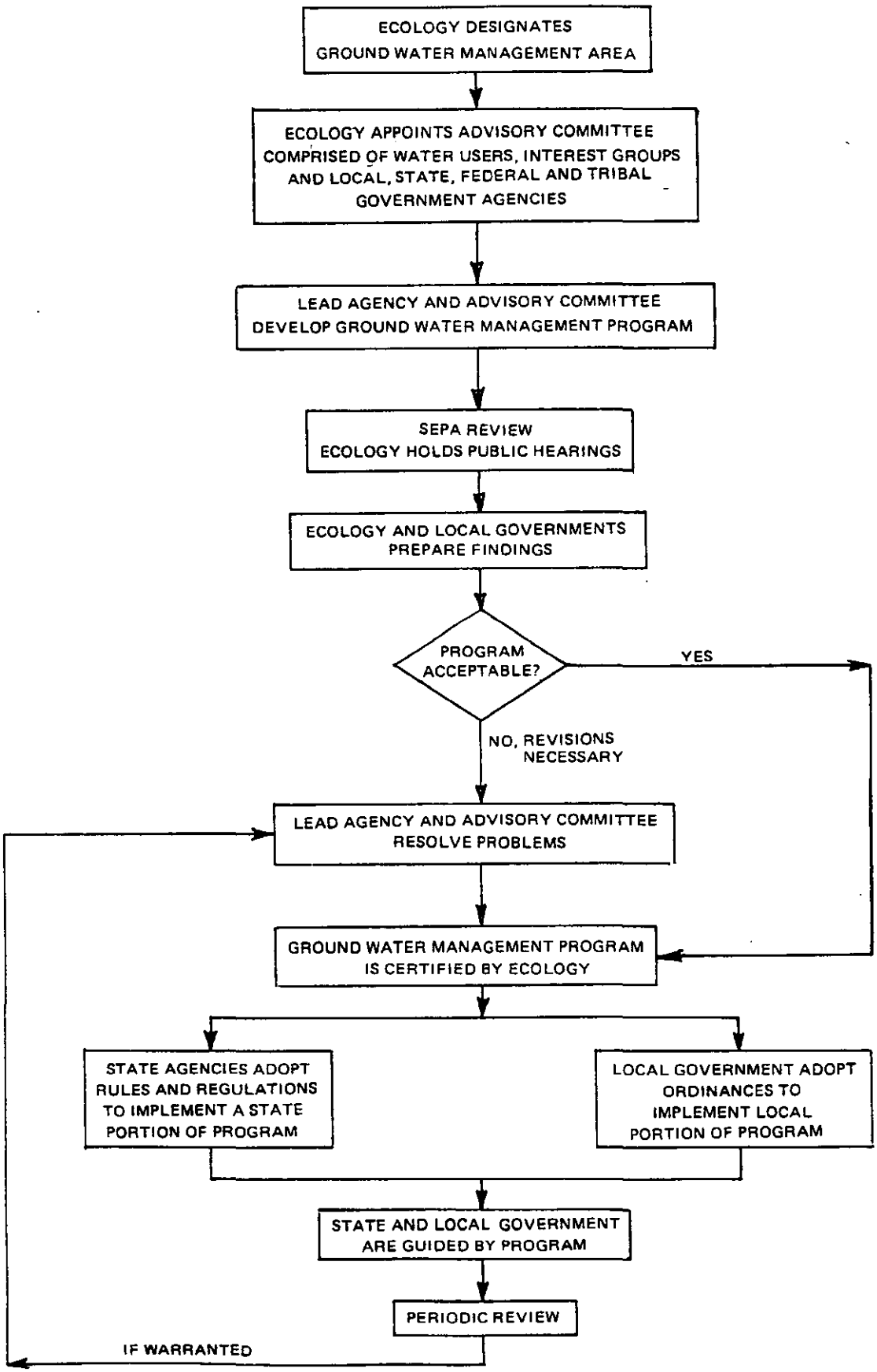


FIGURE IX-2

GROUND WATER MANAGEMENT PROGRAM DEVELOPMENT



SECTION X

ECONOMIC AND
ENGINEERING
SERVICES, INC.

SECTION X

GROUNDWATER PROTECTION STRATEGIES

1. AQUIFER STRATEGIES

This discussion is directed toward recommending the program or combination of programs, reviewed in the previous section, which would offer Snohomish County the best opportunity to achieve comprehensive management and protection of its extremely important groundwater resources.

Table X-1 presents a matrix relating the applicability of the programs to various criteria (e.g. whether all or only a portion of an aquifer system is benefited by the program). This provides a general overview that tends to support the comprehensiveness of the Ground Water Management Program (GWMP) planning as set forth in RCW 90.44.400 through 90.44.440. The matrix does not, however, show a clear difference between some of the programs. These differences along with a showing of some of the inter-relationships, are discussed below.

The Wellhead Protection Program (WHP) is well or well field specific. Although one program might be designed to cover numerous wells, the program is more adaptable for implementation by a single utility or municipality than on a regional or county-wide basis. The protection mechanisms for the wellhead protection area will, of course, often require the cooperation of other governmental entities. Development of WHPs may even become a requirement after the Department of Health (DOH) completes its development of a state-wide program. A WHP can proceed simultaneously with, and complement, a GWMP covering a larger area. Grant funding is available from the Department of Ecology (Ecology) through the Centennial Clean Water Fund. The WHP does not meet full management requirements because it does not comprehensively address water quantity.

Designating Environmentally Sensitive Areas (ESAs) under the State Environmental Policy Act (SEPA) will provide an added protection element for a specific area through the requirement of environmental review on some proposed projects or developments that would otherwise be exempt from full compliance with SEPA. It is a good tool to be used in conjunction with other programs. It should be noted that Snohomish County has adopted a formal "County Policy for Protection of Groundwater Resources" (see Figure X-1). This policy incorporates SEPA review consideration of projects that could potentially have adverse impacts on groundwater quality and quantity. This policy could be given added significance by focusing on critical aquifer recharge areas.

The Sole Source Aquifer (SSA) program, like the ESAs, is not comprehensive. It assures Environmental Protection Agency (EPA) review of new projects that have some federal funding and increases public awareness of an aquifer system, but does not impose any new requirements which might be needed for all new projects. If SSA designation appears appropriate for a specific aquifer system, the process can proceed along with other management programs, but it is not a substitute for comprehensive planning. Based on existing information, initiating a petition for additional SSAs on any of the principal aquifers in Snohomish County does not appear warranted at this time.

Establishing Aquifer Protections Areas (APAs) is primarily a local funding mechanism for groundwater protection. Although the use of funds is restricted to water quality related planning and activities, the APA process should be considered for specific aquifer areas, if local public support is strongly behind the program. APA designation requires an election, therefore, a high level of preliminary work is needed before moving into this program.

The Critical Areas (areas with a critical recharging effect on aquifers used for potable water) program is mandatory under the Growth Management Act (GMA) for Snohomish County (and its cities). Therefore it need not be compared with other programs, except to point out that APAs will often overlay WPAs. Additionally, critical area designation relates only to water quality, so it is not a substitute for comprehensive groundwater management.

The GWMP, as contemplated under RCW 90.44.400 through 90.44.440, is comprehensive and qualifies for funding from Ecology under the Centennial Clean Water Fund. This groundwater characterization study has provided a good overview of groundwater conditions in Snohomish County, but it has been based only on existing studies and information. A GWMP would allow a mechanism for the collection and evaluation of new data relating both to the quality and quantity aspects of the groundwater systems. GWMPs can be conducted in phases and the Ground Water Management Areas' (GWMAs) boundaries can be adjusted and subareas designated during the planning process. In the case of Snohomish County, it appears that designation of the entire County as a probable GWMA would provide maximum flexibility and be appropriate for planning purposes. However, because of the magnitude of the area, a phased program should be considered if this course of action is undertaken.

Thurston County's example of designating a critical aquifer area as a Geologically Sensitive Area (GSA) and enactment of land-use protection controls, is an option that does not fit well into the needs of Snohomish County. First, it relates only to water quality and second, the potential problems it addresses will in large part be taken care of through the designation of aquifer recharge areas and adoption of interim regulations under the GMA.

2. GROWTH MANAGEMENT ACT (GMA) STRATEGIES

A. Background

This discussion is directed toward achieving a meaningful and effective compliance with the requirements of the GMA and Chapter 365-190 WAC (proposed) as they relate specifically to "areas with a critical recharging effect on aquifers used for potable water" (aquifer recharge areas). However, as indicated in Section IX-5, Critical Areas, the classification and designation of aquifer recharge areas, along with the adoption of interim development regulations, on or before September 1, 1991, to protect the aquifer recharge areas is only one element in the compliance process. The findings in this groundwater characterization study must be integrated and correlated with the classification and designation of other critical areas (e.g., wetlands) and the resource lands (agricultural, forest, and mineral resource lands which have long-term commercial significance).

Aquifer recharge areas will often overlap or completely overlay portions of other critical areas or resource lands and all areas within the county already have some type of land use or development controls. In these cases, the development regulations will have to address the relationships between the two or more designations.

At the risk of oversimplification, a brief overview of the requirements of ESHB No. 2929 (GMA) and Chapter 365-190 WAC is appropriate to show where the aquifer recharge areas issue fits into a rather complex planning process. The requirements, as they relate to resource lands and critical areas, are:

(1) Snohomish County (and its cities) must adopt comprehensive land use plans on or before July 1, 1993.

(2) To assure some degree of reasonable control over development during preparation of the comprehensive plans, it is necessary, on or before September 1, 1991, to:

- Inventory or map the resource lands (i.e., agricultural, forest, and mineral resource lands) and
- Classify and designate critical areas (i.e., wetlands, aquifer recharge areas, fish and wildlife habitat conservation areas, frequently flooded areas, and geologically hazardous areas). Precise mapping is not required at this time; rather, performance standards or selection criteria are preferred (see WAC 365-190-040 (2)(d)).

- o Enact interim development regulations to provide for conservation of resource lands for protection of critical areas.

(3) Within 1 year of the adoption of the comprehensive plan, new development regulations that are consistent with and implement the comprehensive plan will have to be enacted (these would be an update of the interim development regulations).

(4) The GMA contemplates significant public participation and governmental agency coordination in the comprehensive planning process.

Based on the above, and in particular on the September 1, 1991 date for adoption of interim development regulations, it is obvious that Snohomish County (and cities) are faced with designating areas based on an existing information base that is rather limited. However, through this groundwater characterization study, those areas with a critical recharging effect on aquifers used for potable water (aquifer recharge areas) have been preliminary identified and classified by high, moderate, and low vulnerability to contamination. The areas and their vulnerability classification are shown on Figure V-2. For consistency with the GMA requirements which only reference high and low vulnerability, the low and moderate classifications can be combined as a low vulnerability class.

Primarily because of the short time frame to formulate the interim development regulations, Snohomish County (and cities) will have to prioritize and focus their attention on only the most critical issues relating to aquifer recharge area protection in developing the interim regulations. These issues can be refined and the other, less critical, issues fully addressed during development of the comprehensive land-use plan and perhaps a parallel GWMP planning effort.

Although not directly in response to GMA requirements, the actions taken by Thurston County (see discussion of GSAs beginning on page IX-13) would be comparable to interim development guidelines. As an example of specific actions that might be considered for an aquifer recharge area of high vulnerability, Section 30: McAllister Geologically Sensitive Area of Article IV of the Thurston County Sanitary Code, is included as Appendix E of this report. Appendix F, which is Ordinance No. 24083 adding a new chapter to Title 13 of the Official Code of the City of Tacoma, entitled "South Tacoma Groundwater Protection District" is included as an additional example of controls that were put in place during the development of longer term groundwater management programs.

As an initial guide for developing interim regulations, Table X-2 is a listing of various activities and/or pollution sources that should be evaluated to determine whether controls more stringent than those now in place are needed to assure aquifer recharge area protection during the comprehensive planning process. It is emphasized that time and the need for public participation precludes an in-depth evaluation of each and every potential source of contamination, but some measures and meaningful actions are necessary and should be achievable.

The references to Appendices E and F following some of the listed activities in Table X-2 are included to show specific examples of the type of actions that have been taken by other local government jurisdictions. They are aquifer-specific, but should be of some value for comparative purposes in Snohomish County.

In reviewing the requirements of the GMA (ESHB No. 2929) along with the geographical location of the critical aquifer recharge areas and the activities/pollution sources, some observations and a suggested course of action for the development of interim regulations for aquifer recharge areas can be made.

B. Recommended Strategy

Upon reviewing the requirements of the GMA, the geographical location of the areas with a critical recharging effect on aquifers, and the activities/pollution sources which may exist, the recommended course of action for development of interim regulations for aquifer recharge areas is as follows:

(1) Designate the areas delineated in Figure IV-6 as critical aquifer recharge areas. These areas have a high recharge potential and/or meet the criteria for designation as Sole Source Aquifers.

(2) Designate all critical aquifer recharge areas as ESAs under the provisions of WAC 197-11-908 (SEPA Rules). Categorical exemptions that relate to the activities listed in Table X-2 should be selected and identified as not applying to critical aquifer recharge areas.

(3) Amend Section 2 of the "County Policy for Protection of Groundwater Resources" (Motion No. 90-249, adopted August 22, 1990) to emphasize protection of critical aquifer recharge areas. Incorporate Figure IV-6 into said policy for general definition of said recharge areas.

(4) Through SEPA review and related County authorization activities:

- o Require that hydrogeologic data acquired through new development activities in critical aquifer recharge areas be submitted to the County (e.g., well logs, pump tests, water level measurements, abandonment of wells, and water quality testing).

- o Require a long-term water quality monitoring program for those land uses which could result in point releases of common contaminants recognized to be highly mobile in aquifer systems. A list of such contaminants appears in Table X-3.

(5) Implement the data management program described in Section VIII. Enter hydrogeologic data into the program by critical aquifer recharge area.

(6) Immediately initiate the study process of Chapter 90.44 RCW leading to development of a Ground Water Management Program for Snohomish County. Include tasks in the scope of work which (a) further refine the boundaries of the critical aquifer recharge areas, (b) determine the extent to which the aquifer is used as a potable water source, (c) establish existing water quality and trends in change, (d) identify existing contamination sources, and (e) recommend management/protection measures to preclude further contamination.

(7) Establish and implement regulations for critical aquifer recharge area protection programs as results become available from the Ground Water Management Plan.

The above strategy should be adopted in response to the September 1, 1991, "interim" program requirement of the Growth Management Act. The ESA program under SEPA will be an extension of the current County program and provide the "interim" protection required. Given the preliminary definition of the critical aquifer recharge areas and the limitations of existing data, a more expansive program is not appropriate or feasible at this time. Since Snohomish County has been designated a groundwater management planning area by the Department of Ecology and the County is proceeding to implement the necessary study activities, the more comprehensive plan for protection of aquifer recharge areas should result from the planning and public participation process.

TABLE X-1
Criteria For Selection of
Aquifer Protection Programs

Protection Programs	Aquifer Coverage		Management of		Responsible Government			Land Use Impl.	Comp. Mgmt. Plan	Revenue Base	Grant $ Avail.
	All	Part	Quant.	Qual.	Fed.	St.	Loc.				
1. Wellhead Protection	X	X		X			X	X	X		X
2. Environmentally Sensitive Areas		X	X	X			X	X			
3. Sole Source	X			X	X						
4. Aquifer Protection Areas	X			X			X			X	
5. Critical Areas	X	X		X			X	X			
6. Groundwater Mgmt. Areas	X		X	X		X	X	X	X		X
7. Geologically Sensitive Areas		X		X			X				

TABLE X-2
AQUIFER RECHARGE AREA PROTECTION

ACTIVITIES/POLLUTION SOURCES FOR CONSIDERATION IN INTERIM REGULATIONS

ACTIVITIES/POLLUTION SOURCES	REFERENCES
1. On-site Sewage Disposal	App. E Subsection 30.3 (a)(b)(c)
2. Building Sites in Unsewered Areas	App. E Subsection 30.3 (d)
3. Agricultural Practices	App. E Subsection 30.4
4. Stormwater Disposal	App. E Subsection 30.5 (e)
5. Pesticides	App. E Subsection 30.5 (a)(c)(d)
6. Lawn and Garden Maintenance	App. E Subsection 30.6
7. Hazardous Materials	App. E Subsection 30.5 and App. F
8. Underground Storage Tanks	*
9. Above-ground Storage Tanks	*
10. Solid Waste Sites	**
11. Abandoned Wells	**
12. Sludge Disposal	**
13. Wastewater Land Application	**
14. Sand and Gravel (mining)	**
15. Transportation Spills	**

Appendix E Section 30: McAllister Geologically Sensitive Area, Article IV, of Thurston County Sanitary Code

Appendix F ORDINANCE NO. 24083 adding a new chapter to Title 13 of the Official Code of the City of Tacoma

* These are covered (as relates to hazardous waste) in App. F

** These activities/pollution sources are being evaluated in numerous ongoing Groundwater Management Programs throughout the state. Recommendations for more stringent controls are variable from one area to another, but one commonality for all the activities is a a need for better implementation and enforcement of existing authorities.

TABLE X-3

COMMON AND HIGHLY MOBILE CONTAMINANTS

Conventional
- Nitrate
- Sulfate
- Chloride

Organic-Petroleum
- Gasoline
- BTEX
  - Benzene
  - Toluene
  - Ethylbenzene
  - Xylene
- Total xylenes

Metals (dissolved)
- Lead
- Arsenic
- Chromium

Organic Solvents
- Trichloroethene
- Tetrachloroethene
- 1,1,1-Trichloroethane
- Dichloroethane
- Vinyl chloride
- Methylene chloride
- Acetone
- Benzene
- Chloroform
- Methyl ethyl ketone

Pesticides
- Chlordane
- Penta chlorophenol
- 2,4-D
- Phenanthrene
- Etheldibromide

FIGURE X-1

COUNTY COUNCIL
Snohomish County, Washington

MOTION No. 90 - 249
COUNTY POLICY FOR PROTECTION OF
GROUNDWATER RESOURCES

WHEREAS, Snohomish County contains a valuable and vulnerable groundwater resource which is an important natural resource to be protected from indiscriminate loss; and

WHEREAS, the county has experienced a number of instances where groundwater has become contaminated and required expensive remediation; and

WHEREAS, the protection of the groundwater resource is important because a significant portion of the county's population depends upon groundwater as its principle drinking water source and groundwater plays a vital role in sustaining wetlands, in-stream flows and other ecological values; and

WHEREAS, Snohomish County has numerous regulations now in place, including, but not limited to, its authority under the State Environmental Policy Act, which should be used to protect the county's groundwater resource from being degraded and polluted to avoid significant adverse environmental impacts; and

WHEREAS, the Planning Division is currently involved in developing a coordinated water system plan for a portion of the north and east county and simultaneously involved in a groundwater protection initiative with the Environmental Protection Agency (EPA) on a county-wide basis; and

WHEREAS, the Council desires to protect groundwater from further degradation in the interim until the groundwater protection initiative and coordinated water system plan are finalized; and

WHEREAS, development projects and county-initiated actions should be carefully scrutinized by the county using existing regulatory authority and adopted policies to the maximum extent possible; and

WHEREAS, section 36.70.330(1) RCW mandates that comprehensive plans include a land use element providing for the protection of the quality and quantity of groundwater;

NOW, THEREFORE, ON MOTION:

Motion No. 90-249

Section 1. It shall be the general policy of Snohomish County to work with the State of Washington, federal agencies, tribal governments, municipal and regional governments, and the Snohomish Health District to preserve, protect, and clean up Snohomish County's groundwater resource for current and future beneficial uses. A fundamental premise of Snohomish County's groundwater protection policy is that groundwater will be managed as a resource and emphasis will be given to prevention of contamination. It shall be the county's policy to pursue groundwater protection in a two phase approach as outlined under the implementation strategy, Exhibit I attached. Definition of terms is found in Exhibit II.

Section 2. The Snohomish County Council adopts the following specific policies which apply to all developments, regardless of size:

(1) Proposed projects for which Snohomish County is the lead agency under SEPA will be evaluated for their potential adverse impacts on groundwater quality and quantity. If significant potential adverse impacts are identified, the applicant will be required to provide documentation which fully addresses these potential adverse impacts and alternatives for their avoidance and prevention. The applicant shall provide a detailed proposed mitigation plan for any unavoidable or unpreventable potential adverse impacts. The mitigation plan may include monitoring, process control and remediation as appropriate. The mitigation plan is subject to county approval and must be implemented as a condition of project approval.

(2) Updates or amendments to comprehensive land use plans will specifically provide for protection of the quality and quantity of groundwater, pursuant to the requirements of section 36.70.330(1) RCW. Such updates or amendments may be initiated by the county in instances where planned land uses or residential densities have either resulted in or may reasonably be assumed to result in, adverse impacts to the groundwater resources. Technical assistance in implementing this policy may be requested from the Washington State Department of Ecology pursuant to section 90.54.130 RCW.

(3) Changes in comprehensive plan land use designations to permit higher densities or more water consumptive uses shall only be allowed in areas where there is evidence of an adequate supply and quality of groundwater for domestic use and where such changes will not result in overtaxing or mining of aquifers or significant degradation of the water quality of the aquifers.

(4) County land use and development decisions shall include consideration of groundwater protection needs for areas within

hydrologically-delineated wellhead protection zones and sole source aquifers.

(5) The Community Development Division shall notify applicants for uses or structures incorporating underground storage tanks subject to Washington State Department of Ecology approval of the requirement for Department of Ecology review and approval. The Community Development Division shall also notify the Department of Ecology of such applications.

(6) The county will consider the development of special measures to protect sole source aquifers pursuant to section 90.54.140 RCW.

(7) The county shall support changes in the state's on-site sewage disposal system regulations (i.e., WAC 248-96) which will improve protection of the groundwater resource from contamination; including an increase in the minimum vertical separation requirement for subsurface soil absorption systems from the present standard (12 inches) to the proposed standard (36 inches for conventional systems or 24 inches for systems which incorporate pressure distribution).

These policies shall be in effect until such time as they are amended by the County Council.

DATED: August 22, 1990

SNOHOMISH COUNTY COUNCIL
Snohomish County, Washington

Chairperson

ATTEST:

Clerk of the Council

Approved as to Form:

Deputy Prosecuting Attorney

Motion No. 90 - 249

EXHIBIT I
GROUNDWATER PROTECTION
IMPLEMENTATION STRATEGY

The groundwater policy shall be implemented in concert with the municipal and regional governments, Snohomish Health District, State of Washington, tribal governments and federal agencies by organizing these combined authorities and resources through interlocal agreements and memoranda of understanding along three parallel but interrelated themes as follows:

1. Managing the groundwater resource by establishing standards and water quality requirements recognizing the interaction between surface water and groundwater.

2. Prevention of degradation by encouraging water purveyors to develop wellhead protection areas recognizing that it is more cost effective to prevent contamination than to remediate a contaminated aquifer or treat at the wellhead.

3. Remediation of contamination will be coordinated among the federal, state and local jurisdictions to maximize resource allocation for groundwater cleanup efforts.

Short Term Phase

1. The Council hereby directs the County Executive to require all departments having programs which potentially impact groundwater to:

a. begin to evaluate its groundwater protection efforts and accomplishments within 30 days from enactment of this motion. A survey questionnaire form will be provided to assist the departments.

b. assign a management/supervisory level departmental representative to sit on a Groundwater Management Committee within 30 days of enactment, the purpose of which will be described under the "Long Term Phase".

2. The County Executive shall request the Snohomish Health District to participate on the Groundwater Management Committee.

3. The County Executive shall request the Environmental Protection Agency and the Washington State Department of Ecology to participate on the Groundwater Management Committee.

4. The County Executive shall submit a grant application for Centennial Clean Water Grant funds to conduct a countywide groundwater characterization study. Acceptance of a grant contract for this proposed study will be considered by the Council at such time as a grant offer is made to the county by the Department of Ecology.

Long Term Phases

This phase will take approximately two years to complete with initial development regulations adopted by September 1, 1991 and will entail a detailed review and evaluation of the existing Snohomish County Code, ordinances and plans with recommendations to the Council concerning adoption of groundwater protection language into the Snohomish County Code, county plans, and day to day operations. Also, broad groundwater protection needs and programmatic goals will be identified.

The vehicle for this phase will be the Groundwater Management Committee. It is envisioned that this committee will be supported by a separate Technical Committee to be established by the Groundwater Management Committee.

The Groundwater Management Committee's charter shall be to:

1. Based on the survey results, evaluate in detail all existing codes, policies, ordinances, and plans to determine the level of groundwater protection. The Groundwater Committee shall recommend to the Council appropriate language changes.

2. Identify and evaluate administrative and legal mechanisms for encouraging the establishment of wellhead protection areas around public water wells. This will be done with close coordination with the Health District and the Washington State Department of Health.

3. Identify available or potential federal, state, or local resources to fund the county's groundwater protection effort. Funding needs of other agencies participating in this groundwater protection effort will be identified during the application phase.

4. Oversee development of a groundwater characterization study for the entire county using existing local, state, EPA, and U.S. Geological Survey data. Request technical and financial assistance from the State Department of Ecology to assist in this effort.

5. Identify vulnerable groundwater based on the groundwater characterization study. Concerns to be addressed shall include potential for pollution and salt water intrusion. Study results will be considered

by the committee to formulate specific management stategies for recommendation to the Council.

6. In concert with the Health District, encourage efforts to develop or enhance groundwater resource management, information, including resource assessments, mapping, monitoring, data/information management, public education, etc.

7. Identify groundwater contamination problems and coordinate with the state, EPA and Health District for the remediation of contaminated groundwater.

8. Evaluate the state groundwater quality standards. If these standards are determined to be sufficient, recommend that they be adopted with county enforcement provisions. If it is determined that these standards are inadequate, develop and recommend county generated groundwater quality standards with enforcement provisions. Close coordination with the Health District shall occur. This will provide for a consistent approach to groundwater quality protection throughout the county.

9. Develop and recommend standards and criteria which will be used to review all development proposals and county initiated actions to determine whether these activities are likely to affect groundwater quality.

10. Develop and recommend programmatic cross linkage for any amended codes, ordinances, and plans to include groundwater protection and water quality standards into various county decisions and actions.

11. Recommend procedures for monitoring and evaluating progress of the county's groundwater protection efforts.

12. Serve as a technical advisory body to the County Council.

13. Develop an information and education program to conduct outreach to the public sensitizing their awareness of the value and vulnerability of groundwater.

14. Determine the appropriateness of establishing a citizens advisory group concerning the county's groundwater protection program.

15. Identify agency roles and responsibilities for the county, Health District, municipalities, Indian tribes, etc.

EXHIBIT II

DEFINITIONS

AQUIFER - water bearing formations, bedrock, sand or gravel that yield usable supplies of water to wells.

CHARACTERIZATION - a hydrogeologic study delineating groundwater boundaries and divides, flow direction, recharge and discharge points.

COORDINATED WATER SYSTEM PLAN - a local water utility plan to be used to guide future water utility expansion and water use in a designated area as authorized by County Council motions 88-208 and 89-172. The legal basis is the Public Water System Coordination Act of 1977, Chapter 70.116 RCW.

GROUNDWATER - the portion of water contained in interconnected pores or fractures located beneath the surface of the earth.

GROUNDWATER MANAGEMENT - the management and coordination of groundwater regulations, strategies, policies and technical information for the protection and use of groundwater resources.

HYDROGEOLOGY - the study of groundwater -- its origin, occurrence, movement and quality.

REMEDIATION - the cleanup and restoring of groundwater to some acceptable level. Frequently, groundwater cannot technically be restored to its previous beneficial level or use.

REQUIREMENTS (WATER QUALITY) - a set of predetermined distances (setbacks), design criteria and materials, groundwater protection measures such as disallowing the use of drywells, etc.

SOLE SOURCE AQUIFER - an EPA designated area which provides 50 percent or more of its drinking water from a definite aquifer; and contamination of the aquifer would pose a significant hazard to public health; and there are no economically feasible alternative sources of drinking water.

STANDARDS (GROUNDWATER) - health based numbers such as the maximum contaminant levels (MCL) as established by EPA regulations and/or State of Washington regulations.

SURFACE WATER - those waters that flow over the land surface and frequently interact with groundwater.

VULNERABILITY - the degree to which groundwater may become contaminated depending on the local hydrogeologic characteristics.

WELLHEAD PROTECTION AREA - the surface and subsurface area surrounding a well or wellfield that supplies a public water system through which contaminants are likely to pass and eventually reach the water well or wellfield.

SECTION XI

ECONOMIC AND
ENGINEERING
SERVICES, INC.

SECTION XI

CONCLUSIONS AND RECOMMENDATIONS

The characterization of groundwater in Snohomish County, based on existing information and past studies, has required a considerable use of estimates, assumptions, and professional judgment. However, a good preliminary overview of the County's aquifer systems is now in place. Some of the major conclusions that can be drawn from the study are that:

- There is an abundance of scattered information relating to the groundwater and hydrogeology in Snohomish County, but there are major deficiencies in data uniformity, accessibility, and management. There is also a lack of information in several areas of need (e.g., water level and water quality trends).

- On a county-wide basis, groundwater appears to be available for future development in a total amount of between 52 and 72 MGD, average day use. Recognizing that there are natural water quality problems (e.g. arsenic) and high vulnerability to contamination risks associated with some aquifers, the effective amount of available groundwater is somewhat less.

- There appear to be no areas of major overdraft or man-induced aquifer pollution. However, due to essentially no monitoring of water levels and water quality parameters, it is not possible to make a definitive assessment.

- There is a general lack of information on water rights and the use of groundwater from the principal aquifers, and a very limited knowledge of detailed aquifer characteristics.

- There appears to be no comprehensive management of groundwater in Snohomish County on the local, State, or federal level.

- The aquifer recharge areas and their vulnerability to pollution as identified in this study should be adequate for initial designation under the Growth Management Act.

- A number of groundwater management and protection programs exist at the local, State, and federal levels. These programs vary in the range of activities addressed, geographical area covered, and degree of management/protection achieved.

Based on the above general conclusions, recommendations for needed actions are as follows:

- Groundwater flow patterns need to be defined for each of the principal aquifer systems. This should include the development of a groundwater monitoring network throughout the County which would begin to answer questions such as:

  1) Areas of groundwater recharge and discharge (vertical flow directions).

  2) Horizontal flow directions within each aquifer system (shallow, intermediate, and deep).

  3) Seasonal fluctuations in groundwater flow conditions.

  4) Surface water-groundwater interactions.

- Little information is available on the deep aquifer systems. Information on areal extent, thickness, and groundwater conditions needs to be developed on these systems. Initial efforts should focus on improving the existing data base by:

  1) Collecting existing well logs for wells completed in the deep systems.

  2) Preparing maps, using existing data, which show areal extent and thickness of deeper aquifers.

  3) Developing strategies to address information gaps (e.g., new wells).

- Boundaries of the principal aquifer systems in Snohomish County need to be more accurately delineated to reflect hydrologic and geologic conditions.

- A better understanding of existing water rights and existing water use by individual aquifer systems needs to be developed. This will require coordinated effort by the County, the Department of Ecology (Ecology), the Department of Health (DOH), and the U.S. Geologic Survey (USGS).

- Some specific county-wide groundwater quality issues need to be addressed through additional studies and a monitoring program. Some issues are:

  1) The nature and extent of nitrate contamination.

  2) Further delineation of the "arsenic" problem.

  3) The current and potential vulnerability for sea water intrusion.

  4) Monitoring requirements for early detection of water quality pollution problems.

- A data management program should be developed that, to the extent possible, will accept data from the USGS, Ecology, DOH, and utilities. Establishing a Data Management Center should be strongly considered.

- In order to address the technical groundwater data deficiencies relating to both quantity and quality, and to assure proper future management of the groundwater resource, a Ground Water Management Program (RCW 90.44.400 - 90.44.440) (GWMP) should be initiated as soon as possible. It should be done in phases to comprehensively define the aquifer systems, their characteristics, and problems, before identifying necessary corrective actions and/or regulatory controls.

- For those aquifer recharge areas or aquifer systems with high vulnerability to pollution, the initiation of Wellhead Protection Programs should be considered as parallel actions with the above-recommended GWMP. Individual utilities or entities utilizing wells in such areas for public water supply purposes should be encouraged and supported to be lead agencies in these programs.

- The critical aquifer recharge areas identified in this assessment should be adopted by the County as "Critical Areas" in response to the requirements of the Growth Management Act. The interim protection regulations should focus on targeted SEPA review of proposed projects within said areas by their designation as Environmentally Sensitive Areas and by amendment of the current "County Policy for Protection of Groundwater Resources. More specific protection measures and regulations should be developed as a product of the planned GWMP activities.

- For the longer term, it is recommended that:

    1) The Aquifer Vulnerability rating system be confirmed as more specific data becomes available and expanded to include additional rating criteria, as appropriate.

    2) Critical aquifer recharge areas be further evaluated as additional data becomes available. High risk land use areas (e.g., industrial and commercial zoning) outside, but in proximity to, such recharge areas, should be evaluated on a more intense scale to determine what degree of recharge potential exists and whether any of these areas meet the Critical Area criteria.

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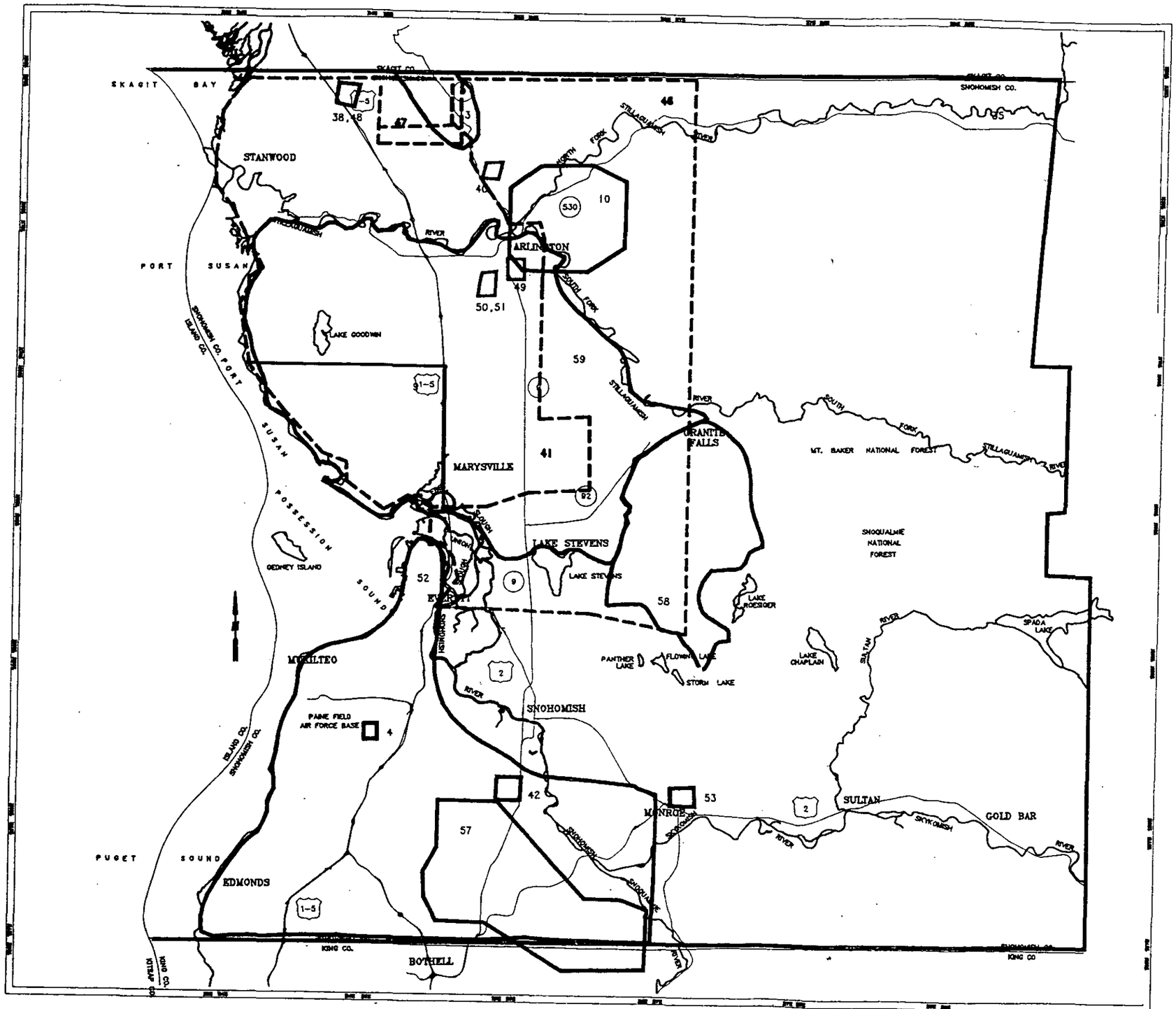


NUMBERS CORRESPOND TO "REFERENCES" IN REPORT

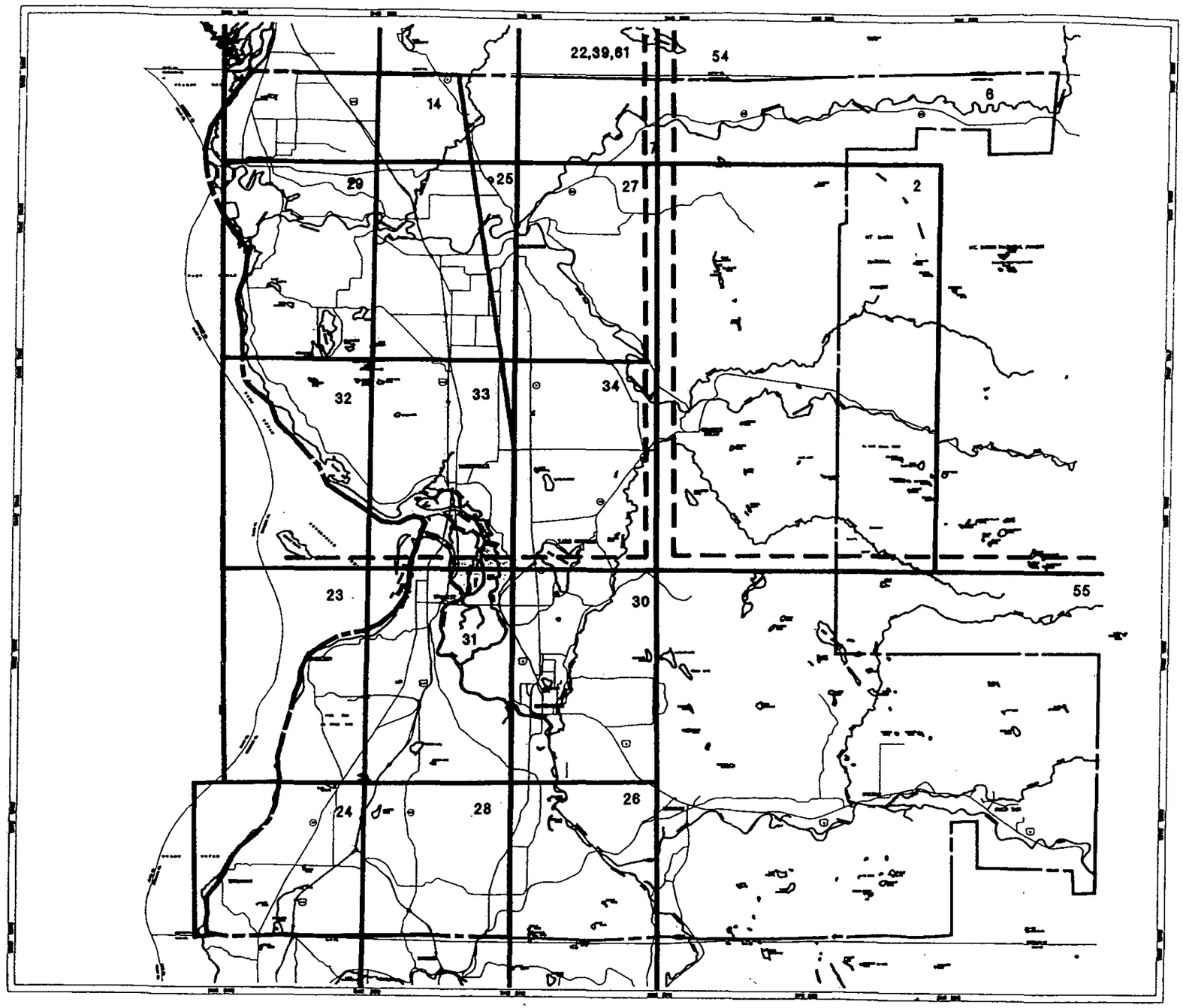
N

0 10000 20000 30000
SCALE (ft)

Sweet-Edwards
EMCON

APPENDIX A
SNOHOMISH COUNTY
INDEX OF GROUND WATER
AND WATER SUPPLY STUDIES

CADD FILE: EES\SNOBAIB\2/13/91



GEOLOGIC MAPS PREPARED BY USGS

SOIL CONSERVATION SERVICE NUMBERS CORRESPOND TO "REFERENCES" IN REPORT

N

SCALE (ft)

Sweet-Edwards
EMCON

DATE 7-91
DWN.
APPR.
REVIS.
PROJECT NO.

APPENDIX A
SNOHOMISH COUNTY
INDEX OF GEOLOGIC AND SOIL MAPS

CADD FILE: EES\SNOBASE2\1/8/91

Snohomish E-4 29/05-35A

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

WATER WELL REPORT
STATE OF WASHINGTON

Application No. R
Permit No. ....

(1) OWNER: Name Gordon Hallgren Address 4926 Fobes Rd Everett WA

(2) LOCATION OF WELL: County Snohomish E½ NW¼ SE ¼ SE ¼ Sec. 35 T. 29N., R. 5 W.M.

Bearing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 5 inches.
Drilled 325 ft. Depth of completed well 0 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: ____" Diam. from ____ ft. to ____ 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
Type Model No
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

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

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

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

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

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

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

Time	Water Level	Time	Water Level	Time	Water Level

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

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

MATERIAL	FROM	TO
Top Soil Surface		3
Glacial Till	3	18
Clay, sandy blue	18	325
Customer ordered drilling halted. Casing salraged and hole back filled and plugged.		
Elev = 190		
CROSS SECTION B - B'		

Work started Jan 14 19 77 Completed March 15 19 77

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 Fields Well Drilling
(Person, firm, or corporation) (Type or print)
Address 8811 196th SE Snohomish

[Signed] (Well Driller)
License No. 584 Date Mar 18 19 77

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

29/05-36N

Application No. _____

Permit No. _____

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

WATER WELL REPORT

STATE OF WASHINGTON

(1) OWNER: Name CLIFFORD HILL Address RT 2 BOX 265 EVERETT WA

(2) LOCATION OF WELL: County SNOHOMISH — SW¼ SW¼ Sec. 36 T. 29 N., R. 5E W.M.

ing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 460 ft. Depth of completed well 460 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 3' ft. to 350 ft.
Threaded ☐ 5 " Diam. from 952 ft. to 460 ft.
Welded ☑ _____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes ☑ No ☐
Type of perforator used _____
SIZE of perforations 1/4 in. by 6 in.
28 perforations from 450 ft. to 460 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? 18 ft.
Material used in seal BENTONITE
Did any strata contain unusable water? Yes ☑ No ☐
Type of water? FINE BLUE SD Depth of strata 38-321
Method of sealing strata off CASEING

(7) PUMP: Manufacturer's Name WEB-TROL
Type: SUBMERGIBLE HP 3

(8) WATER LEVELS: Land-surface elevation above mean sea level.... _____ ft.
Static level 180 ft. below top of well Date 10/2/79
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 10/2/79
Bailer test 12 gal./min. with 260 ft. drawdown after 1 hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☑

(10) WELL LOG:

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

MATERIAL	FROM	TO
Top Soil	0	9
GRAVEL MED W/CLAY BRWN	9	13
CLAY GRAY MED HARD	13	38
SAND GRAY W/B CLAY BLUE	38	43
CLAY GREY HARD	43	50
GRAVEL MED/CLAY BLUE /	50	81
SAND FINE TO COARSE W/B	—	—
SAND GREY FINE / CLAY GREY	81	210
CLAY GRAY HARD	210	260
SAND GREY FINE / W/B CLAY GREY	260	268
CLAY GREY M H	268	318
SAND GREY FINE W/B CLAY GREY	318	321
CLAY GREY HARD	321	423
SAND GREY FINE W/B	423	438
CLAY GREY W WOOD & SEASHELLS		
CLAY GREY M H	438	444
GRAVEL PEA SIZE W/SEASHELLS	444	460
SAND COURSE W/B		
FEW 200		

RECEIVED
FEB 21 1980
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

Work started 9/18 19 79 Completed 10/2 19 79

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 B & B WELL DRILLING
(Person, firm, or corporation) (Type or print)

Address 4612 44th DR. S.E SNOHOMISH

[Signed] KEN H BLACKMAN
(Well Driller)

License No. 0790 Date 10/2, 19 79

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

: Original and First Copy with
partment of Ecology
ond Copy — Owner's Copy
ird Copy — Driller's Copy 29/5E/26/B

WATER WELL REPORT
STATE OF WASHINGTON

Application No. 29/05-26B
Permit No. ....

) OWNER: Name Lenard B Allen Address 2326 Cavalero Rd, Everett, Wa.

) LOCATION OF WELL: County Snohomish NW ¼ NE ¼ Sec. 26 T. 29 N., R. 5 E. W.M.

ng and distance from section or subdivision corner Beg. at N.E. Cor. NW ¼, So 1176' to true pt. of beg., So. 152', W. 300', et

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

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

) DIMENSIONS: Diameter of well 6 inches.
Drilled 130 ft. Depth of completed well 130 ft.

) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 124'6" ft.
Threaded ☐ 5 " Diam. from 124'6" ft. to 130 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 Cook
Type Stainless steel Model No.
Diam. 5 Slot size 12 from 124'6" ft. to 130 ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

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

Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal Bentonite slurry
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.

) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 57 ft. below top of well Date 9/13/74
rtesian 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
as a pump test made? Yes ☐ No ☒ If yes, by whom?
eld: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

scovery 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

te of test
ailer test 4 gal./min. with 53 ft. drawdown after 2 hrs.
rtesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

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

MATERIAL	FROM	TO
Top soil	0	1'
Clay	1	24'
Till	24	32'
Clay	32	98'
Silt	98	114'
Fine sand	114	128'
Clay	128	130'
Elev = 160		
3		

Work started 9/2 19 74 Completed 9/13 19 74

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 J & S Drilling Co., Inc.
(Person, firm, or corporation) (Type or print)

Address P.O. Box 1065, Everett, Wa 98206

[Signed] A H Bakeng
(Well Driller)

License No. 0024 Date 12/12 19 74

(USE ADDITIONAL SHEETS IF NECESSARY)

. F. No. 7356—OS—(Rev. 4-71)

29/5-36/B

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

WATER WELL REPORT

STATE OF WASHINGTON

(4)

Application No. .....

Permit No. .....

(1) OWNER: Name Lloyd A. Downes Address 4911 87th Ave SE Snohomish WA

(2) LOCATION OF WELL: County Snohomish NW¼ – NW ¼ NE ¼ Sec 36 T 29 N., R 5E W.M.

Bearing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 242 ft. Depth of completed well 242 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8 " Diam. from +1 ft. to 237 ft.
Threaded ☐ ____ " Diam. from ____ ft. to ____ ft.
Welded ☒ ____ " Diam. from ____ ft. to ____ ft.

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

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type Stainless Model No. ____
Diam. 8 Slot size 25 from 237 ft. to 242 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? 20 + ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☒ No ☐
Type of water? normal Depth of strata 187-191
Method of sealing strata off Cased off

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

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ____ ft.
Static level 90 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? driller
Yield: 30 gal./min. with 110 ft. drawdown after 5 hrs.
" 25 " " 136 stableized aft 1 hr "
" " " " "

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
18 min	125				
45 min	static				

Date of test 9 Sept 1983
Bailer 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
Gravelly till	surface	8
Clay, sandy, yellow	8	24
Clay, blue	24	35
Glacial till	35	168
Clay, some gravel	168	187
Sand and gravel, fine, some water but very limited	187	191
Clay, blue	191	238
Sand and gravel, medium coarse water bearing	238	242
Clay, blue and beyond	242	
Four feet of aquafer is much less than desired but at this depth must be accepted.		
Elev 201		

RECEIVED
SEP 29 1983
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

Work started 12 August 19 83 Completed 8 Sept 19 83

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 Fields Well Drilling
(Person, firm, or corporation) (Type or print)
Address 8811 196th SE Snohomish WA 98290

[Signed] Eugene Fields
(Well Driller)

License No. 0584 Date 26 Sept 83

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

29/05-36 H

Application No. .....

Permit No. .....

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

WATER WELL REPORT

STATE OF WASHINGTON

(1) OWNER: Name Parker Williams Address .....

(2) LOCATION OF WELL: County Snohomish NE¼ SE¼ Sec 36 T 29 N., R 5E W.M.

ing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 146 ft. Depth of completed well 146 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6" Diam. from +2 ft. to 146 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 .....
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? 18 ft.
Material used in seal Clean 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 N/A
Type: ... H.P. ...

(8) WATER LEVELS: Land-surface elevation above mean sea level .... 300 ft.
Static level 100 ft. below top of well Date 8-10-87
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 Figgins Drlg
Was a pump test made? Yes ☒ No ☐ If yes, by whom? ...
Yield: 5 gal./min. with 36 ft. drawdown after 4 hrs.
" 7 " 38 " 1/2 "
" " " "

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
2:00	136'	2:10	100'	3:15	100'
3:00	136'	3:05	116'	3:10	100'
4:00	136'	4:05	120'	4:10	102

Date of test 8-8-87
Bailer test 7 gal./min. with 32 ft. drawdown after 1 hrs.
Artesian flow ... g.p.m. Date ...
Temperature of water 46 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
8" casing above ground	+2	-0-
gravel & brown clay	0	10
large gravel & clay	10	16
grey hard pan	16	32
brown clay & gravel	32	38
grey hard pan	38	40
brown clay (soft)	40	57
grey hard pan	57	82
blk sand & gravel	82	84
grey hard pan (coarse)	84	87
grey clay & sand	87	114
blk heavy sand & gravel	114	142
blk. coarse gravel	142	146

RECEIVED
AUG 20 1987
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

Work started 8-1 19 87 Completed 8-10 19 87

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 Figgins Drilling
(Person, firm, or corporation) (Type or print)

Address 2109 123rd Ave N.E. #5 Lake Stevens, Wa. 98258

[Signed] William C. Figgins
(Well Driller)

License No. 1514 Date ..., 19...

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

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

WATER WELL REPORT

STATE OF WASHINGTON

29/05-35R

Application No. _____

Permit No. _____

(1) OWNER: Name Richard Rodland Address 4506 Fobes Road Everett WA

(2) LOCATION OF WELL: County Snohomish E½ NW¼ NW ¼ SE ¼ Sec. 35 T. 29 N., R. 5 W.M.

Bearing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 143 ft. Depth of completed well 143 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from plus 1 ft. to 138 ft.
Threaded [ ] _____ " Diam. from _____ ft. to _____ ft.
Welded [X] _____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes [X] No [ ]
Type of perforator used 3/16 1
SIZE of perforations _____ in. by _____ in.
30 perforations from 134 ft. to 136 ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes [X] No [ ] Manufacturer's Name Johnson
Type Wire wound stainless Model No. _____
Diam. 6 Slot size 14 from 138 ft. to 143 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 .... _____ ft.
Static level 70 ft. below top of well Date Feb 8 76
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

Date of test _____
Bailer test 15 gal./min. with 30 ft. drawdown after 2 hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes [ ] No [X]

(10) WELL LOG:

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

MATERIAL	FROM	TO
Top Soil Surface		2
Sandy Clay	2	18
Glacial Till	18	21
Clay brown	21	38
Glacial Till	38	44
Clay, brown	44	62
Glacial Till, boulders	62	94
Gravel, some water	94	108
Gravel stratified with compacted sand and gravel	108	132
Gravel and sand, water-bearing and on	132	143
Perforations admitted small amount of sand so screen was installed. Five feet of flush tube extension covers perforations.		
20'		

Work started Jan 5, 1976 Completed Feb 8, 1976

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 Fields Well Drilling
(Person, firm, or corporation) (Type or print)
Address 8811 196th SE Snohomish WA 9829

[Signed] Clyde Fields
(Well Driller)
884

License No. _____ Date Feb 9, 1976

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

29/06-31 P

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

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Warren E. Roberts Address 316 Ave C, Snohomish WA 98290

(2) LOCATION OF WELL: County Snohomish SE ¼ SE ¼ SE ¼ SW ¼ Sec. 31 T. 29 N., R. 6 W.M.

ing and distance from section or subdivision corner (10615 52nd, Snohomish)

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 180 ft. Depth of completed well 180 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from plus 1 ft. to 161 ft.
Threaded ☐ ____ " Diam. from ____ ft. to ____ ft.
Welded ☒ ____ " Diam. from ____ ft. to ____ ft.

Perforations: Yes ☒ No ☐
Type of perforator used Mills
SIZE of perforations ¼ in. by 1 in.
48 perforations from 61 ft. to 64 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? 18 ft.
Material used in seal ____
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ____ Depth of strata ____
Method of sealing strata off ____

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

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ____ ft.
Static level 36 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 15 gal./min. with 124 ft. drawdown after ½ hrs.
Artesian flow ____ g.p.m. Date ____
Temperature of water ____ Was a chemical analysis made? Yes ☒ No ☐

(10) WELL LOG:

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

MATERIAL	FROM	TO
Top Soil	Surface	2
Glacial Till	2	18
Gravel, dry	18	18
Glacial Till (Caved)	18	62
Gravel	62	63
Clay, blue	63	144
Silt, packed with binder and beyond	144	180
Perforations produced no water.		
Water apparently from thin strata in silt.		
Lowwater protective device recommended.		
130'		

RECEIVED
APR 16

Work started 21 Feb 19 80 Completed 26 Mar 1980

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 Fields Well Drilling
(Person, firm, or corporation) (Type or print)

Address 8811 196th SE Snohomish WA 98290

[Signed] ____ (Well Driller)

License No. 0584 Date 14 April 80

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

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epartment of Ecology
Second Copy — Owner's Copy
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WATER WELL REPORT

STATE OF WASHINGTON

(8)

28/0c-06C
Application No. .....

Permit No. .....

1) OWNER: Clint & Name Linda McCubbin Address 4314-103rd Snohomish, Wa.

(2) LOCATION OF WELL: County Snohomish — NE ¼ NW ¼ Sec 6 T 28 N., R 6E W.M.

Bearing and distance from section or subdivision corner

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

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

5) DIMENSIONS: Diameter of well 6 inches.
Drilled 140 ft. Depth of completed well 138 ft.

6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +2 ft. to 138 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
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? 18 ft.
Material used in seal puddling clay
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

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

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 104 ft. below top of well Date 4-30-86
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

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

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

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 20 gal./min. with ft. drawdown after ½ 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 topsoil	0	2
Gray clay & gravel	2	65
Sandy brown clay	65	67
Brown gravel & little clay	67	74
Gray clay	74	75
Brown gravel & dirty seepage	75	92½
Brown clay & sand	92½	96
Gray clay-gumbo	96	112
Gray clay & gravel	112	117
Brown gravel, clay & sand	117	118
Gray clay & gravel	118	121
Gray clay & gravel & sand	121	130
Gray clay	130	136
Gray gravel & water	136	138½
Started turning brown	138½	---

200'

RECEIVED
JAN 22 1988
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

Work started April 30, 19 86 Completed April 30, 19 86

WELL DRILLER'S STATEMENT:

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

NAME Hayes Well Drilling & Pumps Inc.
(Person, firm, or corporation) (Type or print)

Address 1413 Colony Rd. Bow

[Signed] Steve Gilbert
(Well Driller)

License No. 762 Date July 21, 1987

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

28/06-05M

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

WATER WELL REPORT

STATE OF WASHINGTON

(9) Application No. .....

Permit No. .....

(1) OWNER: Name Albert G. Day Address Machias Rd Snohomish WA 98290

(2) LOCATION OF WELL: County Snohomish S½ SW¼ NW¼ SW¼ ¼ Sec 5 T. 28 N., R. 6 W.M.

Bearing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 218 ft. Depth of completed well 218 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from Plus 1 ft. to 218 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
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? 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 .... ft.
Static level 90 ft. below top of well Date Apr 28, 1977
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 20 gal./min. with 32 ft. drawdown after 2½ hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

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

MATERIAL	FROM	TO
Top Soil	Surface	2
Glacial Till	2	134
Clay with dry gravel strata	134	192
Coarse sand, blue-grey, some water	192	212
Gravel, water-bearing and on	212	218
70'		

Work started Mar 21, 1977 Completed Apr 28, 1977

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 Fields Well Drilling
(Person, firm, or corporation) (Type or print)
Address 9911 198th SE Snohomish WA 98290

[Signed] (Well Driller)
584
License No. Date April 30, 1977

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

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...L REPORT
...F WASHINGTON

Application No. Unknown
Permit No. 28/06-04E

(1) OWNER: Name [illegible] Address [illegible]

(2) LOCATION OF WELL: County [illegible] ¼ ¼ Sec 4 T 23 N., R 5 W.M.

Bearing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 202 ft. Depth of completed well 202 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 133 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
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? 18 ft.
Material used in seal [illegible]
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

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

(8) WATER LEVELS: Land-surface elevation above mean sea level.... 200 ~~220~~ ft.
Static level 17 ft. below top of well Date 3/23/73
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 2 gal./min. with 122 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water [illegible] 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	
[illegible], brown, sandy	0	3	
Gravel, [illegible], brown,	3	20	G
Gravel, [illegible], sandy, cemented	20	35	
Shale, blue, soft	35	73	
Shale, [illegible] brown, soft	73	75	
Shale, [illegible], [illegible]	75	93	SH
Shale, light brown, soft	93	127	
[illegible], [illegible], [illegible]	127	134	SS
[illegible], [illegible], [illegible]	134	197	
[illegible], [illegible], hard?			
bearing	197	202	
[illegible]			
[illegible]			
200'			

Work started [illegible], 19 73 Completed [illegible] 31, 1973

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 [illegible] (Person, firm, or corporation) (Type or print)

Address [illegible]

[Signed] Robert E. Freeman (Well Driller)

License No. [illegible] Date August 27, 1973

(USE ADDITIONAL SHEETS IF NECESSARY)

...F. No. 7356—OS—(Rev. 4-71).

(11) 28/06-04M

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

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 012115

Water Right Permit No. _____

(1) OWNER: Name GEORGE GALLE Address 5203 Panther Lk.Rd.Snohomish 9827

(2) LOCATION OF WELL: County Snohomish NW ¼ SW ¼ Sec 4 T 28 N., R 6E W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) 6312-135th Ave.SE

(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 320 feet. Depth of completed well 320 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +1 ft. to 320 ft.
Welded ☒ _____ " Diam. from _____ ft. to _____ ft.
Liner installed ☐
Threaded ☐ _____ " Diam. from _____ ft. to _____ ft.

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

Screens: Yes ☐ No ☒
Manufacturer's Name _____
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? 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 NA
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 120 ft. below top of well Date _____
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

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

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

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

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

MATERIAL	FROM	TO	
Damp brn sand	0	16	
Damp grey silt and gravel	16	68	
Grey silty clay	68	97	
Silty gravel little water	97	100	C
Grey silty clay	100	157	
Brn sand/gravel lil' water	157	163	S/G
Small angular gravel/sand	163	241	
Grey clay	241	290	
Hard Grey Clay	290	320	C

200'

RECEIVED JUL 18 1988 DEPARTMENT OF ECOLOGY

Work started 5/23/88 19. Completed 5/27/88 19

WELL CONSTRUCTOR CERTIFICATION:

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

NAME OELKE DRILLING, INC. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 4312-166th Ave.E.Sumner,WA 98390

(Signed) Dave Johnson (WELL DRILLER) License No. 1526

Contractor's Registration No. OELKEDI136OC Date June27 19 88

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329- 3

Original and First Copy with
artment of Ecology
ond Copy — Owner's Copy
ird Copy — Driller's Copy 28/6E/09/B

WATER WELL REPORT

STATE OF WASHINGTON

(12)

Application No. 28/06-0913

Permit No. ....

(1) OWNER: Name Robert W. Burfening Address 7226-137th S.E. Snohomish, Wa. 98290

(2) LOCATION OF WELL: County Snohomish NE ¼ NW ¼ Sec. 9 T. 28 N., R. 6E W.M.

Bearing and distance from section or subdivision corner Beginning at No. line of Sec. 9, bearing So. 89° 29' 14", West 660' from (e

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 155 ft. Depth of completed well 155 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 115 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
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? 18 ft.
Material used in seal Bentonite slurry
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

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

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 0 ft. below top of well Date
Artesian pressure 10 lbs. per square inch Date 9/2/74
Artesian water is controlled by Cap (Cap, valve, etc.)

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

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

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow 8-10 g.p.m. Date 9-2-74
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
Hard pan	0	9'
Blue clay	9	24'
Gray till	24	90'
Brown Till	90	98'
Silt	98	104'
Soft Siltstone	104	109'
Hard siltstone - water at 155'	109	155'
200'		

Work started 8-14 19 74 Completed 9-2 19 74

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 J & S Drilling Co., Inc.
(Person, firm, or corporation) (Type or print)

Address P.O. Box 1065, Everett, Wa 98206

[Signed] A W Baking
(Well Driller)

License No. 0094 Date 11-6, 19 74

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

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

WATER WELL REPORT
STATE OF WASHINGTON

(13) 28/00-1C N

Application No. .....

Permit No. .....

(1) OWNER: Name W.C. Jones Address 7802 - 85th S.E., Snohomish 98290

(2) LOCATION OF WELL: County Snohomish NE ¼ NE ¼ Sec. 10 T. 28 N., R. 6E W.M.

Bearing and distance from section or subdivision corner 500' S. of house

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 240 ft. Depth of completed well 240 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6" Diam. from 0 ft. to 70 ft.
Threaded ☐ 5" Diam. from 70 ft. to 240 ft.
Welded ☒ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☐
Type of perforator used torch
SIZE of perforations ⅛ in. by 12 in.
4 per ft. perforations from 205 ft. to 230 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? 18 ft.
Material used in seal puddling clay
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

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

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 40 ft. below top of well Date 10/23/78
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 ☒ (with Air) No ☐ If yes, by whom? Driller
Yield: 10 gal./min. with 240 ft. drawdown after 1 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 min	75'				

Date of test 10/23/78
Baller test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water 49 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
Silty gravel, topsoil	0	4
Brn. silty sand + gravel	4	8 10
Till	8	27
Boulder	27	30
Till	30	65 69
Grey siltstone w/ some sand	65	120
Coarse gray sand w/some gravel, water 2gpm	120	122
Grey to Brown siltstone	122	198
Coarse cemented sand	198	203
Broken sandstone	203	230
Grey to brown siltstone - water	230	240 24
500'		

Work started 10-18 19 78 Completed 10-23 19 78

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 OELKE Drilling Co.
(Person, firm, or corporation) (Type or print)

Address 701 - 41st Ave N.E., Puyallup Wa. 983

[Signed] Roger Oelke
(Well Driller)

License No. 0379 Date 10-30 19 78

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

3

LK Koesig?r F-W (1)

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

WATER WELL REPORT
STATE OF WASHINGTON

Application No. 28/06-11H

Permit No. ....

(1) OWNER: Name Bill Nichols Address 11212 Chain Lk Rd Snohomish

(2) LOCATION OF WELL: County Snohomish SE ¼ NE ¼ Sec 11 T 28 N., R 6E W.M.

Bearing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 165 ft. Depth of completed well 165 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6" Diam. from 0 ft. to 165 ft.
Threaded [ ] ____" Diam. from ____ ft. to ____ ft.
Welded [X] ____" Diam. from ____ ft. to ____ ft.

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 [ ] No [X]
Manufacturer's Name ____
Type ____ Model No. ____
Diam. ____ Slot size ____ from ____ ft. to ____ 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 slurry
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.... ____ ft.
Static level 127 ft. below top of well Date 11-6-78
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? by machine
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
" 8 " 15 " 2 "
" " " "

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.
Artesian flow ____ g.p.m. Date ____
Temperature of water ____ Was a chemical analysis made? Yes [ ] No [X]

(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
topsoil	0	5
till	5	63
clay brown	63	67
till	67	110
clay blue	110	155
sand + gravel water bearing	155	165

520'

Work started 11-2-78, 19____. Completed 11-6-78, 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 J+S Drilling Co, Inc (Person, firm, or corporation) (Type or print)

Address PO Box 1065, Everett Wa

[Signed] Dwayne Rattoff (Well Driller)

License No. 621 Date ____, 19____

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

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WATER WELL REPORT (2)

STATE OF WASHINGTON

Application No. 28/06 - 12 J

Permit No. ....

(1) OWNER: Name James G. Bigg Address 6316 151st Ave. SE, Snohomish Wa

(2) LOCATION OF WELL: County Not available Such NE¼ SE¼ Sec. 12 T. 28 N., R. 6 E W.M.

Bearing and distance from section or subdivision corner Li 500' of NE¼ SE¼ lying N of c.f., Pcl.

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 225 ft. Depth of completed well 225 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 190 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
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? 18 ft.
Material used in seal bentonite slurry
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

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

(8) WATER LEVELS: Land-surface elevation above mean sea level .... — ft
Static level 44 ft. below top of well Date 5-11-96
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 3 gal./min. with 181 ft. drawdown after 2 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

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

MATERIAL	FROM	TO
Top soil	0	3'
Brown till	3'	14'
Gray till	14'	58'
Sandstone, light gray	58'	92'
Bluish gray	92'	123'
Peat	123'	125'
Gravel, black water oil float	125'	126'
Sand	126'	133'
Gray till	133'	178'
Sand with clay	178'	190'
Till, gray & hard with small seam of water	190'	225'

500'

Work started 4-14 19 96 Completed 5-11 19 96

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 J. & S. Drilling Co.
(Person, firm, or corporation) (Type or print)

Address ~~3511 94th Pl~~ PO. Box 1065, Everett, Wa

[Signed] A. H. Baking
(Well Driller)

License No. 24 Date , 19

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

Peter Lance

(3)

28/07-05F

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

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name L. H. Design Inc Address 4006-10 Lake Sammamish Pkwy NE Redmond

(2) LOCATION OF WELL: County Snohomish ¼ SE ¼ NW ¼ Sec 7 T 28 N., R 07 E W.M.

Bearing and distance from section or subdivision corner Lot 18. Seq 167-79

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 100 ft. Depth of completed well 100 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: ..." Diam. from ... ft. to ... ft.
Threaded ☐ ..." Diam. from ... ft. to ... ft.
Welded ☑ 6" Diam. from +1 ft. to 95 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 ☐ Johnson
Manufacturer's Name .....
Type Stainless Steel Model No. .....
Diam. ... Slot size ... from ... ft. to ... ft.
Diam. 6 Slot size .012 from 95 ft. to 100 ft.

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

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

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

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 48 ft. below top of well Date 8-23-87
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? Owner
Yield: 10 gal./min. with 6 ft. drawdown after 10 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
5 PM	54'	5:00	48'		

Date of test 8-23-87
Bailer test 20+ gal./min. with 47 ft. drawdown after 1 hrs.
Artesian flow ... g.p.m. Date .....
Temperature of water ... Was a chemical analysis made? Yes ☑ No ☐

(10) WELL LOG:

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

MATERIAL	FROM	TO
Topsoil	0	1
Brown Till (Silty Sand Gravel)	1	15
Gray Till.	15	70.
Fine To Coarse Sand, Gravel	70	100.
5,0		

OCT 02 1987

Work started 8-19 19 87 Completed 8-19 19 87

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 ..... (Person, firm, or corporation) (Type or print)
AURAL DRILLING CO.
Address P. O. Box 652
Monroe, Wa. 98272
[Signed] ... (Well Driller)
License No. 0007 Date 8-23 1987

(USE ADDITIONAL SHEETS IF NECESSARY)

28/07-05E

(4)

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

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Wayne Peterson Address 7329 Merco Rd. Snohomish, Wa. 98290

(2) LOCATION OF WELL: County Snohomish SW¼ NW¼ Sec 5 T. 28 N., R. 7 W.M.

Bearing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 370 ft. Depth of completed well 368 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 363 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
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? 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 .... 480 ft.
Static level 105 ft. below top of well Date 12-16-81
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

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

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

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 3 gal./min. with 237 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 Clay, Gravel, Boulders	0	13
Brown clay, Gravel	13	17
Brown clay, sand, Gravel	17	19
Green Sand, Gravel, Cemented	19	24
Blue Clay, Gravel, Sand	24	136
Green Clay, Gravel, Sand	136	142
Gray clay, Gravel, Sand	142	155
Gray Clay	155	159
Gray Clay, Gravel, Sand	159	290
Gray Clay, Gravel, Soft	290	295
Gray clay, silt & Gravel	295	297
Gray clay, silty	297	316
Gray clay, sand, gravel Trace of water	316	370
551		

Work started 11-12 19 81 Completed 12-17 19 81

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 B&J Drilling Co 392-3826
(Person, firm, or corporation) (Type or print)

Address 9026 38th Ave SW, Seattle

[Signed] Wesley L. Roberts J. L. Casson
(Well Driller)

License No. 1053 Date Dec. 24, 19 81

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

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epartment of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(5)

26/07w-9K

Application No. .....

Permit No. .....

(1) OWNER: Name Dubick, Mike & L Address 24226 N IK Cochran Monroe

(2) LOCATION OF WELL: County Snohomish - SE ¼ SE ¼ Sec 9 T 28 N., R 7 W.M.

Bearing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 300 ft. Depth of completed well 300 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: ..." Diam. from .. ft. to .. 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
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? 18 ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ... Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name Pioneer
Type: Subm H.P. 3/4

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 70 ft. below top of well Date 12-4-84
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 1/4 gal./min. with -5- ft. drawdown after 1 hrs.
Artesian flow ... g.p.m. Date
Temperature of water ... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

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

MATERIAL	FROM	TO
Yellow Hardpan	0'	24'
Grey	24'	50'
Quicksand	50'	80
Grey Hardpan	80	95'
Yellow Hardpan	95'	150'
Solid Rock	150'	300'
450'		

Work started Oct X 19 54 Completed 12-4 19 84

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 Wallace M. Robinson
(Person, firm, or corporation) (Type or print)

Address 8521 Gold Way Ev 98204

[Signed] Wallace M Robinson
(Well Driller)

License No. 0855 Date 1-1, 19 85

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

(7) 28/07-10G

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

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 020405

Water Right Permit No. _____

(1) OWNER: Name DANA REED Address 25121 74th Pl. S.E., Monroe 98272

(2) LOCATION OF WELL: County Snohomish SW ¼ NE ¼ Sec 10 T 28 N., R 7E W.M.

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

(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 280 feet. Depth of completed well 57 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +1 ft. to 57 ft.

Welded ☒ Liner installed ☐ Threaded ☐ _____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☒

Type of perforator used _____

SIZE of perforations _____ in. by _____ in.

_____ perforations from _____ ft. to _____ ft.

_____ 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? 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 N/A

Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.

Static level _____ ft. below top of well Date _____

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (Cap, valve, etc.)

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

Was a pump test made? Yes ☐ No ☒ If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

" " " "

" " " "

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

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

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

MATERIAL	FROM	TO
Gravel & cobbles	0	16
Brn silty gray	16	24
Weathered gray bedrock	24	57
Gray bedrock	57	280
3"		
encountered seep at 160 ft. less than 1 gpm		

RECEIVED
AUG 30 1989
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

Work started 7/26/89, 19. Completed 7/31/89, 19

WELL CONSTRUCTOR CERTIFICATION:

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

NAME OELKE DRILLING, INC (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 4312-166th Ave. E., Sumner 98390

(Signed) _____ (WELL DRILLER) License No. 0837

Contractor's Registration No. OELKEDI136QC Date 8/17/89, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

LK Stevens N-S

30-06-7B

ile Original and First Copy with
epartment of Ecology
econd Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

(1)

STATE OF WASHINGTON

Application No. .....

Permit No. .....

1) OWNER: Name Toby Tobias Address 10025 189th PLNE Arl

(2) LOCATION OF WELL: County Snohomish NW¼ NE¼ Sec 7 T 30 N., R 6 W.M.

Bearing and distance from section or subdivision corner

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

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

5) DIMENSIONS: Diameter of well 6 inches.
Drilled 60 ft. Depth of completed well 60 ft.

6) CONSTRUCTION DETAILS:

Casing installed: 6" Diam. from 0 ft. to 55 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 Cook
Type Gon Slot Model No .....
Diam. 5 Slot size 30 from 55 ft. to 60 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? 19 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 .... ft.
Static level 25' ft. below top of well Date June 10
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 35 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
Top soil	0	2
Hardpan	2	35
Sand	35	55
Sand & Gravel water bearing	55	60
030		

CROSS SECTION A - A'

SEP 1988

Work started June 10, 19 88 Completed June 10 19 88

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 Anderson Drilling Co
(Person, firm, or corporation) (Type or print)

Address 7412-204th NE Arl

[Signed] ... (Well Driller)

License No 1367 Date Aug 1, 19 88

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

3

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

WATER WELL REPORT (2)

STATE OF WASHINGTON

Start Card No. 014047

Water Right Permit No. _____

(1) OWNER: Name Dooley Address 11409 125th Lk. Stevens

(2) LOCATION OF WELL: County Sno NE¼ NW¼ Sec. 8 T. 30 N., R. 6E 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 200 feet. Depth of completed well 200 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from +3 ft. to 200 ft.
Welded ☒ Liner installed ☐ Threaded ☐ _____ " Diam. from _____ ft. to _____ ft.
_____ " 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 _____
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? 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 GRUNDFOS
Type: SUB H.P. 1

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 142 ft. below top of well Date 1-19-90
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

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

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

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest 30 gal./min. with stem set at 180 ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

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

MATERIAL	FROM	TO
TOPSOIL	0	4
TAN HARD PAN W/ GRAVEL	4	20
BLUE HARD PAN W/ GRAVEL	20	80
TAN CLAY	80	85
RUSTY GRAVEL SILT & CLAY	85	160
RUSTY CLAY SAND & GRAVEL	160	190
SAND GRAVEL W/ WATER	190	200

440'

RECEIVED
MAR 05 1990
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

Work started 1-19 19. Completed 1-20 19 90

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 Camano Well Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address PO Box 432 Stanwood WA

(Signed) Joseph Nuns (WELL DRILLER) License No. 0611

Contractor's Registration No. CAMANWD 141RZ Date 2-28 19 90

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy 30/6E/18/A

WATER WELL REPORT
STATE OF WASHINGTON

(3)

Application No. Waiting
Permit No. 30/06-18 A

(1) OWNER: Name [illegible] Address 12[illegible]-115th [illegible] Lake Stevens, Wash.

(2) LOCATION OF WELL: County Snohomish — [illegible] ¼ NE ¼ Sec 18 T 30 N., R 6E W.M.

Bearing and distance from section or subdivision corner

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

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

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

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 125 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
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? 13 ft.
Material used in seal Bentonite Clay
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.... 422 ft.
Static level 123 ft. below top of well Date 7/30/73
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 22 gal./min. with 12 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date 7/30/73
Temperature of water 52 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
Soil, brown, sandy	0	3
Gravel, brown, coarse, sandy,	3	10
Sand and Gravel, some clay,	10	13
Gravel, brown, boulders,	13	53
Sand and Gravel, gray, thin clay stains	53	68
Clay, blue,	53	79
Sand and Gravel, brown, coarse	79	121
Sand and Gravel, brown, loose, wet	121	125
430		

Work started 7/13 19 73 Completed 7/30 19 73

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 [illegible] Drilling & Pump Service
(Person, firm, or corporation) (Type or print)

Address [illegible] Box 213 Arlington, Wash.

[Signed] R. E. Freeman
(Well Driller)

License No. 23-02-3225 Date Aug. 3, 1973

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

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

(4) 30106-17F

WATER WELL REPORT

STATE OF WASHINGTON

Application No.

Permit No.

(1) OWNER: Name Leroy Ingrum Address 13302 123rd NE Lk Stevens

(2) LOCATION OF WELL: County Snohomish NE1/4 SE ¼ NW ¼ Sec 17 T 30 N., R 6 E W.M.

Bearing and distance from section or subdivision corner

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

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

New well [X] Method: Dug [ ] Bored [ ]
Deepened [ ] Cable [X] Driven [ ]
Reconditioned [ ] Rotary [ ] Jetted [ ]

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 179 ft. Depth of completed well 179 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +1 ft. to 179 ft.
Threaded [ ] " Diam. from ft. to ft.
Welded [X] " Diam. from ft. to ft.

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 [ ] No [X]
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to 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? 20 plus
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.... ft.
Static level 95 ft. below top of well Date Jun 30/76
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 [X] No [X] If yes, by whom? ~~Driller~~
Yield: ~~XXXXXXXXXXXXXXXXXXXXXXXXXX~~ 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
Plus 5-Static					

Date of test
Bailer test 18 gal./min. with 25 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water 54 Was a chemical analysis made? Yes [ ] No [X]

(10) WELL LOG:

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

MATERIAL	FROM	TO
Top Soil	Surface	2'
Glacial Till grey	2'	32'
Clay blue	32'	39'
Glacial Till brown	39'	41'
Sand and Gravel cemented	41'	77'
Sand and Gravel brown	77'	80'
Glacial Till brown	80'	114'
Sand and Gravel brown	114'	121'
Glacial Till brown	121'	130'
Sand and gravel cemented	130'	145'
Glacial Till brown	145'	168'
Sand and Gravel brown	168'	171'
Sand and Gravel, brown, water-bearing, coarse and beyond	171'	179'

420

Work started June 9 19 76. Completed June 30 19 76

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 Fields Well Drilling
(Person, firm, or corporation) (Type or print)

Address 8811 186th SE
Snohomish WA 98290

[Signed] [signature]
(Well Driller)

License No. 584 Date July 1 19 76

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

30/06E/20-E

(5)

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

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 014057

Water Right Permit No. _____

(1) OWNER: Name JEFF EDWARDS Address 11721 84th ST NE LK. STEVENS

(2) LOCATION OF WELL: County SNO SW¼ NW¼ Sec 20 T 30 N., R 6 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 100 feet. Depth of completed well 100 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from +3 ft. to 100 ft.
Welded ☒ Liner installed ☐ Threaded ☐ _____ " Diam. from _____ ft. to _____ ft.
Perforations: Yes ☐ No ☒
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ 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? 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 GRUNDFOS
Type: SUB H.P ½!

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 67 ft. below top of well Date 1-22-90
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 25 gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

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

MATERIAL	FROM	TO
TOPSOIL	0	3
TAN HARD PAN	3	26
RUSTY SAND & GRAVEL	26	80
RUSTY SAND & GRAVEL W/WATER	80	95
SAND & GRAVEL W/CLEAR WATER	95	100

ACC

RECEIVED
JAN 29 1990
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

Work started 1-22-90 19. Completed 1-22- 19 90

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 CAMANO WELL DRILLING (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address PO BOX 432 - STANWOOD, WA

(Signed) Joseph L. Nims (WELL DRILLER) License No. 0611

Contractor's Registration No. CAMANW0146R2 Date 1-22 19 90

(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

STATE OF WASHINGTON

(6)

30/06-28M

Application No. .....

Permit No. CC0653

(1) OWNER: Name BOB RIST Address 13320 68TH NE LK STEVENS

(2) LOCATION OF WELL: County SNO NW ¼ SW ¼ Sec 28 T 30 N R 6 W.M.

Bearing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 120 ft. Depth of completed well 120 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from +3 ft. to 120 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 .....
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? 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 N/A
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level ..... ft.
Static level 25 ft. below top of well Date 6-28-88
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 20 gal./min. with 105 ft. drawdown after 1 hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

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

MATERIAL	FROM	TO
TOPSOIL	0	1
SANDY TAN CLAY	1	5
TAN CLAY W/SAND & GRAVEL	5	8
TAN CLAY W/SAND	8	14
BLUE HARD PAN	14	55
TAN HARD PAN	55	90
TAN SILTY GRAVEL	90	110
GRAVEL W/WATER	110	120

240

Work started 6-28 19 88 Completed 6-28 19 88

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 AMANO WELL DRILLING
(Person, firm, or corporation) (Type or print)

Address PO BOX 432 STANWOOD

[Signed] Jasper Amano
(Well Driller)

License No. 0611 Date 7-12 19 88

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

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hird Copy — Driller's Copy 30/6E/33/R

WATER WELL REPORT
STATE OF WASHINGTON

(7)

Application No. 30106-53R

Permit No. ....

(1) OWNER: Name Marg Hughen Address 4610 147th N. E., Lake Stevens, Wash. 98258

(2) LOCATION OF WELL: County Snohomish - SE¼ SE¼ Sec. 33 T. 30 N., R. 6E W.M.

Bearing and distance from section or subdivision corner

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

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 132 ft. Depth of completed well 131 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +2 ft. to 131 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
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? 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.... ____ ft.
Static level 96 ft. below top of well Date 6/28/74
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?
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 10 gal./min. with 20 ft. drawdown after 1 hrs.
Artesian flow ____ g.p.m. Date
Temperature of water ____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

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

MATERIAL	FROM	TO
Top soil	0	3
Tan clay, rocks	3	15
Gray clay, gravel, scattered boulders	15	128
Gravel, water	128	132
Gray clay	132	

2,30

Work started 6/28/74 19.... Completed 6/28 19 74

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 HAYES WELL DRILLING & PUMPS, INC.
(Person, firm, or corporation) (Type or print)

Address Bow, Wash. 98232

[Signed] ____ (Well Driller)

License No. 223 02 10119 Date 9/24, 19 74

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

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

WATER WELL REPORT
STATE OF WASHINGTON

(8) 32/6 -34Q Application No. .....

Permit No. .....

(1) **OWNER:** Name Rick Gort Address 4411-147th Ave. N.E., Lk. Stevens

(2) **LOCATION OF WELL:** County Snohomish — SE ¼ SW¼ Sec 34 T 30N., R 6 W.M.

Bearing and distance from section or subdivision corner 200' N. of house

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

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

(5) **DIMENSIONS:** Diameter of well 6 inches.
Drilled 195 ft. Depth of completed well 195 ft.

(6) **CONSTRUCTION DETAILS:**

Casing installed: 6 " Diam. from 0 ft. to 195 ft.
Threaded [ ] ____ " Diam. from ____ ft. to ____ ft.
Welded [X] ____ " Diam. from ____ ft. to ____ ft.

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 [ ] No [X]
Manufacturer's Name .....
Type ..... Model No .....
Diam. ____ Slot size ____ from ____ ft. to ____ 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 puddling clay
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 N/A
Type: ..... H.P. .....

(8) **WATER LEVELS:** Land-surface elevation above mean sea level .... ft.
Static level 125 ft. below top of well Date 11/15/82
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
with air
Was a pump test made? Yes [X] No [ ] If yes, by whom? Driller
Yield: 23 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.
Artesian flow ____ g.p.m. Date .....
Temperature of water 49 Was a chemical analysis made? Yes [X] No [ ]
Iron 1.8

(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
Brn silty topsoil	00	1
Tan silty gravel	1	15
Gray silty sandy gravel till	15	102
Gray silty clay	102	105
Gray silty gravel	105	147
Gray silt some gravel	147	150
Gray silty sandy gravel	150	170
Sticky gray clay gravel silty	170	193
Clean fine white gravel	193	195

200

MAR 24 1983
DEPT OF ECOLOGY
NWRO

Work started 11/12/82 19 Completed 11/15/82 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 OELKE DRILLING COMPANY
(Person, firm, or corporation) (Type or print)

Address 701-41st ave. N.E., Puyallup 98371

[Signed] Roger Oelke
(Well Driller)

License No. 0379 Date 1/14/83, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

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partment of Ecology
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WATER WELL REPORT

STATE OF WASHINGTON

(9)

29/06-04A
Application No. .....

Permit No. .....

) OWNER: Name MIKE HASSMAN Address .....

(2) LOCATION OF WELL: County Snohomish – NE¼ NE¼ Sec. 4 T. 29 N., R. 6 W.M.

and distance from section or subdivision corner

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

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

) DIMENSIONS: Diameter of well 6 inches.
Drilled 294 ft. Depth of completed well 294 ft.

) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 294 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☑ " Diam. from ft. to ft.

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

Screens: Yes ☑ No ☐
Manufacturer's Name Johnson
Type S.S. Model No. .....
Diam. 6 Slot size 10 from 290 ft. to 294 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 Blue Clay
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name Wiftal
Type: ..... H.P. 1

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
atic level 175 ft. below top of well Date .....
tesian 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
as a pump test made? Yes ☑ No ☐ If yes, by whom? .....
Yield: 30 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 .....
iler 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
Top Soil	0	4
Hard pan	4	130
Silt	130	155
Clay (Brown)	155	175
Silt	175	210
Clay (green)	210	235
Clay Blue	235	290
Water Table	290	294

Work started ..... 19..... Completed ..... 19.....

WELL DRILLER'S STATEMENT:

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

NAME Hitt Well Drilling
(Person, firm, or corporation) (Type or print)

Address 2896-54th Ave NW

[Signed] Bill Downs
(Well Driller)

License No. 181 Date 5-20, 19 78

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

29/6-4H (10)

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

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. 98258

(1) OWNER: Name ~~Richard & Virginia K. Waring 3916 147th Ave. N.E. Lake Stevens, WA 98258~~ Bill Dailey Address 1206 131st Ave N.E. Lake Stevens Wa 98258

(2) LOCATION OF WELL: County Snohomish E½ - NE ¼ ¼ Sec 4 T 29 N., R 6E W.M.

ring and distance from section or subdivision corner Lot 3 and W½ of NW ¼ of Section 3 R. 29 N. 6E

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

(4) TYPE OF WORK: Owner's number of well (if more than one).... WELL #2
New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☑ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 273 ft. Depth of completed well 273 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 273 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
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? 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.... ft.
Static level 174 ft. below top of well Date 7-22-83
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 20 gal./min. with 70 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
Brown Clay Gravel	0	14
Blue Clay Gravel	14	170
Water 150 - 1 G.P.M.		
Blue Clay	170	213
Brown Clay	213	267
Water Sand Gravel	267	273

(W)

RECEIVED
OCT 19 1983
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

Work started 7-21 1983 Completed 7-22 1983

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 DAHLMAN PUMP & DRILLING INC.
(Person, firm, or corporation) (Type or print)

Address P.O. BOX 422 BURLINGTON WA. 98233

[Signed] H Ken Fowler
(Well Driller)

License No 1192 Date 7-26 19 83

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

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Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(11)

29/06-03E

Application No. .....

Permit No. .....

(1) OWNER: Name Wallace Hubcow Address 3429 Tanner Rd, Lk Stevens Wa. 98

(2) LOCATION OF WELL: County Snohomish SW ¼ NW ¼ Sec 3 T 29 N., R 6E W.M.

ring and distance from section or subdivision corner 90' N. of Fence

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 370 ft. Depth of completed well 370 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 370 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
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? 18 ft.
Material used in seal Puddling Clay
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ____ Depth of strata
Method of sealing strata off

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

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 51 ft. below top of well Date 5/16/79
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? Driller
Yield: 125 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
15	125				

Date of test
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Artesian flow ____ g.p.m. Date
Temperature of water 51 Was a chemical analysis made? Yes ☒ No ☐
IRON-2.0

(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
Bm. Silty sand + gravel	0	15
Gray till	15	76
Gray Blue moist silty sand + gravel	76	130
Fine gray sand	130	142
White Coarse sand	142	145
Blue green silty clay	145	151
Blue green silt	151	165
Blue Silt	165	170
Multicolored sandy clay some MARL LENSES	170	276
Coarse sand + wood with water 2 gpm	276	284
Gray silty clay some wood	284	352
Fine to med. sand, with wood water	352	370

RECEIVED
OCT 2 - 1979
DEPARTMENT OF ECOLOGY
SOUTHWEST REGIONAL OFFICE

RECEIVED
OCT 10 1979
DEPT. OF ECOLOGY

Work started 5/9 19 79 Completed 5/16 19 79

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 Deike Drilling Co. (Person, firm, or corporation) (Type or print)
Address 701-41st Ave N.E., Puyallup Wa. 98371
[Signed] (Well Driller)
License No. 0379 Date 6/1 19 79

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

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WATER WELL REPORT

STATE OF WASHINGTON

(12) 29/06-05 N

Application No. .....

Permit No. .....

(1) OWNER: Name Jeanette Vellinga Address RT 4 Box 485D Snoh WA 98290

(2) LOCATION OF WELL: County Snohomish SW ¼ SW ¼ Sec 3 T 29 N., R 6 W.M.

...g and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 162 ft. Depth of completed well 162 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6" Diam. from 0 ft. to 162 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 .....
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? 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 .... ft.
Static level 30 ft. below top of well Date Oct 11
Artesian pressure 30 lbs. per square inch Date Oct 11
Artesian water is controlled by CAP (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.
" " " "
" " " "

...covery 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 ...
...ller test ... gal./min. with ... ft. drawdown after ... hrs.
...tesian flow 25 g.p.m. Date ...
Temperature of water ... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

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

MATERIAL	FROM	TO
Top soil	0	2
SAND & GRAVEL (Brown)	2	15
HARDPAN	15	40
GRAY CLAY	40	110
BROWN CLAY	110	150
GRAY CLAY	150	161
SAND STONE	161	—
WATER VEIN	160	164

RECEIVED
OCT 18 1979
DEPT. OF ECOLOGY

Work started Oct 9 19 79 Completed Oct 11 19 79

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 Anderson Drilling Co
(Person, firm, or corporation) (Type or print)

Address 7412-204th NE Kent WA. 98

[Signed] Edward Anderson
(Well Driller)

License No. 0771 Date Oct 11, 19 79

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

(13) 29/06-10 K/J

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

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Sunridge Devel Co Address 17324 Bothell Way NE

(2) LOCATION OF WELL: County Snohomish NE ¼ SE ¼ Sec. 10 T. 29 N., R. 6 W.M.

...ring 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 6 inches.
Drilled 225 ft. Depth of completed well 225 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 220 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 Lok
Type Cont slot Model No. ____
Diam. 6 Slot size 16 from 220 ft. to 225 ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

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

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

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

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ____ ft.
Static level 180 ft. below top of well Date Aug 12
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? Brown's
Yield: gal./min. with ____ ft. drawdown after ____ hrs.
" " " "
Artesian 150 GPM " "

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.
Artesian flow ____ g.p.m. Date ____
Temperature of water ____ Was a chemical analysis made? Yes ☑ No ☐

(10) WELL LOG:

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

MATERIAL	FROM	TO
Top Soil	0	3
Brown clay + gravel	3	10
Gray clay + gravel	10	30
Thick heavy clay	30	98
Sandy clay	98	100
Thick heavy clay	100	155
Sandy clay	155	165
Thick brown clay	165	170
Gray clay	170	219
Sand (water)	219	225
clay	225	—
	400	

NOV 18 1987

Work started Aug 11 19 87 Completed Aug 12 19 87

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 Anderson Drilling Co.
(Person, firm, or corporation) (Type or print)

Address 740-204th E NE Acl

[Signed] ____ (Well Driller)

License No. 1367 Date Aug 30, 19 87

(USE ADDITIONAL SHEETS IF NECESSARY)

3

(14) 29/06-10Q

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

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Tom Foster Address 15810-14th ST Snohomish

(2) LOCATION OF WELL: County Snohomish SW ¼ SE ¼ Sec 10 T 29 N., R 6E W.M.

Bearing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 340 ft. Depth of completed well 260 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 260 ft.
Threaded [ ] " Diam. from ft. to ft.
Welded [X] " Diam. from ft. to ft.

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 [ ] No [X]
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to 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 Clay
Did any strata contain unusable water? Yes [ ] No [ ]
Type of water? Depth of strata
Method of sealing strata off

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

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 210 ft. below top of well Date 9-79
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 8 gal./min. with 20 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes [ ] No [ ]

(10) WELL LOG:

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

MATERIAL	FROM	TO
Top Soil Brn	0	2
Soil Brn Cobbles	2	10
Cobbles, Boulders, Gravel Brn	10	30
Clay & Gravel Med. Brn.	30	40
Sand & Clay Grey	40	70
Sand, Fine, Brn.	70	110
Sand, Fine, Grey, Clay	110	180
Sand, Med, Cedar Wood, Grey	180	190
Sand, Fine, Grey	190	205
Sand, Fine, Med Gravel, Grey	205	225
Sand, Med W Gravel, Grey	225	280
Sand, Mixed Grey W.B.	280	340

Work started 8-27 19 79 Completed 9-11 19 79

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 B+B Well Drlg.
(Person, firm, or corporation) (Type or print)

Address

[Signed] Don Crete
(Well Driller)

License No. 820 Date 8-27 19 79

(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

STATE OF WASHINGTON

(15) 29/06 - 11C

Application No. _____

Permit No. _____

(1) OWNER: Name Dale Brammer Address Mail: Box 412 Snohomish, 98290 Route 4 Prop: 7528 Newburg

(2) LOCATION OF WELL: County Snohomish NE ¼ NW ¼ Sec 11 T 29 N., R 6 E W.M.

Bearing and distance from section or subdivision corner

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

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 332 ft. Depth of completed well 332 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 332 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 _____
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? 18 ft.
Material used in seal 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.... _____ ft.
Static level 326 ft. below top of well Date 4-26-79
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 4-26-79
Bailer test 20 gal./min. with 60 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
Top Siol	0	10
Blue clay and gravel	10	280
Brown clay	280	310
Blue clay	320	328
Gravel blue clay and	328	332

RECEIVED
JUN 26 1979

Work started April 23 19 79 Completed April 26 19 79

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 DAHLMAN PUMP AND DRILLING (Person, firm, or corporation) (Type or print)

Address P.O. Box 422 Burlington, 98233

[Signed] R C Johnson (Well Driller)

License No. 0222 Date April 27, 19 79

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

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

WATER WELL REPORT
STATE OF WASHINGTON

(16) 29/04/111F

Application No. .....

Permit No. .....

(1) OWNER: Name Mark Witte Address 2224 Newburg Rd, Snohomish 98290

LOCATION OF WELL: County Snohomish — SE ¼ NW ¼ Sec 11 T 29N. R 6E W.M.

Bearing and distance from section or subdivision corner

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

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 400 ft. Depth of completed well 386 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +1 ft. to 300 ft.
Threaded ☐ PVC 120 Diam. from 266 ft. to 386 ft.
Welded ☒ ____ " Diam. from ____ ft. to ____ ft.

Perforations: Yes ☒ No ☐
Type of perforator used saw
SIZE of perforations 1/8 in. by 3 in.
20 perforations from 366 ft. to 386 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? 18 ft.
Material used in seal ____
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ____ Depth of strata ____
Method of sealing strata off ____

(7) PUMP: Manufacturer's Name N/A
Type: ____ H.P ____

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ____ ft.
Static level 335 ft. below top of well Date 2/11/86
Artesian pressure ____ lbs. per square inch Date ____
Artesian water is controlled by ____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller with air
Yield: 3½ 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.
Artesian flow ____ g.p.m. Date ____
Temperature of water 47 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
Brn topsoil	0	4
Brn till	4	9
Gray till	9	115
Gray/green silt	115	145
Gray green silt w/ some grav	145	150
Gray silt w/grav	150	180
Gray silt w/grav damp	180	182
Gray silt w/grav	182	215
Gray sand, some small grav	215	235
Sticky gray silt	235	270
Gray dry sand	270	290
Gray clay w/wood chips, small white grav	290	315
Brn to gray clay	315	330
Green to gray clay	330	345
Gray clay	345	370
Brn clay wood chips, small white rock	370	380
Gray clay	380	395
Brn clay	395	397
Gray clay	397	400

Work started 2/6 19 86 Completed 2/11 19 86

WELL DRILLER'S STATEMENT:

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

NAME OELKE DRILLING CO.
(Person, firm, or corporation) (Type or print)

Address 10807-32nd St E, Puyallup 98372

[Signed] [signature]
(Well Driller)

License No. 0837 Date 3/10 19 86

(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

STATE OF WASHINGTON

29/06-14 D (7)

Application No. 01720

Permit No. ....

(1) OWNER: Name Steve Frediani Address 529 169th Ave S E Snohomish Wa. 98290

(2) LOCATION OF WELL: County Snohomish NW ¼ NW ¼ Sec 14 T 29 N. R 6 W.M.

ing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 304' ft. Depth of completed well 304 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: ..." Diam. from .. ft. to .. 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....
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? 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.... ft.
Static level 265 ft. below top of well Date 1-8-88
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 5GPM gal./min. with 30 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
Brown Clay	0	18
Blue Clay	18	66
Brown Clay, sand, gravel	66	150
Blue Clay & Gravel	150	195
Wet Blue Clay & Gravel	195	200
Blue Clay & Gravel	200	230
Sand	230	255
Blue Clay & Gravel	255	300
Sand & Gravel& Water	300	304

RECEIVED
FEB 10 1988
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

Work started 1-4- 1988 Completed 1-8- 1988

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 Dahlman Pump & Well Drilling Inc.
(Person, firm, or corporation) (Type or print)

Address P O Box 422 Burlington Wa. 98233

[Signed] Fred Richter
(Well Driller)

License No. 0623 Date 1-11- 1988

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

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

WATER WELL REPORT

STATE OF WASHINGTON

(19) 29/6 — 14F

Application No. .....

Permit No. .....

(1) OWNER: Name Nolan Brown Address 624 Price Road, Snohomish.

(2) LOCATION OF WELL: County Snohomish — SE ¼ NW ¼ Sec 14 T. 29 N., R. 6 W.M.

ing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 260 ft. Depth of completed well 260 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 260 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
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? 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.... ft.
Static level 223 ft. below top of well Date 8/29/82
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 2 gal./min. with 36 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
Till, brown.	0	16
Till, gray.	16	167
Clay, gray with small chips of black wood or coal	167	180
Sand, gray, with wood. Dry.	180	218
Sand, gray/brown. Dry.	218	230
Clay, gray, with chips of wood.	230	238
Siltstone, gray.	238	239
Clay, gray, sandy.	240	250
Till, gray, with layers of gravel, rocks etc.	250	260

Note: The 2 GPM flow is coming into the well at 238' on top of the siltstone. The fine gray sand in this water is apparently being blocked by the layer of coarser sand immediately below it. In any event, the water is clear at 260'.

470'

RECEIVED
OCT 13 1982
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

Work started Aug. 13, 1982 Completed Aug. 29, 1982

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 Cable Tool Well Drilling Co.
(Person, firm, or corporation) (Type or print)

Address 5716 17th Ave NE SEATTLE. 98105

[Signed] Jack W. Robinson
(Well Driller)

License No. 0852 Date Aug. 29, 1982

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

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

WATER WELL REPORT

STATE OF WASHINGTON

(19) 29/06-15C

Application No. .....

Permit No. .....

(1) OWNER: Name Utley Springs Water Assn. Address 15203 Utley Rd. Snohomish, Washington

(2) LOCATION OF WELL: County Snohomish — NE ¼ NW ¼ Sec 15 T 29 N. R 6 W.M.

...ing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 340 ft. Depth of completed well 340 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +2 ft. to 338 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 ____
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? 18 ft.
Material used in seal Puddeling Clay
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ____ Depth of strata ____
Method of sealing strata off ____

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

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ____ ft.
Static level 107 ft. below top of well Date 4-17-87
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? S. Gilbert
Yield: 25 gal./min. with 15½ ft. drawdown after 4 hrs.
" " " "
" " " "

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

Time	Water Level	Time	Water Level	Time	Water Level
0:01	116-0				
0:05	111-9				
:30	109-0				

Date of test 4-20-87
Bailer 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
Topsoil	0	1
Brown sand and gravel	1	4
Gray clay and sand	4	9
Gray clay gravel and sand	9	97
Grav gravel and clay	97	116
Dark gray clay	116	120
Dark gray sand clay wood and water	120	124
Gray clay sand and seapage	124	132
Gray gravel clay and seapage	132	136
Gray clay	136	156
Brown sandy clay	156	160
Gray clay and gravel	160	174
Gray clay with tan layers	174	240
Course gray sand and water 8gpm	240	243
Gray clay	243	270
Brown silty clay	270	273
Gray silty clay	273	278
Brown silty clay	278	296
Gray silty clay hard	296	314
Gray silty clay soft	314	330
Gray course cemented sand and gravel with water, approx.100gpm	330	

300

Work started 4-10 19 87 Completed 4-17 19 87

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 Hayes Well Drilling & Pumps Inc.
(Person, firm, or corporation) (Type or print)

Address 1413 Colony Rd. Bow, Washington

[Signed] Steve Gilbert
(Well Driller)

License No. 762 Date 4-30, 19 87

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

3

LK Roesiger N-S (1) 29/06-14K

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

WATER WELL REPORT

STATE OF WASHINGTON

Application No.
Permit No.

OWNER: Name Harold Clark Address 17220 - 2nd St NE. Snohomish

LOCATION OF WELL: County Snohomish E½ SW¼ NW¼ SE¼ Sec 14 T 29 N., R 06E W.M.

Bearing and distance from section or subdivision corner

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

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

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

DIMENSIONS: Diameter of well 6 inches.
Drilled 208 ft. Depth of completed well 208 ft.

CONSTRUCTION DETAILS:

Casing installed: " Diam. from ft. to ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ 6 " Diam. from 1 ft. to 208 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
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? 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.... ft.
Static level 85 ft. below top of well Date 2-19-85
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?
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 15 gal./min. with 80 ft. drawdown after 2 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
Topsoil.	0	4.
Dense Silty Sand.	4	12
Till	12	31.
CAP Rock	31	32
Till	32	34.
Silty Clayey Sand.	34	38.
Till	38	57.
Dense coarse Sand.	57	98.
Silty Sand.	98	102
Silty Sand & Gravel	102	130.
Silty Sand.	130	165
Blue Clay.	165	195
Sand Stone	195	210.

460

RECEIVED JUN 21 1985 DEPARTMENT OF ECOLOGY NORTHWEST REGION

Work started 2-13 19 85 Completed 2-18 19 85.

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 Aardal Drilling Co. (Person, firm, or corporation) (Type or print)

Address PO Box 662 Monroe WA

[Signed] AR Aardal (Well Driller)

RECEIVED APR 27 1985 DEPARTMENT OF ECOLOGY NORTHWEST REGION

License No. 0007 Date 19 85

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

Lk Kosiger N-2

29/06-23A

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

WATER WELL REPORT

(2)

STATE OF WASHINGTON

Application No. 29/06-23A

Permit No. ....

(1) OWNER: Name John Tallman Address 17607-OK mill rd., Snohomish, Wash

(2) LOCATION OF WELL: County Snohomish — NE ¼ NE ¼ Sec. 23 T. 29 N., R. 6E W.M.

Bearing and distance from section or subdivision corner 70 ft. S. Of House

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 300 ft. Depth of completed well 300 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6" Diam. from 0 ft. to 300 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 ___
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? 2 18 ft.
Material used in seal puddling clay
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ___ Depth of strata ___
Method of sealing strata off ___

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

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ___ ft.
Static level 25.5 ft. below top of well Date 11-1-78
Artesian pressure ___ lbs. per square inch Date ___
Artesian water is controlled by ___ (Cap, valve, etc.)

(9) WELL TESTS: with air — Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? driller
Yield: 12 gal./min. with ___ ft. drawdown after ___ hrs.
" [illegible] " [illegible] " [illegible] "
" " " "

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
55 min	234				

Date of test ___
Bailer test ___ gal./min. with ___ ft. drawdown after ___ hrs.
Artesian flow ___ g.p.m. Date ___
Temperature of water 50 Was a chemical analysis made? Yes ☒ No ☐
1.7 iron

(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
Brn. Topsoil	0	5
Brn. gravel & sand	5	21
Till	21	30
Gray silty ~~sand, wet~~	30	66
Gray silty sand, wet	66	84
Gray fine silty sand, some gravel	84	113
angular gravel	113	119
Silty gravel	119	121
Gray silty sand, dry	121	143
Silty gravel w/wet zones	143	225
Gray, sticky, silty clay	225	268
Gray silty clay w/wood	268	271
Fine sand w/ wood	271	296
Sand w/wood, water	296	300

300'

RECEIVED
JAN 12 1979
DEPARTMENT OF ECOLOGY
NORTHWEST REGIONAL OFFICE

Work started 10-27, 1978. Completed 11-1, 1978

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 OELKE DRILLING Co (Person, firm, or corporation) (Type or print)

Address 701-41st Ave. N.E. Puyallup 983

[Signed] Roger Oelke (Well Driller)

License No. 0379 Date 11-6, 1978

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy 29/6E/24/M

WATER WELL REPORT
STATE OF WASHINGTON

(3)

Application No. Unknown
Permit No. 29/06-24M

(1) **OWNER:** Name Dean Daughenbaugh Address 1024 5th St. Snohomish, WA.

(2) **LOCATION OF WELL:** County Snohomish South ½ of the SW ¼ NW ¼ Sec. 24 T. 29 N., R. 6E W.M.

Bearing and distance from section or subdivision corner SSW one quarter mile

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

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

(5) **DIMENSIONS:** Diameter of well 6 inches.
Drilled 214 ft. Depth of completed well 212 ft.

(6) **CONSTRUCTION DETAILS:**

Casing installed: 6 " Diam. from 0 ft. to 200 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
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? 18 ft.
Material used in seal puddling clay
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.... 460 ft.
Static level 74 ft. below top of well Date 5/14/73
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 30 gal./min. with 25 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date 5/14/73
Temperature of water 50 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
Dirt fill	0	5
Soil, brown, gravelly	5	8
Gravel, brown, cemented	8	42
Clay, blue, hard	42	90
Sand & gravel, fine to coarse	90	105
Clay, blue, hard	105	115
Boulder, black, hard	115	119
Sand & gravel, grey, cemented	119	157
Gravel, grey, coarse, cemented	157	179
Gravel, grey, boulders, cemented	179	185
Clay, blue, hard	185	202
Sand & gravel, dirty white, with clay layers	202	212
Clay, blue, hard	212	214
300'		
460'		

Work started 5/28 19 73 Completed 6/14 19 73

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 Ace Drilling & Pump Service
(Person, firm, or corporation) (Type or print)

Address Rt #1 Box 223 Arlington, WA.

[Signed] Robert E. Freeman
(Well Driller)

License No. 223-02-8395 Date June 14 19 73

(USE ADDITIONAL SHEETS IF NECESSARY)

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

29/6E/24/K

WATER WELL REPORT

(4)

Application No. 29/06-24K

STATE OF WASHINGTON

Permit No. ....

(1) OWNER: Name Howard Miller Address O.K. Road R.4 Box 377 Snohomish, Wn

(2) LOCATION OF WELL: County Snohomish — NW ¼ SE ¼ Sec. 24 T. 29 N., R. 6E W.M.

ng and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 187 ft. Depth of completed well 186 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +2 ft. to 186 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 ____
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? 20 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☒ No ☐
Type of water? Muddy seepage Depth of strata 5
Method of sealing strata off Clay

(7) PUMP: Manufacturer's Name [illegible]
Type: [illegible] H.P. 1 HP.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 100 ft. below top of well Date 11/7/74
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? ____
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 100 gal./min. with ____ ft. drawdown after 1 hrs.
Artesian flow ____ g.p.m. Date ____
Temperature of water ____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:

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

MATERIAL	FROM	TO
Tan Gravel loam	0	2
Tan Gravel, clay + rocks	2	15
Gray hardpan + rocks	15	94
Gray clay + silt sand - seepage	94	99
Gray med. sand - bits of gravel and seepage	99	101
Gray clay + gravel	101	135
Gray clay	135	181
Gray sand + gravel - water	181	187
320'		

Work started Nov. 6 19 74 Completed Nov. 7 19 74

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 Hayes Well Drilling + Pumps Inc.
(Person, firm, or corporation) (Type or print)

Address Bow, Wash. 98232

[Signed] [signature]
(Well Driller)

License No. 223-02-1849 Date 11/12 1974

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

29/06-25E

(6)

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

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

OWNER: Name Don Ensign Address 2832-183rd NE, Snohomish 98290

LOCATION OF WELL: County Snohomish NW ¼ SW ¼ Sec. 25 T. 29 N., R. 6E W.M.

Give distance from section or subdivision corner

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

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

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

DIMENSIONS: Drilled 300' ft. Diameter of well 6 inches. Depth of completed well 233'8" ft.

CONSTRUCTION DETAILS:

Casing installed: 6" Diam. from +1 ft. to 117 ft.
Threaded ☐ 4½" Diam. from 73'8" ft. to 233'8" ft.
Welded ☒ ____" Diam. from ____ ft. to ____ ft.

Perforations: Yes ☒ No ☐
Type of perforator used saw
SIZE of perforations 1/8 in. by 3 in.
78/87 perforations from 73'8" ft. to 233'8" 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? 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 N/A
Type: ____ H.P. ____

WATER LEVELS: Land-surface elevation above mean sea level .... ____ ft.
Static level 198 ft. below top of well Date 9/3/87
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 ☒ with air No ☐ If yes, by whom? Driller
Yield: 4 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.
Artesian flow ____ g.p.m. Date ____
Temperature of water 50 Was a chemical analysis made? Yes ☒ No ☐
Iron: 1.4ppm

(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
Brn topsoil	0	2
Brn till	2	14
Gray silty sand & gravel	14	35
Brn silt	35	42
Gray silt	42	53
Damp gray silt & gravel	53	65
Beige silt	65	70
Blue gray silt	70	87
Beige to gray silt	87	105
Gray clay	105	130
Gray clay, small white rocks wood chips, water-1gpm	130	135
Blue gray clay	135	165
Lt. brn clay	165	170
Gray clay	170	220
Brn clay, black wood chips	220	235
Blue gray clay	235	250
Blue gray clay, wood chips water, 3gpm	250	258
Gray clay	258	285
brn clay, wood chips	285	290
Brn clay	290	300
Gray clay		

520'

RECEIVED
NOV 5 1987
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

Work started 6/20 19 87 Completed 9/3 19 87

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

Address 4312-166th Ave E., Puyallup 98372

[Signed] Lee P. McKenna
(Well Driller)

License No. 0837 Date 10/27 19 87

(USE ADDITIONAL SHEETS IF NECESSARY)

FORM 050-1-20

29/06-26B

6

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

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Gary Neisinger Address 17930 131st Place SE, Snohomish 982

(2) LOCATION OF WELL: County Snohomish — NE¼ SW¼ Sec. 26 T. 29 N. R 6E W.M.

ing and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 97½ 100 ft. Depth of completed well 97½ ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +1 ft. to 97½ 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
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? 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 N/A
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ....
Static level 81 ft. below top of well Date 6/25/87
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 Driller with air
Was a pump test made? Yes ☒ No ☐ If yes, by whom?
Yield: 1.6 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.
Artesian flow g.p.m. Date
Temperature of water 54 Was a chemical analysis made? Yes ☒ No ☐
Iron; 1.3ppm

(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
Brn topsoil	0	2
Gravel	2	5
Brn till	5	9
Blue/gray till	9	12
Brn till	12	18
Gray til	18	20
Brn till	20	24
Gray till	24	35
Fine gray silty sand/gravel	35	47
Damp gray till	47	55
Gray till	55	70
Gray silty sand & gray/dry	70	92
Gray silty grav/w/water	92	98
Gray clay	98	100

550'

RECEIVED
NOV 5 1987
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

Work started 4/21 19 87 Completed 6/25 19 87

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

Address 4312 166th Ave E, Puyallup 98390

[Signed] (Well Driller)

License No. 0837 Date 10/27 19 87

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

(7) 29/06-26K

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

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Pat Melvin Address 728 Mill St. - Snohomish 98290

(2) LOCATION OF WELL: County Snohomish NW ¼ SE ¼ Sec 26 T 29 N., R 6E W.M.

Bearing and distance from section or subdivision corner 50' N E. of House

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 202 ft. Depth of completed well 202 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 202 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 .....
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? 18 ft.
Material used in seal puddling clay
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

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

(8) WATER LEVELS: Land-surface elevation above mean sea level ..... ft.
Static level 113 ft. below top of well Date 1/24/80
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 ☒ with air No ☐ If yes, by whom? Driller
Yield: 30 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.
Artesian flow ..... g.p.m. Date .....
Temperature of water 49 Was a chemical analysis made? Yes ☒ No ☐
IRON 2.0

(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
Brn. Top Soil	0	3
Brn. Silty Gravel	3	6
Gray Silty Gravel	6	15
Gray silt	15	30
Multi colored sticky clay	30	118
Gray silty clay	118	178
Hard gray silt & coarse sand layer + wood.	178	202

500'

RECEIVED
MAR 14 1980
ECOLOGY

Work started 1/22 1980 Completed 1/24 1980

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 OELKE DRILLING CO.
(Person, firm, or corporation) (Type or print)

Address 701-41 Ave NE, Puyallup 98371

[Signed] Roger Oelke
(Well Driller)

License No. 0379 Date 2/29, 1980

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

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

WATER WELL REPORT

STATE OF WASHINGTON

(8)

29/06-26 1/R

Application No. .....

Permit No. .....

(1) OWNER: Name MARSHA SKEWIS-FRED BIED Address P.O. # 612, Snohomish, 98290

(2) LOCATION OF WELL: County Snohomish. E½ of SE ¼ Sec 26 T 29 N., R 6E W.M.

ring and distance from section or subdivision corner

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 240 ft. Depth of completed well 240 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 240 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 .....
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? 18 ft.
Material used in seal puddling clay
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

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

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ..... ft.
Static level 166 ft. below top of well Date 10/25/78
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? Driller with air
Yield: 9.5 gal./min. with 240 ft. drawdown after 1 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
24 min	166.5				

Date of test .....
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Artesian flow ____ g.p.m. Date .....
Temperature of water 51 Was a chemical analysis made? Yes ☒ No ☐
Iron 3.4

(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
Silty Brown top Soil	0	3
Brown silty gravel	3	7
Soft till	7	46
Gray silt	46	49
Gray med. sand	49	73
Gray silty sand & gravel	73	85
Brown silty clay	85	90
Tan to yellow sticky clay	90	120
Gray silt w/some gravel	120	127
Gray clay w/some wood	127	206
Coarse sand, wood, w/ silt	206	221
coarse to med. sand, wood, water	221	240

RECEIVED
JAN 12 1979

Work started 10/23 19 78 Completed 10/25 19 78

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 OELKE DRILLING CO.
(Person, firm, or corporation) (Type or print)

Address 701-41st Ave. N.E., Puyallup 98371

[Signed] ..... (Well Driller)

License No. 0379 Date 10/30, 1978

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

28107-06C

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

WATER WELL REPORT

(8A)

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) **OWNER:** Name HARRY E. MEYERS Address 522 201st.AVE. N.E., SNOHOMISH, WA.

(2) **LOCATION OF WELL:** County SNOHOMISH NE ¼ NW ¼ Sec. 06 T. 28 N. R. 07 W.M.

Bearing and distance from section or subdivision corner LOT 18, PLAT of GREEN VELVET, VOL. 29, PG. 1,2,3 PLATS

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

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

(5) **DIMENSIONS:** Diameter of well 6 inches.
Drilled 295 ft. Depth of completed well 295 ft.

(6) **CONSTRUCTION DETAILS:**

Casing installed: 6 " Diam. from 0 ft. to 290 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

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

Screens: Yes ☒ No ☐
Manufacturer's Name JOHNSON
Type Model No.
Diam. 6 Slot size 20 from 290 ft. to 295 ft.
Diam. Slot size from ft. to ft.

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

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

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

(8) **WATER LEVELS:** Land-surface elevation above mean sea level .... ft.
Static level 108 ft. below top of well Date 9-28-76
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 13 gal./min. with 52 ft. drawdown after 2 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
TILL, BLUE	0	14'
BROWN CLAY	14'	50'
BLUE CLAY	50'	260'
SAND & CLAY	260'	280'
FINE SAND	280'	290'
COARSE SAND	290'	295'

290
+10
550

Work started 9-9 19 76 Completed 9-28 19 76

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 J & S DRILLING CO. INC.
(Person, firm, or corporation) (Type or print)

Address P.O. BOX 1065

[Signed] Dwayne L Pattiff
(Well Driller)

License No. 621 Date 10-5 19 76

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

"ell 2 Loan # 0071-411151-08-841MERO RD.

28/06-01R

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

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. _____

Water Right Permit No. _____

(1) OWNER: Name First Mutual Savings Bank Address P O Box 1647 Bellevue Wa. 98009-1647

(2) LOCATION OF WELL: County Snohomish STEVE TEIBEL SE ¼ SE ¼ Sec 1 T 28 N. R 6 W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) Pro. 8411 Mero Rd. Snohomish Wa. for Al. Kahele

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

(4) TYPE OF WORK: Owner's number of well (if more than one) WELL #2

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 0 ft. to 48 ft.

Welded ☑ Liner installed ☐ Threaded ☐ " Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☑

Type of perforator used _____

SIZE of perforations _____ in. by _____ in.

_____ perforations from _____ ft. to _____ ft.

_____ 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? 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 _____ ft.

Static level 115 ft. below top of well Date 7-20-88 30 MIN

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (Cap, valve, etc.)

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

Was a pump test made? Yes ☐ No ☑ If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

" " " "

" " " "

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

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest 4000 gal./min. with stem set at 110 ft. for _____ hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☑

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

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

MATERIAL	FROM	TO
Brown Clay & Gravel	0	10
Blue Clay & Gravel	10	48
Sand Stone	48	125

100

Work started 7-19- 88 19. Completed 7-19- 88 19

WELL CONSTRUCTOR CERTIFICATION:

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

NAME Dahlman Pump & Well Drilling Inc.
(PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address P O Box 422 Burlington Wa. 98233

(Signed) _____ License No. 0623
(WELL DRILLER)

Contractor's Registration No. DAHLMPW123LC Date 7-21- 19 88

(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

(10)

STATE OF WASHINGTON

Application No. 28/07-17 D

Permit No. ....

(1) OWNER: Name Ed Peterson Address 8619-Merc Rd, Monroe, Wa. 98290

(2) LOCATION OF WELL: County Snohomish - NW ¼ NW ¼ Sec 17 T 28 N., R 7E W.M.

Bearing and distance from section or subdivision corner 120' S. of house

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 261 ft. Depth of completed well 261 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6" Diam. from 0 ft. to 182.5 ft.
Threaded ☐ [illegible]" Diam. from [illegible] ft. to ft.
Welded ☒ PC 4" Diam. from 181 ft. to 261 ft.

Perforations: Yes ☒ No ☐
Type of perforator used hacksaw
SIZE of perforations .025 in. by 3 in.
80 perforations from 181 ft. to 261 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? 18 ft.
Material used in seal puddling clay
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

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

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 42.5 ft. below top of well Date 2/28/79
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 ☒ (with air) No ☐ If yes, by whom? Driller
Yield: 10 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
15 min	42.5				

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water 49 Was a chemical analysis made? Yes ☒ No ☐
IRON 1.3

(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 silty sand & gravel	0	8
Gray till	8	51
Gray silt	51	93
Gray silty gravel	93	150
Clean sand w/ some gravel	150	182.5
Broken black rock	182.5	205
Solid Black Bed Rock	205	230
Fractured Grey Bedrock	230	261
water		

600

RECEIVED
MAR 1 . 1979
[illegible]

Work started 2-19 1979 Completed 2-28 1979

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 CELKE DRILLING CO. (Person, firm, or corporation) (Type or print)

Address 701-41 Ave. N.E. Puyallup Wa 98321

[Signed] [signature] (Well Driller)

License No. 0379 Date 3-5 1979

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

(19) 25/07-18J

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

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No. .....

(1) OWNER: Name [redacted] Address 2012 - 45th S.E., Snohomish, Wa. 98296

(2) LOCATION OF WELL: County Snohomish - Part of N 1/2 of SE 1/4 - NE 1/4 SE 1/4 Sec. 18 T. 25 N., R. 7E W.M.

Bearing and distance from section or subdivision corner Lot #24

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 154 ft. Depth of completed well 154 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6" Diam. from 0 ft. to 154 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 .....
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? 18 ft.
Material used in seal puddling clay
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ... Depth of strata ...
Method of sealing strata off .....

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

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 71 ft. below top of well Date 7/25/82
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 15 gal./min. with 60 ft. drawdown after 4 hrs.
Artesian flow ... g.p.m. Date ...
Temperature of water ... Was a chemical analysis made? Yes ☐ No ☒

(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
Surface	0	3
Brown hardpan	3	16
Brown sand-gravel	16	32
Gray hardpan-boulders	32	56
Gray sandy clay	56	80
Gray silty clay	80	138
Gray water sand	138	154

Work started 3/23 19 82 Completed 7/25 19 82

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 Johnson Drilling Co., Inc.
(Person, firm, or corporation) (Type or print)

Address 19415 108TH Ave SE Renton 98055

[Signed] Brad Johnson
(Well Driller)

License No. 0233 Date 7/25 19 82

(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

STATE OF WASHINGTON

(12)

Start Card No. 073389

Water Right Permit No. _____

(1) OWNER: Name Pete Luckel Address 18626 Hwy 99 #5, Lynnwood

(2) LOCATION OF WELL: County Snohomish SW¼ SW¼ Sec 16 T 29 N., R 7 W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) 9725 227th SE, Monroe

(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 98 feet. Depth of completed well 98 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6" Diam. from 0 ft. to 98 ft.

Welded ☒ Liner installed ☐ Threaded ☐ _____" Diam. from _____ ft. to _____ ft.

_____" 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 _____

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? 18 ft.

Material used in seal puddling clay

Did any strata contain unusable water? Yes ☐ No ☒

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____

Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.

Static level 50 ft. below top of well Date 5-3-90

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (Cap, valve, etc.)

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

Was a pump test made? Yes ☐ No ☒ If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

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

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest 5 gal./min. with stem set at 93 ft. for 2½ 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
Surface	0	4
Brown sand clay - gravel	4	11
Gray hardpan	11	26
Gray clay	26	47
Gray hardpan	47	92
Gray water sand - gravel	92	98
Gray clay	98	—

900'

Work started 5-1, 19. Completed 5-3, 19 90

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 Johnson Drilling Co., Inc. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 19415 105th Ave SE Renton 98055

(Signed) _____ (WELL DRILLER) License No. 0233

Contractor's Registration No. JOHNSDC037M Date 5-3, 19 90

(USE ADDITIONAL SHEETS IF NECESSARY)

(13) 88/7-20B

WATER WELL REPORT
STATE OF WASHINGTON

Start Card No. 032831
Water Right Permit No.

(1) OWNER: Name ELKINS, RUSSELL Address P.O BOX 168 SULTAN, WA 98294-

(2) LOCATION OF WELL: County SNOHOMISH - NW 1/4 NE 1/4 Sec 20 T 28 N., R 7 WM
(2a) STREET ADDRESS OF WELL (or nearest address) 10304 WAGNER RD.

(3) PROPOSED USE: DOMESTIC

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

(5) DIMENSIONS: Diameter of well 6 inches
Drilled 300 ft. Depth of completed well 300 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Dia. from +3 ft. to 106 ft.
WELDED/LINER IN 4.5 " Dia. from 100 ft. to 300 ft.
" Dia. from ft. to ft.

Perforations: YES
Type of perforator used ROTARY STAR
SIZE of perforations 1/8 in. by 1 in.
24 perforations from 55 ft. to 75 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 Size of gravel
Gravel placed from ft. to ft.

Surface seal: YES To what depth? 18 ft.
Material used in seal BENTONITE CLAY
Did any strata contain unusable water? NO
Type of water? Depth of strata ft.
Method of sealing strata off N/A

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

(8) WATER LEVELS: Land-surface elevation above mean sea level ... ft.
Static level 65 ft. below top of well Date 05/23/90
Artesian Pressure lbs. per square inch Date
Artesian water controlled by N/A

(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 2-3 gal/min. w/ stem set at 106 ft. for 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? 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 in formation.

MATERIAL	FROM	TO
BROWN STICKY SILT	0	4
BROWN TILL	4	8
GRAY TILL	8	54
BROWN TILL	54	57
DAMP BROWN SILTY	57	65
SAND & GRAVEL	57	65
BOULDERS GRAY SILT	65	90
SOME GRAVEL WATER BEARING	65	90
GRAY WEATHERED ROCK	90	106
GRAY TO BROWN	106	300
BEDROCK	106	300

530

RECEIVED
JUN 30 1990
DEPT. OF ECOLOGY

Work started 05/21/90 Completed 05/23/90

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 knowlecge and belief.

NAME OELKE DRILLING, INC.
(Person, firm, or corporation) (Type or print)

ADDRESS 4312 166 AV E SUMNER, WA

[SIGNED] _____ License No. 0837

Contractor's
Registration No. OELKEDI 136QC Date 07/20/90

(14) 28/07-21N

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

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 000910

Water Right Permit No. _____

(1) OWNER: Name ALVIN SCHAENHERR Address P.O. BOX 362, MONROE 98272

(2) LOCATION OF WELL: County SNOHOMISH SW ¼ SW ¼ Sec 21 T 28 N., R 7 W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) NOT AVAILABLE

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

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

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

(5) DIMENSIONS: Diameter of well 6 inches. Drilled 205 feet. Depth of completed well 188 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6" Diam. from +1 ft. to 122 ft.
Welded ☒ Liner installed ☒ Threaded ☐ 4½" Diam. from 118 ft. to 188 ft.
_____ Diam. from _____ ft. to _____ ft.

Perforations: Yes ☒ No ☐
Type of perforator used SAW
SIZE of perforations ⅛ in. by 3 in.
135 perforations from 122 ft. to 185 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? 18 ft.
Material used in seal BENTANITE
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

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

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 60 ft. below top of well Date 3-17-88
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? DRILLER
Yield: 7 gal./min. with _____ ft. drawdown after _____ hrs.
" " " "
" " " "

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

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water 50° Was a chemical analysis made? Yes ☒ No ☐
IRON 5.0 PPM

(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
BR. WET TOPSOIL	0	6
LT. BR. WET SILTY GRAVEL	6	8
ANG. SILTY GRAVEL	8	20
BLUE-GREY TILL	20	24
GREY TILL	24	56
LOOSE BR. TILL	56	85
BR. SILTY SAND - SOME GRAV.	85	106
LOOSE BR. SLT/SND. GRAVEL	106	115
BR. SAND W/SOME GRAVEL	115	136
WET BR. SLT. SAND/SOME GR.	136	158
GREY SLT. SND - SNDSTONE CHIPS	158	183
GREY SILTY SAND	183	205

430

RECEIVED
MAY 9 1988
DEPARTMENT OF ECOLOGY
WATER RESOURCES SECTION

Work started 2-11-88 19. Completed 3-17-88 19

WELL CONSTRUCTOR CERTIFICATION:

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

NAME OLIKE DRILLING, INC. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 4312 166TH AVE, E - SUMNER 98391

(Signed) Kenneth McKenna (WELL DRILLER) License No. 0837

Contractor's Registration No. OLIKEDI136QC Date 4-15-88 19

(USE ADDITIONAL SHEETS IF NECESSARY)

(15) 28/07-21P

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

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. _____

Water Right Permit No. _____

(1) OWNER: Name Ed Utterback Address 544 S. Blakeley, Monroe 98272

(2) LOCATION OF WELL: County Snohomish SE ¼ SW ¼ Sec 21 T. 28 N., R 7E W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) 23431-114th St. SE, Monroe

(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 400 feet. Depth of completed well 400 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +1 ft. to 350 ft.
Welded [X] Liner installed [X] PVC 4½ " Diam. from 340 ft. to 400 ft.
Threaded [ ] _____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes [X] No [ ]
Type of perforator used saw
SIZE of perforations 1/8 in. by 3 in.
20 perforations from 380 ft. to 400 ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes [ ] No [XX]
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes [ ] No [XX] 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 [XX]
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

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

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 245 ft. below top of well Date 10/14/87
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 [X] No [ ] If yes, by whom? driller
Yield: 60 gal./min. with _____ ft. drawdown after _____ hrs.
" " " "
" " " "

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

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water 48 Was a chemical analysis made? Yes [X] No [ ]
iron: 2.5 ppm

(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
Brn silty sand, gray, boulders	0	15
gray till	15	22
brn till	22	30
gray till	30	100
damp gray till	100	140
gray damp silt & sand	140	180
Brn damp silty sand	180	222
damp gray silt	222	245
Gray silty clay/water 7gpm	245	280
at 280ft.		
gray silty clay, wood chips	280	300
Gray clay	300	350
brn silty gravel	350	390
Gray clay to coarse gray/water	390	400

RECEIVED
JAN 22 1988
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

Work started 9/25 19 87 Completed 10/14 19 87

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 OELKE DRILLING, INC. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 4312 166th Ave E, Sumner 98390

(Signed) _____ (WELL DRILLER) License No. 0837

Contractor's Registration No. ~~OELKEDI136QC~~ Date 11/8/87 19

(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

STATE OF WASHINGTON

(16) 28/7-28A

Application No. .....

Permit No. .....

(1) OWNER: Name Robert W. Tarpley Address 12015- Bollenbough, Monroe 98272

(2) LOCATION OF WELL: County Snohomish — ¼ NE ¼ Sec 28 T 28 N. R 7 W.M.

Bearing and distance from section or subdivision corner 175' N. of house

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

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 260 ft. Depth of completed well 246 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 176 ft.
Threaded ☐ 4 "PVC " Diam. from 166 ft. to 246 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 ____
Type ____ Model No ____
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

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

Surface seal: Yes ☐ No ☒ To what depth? ____ ft.
Material used in seal previously installed
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: N/A H.P ____

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ____ ft.
Static level 79 ft. below top of well Date 10/6/82
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? Driller with air
Yield: 11 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.
Artesian flow ____ g.p.m. Date ____
Temperature of water 50 Was a chemical analysis made? Yes ☒ No ☐
Iron 3.0

(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
Brn. moist sandy gravel	53	70
Brn gray sand some gravel	70	95
Dry gray silt	95	105
Wet gray fine sand and silt	105	115
Very fine gray wet sand	115	155
Wet gray sand	155	160
Gray sticky silty clay	160	197
Granite boulder	197	200
Fract. Black bedrock	200	230
Hard, fract. comglom. bedrock	230	260

300

RECEIVED MAR 24 1983 DEPT OF ECOLOGY NW REGION

Work started 10/1/82 19 Completed 10/6/82 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 OELKE DRILLING CO.
(Person, firm, or corporation) (Type or print)

Address 701-41st Ave. N.E., Puyallup 98371

[Signed] ____ (Well Driller)

License No. 0379 Date 1/14/83, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

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

(17)

28/07-28

WATER WELL REPORT

STATE OF WASHINGTON

Application No. ....

Permit No. ....

(1) OWNER: Name Howard Rogers Address 11625 Ingraham Rd, Snohomish 98

(2) LOCATION OF WELL: County Snohomish SE ¼ NE ¼ Sec 28 T 28 N., R 7E W.M.

Bearing and distance from section or subdivision corner 75' N. House

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

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 260 ft. Depth of completed well 96 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6" Diam. from 0 ft. to 60 ft.
Threaded ☐ ~~5~~" Diam. from ~~56~~ ft. to ~~96~~ 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 ~~PVC~~ Hydrophilics
Type PVC Model No. ......
Diam. 5 Slot size .020 from 56 ft. to 96 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 puddling clay
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ...... Depth of strata ......
Method of sealing strata off ......

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

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ...... ft.
Static level 55 ft. below top of well Date 6/18/79
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 ☒ (with air) No ☐ If yes, by whom? DRILLER
Yield: 12 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.
Artesian flow ...... g.p.m. Date ......
Temperature of water 46 Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

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

MATERIAL	FROM	TO
Top Soil	0	2
Rocky silt - gravel	2	23
Brown silty clay	23	29
Brown silty gravel	29	35
Clean brown sand w/gravel	35	42
Brown silty gravel	42	47
Clean light brown SAND	47	61
Brown sandy gravel	~~6~~61	79
Brown wet silty sand (WET)	79	98
Gray moist silty sand	98	124
Gray wet very fine to med Sand	124	175
Silty clay w/some fine sand lenses sticky	175	205
Silty gravel w/fine sand	205	220
Tight gravel - broken rock	220	260

710

Work started 6/13, 1979. Completed 6/18, 1979

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 OELKE DRILLING CO. (Person, firm, or corporation) (Type or print)

Address 701 - 41st Ave NE Puyallup 98371

[Signed] Roger Oelke (Well Driller)

License No. 0379 Date 3/27, 1980

(USE ADDITIONAL SHEETS IF NECESSARY)

(18) 28/07-27 J

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

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name PHEASANT TWO INVESTMENTS Address 1624 Broadway Everett, Wa. 98201

(2) LOCATION OF WELL: County Snohomish – NE ¼ SE ¼ Sec. 27 T. 28 N., R. 7 W.M.

Bearing and distance from section or subdivision corner Lot 3

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

(4) TYPE OF WORK: Owner's number of well (if more than one).... 8154

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

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 213 ft. Depth of completed well 213 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +2 ft. to 194 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
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? 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 Flint and Walling
Type: submersible H.P. 3/4

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 189 ft. below top of well Date 12/8/81
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

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

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

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 6 gal./min. with 14 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water 51 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
Soil brown	0	1
Clay brown with boulders	1	15
Consolidated conglomerate	15	87
Sand and gravel dry	87	98
Consolidated conglomerate	98	143
Clay brown	143	144
Consolidated conglomerate	144	178
Gravel dry	178	186
Consolidated conglomerate	186	213

210

Work started 12/3/81, 19.... Completed 12/8/81, 19....

WELL DRILLER'S STATEMENT:

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

NAME JANNSEN WELL DRILLING
(Person, firm, or corporation) (Type or print)

Address 19401-63 Ave NE Arlington, Wa. 98223

[Signed] (Well Driller)

License No. 0747 Date 12/16/81, 19....

(USE ADDITIONAL SHEETS IF NECESSARY)

(19) 28/07-34C

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

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Jerry Edwards Address 24930-132nd. St. S.E.

(2) LOCATION OF WELL: County Snohomish — NE ¼ NW ¼ Sec. 34 T. 28 N., R. 7 W.M.

Bearing and distance from section or subdivision corner

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

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

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

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +16" ft. to 138 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 .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

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

Surface seal: Yes ☒ No ☐ To what depth? ..... ft.
Material used in seal 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 To Be Determined
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 123' ft. below top of well Date 6-29-79
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

Approximately 3GPM

Date of test .....
Bailer 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
over burden lome & gravel	+16	10'
gravel and hardpan	10'	20'
gravel -blue clay- mixed	20'	40'
	40'	60'
	60'	80'
	80'	100'
	100'	120'
	120'	122'
gravel and sand	122'	140'

360'

JUL 6 1979

Work started 6-27 19 79 Completed 6-28 19 79

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 Berg Drilling & Pump Service
(Person, firm, or corporation) (Type or print)

Address Box 585 Fall City, Washington 98024

[Signed] James Dinnow
(Well Driller)

License No. 1003 Date July 2, 19 79

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

Example Printout* of a Primary Report from the Water Rights Information System (WRIS)

RECORDED WATER RIGHTS OF THE DEPARTMENT OF ECOLOGY REGION 2 PAGE 00 REPORT DATE 02/28/89

CONTROL #	SEC #	OLD APPL	OLD PERM	OLD CERT	DATE OF PRIORITY	S C A T C M	CNTY	PERMIT DATE	NAME	SOURCE OF APPROPRIATION	TRIBUTARY OF

#OF PTS	R P	LOC. OF POD/POW	(CHG C#)	PURPOSE OF USE	USE TYPE	INST QI	C R S M U U	ANNUAL QA	C R S M U U	IRR ACC	C S PRO- M U VISOS	TIME OF USE	R R R I A C

WATER RESOURCE INVENTORY AREA- 10

TOWNSHIP - 18 RANGE - 10 E

S2*06508C	22	06508	06179	04701	09/12/962		PIER	03/25/963	FIRGROVE MUTUAL	ROCK CR			CHEHALIS R
1 NW4NW4				DOMESTIC MULTIPLE		C	0.5	C 3	50.0 3			S$	
				STOCKWATER		C	0.5	C 3	50.0 3			S$	
				IRRIGATION		C	0.5	C 3	50.0 3		20	S$	04011001

CONTROL # — Number used to identify water rights in WRIS. The letters S, G, and R, at the beginning of the number, denote surface, ground, and reservoir water rights. The second character of the control number denotes the Region in which the water right was issued. Our example is from Region 2, SWRO. The letter at the end of the number denotes the stage of perfection (A=Application, P=Permit, and C=Certificate are used most frequently) of the water right.

SEC # — Denotes section, within a township and range, that the point, or points, of diversion or withdrawal are located. In our example, the township is 18N, the range is 10E, and the section number is 22.

OLD OLD OLD APPL PERM CERT — These represent Application, Permit and Certificate numbers that were assigned by Ecology prior to the development of the current system (which tracks information by CONTROL #).

DATE OF PRIORITY — Date of filing of a water right application with the Department of Ecology. The year is designated by three digits. In our example, 962 represents 1962.

S C A T C M — Internal tracking parameters, designating water right status, change of certificate, and adjudication class number. Most frequently used status codes are (Q) relinquishment, (C) cancelled permit, and (R) rejected application.

CNTY — A four letter code which indicates the county in which the point of diversion or withdrawal is located (PIER = PIERCE Co.).

PERMIT DATE — Date permit was issued. The year is designated by 3 digits. In our example, 963 represents 1963.

NAME — The name of the applicant, permittee, certificant depending on the stage and type of record, is entered in this field last name first followed by initials or first name. In our example, the NAME is FIRGROVE MUTUAL.

SOURCE OF APPROPRIATION — The name, if known, of the surface water source, or type of source if unnamed, for surface water records. For ground water records, the source is indicated as being a well, or sump. In our example, the SOURCE OF APPROPRIATION is ROCK CREEK.

TRIBUTARY — For surface water records, this field refers to the name, if known, of the stream or other surface water body to which the source flows, if any. In our example, the source is a TRIBUTARY OF the CHEHALIS RIVER.

*This is a real record which is located in Region 2 (SWRO), WATER RESOURCE INVENTORY AREA 10

Example Printout of a Primary Report from the Water Rights Information System (WRIS)

RECORDED WATER RIGHTS OF THE DEPARTMENT OF ECOLOGY REGION 2 PAGE 00 REPORT DATE 02/28/89

CONTROL #	SEC #	OLD APPL	OLD PERM	OLD CERT	DATE OF PRIORITY	S T	C C	A M	CNTY	PERMIT DATE	NAME	SOURCE OF APPROPRIATION	TRIBUTARY OF

#OF PTS	R P	LOC. OF POD/POW	(CHG C#)	PURPOSE OF USE	USE TYPE	INST QI	C M	R U	S U	ANNUAL QA	C M	R U	S U	IRR ACC	C M	S U	PRO-VISOS	TIME OF USE	R I	R A	R C

WATER RESOURCE INVENTORY AREA- 10

TOWNSHIP - 18 RANGE - 10 E

S2*06508C	22	06508	06179	04701	09/12/962		PIER 03/25/963 FIRGROVE MUTUAL				ROCK CR								CHEHALIS R				
1	NW4NW4			DOMESTIC MULTIPLE		C	0.5	C	3		50.0	3					S$						
				STOCKWATER		C	0.5	C	3		50.0	3					S$						
				IRRIGATION		C	0.5	C	3		50.0	3		20			S$		04011001				

LOC. OF POD/POW This field is used to describe land subdivisions that completely encompass the location of the point(s) of diversion or withdrawal. In our example, the land subdivision is the NW¼ of the NW¼ of section 22.

PURPOSE OF USE The authorized or proposed uses of water under each water right are indicated in this field. There can be multiple purposes of use for a given water right. In our example, we site three different uses.

USE TYPE This field indicates whether the diversion of water for each use has a (C) consumptive, (P) partially consumptive or (N) non-consuptive effect on the source of supply.

INST QI Instantaneous Quantity: For surface water rights, the authorized instantaneous rate of diversion is stated in cubic feet per second (C) for each purpose of use. For ground water rights, the authorized instantaneous rate of withdrawal is stated in gallons per minute (G) for each purpose of use. These quantities are not necessarily additive. In our example, the QI = 0.5 CFS.

C R S M U U Internal tracking parameters which indicate if a water quantity is in Common (C), Re-use (R), or Supplemental (S) to other purposes of use.

ANNUAL QA For both surface water and ground water rights, the authorized total annual diversion is stated in acre-feet per year for each purpose of use. For reservoir storage rights, the authorized annual storage volume is stated in acre-feet per year. In our example, QA = 50.

IRR ACC Where irrigation is specified as a purpose of use, the maximum irrigated land area authorized is indicated in acres. In our example, the maximum number of irrigated acres is 20.

PRO-VISOS Certain standard informative statements, restrictions or provisions are often included on state issued permits and certificates. These are tracked by letter codes in this field (R for access port, S for screening, $ for general information, etc.).

TIME OF USE An entry in this field denotes the period of time during a year when water may be diverted or withdrawn for a specific purpose of use. A blank field indicates continuous use. In our example, 04011001 denotes April 1st to October 1st (IS denotes during irrigation season).

R R R I A C Internal tracking parameters used for split records which indicate the number of repeat QI's (RI), repeat QA's (RA), and repeat irrigated acres (RC), associated with this water right. These fields are blank in our example.

CONTROL # / #OF PTS	SEC / R / P	OLD APPL / OLD PERM / OLD CERT / LOC. OF POD/POW (CHG C#)	DATE OF PRIORITY / PURPOSE OF USE	S T	C C	A M	CNTY / USE TYPE	PERMIT DATE / INST QI	NAME	ANNUAL QA	SOURCE OF APPROPRIATION TRIBUTARY OF C M	R U	S U	IRR AC	C M	S U	PROVISOS	TIME OF USE	R I	R A	R C
WATER RESOURCE INVENTORY AREA- 03																				
TOWNSHIP - 32 RANGE - 04 E																				
TOWNSHIP - 32 RANGE - 04 E																				
G1-21414C 1	05 SW4SW4SE4		04/03/974 DOMESTIC SINGLE				SNOH C	09/15/975 10.0 G	NORGAARD ELMER	1.0	WELL						R			
G1*10004C 1	06 10004 TR121 LK KETCHUM REC TR DIV6	09447	06709 02/03/969 DOMESTIC MULTIPLE				SNOH C	12/15/969 150.0 G	DAVIDSON H INC	5.3	WELL						RHT			
G1-22415C 1	06 NW4SE4		01/24/975 DOMESTIC MULTIPLE				SNOH C	09/15/976 1250.0 G	WILDERNESS RIDGE C	129.7	WELL						R			
G1-24414C 1	06 LOT 5 LK KETCHUM REC TR #1		11/23/983 DOMESTIC SINGLE				SNOH C	08/15/984 5.0 G	HAIGHT R W ETUX	1.0	WELL									
G1-00155C 1	07 12358 L 71 PL LK KETCHUM BECK TR 1		12/21/971 DOMESTIC SINGLE				SNOH C	08/28/972 5.0 G	FURIAK MICHAEL	1.0	WELL						R			
G1-22891C 1	07 SW4SE4		06/07/977 DOMESTIC MULTIPLE				SNOH C	04/28/978 30.0 G	WALLIN COMM WELL A	5.4	WELL						RE			
G1-23152C 1	08 SW4NW4		06/29/978 DOMESTIC MULTIPLE				SNOH C	01/15/979 35.0 G	ERICKSON ELMER	9.0	WELL						RE			
G1*03616C 1	18 03616 W2 GL1	03369	02919 05/13/954 DOMESTIC SINGLE STOCK WATERING IRRIGATION	E			SNOH C C C	07/30/954 20.0 G 3 20.0 G 3 20.0 G 3	FOLDEN P T	7.6 3 7.6 3 7.6 3	WELL			.5			EA EA EA	I8		

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CONTROL #    SEC  OLD      OLD      OLD      DATE OF    S C A   CNTY  PERMIT    NAME                  SOURCE OF APPROPRIATION TRIBUTARY OF
              #   APPL     PERM     CERT     PRIORITY   T C M         DATE
#OF R                                                           USE     INST  C R S      ANNUAL C R S       IRR   C S PRO-     TIME OF    R R R
PTS P LOC. OF POD/POW  (CHG C#)  PURPOSE OF USE                 TYPE    QI    M U U      QA     M U U       AC    M U VISOS    USE        I A C

WATER RESOURCE INVENTORY AREA-  05

TOWNSHIP - 30    RANGE - 06 E

TOWNSHIP - 30    RANGE - 06 E

G1*02086C    02 02086    01888    01569    08/20/951          SNOH 10/19/951 LEAQUEE A R          WELL
 1   SE4NW4                       IRRIGATION                  C       45.0 G              12.0                 6.0       E        IS

G1-22730C    02                            08/19/976          SNOH 01/30/981 CORRIGAN THOMAS F    WELL
 1   GL-4                         DOMESTIC SINGLE             C       40.0 G 2             1.0

G1-24834A    08                            05/13/986          SNOH   /  /    NORTHLAND DEVEL CO   WELL
 1   NE4NE4                       DOMESTIC MULTIPLE           C      152.0 G

G1*09299C    11 09299    08840    07222    03/13/968          SNOH 12/04/968 BIENDL J             WELL
 1   SE4SE4                       DOMESTIC MULTIPLE           C       35.0 G               8.0                           HTM

G1*09300C    11 09300    08841    07223    03/13/968          SNOH 12/06/968 BIENDL J             WELL
 1   COMM BCH TR                  DOMESTIC MULTIPLE           C       35.0 G               8.0        S                  HTM

G1*09301C    11 09301    08842    07224    03/13/968          SNOH 12/04/968 BIENDL J             WELL
 1   SE4 SE4                      DOMESTIC MULTIPLE           C       35.0 G               8.0        S                  HTM

G1*09636C    11 09636    08963    07295    08/06/968          SNOH 02/26/969 BLUE SPRUCE GROVE    INFILTRATION TR
 1   GL5                          DOMESTIC MULTIPLE           C      130.0 G             170.0                           HTM

G1-23680C    11                            09/16/980          SNOH 06/30/981 CEDAR LN WTR ASSOC   WELL
 1   NW4SW4SE4                    DOMESTIC MULTIPLE           C      150.0 G             142.0                           M

G1*10642P    12 10642    10174             02/10/970          SNOH 03/01/971 RIVERSCENE           WELL
 1   L39 BL2 RIVERSCENE           DOMESTIC MULTIPLE           C      200.0 G 2            81.0                           THR
                                  COMMERCIAL/INDUSTRIAL       C      200.0 G 2             4.0                           THR

TOWNSHIP - 30    RANGE - 07 E

G1*09361C    06 09361    08733    06487    06/04/968          SNOH 10/18/968 MOUNTAIN LOOP INC    WELL
 1   L75 MT LOOP VIEW TR          DOMESTIC MULTIPLE           C      100.0 G               4.5                           RHTM

G1-20447C    06                            02/09/973          SNOH 01/03/974 PITTMAN EVA MAE      WELL
 1   L 96 PL CANYON FALLS PARK 2  DOMESTIC SINGLE             C        3.0 G               .45

G1-24026C    06                            01/26/982          SNOH 09/15/982 ANDERKA GORDON       WELL
 1   NE4SE4                       DOMESTIC MULTIPLE           C       50.0 G              43.5                           R

G1-24377C    06                            09/26/983          SNOH 01/15/985 CANDY CANE PARK      WELL
 1   LOT 75 MTN LOOP VIEW TRACTS  DOMESTIC MULTIPLE           C       70.0 G              43.5        S

G1-25288A    06                            08/17/988          SNOH   /  /    CANYON CREEK UNINC   WELL
 1   NE4SE4                       DOMESTIC MULTIPLE           C       40.0 G

G1-22575P    07                            08/22/975          SNOH 06/15/976 HURLEY ELIZABETH I   WELL
 1   SW4 SE4                      DOMESTIC SINGLE             C       80.0 G 3             1.0                           RE
                                  STOCK WATERING              C       80.0 G 3              .5                           RE
                                  IRRIGATION                  C       80.0 G 3            12.0                 6.0       RE       IS

G1-21172C    08                            01/15/974          SNOH 03/31/976 RIVER TERR WTR & P   WELL
 1   L 18 RIVR TERRACE IN SW4 NW4 DOMESTIC MULTIPLE           C       65.0 G              63.0                           R

G1-23290C    08                            01/22/979          SNOH 09/30/980 GRANCO INC           WELL
 1   SE4SW4                       DOMESTIC SINGLE             C       90.0 G 2              .1                           RK       00000000
                                  ENVIRONMENTAL QUALITY       C       90.0 G 2             2.0                           RK       00000000

G1*02107C    18 02107    02062    01188    08/29/951  E       SNOH 03/04/952 STROUD P             INFILTRATION TR
 1   GL-1                         IRRIGATION                  C      160.0 G             136.0                68.0       E        IS

TOWNSHIP - 31    RANGE - 04 E

G1*00242S    02 00242             00168    01/00/891          SNOH   /  /    GREAT NORTHERN RY    WELL
 1   SE4SE4                       RAILWAY                     C      100.0 G              25.0

G1*02561C    02 02561    02498    01741    05/27/952          SNOH 12/19/952 WALEN N R            WELL
 1   GL11                         FIRE PROTECTION             C      125.0 G 2            50.0    2
                                  IRRIGATION                  C      125.0 G 2            50.0    2           25.0                IS

G1-21375C    03                            03/26/974          SNOH 08/29/975 MOORE ALEX           WELL
 1   SE4SE4                       STOCK WATERING              C       20.0 G              10.6
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CONTROL # / #OF PTS	SEC / P	OLD APPL / LOC. OF POD/POW	OLD PERM / (CHG C#)	OLD CERT / PURPOSE OF USE	DATE OF PRIORITY	S T	C M	CNTY / USE TYPE	PERMIT DATE / INST QI	C M	R U	S U	NAME / ANNUAL QA	C M	R U	S U	SOURCE OF APPROPRIATION / IRR AC	C M	S U	PRO-VISOS	TRIBUTARY OF / TIME OF USE	R I	R A	R C
WATER RESOURCE INVENTORY AREA- 05																								
TOWNSHIP - 31 RANGE - 04 E																								
G1*03136C 2	04	03136 W2 SE4 NE4	02967	02238 IRRIGATION	03/31/953	E		C	SNOH 08/07/953 84.0			G	GRUWELL W 22.0				WELLS 11.0			E	IS			
G1*05492C 1	04	05492 SW4 SW4 SE4	05153	03743 DOMESTIC SINGLE	02/02/960			C	SNOH 04/21/960 85.0			G 2	HOVIG A 45.6			2	WELL			A				
				IRRIGATION				C	85.0			G 2	45.6			2	20.0			A	IS			
G1-25301C 1	05	SW4SW4		09/06/988 DOMESTIC MULTIPLE				C	SNOH 04/16/990 20.0			G	W T WITHERS 4.0				WELL			‡RM				
G1-25302C 1	05	SW4SW4		09/06/988 DOMESTIC MULTIPLE				C	SNOH 05/15/990 30.0			G	W T WITHERS 3.5				WELL			‡RM				
G1*06525C 1	07	06525 NW4NE4SW4	06148	05108 DOMESTIC MULTIPLE	10/22/962			C	SNOH 02/08/963 40.0			G	WARM BEACH CONF GR 50.0				WELL			A				
G1-20121C 1	07	NE4 SE4		05/10/972 DOMESTIC SINGLE				C	SNOH 02/20/973 10.0			G	HARDEBECK L E OR M 1.0				WELL							
				STOCK WATERING				C	5.0			G	1.0											
				IRRIGATION				C	5.0			G	1.0				1.0				04151001			
G1-21305C 3	07	SW4NE4		03/04/974 DOMESTIC MULTIPLE				C	SNOH 10/13/978 70.0			G 3	WARM BEACH CONF GR 68.2				WELLS			RE				
				FIRE PROTECTION				C	70.0			G 3								RE				
				IRRIGATION				C	70.0			G 3	38.2				20.0			RE	IS			
G1-23659C 3	07	SW4		07/17/980 DOMESTIC SINGLE				C	SNOH 08/15/985 300.0			G	WARM BEACH CON GRD 96.0				WELLS			M				
G1-23811C 1	08	NE4SW4		04/10/981 DOMESTIC MULTIPLE				C	SNOH 06/17/981 35.0			G	HAPPY HOLLOW WTR A 7.0				WELL							
G1-25523A 1	08	SE4NW4		10/20/989 DOMESTIC MULTIPLE				C	SNOH / / 37.0			G	NORM SATRA				WELL							
G1*06328C 1	09	06328 SE4NW4NE4	06012	04402 IRRIGATION	05/28/962			C	SNOH 11/14/962 120.0			G	WINTERHALTER J E 80.0				WELL 40.0			AE	IS			
G1*06329C 1	09	06329 W2 SW4 NE4	06013	04387 IRRIGATION	05/25/962			C	SNOH 11/14/962 80.0			G	HURLBERT V 64.0				WELL 40.0			AE	IS			
G1*01978C 1	12	01978 NW4NE4	01829	01065 FIRE PROTECTION	05/25/951			C	SNOH 09/07/951 100.0			G 2	WALEN N R 28.0			2	WELL							
				IRRIGATION				C	100.0			G 2	28.0			2	14.0				IS			
G1*02599C 1	12	02599 NE4NE4	02484	01515 IRRIGATION	06/12/952			C	SNOH 11/20/952 168.0			G	SANDER H 50.0				WELL 25.0				IS			
G1*07824C 1	14	07824 NE4 NW4 SW4	07351	05559 DOMESTIC MULTIPLE	10/18/965			C	SNOH 03/07/966 30.0			G 2	SOHNS L M 6.4			2	WELL			R				
				FISH PROPAGATION				C	20.0			G 2	32.0			2				RP				
				REC & BEAUTIFICATION				C	20.0			G 2	32.0			2				R				
				IRRIGATION				C	30.0			G 2	6.4			2	2.0			R	IS			
G1-24278C 1	15	SE4SW4		03/30/983 DOMESTIC MULTIPLE				C	SNOH 08/15/984 32.0			G	BUMPUS GEORGE 2.5				WELL							
G1-24211C 1	16	SW4SE4		12/07/982 DOMESTIC MULTIPLE				C	SNOH 08/15/984 32.0			G	DUNEDIN INDUSTRIES 3.5				WELL							
G1-00214C 1	17	12443 NW4 NW4		02/04/972 DOMESTIC SINGLE				C	SNOH 10/12/972 5.0			G 2	FOLDEN PETER T 1.5				WELL							
				STOCK WATERING				C	5.0			G 2	1.0											
G1-25080C 1	18	L-2		10/06/987 DOMESTIC MULTIPLE				C	SNOH 09/15/988 30.0			G	MOORE & PETERSON 5.4				WELL			RM				
G1-25686A 1	19	SE4SW4		05/03/990 DOMESTIC MULTIPLE				C	SNOH / / 200.0			G	WARM BEACH WTR CO				WELL							
G1-22013C 1	20	NE4SW4		07/18/974 DOMESTIC MULTIPLE				C	SNOH 09/30/975 20.0			G	HUMPHRIES WILMA D 13.0				WELL			R				
G1-23558PAKT 1	20	SW4SE4		02/11/980 DOMESTIC MULTIPLE				C	SNOH 05/29/981 65.5			G	POESCHEL & SCHULTZ 27.2			2	WELL							

CONTROL # / #OF PTS	SEC / R / P	OLD APPL / LOC. OF POD/POW	OLD PERM / (CHG C#)	OLD CERT / PURPOSE OF USE	DATE OF PRIORITY / S T C M	CNTY / USE TYPE	PERMIT DATE / INST QI	NAME / ANNUAL QA	SOURCE OF APPROPRIATION TRIBUTARY OF / C R S M U U	IRR AC / C S M U	PRO-VISOS	TIME OF USE	R R R I A C
WATER RESOURCE INVENTORY AREA- 05													
TOWNSHIP - 31 RANGE - 04 E													
G1-24561C 1	20 SE4NE4			10/03/984 DOMESTIC MULTIPLE		SNOH C	08/15/985 29.0 G	GOTT CARL E 15.0	WELL		RM		
G1-23417C 1	21 SW4SE4			06/25/979 DOMESTIC MULTIPLE		SNOH C	08/29/980 200.0 G	SEVEN LAKES WTR AS 320.0	WELL		RM		
G1-23558PBKT 1	21 SW4SE4			02/11/980 DOMESTIC MULTIPLE		SNOH C	05/29/981 11.5 G	POESCHEL & SCHULTZ 27.2 2	WELL				
G1-23805C 1	22 NW4SE4			03/24/981 DOMESTIC MULTIPLE		SNOH C	03/15/982 250.0 G	SEVEN LKS WTR ASSN 400.0	WELL		RM		
G1*05634C 1	23 05634 GL3		05309	04045 06/10/960 DOMESTIC MULTIPLE		SNOH C	09/08/960 20.0 G	LAKE GOODWIN LAND 32.0	WELL		A		
G1-23555C 1	23 TR-A BL-B LK KI SUNRISE ADD			02/06/980 DOMESTIC MULTIPLE		SNOH C	10/31/980 30.0 G	LAKE KI SUNRISE WT 32.0	WELL		R		
G1-24426C 1	23 SW4NE4			12/22/983 DOMESTIC MULTIPLE		SNOH C	10/15/984 37.0 G	POESCHEL & SCHULTZ 4.5	WELL				
G1*00083C 1	24 00083 SW4SW4		00047	00286 01/12/946 DOMESTIC MUNICIPAL		SNOH C	03/11/946 300.0 G	MARYSVILLE TOWN OF 160.0	WELL P				
G1*02379C 1	24 02379 SW4SW4		02223	02096 03/07/952 DOMESTIC MUNICIPAL		SNOH C	06/20/952 500.0 G	MARYSVILLE TOWN OF 800.0	WELL P		AE		
G1*02391C 1	24 02391 SW4SW4		02224	01152 03/07/952 DOMESTIC MUNICIPAL		SNOH C	06/20/952 [illegible] G	MARYSVILLE TOWN OF 320.0	WELL P				
G1-22636C 1	25 NW4SW4			02/02/976 DOMESTIC MULTIPLE		SNOH C	06/30/976 50.0 G	KINGSTON JAMES E 9.0	WELL		RUE		
G1-23387C 1	25 TRACT 22			05/23/979 DOMESTIC MULTIPLE		SNOH C	04/15/983 65.0 G	KINGSTON JAMES E 36.0	WELL S		$M		
G1*05500C 1	26 05500 NW4 NE4		05264	04586 02/10/960 DOMESTIC SINGLE IRRIGATION		SNOH C C	08/11/960 15.0 G 2 15.0 G 2	LINTH V E 13.6 2 13.6 2	WELL	4.0	A A	IS	
G1*09058C 1	26 09058 NW4 SW4 NE4		08586	06997 11/17/967 DOMESTIC MULTIPLE		SNOH C	07/26/968 75.0 G	SEVEN LAKES WTR AS 62.0	WELL S		RHM		
G1-22497C 1	29 SW4SW4			05/15/975 DOMESTIC SINGLE IRRIGATION		SNOH C C	10/31/980 75.0 G 2 75.0 G 2	SNOHOMISH CO PK&RE 2.0 58.0	WELL	80.0		IS	
G1-24415C 1	29 LOT 6 GL-I KAYAK PT ESTATES			12/14/983 DOMESTIC MULTIPLE		SNOH C	03/15/985 57.0 G	DORLAND DAVID 42.0	WELL		RM		
G1-22364C 1	30 NW4SE4			01/07/975 IRRIGATION		SNOH C	10/31/980 175.0 G	SNOHOMISH CO PK&RE 90.0	WELL	80.0		IS	
G1-23278C 1	31 ONW4NE4			12/20/978 DOMESTIC MULTIPLE		SNOH C	04/15/983 70.0 G	ILIAD CO 72.0	WELL		RM		
G1-24066C 1	34 NW4NE4			04/12/982 DOMESTIC MULTIPLE		SNOH C	02/15/983 250.0 G	SEVEN LAKES WTR AS WELL #7 S			RM		
TOWNSHIP - 31 RANGE - 05 E													
G1*02442C 1	02 02442 GL13		02295	02968 04/09/952 IRRIGATION		SNOH C	08/01/952 156.0 G	HAMMER C D 30.0	WELL	26.0		IS	
G1*07494C 3	02 07494 GL-7		07040	05169 02/12/965 W DOMESTIC MUNICIPAL		SNOH C	05/21/965 1700.0 G	ARLINGTON CITY OF 1344.0	WELLS		MHT		
G1*09495C 1	02 09495 W2 GL2		00922	06379 06/04/968 COMMERCIAL/INDUSTRIAL		SNOH C	02/07/969 150.0 G	ASSOC SAND & GRAVE 36.0	WELL		P	PS	
G1*01355C 1	03 01355 SW4SE4		01183	00446 01/31/950 IRRIGATION		SNOH C	04/28/950 64.0 G	KLEIN J 21.0	WELL	17.0	A	IS	
G1*02115C 1	03 02115 GL-8		02020	01488 09/04/951 IRRIGATION		SNOH C	01/24/952 90.0 G	ROBERTSON P V 40.0	WELL	30.0	AE	IS	

#5

#7

CONTROL # / #OF PTS	SEC / R P	OLD APPL / LOC. OF POD/POW	OLD PERM / (CHG C#)	OLD CERT / PURPOSE OF USE	DATE OF PRIORITY	S T C A M	CNTY / USE TYPE	PERMIT DATE / INST QI	NAME	C R S M U U	ANNUAL QA	C R S M U U	IRR AC	C S M U	PRO-VISOS	TIME OF USE	R R R I A C
WATER RESOURCE INVENTORY AREA- 05																	
TOWNSHIP - 31 RANGE - 05 E																	
G1*02925C 1	03 NE4SW4	02925	02655	01830 IRRIGATION	01/16/953		SNOH C	03/27/953 150.0 G	JANTZ A		40.0		WELL 20.0		AE	IS	
G1*04837C 1	03 TR6/7 C J MURPHY 10-ACRE TRS	04837	04553	03155 IRRIGATION	06/23/958		SNOH C	07/25/958 150.0 G	WINTER W		30.0		WELL 15.0		AE	IS	
G1-00675C 1	03 GL-1	11070	10741	DOMESTIC MUNICIPAL	07/14/970		SNOH C	04/07/972 2250.0 G	MARYSVILLE CITY OF		3600.0		WELL				
G1-23427Q 1	05 NW4SE4			DOMESTIC SINGLE IRRIGATION	07/06/979		SNOH C C	03/31/981 25.0 G 2 25.0 G 2	THOMAS JOHN H		1.0 5.0		WELL 5.0			IS	
G1*01252C 1	07 W2NE4SW4	01252	01204	00553 IRRIGATION	10/08/949		SNOH C	05/31/950 100.0 G	LORENZEN H		21.0		WELL 17.0		A	IS	
G1*02021C 1	07 NW4NE4	02021	01859	00847 IRRIGATION	06/29/951		SNOH C	09/28/951 175.0 G	HENNING P		120.0		WELL 60.0			IS	
G1*04749C 1	07 GL3	04749	04481	03110 DOMESTIC SINGLE IRRIGATION	01/08/958		SNOH C C	04/21/958 100.0 G 2 100.0 G 2	ROTHROCK R E		20.0 2 20.0 2	S	WELL 10.0		A AEX	IS	
G1*04864C 1	07 N2NE4NW4	04864	04577	03181 IRRIGATION	05/19/958		SNOH C	08/15/958 96.0 G	GULHAUGEN O		36.0		WELL 18.0		AE	IS	
G1-21190C 5	07 W2NE4/NW4SE4			DOMESTIC MULTIPLE STOCK WATERING IRRIGATION	01/18/974		SNOH C C C	12/15/975 648.0 G 3 648.0 G 3 648.0 G 3	HENNING PETER JR		353.7 3 353.7 3 353.7 3		WELLS 168.0		R E R E R E	IS	
G1*02511C 1	08 SE4SE4	02511	02668	02040 IRRIGATION	05/12/952	W	SNOH C	04/03/953 90.0 G	PETERSON KENNETH		36.0		WELL 18.0		AE	IS	
G1*02651C 1	08 NE4SW4	02651	02500	01358 IRRIGATION	07/23/952		SNOH C	12/19/952 90.0 G	SESBY H		40.0		WELL 20.0			IS	
G1*04337C 1	08 L7	04337	04039	03293 IRRIGATION	06/05/956		SNOH C	08/06/956 400.0 G	DARST L C		140.0		WELL 70.0		AE	IS	
G1*05119C 1	08 SE4NW4	05119	04784	03389 IRRIGATION	02/04/959		SNOH C	04/17/959 320.0 G	LANG C J		64.0		WELL 32.0		AE	IS	
G1*05276C 1	08 SE4SW4	05276	04974	03741 IRRIGATION	06/02/959		SNOH C	10/02/959 200.0 G	WINTER J		40.0		WELL 20.0		AE	IS	
G1*05946C 1	08 GL8	05946	05647	04057 IRRIGATION	05/18/961		SNOH C	09/15/961 250.0 G	DRIVSTUEN I		50.0		WELL 25.0		A	IS	
G1*06501C 1	08 SE4NW4	06501	06114	04778 IRRIGATION	10/02/962		SNOH C	01/18/963 256.0 G	KAZEN P SR		84.0		WELL 42.0		A	IS	
G1*02545C 1	09 GL12	02545	02524	01656 IRRIGATION	05/20/952		SNOH C	12/31/952 190.0 G	BARLOND P E		65.0		WELL P 43.0			IS	
G1*04937C 1	09 SE4SW4	04937	04768	03601 IRRIGATION	07/25/958		SNOH C	03/27/959 192.0 G	KING C E		80.0		WELL 40.0		AE	IS	
G1*05211C 1	09 N2 SE4	05211	04970	03740 IRRIGATION	04/14/959		SNOH C	10/02/959 382.0 G	STEVENSON E W / M		200.0		WELL 100.0		AE	IS	
G1-23648C 1	09 SW4NE4			DOMESTIC MULTIPLE	05/29/980		SNOH C	01/15/982 140.0 G	BRITISH HLDGS INC		98.0		WELL		BM		
G1*02512C 1	10 N2 SW4	02512	02456	02849 IRRIGATION	05/12/952		SNOH C	11/21/952 160.0 G	FOSTER G F		120.0		WELL 60.0		EA	IS	
G1*00777C 1	11 SE4SE4	00777	00731	00782 IRRIGATION	03/20/948		SNOH C	06/21/948 250.0 G	MURPHY G ESTATE		140.0		WELL 70.0			IS	
G1*03413C 4	11 SE4 NW4	03413	03190	02495 HEAT EXCHANGE	10/23/954		SNOH C	01/22/954 600.0 G	GLACIER COLD STOR		480.0		WELLS		A		
G1-25680A 1	12 SW4SE4NW4			DOMESTIC MULTIPLE	04/17/990		SNOH C	/ / 38.0 G	TRIPLE T CONST				WELL				

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WATER RESOURCE INVENTORY AREA- 05												
TOWNSHIP - 31 RANGE - 05 E												
G1-24564C	14			10/11/984			SNOH 04/15/985		ROBINETT HENRY M	WELL		
1 NW4SE4				DOMESTIC MULTIPLE		C	31.0 G	6.0				
G1*03967C	15	03967	03745	02401 04/20/955			SNOH 08/11/955		ARLINGTON CEMETERY	WELL		
1 NE4 NE4				IRRIGATION		C	150.0 G	60.0	P	30.0	AEN	IS
G1-23362C	15			04/23/979	S		SNOH 12/15/981		ROLLINS THOMAS ET	WELL		
1 SE4NE4				DOMESTIC MULTIPLE		C	10.0 G	10.5				
G1-24599C	17			01/30/985			SNOH 08/15/985		MILLER GENE F	WELL		
1 SE4NW4				DOMESTIC MULTIPLE		C	40.0 G	6.0			RK	
G1-25418A	18			04/04/989			SNOH / /		AL FROST	WELL		
1 SE4SE4				DOMESTIC SINGLE		C	90.0 G 2	44.0 2				
				IRRIGATION		C	90.0 G 2	44.0 2		9.0		
G1-24168C	22			07/27/982			SNOH 06/15/983		BERTILSON ROBT ET	WELL		
1 NW4NE4				DOMESTIC MULTIPLE		C	50.0 G	25.5				
G1-24900C	22			09/17/986			SNOH 09/15/987		ARLINGTON CITY OF	WELL		
1 SE4NW4				DOMESTIC MUNICIPAL		C	580.0 G	696.0	S		$RM	
G1-23569C	26			03/17/980			SNOH 03/15/982		EDGECOMB LDOWRS AS	WELL		
1 SW4SW4				DOMESTIC MULTIPLE		C	15.0 G	10.0			R	
G1-24752C	29			12/04/985			SNOH 08/15/986		MCKEOWN PETER J	WELL		
1 SW4				DOMESTIC MULTIPLE		C	80.0 G	4.7				
TOWNSHIP - 31 RANGE - 06 E												
G1*02680C	04	02680	02504	01655 08/14/952			SNOH 12/19/952		CARLSON H F	WELL		
1 GL3				IRRIGATION		C	45.0 G	15.0		10.0	E	IS
G1*05827C	04	05827	05521	04228 02/06/961			SNOH 05/15/961		CORNING R	UNN POND		
1 SW4SW4SW4				IRRIGATION		C	500.0 G	100.0		50.0		IS
G1-22353C	04			06/26/974			SNOH 06/30/976		VANCE DONALD R	WELLS		
2 GL-4				DOMESTIC SINGLE		C	270.0 G 3	52.0 3			R	
				STOCK WATERING		C	270.0 G 3	52.0 3			R	
				IRRIGATION		C	270.0 G 3	52.0 3		25.0	R	04151001
G1*00595C	05	00595	00537	00631 07/30/947			SNOH 10/15/947		CUTLER H C / R	WELL		
1 SE4NE4				IRRIGATION		C	120.0 G	24.0		24.0		IS
G1*00970C	05	00970	00927	00327 08/05/948			SNOH 03/04/949		BAUER J	WELL		
1 GL1				IRRIGATION		C	200.0 G	10.0		10.0		IS
G1*02298C	05	02298	02120	01212 01/18/952			SNOH 04/04/952		PRICE J M	WELL		
1 E2E2W2SE4NW4				IRRIGATION		C	45.0 G	8.0		4.0	AE	IS
G1*06177C	05	06177	05969	04696 02/09/962			SNOH 10/08/962		TILLMAN D C	WELL/INFILTRATION		TR
2 NW4SE4				IRRIGATION		C	135.0 G	60.0		30.0		IS
G1-00037C	05	10833	10124	05/04/970			SNOH 02/10/971		BORSETH DONALD H	WELL		
1 NE4SW4				DOMESTIC MULTIPLE		C	100.0 G	27.9			R	
G1-00394C	05	11281	10591	10/06/970			SNOH 12/07/971		TILLMAN DONALD C	WELL		
1 NW4SE4				DOMESTIC SINGLE		C	20.0 G 2	1.0				
				STOCK WATERING		C	20.0 G 2	7.0				
G1-00442C	05	11269	10288	10/01/970			SNOH 04/28/971		GEMMER/PARSON/BARK	WELL		
1 GL-1				DOMESTIC MULTIPLE		C	200.0 G	83.7			THNR$	
G1-00613C	05	11531	10525	01/18/971			SNOH 11/16/971		TILLMAN DONALD C	WELL		
1 SE4 SE4 NW4				DOMESTIC SINGLE		C	200.0 G 3	1.0			RN	
				STOCK WATERING		C	200.0 G 3	1.0			RN	
				IRRIGATION		C	200.0 G 3	37.0		17.0	RN	05150915
G1-23494Q	05			10/22/979			SNOH 07/16/984		TILLMAN DONALD C	WELL		
1 SW4SE4				DOMESTIC SINGLE		C	180.0 G 3 S	60.0 3 S			$	
				STOCK WATERING		C	180.0 G 3 S	60.0 3 S			$	
				IRRIGATION		C	180.0 G 3	60.0 3		30.0	$	IS
G1*03695C	06	03695	03460	02432 07/02/954			SNOH 10/15/954		HOLLAND C	WELL		
1 GL4				IRRIGATION		C	100.0 G	46.0	P	23.0	E	IS

CONTROL # / #OF PTS	SEC / P	OLD APPL / LOC. OF POD/POW	OLD PERM / (CHG C#)	OLD CERT / PURPOSE OF USE	DATE OF PRIORITY	S T	C C	A M	CNTY / USE TYPE	PERMIT DATE / INST QI	NAME	C M	R U	S U	SOURCE OF APPROPRIATION / ANNUAL QA	C M	R U	S U	TRIBUTARY OF / IRR AC	C M	S U	PRO-VISOS	TIME OF USE	R I	R A	R C
WATER RESOURCE INVENTORY AREA- 05																									
TOWNSHIP - 31 RANGE - 06 E																									
G1-23024Q	06			12/29/977	S			SNOH	08/15/978	SAFFORD DAVID ETUX				WELL											
1 GL-3				DOMESTIC SINGLE				C	90.0	G 3				2.0							R				
				STOCK WATERING				C	90.0	G 3				1.0							R				
				IRRIGATION				C	90.0	G 3				14.0				7.0			R	IS			
G1-23631C	07			07/21/980				SNOH	07/15/983	ILIAD INC				WELL											
1 NW4SE4				DOMESTIC MULTIPLE				C	40.0	G				29.7											
G1-23775C	18			02/25/981				SNOH	08/16/982	ILIAD INC				WELL											
1 SE4SE4				DOMESTIC MULTIPLE				C	30.0	G				29.0							R				
G1-24504C	20			08/06/984				SNOH	06/14/985	ILIAD INC				WELL											
1 LOT 20 BL-1 SUDDENVIEW PL				DOMESTIC MULTIPLE				C	40.0	G				29.0				S			RM				
G1-23239C	21			10/04/978				SNOH	11/26/980	SCOTT STEPHEN M				WELL											
1 GL-1				DOMESTIC MULTIPLE				C	10.0	G				2.0							RK				
G1*11179C	28	11179	10604	07709	08/24/970			SNOH	12/13/971	JORDAN MAINTENANCE				WELL											
1 L 2 PL JORDAN RV TRAILS D 2				DOMESTIC MULTIPLE				C	150.0	G				81.0							H				
G1-24757C	30			12/06/985				SNOH	08/15/986	TOBIAS DARREL J				WELL											
1 GL-1				DOMESTIC MULTIPLE				C	35.0	G				5.4											
TOWNSHIP - 32 RANGE - 04 E																									
G1-20146A	01			05/30/972				SNOH	/ /	VICTORIA RANCH INC				WELL											
1 SE4 SW4				DOMESTIC MULTIPLE				C	60.0	G 2															
				IRRIGATION				C	60.0	G 2												IS			
G1-24450P	01			02/16/984				SNOH	03/15/985	PEAKE R S				WELL											
1 NW4SE4				DOMESTIC MULTIPLE				C	30.0	G				5.36							R				
G1-25596A	06			01/11/990				SNOH	/ /	WILDRNESS R COM CO				WELLS											
2 LOT 121				DOMESTIC MULTIPLE				C	365.0	G															
G1-23536C	07			12/26/979				SNOH	07/15/982	WILLIAMS THOMAS				WELLS											
2 NE4NE4				DOMESTIC MULTIPLE				C	72.0	G				24.0							R				
G1*02517C	08	02517	02447	01941	05/13/952			SNOH	11/07/952	TWING H D				INFILTRATION TR											
1 NW4SE4				IRRIGATION				C	200.0	G				50.0				25.0			E	IS			
G1*08926C	08	08926	08383	07192	08/23/967			SNOH	03/08/968	SMALL J				INFILTRATION TR											
1 N2SE4SE4				IRRIGATION				C	150.0	G				60.0				40.0			E	06010901			
G1-22010C	08			07/16/974				SNOH	04/30/976	SKAGIT FRYER FARMS				WELL											
1 NE4 NW4				DOMESTIC SINGLE				C	20.0	G 2				1.0							R				
				STOCK WATERING				C	20.0	G 2				13.5							R				
G1-25297C	10			08/30/988				SNOH	03/15/989	REVELL GERALD L				WELL											
1 NW4NW4				DOMESTIC MULTIPLE				C	11.0	G				1.0							R				
G1*07308C	17	07308	06803	05550	08/26/964			SNOH	11/06/964	KROMANN E S				WELL											
1 E2 NE4 NW4 NE4				DOMESTIC SINGLE				C	98.0	G 2				35.6							AN				
				IRRIGATION				C	98.0	G 2				35.6				15.0			AEN	IS			
G1*00605S	19	00605		00509	05/00/918			SNOH	/ /	STANWOOD WTR CO				WELL											
1 BL1 FARMER ADD TO E STANWOOD				DOMESTIC MULTIPLE				C	250.0	G				17.0											
G1*00606S	19	00606		00498	00/00/918			SNOH	/ /	PICTSWEET FOODS IN				WELL											
1 SE4NE4SW4				COMMERCIAL/INDUSTRIAL				C	250.0	G				165.0											
G1*01067C	20	01067	00976	00616	02/11/949			SNOH	05/06/949	STANWOOD WTR CO				WELL											
1 NW4SE4				DOMESTIC MUNICIPAL				C	150.0	G 2				121.0	2										
				COMMERCIAL/INDUSTRIAL				C	150.0	G 2				121.0	2										
G1*04239C	20	04239	04111	02986	03/06/956			SNOH	10/22/956	STANWOOD WTR CO				WELL											
1 SE4 NE4				DOMESTIC MUNICIPAL				C	600.0	G 2				960.0	2		S				A				
				COMMERCIAL/INDUSTRIAL				C	600.0	G 2				960.0	2		S				A				
G1-20201C	22			07/06/972				SNOH	05/02/973	LAWLISS MARION L				WELLS											
2 W2 NE4 NW4				DOMESTIC SINGLE				C	10.0	G				1.0											
				STOCK WATERING				C	10.0	G				2.0											
				IRRIGATION				C	100.0	G				20.0				10.0				05150930			
G1-20832C	22			08/14/973				SNOH	07/15/975	BOVA TRANSPLANT IN				WELL											
1 NW4 SE4				DOMESTIC GENERAL				C	10.0	G 2				1.0							RN				

2L

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WATER RESOURCE INVENTORY AREA- 05																									
TOWNSHIP - 32 RANGE - 04 E																									
				STOCK WATERING					C	10.0 G 2				6.0							RN				
G1*04391C	23	04391	04145	05283	08/02/956				SNOH	11/28/956	PETERSON L							INFILTRATION TR							
1	SE4SE4			IRRIGATION					C	90.0 G				24.0				12.0			E	IS			
G1-25778A	26				07/30/990				SNOH	/ /	SUNDAY LK COM CLUB							WELL							
1	PARCEL A			DOMESTIC MULTIPLE					C	60.0 G															
G1-25779A	26				07/03/990				SNOH	/ /	SUNDAY LK COM CLUB							WELL							
1	PARCEL B SUNDAD LK PLAT			DOMESTIC MULTIPLE					C	35.0 G															
G1-24814C	27				04/11/986				SNOH	10/15/986	WITHERS W T							WELL							
1	SW4SE4			DOMESTIC MULTIPLE					C	35.0 G				5.4							R				
G1*00741C	29	00741	00670	00615	02/20/948				SNOH	04/16/948	STANWOOD WTR CO							WELL							
1	NW4NE4			DOMESTIC MUNICIPAL					C	2000.0 G 2				2400.0	2										
				COMMERCIAL/INDUSTRIAL					C	2000.0 G 2				2400.0	2										
G1-22379Q	31				01/06/975				SNOH	08/31/981	OIEN TED							WELL							
1	NE4NE4			IRRIGATION					C	120.0 G				76.4				45.0			R	IS			
G1-21976C	34				07/017974				SNOH	04/15/976	YOUNGREN JOE L							WELL							
1	NE4SE4			IRRIGATION					C	200.0 G				191.0				100.0			R	IS			
G1-22554C	35				07/30/975				SNOH	07/30/976	SILVER SPRINGS EST							WELL							
1	NE4NE4			DOMESTIC MULTIPLE					C	50.0 G				30.6							RM				
G1-22605A	35				10/297975				SNOH	/ /	LANGSJOEN JOHN P							WELL							
1	L 35 WELL ST SILVER SRR ESTA			DOMESTIC MULTIPLE					C	20.0 G															
TOWNSHIP - 32 RANGE - 05 E																									
G1-00195C	06	11257	10678		09/28/970				SNOH	02/18/972	CHARBONNEAU LLOYD							WELL							
1	S4 OF GOVT LOT 7			DOMESTIC SINGLE					C	15.0 G 2				1.0											
				STOCK WATERING					C	15.0 G 2				1.0											
G1-00693C	06	11254	10734		09/25/970				SNOH	03/31/972	HOLLINGSWORTH C E							WELL							
1	GL-7			DOMESTIC SINGLE					C	25.0 G 2				1.0							R				
				STOCK WATERING					C	25.0 G 2				1.0							R				
G1-20381C	07				12/08/972				SNOH	01/03/974	HOMSTAD E / L							WELL							
1	GOVT LOT 3			DOMESTIC SINGLE					C	20.0 G 2				1.0											
				STOCK WATERING					C	20.0 G 2				1.0											
G1-22884C	23				06/01/977				SNOH	04/28/978	SHULER DALE							WELL							
1	SW4NW4			DOMESTIC MULTIPLE					C	32.0 G				7.2							E				
G1-24638C	27				04/19/985				SNOH	02/14/986	THOMAS BROTHERS							WELLS							
3	SW4SW4			DOMESTIC MULTIPLE					C	63.0 G				34.0							M				
G1-25177C	27				01/12/988				SNOH	06/15/990	THOMAS WTR SERVICE							WELLS							
2	NE4SW4			DOMESTIC MULTIPLE					C	58.0 G				24.5							$RM		00000000		
G1*02111C	30	02111	01910	02026	08/30/951				SNOH	11/05/951	NOURSE L C							WELL							
1	SW4NE4			DOMESTIC SINGLE					C	80.0 G 2				16.0	2										
				IRRIGATION					C	80.0 G 2				16.0	2			8.0			E	IS			
G1-25253C	30				06/08/988				SNOH	03/15/989	EIGHT IS ENOUGH AS							WELL							
1	GL-3			DOMESTIC MULTIPLE					C	43.0 G				4.0							R				
G1-25220A	31				04/27/988				SNOH	/ /	SCHULTZ RONALD							WELL							
1	NE4 SE4			DOMESTIC MULTIPLE					C	17.0 G															
G1*02354C	35	02354	02256	01573	027257952				SNOH	077077952	BREEKVELDT B J							WELL							
1	L-5			IRRIGATION					C	288.0 G				100.0				50.0			AE	IS			
G1-23942C	35				09/25/901				SNOH	07/17/989	STILLAGUAMISH TRIB							WELL							
1	SW4NW4			FISH PROPAGATION					C	120.0 G				144.0							R		09010601		
TOWNSHIP - 32 RANGE - 06 E																									
G1-23767C	11				02/10/981				SNOH	10/14/988	ST DEPT OF WILD LI							WELL							
1	NW4NE4NE4NE4			FISH PROPAGATION					C	550.0 G				527.0							S				
G1*04882C	15	04882	04583	03238	06/10/958				SNOH	08/26/958	JANTZ B							WELL							

CONTROL # / #OF PTS	SEC / P	OLD APPL # / LOC. OF POD/POW	OLD PERM / (CHG C#)	OLD CERT / PURPOSE OF USE	DATE OF PRIORITY	S T	C C	A M	CNTY / USE TYPE	PERMIT DATE / INST QI	C M	R U	S U	NAME / ANNUAL QA	C M	R U	S U	SOURCE OF APPROPRIATION TRIBUTARY OF / IRR AC	C M	S U	PRO-VISOS	TIME OF USE	R I	R A	R C
WATER RESOURCE INVENTORY AREA- 05																									
TOWNSHIP - 32 RANGE - 06 E																									
1	E2NE4NW4			IRRIGATION					C	100.0 G				40.0				WELL	20.0			AE	IS		
G1-21071C	19				11/27/973					SNOH 05/15/975				HELMS DAVID M				WELL							
1	SE4SE4			IRRIGATION					C	125.0 G				200.0					100.0				IS		
G1-24628G	19				03/26/985					SNOH 12/16/985				HELMS DAVID M				WELL							
1	NE4SE4			IRRIGATION					C	275.0 G				180.0					150.0				IS		
G1*10898C	21	10898	10179	07679	05/20/970					SNOH 03/01/971				WATSON ALVIN J				WELL							
1	SE4NW4SW4			DOMESTIC SINGLE					C	10.0 G				1.0								RN			
G1*10909C	21	10909	10188	07681	05/26/970					SNOH 03/03/971				WATSON CHARLES R				WELL							
1	E2NW4SW4			DOMESTIC SINGLE					C	10.0 G				1.0								RN			
G1-25632A	28				02/03/990					SNOH / /				J D BALKENHOL				WELL							
1	NW4NW4			IRRIGATION					C	100.0 G									3.0						
G1*05343C	33	05343	05026	03766	07/23/959					SNOH 11/13/959				DARST L C				WELL							
1	SW4NW4			IRRIGATION					C	400.0 G				80.0					40.0			A	IS		
G1*11096C	33	11096	10270	07292	07/27/970					SNOH 04/19/971				ROWEN D C				WELL							
1	SW4 NW4 SE4			DOMESTIC SINGLE					C	30.0 G	2			1.0								NR			
				STOCK WATERING					C	30.0 G	2			2.0								NR			
G1-23887G	34				07/20/981					SNOH 05/14/982				NOLTE JOHN E				WELL							
1	S2SW4			DOMESTIC SINGLE					C	50.0 G	2			1.0											
				IRRIGATION					C	50.0 G	2			5.0					5.0				IS		
TOWNSHIP - 32 RANGE - 07 E																									
G1*05042C	17	05042	04687	03475	10/20/958					SNOH 01/05/959				WIKSTROM C B				WELL							
1	W2 SW4 NE4			IRRIGATION					C	60.0 G				48.0					30.0			AE	IS		
G1-24057C	19				03/30/982					SNOH 01/14/983				NORMANNA PK INC				WELLS							
2	NE4SE4NE4			DOMESTIC MULTIPLE					C	58.0 G	2			12.9											
G1-23294C	30				01/18/979					SNOH 01/15/982				PARTICK DAVID M				WELL							
1	NE4SE4			DOMESTIC SINGLE					C	7.0 G				.5											

CONTROL # / #OF PTS	SEC / P	OLD APPL / LOC. OF POD/POW	OLD PERM / (CHG C#)	OLD CERT / PURPOSE OF USE	DATE OF PRIORITY / USE TYPE	S C A T C M / QI	CNTY / INST M	PERMIT DATE / QA	NAME / ANNUAL M	SOURCE OF APPROPRIATION TRIBUTARY OF / IRR AC	C S M U / PRO-VISOS	TIME OF USE	R R R I A C
WATER RESOURCE INVENTORY AREA- 07													
TOWNSHIP - 27 RANGE - 05 E													
TOWNSHIP - 27 RANGE - 05 E													
G1*04719C	01	04719	04437	03299	10/30/957		SNOH	01/31/958	HUNTLEY A R	WELL/INFILTRATION		TR	
2 L-12 CATHCART DIV.				DOMESTIC SINGLE		C	15.0 G 3		21.6 3			A	
				FISH PROPAGATION		C	15.0 G 3		21.6 3			A	
				IRRIGATION		C	15.0 G 3		21.6 3	.5		A	IS
G1*05102C	01	05102	04847	05348	01/19/959		SNOH	06/11/959	GOODWIN E A	WELL			
1 L2 CATHCART DIV 1				STOCK WATERING		C	24.0 G 2		9.0 2			AEN	
				IRRIGATION		C	24.0 G 2		9.0 2	4.0		AEN	IS
G1-25197P	01				03/04/988		SNOH	03/15/990	SYVERSON STANLEY	WELL			
1 L-5 BL-1 WOOD SHIRE				DOMESTIC MULTIPLE		C	25.0 G		4.0			R	00000000
G1*05605C	12	05605	05274	04334	05/16/960		SNOH	08/11/960	DONAHOE R P / J M	SUMP			
1 TR160 CARTHCART DIV 1				DOMESTIC SINGLE		C	10.0 G		5.6			A	
G1*06069C	24	06069	05743	04673	10/02/961 R		SNOH	01/12/962	FINROW BETTY ANN	WELL			
1 N2 SE4 NW4				COMMERCIAL/INDUSTRIAL		C	95.0 G		107.0			AN	
G1-22974C	24				10/05/977		SNOH	12/15/978	CROSS VAL WTR ASSN	WELL			
1 SE4NW4				DOMESTIC MULTIPLE		C	900.0 G		1200.0			REM	
G1-25582A	24				12/11/989		SNOH	/ /	CROSS VAL WTR ASSC	WELL			
1 N2SW4NW4				DOMESTIC MUNICIPAL		C	1000.0 G		1613.0				
TOWNSHIP - 27 RANGE - 06 E													
G1*08653C	01	08653	07996	06141	03/28/967		SNOH	06/28/967	SNOHOMISH CO RD #3	WELL			
1 GL1				COMMERCIAL/INDUSTRIAL		C	90.0 G		34.9			AP	06011201
G1*01586C	02	01586	01403	00544	07/13/950		SNOH	11/09/950	DENNIS O M	WELL			
1 NW4SE4				IRRIGATION		C	110.0 G		13.5	9.0		E	IS
G1*02147C	02	02147	01964	01693	09/24/951		SNOH	12/14/951	DAVIS G B	WELL			
1 NE4SE4				IRRIGATION		C	150.0 G		45.0	30.0			IS
G1*02609C	02	02609	02425	01819	06/23/952		SNOH	10/17/952	HANSEY L R	WELL			
1 GL-1				IRRIGATION		C	200.0 G		70.0	35.0		AE	IS
G1-21483C	02				04/11/974		SNOH	05/30/975	GOSHORN HELEN D	WELL			
1 NE4 SW4				DOMESTIC SINGLE		C	10.08G 2		1.0			R	
				STOCK WATERING		C	10.08G 2		.5			R	
G1*00671C	11	00671	00625	00330	11/22/947		SNOH	02/25/948	WA ST D O T	WELLS			
2 NW4SW4SE4				DOMESTIC MULTIPLE		C	1000.0 G		336.0				
G1-21266C	12				02/19/974		SNOH	08/16/976	VAN HULE ANTHONY F	WELLS			
2 S2 SE4				DOMESTIC SINGLE		C	200.0 G 3		1.0			R	
				STOCK WATERING		C	200.0 G 3		2.0			R	
				IRRIGATION		C	200.0 G 3		90.0	45.0		R	IS
G1-23634C	12				06/30/980		SNOH	11/15/982	CONNELLY DOUGLAS	WELL			
1 N2				COMMERCIAL/INDUSTRIAL		C	200.0 G		11.0			K	
G1*00041C	13	00041	00044	00269	11/08/945		SNOH	02/28/946	O'DELL J	WELL			
1 NW4NE4				IRRIGATION		C	180.0 G		40.0	40.0			IS
G1*02130C	13	02130	02151	02121	09/10/951		SNOH	05/06/952	WEISHAUPT A	WELL			
1 NW4SW4				IRRIGATION		C	170.0 G		80.0	40.0			IS
G1-24197P	13				11/05/982		SNOH	05/15/990	DECK JOHN J	WELL			
1 NE4SW4				DOMESTIC SINGLE		C	35.0 G 2		.5			RM	
				STOCK WATERING		C	35.0 G 2		15.9			RM	
G1*02412C	14	02412	02238	01203	03/25/952		SNOH	06/30/952	HANSEN J P	WELL			
1 GL-2				IRRIGATION		C	200.0 G		60.0	30.0			IS
G1-25577A	14				12/04/989		SNOH	/ /	MEADOW WOOD FARMS	WELL			
1 NW4				DOMESTIC MULTIPLE		C	20.0 G 2						
				STOCK WATERING		C	20.0 G 2						
G1-00190C	18	10409	09676		09/16/969		SNOH	04/24/970	DREIER WERNER	WELL			
1 GL-4				IRRIGATION		C	30.0 G		5.7	3.0		N	03010930

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WATER RESOURCE INVENTORY AREA- 07																									
TOWNSHIP - 27 RANGE - 06 E																									
G1-20695C 1	19 S2NE4NW4		DOMESTIC MULTIPLE		06/11/973				C	SNOH 04/15/974 40.0	G			WENTZ FAY K ET AL 4.0				WELL			THR				
G1-25273A 1	20 NE4NE4SW4		IRRIGATION		07/06/988				C	SNOH / / 600.0	G			LUECKENOTTE LEON 315.0				WELL							
G1-25542P 1	21 NE4SW4SE4SE4		DOMESTIC MULTIPLE		09/27/989				C	SNOH 06/15/990 14.0	G			EDWIN J BECKER 5.0				WELL			$RM				
G1-21490C 1	22 W2 NW4		DOMESTIC MULTIPLE		04/12/974				C	SNOH 12/15/976 60.0	G	3		WALKER E/PRIOR M 3.0		2		WELL			R				
			DOMESTIC GENERAL						C	60.0	G	3		3.0		2					R				
			IRRIGATION						C	60.0	G	3		16.0					8.0		R	IS			
G1-24022C 3	22 LOTS 1 11 & 9		DOMESTIC MULTIPLE		01/15/982				C	SNOH 12/14/984 13.0	G			BURGESS INTERSTATE 8.5				WELLS			M				
G1-00193C 1	24 09668 08964 NE4NW4SW4		DOMESTIC GENERAL		07/02/968				C	SNOH 02/26/969 300.0	G			WA ST D O I 30.0				WELL							
G1-23523C 1	24 SW4SE4		DOMESTIC MULTIPLE		01/28/980				C	SNOH 08/15/984 10.0	G			ELLEDGE CONRAD C 8.0				WELL			R				
G1-24325C 1	25 W2NE4		DOMESTIC MULTIPLE		06/21/983				C	SNOH 09/14/984 8.0	G			ILIAD INC 6.7				WELL							
G1-25041P 1	26 SW4SW4		DOMESTIC MULTIPLE		08/05/987				C	SNOH 10/14/988 38.0	G			WEISS ANDREW R 4.5				WELL							
G1-25213P 1	26 NW4SW4		DOMESTIC MULTIPLE		04/18/988				C	SNOH 01/04/989 35.0	G			MT FOREST WATER 21.0				WELL			$R				
G1-25475P 1	26 SE4NW4NW4		DOMESTIC SINGLE		06/15/989				C	SNOH 11/15/990 15.0	G	2		DARRELL G SMITH .5				WELL			R				
			IRRIGATION						C	15.0	G	2		2.0					1.5		R	IS			
G1-25564A 1	26 NW4NW4		DOMESTIC MULTIPLE		09/20/989				C	SNOH / / 5.0	G			COLE D SMITH				WELL							
G1-25026C 1	27 SE4SW4		DOMESTIC MULTIPLE		06/22/987				C	SNOH 12/15/987 30.0	G			SOURBEER JOHN & C 4.5				WELL			R				
G1-25222P 1	27 L-4 MORGANS LANDING		DOMESTIC MULTIPLE		04/28/988				C	SNOH 03/15/989 15.0	G			MORGAN NOEL 4.5				WELL			R	00000000			
G1-22078C 1	28 SW4SE4		DOMESTIC MULTIPLE		09/05/974				C	SNOH 12/15/976 20.0	G			WELCH ROBERT J ET 2.0				WELL			R				
G1-24379C 1	32 SE4SE4		DOMESTIC SINGLE		08/31/983				C	SNOH 07/16/984 10.0	G			SPRAGUE RUTH E 1.0				WELL							
G1*09316C 1	35 09316 08909 NE4 SW4 NE4		DOMESTIC MULTIPLE	06767	03/18/968				C	SNOH 01/24/969 28.0	G	2		DE JONG W 1.5				WELL							
			STOCK WATERING						C	28.0	G	2		33.5											
G1-00594C 1	35 10425 09702 NW4SW4		DOMESTIC MULTIPLE		09/26/969				C	SNOH 05/06/970 110.0	G			MT FOREST CORP 88.0				WELL			RH				
G1-22043C 1	35 NW4SW4		DOMESTIC MULTIPLE		08/12/974				C	SNOH 02/18/976 165.0	G			CROSS VALLEY WTR A 88.0				WELL			T				
G1-23027C 1	35 NE4NW4		DOMESTIC MULTIPLE		01/09/978				C	SNOH 02/15/979 19.0	G			SEVENTH HEAVEN INC 12.0				WELL			RE				
G1-23697C 1	35 NW4SW4		DOMESTIC MULTIPLE		10/20/980				C	SNOH 10/30/981 700.0	G			CROSS VLY WTR ASSN 659.0				WELL			M				
TOWNSHIP - 27 RANGE - 07 E																									
G1-24833C 1	02 SW4NE4		DOMESTIC SINGLE		05/15/986				C	SNOH 04/15/988 10.0	G			GARY JOHNSON&BH .67				WELL							
G1-23386C 1	03 NE4SW4NE4		DOMESTIC MULTIPLE		05/18/979				C	SNOH 10/30/981 12.0	G			BURGESS/BURGER/HEI 12.0				WELL			R				
G1*00939S	05 00939			00701	01/00/945					SNOH / /				SMITH D R				WELL							

14

CONTROL # / #OF PTS	SEC / P	OLD APPL / LOC. OF POD/POW	OLD PERM / (CHG C#)	OLD CERT / PURPOSE OF USE	DATE OF PRIORITY / S T	C M	CNTY / USE TYPE	PERMIT DATE / INST QI	C M	R U	S U	NAME / ANNUAL QA	C M	R U	S U	SOURCE OF APPROPRIATION TRIBUTARY OF / IRR AC	C M	S U	PRO-VISOS	TIME OF USE	R I	R A	R C
WATER RESOURCE INVENTORY AREA- 07																							
TOWNSHIP - 27 RANGE - 07 E																							
1	GL-6			STOCK WATERING			C	200.0	G	2		53.0			2								
				IRRIGATION			C	200.0	G	2		53.0			2	35.0			%	IS			
G1*009408	05	00940		00702	01/00/945		SNOH	/ /				SMITH D R				WELL							
1	NW4SE4			DOMESTIC GENERAL			C	50.0	G	2		3.0			2								
				IRRIGATION			C	50.0	G	2		3.0			2	2.0			%	IS			
G1*01760C	05	01760	01571	01699	12/26/950	E	SNOH	03/09/951				SMITH D R				WELL							
1	GL7			STOCK WATERING			C	200.0	G	2		86.0			2				A				
				IRRIGATION			C	200.0	G	2		86.0			2	43.0			AE	IS			
G1*02266C	05	02266	02081	02087	12/20/951		SNOH	03/14/952				FLEMING D				WELL							
1	NE4SE4			IRRIGATION			C	200.0	G			80.0				40.0			AE	IS			
G1-20088CBL	06				04/24/972		SNOH	01/03/974				OHLSEN ALICE ET UX				WELL							
1	2SE4SE4			DOMESTIC SINGLE			C	10.0	G			1.0							R		2	2	0
				IRRIGATION			C	500.0	G			140.0				70.0			R	05151015	2	2	2
G1*02929C	07	02929	02649	01576	01/19/953		SNOH	03/26/953				HEGEWALD M				WELL							
1	82N84			IRRIGATION			C	210.0	G			80.0				40.0			AE	IS			
G1-20088CAL	07				04/24/972		SNOH	01/03/974				OHLSEN ALICE ET UX				WELL							
1	2NE4NE4			DOMESTIC SINGLE			C	10.0	G			1.0							R		2	2	0
				IRRIGATION			C	500.0	G			140.0				70.0			R	05151015	2	2	2
G1-24225C	07				01/13/983		SNOH	08/15/983				ROESLER TIMBER CO				WELL							
1	SE4SE4			DOMESTIC MULTIPLE			C	30.0	G			20.7											
G1*05144C	09	05144	04862	03455	02/17/959		SNOH	06/23/959				BARR D R				WELL							
1	SE4NE4			IRRIGATION			C	250.0	G			190.0				95.0			AE	IS			
G1-23726C	11				12/17/980		SNOH	01/15/982				BARMON DANIEL J				WELL							
1	L-46 RIVER KING ESTS			DOMESTIC SINGLE			C	10.0	G			1.0											
G1*01806C	12	01806	01674	01323	02/02/951		SNOH	05/29/951				STITT E M				WELL							
1	NW4NE4			DOMESTIC SINGLE			C	105.0	G	2		100.0			2								
				IRRIGATION			C	105.0	G	2		100.0			2	50.0				IS			
G1-23107A	18				05/15/978		SNOH	/ /				NEATHERLIN TIMBER				WELLS							
2	NW4SE4			DOMESTIC MULTIPLE			C	30.0	G														
G1-22879C	19				05/18/977		SNOH	03/15/978				LOVELESS RODNEY L				WELL							
1	SW4SE4			DOMESTIC MULTIPLE			C	14.0	G			22.4							R				
G1-23596C	19				04/23/980		SNOH	06/30/981				HEATHERCREST SER I				WELL							
1	NW4SE4			DOMESTIC MULTIPLE			C	25.0	G			17.6							RM				
G1-25298P	27				09/01/988		SNOH	06/15/989				CYO J ROMENELLI				WELL							
1	N2NE4NE4			DOMESTIC MULTIPLE			C	16.0	G			7.5							$RM				
G1-25008C	31				04/20/987		SNOH	08/15/988				EASTERLY JIM				WELL							
1	SE4NW4			DOMESTIC SINGLE			C	10.0	G	2		1.0			2								
				COMMERCIAL/INDUSTRIAL			C	10.0	G	2		1.0			2								
TOWNSHIP - 28 RANGE - 04 E																							
G1*03267C	01	03267	03085	01666	06/12/953		SNOH	10/23/953				SIEVERS & DUECY				WELL							
1	NE4SW4NE4			COMMERCIAL/INDUSTRIAL			C	250.0	G			224.0											
G1*05830C	11	05830	05513	03941	02/09/961		SNOH	05/08/961				MODERN HOME BUILDE				WELL							
1	N2 NE4 NE4			COMMERCIAL/INDUSTRIAL			C	650.0	G			481.0											
G1-21297C	11				02/27/974		SNOH	07/30/976				KOHKOKU USA INC				WELL							
1	NE4SE4			COMMERCIAL/INDUSTRIAL			C	200.0	G			160.0							B				
TOWNSHIP - 28 RANGE - 05 E																							
G1*05955C	04	05955	05608	04864	05/22/961		SNOH	08/07/961				WEYERHAEUSER CO				WELL							
1	GL1			COMMERCIAL/INDUSTRIAL			C	40.0	G			64.0							A				
G1*005895	07	00589		00550	10/01/943		SNOH	/ /				PINEHURST WTR DIST				WELL							
1	SW4SW4NE4			DOMESTIC MULTIPLE			C	300.0	G			275.0											
G1*00597C	07	00597	00629	00594	08/04/947		SNOH	03/03/948				PINEHURST WATER DI				WELL							
1	NE4SE4NE4			DOMESTIC MULTIPLE			C	250.0	G			200.0											

WATER RESOURCE INVENTORY AREA- 07

TOWNSHIP - 28 RANGE - 05 E

CONTROL #	SEC #	OLD APPL	OLD PERM	OLD CERT	DATE OF PRIORITY	CNTY	PERMIT DATE	NAME	SOURCE OF APPROPRIATION	#OF PTS	LOC. OF POD/POW (CHG C#)	PURPOSE OF USE	USE TYPE	INST QI	C R S M U U	ANNUAL QA	C R S M U U	IRR AC	PRO-VISOS	TIME OF USE
G1*00676S	07	00676		00552	00/00/923	SNOH	/ /	SNOHOMISH CO PUD 1	WELL	1	SW4NE4	DOMESTIC MULTIPLE	C	200.0 G		63.0				
G1*00677S	07	00677		00553	05/29/936	SNOH	/ /	SNOHOMISH CO PUD 1	WELL	1	SW4NE4	DOMESTIC MULTIPLE	C	300.0 G		94.0				
G1*00678S	07	00678		00554	00/00/944	SNOH	/ /	SNOHOMISH CO PUD 1	WELL	1	SW4NE4	DOMESTIC MULTIPLE	C	300.0 G		94.0				
G1*04087C	07	04087	03818	02579	08/16/955	SNOH	10/31/955	SNOHOMISH CO PUD 1	WELL	1	GL3	DOMESTIC MULTIPLE	C	475.0 G		760.0			A	
G1*06495C	11	06495	06072	04921	10/01/962	SNOH	12/12/962	WELCH R L	WELL	1	NW4SW4NE4	DOMESTIC SINGLE	C	3.0 G		4.8			A	
G1*01157C	12	01157	01633	01075	03/18/949	SNOH	04/20/951	USDI BPA	WELL	1	SE4SE4	DOMESTIC GENERAL	C	300.0 G	2	161.0	2		A	
												HEAT EXCHANGE	C	300.0 G	2	161.0	2		A	
G1*04289C	17	04289	04027	02811	04/23/956	SNOH	07/19/956	SNOHOMISH CO PUD 1	WELL	1	SW4NE4SW4	DOMESTIC MULTIPLE	C	585.0 G		936.0			AE	
G1*03386C	25	03386	03180	02424	09/29/953	SNOH	01/15/954	HERETH L W	WELL	1	NW4SE4NE4	IRRIGATION	C	190.0 G		100.0		50.0	AE	IS
G1*04486C	25	04486	04213	03045	01/04/957	SNOH	04/01/957	WILSON N C	WELL	1	W2NW4SW4 /&OR SW4 NW4	IRRIGATION	C	120.0 G		100.0		50.0	AE	IS
G1-23383C	32				05/17/979	SNOH	01/14/983	UNITED DEVELOP COR	WELL	1	N2SW4	IRRIGATION	C	300.0 G		60.0		60.0		IS
G1*07165C	36	07165	06921	05088	05/18/964	SNOH	02/26/965	WA ST D N R	WELL	1	SE4 SW4	DOMESTIC SINGLE	C	10.0 G	2	5.6	2			
												STOCK WATERING	C	10.0 G	2	5.6	2			

TOWNSHIP - 28 RANGE - 06 E

CONTROL #	SEC #	OLD APPL	OLD PERM	OLD CERT	DATE OF PRIORITY	CNTY	PERMIT DATE	NAME	SOURCE OF APPROPRIATION	#OF PTS	LOC. OF POD/POW (CHG C#)	PURPOSE OF USE	USE TYPE	INST QI	C R S M U U	ANNUAL QA	C R S M U U	IRR AC	PRO-VISOS	TIME OF USE
G1*02291C	08	02291	02100	01173	01/11/952	SNOH	03/28/952	HECK O	WELL	1	SW4SW4	IRRIGATION	C	60.0 G		16.0		8.0	E	IS
G1-22271C	14				11/14/974	SNOH	08/16/976	EASTMAN DEWEY G	WELL	1	SW4SW4	DOMESTIC SINGLE	C	10.0 G		1.0				
G1*03583C	17	03583	03501	02513	04/16/954	SNOH	11/30/954	BARTELHEIMER R E	INFILTRATION TR	1	SW4SE4	IRRIGATION	C	585.0 G		112.0		56.0		IS
G1*04808C	18	04808	04537	03544	03/17/958	SNOH	07/11/958	SNOHOMISH SND / GR	WELL	1	L39/40 HOGANS ACRE TRS	COMMERCIAL/INDUSTRIAL	C	200.0 G		320.0			A	
G1*05555C	18	05555	05233	04150	04/06/960	SNOH	07/08/960	NORTHERN PACIFIC R	WELL	1	L8 BL1 E C FERGUSONS 1ST ADD	HEAT EXCHANGE	C	750.0 G		800.0			A	
G1-00585C	25	11262	10674		09/29/970	SNOH	02/16/972	JONES ETHAN E	WELL	1	LT-8 PLAT OF MARBELLO	DOMESTIC MULTIPLE	C	60.0 G		19.8			THR	
G1*02099C	29	02099	01906	01292	08/27/951	SNOH	11/05/951	DRENNON G A	WELL	1	NE4SE4	IRRIGATION	C	130.0 G		26.0		13.0		IS
G1*03575C	29	03575	03385	02136	04/12/954	SNOH	08/20/954	TREOSTI J	WELL	1	NW4SW4	IRRIGATION	C	200.0 G		100.0		50.0	AE	IS
G1-21466C	29				04/10/974	SNOH	08/16/976	TESTER WILLIAM N	WELL	1	NE4NW4SW4	IRRIGATION	C	400.0 G		240.0		120.0	R	IS
G1-20400C	30				01/05/973	SNOH	06/01/973	BAILEY CLIFFORD E	WELL	1	GL-4	DOMESTIC MULTIPLE	C	28.45G	3	2.0				
												STOCK WATERING	C	28.45G	3	22.4	2			
												STOCK WATERING	C	28.45G	3	22.4	2			
G1*00887C	32	00887	01147	01029	06/01/948	SNOH	04/04/950	KRIEGER W V	WELL	1	SW4NW4	IRRIGATION	C	115.0 G		35.0		20.0		IS
G1*02395C	32	02395	02260	02161	03/20/952	SNOH	07/11/952	LAUTERBACH E A	WELL	1	SE4NE4	IRRIGATION	C	75.0 G		45.0		30.0		IS
G1*04699C	34	04699	04424	03123	09/30/957	SNOH	01/17/958	MCKENNON F	WELL											

CONTROL #	SEC	OLD APPL	OLD PERM	OLD CERT	DATE OF PRIORITY	S T	C A M	CNTY	PERMIT DATE	NAME	SOURCE OF APPROPRIATION	TRIBUTARY OF
#OF PTS	R P	LOC. OF POD/POW	(CHG C#)	PURPOSE OF USE				USE TYPE	INST QI	C M	R U	S U	ANNUAL QA	C M	R U	S U	IRR AC	C M	S U	PRO-VISOS	TIME OF USE	R I	R A	R C
WATER RESOURCE INVENTORY AREA- 07																								
TOWNSHIP - 28 RANGE - 06 E																								
1	NE4 NE4			STOCK WATERING				C	100.0 G				18.2			P				A				
G1*06284C	34	06284	05986	04375	05/04/962			SNOH	10/29/962	MCKENNON F						WELL								
1	NE4 NE4			STOCK WATERING				C	100.0 G				53.0			P				A				
G1*00002S	35	00002		00001	05/14/945			SNOH	/ /	BOZEMAN CANNING GO						WELL								
1	SW4NW4			COMMERCIAL/INDUSTRIAL				C	500.0 G															
G1*00107C	35	00107	00061	00015	02/01/946			SNOH	03/21/946	PICTSWEET FOODS IN						WELL								
1	SW4NW4			COMMERCIAL/INDUSTRIAL				C	500.0 G	2			40.0	2										
				FIRE PROTECTION				C	500.0 G	2			40.0	2										
G1*02286C	36	02286	02140	01202	01/09/952			SNOH	04/25/952	LEHTO O W						WELL								
1	W2SE4SW4			DOMESTIC SINGLE				C	150.0 G	2			26.0	2						A				
				IRRIGATION				C	150.0 G	2			26.0	2			12.0			AE	IS			
TOWNSHIP - 28 RANGE - 07 E																								
G1-24917C	07				11/06/986			SNOH	08/15/988	L G DESIGN INC						WELL								
2	SE4NW4			DOMESTIC MULTIPLE				C	14.0 G				15.4							RKM				
G1*02862C	30	02862	02647	01698	12/11/952			SNOH	03/26/953	OTIS G B						WELL								
1	SW4 SE4			DOMESTIC SINGLE				C	12.0 G	3			7.0	3						AE				
				STOCK WATERING				C	12.0 G	3			7.0	3						AE				
				IRRIGATION				C	12.0 G	3			7.0	3			1.0			AE	IS			
G1-23313C	31				02/22/979			SNOH	05/15/987	MILWAUKEE HILL WAT						WELL								
1	GL-4			DOMESTIC MULTIPLE				C	20.0 G				4.2							R				
G1-25060C	31				08/19/987			SNOH	10/14/988	BACONS MAKINS WAT						WELL								
1	SW4SW4			DOMESTIC MULTIPLE				C	40.0 G				4.5											
G1-20499C	33				03/01/973			SNOH	08/28/974	VAN ESS JAMES						WELL								
1	NW4SW4			DOMESTIC SINGLE				C	20.0 G	3			1.0							RN				
				STOCK WATERING				C	20.0 G	3	S		25.0	2	S					RN				
				STOCK WATERING				C	20.0 G	3			25.0	2						RN				
TOWNSHIP - 28 RANGE - 08 E																								
G1-23695C	09				10/21/980			SNOH	04/30/981	LK BRONSON ASSOC I						WELLS								
2	NE4SW4			DOMESTIC MULTIPLE				C	75.0 G				10.0							R				
G1*09940C	31	09940	09039	07500	12/12/968			SNOH	04/18/969	SULTAN TOWN OF						INFILTRATION TR								
1	N2 NE4 SE4			DOMESTIC MUNICIPAL				C	4901.0 G				583.0			P				HM				
G1-20179C	35				06/15/972			SNOH	02/15/974	STRANG J RICHARD						WELL								
1	GL-3			DOMESTIC MULTIPLE				C	30.0 G				40.6											
G1-24043C	35				04/15/982			SNOH	11/15/982	CURL DEAN W						WELLS								
2	GL-3			DOMESTIC MULTIPLE				C	95.0 G				40.6			S								
G1*06141C	36	06141	05789	04493	12/28/961			SNOH	03/20/962	STARTUP WTR DIST						WELL								
1	NW4SW4			DOMESTIC MULTIPLE				C	2507.0 G				68.0							A				
G1-00329C	36	12432			01/14/972			SNOH	/ /	WA ST DEPT FISHERI						WELL								
1	SE4 SE4			DOMESTIC MULTIPLE				C	20.0 G				2.0											
				FISH PROPAGATION				C	4801.0 G															
G1-23260C	36				11/207978			SNOH	10/15/982	WA ST DEPT FISHERI						WELL								
1	SE4SE4			DOMESTIC MULTIPLE				C	35.0 G				3.5							M				
TOWNSHIP - 29 RANGE - 04 E																								
G1*05177C	01	05177	04880	03384	03/24/959			SNOH	06/30/959	GAY S						WELL								
1	L20 BL2 PRIEST PT PARK 2			DOMESTIC MULTIPLE				C	50.0 G				22.5							AE				
G1*07269C	01	07269	07005	05407	07/22/964			SNOH	04/23/965	PRIEST PT WTR CO I						WELLS								
2	NE4 NE4			DOMESTIC MULTIPLE				C	57.0 G				43.5							MANH				
G1*07739C	01	07739	07368	06030	08/11/965			SNOH	02/18/966	REINERTSEN O J						WELL								
1	L-A PRIEST PT MANOR			DOMESTIC MULTIPLE				C	50.0 G				13.33							RTHN				
G1-24733P	01				10/30/985			SNOH	08/15/988	CHEALCO COMM ASN						WELL								
1	LOT 4 BL-2 PRIEST PT PK			DOMESTIC MULTIPLE				C	150.0 G				15.0											
G1-25876A	01				09/10/990			SNOH	/ /	SKOKIA WTR SYSTEM						WELL								

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CONTROL #    SEC  OLD     OLD     OLD     DATE OF    S C A   CNTY  PERMIT    NAME                     SOURCE OF APPROPRIATION TRIBUTARY OF
              #   APPL    PERM    CERT    PRIORITY   T C M         DATE
#OF R                                                         USE     INST  C R S       ANNUAL  C R S      IRR   C S PRO-    TIME OF   R R R
PTS P LOC. OF POD/POW  (CHG C#)   PURPOSE OF USE              TYPE    QI    M U U       QA      M U U      AC    M U VISOS   USE       I A C

WATER RESOURCE INVENTORY AREA-   07

TOWNSHIP - 29    RANGE - 04 E

 1   LOT 6 PRIEST POINT DIV 2    DOMESTIC MULTIPLE          C       35.0 G

G1*07359C    08 07359   07176   05571   10/13/964          SNOH 09/30/965 HAT ISLAND DEV CO  WELLS
 3   SE4SE4NW4/SW4SE4NW4/SW4NW4SEDOMESTIC MULTIPLE          C      135.0 G 2         96.0   2                      HMT
                                 IRRIGATION                 C      135.0 G 2         96.0   2          40.0         T        1S

G1-24188C    08                          10/04/982          SNOH 08/15/984 HAT ISL COM INC    WELL
 1   NW4SE4                      DOMESTIC MULTIPLE          C       15.0 G           24.0                           M

G1-24971P    16                          12/17/986          SNOH 02/15/990 HAT ISL COMM INC   WELL
 1   L-76 B-A HAT ISLAND         DOMESTIC MULTIPLE          C        8.0 G            4.3                           $RM

G1-24972P    16                          12/17/986          SNOH 02/15/990 HAT ISL COMM INC   WELL
 1   L-93 B-A HAT ISLAND         DOMESTIC MULTIPLE          C        8.0 G            4.3                           $RM

TOWNSHIP - 29    RANGE - 05 E

G1*07472C    01 07472   07032   05184   01/25/965          SNOH 05/21/965 TASTAD P B          WELL
 1   TR195 SUNNYSIDE 5 AC TR     DOMESTIC MULTIPLE          C       25.0 G 2          2.7   P
                                 STOCK WATERING             C       25.0 G 2          3.4   P

G1*04221C    02 04221   03943   03100   02/14/956  E       SNOH 04/30/956 MARYSVILLE CITY OF WELL
 1   S2 L3                       DOMESTIC MUNICIPAL         C     1000.0 G         1344.0   S

G1*07276C    02 07276   06864   05469   07/27/964          SNOH 01/01/965 MARYSVILLE CITY OF WELL
 1   GL3                         DOMESTIC MUNICIPAL         C     1000.0 G         1176.0   S                       AH

G1-24894C    02                          09/11/986          SNOH 06/15/987 WILLSON FRANK      WELL
 1   GL-2                        DOMESTIC MULTIPLE          C       32.0 G            4.5                                    00000000

G1*08792C    19 08792   08147   05882   06/15/967          SNOH 10/19/967 SCOTT PAPER CO     WELLS
 3   GL-3                        COMMERCIAL/INDUSTRIAL      C      900.0 G          609.0                           A

G1*09168C    19 09168   08470   06082   01/24/968          SNOH 05/08/968 SCOTT PAPER CO     WELL
 1   GL3                         COMMERCIAL/INDUSTRIAL      C      400.0 G          270.0                           R        06011031

G1*03464C    20 03464   03251   02186   12/23/953          SNOH 03/26/954 SNOHOMISH CO PUD 1 WELL
 1   L7 BL661 EVERETT DIV NO 1   HEAT EXCHANGE              C      750.0 G          800.0                           A

G1*04986C    20 04986   04665   03358   09/02/958  E       SNOH 12/17/958 SNOHOMISH CO PUD 1 WELL
 1   L4 BL661 EVERETT DIV1       HEAT EXCHANGE              C      350.0 G          600.0                           A

G1*05557C    32 05557   05303   03848   04/12/960          SNOH 09/08/960 WEST COAST TELEPHO WELLS
 2   NW4 NW4                     HEAT EXCHANGE              P      750.0 G         1200.0                           A

TOWNSHIP - 29    RANGE - 06 E

G1*10007C    04 10007   09537   06783   02/05/969          SNOH 02/11/970 HAPPY HILL COMM CL WELL
 1   GL2                         DOMESTIC MULTIPLE          C       40.0 G           12.5   S                       H

G1-00186C    04 08081   08244           05/10/966          SNOH 01/16/968 HAPPY HILL COMM CL WELL
 1   GL-2                        DOMESTIC MULTIPLE          C       50.0 G           12.5

G1*08290C    06 08290   07853   05819   09/09/966          SNOH 04/28/967 SHIPLEY M A JR     WELL
 1   GL2                         DOMESTIC SINGLE            C       10.0 G            1.0

G1*00287S    07 00287           00239   05/00/944          SNOH   /  /    OLDFIELD H L       WELL
 1   GL-5                        DOMESTIC SINGLE            C      100.0 G 3         20.0   2
                                 COMMERCIAL/INDUSTRIAL      C      100.0 G 3         20.0   2
                                 IRRIGATION                 C      100.0 G 3         18.0               9.0                  IS

G1*00782C    08 00782   00702   00168   03/23/948          SNOH 06/02/948 SNOHOMISH CO PUD 1 WELL
 1   SE4SE4NE4                   DOMESTIC MUNICIPAL         C     1200.0 G          700.0

G1*00783C    08 00783   00703   00169   03/23/948  E       SNOH 06/02/948 SNOHOMISH CO PUD 1 WELL
 1   SE4SE4NE4                   DOMESTIC SINGLE            C     1200.0 G          700.0

G1-25051C    10                          08/12/987          SNOH 02/15/988 SUNSET RIDGE WTR   WELLS
 2   L-6; L-2 SUNSET RIDGE       DOMESTIC MULTIPLE          C       25.0 G           23.8                           MR       00000000

G1-25536A    15                          08/23/989          SNOH   /  /    UTLEY SPR WTR ASSC WELL
 1   S2SE4NW4NW4                 DOMESTIC MULTIPLE          C       90.0 G

G1-22424C    16                          01/30/975          SNOH 09/15/976 MURPHY JOHN F      WELL
 1   SE4NE4                      DOMESTIC MULTIPLE          C       60.0 G           35.0                           R
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CONTROL # / #OF PTS	SEC / P	OLD APPL / PERM	OLD CERT	DATE OF PRIORITY	S C A T C M	CNTY / USE TYPE	PERMIT DATE / INST QI	NAME	ANNUAL QA	C R S M U U	IRR AC	C S M U	PROVISOS	TIME OF USE	R R R I A C
LOC. OF POD/POW (CHG C#)				PURPOSE OF USE				SOURCE OF APPROPRIATION TRIBUTARY OF							
WATER RESOURCE INVENTORY AREA- 07															
TOWNSHIP - 29 RANGE - 06 E															
G1-20952C	17			10/04/973		SNOH	03/28/975	SCHILLING ROBERT A							
1 T 3 P SORENSONS 5 ACRE TRACT				DOMESTIC MULTIPLE		C	12.0 G 2		2.0				R		
				IRRIGATION		C	12.0 G 2		6.0		3.0		R	IS	
G1-24988P	18			03/18/987		SNOH	11/15/988	WOOLWORTH RICHARD							
1 LOT 5				DOMESTIC MULTIPLE		C	6.0 G		3.5				RM		
G1*02100C	19	02100	01967	02259 08/27/951	E	SNOH	12/18/951	CLARK F							
1 PL NO 1 IDEAL GARDEN TRS				FISH PROPAGATION		C	10.0 G		16.0					IS	
G1-23030C	21			01/06/978		SNOH	10/31/978	NASH JAMES L							
1 SE4SW4				DOMESTIC SINGLE		C	30.0 G 2		8.0	2			R		
				IRRIGATION		C	30.0 G 2		8.0	2	3.0		R	IS	
G1-22621C	25			12/17/975		SNOH	07/30/976	SIM JAMES H							
1 LT 3 THREE LK LUMBER CO #2				DOMESTIC MULTIPLE		C	40.0 G		9.0				R		
G1-21133C	31			12/14/973		SNOH	04/30/975	MORRIS R H							
1 L3 BL A SUNNYSDE L C ACRE TR				DOMESTIC SINGLE		C	10.0 G		1.0				R		
G1-24149C	31			06/18/982		SNOH	09/15/983	SCHMIDT RICHARD E							
1 NW4SE4				DOMESTIC MULTIPLE		C	35.0 G		6.0						
G1-25378P	35			01/25/989		SNOH	03/15/990	MARK STRIKER							
1 SW4SW4SW4NW4				DOMESTIC MULTIPLE		C	13.0 G		10.5				$RK		
TOWNSHIP - 29 RANGE - 07 E															
G1-22762C	04			11/15/976		SNOH	01/31/978	C P R CONSTRUCTION WELLS							
2 SW4SW4NW4				DOMESTIC MULTIPLE		C	175.0 G		112.5				R		
G1*08218C	27	08218	07708	06362 07/27/966		SNOH	12/08/966	B S A SEATTLE CHIE							
1 NE4NE4				DOMESTIC MULTIPLE		C	30.0 G		2.7				AH		
TOWNSHIP - 30 RANGE - 04 E															
G1-00164C	01	10534	09799	12/02/969		SNOH	08/10/970	LANDS AND WATER IN							
1 TR 27 PL TU R T 2 IN SW4 SW4				DOMESTIC MULTIPLE		C	200.0 G		46.5				R		
G1-25599A	01			12/29/989		SNOH	/ /	R YOUNG							
1 GL-2				DOMESTIC SINGLE		C	30.0 G 3								
				STOCK WATERING		C	30.0 G 3								
				IRRIGATION		C	30.0 G 3				10.0				
G1*10384C	03	10384	09410	07206 09/02/969		SNOH	11/25/969	BATHER K M							
1 GL3				DOMESTIC MULTIPLE		C	95.0 G		24.0				RHTM		
G1-24941P	06			12/02/986		SNOH	06/15/989	WTS FLACK							
1 LOT 3				DOMESTIC MULTIPLE		C	40.0 G		3.0				$RM		
G1-24969P	06			01/21/987		SNOH	08/15/988	KAYAK RIDGE PART							
1 SE4NE4				DOMESTIC MULTIPLE		C	40.0 G		10.5				$RM		
G1-20710C	07			06/18/973		SNOH	08/15/988	TULARE BEACH ASSN							
1 GOVT LOT 3				DOMESTIC MULTIPLE		C	40.0 G 2		18.8	2			$M		
				FIRE PROTECTION		C	40.0 G 2		18.8	2			$M		
G1-25148P	08			12/04/987		SNOH	01/16/990	BRUST W & GOLDFINC	WELLS						
2 LOT 9				DOMESTIC MULTIPLE		C	25.0 G		12.0				$RM	00000000	
G1-20532C	17			04/06/973		SNOH	08/15/988	SPEE BI DAH WATER							
1 L 3 BL 1 PL SPEE BI DAH WTFR				DOMESTIC MULTIPLE		C	50.0 G		10.0				$		
G1-22226C	17			11/12/974		SNOH	08/15/988	OCHS ANDREW ET AL							
1 L-2 BL-4				DOMESTIC MULTIPLE		C	10.0 G		2.0				$M		
G1-24544P	17			09/05/984		SNOH	09/15/988	TULALIP SHORES ASN	WELLS						
2 TR-B & LOT 98 TULALIP SHORES				DOMESTIC MULTIPLE		C	45.0 G		7.7	S			$MRK		
G1-24545C	17			09/05/984		SNOH	08/15/988	TULALIP SHORES ASN	WELL						
1 TR-B TULALIP SHORES DIV A				DOMESTIC MULTIPLE		C	6.0 G		7.7				$M		
G1-25401A	17			03/08/989		SNOH	/ /	SPEEBIDAH & WTR SY	WELL						
1 LOT 6 BLK 2				DOMESTIC MULTIPLE		C	35.0 G								
G1-20257A	21			08/21/972		SNOH	/ /	UPPER TULALIP HGHT	WELL						

CONTROL # / #OF PTS	SEC / P	OLD APPL / LOC. OF POD/POW	OLD PERM / (CHG C#)	OLD CERT / PURPOSE OF USE	DATE OF PRIORITY / USE TYPE	S T	C M	A	CNTY / INST QI	PERMIT DATE / C M	R U	S U	NAME / ANNUAL QA	C M	R U	S U	SOURCE OF APPROPRIATION / IRR AC	C M	S U	PRO-VISOS	TIME OF USE	R I	R A	R C	TRIBUTARY OF
WATER RESOURCE INVENTORY AREA- 07																									
TOWNSHIP - 30 RANGE - 04 E																									
1	PL TULALIP HEIGHTS			DOMESTIC MULTIPLE			C		50.0 G			80.0												
G1-20427C	21			01/25/973					SNOH	02/01/974		ARCADIA WATER DIST				WELL								
1	GL-3			DOMESTIC MULTIPLE			C		60.0 G			12.0								$				
G1-25585A	21			12/19/989					SNOH	/ /		L&V NESS				WELL								
1	GL-4			DOMESTIC MULTIPLE			C		25.0 G															
G1-23529C	25			12/14/979					SNOH	02/15/984		ILIAD INC				WELL								
1	L-9 BLK-1 AQUA HILLS			DOMESTIC MUNICIPAL			C		30.0 G			30.0			S					$M				
G1-23341C	26			02/08/979					SNOH	02/15/984		ILIAD, INC				WELL								
1	SE4SE4			DOMESTIC MULTIPLE			C		25.0 G			30.0								$M				
G1-25146A	26			12/10/987					SNOH	/ /		ILIAD INC				WELL								
1	L-16 BL-1 MARYSVILLE EST			DOMESTIC MULTIPLE			C		17.0 G												00000000			
G1-21630C	35			05/14/974					SNOH	10/31/975		SOUTH SOUND VW WTR				WELL								
1	SE4SE4			DOMESTIC MULTIPLE			C		50.0 G			7.2								R				
G1-21368A	36			03/15/974					SNOH	/ /		CHADWICK ERNEST F				WELLS								
2	SE4 SE4			DOMESTIC MULTIPLE			C		75.0 G															
TOWNSHIP - 30 RANGE - 05 E																									
G1*04772C	03	04772	04560	03361	02/11/958				SNOH	08/04/958		KLEIN NEIL				WELL								
1	N2SE4SE4			IRRIGATION			C		75.0 G			34.0					17.0			AE		IS		
G1*05539C	03	05539	05278	04059	03/28/960				SNOH	08/19/960		GANGLER P				WELL								
1	GL3			IRRIGATION			C		80.0 G			40.0			P		20.0			AEK		IS		
G1*05710C	03	05710	05379	04992	08/22/960				SNOH	11/07/960		GANGLER P				WELL								
1	NE4 NE4 NW4			IRRIGATION			C		100.0 G			40.0			P		20.0			AE		IS		
G1-24966P	03			12/16/986					SNOH	10/15/987		ISLAND POND CORP				WELL								
1	SE4SW4			DOMESTIC MULTIPLE			C		50.0 G			7.8								$MRK				
G1*02810C	04	02810	02575	01761	10/30/952				SNOH	01/30/953		STEINEKE H W				WELL								
1	SE4NE4			IRRIGATION			C		128.0 G			60.0					30.0					IS		
G1*02911C	04	02911	02652	02406	01/12/953	E			SNOH	03/27/953		HAMMER D J				WELL								
1	SE4 NE4			IRRIGATION			C		48.0 G			20.0			P		10.0			AEN		IS		
G1*03174C	04	03174	02949	02475	04/21/953				SNOH	07/31/953		STEEN F				WELL								
1	GL2			IRRIGATION			C		250.0 G			120.0					60.0			E		IS		
G1*02058C	05	02058	01893	00954	08/01/951				SNOH	10/26/951		YANDLE H C				WELL								
1	SW4NW4			IRRIGATION			C		90.0 G			60.0					30.0			E		IS		
G1*05508C	05	05508	05172	03768	02/24/960				SNOH	05/06/960		JOHNSON H A				WELL								
1	GL3			IRRIGATION			C		104.0 G			50.0					25.0			A		IS		
G1-23459A	07			08/06/979					SNOH	/ /		MITCHELL H LEE				WELL								
1	SE4NW4, L-18 MARYSVILLE HGTS			DOMESTIC SINGLE			C		10.0 G															
G1*02216C	09	02216	02060	01342	11/14/951				SNOH	02/25/952		DOBESH H C				WELL								
1	N2S2SW4SE4			IRRIGATION			C		100.0 G			14.0					7.0			E		IS		
G1-21881C	09			06/13/974					SNOH	09/15/975		BARKLY RAYMOND G				WELL								
1	NW4SW4			DOMESTIC MULTIPLE			C		50.0 G			10.8								R				
G1*01697C	10	01697	01567	01608	10/05/950	E			SNOH	03/09/951		CHRISTOFFERSON F F				WELL								
1	NW4NE4			IRRIGATION			C		300.0 G			150.0					100.0			E		IS		
G1*02217C	10	02217	02061	01383	11/14/951				SNOH	02/25/952		EASTERLY F H				WELL								
1	SE4SW4SW4			IRRIGATION			C		25.0 G			4.0					2.0			E		IS		
G1*02341C	10	02341	02160	01428	02/18/952				SNOH	05/06/952		AUSTIN J E				WELL								
1	NW4SW4			IRRIGATION			C		70.0 G			14.0					7.0			A		IS		
G1*04696C	10	04696	04435	03213	09/25/957				SNOH	01/31/958		ZIEBELL A G				WELL								
1	SE4			STOCK WATERING			C		25.0 G			40.0								A				
G1*05864C	10	05864	05542	04209	03/08/961				SNOH	06/08/961		MACY E E				WELL								
1	E2 W2 SE4 SW4 SW4			DOMESTIC SINGLE			C		30.0 G	2		9.6	2											
				IRRIGATION			C		30.0 G	2		9.6	2				2.0					IS		

CONTROL # / #OF PTS	SEC / R P	OLD APPL / LOC. OF POD/POW	OLD PERM / (CHG C#)	OLD CERT / PURPOSE OF USE	DATE OF PRIORITY	S T C M	CNTY / USE TYPE	PERMIT DATE / INST QI	NAME	CRS MUU	ANNUAL QA	CRS MUU	IRR AC	CS MU	PRO-VISOS	TIME OF USE	RRR IAC	SOURCE OF APPROPRIATION TRIBUTARY OF
WATER RESOURCE INVENTORY AREA- 07																		
TOWNSHIP - 30 RANGE - 05 E																		
G1-20714C 1	10 SE4NW4			06/18/973 DOMESTIC MULTIPLE			SNOH C	04/15/976 53.0 G	ANDERSON EMERY		WELL 18.0				R			
G1-24897C 1	10 SE4NW4			09/15/986 DOMESTIC MULTIPLE			SNOH C	10/15/987 125.0 G	COUNTRY MOBILE EST		WELL 18.0				M			
G1-23318C 1	11 NE4SW4SE4			03/02/979 DOMESTIC MULTIPLE			SNOH C	10/31/980 30.0 G	JOHNSON ET AL		WELL 4.0							
G1-24703C 1	11 SW4NE4			09/12/985 DOMESTIC MULTIPLE			SNOH C	06/16/986 30.0 G	REGAL FOUR INC		WELL 6.0							
G1-23582A 1	12 NW4NE4			03/20/980 DOMESTIC MULTIPLE			SNOH C	/ / 39.0 G	LAWLER, RICE & DAV		WELL							
G1-21612C 1	14 SW4 NW4			05/09/974 DOMESTIC SINGLE STOCK WATERING			SNOH C C	01/30/976 25.0 G 2 25.0 G 2	DE JONG SAM		WELL 1.0 7.0				R R			
G1*05509C 1	16 05509 SE4NW4		05178	03673 02/25/960 IRRIGATION			SNOH C	05/06/960 30.0 G	HOWLETT J W		WELL 10.0		5.0		AE	IS		
G1-22696C 1	16 NE4SW4			06/01/976 DOMESTIC MULTIPLE			SNOH C	03/15/979 40.0 G	INDIAN CR COM WTR		WELL 9.0							
G1*03403C 1	21 03403 SE4SE4		03161	01916 10/15/953 IRRIGATION			SNOH C	12/31/953 50.0 G	WOODHULL G M		WELL 3.0		1.5		AE	IS		
G1-20452C 1	21 SE4NW4			02/14/973 IRRIGATION			SNOH C	01/03/974 30.0 G	CHURCH OF SAINT MA		WELL 6.0		3.0		TNR	05150915		
G1*02952C 1	22 02952 NW4NW4NW4		02657	01710 01/27/953 IRRIGATION			SNOH C	03/27/953 60.0 G	NUTTER T J		WELL 20.0		10.0		E	IS		
G1*03179C 1	22 03179 E2 NW4 NE4		03101	02216 04/23/953 DOMESTIC SINGLE IRRIGATION			SNOH C C	11/13/953 40.0 G 2 40.0 G 2	BIRINGER M		WELL 32.0 2 32.0 2		18.0			IS		
G1*05828C 1	22 05828 E2NE4NW4		05505	03994 02/07/961 IRRIGATION			SNOH C	04/27/961 50.0 G	HENDERSON W G		WELL 40.0		20.0		NE	IS		
G1*00277C 1	23 00277 SW4SW4		00310	00316 06/17/946 IRRIGATION			SNOH C	12/02/946 120.0 G	QUAST T / F A		WELL 38.0	P	30.0		K	IS		
G1*06100C 1	23 06100 SW4 NW4		05748	05358 11/06/961 DOMESTIC GENERAL IRRIGATION			SNOH C C	01/12/962 150.0 G 2 150.0 G 2	CEDARCREST GOLF CO		WELL 11.2 108.0	P	100.0		AN AN	IS		
G1-24835C 2	24 NE4SW4SE4			05/13/986 DOMESTIC MULTIPLE			SNOH C	10/15/987 70.0 G	FRONTIER TRUST		WELLS 18.9				RM			
G1-23487C 1	25 N2SE4SW4			10/17/979 DOMESTIC MUNICIPAL			SNOH C	12/31/980 1000.0 G	MARYSVILLE CITY OF		WELL 1600.0				M			
G1*03984C 1	26 03984 NW4 NW4		03763	04155 05/05/955 DOMESTIC MUNICIPAL			SNOH C	08/26/955 57.0 G	MARYSVILLE CITY OF		WELL 91.0	P			A			
G1*06646C 1	29 06646 NE4NE4NW4		06305	05079 03/19/963 IRRIGATION			SNOH C	08/30/963 48.0 G	SHERLOCK D T		WELL 10.0		5.0		AN	IS		
G1-20077C 1	30 L 19 PL TYEE BERRY FARMS			04/20/972 DOMESTIC SINGLE IRRIGATION			SNOH C C	05/02/973 10.0 G 25.0 G	WICKSTROM WALDO R		WELL 1.0 5.0		2.5			04010930		
G1-24525G 1	35 LOT 82 SUNNYSIDE 5-AC TRACTS			07/05/984 DOMESTIC SINGLE IRRIGATION			SNOH C C	03/15/985 38.5 G 2 38.5 G 2	OSBORN BURYL E		WELL 1.0 28.0		14.0			IS		
TOWNSHIP - 30 RANGE - 06 E																		
G1-24106G 1	07 NW4SW4			06/04/982 DOMESTIC MULTIPLE STOCK WATERING IRRIGATION			SNOH C C C	01/14/983 30.0 G 3 30.0 G 3 30.0 G 3	SCHELLING CLAUDIA		WELL 10.0 3 10.0 3 10.0 3		3.0		R R R	IS		
G1-24695C	11			08/19/985			SNOH	/ /	BLUE SPRUCE GROVE		INFILTRATION GALLERY							

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WATER RESOURCE INVENTORY AREA- 07																										
TOWNSHIP - 30 RANGE - 06 E																										
1 GL-5				DOMESTIC MULTIPLE					C	175.0 G		S	170.0			S									
G1-25653A 1 S2SW4	13			DOMESTIC MULTIPLE	04/03/990				SNOH C	/ / 20.0 G	V C OHM					WELL									
G1-24239C 1 SE4SW4	14			DOMESTIC SINGLE STOCK WATERING IRRIGATION	01/25/983				SNOH C C C	09/14/984 10.0 G 3 10.0 G 3 10.0 G 3	SARVER RICHARD P				1.8 1.8 1.0	WELL	2 2			5.0				IS		
G1-24252C 1 SW4NE4	14			DOMESTIC MULTIPLE	03/22/983				SNOH C	09/15/983 37.0 G	POESCHEL & SCHULTZ				6.0	WELL									
G1*01802C 1 SW4SE4	15	01802	01703	IRRIGATION	00833 02/01/951				SNOH C	06/06/951 300.0 G	STEINKE R D				68.0	WELL				34.0		E	IS		
G1-20191C 1 W2 NW4 SE4	15			DOMESTIC SINGLE IRRIGATION	06/26/972				SNOH C C	03/23/973 10.0 G 180.0 G	FROST HERBERT H				1.0 51.0	WELL				18.0			IS		
G1-22053P 1 GL 3	19			DOMESTIC MULTIPLE IRRIGATION	06/07/974				SNOH C C	10/15/990 16.0 G 2 16.0 G 2	LANGBEHN FRED H				.5 8.9	WELL				5.3		$R $R			
G1-24401C 1 SE4NE4	20			DOMESTIC SINGLE	11/03/983				SNOH C	01/15/985 10.0 G	WIGGINS TELITHA				1.0	WELL									
G1-24402P 1 SW4NW4	20			DOMESTIC SINGLE	11/03/983				SNOH C	02/15/985 20.0 G 3	TANKERSLEY FRELON				1.0	WELL									
G1*05405C 1 SW4SE4	22	05405	05117	IRRIGATION	03884 09/22/959				SNOH C	02/26/960 210.0 G	NALL R E				62.0	WELL				31.0		AE	IS		
G1*06719C 1 NE4SW4	22	06719	06301	COMMERCIAL/INDUSTRIAL	04609 05/15/963				SNOH C	08/30/963 200.0 G	SCOTT PAPER CO				320.0	WELL						A			
G1-00364C 1 TR A PL GETCH PRK IN NW4 SE4	22	09428	08834	DOMESTIC MULTIPLE	05/06/968				SNOH C	12/04/968 85.0 G	HILLCREST IMPRO CO				26.0	WELL						RHT			
G1-25445A 1 NW4NE4	22			DOMESTIC SINGLE COMMERCIAL/INDUSTRIAL	05/15/989				SNOH C C	/ / 25.0 G 2 25.0 G 2	CONCRETE NORTHWEST					WELL									
G1-20569C 1 NW4SW4	23			COMMERCIAL/INDUSTRIAL	04/20/973				SNOH C	01/03/974 20.0 G	GRAAFSTRA NICK				2.0	WELL						HN			
G1*09986C 1 L49 LOCHAVEN EST	27	09986	09256	DOMESTIC MULTIPLE	07356 01/20/969				SNOH C	08/12/969 100.0 G	EVERGREEN GROUP 3				42.0	WELL						HTM			
G1*09156C 1 S2NE4SW4	29	09156	08623	DOMESTIC MULTIPLE	07233 01/17/968				SNOH C	08/16/968 270.0 G	ROSELAND INC				45.0	WELL						RHTM			
G1-20570C 1 GOVT LOT 2	31			DOMESTIC SINGLE WILDLIFE PROPAGATION FISH PROPAGATION	04/20/973				SNOH C C C	04/30/974 25.0 G 3 25.0 G 3 25.0 G 3	DYE PAUL G				1.0 10.0 10.0	WELL	2 2					RNT RNT RNT			
G1*02887C 1 SE4NE4	33	02887	02742	IRRIGATION	02219 01/02/953				SNOH C	05/08/953 170.0 G	COOPER N R				80.0	WELL				40.0		AE	IS		
TOWNSHIP - 30 RANGE - 07 E																										
G1*10323C 1 TR7 M TURNER AC TR	18	10323	09484	DOMESTIC MUNICIPAL	07412 07/25/969				SNOH C	01/02/970 200.0 G	GRANITE FALLS TOWN				202.0	WELL						P	RH		
G1-25050C 1 SE4SW4	18			COMMERCIAL/INDUSTRIAL	07/10/987				SNOH C	08/15/988 35.0 G	PERRIGOUE DAVID C				1.0	WELL						R			
G1-25457A 1 LOT 7	18			DOMESTIC MUNICIPAL	06/20/989				SNOH C	/ / 180.0 G	GRANITE FALLS				200.0	WELL									

CONTROL # / #OF PTS	SEC / R / P	OLD APPL / OLD PERM / OLD CERT	DATE OF PRIORITY	S C A T C M	CNTY / PERMIT DATE / INST QI	NAME	SOURCE OF APPROPRIATION TRIBUTARY OF	ANNUAL C R S QA M U U	IRR AC	C S PRO- M U VISOS	TIME OF USE	R R R I A C
LOC. OF POD/POW (CHG C#)			PURPOSE OF USE		USE TYPE							
WATER RESOURCE INVENTORY AREA- 07												
TOWNSHIP - 30 RANGE - 07 E												
G1-25640A 1 NE4NW4	31		04/16/990 DOMESTIC MULTIPLE		SNOH / / C 40.0 G	COURTNEY WTR SYS	WELL					
TOWNSHIP - 31 RANGE - 04 E												
G1*04568C 1 W2 E2 NW4 SE4	21 04568	04306	04415 04/09/957 DOMESTIC MULTIPLE		SNOH 07/09/957 C 46.6 G	SWIMME L T	WELL	74.5		AN		
G1-20597C 1 LK GOODWIN SUMMER HM PK	21		04/30/973 DOMESTIC MULTIPLE COMMERCIAL/INDUSTRIAL		SNOH 04/30/974 C 50.0 G 2 C 50.0 G 2	OLSON NORMAN W	WELL	8.0 2 8.0 2		RH RH		
G1-20761C 1 LOT 17 PLAT ORCHARD BEACH	21		06/28/973 DOMESTIC MULTIPLE		SNOH 05/31/974 C 40.0 G	ORCHARD BEACH COMM	WELL	21.6		HR		
G1*08803C 1 NW4 SE4 SW4	22 08803	08276	06980 06/19/967 DOMESTIC MUNICIPAL		SNOH 01/19/968 C 550.0 G	MARYSVILLE CITY OF	WELL	880.0 S		RH		
G1*09679C 1 SW4 NE4 NW4	22 09679	08926	07226 08/22/968 DOMESTIC MUNICIPAL		SNOH 02/07/969 C 100.0 G	SWIMME W M	WELL	83.0 S		HM		
G1-25182A 1 SW4SW4	24		02/16/988 DOMESTIC MUNICIPAL		SNOH / / C 400.0 G	MARYSVILLE CITY OF	WELL				00000000	
G1-25772A 1 BLK 2	25		05/21/990 DOMESTIC MULTIPLE		SNOH / / C 60.0 G	MCRAE RD WTR SYS	WELL					
G1-25311P 1 NE4SW4	26		09/14/988 DOMESTIC MULTIPLE		SNOH 11/15/989 C 300.0 G	SEVEN LKS WTR ASS	WELL	336.0 S		#M		
G1*04723C 1 L23 BL115 LAKEWOOD FARMS	28 04723	04470	03079 11/04/957 DOMESTIC MULTIPLE		SNOH 03/28/958 C 50.0 G	FAIRBANKS F M	WELL	21.6		A		
G1-25611A 1 LOT 11 BLK 15	28		01/18/990 DOMESTIC MULTIPLE		SNOH / / C 30.0 G	LAKEWIN LN WTR SYS	WELL					
G1-25832A 1 LOT 22 BLK 115	28		09/06/990 DOMESTIC MULTIPLE		SNOH / / C 250.0 G	LK GOODWIN WTR CO	WELL					
G1*09031C 1 TR19 BL2 LK SHOECRAFT BEACHW	33 09031	08583	07098 10/26/967 DOMESTIC MULTIPLE		SNOH 07/24/968 C 45.0 G	SEVEN LAKES WTR AS	WELL	62.0		HM		
G1*08427C 1 GL3	34 08427	07963	05763 11/15/966 DOMESTIC MULTIPLE		SNOH 06/20/967 C 50.0 G	WA ST PK&REC COMM	WELL	5.0		R		
G1-21526C 1 GL-2	34		04/11/974 DOMESTIC MULTIPLE		SNOH 10/31/975 C 50.0 G	PILCHUCK CNCL CP F	WELL	15.2		R#		
G1-22187C 1 SW4 SW4	34		11/13/974 DOMESTIC SINGLE FIRE PROTECTION IRRIGATION		SNOH 03/15/977 C 25.0 G 3 C 25.0 G 3 C 25.0 G 3	TURNER STACY E	WELL	1.0 2.0	1.0	R R R	IS	
G1-23373C 1 L-3 BL-2 LK LOMA	35		05/02/979 DOMESTIC MULTIPLE		SNOH 08/29/980 C 150.0 G	SEVEN LAKES WTR AS	WELL	240.0		RM		
G1-24501C 1 LOT 17 CASCADE VIEW	36		06/07/984 DOMESTIC MULTIPLE		SNOH 03/15/985 C 40.0 G	ILIAD INC	WELL	12.1		R		
G1-24584C 1 SE4SE4	36		12/24/984 DOMESTIC MULTIPLE		SNOH 08/15/985 C 35.0 G	DEISHER LARRY D	WELL	5.4				
G1-24605C 1 NE4SE4	36		02/07/985 DOMESTIC MULTIPLE		SNOH 02/14/986 C 35.0 G	POESCHEL & SCHULTZ	WELL	4.5				
G1-25062C 1 N2SE4SE4SE4	36		09/01/987 DOMESTIC MULTIPLE		SNOH 04/18/988 C 30.0 G	WITHERS W T	WELL	5.4				
TOWNSHIP - 31 RANGE - 05 E												
G1-00650C 1 SE4SW4SW4	14 11155	10570	08/13/970 DOMESTIC MULTIPLE		SNOH 11/29/971 C 40.0 G	ARLING CONG JEH WI	WELL	4.0		RT		
G1-24838C	14		06/06/986		SNOH 08/17/987	BOYDEN REALTY INC	WELL					

#9

#4

CONTROL # / #OF PTS	SEC / P	OLD APPL / LOC. OF POD/POW	OLD PERM / (CHG C#)	OLD CERT / PURPOSE OF USE	DATE OF PRIORITY /	S T C M	CNTY / USE TYPE	PERMIT DATE / INST QI	C R S M U U	NAME / ANNUAL QA	C R S M U U	SOURCE OF APPROPRIATION TRIBUTARY OF / IRR AC	C S M U	PRO-VISOS	TIME OF USE	R R R I A C
WATER RESOURCE INVENTORY AREA- 07																
TOWNSHIP - 31 RANGE - 05 E																
1	SW4			DOMESTIC MULTIPLE			C	50.0 G		14.5		S				
G1*04359C	20	04359	04142	03463	06/19/956			SNOH	11/28/956	SWANSON E C		WELLS				
2	NE4 SE4			IRRIGATION			C	370.0 G		74.0			37.0	E	IS	
G1*04511C	20	04511	04255	03187	02/05/957			SNOH	05/22/957	RAYMOND J L		WELL				
1	NE4SE4SE4			DOMESTIC MULTIPLE			C	20.0 G		32.0				AN		
G1*03658C	21	03658	03473	03933	06/02/954			SNOH	10/29/954	KEMPKES J A		WELLS				
2	W2 SW4			IRRIGATION			C	160.0 G		32.0			16.0	AE	IS	
G1*04519C	21	04519	04278	03140	02/13/957			SNOH	06/17/957	HUNT L J		WELL				
1	S2 N2 NW4 SW4			IRRIGATION			C	80.0 G		16.0			8.0	AEN	IS	
G1-23085G	21				04/17/978			SNOH	07/31/979	GREEN VALLEY TURF		WELL				
1	SE4SE4			IRRIGATION			C	150.0 G		80.0			140.0		IS	
G1*02370C	22	02370	02164	01694	03/04/952			SNOH	05/06/952	KLUIN A SR		WELL				
1	SE4SE4			IRRIGATION			C	19610 G		104.0			52.0	AE	IS	
G1*04762C	22	04762	04468	03147	01/23/958			SNOH	03/28/958	FALOR E R		WELL				
1	SE4NE4			IRRIGATION			C	15.0 G		10.0			5.0	AE	IS	
G1*07495C	22	07495	07041	05170	02/12/965			SNOH	05/21/965	ARLINGTON CITY OF		WELL				
1	SE4 NW4			DOMESTIC MUNICIPAL			C	200.0 G 2		320.0	2			HTM		
				COMMERCIAL/INDUSTRIAL			C	200.0 G 2		320.0	2			HTM		
G1-22461C	26				03/17/975			SNOH	04/30/976	ABCO INC		WELL				
1	SE4NW4			DOMESTIC MULTIPLE			C	41.0 G		13.0				R		
G1-22615C	26				01/21/976			SNOH	09/15/982	EDGECOMB WATER		WELL				
1	NW4SE4			DOMESTIC MULTIPLE			C	23.0 G		28.0				R		
G1-25489A	26				08/23/989			SNOH	/ /	TOP O HILL HOME AS		WELL				
1	SW4SE4			DOMESTIC MULTIPLE			C	45.0 G								
G1*07704C	27	07704	07262	05539	07/21/965			SNOH	11/24/965	PENNEY N R		WELL				
1	NE4SW4			IRRIGATION			C	175.0 G		70.0			75.0		IS	
G1*03668C	28	03668	03375	02389	06/09/954			SNOH	08/06/954	RICHARDSON A J		WELL				
1	SW4SW4			IRRIGATION			C	150.0 G		39.0			26.0	AE	IS	
G1-20862C	28				08/23/973			SNOH	08/29/975	MALISHESKI MARY G		WELL				
1	SE4 NE4			DOMESTIC SINGLE			C	100.0 G 2		1.0						
				IRRIGATION			C	100.0 G 2		40.0			20.0		04151001	
G1-22622C	28				12/12/975			SNOH	08/15/977	GREEN VALLEY TURF		WELL				
1	NW4NE4			IRRIGATION			C	150.0 G		76.4			40.0	R	IS	
G1*00995C	29	00995	00902	00321	09/14/948			SNOH	01/06/949	ALSTROM J		WELL				
1	SE4NE4SE4			IRRIGATION			C	80.0 G		13.0			10.0		IS	
G1*03104C	29	03104	03002	02531	03/23/953			SNOH	08/21/953	JENSEN P		WELL				
1	S2 SE4			IRRIGATION			C	4350.0 G		160.0			80.0	E	IS	
G1-21999C	31				07/03/974			SNOH	10/15/976	FOREST GROVE PARK		WELL				
1	NE4SW4			DOMESTIC MULTIPLE			C	23.0 G		24.3				R		
G1-24593C	31				01/21/985			SNOH	12/16/985	POESCHEL & SCHULTZ		WELL				
1	GL-4			DOMESTIC MULTIPLE			C	80.0 G		4.5						
G1-24830C	31				05/05/986			SNOH	03/06/987	BERTILSON R & V		WELL				
1	SE4SW4			DOMESTIC MULTIPLE			C	42.0 G		5.4				R		
G1*02803C	32	02803	02694	02661	10/29/952			SNOH	04/10/953	MANGINI J		WELL				
1	NW4NW4			IRRIGATION			C	4350.0 G		75.0			45.0	E	IS	
G1*03900C	32	03900	03734	04174	03/03/955			SNOH	08/02/955	HAMMER D J		WELL				
1	NE4SW4			IRRIGATION			C	72.0 G		30.0			15.0	AE	IS	
G1*05588C	32	05588	05271	03892	04/29/960			SNOH	08/11/960	LARSON L		WELL				
1	SE4 SE4			DOMESTIC SINGLE			C	2300.0 G 2		44.0	2			A		
				IRRIGATION			C	230.0 G 2		44.0	2		22.0	A	IS	
G1-00026C	32	12266			11/01/971			SNOH	05/30/972	FREEMAN ROBERT E		WELL				
1	NE4 SW4			DOMESTIC SINGLE			C	10.0 G		1.0				R		

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WATER RESOURCE INVENTORY AREA- 07																											
TOWNSHIP - 31 RANGE - 05 E																											
				FISH PROPAGATION					C	15.0 G					24.0								R				
				IRRIGATION					C	125.0 G					37.0					15.0			R	05151015			
G1-22203C	32				06/28/974				SNOH	06/30/976	LARSON LELAND W							WELL								
1 NW4 NE4				DOMESTIC SINGLE					C	25.0 G 2					1.0								R				
				STOCK WATERING					C	25.0 G 2					11.0								R				
G1-24765Q	32				12/11/985				SNOH	10/15/986	WALLER FREDERICK							WELL								
1 SE4SW4				IRRIGATION					C	30.0 G					13.0					9.0				IS			
G1*01869C	33	01869	01709		00862 03/16/951				SNOH	06/06/951	NELSON C T							WELL								
1 NW4SW4				IRRIGATION					C	33.0 Q					8.0					4.0			E	IS			
G1*02500C	33	02500	02490		01704 05/06/952				SNOH	12/11/952	CRAIG C							WELL								
1 NW4SW4				IRRIGATION					C	50.0 G					10.0					5.0			E	IS			
G1*05339C	33	05339	05016		03593 07/22/959				SNOH	11/05/959	KLEIN W							WELL								
1 NE4NE4				IRRIGATION					C	138.0 G					78.0					39.0			A	IS			
G1*02643C	34	02643	02479		01611 07/18/952				SNOH	11/28/952	DELONG J A							WELL								
1 N2S2SW4				IRRIGATION					C	168.0 G					72.0					36.0			A	IS			
G1*03265C	34	03265	03098		01839 06/10/953				SNOH	11/13/953	KLEIN J							WELL								
1 SW4NW4				IRRIGATION					C	225.0 G					80.0					40.0				IS			
G1*05311C	34	05311	04964		03477 07/02/959				SNOH	09/25/959	GRAAFSTRA E							WELL								
1 NW4NW4				IRRIGATION					C	120.0 G					76.0					30.0			A	IS			
G1-24766Q	35				12/11/985				SNOH	10/15/986	KIRBY & BRIDGMAN							WELL								
1 SE4SE4				DOMESTIC SINGLE					C	10.0 G 2					.5								R				
				IRRIGATION					C	10.0 G 2					4.0					4.0			R	IS			

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#OF R PTS P LOC. OF POD/POW (CHG C#)	PURPOSE OF USE						USE TYPE	INST QI	C R S M U U	ANNUAL QA	C R S M U U	IRR AC	C S PRO- M U VISOS	TIME OF USE	R R R I A C
WATER RESOURCE INVENTORY AREA- 08															
TOWNSHIP - 27 RANGE - 04 E															
TOWNSHIP - 27 RANGE - 04 E															
G1*04396C 02 04396 04135 03227 08/08/956							SNOH	11/20/956	LAYNE PACIFIC INC	WELL					
1 SE4SW4SW4	DOMESTIC MULTIPLE						C	150.0 G		240.0			A		
G1*05015C 10 05015 04724 03401 09/24/958							SNOH	02/04/959	ALDERWOOD WTR DIST	WELL					
1 L10 BL3 ALDERWOOD MANOR 2	DOMESTIC MULTIPLE						C	700.0 G		1120.0			A		
G1*10860C 11 10860 10480 07491 05/11/970							SNOH	10/29/971	ROBERTS/ELECTRO CO	WELL					
2 W2NE4,L6BL7 PL ALDERWOOD MAN	COMMERCIAL/INDUSTRIAL						C	60.0 G		96.0					
G1*04687C 12 04687 04434 03398 09/16/957							SNOH	01/31/958	ALDERWOOD WTR DIST	WELL					
1 L36 MARTHA LK ACREAGE DIV 2	DOMESTIC MULTIPLE						C	1000.0 G		1600.0			A		
G1*04735C 14 04735 04721 03814 12/24/957							SNOH	02/04/959	ALDERWOOD WTR DIST	WELL					
1 NW4NW4SW4	DOMESTIC MULTIPLE						C	250.0 G		400.0			A		
G1*04736C 15 04736 04501 03174 12/24/957							SNOH	05/12/958	ALDERWOOD WTR DIST	WELL					
1 SE4NW4	DOMESTIC MULTIPLE						C	1000.0 G		1600.0			A		
G1*04128C 16 04128 03809 02536 09/30/955							SNOH	03/02/956	LAYNE PACIFIC INC	WELL					
1 L4/5 BL5 ALDERWOOD MANOR 10	DOMESTIC MULTIPLE						C	560.0 G		896.0			A		
G1*05463C 16 05463 05159 04251 01/12/960							SNOH	04/29/960	ALDERWOOD WTR DIST	WELL					
1 TR17 PLAT OF LYNNCREST	DOMESTIC MULTIPLE						C	300.0 G		480.0			A		
G1-25554A 20				10/23/989			SNOH	/ /	CITY OF LYNNWOOD	WELLS					
4 NW4	IRRIGATION						C	250.0 G		100.0		50.0		04011001	
G1*03307C 21 03307 03080 02034 07/21/953 E							SNOH	10/23/953	LAYNE-PACIFIC INC	WELL					
1 TR-50 HALLS LK WTRFNT ADDN	DOMESTIC MULTIPLE						C	700.0 G		1130.0			AE		
G1*03402C 21 03402 03236 03258 10/13/953							SNOH	03/12/954	LAYNE-PACIFIC INC	WELL					
1 TR50 UNRECORDED HALL LAKE ADD	DOMESTIC MULTIPLE						C	750.0 G		1200.0					
G1-00369C 21 10532 09710 12/01/969							SNOH	05/07/970	GROUP HEALTH COOP	WELLS					
2 TR 2&3 BL-2 PL HALLS LK	COMMERCIAL/INDUSTRIAL						C	150.0 G							
G1*00545S 26 00545 00466 05/00/936							SNOH	/ /	BROWN R	WELL					
1 L7 BL21 ALDERWOOD MANOR 6	DOMESTIC SINGLE						C	150.0 G 2		19.0 2					
	IRRIGATION						C	150.0 G 2		19.0 2		19.0		IS	
G1*04351C 27 04351 04056 02920 06/12/956							SNOH	09/05/956	LAYNE PACIFIC INC	WELL					
1 L35/36 ALDERBROOK	DOMESTIC MULTIPLE						C	350.0 G		576.0			A		
G1*02658C 28 02658 02452 01499 08/01/952 E							SNOH	11/07/952	LAYNE PACIFIC INC	WELL					
1 NE4NW4	DOMESTIC MULTIPLE						C	700.0 G		742.0					
G1-00198C 35 10101 09167 05/24/969							SNOH	06/10/969	SNOHOMISH CO RD DS	WELL					
1 E2 W2 NE4 NE4	COMMERCIAL/INDUSTRIAL						C	30.0 G		38.0			PR		
TOWNSHIP - 27 RANGE - 05 E															
G1*01097C 04 01097 01002 00912 04/06/949							SNOH	06/17/949	SEATTLE CITY OF	WELL					
1 SW4	DOMESTIC GENERAL						C	35.0 G 2		5.5 2					
	FIRE PROTECTION						C	35.0 G 2		5.5 2					
G1-23575C 04				03/04/980			SNOH	11/26/980	BOYD DELBERT	WELL					
1 GL-4	DOMESTIC SINGLE						C	10.0 G		1.0			R		
G1-23580C 04				03/04/980			SNOH	11/26/980	BOYD DELBERT	WELL					
1 GL-4	DOMESTIC SINGLE						C	10.0 G		1.0			R		
G1-20476C 05				03/06/973			SNOH	01/25/974	GREEN DALE E	WELL					
1 NE4SE4	DOMESTIC MULTIPLE						C	20.0 G		4.0					
G1-20954C 05				10/09/973			SNOH	03/28/975	BILLINGS MORRIS W	WELL					
1 SE4SW4	DOMESTIC SINGLE						C	40.0 G 3		1.0			R		
	STOCK WATERING						C	40.0 G 3		1.0			R		
	IRRIGATION						C	40.0 G 3		8.0		4.0	R	04151001	
G1-21749C 05				02/23/974			SNOH	09/15/975	UNITED DVLPMT CORP	WELL					
1 SW4NW4	IRRIGATION						C	300.0 G		140.0		70.0	RM	IS	
G1-20945C 06				09/27/973			SNOH	02/14/975	KLINT VIRGINIA LEE	WELL					
1 SE4NW4	DOMESTIC MULTIPLE						C	33.0 G		12.0			HRN		

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WATER RESOURCE INVENTORY AREA- 08																										
TOWNSHIP - 27 RANGE - 05 E																										
G1*00843C	07	00843	00775	00804	05/07/948				SNOH	08/04/948	SPENCER M V											WELL				
1 NE4NW4				DOMESTIC SINGLE					C	10.0	G 3				1.5	3										
				STOCK WATERING					C	10.0	G 3				1.5	3										
				IRRIGATION					C	10.0	G 3				1.5	3			25				IS			
G1*00844C	07	00844	00744	00213	05/07/948				SNOH	07/02/948	AUERSWALD E G											WELL				
1 NW4NW4				DOMESTIC SINGLE					C	50.0	G 3				12.5	3										
				STOCK WATERING					C	50.0	G 3				12.5	3										
				IRRIGATION					C	50.0	G 3				12.5	3			10.0				IS			
G1-24011C	08				12/18/981				SNOH	09/15/982	EVERETT SCHOOL DIS											WELL				
1 NW4NW4				DOMESTIC SINGLE					C	83.0	G 2				4.0	2										
				IRRIGATION					C	83.0	G 2				4.0	2			2.0				IS			
G1-25351A	09				12/12/988				SNOH	/ /	PETER LAROCK											WELL				
1 LOT 3				DOMESTIC MULTIPLE					C	60.0	G															
G1-23408A	10				06/18/979				SNOH	/ /	TARSI DAVID R ETUX											WELLS				
2 NW4NE4				DOMESTIC SINGLE					C	500.0	G 2															
				IRRIGATION					C	500.0	G 2								5.0				IS			
G1*04955C	14	04955	04633	03279	08/07/958				SNOH	11/21/958	ZANON M											WELL				
1 NE4				DOMESTIC SINGLE					C	6.0	G				9.6							AE				
G1-22803C	14				02/23/977				SNOH	06/30/978	TORSET LLOYD R											WELL				
1 NW4SW4				DOMESTIC MULTIPLE					C	20.0	G				3.6							RE				
G1-23589C	14				04/07/980				SNOH	10/31/980	STANDER HARRY R											WELL				
1 W2E2SW4SW4				DOMESTIC MULTIPLE					C	40.0	G				15.0							RK				
G1-23866C	14				06/08/981				SNOH	04/15/982	AQUA COPIA INC											WELL				
1 SE4SE4				DOMESTIC MULTIPLE					C	30.0	G				48.0							R				
G1-25040A	14				09/06/990				SNOH	/ /	BLUE JACK D											WELL				
1 SE4SW4				DOMESTIC SINGLE					C	7.0	G															
G1-20266P	17				08/25/972				SNOH	06/01/973	DAVIDSON ROBERT R											WELL				
1 W2 NE4 NE4				DOMESTIC SINGLE					C	10.0	G 3				1.0							R				
				STOCK WATERING					C	10.0	G 3				1.0							R				
				IRRIGATION					C	10.0	G 3				8.0				4.0			R	05011001			
G1-20503C	17				03/20/973				SNOH	03/29/975	PAULSEN SVEND											WELL				
1 NW4 NE4				DOMESTIC MULTIPLE					C	120.0	G 2				3.0											
				IRRIGATION					C	120.0	G 2				33.0				16.0				04151001			
G1*01177C	19	01177	01058	01231	07/23/949				SNOH	09/30/949	DOLPH L F											WELL				
1 SE4NE4				IRRIGATION					C	100.0	G				7.5				5.0			A	IS			
G1-22135C	19				06/14/974				SNOH	09/15/976	SULLIVAN ROBERT L											WELL				
1 NW4 NE4				DOMESTIC SINGLE					C	25.0	G 2				1.0							R				
				IRRIGATION					C	25.0	G 2				4.0				2.0			R	IS			
G1*00456C	20	00456	00416	00790	02/12/947				SNOH	05/02/947	SHENKEL M A											WELL				
1 SW4SW4				DOMESTIC SINGLE					C	300.0	G 2				25.0	2										
				IRRIGATION					C	300.0	G 2				25.0	2			25.0				IS			
G1-00209C	21	12495			02/24/972				SNOH	10/12/972	DEACH W V											WELL				
1 SE4NE4SE4				DOMESTIC SINGLE					C	7.5	G				1.0											
G1*10048C	22	10048	09175	07386	02/27/969				SNOH	06/13/969	GRANT W S											WELL				
1 NW4SW4				DOMESTIC MULTIPLE					C	15.0	G				12.0							TM				
G1*10305C	22	10305	09391	07387	07/14/969				SNOH	11/12/969	GRANT W S											WELL				
1 NW4 NW4 SW4				DOMESTIC MULTIPLE					C	45.0	G				52.0						S	RHTM				
G1*06692C	23	06692	06466	06064	04/26/963				SNOH	01/17/964	AQUA COPIA INC											WELL				
1 L8 BL2 TIGER COUNTRY 3				DOMESTIC MULTIPLE					C	50.0	G				53.0							AH				
G1-20830C	23				08/13/973				SNOH	12/15/975	DREBAUM RAYMOND A											WELL				
1 S2NE4NW4				DOMESTIC MULTIPLE					C	35.0	G				5.4							TRH				
G1*08872C	24	08872	08289	06472	07/31/967				SNOH	01/23/968	CROSS VLY WTR ASSN											WELL				
1 NW4SW4				DOMESTIC MULTIPLE					C	160.0	G				250.0							MHR				
G1-20326C	24				10/20/972				SNOH	/ /	MALMBERG JON C											WELL				

CONTROL # / #OF PTS	SEC / P	OLD APPL / LOC. OF POD/POW	OLD PERM / (CHG C#)	OLD CERT / PURPOSE OF USE	DATE OF PRIORITY	S T	C M	CNTY / USE TYPE	PERMIT DATE / INST QI	C M	R U	S U	NAME / ANNUAL QA	C M	R U	S U	SOURCE OF APPROPRIATION / IRR AC	C M	S U	TRIBUTARY OF / PRO-VISOS	TIME OF USE	R I	R A	R C
WATER RESOURCE INVENTORY AREA- 08																								
TOWNSHIP - 27 RANGE - 05 E																								
1	N2 NW4 SW4			DOMESTIC MULTIPLE				C	30.0	G	2		2.0							R				
				IRRIGATION				C	30.0	G	2		8.0				4.0			R	IS			
G1-20550P	24				04/12/973				SNOH	02/28/974	CROSS VALLEY WTR A						WELL							
1	SW4SE4NW4			DOMESTIC MUNICIPAL				C	500.0	G			400.0							MR				
G1-21364C	24				04/04/974				SNOH	07/30/976	SEE DONALD E						WELL							
1	L248 CATHCART DIV NO 1			DOMESTIC MULTIPLE				C	20.0	G			2.0							R				
G1-24906C	24				10/03/986				SNOH	06/15/987	CROSS VALLEY WAT						WELL							
1	NW4SW4			DOMESTIC MUNICIPAL				C	900.0	G			1008.0							RM				
G1-25370A	24				01/05/989				SNOH	/ /	ALVIN & GERRI SEE						WELL							
1	NE4SE4			DOMESTIC MULTIPLE				C	50.0	G														
G1*11000C	25	11000	10007	07424	06/24/970				SNOH	12/11/970	CROSS VLY WTR ASSN						WELL							
1	NE4SE4NE4			DOMESTIC MULTIPLE				C	400.0	G			400.0							THQUR				
G1-22964C	25				09/19/977				SNOH	02/16/982	THOMPSON PHILIP						WELL							
1	SW4SW4			DOMESTIC MULTIPLE				C	35.0	G			4.0											
G1-24658C	25				05/14/985				SNOH	10/20/985	E CRYSTAL LK WTR S						WELL							
1	SE4SE4			DOMESTIC MULTIPLE				C	18.0	G			12.0							RM				
G1-24816C	25				04/21/986				SNOH	03/16/987	CROSS VALLEY WATER						WELL							
1	NE4NE4			DOMESTIC MUNICIPAL				C	500.0	G			600.0							RM				
G1-25216C	25				04/05/988				SNOH	04/16/990	WELLS CINDY						WELL							
1	SE4SE4			DOMESTIC MULTIPLE				C	40.0	G			4.5							‡RM				
G1-25388A	25				02/21/989				SNOH	/ /	BURTENSHAW DEVELOP						WELL							
1	NE4SW4			DOMESTIC MULTIPLE				C	32.0	G	2													
				COMMERCIAL/INDUSTRIAL				C	32.0	G	2													
G1-00188C	26	11318	10592		10/16/970				SNOH	12/07/971	BRANDT ROLAND B						WELL							
1	W2NE4SE4	SE4		DOMESTIC SINGLE				C	10.0	G			1.0											
G1-25212A	26				03/23/988				SNOH	/ /	OVERBECK ROGER						WELL							
1	N2SE4SW4			DOMESTIC SINGLE				C	15.0	G											00000000			
G1*01307C	27	01307	01189	01846	12/15/949				SNOH	05/10/950	BELMONT E R						WELL							
1	NE4NW4			DOMESTIC SINGLE				C	60.0	G	3		13.0	3						‡				
				STOCK WATERING				C	60.0	G	3		13.0	3						‡				
				IRRIGATION				C	60.0	G	3		13.0	3			5.0			‡	IS			
G1-21350C	27				03/19/974				SNOH	09/15/976	DEMEERLEER A D ET						WELL							
1	L3 TURNER COR ADD IN NE4 NE4			DOMESTIC MULTIPLE				C	35.0	G	2		3.0											
				IRRIGATION				C	35.0	G	2		10.0				5.0				IS			
G1-21321C	28				03/13/974				SNOH	10/31/975	STRAHM F A & B						WELL							
1	W2 SW4 NW4			DOMESTIC MULTIPLE				C	15.0	G			2.0							R				
G1*04922CBL	29	04922B	04648B	03265B	07/18/958				SNOH	12/05/958	CAROTHERS M A						WELL							
1	2W2W2W2			DOMESTIC MULTIPLE				C	15.0	G			24.0									2	2	0
G1*04744C	30	04744	04466	03273	01/03/958				SNOH	03/10/958	WEBER L V						WELL							
1	NE4SE4NE4			DOMESTIC MULTIPLE				C	25.0	G			5.6							A				
G1*04922CAL	30	04922A	04648A	03265A	07/18/958				SNOH	12/05/958	CAROTHERS M A						WELL							
1	2E2E2E2			DOMESTIC MULTIPLE				C	15.0	G			24.0									2	2	0
G1-00318C	30	12434			01/317972				SNOH	01/177973	MATTISON LAWERENCE						WELL							
1	NE4 NE4			DOMESTIC SINGLE				C	5.0	G			.5											
				STOCK WATERING				C	5.0	G			.5											
				IRRIGATION				C	20.0	G			4.0				2.0				04151001			
G1-23131C	35				06/01/978				SNOH	01/31/979	FREYLAND INC						WELL							
1	NW4NE4			DOMESTIC MULTIPLE				C	40.0	G			37.0							REM				
G1-24407C	35				11/07/983				SNOH	06/15/984	B						WELL							
1	NE4SW4			DOMESTIC MULTIPLE				C	45.0	G			4.5											
G1-24708C	35				09/24/985				SNOH	06/16/986	HARDING TOM						WELL							

CONTROL # / FOR PTS	SEC / R / P	OLD APPL / LOC. OF POD/POW (CHG C#)	OLD PERM / PURPOSE OF USE	OLD CERT / USE TYPE	DATE OF PRIORITY / INST QI	S C A T C M	CNTY / PERMIT DATE / ANNUAL QA	NAME / C R S M U U	SOURCE OF APPROPRIATION TRIBUTARY OF / IRR AC / C S M U	PRO-VISOS	TIME OF USE	R I	R A	R C
WATER RESOURCE INVENTORY AREA- 08														
TOWNSHIP - 27 RANGE - 05 E														
1	LOT 26 WELLINGTON HEIGHTS		DOMESTIC MULTIPLE	C	14.0 G		4.0							
G1-25096C	35		09/14/987		SNOH 11/15/988		HARDING TOM		WELL					
1	L-5/6 WELLINGTON HTS		DOMESTIC MULTIPLE	C	14.0 G		3.5							
TOWNSHIP - 27 RANGE - 06 E														
G1-25184P	19		02/10/988		SNOH 07/17/989		TITAN DEVELOPMENT		WELL					
1	NW4SE4NE4		DOMESTIC MULTIPLE	C	10.0 G		4.0			R	00000000			
TOWNSHIP - 28 RANGE - 04 E														
G1-25777A	21		08/03/990		SNOH / /		GOLF NORTHWEST INC		WELL					
1	SE4SE4		IRRIGATION	C	300.0 G				85.0					
TOWNSHIP - 28 RANGE - 05 E														
G1-20346C	28		11/06/972		SNOH 10/23/973		REDI-PAK		WELL					
1	E4 SW4 SW4		DOMESTIC MULTIPLE	C	50.0 G 2		10.0			R				
			COMMERCIAL/INDUSTRIAL	C	50.0 G 2		40.0			R				
G1-20443C	31		02/06/973		SNOH 01/25/974		ANDERSEN WALLACE		WELL					
1	S2 NW4 SW4		STOCK WATERING	C	25.0 G 2		1.0			R				
			IRRIGATION	C	25.0 G 2		20.0		10.0	R	04151001			
G1-21458C	31		04/10/974		SNOH 08/16/976		ALVESTAD R		WELL					
1	GL-4		DOMESTIC MULTIPLE	C	300.0 G		30.0			R				
G1-20819C	33		08/03/973		SNOH 08/16/976		WIBBELMAN LLOYD		WELL					
1	NW4 NW4		STOCK WATERING	C	310.0 G 2		1.0			R				
			IRRIGATION	C	310.0 G 2		60.0		30.0	R	IS			

TABLE 1

GROUND WATER QUALITY CRITERIA

CONTAMINANT	CRITERION	
I. PRIMARY AND SECONDARD CONTAMINANTS AND RADIONUCLIDES		
A. PRIMARY CONTAMINANTS		
Barium*	1.0	milligrams/liter (mg/l)
Cadmium*	0.01	mg/l
Chromium*	0.05	mg/l
Lead*	0.05	mg/l
Mercury*	0.002	mg/l
Selenium*	0.01	mg/l
Silver*	0.05	mg/l
Fluoride	4	mg/l
Nitrate (as N)	10	mg/l
Endrin	0.0002	mg/l
Methoxychlor	0.1	mg/l
1,1,1-Trichloroethane	0.20	mg/l
2-4 D	0.10	mg/l
2,4,5-TP Silvex	0.01	mg/l
Total Coliform Bacteria	1/100	ml
B. SECONDARY CONTAMINANTS		
Copper*	1.00	mg/l
Iron*	0.30	mg/l
Manganese*	0.05	mg/l
Zinc*	5.	mg/l
Chloride	250	mg/l
Sulfate	250	mg/l
Total Dissolved Solids	500	mg/l
Foaming Agents	0.5	mg/l
pH	6.5-8.5	
Corrosivity	non-corrosive	
Color	15 color units	
Odor	3 threshold odor units	
C. RADIONUCLIDES		
Gross Alpha Particle Activity	15	picoCuries/liter (pCi/l)
Gross Beta Particle Activity		
Gross Beta Activity	~~20~~ 50	pCi/l
Tritium	20,000	pCi/L
Strontium-90	8	pCi/l
Radium 226 & 228	5	pCi/l
Radium -226	3	pCi/l

* Metals are measured as total metals

CONTAMINANT	CRITERION
II. CARCINOGENS	
Acrylamide	0.02 micrograms/liter (ug/l)
Acrylonitrile	0.07 ug/l
Aldrin	0.005 ug/l
Aniline	14 ug/l
Aramite	3 ug/l
Arsenic*	0.05 (ug/l)
Azobenzene	0.7 ug/l
Benzene	1.0 ug/l
Benzidine	0.0004 ug/l
Benzo(a)pyrene	0.008 ug/l
Benzotrichloride	0.007 ug/l
Benzyl chloride	0.5 ug/l
Bis(chloroethyl)ether	0.07 ug/l
Bis(chloromethyl)ether	0.0004 ug/l
Bis(2-ethylhexyl) phthalate	6.0 ug/l
Bromodichloromethane	0.3 ug/l
Bromoform	5 ug/l
Carbazole	5 ug/l
Carbon tetrachloride	0.3 ug/l
Chlordane	0.06 ug/l
Chlorodibromomethane	0.5 ug/l
Chloroform	7.0 ug/l
4 Chloro-2-methyl aniline	0.1 ug/l
4 Chloro-2-methyl analine hydrochloride	0.2 ug/l
o-Chloronitrobenzene	3 ug/l
p-Chloronitrobenzene	5 ug/l
Chlorthalonil	30 ug/l
Diallate	1 ug/l
DDT (includes DDE and DDD)	0.3 ug/l
1,2 Dibromoethane	0.001 ug/l
1,4 Dichlorobenzene	4 ug/l
3,3' Dichlorobenzidine	0.2 ug/l
1,1 Dichloroethane	1.0 ug/l
1,2 Dichloroethane (ethylene chloride)	0.5 ug/l
1,2 Dichloropropane	0.6 ug/l
1,3 Dichloropropene	0.2 ug/l
Dichlorvos	0.3 ug/l
Dieldrin	0.005 ug/l
3,3' Dimethoxybenzidine	6 ug/l
3,3' Dimethylbenzidine	0.007
1,2 Dimethylhydrazine	60 ug/l
2,4 Dinitrotoluene	0.1 ug/l
2,6 Dinitrotoluene	0.1 ug/l
1,4 Dioxane	7 ug/l
1,2 Diphenylhydrazine	0.09 ug/l

CONTAMINANT	CRITERION
II. CARCINOGENS	
Direct Black 38	0.009 ug/l
Direct Blue 6	0.009 ug/l
Direct Brown 95	0.009 ug/l
Epichlorohydrin	8 ug/l
Ethyl acrylate	2 ug/l
Ethylene dibromide	0.001 ug/l
Ethylene thiourea	2 ug/l
Folpet	20 ug/l
Furazolidone	0.02 ug/l
Furium	0.002 ug/l
Furmecyclox	3 ug/l
Heptachlor	0.02 ug/l
Heptachlor Epoxide	0.009 ug/l
Hexachlorobenzene	0.05 ug/l
Hexachlorocyclohexane (alpha)	0.001 ug/l
Hexachlorocyclohexane (technical)	0.05 ug/l
Hexachlorodibenzo-p-dioxin, mix	0.00001 ug/l
Hydrazine/Hydrazine sulfate	0.03 ug/l
Lindane	0.06 ug/l
2 Methoxy-5-nitroaniline	2 ug/l
2 Methylaniline	0.2 ug/l
2 Methylaniline hydrochloride	0.5 ug/l
4,4' Methylene bis(N,N'-dimethyl) aniline	2 ug/l
Methylene chloride (dichloromethane)	5 ug/l
Mirex	0.05 ug/l
Nitrofurazone	0.06 ug/l
N-Nitrosodiethanolamine	0.03 ug/l
N-Nitrosodiethylamine	0.0005 ug/l
N-Nitrosodimethylamine	0.002 ug/l
N-Nitrosodiphenylamine	17 ug/l
N-Nitroso-di-n-propylamine	0.01 ug/l
N-Nitrosopyrrolidine	0.04 ug/l
N-Nitroso-di-n-butylamine	0.02 ug/l
N-Nitroso-N-methylethylamine	0.004 ug/l
PAH	0.01 ug/l
PBBs	0.01 ug/l
PCBs	0.01 ug/l
o-Phenylenediamine	0.005 ug/l
Propylene oxide	0.01 ug/l
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.0000006 ug/l
Tetrachloroethylene (perchloroethylene)	0.8 ug/l
para, alpha, alpha, alpha-Tetrachlorotoluene	0.004 ug/l
2,4 Toluenediamine	0.002 ug/l

CONTAMINANT	CRITERION
II. CARCINOGENS	
o-Toluidine	0.2 ug/l
Toxaphene	0.08 ug/l
Trichloroethylene	3 ug/l
2,4,6-Trichlorophenol	4 ug/l
Trimethyl phosphate	2 ug/l
Vinyl chloride	0.02 ug/l

SECTION 30: MC ALLISTER GEOLOGICALLY SENSITIVE AREA.

30.1 Creation of Geologically Sensitive Area. Pursuant to Chapter 70.05 RCW and Article IV, Section 15 in the Thurston County Sanitary Code, the area described in subsection 30.2 of this Section 30 constitutes a geologically sensitive area to be known as the McAllister Geologically Sensitive Area (McAllister GSA).

30.2 Area of McAllister GSA. The McAllister GSA comprises the territory shown on the parcel specific map entitled "McAllister Geologically Sensitive Area, August 13, 1990", with a notation referring to this Resolution in the custody of the Thurston County Public Health and Social Services Department.

30.3 Sewage Disposal Regulations. In addition to any other requirements imposed by this Code, the following requirements shall apply within the McAllister GSA:

(a) Any on-site sewage disposal system for which a permit to install, connect, repair, alter, extend or relocate is issued on or after August 15, 1990

(i) shall contain a pressure distribution system in accord with State Department of Health Technical Review Committee Guidelines;

(ii) shall have SSAS trenches or beds no deeper than thirty (30) inches below the surface of the ground;

(iii) shall have at least thirty-six (36) inches of separation between the bottom of any SSAS trenches or beds and the maximum seasonal groundwater elevation or any impermeable layer. The health officer may require greater vertical separation pursuant to Section 5.2.2. of this Article IV. However, notwithstanding the provisions of Section 5.2.2 the health officer may not reduce the thirty-six (36) inch vertical separation required by this Section.

(b) An operational permit is required for any on-site sewage disposal system for which a permit to install, connect, repair, alter, extend or relocate is issued on or after August 15, 1990, or which is part of a sale of property on or after August 15, 1990. The operational permit may be revoked when:

(i) the on-site system fails to meet the maintenance and operational conditional or requirements of the permit, or

(ii) the on-site system fails to meet any standard or requirement imposed by law. The operational permit shall be revoked when any dwelling unit or other premises where sewage originates is required to connect to connect to public sewer pursuant to subsection 30.3(c), below. Unless inconsistent with this section, all other provisions of Article IV, Section 10.6 of this Code shall apply to operational permits. (c) Whether or not an operational permit is required, any dwelling unit or other premises where sewage originates within two hundred (200) feet of a public sewer system shall be connected to the sewer system pursuant to Article IV, Sections 6.1 through 6.1.4 and 6.2 through 6.6.2 of this Code.

(d) Building site approvals may be issued for uses other than single or multi-family residential only if

(i) the designed sewage flow is no greater than 450 gallons per five acres per day, and

(ii) the waste entering on the on-site system is equivalent in quality to typical residential waste.

30.4 Agriculture.

(a) The Thurston County Cooperative Extension office is requested annually to review best management practices for the use of pesticides and fertilizers with the McAllister GSA. The procedures used in this review should be submitted to the Board of Health for approval by January 1, 1991.

(b) The health officer shall work with the North Thurston School District and any public or private agency owning or operating parks within the McAllister GSA to obtain better compliance with best management practices for pesticides and fertilizers.

30.5 Stormwater and Hazardous Materials.

(a) Pesticides shall not be used to maintain any County property in McAllister GSA.

(b) The health officer shall send letters to the director of the State Department of Transportation and to the governing officials of the Fort Lewis Military Reservation, Nisqually Indian Reservation and Puget Power requesting that chemical methods not be used to maintain any rights-of-way located within the McAllister GSA or over groundwater which the health officer deems is connected to the aquifer underlying the McAllister GSA.

(c) The health officer shall write a letter to the director of the State Department of Ecology requesting that applications for the use of aquatic pesticides in Lake St. Clair be granted only upon a finding by the health officer that the proposed use will not likely threaten groundwater.

(d) The health officer shall advise Burlington Northern Railroad and Amtrak of the vulnerable nature of groundwater in the McAllister GSA and request that each:

(i) cease discharging sewage and waste water along tracks within the McAllister GSA, and

(ii) cease using chemical methods to maintain rights-of-way with the GSA. The health officer shall also request Burlington Northern and Amtak to coordinate emergency management procedures with the County for spills and accidents within the McAllister GSA.

(e) By December 31, 1990, the health officer shall review existing and proposed requirements for stormwater management governing public or private developments. If the health officer deems such requirements insufficient to protect groundwater in the McAllister GSA, he shall propose stormwater management requirements which are sufficient to that end.

30.6 Education. The Office of Water Quality and Resource Management shall conduct a public education program in the McAllister GSA. The purpose of this program shall be to protect groundwater by instructing residents in proper lawn care and gardening practices, septic system maintenance, and handling and disposal of household hazardous waste.

APPENDIX E

APPENDIX F

ORDINANCE NO. 24083

AN ORDINANCE relating to zoning and groundwater protection and amending Title 13 of the Official Code of the City of Tacoma by adding thereto a new Chapter consisting of twenty sections, numbered 13.09.010 through 13.09.200, entitled "South Tacoma Groundwater Protection District," and amending Section 13.12.908 thereof.

BE IT ORDAINED BY THE CITY OF TACOMA:

Section 1. That Title 13 of the Official Code of the City of Tacoma is hereby amended by adding thereto a new Chapter consisting of twenty sections, numbered 13.09.010 through 13.09.200, entitled "South Tacoma Groundwater Protection District," reading as follows:

13.09.010 BACKGROUND, PURPOSE, AND INTENT. The South Tacoma groundwater aquifer system serves as a significant source of drinking water for the City of Tacoma. It supplies as much as forty percent of the City's total water demand during periods of peak summer usage. As future growth and development occur, this resource will become increasingly important.

It has been found and determined that a major cause of groundwater contamination in the South Tacoma aquifer system is from accidental or improper release of hazardous substances from spillage, leaks, or discharges. Due to the large number of potential sources of toxic and hazardous material within the area which recharges the aquifer system and the possibility of further contamination, the City of Tacoma finds that it is necessary and in the public interest to establish the South Tacoma Groundwater Protection District.

The South Tacoma Groundwater Protection District is an overlay land use control district specifically designed to prevent the degradation of groundwater in the South Tacoma aquifer system by controlling the use

City of Tacoma

and handling of hazardous substances. The overlay district imposes additional restrictions on development in order to protect public health and safety by preserving and maintaining the existing groundwater supply for current and potential users and to protect the City of Tacoma from costs which might be incurred if unsuitable development were to reduce either the quality or quantity of this important public water supply source.

The intent of this overlay district is to provide supplemental development regulations in the area so designated to permanently protect this supplemental source of Tacoma's water supply from additional long-term contamination originating from surface land use activities. Due to the exceptional vulnerability and sensitivity of the aquifer system resource to contamination, it is the intent and purpose of this chapter to safeguard groundwater resources in the aquifer system from hazardous substance pollution by controlling or abating pollution from existing commercial and industrial sources and by preventing future pollution from new or different land uses or activities.

It is further the intent of this chapter to establish orderly procedures which will ensure that newly constructed storage facilities for hazardous substances meet appropriate performance standards, and that existing storage facilities are properly maintained, inspected, and tested.

13.09.020 DECLARATION OF POLICY. In order that the City of Tacoma might maintain its groundwater resources within the South Tacoma Channel as near as reasonably possible to their natural condition of purity, it is the policy of the City of Tacoma to establish strict performance standards which will reduce or eliminate threats to this resource from improper storage, handling, and disposal of hazardous substances at

106

City of Tacoma

business locations and developments. Also, the City of Tacoma shall require use of all practical methods and procedures for protecting groundwater which do not discourage appropriate commercial and industrial uses from locating and conducting business within the South Tacoma channel area.

13.09.030 SCOPE AND APPLICABILITY

A. The mandates of this chapter shall apply to new, substantially modified, and existing developments and facilities as defined herein. When determined appropriate by the Health Department, an existing facility shall comply with the inspecting, monitoring, and testing requirements set forth in Section 13.09.100 of this chapter.

B. All property within the district defined herein shall be subject to the restrictions set forth herein, as well as the bulk, use, setback, and other controls of the zoning district in which it is presently located, and owners of property shall comply with the mandates of this chapter in addition to the zoning requirements of the district in which such property is presently or may later be located. In the event of conflict with the regulations of the underlying zoning district and the mandates of this chapter, the provisions of this chapter shall control.

13.09.040 DEFINITIONS. For the purpose of this chapter, certain words and terms are defined as follows:

A. Abandon: To discontinue use of an underground tank pursuant to agreed conditions of final or partial closure. Underground tanks can only be abandoned if they have been completely decontaminated and removed from the ground.

B. Aquifer: A saturated geologic formation which will yield a sufficient quantity of water to serve as a private or public water supply.

City of Tacoma

C. Contamination - The degradation of any component of the environment by a release of hazardous substance in sufficient quantity to impair its usefulness as a resource.

D. Closure: To cease a facility's operations related to hazardous substances by complying with the approved facility closure plan and all closure requirements.

E. Environment: The sum of all physical, biological, and chemical conditions inherent to any particular locality. These conditions directly influence all life, and include, but are not limited to, such parameters as soil, air, and water.

F. Facility: All structures, contiguous land, appurtenances, and other improvements on the land used for recycling, reusing, reclaiming, transferring, storing, treating, disposing, or otherwise handling a hazardous substance (HS) which is not specifically excluded by the exemptions contained in Section 13.09.080. Use of the term "facility" includes underground and aboveground tanks, and operations which handle, use, dispose of, or store hazardous substances.

G. Groundwater: All water found beneath the ground surface. The slowly-moving subsurface water present in aquifers and recharge areas.

H. Development: The construction, reconstruction, conversion, structural alteration, relocation, or enlargement of any building or structure; any use or change in use of any building or land; any extension of any use of land, or any clearing, grading, or other movement of land for which permission may be required pursuant to this chapter.

I. Hazardous Substance(s): Any material, either singularly or in combination, which may pose a present or potential hazard to human

208

City of Tacoma

health or to the quality of the drinking water supply in the South Tacoma aquifer system when improperly used, stored, transported, or disposed of or otherwise mismanaged, including without exception those materials identified as hazardous waste in 40 CFR 261 or defined as a hazardous substance in 40 CFR 302, WAC 173-303, Chapter 12.08 of the Official Code of the City of Tacoma, and those set forth in the General Guidance and Performance Standards hereinafter referred to. In addition, hazardous substances shall include petroleum products and by-products, including crude oil or any faction thereof such as gasoline, diesel, and waste oil which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute).

J. Health Department: Health Department shall mean the Tacoma-Pierce County Health Department.

K. High-Impact Use: A business establishment that is considered to be hazardous and/or noxious due to the probability and/or magnitude of its effects on the environment. For purposes of this chapter, these uses or establishments possess certain characteristics which pose a substantial or potential threat or risk to the quality of the ground and surface waters within the South Tacoma Groundwater Protection District. High-impact uses shall include but are not limited to the following:

1. Chemical manufacture and reprocessing.
2. Creosote/asphalt manufacture or treatment.
3. Electroplating activities.
4. Manufacture of Class 1A or 1B flammable liquids as defined in the Fire Code.
5. Petroleum and petroleum product refining, including repro-

City of Tacoma

cessing.

6. Wood product preserving.

7. Hazardous waste treatment, storage, and disposal facilities.

L. Impervious Surface: Natural or man-made material on the ground that does not allow surface water to penetrate into the soil. Impervious surfaces may consist of buildings, parking areas, driveways, roads, sidewalks, and any other areas of concrete, asphalt, plastic, etc.

M. Operator: Operator means any person in control of, or having responsibility for, the daily operation of a storage facility.

N. Permeable Surfaces: Sand, gravel, and other penetrable deposits on the ground which permit movement of groundwater through the pore spaces, or active or abandoned wells which permit the movement of fluid to the groundwater.

O. Person: Person means any individual, trust, joint stock company, corporation (including government corporation), partnership, association, consortium, joint venture, commercial entity, state, municipality, commission, political subdivision of a state, interstate body, the federal government, or any department or agency of the federal government.

P. Recharge Areas: Areas of permeable deposits exposed at the surface which transmit precipitation and surface water to the aquifer.

Q. Release: Any spilling, leaking, emitting, discharging, escaping, leaching or disposing of a hazardous substance from a facility or other regulated operation or activity into or onto soil, air, water, groundwater, or other natural or man-made structures or materials.

R. Release Detection: A method or methods of determining whether a release or discharge of a hazardous substance has occurred from

City of Tacoma

a regulated facility into the environment.

S. Retail Business Use: For purposes of this chapter, a retail business use is a use in which individually packaged products or quantities of hazardous substances are rented or sold at retail to the general public and are intended for personal or household consumption.

T. Solid Waste: All putrescible and non-putrescible solid and semi-solid waste, including garbage, rubbish, ashes, industrial waste, swill, demolition and construction waste, abandoned vehicles or parts thereof, and discarded commodities.

U. Substantial Modifications: The construction of any additions to an existing facility, or restoration, refurbishment, or renovation which:

1. Increases or decreases the in-place storage capacity of the facility;

2. Alters the physical configuration; or

3. Impairs or affects the physical integrity of the facility or its monitoring systems.

4. Alters or changes the designated use of the facility.

V. Underground Tank: Any one or a combination of tanks (including underground pipes connected thereto) which are used to contain or dispense an accumulation of hazardous substances, and the volume of which (including the volume of underground pipes connected thereto) is ten percent or more beneath the surface of the ground. Specific exclusions to this definition are contained in Section 13.09.080.

13.09.050 GENERAL PROVISIONS.

A. District Designated (Location). For the purposes of this

City of Tacoma

chapter and to carry out these regulations, the boundaries of the South Tacoma Groundwater Protection District are delineated on a map, as now or hereafter updated and supplemented, which is made part hereof by this reference, and a copy of which is on file in the Planning Department, the Public Utilities Department, and the Health Department. The physical boundaries of the South Tacoma Groundwater Protection District are more particularly described as follows:

> Beginning at the southwest corner of Section 25, Township 20 North, Range 2 East of the W.M.; thence north along the west line of said Section 25 and the west line of Section 24, Township 20 North, Range 2 East of the W.M. to the northwest corner of MANITO PARK ANNEX; thence west 230 feet more or less to a point 615.78 feet east of the west line of the John Rigney Donation Land Claim; thence north parallel to the west line of said John Rigney Donation Land Claim a distance of 336.6 feet more or less to a point 587.4 feet south of the north line of said John Rigney Donation Land Claim; thence west parallel to the north line of said John Rigney Donation Claim 525 feet more or less to the center line of Orchard Street West (Custer Road); thence northeasterly along the center line of Orchard Street West to the north line of the southeast quarter of Section 23, Township 20 North, Range 2 East of the W.M.; thence east along said north line of the southeast quarter of Section 23 to the northeast corner of the southeast quarter of said Section 23; thence north along the west line of Sections 24, 25 and 12, Township 20 North, Range 2 East of the W.M. to the north line of said Section 12; thence east along said north line of Section 12 and the north line of Sections 7 and 8, Township 20 North, Range 3 East of the W.M. to the center line of South 19th Street; thence easterly along said center line of South 19th Street to the center line of South Yakima Avenue; thence southerly along the center line of South Yakima Avenue to the center line of F.A.I. #5 Freeway; thence westerly and southerly along said center line of F.A.I. #5 Freeway to the south line of Section 30, Township 20 North, Range 3 East of the W.M.; thence west along said south line of Section 30 and the south line of Section 25, Township 20 North, Range 2 East of the W.M. to the point of beginning.

The area described above is hereby designated as the South Tacoma

City of Tacoma

Groundwater Protection District.

B. District Designated (Environmentally Sensitive Area). Pursuant to WAC 197-11-908 and Section 13.12.908 of this Title, the area described above is hereby designated as an environmentally (geohydrologically) sensitive area. The following SEPA categorical exemptions shall not apply within said area: Section 13.12.801(2)(3) of this Title and the following subsections of WAC 197-11-800: (2)(e)(g), (25)(h).

C. Development and Adoption of Technical Standards. The Health Department shall hereafter maintain a document entitled "General Guidance and Performance Standards for the South Tacoma Groundwater Protection District" (hereinafter referred to as the "General Guidance and Performance Standards"). These standards shall prescribe the minimum acceptable best management and design solutions which are consistent with the requirements of this chapter. This document, to the extent that it assists in meeting the purposes and intent of this chapter and the South Tacoma Plan, is incorporated herein as though fully set forth. Periodically, the Tacoma-Pierce County Board of Health and the City Council shall review these standards to assure that improvements in technology are considered and that the standards are consistent with this chapter.

D. Filing. Applications for permits as required in Section 13.09.070 shall be filed with the Health Department. Applications shall be on forms and shall contain information prescribed by the Health Department. At the time of filing such application, the applicant shall pay a fee in an amount sufficient to pay the costs of issuing permits and making inspections under this chapter. The Health Department shall present a fee schedule to the City Council for approval. Departments and divisions of

City of Tacoma

the City of Tacoma and other public agencies regularly receiving funds from the City's General Fund shall be exempt from payment of said fee.

13.09.060 PROHIBITED USES--DISCHARGES AND DISPOSAL.

A. The following "high-impact" uses of land shall hereafter be prohibited from locating within the boundaries of the South Tacoma Groundwater Protection District unless they comply with the provisions of Subsection E below:

1. Chemical manufacture and reprocessing.

2. Creosote/asphalt manufacture or treatment.

3. Electroplating activities.

4. Manufacture of Class 1A or 1B flammable liquids as defined in the Fire Code.

5. Petroleum and petroleum products refinery, including reprocessing.

6. Wood products preserving.

7. Hazardous waste storage, treatment, and disposal facilities.

B. The above uses should be periodically revised, updated, and amended, as appropriate, in order to take into account other potential high-impact uses or improvements in technology, pollution control, and management. The Land Use Administrator shall consult the Standard Industrial Classification (SIC) Manual for assistance in reviewing and making use interpretations pursuant to this subsection.

C. Permanent or temporary waste storage and disposal of hazardous substances on sites with permeable surfaces, including the disposal of solid waste other than brush and stumps, is prohibited, unless such discharge or disposal is specifically in accordance with a valid discharge

City of Tacoma

permit or is approved for discharge into the City's sewerage system pursuant to Chapter 12.08 of the Tacoma City Code.

D. Dry wells used to receive storm water from any street or paved parking area, provided, however, that if in the opinion of the Public Works Department no other reasonable alternative exists, then the Director of Public Works may approve such private disposal system subject to design by a licensed professional engineer.

E. A prohibited land use, except as described in Subsection C, above, may be considered for location within the South Tacoma Groundwater Protection District only upon conclusive demonstration that application of new or improved technology will result in no greater threat to the groundwater resource than that posed by a nonprohibited use. Procedures for location as a permitted use shall be consistent with those set forth in Section 13.06.460 of this Title.

13.09.070 PERMITS--CONSTRUCTION, MODIFICATION, OPERATION, CHANGE IN USE.

A. It is a violation of this chapter for any person to construct, install, substantially modify, or change the use of a facility as defined herein, or part thereof, without a valid permit or authorization issued by or acceptable to the Health Department. The Fire Department also specifically regulates and authorizes permits for underground storage tanks, pursuant to the Fire Code and this chapter. A permit issued for a facility may include appropriate conditions and limitations as may be deemed necessary to implement the requirements of this chapter.

B. It is a violation of this chapter for any person to use, cause to be used, maintain, fill, or cause to be filled any facility as

City of Tacoma

defined herein, or part thereof, with a hazardous substance without having registered the facility on forms provided by the Health Department and without having obtained a valid permit issued by the Health Department to operate such facility or part thereof.

C. No permit or authorization to operate a facility as required herein shall be issued by the Health Department or shall be satisfactory to the Health Department unless and until the prospective permittee, at a minimum:

1. Has provided a listing to the Health Department of all of the hazardous substances to be stored, used, or handled at the facility and

2. Has demonstrated that said facility complies with all the provisions of this chapter and the standards set forth in the General Guidance and Performance Standards.

D. It is a violation of this chapter for any person in possession of or acting pursuant to a permit or authorization issued hereunder to act, or to allow or cause another person to act, in any manner contrary to any provision of said permit.

13.09.080 EXEMPTIONS. The following facilities shall be exempt from all provisions of this chapter:

A. Farm or residential tanks of 1,100 gallons or less capacity used for storing motor fuel for non-commercial purposes.

B. Existing on-site tanks of 1,100 gallons or less capacity which store heating oil, motor diesel, or new (non-waste) lubricating oils subject to documentation that the tank meets the integrity standards contained

11h

City of Tacoma

in the General Guidance and Performance Standards and Underwriters Laboratories or other nationally recognized independent testing organization.

C. Gasoline or diesel tanks attached to private or commercial motor vehicles and used directly in the propulsion of that vehicle, including tank trucks in transit.

D. All petroleum tanks and/or other containers of 660 gallons or less capacity per tank, or 1,100 gallons total, which are privately stored and intended for personal use.

E. A pipeline facility (including gathering lines) regulated under: (1) the Natural Gas Pipeline Safety Act of 1968, or (2) the Hazardous Liquid Pipeline Safety Act of 1979; or which is an interstate pipeline facility regulated under state laws comparable to the provisions of law referred to in (1) and (2) above,

F. The City's municipal sewer system, in accordance with Chapter 12.08 of Tacoma City Ordinances.

G. Any sanitary landfill, when operated in compliance with WAC 173-304, RCRA and RCW 90.48.

H. The application of fertilizer, plant growth retardants, and pesticides in accordance with accepted agronomic practices.

I. A retail business use, as defined in Subsection 13.09.040, unless otherwise included as a regulated facility, with aboveground tanks, underground tanks, bulk storage, or incidental processing that involves the use of hazardous substances.

J. The term 'underground tank' as defined in Subsection 13.09.040.V shall not include any pipes connected to any tank which is described in Subparagraphs 1 through 5 of this subsection.

City of Tacoma

K. Any handling, storing, disposing, or generating of 220 pounds (100 kilograms) or less of a hazardous substance per month or batch, unless specifically ruled otherwise by the Health Department on a case by case basis.

L. Any small quantity of hazardous substance intended solely for personal use, unless specifically ruled otherwise by the Health Department on a case-by-case basis, in accordance with the General Guidance and Performance Standards.

13.09.090 FACILITIES WITH UNDERGROUND TANKS.

A. New Underground Tanks

1. All new underground storage facilities used or to be used for the underground storage of hazardous substances shall be designed and constructed so as to:

a. prevent releases due to corrosion or structural failure for the operational life of the tank;

b. be cathodically protected against corrosion, constructed of non-corrosive material, steel clad with a noncorrosive material, or designed in a manner to prevent the release or threatened release of any stored substance; and

c. use material in the construction or lining of the tank which is compatible with the substance to be stored.

2. Design, construction, installation, repair, monitoring, release detection, corrosion, and compatibility standards for new underground storage tanks, including piping, shall be in accordance with the requirements and standards set forth in the General Guidance and Performance Standards adopted pursuant to

218

City of Tacoma

this chapter, and the rules of the Environmental Protection Agency pursuant to 40 CFR 280, whichever is more stringent, including all applicable permit requirements of the Fire Department.

3. All new underground tanks must use release detection method(s) specified in the General Guidance and Performance Standards.

B. Existing Underground Tanks. All existing underground tanks must comply with the release detection requirements, including the compliance schedule, in the General Guidance and Performance Standards.

C. Facility Closures

1. No person shall abandon or close an underground tank, temporarily or otherwise, except as provided in this subsection and in compliance with the General Guidance and Performance Standards.

2. An underground tank which is temporarily taken out of service, but which the operator intends to return to use, shall continue to be subject to all the permit, corrosion protection, and release detection requirements of this chapter and those established pursuant to the General Guidance and Performance Standards.

3. No person shall close or abandon an underground storage tank unless the person undertakes all of the following actions:

a. Notifies the Health Department and other appropriate agencies at least 60 days in advance of any closing and obtains the proper authorization or permit.

b. Demonstrates to the Health Department that all residual amounts of the hazardous substance which were stored in the tank prior to its closure have been removed, properly disposed of, and neutralized.

City of Tacoma

c. Permanently removes the tank to minimize any threat to the public safety and health and the possibility of water intrusion into, or runoff from, the tank.

d. Demonstrates to the Health Department that there has been no significant soil contamination resulting from a release in the area surrounding the underground storage tank or facility.

13.09.100 INSPECTIONS AND TESTING.

A. Any owner or operator of existing underground tank(s) shall, upon request of any representative of the Health, Fire, or Public Utilities Department whose duties entail enforcing the provisions of this chapter, furnish information relating to such tanks, their associated equipment, their contents, conduct monitoring or testing, and permit such representative at all reasonable times to have access to and to copy all records relating to such tanks. For the purpose of implementing this subsection, representatives of the above referenced departments are hereby authorized:

1. To enter at reasonable times any establishment or other place where an underground tank is located.

2. To inspect and obtain samples from any person of any hazardous substances contained in such tank; and

3. To conduct monitoring or testing of the tanks, associated equipment, contents, or surrounding soils, air, surface water, or groundwater.

B. Each inspection shall be commenced and completed with reasonable promptness. If the departmental representative obtains any samples prior to leaving the premises, he or she shall give to the owner or

220

City of Tacoma

operator a receipt describing the sample obtained and, if requested, a portion of each sample equal in volume or weight to the portion retained. If any analysis is made of the samples, a copy of the results of the analysis shall be furnished promptly to the owner or operator.

C. In addition to, or instead of, the inspections specified in Subsection A. above, the Health Department may require the owner or operator of an underground tank to employ, periodically, special inspectors to conduct an audit or assessment of the underground tank to determine whether the facility complies with the design and construction standards of Subsection 13.09.090.A, whether the owner or operator has monitored and tested the tank as may have been required by his permit, and whether the tank is in a safe operating condition. The inspector shall prepare a special inspection report with recommendations concerning the safe storage of hazardous substances at the facility. The report shall contain recommendations consistent with the provisions of this chapter where appropriate. A copy of the report shall be filed with the Health Department at the same time the inspector submits the report to the owner or operator. Within thirty (30) days after receiving this report, the owner or operator shall file with the Health Department a plan to implement all recommendations contained in the report or shall demonstrate, to the satisfaction of the Health Department, why these recommendations should not be implemented.

13.09.110 RELEASE REPORTING, INVESTIGATION, CORRECTIVE ACTION

A. Release Reporting. All owners and operators of underground tanks must report within 24 hours to the Health Department any of the following conditions:

City of Tacoma

1. Test, sampling, or monitoring results from a release detection method specified under 13.09.090.A.1 which indicate a release may have occurred.

2. Unusual operating conditions, such as the erratic behavior of product-dispensing equipment, the sudden loss of product from the underground tank, an unexplained presence of water in the tank, or the physical presence of the regulated substance or an unusual level of vapors on the site that are of unknown origin.

3. Impacts in the surrounding area, such as evidence of regulated substances or resulting vapors in soils, basements, sewer and utility lines, and nearby surface water.

4. Other conditions as may be established by the Health Department and incorporated into the General Guidance and Performance Standards.

B. Release investigation and confirmation. Unless corrective action is initiated by the owner or operator under Subsection 13.09.110.C, or is otherwise directed by the Health Department, all suspected releases requiring reporting, as set forth above, must be immediately investigated by the owner or operator using an appropriate procedure as set forth by the Health Department in accordance with the General Guidance and Performance Standards. Such procedures may include, but shall not be limited to, the following:

1. A site-specific investigation of surrounding soils and groundwater.

2. An investigation of the secondary containment area, if applicable.

272

City of Tacoma

3. Testing of the tanks and piping for tightness or structural soundness. Confirmation of a release by one of these methods will require the owner and operator to comply with the requirements for corrective action as set forth below.

C. Corrective Action. All owners or operators of an underground storage facility containing hazardous substances shall, in response to a suspected or confirmed release, comply with the directives and requirements of the Health Department in accordance with the General Guidance and Performance Standards and 40 CFR 280.

D. The Health Department, in administering and enforcing this section, may, if appropriate, take into account types, classes, and ages of underground tanks. In making such distinctions, the Health Officer may take into consideration factors including, but not limited to: location of the tanks, soil conditions, use of the tanks, history of maintenance, age of the tanks, current industry-recommended practices, hydrogeology, water table, size of the tanks, quantity of hazardous substance periodically deposited in or dispensed from the facility, the technical capability of the owners and operators, the compatibility of the regulated substance, and the materials of which the tank is fabricated.

13.09.120 ABOVEGROUND TANKS.

A. New Aboveground Tanks

1. No new aboveground storage facility or part thereof shall be fabricated, constructed, installed, used, or maintained in any manner which may allow the release of a hazardous substance to the ground, groundwaters, or surface waters of South Tacoma within the boundaries of this district.

City of Tacoma

2. No new aboveground tank or part thereof shall be fabricated, constructed, installed, used, or maintained without having constructed around and under it an impervious containment area enclosing or underlying the tank or part thereof, conforming to the requirements set forth in the General Guidance and Performance Standards.

B. Existing Aboveground Tanks

1. It shall be a violation of this chapter to substantially modify or cause the substantial modification of any existing aboveground storage facility or part thereof without obtaining a permit or authorization from the Health Department and Fire Department and without complying with the provisions of this section and the General Guidance and Performance Standards.

2. Inspections, release detection, and corrective action requirements for aboveground tanks shall be substantially as set forth in Sections 13.09.100 and 13.09.110 of this chapter.

C. Facility Closures. No person shall abandon or close an aboveground tank, temporarily or otherwise, except as provided in this subsection and in compliance with the General Guidance and Performance Standards.

13.09.130 SPILL PREVENTION AND MANAGEMENT.

A. Owners and operators of facilities handling hazardous substances, including retail facilities, wholesale distributors, processors, manufacturers, and home occupations must adopt and comply with appropriate spill or leak prevention and management practices in accordance with the General Guidance and Performance Standards. Facilities will be evaluated

City of Tacoma

on an individual basis to determine what requirements are necessary to comply with an appropriate spill prevention and management procedure.

B. Spill Prevention Requirements. Owners and operators of facilities handling hazardous substances must prepare and follow a schedule for the following activities as set forth in the General Guidance and Performance Standards:

1. Inspection
2. Loading, unloading, and transfer areas
3. Employee or resident training
4. Record-keeping and inventory
5. Notification and labeling
6. Container storage, handling, and integrity
7. Drainage control
8. Bulk storage

C. Spill Management Requirements. Owners and operators of facilities handling hazardous substances must prepare and submit a written spill management plan which explains the procedures that will be followed in response to an unanticipated release. The spill management plan must contain facility characterization information, response equipment, and response procedures, all in accordance with the General Guidance and Performance Standards.

13.09.140 REPORTING AND RECORDKEEPING

A. Reporting. For purposes of reporting under Section 13.09.110, the owners and operators of a facility containing hazardous substances shall report:

City of Tacoma

1. All below-ground releases in any quantity.

2. All above-ground releases of petroleum to land in excess of 25 gallons, or less than 25 gallons if the owners and operators are unable to contain or clean up the release within 24 hours.

3. All above-ground releases which result in a sheen on the water.

4. All above-ground releases to land or surface waters of hazardous substances other than petroleum in excess of the reportable quantity established under 40 CFR 302 for the released substance (report immediately).

5. The owners and operators shall provide any additional information on corrective action as may be required by the Health Department and the Environmental Protection Agency pursuant to 40 CFR 280.

B. Record-keeping. An owner or operator of any underground or aboveground facility storing hazardous substances must maintain a written record of the following:

1. Release detection method. Records for a period of 5 years indicating how well the equipment manufacturer or installer's leak detection devices will perform. All monitoring or sampling results must be maintained for at least one year. Tank tightness test results must be kept until the facility is tested again.

2. Corrosion protection system. Reporting periods for corrosion protection systems must be for a minimum of one year or as proposed by the Environmental Protection Agency pursuant to 40 CFR 280.

276

City of Tacoma

3. Tank Repair. Records must be kept which show that the tank was properly repaired and passed ultrasonic and vacuum tests.

4. Facility Closure. Records showing what impact the facility has had on the surrounding area must be kept for one year in the case of a temporary closure and three years in the case of a permanent closure.

5. Any other record-keeping requirement that may be required by an owner or operator's permit or as established in the General Guidance and Performance Standards.

6. All records required by this subsection must be maintained:

a. On-site and be immediately available for inspection; or

b. At a readily available alternative site and be provided for inspection within twenty-four hours to the Health Department.

c. A report to the Health Department shall not be deemed compliance with any reporting requirements of any federal or state law.

D. Any records, reports, or information obtained from any persons under this chapter shall be made available to the public, except that upon a showing satisfactory to the Health Department by any person that records, reports, or information, or a particular part thereof, to which the Health Department has access under this section if made public, would divulge information entitled to protection under Section 1905 of Title 18 of the United States Code, or any applicable state law such information or particular portion thereof shall be considered and kept confidential, except for the use and purpose of the Health Department or other agency or department in the enforcement of this chapter. In submitting data under this subsection, a person required to provide such data may:

227

City of Tacoma

1. Designate the data which such person believes is entitled to protection under this subsection, and

2. Submit such designated data separately from other data submitted under this subsection.

A designation under this subsection shall be made in writing and in such manner as the Health Department may prescribe.

13.09.150 WAIVERS. Any person may apply to the Health Department for a waiver of any requirement imposed by this chapter or any regulation, standard, or ruling generated hereunder; provided that the waiver request does not conflict with any other local, state, or federal requirement. In determining whether a waiver is appropriate, the Health Department shall require an applicant to demonstrate by clear and convincing evidence that, because of special circumstances not generally applicable to other property or facilities, including size, shape, design, topography, location, or surroundings, the strict application of the standards of this chapter would be unnecessary to adequately protect the soil and groundwaters of South Tacoma from an unauthorized release, or that strict application would create practical difficulties not generally applicable to other facilities or property, and that the proposed alternative method or process will still adequately protect the soil and groundwaters of South Tacoma. This subsection is not intended to waive any applicable requirements of the Fire Codes.

13.09.160 EXCAVATION OPERATIONS. Excavation operations within the boundaries of this district shall be subject to the permit requirements and standards contained in Section 13.06.406 or 2.02.390 of the City Code as considered appropriate.

City of Tacoma

13.09.170 ENFORCEMENT. It shall be the duty of the Director of Health to enforce and administer the provisions of this chapter, except those that shall be the responsibility of the Tacoma Fire Department. It shall be the duty of the Land Use Administrator of the City of Tacoma to enforce the specific provisions of Section 13.09.060 of this chapter.

13.09.180 APPEALS. Procedures for appeals to the Hearings Examiner or Board of Health from any ruling or decision of the Health Department shall be taken in accordance with Sections 5.02.160 and 5.02.180 of the Official Code of the City of Tacoma.

13.09.190 SEVERABILITY. In the event that any section, paragraph, or part of this chapter is for any reason declared invalid or held unconstitutional by any court of last resort, every other section, paragraph, or part shall continue in full force and effect.

13.09.200 VIOLATIONS - PENALTIES. Any person, firm, or corporation who violates, disobeys, omits, neglects, or refuses to comply with, or who resists the enforcement of any of the provisions of, this chapter shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine in any sum not exceeding five thousand dollars, or by imprisonment in the Pierce County Jail for a term not exceeding one year, or by both such fine and imprisonment. Each day that such person violates any of the provisions of this chapter or refuses or neglects to obey any of the rules or regulations issued by the Health Department shall constitute a separate offense and be punished as such. Other violations or penalties of law may be available pursuant to various federal and state statutes.

Section 2. That Section 13.12.908 of the Official Code of the

City of Tacoma

City of Tacoma is hereby amended to read as follows:

13.12.908 ENVIRONMENTALLY SENSITIVE AREAS. The City may, at its option, designate areas within its jurisdiction which are environmentally sensitive areas pursuant to WAC 197-11-908.

The South Tacoma Groundwater Protection District, as described in Chapter 13.09 of this title, is hereby designated an environmentally sensitive area, subject to the requirements set forth in Section 13.09.050.B.

Passed MAY 1 0 1988

Mayor

Attest: City Clerk

K/jec

#5262r

190