

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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

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

PRIORITY DATE April 18, 2006	APPLICATION NUMBER G1-28425	PERMIT NUMBER	CERTIFICATE NUMBER
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NAME City of Mercer Island			
ADDRESS (STREET) 9611 SE 36th Street	(CITY) Mercer Island	(STATE) WA	(ZIP CODE) 98040

**PUBLIC WATERS TO BE APPROPRIATED**

SOURCE Wells (2)
TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 400	MAXIMUM ACRE FEET PER YEAR 66.3
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QUANTITY, TYPE OF USE, PERIOD OF USE  
Emergency Municipal Supply, for Standby-Reserve use during declared emergencies when other sources are not available due to catastrophic infrastructure failure.

**LOCATION OF DIVERSION/WITHDRAWAL**

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL

One well located within the SE1/4 of the NW1/4 of Section 18, T24N, R05E, and  
A second well within Section 19 or 30, T24N, R05E or Section 25, T24N, R04E.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
North Well - SE1/4 NW1/4	18	24	5 E	8	King
South Well	19 or 30	24	5 E	8	King
	or 25	24	4 E	8	King

**RECORDED PLATTED PROPERTY**

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
North Well - Lot 9	5	Lucas Heights Addition
South Well - To be Determined		

**LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED**

The place of use is the service area of the City of Mercer Island<sup>1</sup>.

1: Distribution is limited to well sites only.

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**DESCRIPTION OF PROPOSED WORKS**

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As of the time of writing of this report a 12-inch (to 402 feet) and 8-inch diameter (to 570 feet) steel cased well has been completed located in the SE1/4 of the NW1/4 of Section 18, T24N, R05E near the southwest corner of Rotary Park.

Additional well characteristics are as follows:

Well Driller: Bob Carper (Hokkaido Drilling, Inc.)  
Completion Date: 04/26/2007  
Screened Interval: 505 to 540 feet below top of casing  
Land Elevation: 350 feet (estimate)  
Static Water Level: 371 feet below top of well casing, 04/27/2007  
Unique Well ID: AFT335

A second well of similar construction is planned, but is not expected to be completed within the next two years. This well is expected to be drilled within Section 19 or 30, T24N, R05E or Section 25, T24N, R04E. The City of Mercer Island has indicated that the most likely site will be at Island Crest Park or Islander Middle School.

Throughout the remainder of this report the two well sites are referred to as the North Well (Rotary Park site) and the South Well. Both wells are to be operated as emergency water sources and will not be connected to City of Mercer Island delivery infrastructure.

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**DEVELOPMENT SCHEDULE**

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BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Begun	July 1, 2015	When Required

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**REPORT**

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**BACKGROUND**

Ground Water Application #: G1-28425  
Applicant Name: The City of Mercer Island  
Priority Date: April 18, 2006  
Source: Wells (2)  
Purpose of Use: Emergency Municipal Supply  
Period of Use: Standby-Reserve use during declared emergencies when other sources are not available due to catastrophic infrastructure failure  
Notice of Publication: Mercer Island Reporter; May 3, 2006 and May 10, 2006  
Protests: None received during the statutory 30-day protest period  
SEPA: Exempt

On April 18, 2006, ground water application G1-28425, submitted by the City of Mercer Island, was accepted by the Department of Ecology. The application was published on May 3, 2006, and May 10, 2006, for emergency municipal supply at 400 gpm. No protests were received.

The City of Mercer Island serves the community with wholesale water purchased from Seattle Public Utilities (SPU). The present application is intended solely as an interim source of supply in the event that a catastrophic event, such as an earthquake, causes a rupture or other interruption of the SPU pipeline.

The Washington Department of Health (DOH) identifies the City of Mercer Island as public water system ID 53640. The three approved sources are interties with Seattle Public Utilities (SPU Stations 67, 68 & 171). All three SPU interties are connected to Mercer Island from Bellevue via a 16-inch pipeline suspended beneath the I-90 bridge, and a 20-inch pipeline beneath the east channel of Lake Washington.

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**INVESTIGATION**

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In considering this application, the investigation included, but was not limited to, research and/or review of:

- The State Water Code
- Records of water rights in the vicinity
- Notes from site visit on June 24, 2009
- Topographic and local area maps
- Records and Reports submitted by the applicant:
  - Clothier, Bert G., and Willis, Max T. (2007)  
City of Mercer Island Construction and Testing of Emergency Water Supply Test Well 1; Robinson, Noble, Saltbush, Inc.
  - Mortimer, Tom Jr. (2005)  
City of Mercer Island Emergency Water Supply Feasibility Analysis Phase I; Tom Mortimer, Attorney at Law, Robinson, Noble & Saltbush, Inc., Roth Hill Engineering partners, LLC.
- Other reports and sources of information pertinent to the project:
  - Troost, Kathy G., and Wisher, Aaron P. (Troost and Wisher, 2006a)

Geologic Map of Mercer Island, Washington; GeoMap NW  
Troost, Kathy G., and Wisner, Aaron, P. (Troost and Wisner, 2006b)  
Geologic Mapping of Mercer Island (PowerPoint presentation); GeoMapNW  
King County (KCGIS, 2009)  
Geographic Information System data for well locations and land parcels on Mercer Island, Washington;  
King County GIS.  
King County Assessor's Office (KCAO, 2009)  
Internet accessible property records ([http://www5.kingcounty.gov/kcgisreports/property\\_report.aspx](http://www5.kingcounty.gov/kcgisreports/property_report.aspx))  
Department of Ecology (Ecology, 2009a)  
Water Right Tracking System (WRTS) database entries for Mercer Island, Washington.  
Department of Ecology (Ecology, 2009b)  
Well Log Database for wells drilled on Mercer Island, Washington.

**State Water Code**

Chapters 90.03 and 90.44 RCW authorize the appropriation of public water for beneficial use and describe the process for obtaining water rights. Statutes specifically governing the water right permitting process are RCW 90.03.250 through 90.03.340 and RCW 90.44.060.

**Existing Water Rights Issued to the City of Mercer Island**

The Department of Ecology Water Right Application Tracking System (WRTS) database reports that The City of Mercer Island is listed as controlling a surface water right claim transferred in 2007 from King County Water District #1 (Yarrow Point), and filed twelve claims to vested water rights in 1974 (Table 1).

**Table 1. Water Rights Held by the City of Mercer Island**

<i>Water Right<sup>1</sup></i>	<i>Priority Date</i>	<i>Purpose</i>	<i>Qi</i>	<i>Qa (afy)</i>	<i>Twp</i>	<i>Rng</i>	<i>Sec</i>	<i>Qtr Qtr</i>
S1-146491CL	Jan-56	Sewers	5	7	24	4	1	NE/SE
S1-146492CL	Jan-56	Sewers	25	40.4	24	4	2	SE/SE
S1-146493CL	May-66	Sewers	9	14	24	5	7	NW/NW
S1-146494CL	Jan-66	Sewers	6	9	24	5	17	NW/NW
S1-146495CL	Apr-66	Sewers	18	29	24	4	13	NE/NW
S1-146496CL	Apr-66	Sewers	9	14	24	4	13	SW/NE
S1-146497CL	Apr-66	Sewers	35	56	24	4	13	SE/SE
S1-146498CL	Apr-66	Sewers	152	245	24	4	24	NW/SE
S1-146499CL	Apr-66	Sewers	60	97	24	4	25	SE/SW
S1-146500CL	Jan-66	Sewers	37	60	24	5	19	SE/SE
S1-146501CL	Jan-66	Sewers	25	13.5	24	5	17	W/NW
G1-158489AH	1888	Irrigation	40	4.5	24	5	6	SE
"	"	"	"	"	24	5	20	SW/SE
"	"	"	"	"	24	4	24	NW/SE

<sup>1</sup>CL = Claim to vested Water Right

Surface Water Right record S1-158489AH represents the transfer of a portion of the vested water right originally held by King County Water District #1 (Yarrow Point) that was approved by Ecology on June 7, 2007 for the irrigation of park space at three locations on Mercer Island. Three separate points of diversion from Lake Washington are approved through the transfer. The extent and validity of the original claim was tentatively determined by Andrew B. Dunn, LHG in a report dated June 1, 2006.

All twelve of the City's remaining claims are for direct diversion of water from Lake Washington. The year of first use for these claims is recorded as 1956 and 1966. Use is claimed for the flushing of septic sewer lines that follow the shoreline of the island. The total diversion recorded for all twelve claims is 421 gpm (0.94 cfs) and 589.4 afy.

The dates of sewer flushing first use are not eligible to be considered vested usage as recorded. Under RCW 90.03 the date of first use of a surface water claim must precede the enactment of the surface water code in 1917 to be considered vested. It is however beyond the scope of this report and Ecology authority to determine the validity of claims to vested water rights. This authority is reserved to the county superior courts through the water rights adjudication process (RCW 90.03.110). It should be noted, however, that the adjudication court relies upon an Ecology investigation of the facts for its determination.

**Existing Water Rights in the area of the Proposed Wells**

The WRTS database (Ecology, 2009a) was queried to determine the number of existing water rights within an area of approximately 1/2 mile radius of the North Well and an approximate 1 mile radius of the proposed locations of the South Mercer Island Well.

No water right certificates or recent changes were found to be located within a 1/2 mile radius of the North Well. Three claims to vested rights were found to correspond to properties within a 1/2 mile radius of the North Well. All three lots are currently served by the City of Mercer Island and if the wells are still in use, they would likely be used only for irrigation.

A review of well logs for the areas surrounding both the North and South Well sites (Ecology, 2009b) indicates that few wells are completed deeper than approximately 100 feet. This indicates that the wells are completed in either a perched aquifer hosted in recessional outwash (Qvr), post glacial alluvium (Qal), or in the Vashon Advance Outwash (Qva).

Two wells completed at depths of 182 feet and 162 feet were drilled in the mid 1980's on a property located approximately one mile north of the North Well (near I-90). This location appears to conform with a groundwater permit issued to Myer Coval (G1-26862P). The well logs and WRTS entries indicate that the wells are intended to provide irrigation to property owner. The King

County Assessor's office reports that the property is 5.07 acre lot (3051 84th Ave SE) which is connected to the City of Mercer Island for potable water supplies.

A single groundwater right (Certificate 1517) was found whose well is located approximately 3,500 feet east northeast of the North Well. This well is the sole source in DOH records for the Shoreridge Water Cooperative (DOH System ID # 78700). The Shoreridge well is completed at a depth of 50 feet and operates at 25 gpm. It serves 8 homes with a population of 20.

Three groundwater right certificates were found for the areas surrounding the two sites for the South Well. Groundwater Certificate 2380 was issued to Mercer Island School District #400 in 1953 for the current site of Lakeridge Elementary School (immediately south of Islander Middle School). This right was issued for domestic uses (25 gpm, 40 afy) during school hours and no mention is found in the file that it was issued for irrigation. The King County Assessor's database indicates the school is now served by the City of Mercer Island, so it is likely that this right is no longer in use.

Certificate G1-24735C was issued to the Mercer Island Homeowners Association for 35 gpm and 32 afy based on a 1985 application for water to fill lakes in a development adjacent and west of Islander Middle School, one of the two proposed sites for the South Well. The right is issued for beautification purposes and the well is completed at a depth of 280 feet within what appears from the well log to be the lower portion of the Qva aquifer.

The third certificated water right found in the South Well area is groundwater right G1-21929C issued for 20 gpm and 2 afy. This right was issued for single domestic use, pool filling, and irrigation. The well is recorded as being 161 deep, which indicates it is completed within the Qva aquifer.

A 1/2 mile radius about the North Well encompasses the locations of six wells within the King County well database. Two of these wells are deeper than 100 feet and both appear to be completed in the lower portion of the Qva aquifer.

File #	Name	Purpose	TRS
<b>North Well Area</b>			
G1-039179CL	KEARNS, IVAN F.	DG	24.0N 04.0E 13
G1-051066CL	BRUCE, IVAN M.	IR,DG	24.0N 04.0E 13
G1-149378CL	RUDOLPH, WM JR	DG	24.0N 04.0E 13
G1-155753CL	LEE, JOSEPH A	DG	24.0N 04.0E 13
G1-070877CL	REES, DONALD E.	DG	24.0N 05.0E 18
G1-122168CL	SMITH, ERNEST A	IR	24.0N 05.0E 18
G1-134284CL	BRUNER, BRUCE A	NR	24.0N 05.0E 18
<b>South Well Area</b>			
G1-032892CL	FERGUSON, WM. H.	IR,DG	24.0N 04.0E 24
G1-157772CL	GULLIFORD, DON M	IR,DG	24.0N 04.0E 24
G1-002718CL	HEAD, EDWARD D.	IR,DG	24.0N 04.0E 25
G1-026711CL	SOUTHGATE, PETER A. E.	DG	24.0N 04.0E 25
G1-043037CL	SHORELINE WATER USERS	IR,DG	24.0N 04.0E 25
G1-071223CL	SWAN, FORREST E.	DG	24.0N 04.0E 25
G1-111878CL	BORTLES, IRA	DG	24.0N 04.0E 25
G1-113718CL	TREIGER, IRWIN L	DG	24.0N 04.0E 25
G1-118695CL	WILLIAMS, DONALD V	DG	24.0N 04.0E 25
G1-010267CL	LUNDSTROM, ROY L.	DG	24.0N 05.0E 19
G1-013477CL	DEHN, W. W.	DG	24.0N 05.0E 19
G1-108451CL	RICHARDSON, THOMAS M	DG	24.0N 05.0E 19
G1-144033CL	CLARKE, JOHN K	IR,DG	24.0N 05.0E 30
G1-155334CL	HOVELAND, MRS THORLIEF C	DG	24.0N 05.0E 30
G1-077507CL	CRESSMAN, PAUL R.	DG	24.0N 04.0E 24
G1-078267CL	EASTERBROOK, SARAH L.	DG	24.0N 04.0E 24
G1-135072CL	BARNES, MARTHA D	IR,DG	24.0N 04.0E 24
G1-137134CL	STRIKER, GARY E	DG	24.0N 04.0E 24
G1-142802CL	BERGSTROM, LOUISE F	IR	24.0N 04.0E 24
G1-143401CL	LAHR, WILLIAM J	IR,DG	24.0N 04.0E 24
G1-040992CL	STANISLA, W I. R.	DG	24.0N 04.0E 25
G1-052191CL	KUNDAHL, BILLIE M.	DG	24.0N 04.0E 25
G1-112715CL	ENGEL, KLAUS H C	DG	24.0N 04.0E 25
G1-150111CL	OLSON, SWEN M	IR,DG	24.0N 04.0E 25
G1-061683CL	LARSEN, DOROTHY R.	DG	24.0N 05.0E 19
G1-091431CL	KLOVER, KARL	DG	24.0N 05.0E 19
G1-136240CL	PAUL IR, VING C JR	ST,IR	24.0N 05.0E 19
G1-138336CL	WOOD, AMOS L	DG	24.0N 05.0E 19
G1-145374CL	BRITT, LEO S	IR,DG	24.0N 05.0E 19
G1-057092CL	STRAUSS, HENRY P.	DG	24.0N 05.0E 30
G1-111176CL	NORTH STAR LODGE #2IOGT	DG	24.0N 05.0E 30
G1-122920CL	NICHOLS, CLAYTON F	IR	24.0N 05.0E 30

There are 17 wells within a 1/2 mile radius of the two proposed sites for the South Well contained in the King County well database. One of these is completed below the Qva aquifer at a depth (561 feet) that might result in interference of impairment if

the South Well is drilled at the Islander Middle School site. This well, which does not appear to coincide with Ecology water right locations, is classified as being unused in the King County well database.

Water rights records (Ecology, 2009a) show there are seven claims to vested groundwater rights within approximately a 1 mile radius of the North Well site and 32 claims in the vicinity of the two proposed South Well sites (Table 2). A review of the records for these indicates that all are claimed for single home domestic supplies (DG) and/or irrigation (IR), or in one case for a not reported purpose (NR). Two of the claims appear to serve community needs (G1-111176CL, G1-043037CL) but the quantities claimed or the type of claim do not indicate significant water use.

None of the claims appear to be served through deep wells and many were claimed to serve cottages at a time (early 1960's) when much of Mercer Island was a seasonal recreational community rather than a suburban residential one.

### Purpose of Use

Ground water from Mercer Island is requested for municipal supply to be used during declared emergencies, when a catastrophic event has interrupted its existing water supply sources. The City of Mercer Island's existing sources are supplied by a pipeline connected across Mercer Slough (I-90) to SPU's wholesale distribution system.

### Site visit

The site of the North Well was visited by the author on June 24, 2009. Ecology well tag ATF 335 is secured by a metal band to the capped and locked top of the well casing (Figure 1). The well is situated approximately 50 feet east of 86th Ave. SE and a similar distance southwest of the City of Mercer Island Water Storage tank.

The general locations of two potential sites for the South Well were examined as part of the field visit. Both the Island Crest Park and Islander Middle School sites are located along the central spine of the island, with the Island Crest site at a higher elevation and located closer to main roads.

As part of the field visit the writer examined the water delivery infrastructure that links Mercer Island to the SPU Cedar and Tolt surface water sources (Figure 2). On the east side of Mercer Slough two lines were found; a 30-inch pipe that travels beneath Mercer Slough and a 16-inch that is suspended beneath the west bound lane of I-5.

A single 16-inch pipe was seen to be suspended beneath the west bound lane of I-90 between Enatai Beach Park in Bellevue and the east shore of Mercer Island. The 30-inch line was not seen where it again is submerged under water between Enatai Beach Park and Mercer Island.

City of Mercer Island officials inform Ecology that the 30" pipeline was constructed as the primary delivery line for the city's water system. The 16" pipeline was later installed and used as the secondary delivery line. In recent years, however, the 16" pipeline has been used by the City as its primary supply line, while the 30" pipeline is now used as the secondary pipeline.



Figure 1: City of Mercer Island North Well with inset showing well tag AFT 335.

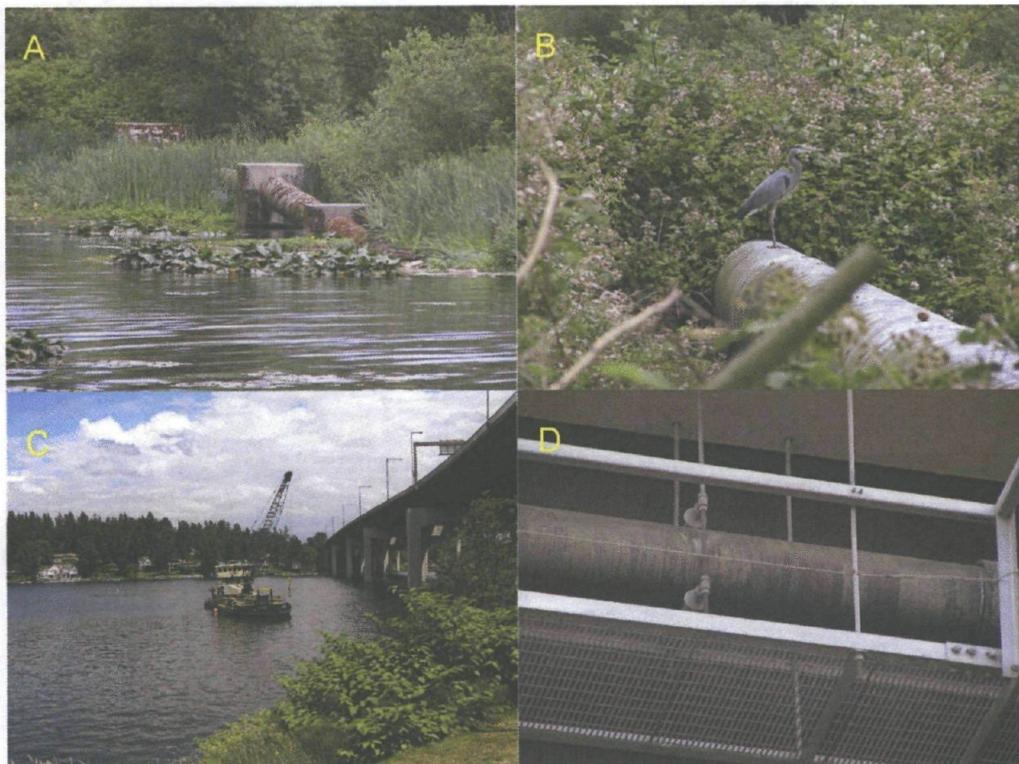


Figure 2: Photos of the SPU 30-inch pipeline crossing Mercer Slough (A & B) and of the 16-inch pipeline that hangs beneath the I-90 bridge between Bellevue and Mercer Island (C & D).

### Mercer Island Hydrogeology

Two geological features dominate the geological and hydrogeological conditions present on Mercer Island. The first of these is the Seattle Fault Zone (Figure 3) – a roughly east-west trending series of nested thrust faults that runs from the Kitsap Peninsula at its west end to the Cascade Mountains near North Bend. Interstate Route 90 (I-90) follows the trace of the north edge Seattle Fault Zone from the City of Seattle, through the north end of Mercer Island, and on to North Bend (Troost and Wisler, 2006b). The south edge of the Seattle Fault Zone lies to the south of Mercer Island.



Figure 3: Approximate boundaries of the Seattle Fault Zone (Troost and Wisler, 2006b).

The other geological feature is the presence of thick accumulations of ice age sediments that underlie the surface of Mercer Island. It is this feature which provides a host for groundwater.

The stratigraphy of the ice age sediments is typical of the Puget Sound Lowland region (Figure 4). The youngest of these, the Vashon Recessional Outwash (Qvr), are stream sediments related to the melting of the last ice sheet approximately 12,000 year ago. Time equivalent sediments of Qvr are ice contact and periglacial lake sediments (Qvrl). Underlying Qvr are densely compacted, poorly sorted mix of clay, sand and gravel of the Vashon Till (Qvt), which formed at the base of the overriding

glacier. Beneath the till is the Vashon Advance Outwash (Qva), a productive aquifer hosting sequence of sand and gravels laid down by streams draining the advancing glacier. The Qva overlies clay and silt (Qvlc) deposited in a periglacial lake that was located south of the advancing glacier. Several similar sequences are known to occur deeper in the sequence and which represent earlier glacial advances and retreats that occurred during the ice ages.

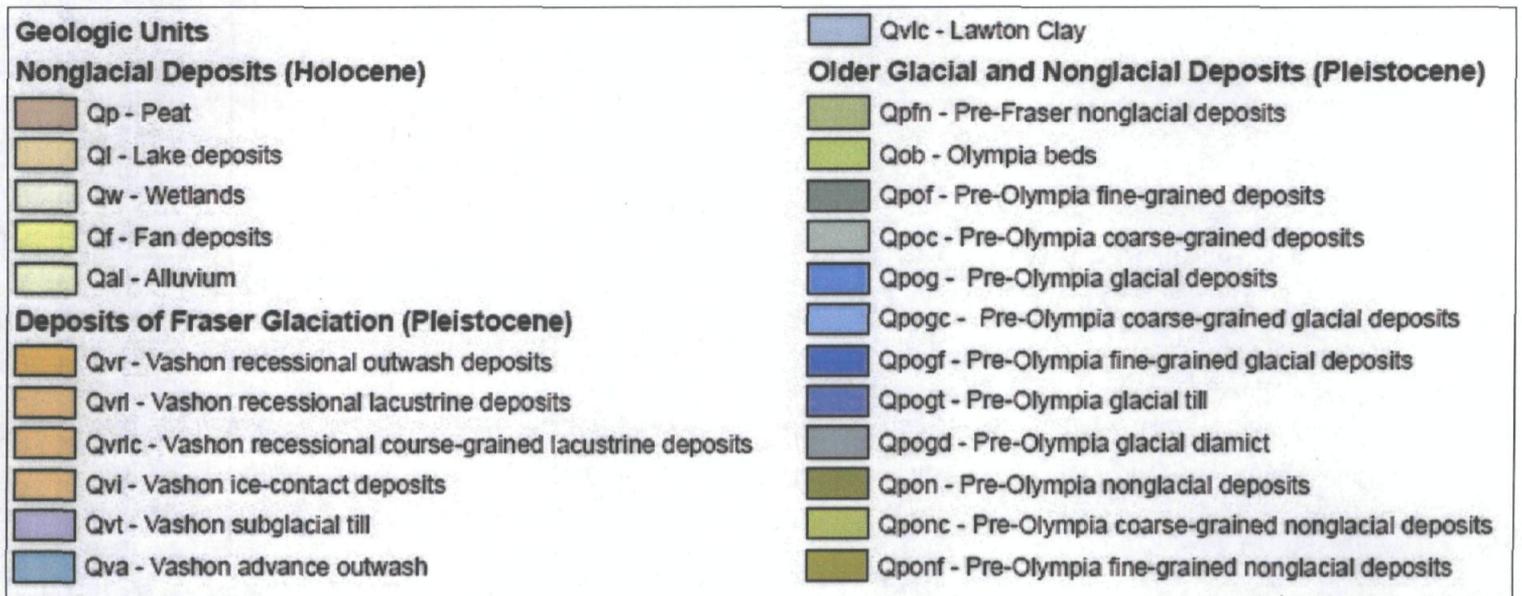


Figure 4: Surficial geologic units of Mercer Island (from Troost & Wisher, 2006a).

The glacial sequences are typically separated by fluvial and lacustrine sediments deposited during interglacial eras. The most recent interglacial sequence, which underlies the Vashon Drift, is recognized in the Central Puget Sound Region as the Olympia Beds (Qob) and is characterized by iron oxide staining with varying amounts of peat and wood. While the Qob likely exists at depth elsewhere under Mercer Island, it is seen at the surface on the west side of the island.

Pre-Olympia aged deposits include fine grained (Qpof) and coarse grained (Qpoc) sediments of presumably interglacial origin, and coarse grained (Qpogc) and fine grained (Qpogf) glacial material and tills (Qpogt/Qpogd). The oldest material exposed at surface coarse grained (Qponc) and fine grained (Qponf) non-glacial sediments.

The descriptions of cuttings from well log supplied by the City of Mercer Island for the North Well suggests that the well is completed in either fluvial or glaciofluvial sand interbedded with clay and silt. Given the 570 foot completion depth of the North Well, it is not likely that the materials encountered at that depth are the same as those mapped at the surface by Troost and Wisher (2006a). Elsewhere in the Central Puget Sound area similar materials, with varying thicknesses of glacial and non-glacial sediments, are encountered to depths of over 1,000 feet without encountering bedrock. It is likely that the bedrock under Mercer Island is not so deep given that the Seattle Fault Zone (related to uplift) underlies the island.

Surface mapping (Troost and Wisher, 2006a) and well logs indicate that the deep aquifer encountered at the north Well is confined and thus hydraulically separated from surface water features on Mercer Island.

#### Aquifer Test Results

Aquifer testing of the North Well was conducted under the supervision of Robinson Noble Saltbush, Inc. (RNS) hydrogeologist Burt Clothier (WA Lic#140). The testing included a step test with short term rates of up to 343 gpm and a 24-hour test at a constant rate of 302 gpm. Draw down for the constant rate test was 14.9 feet after 24 hours.

Specific capacity is estimated to be 20.3 gpm per foot of drawdown. Transmissivity within the immediate vicinity of the well is calculated at 145,000 gpd/ft and 45,000 gpd/ft at a distance from the well. RNS recommended that the well be operated at a rate of 300 gpm.

#### FINDINGS

In accordance with state law, the following considerations must be addressed prior to the issuance of a permit:

- Water Availability
- Impairment to Existing Rights
- Beneficial Use of Water
- Detrimental to Public Interest

#### Water Availability & Annual Allocation

Mercer Island is located within Lake Washington sub basin of the Cedar-Sammamish Watershed (WRIA 8). The Lake Washington drainage, including all tributary streams was closed in 1978 to new allocations under WAC 173-508. Water for any new water rights is therefore not available unless an allocation is non-consumptive or is exempt from the closure under WAC 173-508-080. The proposed purpose here, namely to construct an emergency groundwater source for municipal water supply, a consumptive purpose, is not exempt from the closure to future appropriations imposed by WAC 173-508, nor by any of exemptions or provisions of WAC 173-500.

The temporary use of these wells for required periodical testing can be accomplished in a nonconsumptive manner by disposing of water pumped through the storm water drainage system. This insures that pumped quantities are not removed from the Lake Washington basin.

Groundwater allocations may be approved under WAC 173-508 only in cases where groundwater withdrawals will not derive all or part of their quantities from the closed surface water bodies (with any partial quantities derived from surface water fully mitigated). That is not the case here, as it is likely that all or nearly all of the withdrawals from the aquifers underlying Mercer Island contribute to Lake Washington lake levels and flows to Chittenden Locks, the lower point at which the drainage basin is closed.

The timing of pumping induced hydrogeological and hydrological impacts within Lake Washington, while possibly important to the issues of impairment or the public interest, is not relevant to the analysis of availability.

The proposal calls for an allocation of 400 gpm and 66.3 afy, a quantity capable of supplying Mercer Island potable water needs during emergency conditions for a period of 90 days. It should be noted that this quantity may be exceeded if an emergency were to cause a disruption lasting longer than 90 days.

Due to the unavailability of water within the Lake Washington sub-basin, the application can only be approved through a finding that approval is required by the overriding consideration of the public interest (RCW 90.54.020(3)).

### Impairment to existing rights

A review of water rights and well databases reveals no competing wells completed in the deeper aquifers underlying Mercer Island in the areas surrounding the North and South wells proposed in the present application.

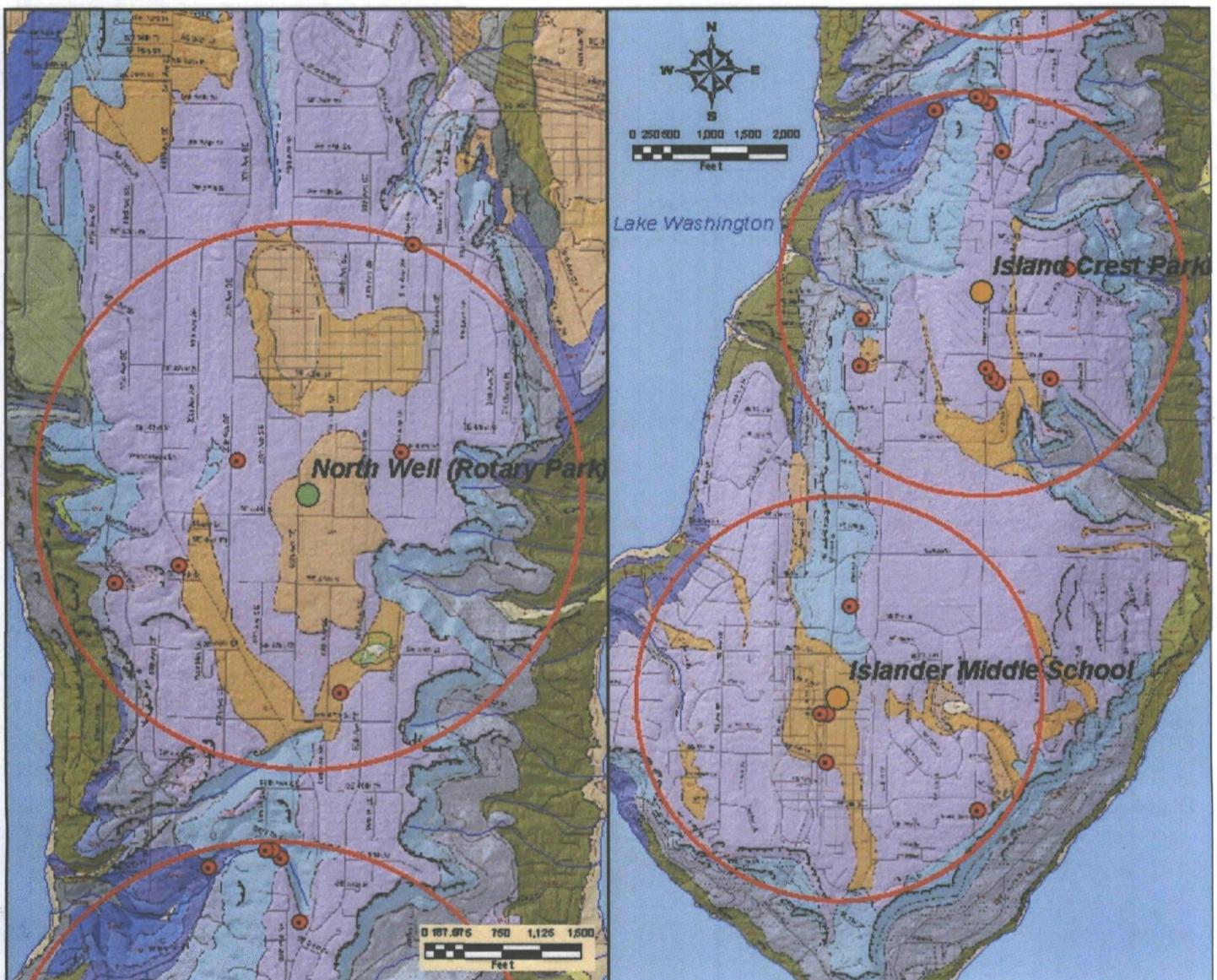


Figure 5: Geology and nearby well locations for the North Well and South Well sites (see figure 4 for geologic units).

The several shallow wells associated with single domestic uses (primarily irrigation of homes already connected to Mercer Island's potable water system) were found within the King County well database (KCGIS, 2009). Six wells were found within a 1-mile radius of the North Well and 17 wells were found within a 1-mile radius of the two proposed sites for the South Well. Only one well was found that is completed at a depth which could potentially be impaired by the City's South Well. This well, completed at depth of 561 feet (production zone elevation of -361 feet) is listed as being unused in the database. Ecology's well log database (Ecology, 2009b) includes only three wells on Mercer Island, all completed in the Qva aquifer.

There may be other wells not entered into public databases, but it is unlikely these would be deep wells given the distribution of Qva underlying the island. The lack of deep wells and the ubiquitous presence of the Qva, which is a reliable source for much shallower sources for groundwater, suggest that other wells on Mercer Island would not likely be impaired by the proposed emergency source wells.

There are no instream flows associated with streams on Mercer Island that could be impaired by the proposed wells.

The data reviewed support a finding that the proposed use will not result in the impairment of existing rights.

## **Beneficial Use**

Water used for municipal supply purposes is considered a beneficial use under RCW 90.54.020(1).

## **Public Interest**

The closure of the Lake Washington basin is an expression of public's interest in preserving the aesthetic, environmental, and recreational values of Lake Washington. Therefore, since approval of the application would require water to be appropriated from the basin it would be contrary to the public interest as expressed through the rule.

RCW 90.54, the statute which provides the authority to close Lake Washington and its tributaries under WAC 173-508, however, provides an exception under which Ecology may approve an application for a new appropriation from the Lake Washington basin.

RCW 90.54.020(3)(a) states in part that "*Lakes and ponds shall be retained substantially in their natural condition. Withdrawals of water which would conflict therewith shall be authorized only in those situations where it is clear that overriding considerations of the public interest will be served.*" This exception to the Lake Washington Basin closure is adopted here.

Protection and preservation of public health and safety during, and especially after, natural or man-made catastrophes is one of the primary responsibilities of government.

The location of Mercer Island, sitting astride the Seattle Fault Zone, and the City's dependence for water supplies on a pipeline suspended beneath the bridge on I-90 that crosses Mercer Slough and Lake Washington, presents some unique problems for the City in planning for a strong earthquake. If a strong subduction-related earthquake or a shallow thrust fault related quake were to occur there is a significant probability of damage to the water pipeline as well as to the City's internal delivery infrastructure. Such damage would greatly affect the City's ability to provide potable water to residents, fight fires, and to provide for other essential water needs.

The applicant's proposal here is to construct two wells, one near the north end of the island, and the other near the south end. One or both wells would be used when the existing SPU interties and/or City of Mercer Island water supply facilities have been severely damaged and/or compromised by a catastrophic event. The wells would operate during such an emergency independently of the City's existing delivery system, with water distributed at the well site via trucks and containers.

Periodic testing of the emergency sources can be done in a manner which makes water use non-consumptive by disposing of test waters in the stormwater system or to a lake or pond near the well location. Testing waters should not be disposed of in creeks due to the potential for channel scouring.

In an ideal future, the City would never be struck by a powerful earthquake and these wells would never need to be used. In such a case the water allocated under the permit could never be perfected through beneficial use. Water Resources Program Policy 1045, adopted in 2006, recognizes that this requires the water right remain in permit status until such time as it becomes necessary, if ever, for it to be used.

Granting approval of the proposed permit would provide the City of Mercer Island with two potential alternative sources for water when it would be most needed for critical community needs.

## **Protests**

No protests were received during the statutory 30-day protest period.

The Muckleshoot Indian Tribe was contacted by both Ecology and the applicant. The Tribe has indicated that although they have general reservations on the potential impacts of groundwater withdrawals on fish habitat within the Lake Washington basin, they have no specific objections to the present application so long as water is used solely for its intended emergency purpose and is not distributed via the city's water mains.

## **RECOMMENDATIONS**

Although water from the two proposed wells is not available based on the closure of the Lake Washington Sub-Basin under WAC 173-508, the Instream Flow Rule for WRIA 8, an overriding consideration of the public interest justifies approval of the proposed allocation. The health and safety of the people of Mercer Island during and after a catastrophic failure of the City's sole source of water is deemed to be of greater importance than a temporary (and likely minor) impact to lake water levels.

The proposed use of groundwater is not expected to result in impairment of existing water rights and the proposed use is deemed to be beneficial.

It is recommended therefore that a groundwater permit be issued at an instantaneous rate of **400 gpm** and maximum annual volume of **66.3 acre-feet**.

The permit should be issued subject to the following provisions.

## **PROVISIONS**

### **1. Well Construction:**

- a. All water wells constructed within the State shall meet the minimum standards for well construction and maintenance as provided under chapter 18.104 RCW, Washington Water Well Construction Act of 1971, and Chapter 173-160 WAC, Minimum Standards for Construction and Maintenance of Wells.

## 2. Water Level Monitoring:

- a. In order to monitor the health of the ground water resource, static water level in the well shall be measured at least once each month. Ecology shall be notified if water levels drop significantly below normal seasonal declines. The water level data shall be maintained and made available to Ecology upon request.
- b. Installation and maintenance of an access port as described in WAC 173-160-291 is required on any additional wells drilled under this water right. An air-line and gauge may be installed in addition to the access port.

## 3. Water Use Metering:

- a. An approved measuring device shall be installed and maintained for each diversion/withdrawal of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use," Chapter 173-173 WAC.
- b. Water use (including that required for periodic testing) data shall be recorded monthly. Data shall be maintained by the well owner and promptly submitted to Ecology upon request. Recording and retention of data by the water right holder are required to inform the water users about how much water is used, when the water is used and to assist users in efficient water management.
- c. Chapter 173-173 WAC describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition Ecology for modifications to some of the requirements. Installation, operation and maintenance requirements are enclosed as a document entitled "Water Measurement Device Installation and Operation Requirements."
- d. Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the records of water use that are kept to meet the above conditions, and to inspect at reasonable times any measuring device used to meet the above conditions.

## 4. Water Allocation:

- a. The total combined rate of withdrawal ( $Q_i$ ) from all sources authorized under this permit shall not exceed 400 gallons per minute.
- b. The total combined annual quantities ( $Q_a$ ) from all sources authorized under this permit shall not exceed 66.3 acre-feet per year.
  - i. It is noted that this quantity may be exceeded if an emergency were to cause a supply disruption lasting in excess of 90 days.
- c. The authorized place of use shall be the same as the location of the point of withdrawal, meaning that water from emergency sources shall be distributed from the well site.
- d. The permit shall be issued for an indefinite period due to the nature of the allocation.
- e. A certificate of water right can be issued, but may only be done so for the quantity of water that has been withdrawn and applied to actual beneficial use.
  - i. Such quantity applied to actual beneficial use shall not exceed the quantity specified in this report of exam and will be calculated on the basis of the best information available to Ecology, including metering data and/or water duty analysis. The applicant is advised that the quantity of water allocated by this permit may be reduced at the time of final certification to reflect system capacity and actual usage.
  - ii. A water right certificate shall not be issued until a final investigation has been made.

## 5. Permit is issued for Emergency Water Use Only:

- a. This permit shall be issued for Standby-Reserve use only. Use of the sources described in the permit may only occur pursuant to catastrophic events that disrupt, compromise, damage, or otherwise affect existing public water supplies and related transmission, distribution, storage, fire flow, and treatment facilities in a manner that risks the public health and safety of local and transient populations.
- b. Authorization for emergency use does not extend to water shortages caused by drought conditions, or to emergency conditions that may be effectively relieved through use of emergency water interties. Inadequate water rights for a public water system to serve existing hook-ups or to accommodate future population growth or other future uses do not constitute a public health or safety emergency.
- c. Emergency supply sources may not be used to circumvent the water right permitting process, nor used for any beneficial uses that occur outside the context of an actual emergency event (described above).
- d. Emergency source water may only be put to beneficial use in lieu of water supplies and/or sources that are unavailable due to emergency conditions.
- e. Identification and intended use of emergency water sources should be clearly documented by public water systems within Comprehensive Water System Plans, Small Water System Plans, and/or Emergency Response Plans prepared consistent with applicable State Board of Health requirements, Department of Health statutes, guidelines, and regulations, and federal law.
- f. Periodic testing of the sources is authorized so long as water produced during testing is routed to stormwater drains or to a nearby surface water pond or lake, thus insuring that water produced is non-consumptive. Testing water should not be disposed of in creeks in order to avoid scouring of stream channels.

**6. Emergency Water Source(s) use may only occur pursuant to:**

- a. Governor's Emergency Declaration;
- b. Determination of a local (government) Incident Response Commander or other authorized local official(s) that emergency conditions have so damaged or compromised existing water supplies and/or related facilities, as well as access to and use of emergency interties (if existing), that public health and safety are at risk, and thereby warrant the use of emergency water source(s).

Incident Response Commanders or other officials responsible for authorizing emergency source use should notify the appropriate regional offices of the Department of Ecology and the Department of Health prior to authorizing use of an emergency source. If such contact is not feasible, notice should be provided as soon as possible thereafter.

Emergency water source use should occur only within the service area of the local government and/or public utility.

**7. Duration of Emergency use**

- a. The time duration for the use of emergency water sources will vary according to the severity of the emergency event and resulting condition(s), the response and recovery capability of public water systems and local governments, and the status of public health and safety risks and conditions.
  - i. If emergency use extends beyond 90 days, the permit holder must inform the Northwest Regional Office of the Water Resources Program in writing, providing an explanation of the reasons for continued use and the steps being taken to remedy the situation.
- b. When the water supply emergency no longer exists, use of emergency water sources should be immediately terminated and the Department of Ecology and Department of Health so notified.
- c. The public water system officials should prepare a report consistent with Department of Health guidelines documenting the volume of water consumed, the quality of the water produced, the manner in which the water was used and/or consumed, and the reliability and ability of the emergency sources in meeting emergency need(s). This report should be submitted to the Department of Ecology and the Department of Health within 3 months after formal termination of locally or state declared emergency conditions.

**8. Special Conditions**

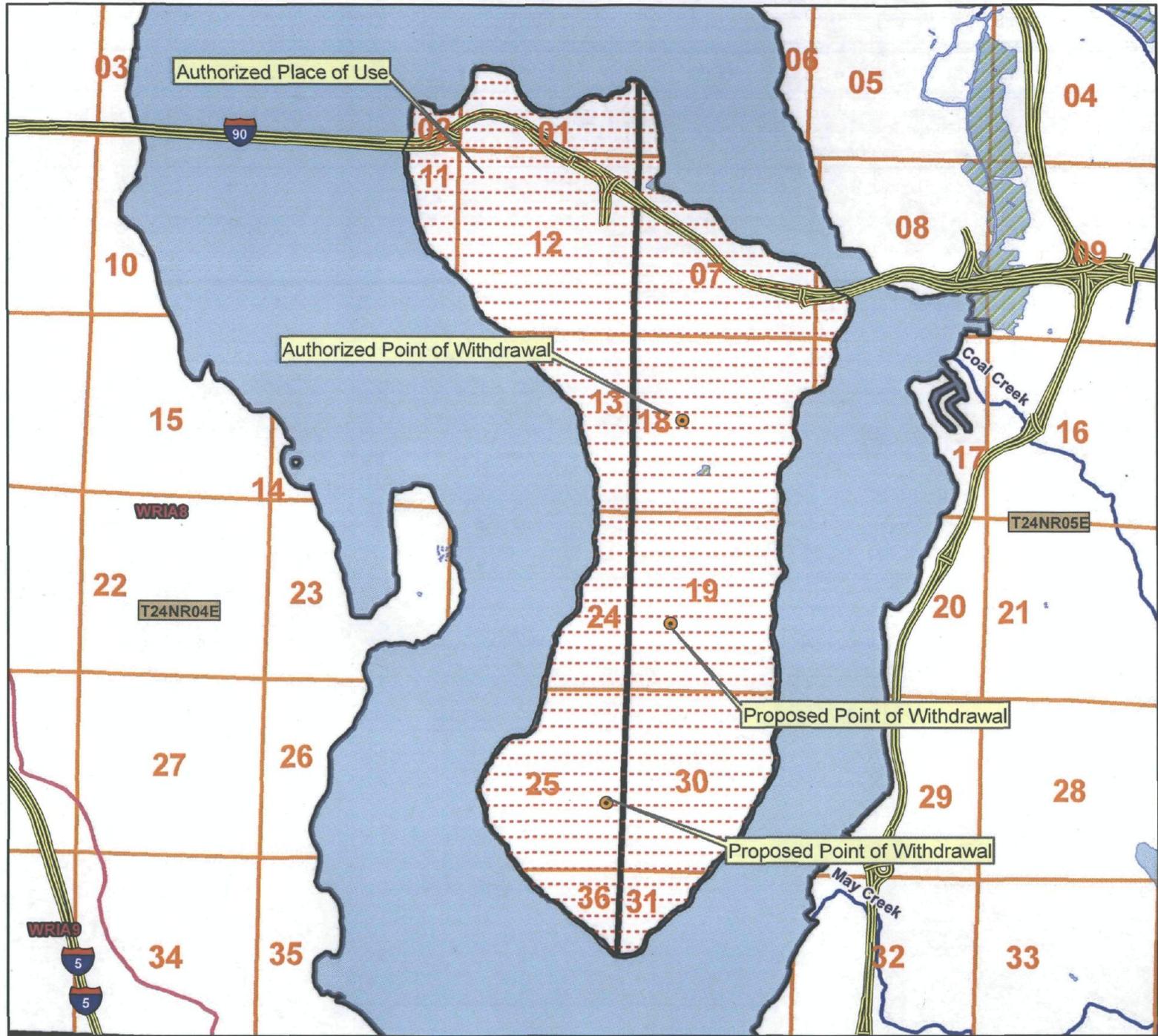
- a. Water produced from emergency sources shall be distributed from the site of the source and potable water may not be distributed within the City of Mercer Island distribution system. On site storage of water produced from emergency sources is authorized.
- b. During the course of an emergency which authorizes the use of emergency sources herein described, it is understood by Ecology and the applicant that the duties of the City of Mercer Island to provide for the health and safety of the public shall be paramount to any and all restrictions detailed in the permit.

**CONCLUSION**

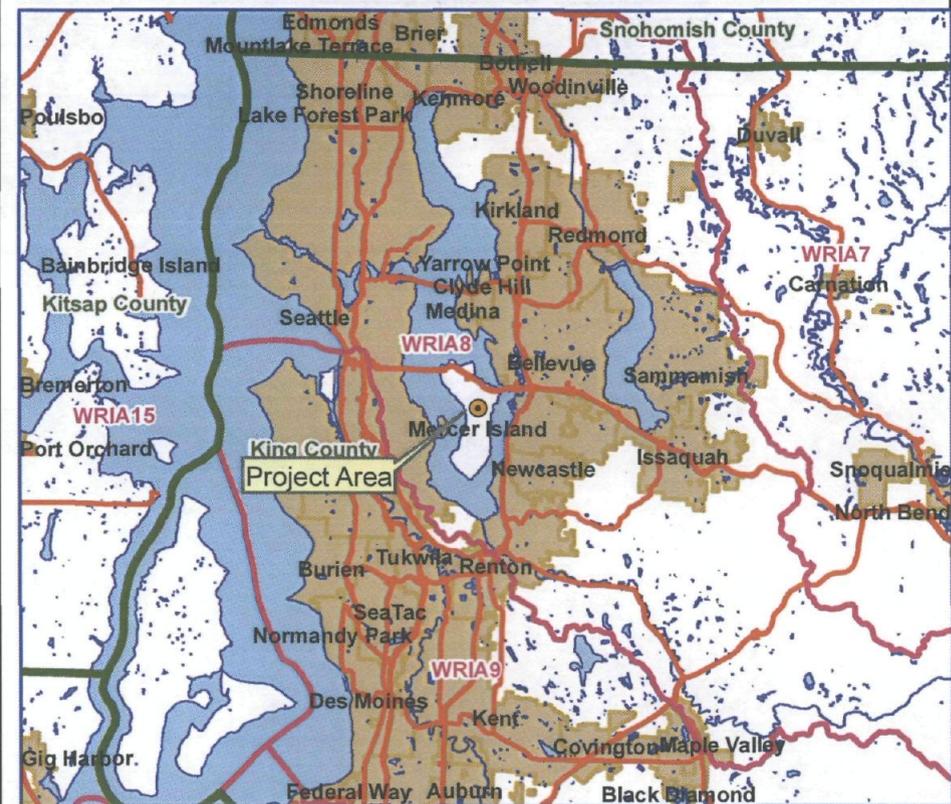
In accordance with chapters 90.03, 90.44, and 90.54.03 RCW; I find the proposed use to be beneficial. The withdrawal of groundwater will not impair existing rights. The overriding consideration of the public interest exempts this appropriation from denial due to the closure of the Lake Washington Basin under WAC 173-508. A permit should therefore be issued, subject to the above-indicated provisions.

REPORT BY Douglas H. Wood DATE September 16, 2009  
Douglas H. Wood, P. Geo., LHG





Mercer Island City  
Water Right Number G1-28425  
WRIA 8 - King County



- Legend**
- County
  - WRIA
  - Highways
  - Townships
  - cities
  - Sections
  - Authorized Point of Withdrawal
  - Authorized Place of Use

Place of use and point(s) of diversion/withdrawal are as defined on the cover sheet under the headings, 'LOCATION OF DIVERSION/WITHDRAWAL' and 'LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED.'

Attachment 1