REDMOND 9 SHORT PLAT
 Preliminary Short Plat

STORMWATER REPORT

13437 & 13441 NE 100th Street, Redmond, Washington

DRS Project No. 18037
 Redmond File No. LAND 2018-00405

Owner/Applicant

Harbour Homes, LLC
400 North 34th Street, Suite 300
Seattle, WA 98103

Report Prepared by

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Kirkland WA 98033
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Issued: April 4, 2019
REDMOND 9 SHORT PLAT
Preliminary Short Plat
STORMWATER REPORT

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SECTION I
DRAINAGE REPORT SUMMARY

A. DRAINAGE INFORMATION SUMMARY FORM

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>Redmond 9 Short Plat</th>
</tr>
</thead>
<tbody>
<tr>
<td>City Project Number:</td>
<td>LAND 2018-00405</td>
</tr>
<tr>
<td>Project Engineer:</td>
<td>D.R. STRONG Consulting Engineers Inc.</td>
</tr>
<tr>
<td>Project Applicant:</td>
<td>Harbour Homes, LLC</td>
</tr>
<tr>
<td>Project Site Area:</td>
<td>2.638 acres</td>
</tr>
<tr>
<td>Project Development Area:</td>
<td>1.857 acres</td>
</tr>
<tr>
<td>Number of Lots:</td>
<td>9</td>
</tr>
</tbody>
</table>

Summary Table

<table>
<thead>
<tr>
<th>Drainage Basin Information</th>
<th>Basin Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Basin Area (acres)</td>
<td>1.857 ac</td>
</tr>
<tr>
<td>Type of Storage Proposed</td>
<td>Vault</td>
</tr>
<tr>
<td>Approx. Total Storage Volume (cu. ft.)</td>
<td>28,611</td>
</tr>
<tr>
<td>Soil Type(s)</td>
<td>Alderwood (AgB) 0-8%</td>
</tr>
<tr>
<td></td>
<td>Alderwood (AgC) 8-15%</td>
</tr>
<tr>
<td></td>
<td>Alderwood (AgD)15-30%</td>
</tr>
</tbody>
</table>

Pre-developed Runoff Rates

<table>
<thead>
<tr>
<th>Q (cfs.)</th>
<th>2 yr.</th>
<th>10 yr.</th>
<th>100 yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.054597</td>
<td>0.1034</td>
<td>0.143519</td>
</tr>
</tbody>
</table>

Post-dev. Runoff Rates

<table>
<thead>
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<th>Q (cfs.)</th>
<th>2 yr.</th>
<th>10 yr.</th>
<th>100 yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.02707</td>
<td>0.073399</td>
<td>0.187247</td>
</tr>
</tbody>
</table>

Off-Site Upstream Area

<table>
<thead>
<tr>
<th>Number of acres (included in runoff analysis)</th>
<th>0.227</th>
</tr>
</thead>
</table>
SECTION II
EXECUTIVE SUMMARY

A. DRAINAGE PLAN DESCRIPTION

The Project proposes to short plat 2.64 acres (tax parcels 0325059035, 0325059208 and 0325059211) into nine lots for single family residences. The Project will be required to improve the south half of the right of way of NE 100th Street. Tracts B and C will be placed in NGPA for steep slopes, wetland and stream buffers as well tree preservation. Runoff from the east may enter the site as sheet flow from an area that is mostly lawn. The Project Development Area will be 1.857 acres (Project).

B. DRAINAGE BASINS

Pre-Developed Basin

The Project is located in one Threshold Discharge Area (TDA) and two Natural Discharge Areas (NDA). Vegetation consists of scattered trees, lawn, shrubs and blackberry bushes. There are existing structures which are scheduled to be removed.

NDA 1:

Runoff from the Project Development Area sheet flows across the Site in a southwesterly direction and exits Site at the Natural Discharge Location (NDL 1) near the southwest corner of said NDA where it becomes more of a concentrated flow off site. NDA 1 is mostly flat with areas of slopes reaching 15%.

NDA 2:

Tracts B and C comprise this NDA. Runoff sheet flows across the steep slopes in a southerly direction before it exists near the southeast corner where a Category III and a Class II stream exist (NDL 2). NDA 2 has slopes in excess of 40% in some places. Runoff from both NDAs converge shortly after exiting Site as demonstrated in the offsite analysis.

Post-Developed Basin(s)

NDA 1:

The offsite improvements will include pavement widening, a planter strip and a concrete sidewalk. On site, there will be a subdivision road with 20 feet of pavement, a drainage swale, and a sidewalk along with a cul-de-sac, future homes, their driveways, and lawn. Tract A, recreation space and storm drainage tract, will be developed with a subsurface vault and recreation space equipment along with an access road. The following table and Figure further illustrate the preliminary area breakdown.
### NDA 1

<table>
<thead>
<tr>
<th>Lot</th>
<th>Lot Area (SF)</th>
<th>Max Coverage 35%</th>
<th>Proposed Driveway/patio</th>
<th>Proposed Impervious (SF)</th>
<th>Proposed Impervious (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4,757.00</td>
<td>1,664.95</td>
<td>800.00</td>
<td>2,464.95</td>
<td>51.82%</td>
</tr>
<tr>
<td>2</td>
<td>4,290.00</td>
<td>1,501.50</td>
<td>800.00</td>
<td>2,301.50</td>
<td>53.65%</td>
</tr>
<tr>
<td>3</td>
<td>5,630.00</td>
<td>1,970.50</td>
<td>800.00</td>
<td>2,770.50</td>
<td>49.21%</td>
</tr>
<tr>
<td>4</td>
<td>4,888.00</td>
<td>1,710.80</td>
<td>800.00</td>
<td>2,510.80</td>
<td>51.37%</td>
</tr>
<tr>
<td>5</td>
<td>4,064.00</td>
<td>1,422.40</td>
<td>800.00</td>
<td>2,222.40</td>
<td>54.69%</td>
</tr>
<tr>
<td>6</td>
<td>3,731.00</td>
<td>1,305.85</td>
<td>800.00</td>
<td>2,105.85</td>
<td>56.44%</td>
</tr>
<tr>
<td>7</td>
<td>3,162.00</td>
<td>1,106.70</td>
<td>800.00</td>
<td>1,906.70</td>
<td>60.30%</td>
</tr>
<tr>
<td>8</td>
<td>4,573.00</td>
<td>1,600.55</td>
<td>800.00</td>
<td>2,400.55</td>
<td>52.49%</td>
</tr>
<tr>
<td>9</td>
<td>4,989.00</td>
<td>1,746.15</td>
<td>800.00</td>
<td>2,546.15</td>
<td>51.04%</td>
</tr>
</tbody>
</table>

|          |                |                   |                         |                         |                         |
| Road A   | 18,007.37      | 14,270.25         |                          |                         |                         |
| NE 100th | 2,780.13       | 2,037.13          |                          |                         |                         |
| Tract A  | 10,018.00      | 1,787.00          |                          |                         |                         |
| Upstream | 10,000.00      | 0.00              |                          |                         |                         |
| **Total**| **80,889.50**  | **14,029.40**     | **7,200.00**             | **39,323.77**           | **53.44%**              |
| ACRE     | 1.86           | 0.32              | 0.17                     | 0.90                    |

### NDA 2:
This NDA will remain undeveloped except for the construction of the above ground discharge system from NDA 1.

### NDA 2

| TRACT B  | 6,134.000 | 0.141 |
| TRACT C  | 42,191.000| 0.969 |
| **TOTAL**| **48,325.000**| **1.109**|
C. OFFSITE IMPROVEMENTS

Adjacent Offsite Improvements

NE 100th Street will be improved by widening pavement, installing a planter strip and a concrete sidewalk.

Proposed Water Quality Measures

The Project creates more than 5,000 square feet of new pollution generating impervious surface. Basic water quality treatment will be provided in a wet vault or equal.

Downstream Analysis

NDA 1:

Concentrated runoff flows in an overgrown steep channel in a southerly direction for approximately 140 feet. This flow is then intercepted by the main channel of the Class II Stream. Runoff travels in said stream channel, which is also steep and overgrown, for a distance of approximately 250 feet where it converges with runoff from NDA 2.

NDA 2:

Southeasterly shallow concentrated flow from this NDA exits the Site at NDL 2 at the Category III wetland and aforementioned stream. The confluence of both NDAs flows in the steep creek channel, in an easterly direction for the remainder of the one quarter mile downstream study.

Post-Developed Conditions

NDA 1:

A storm drainage conveyance system will be constructed in the subdivision road. Runoff from pavement in NE 100th Street, lots and road A will sheet flow into the drainage swale before it enters the cathbasin and conveyance pipes. Runoff from roof will be tight lined into the same conveyance system. A storm drainage vault for runoff control and treatment will be installed in Tract A. The outfall from vault will be in an above ground 12-inch HDPE and an above ground HDPE dispersal pipe.

Upstream Analysis

The Project receives some runoff from approximately 10,000 s.f. of lawn area along the east property line. This runoff will most likely enter the proposed conveyance system via sheet flow across Road A pavement. Vault sizing will account for said runoff.
SECTION III
MR 1 – PREPARATION OF STORMWATER SITE PLANS

A. PROJECT DESCRIPTION

The Project is a nine-lot short plat for seven detached single family homes and one duplex.

B. PROPOSED DEVELOPMENT

Project will provide Basic Water Quality treatment and Flow Control per the DOE Manual. All surface water runoff from impervious surfaces will be collected in an underground vault. Water quality treatment will be provided in a wet vault.

While Site as a whole is located in R1 and RIN zonings, the Project itself will be in RIN zoning while the area to remain undeveloped (Tracts B and C) will be located in R1.

RIN zoning allows 65% maximum impervious surface and 35% lot coverage. Due to restriction on lot coverage, reduced impervious surface will be proposed on per lot basis as a “restricted footprint BMP”. The following is a breakdown of lots and their proposed impervious surfaces.
### Maximum and Proposed Impervious Comparison

<table>
<thead>
<tr>
<th>Lot</th>
<th>Lot Area (SF)</th>
<th>Max Coverage 35%</th>
<th>Proposed Driveway/patio</th>
<th>Proposed Impervious (SF)</th>
<th>Proposed Impervious * (%)</th>
<th>Proposed Pervious</th>
<th>Required 10% Open Space Per Lot (SF)</th>
<th>Provided Open Space Per Lot (SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4,757</td>
<td>1,664.95</td>
<td>800.00</td>
<td>2,464.95</td>
<td>51.82%</td>
<td>2,292.05</td>
<td>475.70</td>
<td>825.00</td>
</tr>
<tr>
<td>2</td>
<td>4,290</td>
<td>1,501.50</td>
<td>800.00</td>
<td>2,301.50</td>
<td>53.65%</td>
<td>1,988.50</td>
<td>429.00</td>
<td>825.00</td>
</tr>
<tr>
<td>3</td>
<td>5,630</td>
<td>1,970.50</td>
<td>800.00</td>
<td>2,770.50</td>
<td>49.21%</td>
<td>2,859.50</td>
<td>563.00</td>
<td>750.00</td>
</tr>
<tr>
<td>4</td>
<td>4,888</td>
<td>1,710.80</td>
<td>800.00</td>
<td>2,510.80</td>
<td>51.37%</td>
<td>2,377.20</td>
<td>488.80</td>
<td>1,044.00</td>
</tr>
<tr>
<td>5</td>
<td>4,064</td>
<td>1,422.40</td>
<td>800.00</td>
<td>2,222.40</td>
<td>54.69%</td>
<td>1,841.60</td>
<td>406.40</td>
<td>675.00</td>
</tr>
<tr>
<td>6</td>
<td>3,731</td>
<td>1,305.85</td>
<td>800.00</td>
<td>2,105.85</td>
<td>56.44%</td>
<td>1,625.15</td>
<td>373.10</td>
<td>600.00</td>
</tr>
<tr>
<td>7</td>
<td>3,162</td>
<td>1,106.70</td>
<td>800.00</td>
<td>1,906.70</td>
<td>60.30%</td>
<td>1,255.30</td>
<td>316.20</td>
<td>490.00</td>
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<tr>
<td>8</td>
<td>4,573</td>
<td>1,600.55</td>
<td>800.00</td>
<td>2,400.55</td>
<td>52.49%</td>
<td>2,172.45</td>
<td>457.30</td>
<td>750.00</td>
</tr>
<tr>
<td>9</td>
<td>4,989</td>
<td>1,746.15</td>
<td>800.00</td>
<td>2,546.15</td>
<td>51.04%</td>
<td>2,442.85</td>
<td>498.90</td>
<td>750.00</td>
</tr>
</tbody>
</table>
C. PROJECT MINIMUM REQUIREMENTS

The Minimum Requirements that apply to this Project were determined using the Flow Chart for New Development.

Per Figure 5, all Minimum Requirements apply to all new impervious surfaces and converted pervious surfaces. The Minimum Requirements, as identified by the 2017 DOE Manual, and a brief discussion of how they are met follows:

**Minimum Requirement #1: Preparation of Stormwater Site Plans**
- The Preliminary Short Plat Drawings and this Report constitute the Stormwater Site Plans.

**Minimum Requirement #2: Construction Stormwater Pollution Prevention**
- The SWPPP is provided in Section IV.

**Minimum Requirement #3: Source Control of Pollution**
- Source Control of Pollution is addressed in the SWPPP.

**Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls**
- The Project discharges stormwater at the natural discharge point of the Site.

**Minimum Requirement #5: On-site Stormwater Management**
- On-site stormwater management BMPs are discussed in Item F of this Section.

**Minimum Requirement #6: Runoff Treatment**
- The Project proposes to provide basic water quality treatment using a wetvault.

**Minimum Requirement #7: Flow Control**
- The Project proposes to provide flow control using a vault.

**Minimum Requirement #8: Wetlands Protection**
- Project proposes to provide wetland and stream buffers as show on plans and per Project biologist recommendation.

**Minimum Requirement #9: Operation and Maintenance**
- An Operations and Maintenance Manual will be prepared during the final engineering phase of this Project.

D. EXISTING CONDITIONS

Total existing Site area is approximately, 114,920 s.f. (2.638 ac). Vegetation consists of Maple, Pine, Douglas Fir, and Cedar trees as well as lawn, shrubs, and black berry bushes. The Site is currently used as two single family homes with multiple structures on each parcel.

For the purpose of hydrologic calculations, the entire Project Development Area is modeled as till forest.
E. DOWNSTREAM ANALYSIS
See Appendix A for a detailed Level One Downstream Analysis.

F. STORMWATER QUANTITY CONTROL MEASURES
NDA 1 runoff will be conveyed into a storm drainage vault located in Tract A. Releases from vault will be via an above ground discharge system.

Per City of Redmond Stormwater Notebook section 8.7.4, the Project is required to implement on-site/LID BMP’s (Low Impact Development Best Management Practices) to the greatest extent possible. The Project proposes to implement footprints restricting impervious surfaces on each lot to an average of 55% instead of the allowed 65%. The following table is a conceptual breakdown.

<table>
<thead>
<tr>
<th>Lot</th>
<th>Lot Area (SF)</th>
<th>Max Coverage 35%</th>
<th>Proposed Driveway/patio</th>
<th>Proposed Impervious (SF)</th>
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<tr>
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<td>1,501.50</td>
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<td>49.21%</td>
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<tr>
<td>4</td>
<td>4,888.00</td>
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<td>800.00</td>
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<td>7</td>
<td>3,162.00</td>
<td>1,106.70</td>
<td>800.00</td>
<td>1,906.70</td>
<td>60.30%</td>
</tr>
<tr>
<td>8</td>
<td>4,573.00</td>
<td>1,600.55</td>
<td>800.00</td>
<td>2,400.55</td>
<td>52.49%</td>
</tr>
<tr>
<td>9</td>
<td>4,989.00</td>
<td>1,746.15</td>
<td>800.00</td>
<td>2,546.15</td>
<td>51.04%</td>
</tr>
<tr>
<td>Road A</td>
<td>18,007.37</td>
<td>14,270.25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NE 100th</td>
<td>2,780.13</td>
<td>2,037.13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tract A</td>
<td>10,018.00</td>
<td>1,787.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upstream</td>
<td>10,000.00</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>80,889.50</td>
<td>14,029.40</td>
<td>7,200.00</td>
<td>39,323.77</td>
<td>53.44%</td>
</tr>
<tr>
<td>ACRE</td>
<td>1.86</td>
<td>0.32</td>
<td>0.17</td>
<td>0.90</td>
<td></td>
</tr>
</tbody>
</table>

G. STORMWATER CONVEYANCE CALCULATIONS
To be completed at construction plan preparation.
H. STORMWATER QUALITY CONTROL MEASURES

The Project will add pollution generating surfaces (PGIS) in NE 100th Street, Road A, Driveways, and Tract A access road. For purpose of this Report, sidewalks, and other impervious non PGIS surfaces will counted as PGIS. This runoff will be treated in a Basic water quality cell in the wet vault proposed in Tract A.

<table>
<thead>
<tr>
<th>Lot</th>
<th>Lot Area (SF)</th>
<th>Max Coverage 35%</th>
<th>Proposed Driveway/patio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4,757.00</td>
<td>1,664.95</td>
<td>800.00</td>
</tr>
<tr>
<td>2</td>
<td>4,290.00</td>
<td>1,501.50</td>
<td>800.00</td>
</tr>
<tr>
<td>3</td>
<td>5,630.00</td>
<td>1,970.50</td>
<td>800.00</td>
</tr>
<tr>
<td>4</td>
<td>4,888.00</td>
<td>1,710.80</td>
<td>800.00</td>
</tr>
<tr>
<td>5</td>
<td>4,064.00</td>
<td>1,422.40</td>
<td>800.00</td>
</tr>
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</tr>
<tr>
<td>9</td>
<td>4,989.00</td>
<td>1,746.15</td>
<td>800.00</td>
</tr>
<tr>
<td>Road A</td>
<td>18,007.37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NE 100th</td>
<td>2,780.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tract A</td>
<td>10,018.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upstream</td>
<td>10,000.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80,889.50</strong></td>
<td><strong>14,029.40</strong></td>
<td><strong>7,200.00</strong></td>
</tr>
<tr>
<td><strong>ACRE</strong></td>
<td><strong>1.86</strong></td>
<td><strong>0.32</strong></td>
<td><strong>0.17</strong></td>
</tr>
</tbody>
</table>
FIGURE 1
VICINITY MAP
FIGURE 3
EXISTING SITE CONDITIONS
LEGEND:

- TOTAL PROJECT AREA: 80,889 S.F. (1.857 AC)
- NDA 1: 80,889 S.F. (1.857 AC)
- NDA 2: 48,124 S.F. (1.099 AC)
- UPSTREAM AREA: 10,000 S.F. (0.230 AC)

PREDEVELOPED AREA BREAKDOWN:

- SITE AREA: 114,920 S.F. (2.638 AC)
- PROJECT DEVELOPMENT AREA: 80,889 S.F. (1.857 AC)
  (Includes frontage improvements on NE 100th Street, upstream area and excludes tracts B and C)

WM/2012 INPUT:

- PREDEVELOPED AREA:
  - C. FOREST, MOD: 80,889 S.F. (1.857 AC)
  - IMPERVIOUS: 0 S.F. (0 AC)
- TOTAL: 80,889 S.F. (1.857 AC)
FIGURE 4
USDA KING COUNTY SOILS SURVEY MAP

Soil Map—King County Area, Washington

Map Scale: 1:1,000 printed on A portfolio (10.5" x 14") sheet.

N

0 15 30 45 60
Yard

0 50 100 150 200
Foot

Map projection: Web Mercator  Corner coordinates: WGS84  Edge tics: UTM Zone 13N WGS84

©2019 D. R. STRONG Consulting Engineers Inc. Redmond 9 Short Plat Stormwater Report
King County Area, Washington

AgB—Alderwood gravelly sandy loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t625
Elevation: 50 to 800 feet
Mean annual precipitation: 25 to 60 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Alderwood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the map unit.

Description of Alderwood

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Glacial drift and/or glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 7 inches: gravelly sandy loam
Bw1 - 7 to 21 inches: very gravelly sandy loam
Bw2 - 21 to 30 inches: very gravelly sandy loam
Bg - 30 to 35 inches: very gravelly sandy loam
2Cd1 - 35 to 43 inches: very gravelly sandy loam
2Cd2 - 43 to 59 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 20 to 39 inches to dense material
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Forage suitability group: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XS301WA)
Hydric soil rating: No

Minor Components

Mckenna
Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Everett
Percent of map unit: 5 percent
Landform: Kames, eskers, moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Shalcar
Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Norma
Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

AgC—Alderwood gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 2t626
Elevation: 50 to 800 feet
Mean annual precipitation: 20 to 60 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Alderwood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alderwood
Setting

Landform: Ridges, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Glacial drift and/or glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 7 inches: gravelly sandy loam
Bw1 - 7 to 21 inches: very gravelly sandy loam
Bw2 - 21 to 30 inches: very gravelly sandy loam
Bg - 30 to 35 inches: very gravelly sandy loam
2Cd1 - 35 to 43 inches: very gravelly sandy loam
2Cd2 - 43 to 59 inches: very gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Forage suitability group: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XS301WA), Limited Depth Soils (G002XF303WA)
Hydric soil rating: No

Minor Components

Everett

Percent of map unit: 5 percent
Landform: Kames, eskers, moraines
Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Crest, base slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Indianola

Percent of map unit:5 percent
Landform: Eskers, kames, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Shalcar

Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

Norma

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave

Hydric soil rating: Yes

AgD—Alderwood gravelly sandy loam, 15 to 30 percent slopes

Map Unit Setting

map unit symbol: 2t627
Elevation: 0 to 1,000 feet
Mean annual precipitation: 25 to 60 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Alderwood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alderwood

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, nose slope, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Glacial drift and/or glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 7 inches: gravelly sandy loam
Bw1 - 7 to 21 inches: very gravelly sandy loam
Bw2 - 21 to 30 inches: very gravelly sandy loam
Bg - 30 to 35 inches: very gravelly sandy loam
2Cd1 - 35 to 43 inches: very gravelly sandy loam
2Cd2 - 43 to 59 inches: very gravelly sandy loam

Properties and qualities
Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 39 inches to dense material
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Forage suitability group: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XS301WA)
Hydric soil rating: No

Minor Components

Everett
Percent of map unit: 5 percent
Landform: Kames, eskers, moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Indianola
Percent of map unit: 5 percent
Landform: Kames, terraces, eskers
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Shalcar
Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Norma
Percent of map unit: 2 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes
FIGURE 5
MINIMUM REQUIREMENTS FLOW CHART

Start Here

Does the site have 35% or more of existing impervious coverage?

Yes: See Redevelopment Minimum Requirements and Flow Chart (Figure I-2.4.2).

No: Does the project result in 5,000 square feet, or greater, of new plus replaced hard surface area?

No: Does the project convert ¾ acres or more of vegetation to lawn or landscaped areas, or convert 2.5 acres or more of native vegetation to pasture?

Yes: All Minimum Requirements apply to the new and replaced hard surfaces and converted vegetation areas.

No: Does the project result in 2,000 square feet, or greater, of new plus replaced hard surface area?

No: Minimum Requirement #2 applies.

Yes: Does the project have land disturbing activities of 7,000 square feet or greater?

Yes: Minimum Requirements #1 through #5 apply to the new and replaced hard surfaces and the land disturbed.

No: Minimum Requirement #2 applies.
SECTION IV
MR 2 - PRELIMINARY STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A preliminary SWPPP is included in Appendix B. A complete SWPPP will be included with the engineering phase of this project.
SECTION V
MR 3 – SOURCE CONTROL OF POLLUTION

To be prepared as a part of the SWPPP document found in Appendix B.
SECTION VI
MR 4 – PRESERVATION OF NATURAL DRAINAGE SYSTEMS AND OUTFALLS

The Site has one TDA and two NDAs as described throughout the Report. Discharge from the vault is designed to simulate the predeveloped conditions to the maximum extent feasible. Discharge will be dispersed over a large area utilizing an above ground dispersal system. Considering that runoff from NDA 1 and NDA 2 converged almost immediately after exiting the Site (within 390 feet or less), locating said dispersal system in NDA 2 should preserve the natural drainage systems and outfalls.
FIGURE 6
DEVELOPED CONDITIONS MAP
## DEVELOPED AREA BREAKDOWN:

**SITE AREA:** 114,920 S.F. (2.638 AC)

**PROJECT DEVELOPMENT AREA:**
- (Includes frontage improvements on NE 100th Street, upstream, and excludes tracts B and C)
- 80,889 S.F. (1.857 AC)

### DEVELOPED SITE CONDITIONS

<table>
<thead>
<tr>
<th>LOT</th>
<th>LOT AREA (SF)</th>
<th>MAX COVERAGE %</th>
<th>PROPOSED DRIVEWAY/ PATIO</th>
<th>PROPOSED IMPERVIOUS (SF)</th>
<th>REQUIRED NON OPEN SPACE PER LOT (SF)</th>
<th>PROVIDED OPEN SPACE PER LOT (SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4,757</td>
<td>1,685</td>
<td>800</td>
<td>2,445</td>
<td>52%</td>
<td>2,292</td>
</tr>
<tr>
<td>2</td>
<td>4,290</td>
<td>1,502</td>
<td>800</td>
<td>2,302</td>
<td>54%</td>
<td>1,989</td>
</tr>
<tr>
<td>3</td>
<td>3,630</td>
<td>1,971</td>
<td>800</td>
<td>2,771</td>
<td>49%</td>
<td>2,693</td>
</tr>
<tr>
<td>4</td>
<td>4,888</td>
<td>1,771</td>
<td>800</td>
<td>2,511</td>
<td>51%</td>
<td>2,377</td>
</tr>
<tr>
<td>5</td>
<td>4,064</td>
<td>1,422</td>
<td>800</td>
<td>2,222</td>
<td>55%</td>
<td>1,842</td>
</tr>
<tr>
<td>6</td>
<td>3,731</td>
<td>1,306</td>
<td>800</td>
<td>2,106</td>
<td>56%</td>
<td>1,625</td>
</tr>
<tr>
<td>7</td>
<td>3,162</td>
<td>1,107</td>
<td>800</td>
<td>1,907</td>
<td>60%</td>
<td>1,255</td>
</tr>
<tr>
<td>8</td>
<td>4,573</td>
<td>1,601</td>
<td>800</td>
<td>2,401</td>
<td>52%</td>
<td>2,172</td>
</tr>
<tr>
<td>9</td>
<td>4,989</td>
<td>1,746</td>
<td>800</td>
<td>2,546</td>
<td>51%</td>
<td>2,443</td>
</tr>
</tbody>
</table>

**ROAD A:** 10,000 3,105 960 165 489 650 750
**NE 100TH ST:** 6,700 8,600 15,600 10,000 10,000 10,000 10,000
**TRACT A:** 10,000 10,000 10,000 10,000 10,000 10,000 10,000
**UPSTREAM:** 10,000 10,000 10,000 10,000 10,000 10,000 10,000
**TOTAL:** 80,889 14,029 7,200 36,234 53% 41,566 4,008 6,709
**ACRE:** 1.857 0.32 0.17 0.90 0.95 0.09 0.15
SECTION VII
MR 5 – ON-SITE STORMWATER MANAGEMENT

Per City of Redmond Stormwater Notebook section 8.7.4, the Project is required to implement on-site/LID BMP’s (Low Impact Development Best Management Practices) to the greatest extent possible. The project will implement restricted footprints as stated earlier in this report. Project will restrict impervious surface to around 52% instead of the 65% allowed. (No development activities are proposed in the portion of the Site zoned R1).

The 2014 SWMMWW lists On-site Stormwater Management BMPs for Projects Triggering Minimum Requirements #1 through #9:

Lawn and landscaped areas:
- Post-Construction Soil Quality and Depth in accordance with BMP T5.13
  
  **Post-Construction Soil Quality and Depth will be implemented to the maximum extent feasible.**

Roofs:
1. Full Dispersion in accordance with BMP T5.30: Full Dispersion, or Downspout Full Infiltration Systems in accordance with BMP T5.10A: Downspout Full Infiltration
   
   Due to size of lots and soils limited infiltration capacity, this BMP is deemed unfeasible for most lots.

2. Bioretention facilities that have minimum horizontally projected surface area below the overflow which is at least 5% of the total surface area draining to it (BMP T5.15)
   
   This BMP is not feasible due to poor infiltration of native soils and potential high water table.

3. Downspout Dispersion Systems in accordance with BMP T5.10B: Downspout Dispersion Systems
   
   Due to size of lots and soils limited infiltration capacity, this BMP is deemed unfeasible.

4. Perforated Stub-out Connections in accordance with BMP T5.10C: Perforated Stub-out Connections
   
   **The Project will implement this BMP for all lots.**

Other Hard Surfaces:
1. Full Dispersion in accordance with BMP T5.30: Full Dispersion (p.939)
   
   **Due to size of lots and soils limited infiltration capacity, this BMP is deemed unfeasible.**
2. Permeable pavement in accordance with BMP T5.15

*Due to soils limited infiltration capacity, this BMP is deemed unfeasible.*

- Bioretention BMP’s (BMP T7.30: Bioretention Cells, Swales, and Planter Boxes, page 959) that have a minimum horizontally projected surface area below the overflow which is at least 5% of the total surface area draining to it
- This BMP is not feasible due to poor infiltration of native soils and potential high water table.

3. Sheet Flow Dispersion in accordance with BMP T5.12: Sheet Flow Dispersion (page 908), or Concentrated Flow Dispersion in accordance with BMP T5.11: Concentrated Flow Dispersion (page 905)

*This BMP will not be used due to lot size and proximity of neighboring structures to property lines.*
MR 6 – RUNOFF TREATMENT

This project is required to provide basic water quality treatment. Basic water quality will be provided in a modular wetland or equivalent proprietary device. The sizing and selection of the device will be completed at the time of engineering.
SECTION VIII
MR 7 – FLOW CONTROL

A. DESIGN APPROACH

The continuous simulation model, the Western Washington Hydrology Model, WWHM, was used to analyze the pre and post developed runoff rates. Per Table 3.2.2.b of the Manual, the soil type is modeled as “Till” for the Alderwood gravelly sandy loam SCS classification as shown in Figure 6: Soils. While the existing Site conditions are mostly lawn and groves of mature trees, DOE requires that the Site be modeled as “Forest”. The soil types are unchanged from the pre-developed conditions. The portions of the Site within the proposed clearing limits tributary to the proposed detention tank were modeled as “Till Grass” and Impervious as appropriate.

Results of the WWHM analysis are included in Appendix C of this report.

B. FULL SITE AREA ANALYSIS

The Site is analyzed as one Threshold Discharge area (TDA). The following table represents the Site areas breakdown for existing and design input in WWHM.

<table>
<thead>
<tr>
<th></th>
<th>Developed Area</th>
<th>Impervious Pavment, SW, DWS</th>
<th>Roof</th>
<th>Lawn</th>
<th>Forest</th>
</tr>
</thead>
<tbody>
<tr>
<td>PreDev</td>
<td>1.857</td>
<td></td>
<td></td>
<td></td>
<td>1.857</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dev</td>
<td>1.857</td>
<td>0.581</td>
<td>0.322</td>
<td>0.954</td>
<td>0.00</td>
</tr>
</tbody>
</table>
SECTION IX
MR 8 – WETLANDS PROTECTION

Site is home to a Category III wetland and a Class II stream both located along the south property line. The Project will maintain standard buffers for both critical areas, 150 feet each respectively. Tract C will be set aside as a native growth protection area (NGPA) to provide permanent protection for those critical areas. In addition, a tree preservation open space tract (Tract B) will provide additional protection since it will be positioned contiguous with Tract C. Runoff from Project will be controlled through the vault for both release and water quality.
SECTION X
MR 9 – BASIN/WATERSHED PLANNING

There are no known basin or watershed plans that affect this Project.
SECTION XI
MR 10 – OPERATIONS AND MAINTENANCE

A stand-alone O&M manual will be prepared during the final engineering phase of this Project.
APPENDICES
APPENDIX A
OFFSITE ANALYSIS

An Offsite Analysis prepared by D.R. STRONG Consulting Engineers Inc. is included in this Appendix.
REDMOND 9
Preliminary Short Plat
OFFSITE ANALYSIS

DRS Project No. 18037
Redmond File No. LAND-2018-00405

Owner/Applicant

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(206) 315-8130

Report Prepared by

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(425) 827-3063

Issued: April 2, 2019
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TASK 1
DEFINE AND MAP THE STUDY AREA

This Offsite Analysis was prepared in accordance with Volume 1, Section 2.6.2 of the 2014 Stormwater Management Manual for Western Washington (Manual) and the City of Redmond 2017 Stormwater Notebook. The Site (tax parcels 0325059035, 0325059208, and 0325059211) is located at 13437 and 13441 NE 100th Street in Redmond, Washington.

See Figure 1, Figure 2, and Figure 3 for maps of the study area.
FIGURE 3
TOPOGRAPHY
COR Maps
TASK 2
RESOURCE REVIEW

- Adopted Basin Plans: No basin plans available.
- Floodplain/Floodway (FEMA) Map: There are no FEMA maps available for the Site area.
- Other Offsite Analysis Reports None.
- Sensitive Areas Folio Maps: See Figures 4-9 for documentation of the distance downstream from the proposed project to the nearest critical areas. Included, are sections of the King County Sensitive Areas Folio which indicate the following:
  - Figure 4 100-Year Floodplains and Floodway: There is a 100 year floodplain within one mile of the Site along the downstream path. There is a Class II stream along the south property line.
  - Figure 5 Stream Classifications: There is a stream south of the Site that is classified IV and III.
  - Figure 6 Wetlands: A Category III Wetland is found along the south property line of the Site.
  - Figure 7 Erosion Hazard: The south portion of the Site is mapped as an Erosion Hazard Area per King County IMAP.
  - Figure 8 Landslide Hazard: The south portion of the Site is mapped as an Erosion Hazard Area per King County IMAP.
  - Figure 9 Seismic Hazard: There are no mapped Seismic Hazard Areas within one mile of the Site along the downstream path.
- City of Redmond Drainage Complaints: As shown in Figure 10, there are no open drainage complaints within 1 mile of the Site along the downstream paths within the past 10 years. Mapped drainage complaints have been closed prior to this date.
- Road Drainage Problems: None noted.
- USDA King County Soils Survey: See Figure 11.
- Wetlands Inventory: Vol. 1 North (1990) – The wetland inventory revealed no additional wetlands within the downstream path.
- Migrating River Studies: Bear Creek Watershed Management Study.
- Washington State Department of Ecology's latest published Clean Water Act Section 303d list of polluted waters: Sammamish River has 3 listings for Category 5 water: Dissolved Oxygen, Bacteria, and Temperature.
- King County Designated Water Quality Problems: None at this time.
FIGURE 4
FREQUENTLY FLOODED AREA
COR Standard Maps
FIGURE 5
STREAM CLASSIFICATION
COR Standard Maps
FIGURE 6
WETLANDS
COR Standard Maps
FIGURE 7
EROSION HAZARD AREAS
COR Standard Maps

[Map showing erosion hazard areas with a marked site]

Erosion Hazard Areas
Critical Areas Map
City of Redmond, Washington
Effective: 05/08/2005

Contour
Erosion Hazard Area
City Limit

Park and Open Space
Water

Disclaimer: This map is created and maintained by GIS Services Core Finance and Information Services, City of Redmond, Washington, for reference purposes only.

The City makes no guarantees as to the accuracy of the features shown on this map.
FIGURE 8
LANDSLIDE HAZARD AREAS
COR Standard Maps

City of Redmond
Critical Areas Map
Effective: 03/12/2016
Map 64.7 Landslide Hazards

Legend
- Landslide Hazards Areas
- Contours
- Park

Sources:
City of Redmond GIS Services
King County GIS

Note: This map shall be used as a general guide representing the approximate location of slope slopes, per RZC 21.54.050A(1)(c). It does not necessarily ensure the presence or absence of landslide hazards. In the event of a conflict between the map and the criteria of the Critical Areas Ordinance (CAO), the criteria shall prevail. Consult the CAO (RZC 21.54) for reporting requirements.
FIGURE 9
SEISMIC HAZARD AREAS
COR Standard Maps

Seismic Hazard Areas
Critical Areas Map
City of Redmond, Washington
Effective: 05/28/2006

Water

Site

City Limit

Park and Open Space

Seismic Hazard Area

Redmond 9 Short Plat
Offsite Analysis
FIGURE 10
CITY OF REDMOND DRAINAGE COMPLAINTS

The information included on this map has been compiled by King County staff from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a surveying product. King County shall not be liable for any general, special, indirect, incidental, or consequential damages resulting from the use or misuse of the information contained on this map. Any use of this map or information on this map is prohibited except with written permission of King County.

Date: 8/1/2018

Notes:

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Redmond 9 Short Plat
Offsite Analysis

Page 12 of 24
City of Redmond
FIGURE 11
USDA KING COUNTY SOILS SURVEY MAP

Soil Map—King County Area, Washington
King County Area, Washington
AgB—Alderwood gravelly sandy loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t625
Elevation: 50 to 800 feet
Mean annual precipitation: 25 to 60 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Alderwood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alderwood

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Glacial drift and/or glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 7 inches: gravelly sandy loam
Bw1 - 7 to 21 inches: very gravelly sandy loam
Bw2 - 21 to 30 inches: very gravelly sandy loam
Bg - 30 to 35 inches: very gravelly sandy loam
2Cd1 - 35 to 43 inches: very gravelly sandy loam
2Cd2 - 43 to 59 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Forage suitability group: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XS301WA)
Hydric soil rating: No

Minor Components

Mckenna
Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Everett
Percent of map unit: 5 percent
Landform: Kames, eskers, moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Shalcar
Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Norma
Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

AgC—Alderwood gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 2t626
Elevation: 50 to 800 feet
Mean annual precipitation: 20 to 60 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Alderwood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alderwood
Setting

Landform: Ridges, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Glacial drift and/or glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 7 inches: gravelly sandy loam
Bw1 - 7 to 21 inches: very gravelly sandy loam
Bw2 - 21 to 30 inches: very gravelly sandy loam
Bg - 30 to 35 inches: very gravelly sandy loam
2Cd1 - 35 to 43 inches: very gravelly sandy loam
2Cd2 - 43 to 59 inches: very gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Forage suitability group: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XS301WA), Limited Depth Soils (G002XF303WA)
Hydric soil rating: No

Minor Components

Everett

Percent of map unit: 5 percent
Landform: Kames, eskers, moraines
Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Crest, base slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Indianola

Percent of map unit: 5 percent
Landform: Eskers, kames, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Shalcar

Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Norma

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

AgD—Alderwood gravelly sandy loam, 15 to 30 percent slopes

Map Unit Setting

map unit symbol: 2t627
Elevation: 0 to 1,000 feet
Mean annual precipitation: 25 to 60 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Alderwood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alderwood

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, nose slope, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Glacial drift and/or glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 7 inches: gravelly sandy loam
Bw1 - 7 to 21 inches: very gravelly sandy loam
Bw2 - 21 to 30 inches: very gravelly sandy loam
Bg - 30 to 35 inches: very gravelly sandy loam
2Cd1 - 35 to 43 inches: very gravelly sandy loam
2Cd2 - 43 to 59 inches: very gravelly sandy loam

Properties and qualities
Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 39 inches to dense material
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Forage suitability group: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XS301WA)
Hydric soil rating: No

Minor Components

Everett

Percent of map unit: 5 percent
Landform: Kames, eskers, moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Indianola

Percent of map unit: 5 percent
Landform: Kames, terraces, eskers
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Shalcar

Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Norma

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes
TASK 3
FIELD INSPECTION

UPSTREAM TRIBUTARY AREA

In evaluating the upstream area, we reviewed King County IMAP aerial topography, City of Redmond Property Viewer aerial topography, imagery and conducted field reconnaissance. The local topography is for general slopes from north to south and southwest across the Site. The entire Site is surrounded by single family residences. The northerly property line is bordered by NE 100th Street, which contains an existing conveyance system that collects runoff. Runoff from the east may enter the Site. Said runoff will enter Project collection and detention system.

GENERAL ONSITE AND OFFSITE DRAINAGE DESCRIPTION

Site area is approximately 114,920 s.f. (2.638 acres). Vegetation consists of douglas, fir and cedar trees, as well as lawn, shrubs and bushes. There is currently one single family residence, garage, and driveway.

The development area has slopes from 1 to 15%. The south half of the Site has slopes in excess of 40%.

The Site is located in one Threshold Discharge Area (TDA) and two distinct Natural Discharge Areas (NDA).

Pre-Developed Basin

The Project is located in one Threshold Discharge Area (TDA) and two Natural Discharge Areas (NDA). Vegetation consists of scattered trees, lawn, shrubs and blackberry bushes. There are existing structures which are scheduled to be removed.

NDA 1:

Runoff from the Project Development Area sheet flows across the Site in a southwesterly direction and exits Site at the Natural Discharge Location (NDL 1) near the southwest corner of said NDA where it becomes more of a concentrated flow off site. NDA 1 is mostly flat with areas of slopes reaching 15%.

NDA 2:

Tracts B and C comprise this NDA. Runoff sheet flows across the steep slopes in a southerly direction before it exists near the southeast corner where a Category III and a Class II stream exist (NDL 2). NDA 2 has slopes in excess of 40% in some places. Runoff from both NDAs converge shortly after exiting Site as demonstrated in the offsite analysis.
Post-Developed Basin(s)

NDA 1:
The offsite improvements will include pavement widening, a planter strip and a concrete sidewalk. On site, there will be a subdivision road with 20 feet of pavement, a drainage swale, and a sidewalk along with a cul-de-sac, future homes, their driveways, and lawn. Tract A, recreation space and storm drainage tract, will be developed with a subsurface vault and recreation space equipment along with an access road. The following table and Figure further illustrate the preliminary area breakdown.

NDA 2:
This NDA will remain undeveloped except for the construction of the above ground discharge system from NDA 1.
TASK 4
DRAINAGE SYSTEM DESCRIPTION AND POTENTIAL PROBLEMS

DRAINAGE SYSTEM DESCRIPTION
The downstream analysis (Analysis) is further illustrated and detailed in the Downstream Map (Figure 11) and the Downstream Table (Figure 12). The site visit was completed on 9/11/2018 under cloudy and rainy conditions.

NDA 1:
Concentrated runoff flows in an overgrown and steep channel in a southerly direction for approximately 140 feet. This flow is then intercepted by the main channel of the Class II Stream. Runoff travels in said stream channel, which is also steep and overgrown, for a distance of approximately 250 feet where it converges with runoff from NDA 2.

NDA 2:
Southeasterly shallow concentrated flow from this NDA exits the Site at NDL 2 at the Category III wetland and the aforementioned stream. The confluence of both NDAs flows in the steep creek channel, in an easterly direction, for the remainder of the one quarter mile downstream study.
FIGURE 12
DOWNSTREAM MAP
### FIGURE 13
### DOWNSTREAM TABLES

**NDA Northeast**  
**Subbasin Name:** Bear Creek  
**Subbasin Number:** N/A

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Drainage Component Type, Name, and Size</th>
<th>Drainage Component Description</th>
<th>Slope</th>
<th>Distance From site Discharge</th>
<th>Existing Problems</th>
<th>Potential Problems</th>
<th>Observations of field inspector resource reviewer, or resident</th>
</tr>
</thead>
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<tr>
<td>See map</td>
<td>Type: sheet flow, swale, Stream, channel, pipe, Pond; Size: diameter Surface area</td>
<td>drainage basin, vegetation, cover, depth, type of sensitive area, volume</td>
<td>%</td>
<td>$1/4 \text{ mi}=1,320 \text{ ft}$</td>
<td>Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion</td>
<td>tributary area, likelihood of problem, overflow pathways, potential impacts.</td>
<td></td>
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<td>A1</td>
<td>Natural Discharge Point for NDA 1</td>
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<td></td>
<td></td>
<td>None Observed</td>
<td>None Anticipated</td>
<td></td>
</tr>
<tr>
<td>A1-A2</td>
<td>Southern Stream Flow</td>
<td>Overgrown steep channel flow</td>
<td></td>
<td></td>
<td>None Observed</td>
<td>None Anticipated</td>
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<tr>
<td>A2</td>
<td>Class II Stream</td>
<td></td>
<td>±140'</td>
<td></td>
<td>None Observed</td>
<td>None Anticipated</td>
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<tr>
<td>A2-A3</td>
<td>Southeasterly Stream Flow</td>
<td>Stream flow via Class II stream</td>
<td></td>
<td></td>
<td>None Observed</td>
<td>None Anticipated</td>
<td></td>
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<td>A3</td>
<td>Class II Stream</td>
<td>Runoff converges with NDA 2 in a stream</td>
<td>±390'</td>
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<td>None Observed</td>
<td>None Anticipated</td>
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<td>Natural Discharge Point for NDA 2</td>
<td></td>
<td>±0'</td>
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<td>None Observed</td>
<td>None Anticipated</td>
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<tr>
<td>B1-B2</td>
<td>Shallow Concentrated Flow</td>
<td></td>
<td></td>
<td></td>
<td>None Observed</td>
<td>None Anticipated</td>
<td></td>
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<tr>
<td>B2</td>
<td>Stream</td>
<td>Category III Wetland and Class II stream. NDL 1 and NDL 2 converge</td>
<td></td>
<td></td>
<td>None Observed</td>
<td>None Anticipated</td>
<td></td>
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<tr>
<td>B2 &amp; A3</td>
<td>Stream Flow</td>
<td>Both NDL 1 and NDL 2 continue southerly via stream flow for remainder of $1/4$ mile downstream study</td>
<td></td>
<td></td>
<td>None Observed</td>
<td>None Anticipated</td>
<td></td>
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</table>
TASK 5  MITIGATION OF EXISTING OR POTENTIAL PROBLEMS

A review of the documented drainage complaints available from the City of Redmond within one mile of the downstream flow path revealed no open complaints within the last ten years.

The Site is located in an erosion hazard area. The Class II stream acts as a stormwater conveyance for runoff from this Site as well as other parcels abutting this creek. As stated earlier, the channel of this creek is relatively steep. Therefore there is always a potential for erosion in its channel. The Project is implementing several measures to reduce its impact:

1. During construction the Project will implement standard temporary erosion control while permanent measures will be put in place after construction is complete.

2. The Project is proposing to control developed runoff to prededevlop ed rates assuming forested conditions. In other words, developed runoff will be controlled to rates below what is currently being discharged over the steep slopes. Discharge from the vault will be via an above ground pipe with an above ground dispersal pipe.

3. The Project will be providing the required buffers for the stream and the wetland.

4. Project is providing additional buffer by dedicating additional open space that is contiguous to the buffers.

5. No construction activities are proposed on steep slopes.

These measures exceed the Minimum Requirements per City codes. There should be no adverse impacts as a result of this development.
APPENDIX B
CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN

A preliminary SWPPP is included in this Appendix. A complete SWPPP will be included during the engineering phase of this project.
APPENDIX C
WWHM2012 REPORT
**General Model Information**

Project Name: 18037  
Site Name: Redmond 9  
Site Address: 13437 NE 100th ST  
City: Redmond  
Report Date: 4/1/2019  
Gage: Seatac  
Data Start: 1948/10/01  
Data End: 2009/09/30  
Timestep: 15 Minute  
Precip Scale: 1.000  
Version Date: 2018/07/12  
Version: 4.2.15

**POC Thresholds**

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<th>Threshold Type</th>
<th>Requirement</th>
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<td>Low Flow Threshold for POC1:</td>
<td>50 Percent of the 2 Year</td>
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<td>High Flow Threshold for POC1:</td>
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**Landuse Basin Data**  
*Predeveloped Land Use*

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<th>Predev Land Use</th>
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<th>Total</th>
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<tr>
<td>GroundWater</td>
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<td></td>
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<tr>
<td>Pervious Land Use</td>
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<td>1.857</td>
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<tr>
<td>C, Forest, Flat</td>
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<tr>
<td>Pervious Total</td>
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<td>Basin Total</td>
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</table>

Element Flows To:
- Surface
- Interflow
- Groundwater
Mitigated Land Use

devolved
Bypass: No

GroundWater: No

Pervious Land Use acre
C, Lawn, Flat 0.9542

Pervious Total 0.9542

Impervious Land Use acre
ROADS FLAT 0.2842
ROOF TOPS FLAT 0.3221
DRIVEWAYS FLAT 0.1653
SIDEWALKS FLAT 0.1312

Impervious Total 0.9028

Basin Total 1.857

Element Flows To:
Surface Interflow Groundwater
Vault 1 Vault 1 Vault 1
Routing Elements
Predeveloped Routing
**Mitigated Routing**

**Vault 1**

Width: 51 ft.
Length: 51 ft.
Depth: 12 ft.

Discharge Structure
Riser Height: 11 ft.
Riser Diameter: 18 in.
Orifice 1 Diameter: 0.48 in.  Elevation: 0 ft.
Orifice 2 Diameter: 0.72 in.  Elevation: 7.557 ft.
Orifice 3 Diameter: 1.36 in.  Elevation: 8.59791666666669 ft.

Element Flows To:
Outlet 1  Outlet 2

**Vault Hydraulic Table**

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<th>Stage (feet)</th>
<th>Area (ac.)</th>
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<th>Infiltration (cfs)</th>
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Analysis Results

POC 1

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.857
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.9542
Total Impervious Area: 0.9028

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

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Flow Frequency Return Periods for Mitigated. POC #1

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Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

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1965  0.037  0.040
1966  0.036  0.021
1967  0.074  0.034
1968  0.046  0.016
1969  0.045  0.021
1970  0.037  0.028
1971  0.040  0.017
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1973  0.041  0.050
1974  0.044  0.026
1975  0.060  0.016
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1977  0.005  0.011
1978  0.038  0.027
1979  0.023  0.012
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1989  0.022  0.015
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1993  0.042  0.013
1994  0.014  0.012
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1996  0.128  0.112
1997  0.107  0.097
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2005  0.055  0.014
2006  0.065  0.068
2007  0.130  0.099
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**Ranked Annual Peaks**

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

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Water Quality

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On-line facility target flow: 0.1481 cfs.
Adjusted for 15 min: 0.1481 cfs.
Off-line facility target flow: 0.0827 cfs.
Adjusted for 15 min: 0.0827 cfs.
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Model Default Modifications

Total of 0 changes have been made.

PERLND Changes
No PERLND changes have been made.

IMPLND Changes
No IMPLND changes have been made.
Appendix
Predeveloped Schematic

predev
1.86ac
Mitigated Schematic

developed
1.86ac

SI

Vault 1
Predeveloped UCI File

RUN

GLOBAL

WWHM4 model simulation
START 1948 10 01 END 2009 09 30
RUN INTERP OUTPUT LEVEL 3 0
RESUME 0 RUN 1 UNIT SYSTEM 1
END GLOBAL

FILES

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WDM 26 18037.wdm
MESSU 25 Pre18037.MES
      27 Pre18037.L61
      28 Pre18037.L62
      30 POC180371.dat
END FILES

OPN SEQUENCE

INGRP
PRLND 10
COPY 501
DISPLY 1
END INGRP
END OPN SEQUENCE

DISPLY

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# - #<---------Title---------->***TRAN PIVL DIG1 FIL1 PYR DIG2 FIL2 YRND
   1 predev MAX 1 2 30 9
END DISPLY-INFO1
END DISPLY

COPY

TIMESERIES
# - # NPT NMN ***
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501 1 1
END TIMESERIES
END COPY

GENER

OPCODE
# # OPCD ***
END OPCODE

PARM
# # K ***
END PARM
END GENER

PERLND

GEN-INFO

<PLS ><--------Name-------->NBLKS Unit-systems Printer ***
# - # User t-series Engl Metr ***
in out ***
   10 C, Forest, Flat 1 1 1 1 27 0
END GEN-INFO

*** Section PWATER***

ACTIVITY

<PLS > ************ Active Sections ***********************
# - # ATMP SNOW PWAT SED PST PWG PQAL MSLT PST NITR PHOS TRAC ***
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END ACTIVITY

PRINT-INFO

<PLS > ************ Print-flags *********************** PIVL PYR
# - # ATMP SNOW PWAT SED PST PWG PQAL MSLT PST NITR PHOS TRAC **********
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END PRINT-INFO
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<PLS> PWATER variable monthly parameter value flags ***
# - # CSNO RTOP UZFG VCS VUZ VNN VIFW VIRC VLE INFC HWT ***
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END PWAT-PARM1

PWAT-PARM2
<PLS> PWATER input info: Part 2 ***
# - # ***FOREST LZN INVILT LSUR SLSUR KVARY AGWRC
10 0 4.5 0.08 400 0.05 0.5 0.996
END PWAT-PARM2

PWAT-PARM3
<PLS> PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
10 0 0 2 2 0 0 0
END PWAT-PARM3

PWAT-PARM4
<PLS> PWATER input info: Part 4 ***
# - # CEPS SURS UZS IFWS LZS AGWS GWVS
10 0.2 0.5 0.35 6 0.5 0.7
END PWAT-PARM4

PWAT-STATE1
<PLS> *** Initial conditions at start of simulation
ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
# - # *** RETS SURS UZS IFWS LZS AGWS GWVS
10 0 0 0 0 2.5 1 0
END PWAT-STATE1

END PERLND

IMPLND

GEN-INFO
<PLS><--------Name--------> Unit-systems Printer ***
# - # User t-series Engl Metr ***
END GEN-INFO

*** Section IWATER***

ACTIVITY
<PLS> ************* Active Sections ****************************
# - # ATMP SNOW IWAT SLD IWG IQAL ***
END ACTIVITY

PRINT-INFO
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# - # ATMP SNOW IWAT SLD IWG IQAL ********
END PRINT-INFO

IWAT-PARM1
<PLS> IWATER variable monthly parameter value flags ***
# - # CSNO RTOP VRS VNN RTL1 ***
END IWAT-PARM1

IWAT-PARM2
<PLS> IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
END IWAT-PARM2

IWAT-PARM3
<PLS> IWATER input info: Part 3 ***
# - # *** PETMAX PETMIN
END IWAT-PARM3

IWAT-STATE1
<PLS> *** Initial conditions at start of simulation
# - # *** RETS SURS
END IWAT-STATE1
END IMPLND

SCHEMATIC
<--Source-->  <--Area-->  <--Target-->  MBLK ***
>Name>  #  <--factor-->  <Name>  #  Tbl#  ***
predev***
PERLND 10  1.857  COPY  501  12
PERLND 10  1.857  COPY  501  13

******Routing******
END SCHEMATIC

NETWORK
<--Volume-->  <--Grp-->  <--Member-->  <--Mult-->  Tran  <--Target vols>  <--Grp>  <--Member-->  ***
{Name>  #   <Name>  #  #<--factor-->strg <Name>  #  #  <Name>  #  #  ***
COPY  501  OUTPUT  MEAN  1  1  48.4  DISPLY  1  INPUT  TIMSER  1

******Routing******
END SCHEMATIC

RCHRES
GEN-INFO
   RCHRES  Name  Nexits  Unit  Systems  Printer
   # -  #<------------------><--->  User  T-series  Engl  Metr  LKFG
   in  out
END GEN-INFO
*** Section RCHRES***

ACTIVITY
<PLS > *************  Active Sections  *****************
# -  # HYFG  ADFG  CNFG  HTFG  SDFG  GQFG  OXFG  NUFG  PKFG  PHFG  ***
END ACTIVITY

PRINT-INFO
<PLS > *****************  Print-flags  ************
# -  # HYDR  ADCA  CONS  HEAT  SED  GQL  OXRX  NUTR  PLNK  PHCB  PIVL  PYR  ********
END PRINT-INFO

HYDR-PARM1
   RCHRES  Flags  for  each  HYDR  Section
   # -  #  VC  A1  A2  A3  ODFVFG  for  each  ***  ODGTFG  for  each  FUNCT  for  each
   FG  FG  FG  FG  possible  exit  ***  possible  exit  possible  exit
   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
END HYDR-PARM1

HYDR-PARM2
# -  #  FTABNO  LEN  DELTH  STCOR  KS  DB50
<--------><--------><--------><--------><--------><--------><--------><--------><-------->
END HYDR-PARM2

HYDR-INIT
   RCHRES  Initial  conditions  for  each  HYDR  section
   # -  #  ***  VOL  Initial  value  of  COLIND  Initial  value  of  OUTDGT
   ***  ac-ft  for  each  possible  exit  for  each  possible  exit
   <--------><--------><--------><--------><--------><--------><--------><--------><-------->
END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<--Volume-->  <Member>  SsysSgap<--Mult-->  Tran  <--Target vols>  <--Grp>  <--Member-->  ***
{Name>  #  <Name>  #  tem  strg<--factor-->strg <Name>  #  #  <Name>  #  #  ***
WDM  2  PREC  ENGL  1  PERLND  1  999  EXTNL  PREC
WDM  2  PREC  ENGL  1  IMPLND  1  999  EXTNL  PREC
WDM 1 EVAP ENGL 0.76 PERLND 1 999 EXTNL PETINP
WDM 1 EVAP ENGL 0.76 IMPLND 1 999 EXTNL PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><-Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name> # <Name> # #<-factor->strg <Name> # <Name> tem strg strg***
COPY 501 OUTPUT MEAN 1 1 48.4 WDM 501 FLOW ENGL REPL
END EXT TARGETS

MASS-LINK
<-Volume> <-Grp> <-Member-><-Mult--> <Target> <-Grp> <-Member->***
<Name> <Name> # #<-factor-> <Name> <Name> # #***
MASS-LINK 12 PERLND PWATER SURO 0.083333 COPY INPUT MEAN
END MASS-LINK 12

MASS-LINK 13 PERLND PWATER IFWO 0.083333 COPY INPUT MEAN
END MASS-LINK 13

END MASS-LINK

END RUN
Mitigated UCI File

RUN

GLOBAL
  WWHM4 model simulation
  START 1948 10 01       END 2009 09 30
  RUN INTERP OUTPUT LEVEL 3  0
  RESUME 0 RUN 1          UNIT SYSTEM 1
END GLOBAL

FILES
  <File>  <Un#>  <-----------File Name-------------------->***
  <-ID->   ***
  WDM  26  18037.wdm
  MESSU  25  Mit18037.MES
        27  Mit18037.L61
        28  Mit18037.L62
        30  POC180371.dat
END FILES

OPN SEQUENCE
  INGRP          INDELT 00:15
    FERLND  16
    IMPLND  1
    IMPLND  4
    IMPLND  5
    IMPLND  8
    RCHRES  1
    COPY   1
    COPY   501
    DISPLAY 1
  END INGRP
END OPN SEQUENCE

DISPLAY
  DISPLAY-INFO1
    # - #<---------------Title------------------->***TRAN PIVL DIG1 FIL1 PYR DIG2 FIL2 YRND
    1    Vault 1 MAX 1 2 30 9
  END DISPLAY-INFO1
END DISPLAY

COPY
  TIMESERIES
    # - # NPT NMN ***
    1  1  1
    501 1 1
  END TIMESERIES
END COPY

GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    # K ***
  END PARM
END GENER

PERLND
  GEN-INFO
    <PLS ><----------Name----------->NBLKS Unit-systems Printer ***
    # - # User t-series Engl Metr ***
    in out ***
    16  C, Lawn, Flat 1 1 1 1 27 0
  END GEN-INFO

*** Section PWATER***

ACTIVITY
  <PLS > ************ Active Sections **********************
    # - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC ***
    16 0 0 1 0 0 0 0 0 0 0 0
END ACTIVITY
PRINT-INFO
<PLS> **************** Print-flags ********************** PIVL PYR
# - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC ********
16 0 0 4 0 0 0 0 0 0 0 0 1 9
END PRINT-INFO

PWAT-PARM1
<PLS> PWATER variable monthly parameter value flags ***
# - # CSNO RTOP UZFG VCS VUZ VNN VIFW VIRC VLE INFC HWT ***
16 0 0 0 0 0 0 0 0 0 0 0
END PWAT-PARM1

PWAT-PARM2
<PLS> PWATER input info: Part 2 ***
# - # ***FOREST LZSN INFILT LSUR SLSUR KVARY AGWRC
16 0 4.5 0.03 400 0.05 0.5 0.996
END PWAT-PARM2

PWAT-PARM3
<PLS> PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
16 0 0 2 2 0 0 0
END PWAT-PARM3

PWAT-PARM4
<PLS> PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
16 0.1 0.25 0.25 6 0.5 0.25
END PWAT-PARM4

PWAT-STATE1
<PLS> *** Initial conditions at start of simulation
ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
# - # *** CEPS SURS UZS IFWS LZS AGWS GWVS
16 0 0 0 0 2.5 1 0
END PWAT-STATE1

END PERLND

IMPLND

GEN-INFO
<PLS><-------Name------->   Unit-systems   Printer ***
# - #                     User  t-series Engl Metr ***
in  out           ***
1      ROADS/FLAT             1    1    1   27    0
4      ROOF TOPS/FLAT         1    1    1   27    0
5      DRIVEWAYS/FLAT         1    1    1   27    0
8      SIDEWALKS/FLAT         1    1    1   27    0
END GEN-INFO

*** Section IWATER***

ACTIVITY
<PLS> ************* Active Sections ***********************
# - # ATMP SNOW IWAT SLD IWG IQAL ***
1 0 0 1 0 0 0
4 0 0 1 0 0 0
5 0 0 1 0 0 0
8 0 0 1 0 0 0
END ACTIVITY

PRINT-INFO
<ILS> ******** Print-flags ******** PIVL PYR
# - # ATMP SNOW PWAT SLD IWG IQAL ********
1 0 0 4 0 0 0 0 1 9
4 0 0 4 0 0 0 0 1 9
5 0 0 4 0 0 0 0 1 9
8 0 0 4 0 0 0 0 1 9
END PRINT-INFO

IWAT-PARM1
<PLS> IWATER variable monthly parameter value flags ***
# - # CSNO RTOP VRS VNN RTLI ***
1 0 0 0 0 0
4 0 0 0 0 0
5 0 0 0 0 0
8 0 0 0 0 0
END IWAT-PARM1

IWAT-PARM2
<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
1 400 0.01 0.1 0.1
4 400 0.01 0.1 0.1
5 400 0.01 0.1 0.1
8 400 0.01 0.1 0.1
END IWAT-PARM2

IWAT-PARM3
<PLS > IWATER input info: Part 3 ***
# - # *** PETMAX PETMIN
1 0 0
4 0 0
5 0 0
8 0 0
END IWAT-PARM3

IWAT-STATE1
<PLS > *** Initial conditions at start of simulation
# - # *** RETS SURS
1 0 0
4 0 0
5 0 0
8 0 0
END IWAT-STATE1

END IMPLND

SCHEMATIC
<--Source--> <--Area--> <--Target--> MBLK ***
<Name> # <--factor--> <Name> # #<-factor->strg <Name> # #  ***
developed***
PERLND 16 0.9542 RCHRES 1 2
PERLND 16 0.9542 RCHRES 1 3
IMPLND 1 0.2842 RCHRES 1 5
IMPLND 4 0.3221 RCHRES 1 5
IMPLND 5 0.1653 RCHRES 1 5
IMPLND 8 0.1312 RCHRES 1 5

******Routing******
PERLND 16 0.9542 COPY 1 12
IMPLND 1 0.2842 COPY 1 15
IMPLND 4 0.3221 COPY 1 15
IMPLND 5 0.1653 COPY 1 15
IMPLND 8 0.1312 COPY 1 15
PERLND 16 0.9542 COPY 1 13
RCHRES 1 1 COPY 501 16
END SCHEMATIC

NETWORK
<--Volume--> <--Grp> <--Member--> <--Mult--> Tran <--Target vols> <--Grp> <--Member--> ***
<Name> # <Name> # #<-factor->strg <Name> # # <Name> # #  ***
COPY 501 OUTPUT MEAN 1 1 48.4 DISPLY 1 INPUT TIMSER 1

<--Volume--> <--Grp> <--Member--> <--Mult--> Tran <--Target vols> <--Grp> <--Member--> ***
<Name> # <Name> # #<-factor->strg <Name> # # <Name> # #  ***
END NETWORK

RCHRES
GEN-INFO
**RCHRES**

Name | Nexits | Unit Systems | Printer
--- | --- | --- | ---
# - #<-----------<------ User T-series Engl Metr LKFG

in out

1 Vault 1 1 1 1 1 28 0 1

END GEN-INFO

*** Section RCHRES***

**ACTIVITY**

**PRINT-INFO**

**HYDR-PARM1**

**HYDR-PARM2**

**HYDR-INIT**

**SPEC-ACTIONS**

**FTABLES**

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COPY 1 OUTPUT MEAN 1 1 48.4 WDM 701 FLOW ENGL REPL
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END EXT TARGETS

MASS-LINK
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MASS-LINK 3 PERLND PWATER IFWO 0.083333 RCHRES INFLOW IVOL
END MASS-LINK 3

MASS-LINK 5 IMPLND IWATER SURO 0.083333 RCHRES INFLOW IVOL
END MASS-LINK 5

MASS-LINK 12 PERLND PWATER SURO 0.083333 COPY INPUT MEAN
END MASS-LINK 12

MASS-LINK 13 PERLND PWATER IFWO 0.083333 COPY INPUT MEAN
END MASS-LINK 13

MASS-LINK 15 IMPLND IWATER SURO 0.083333 COPY INPUT MEAN
END MASS-LINK 15

MASS-LINK 16 RCHRES ROFLOW COPY INPUT MEAN
END MASS-LINK 16

END MASS-LINK

END RUN
Predeveloped HSPF Message File
The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:
DATE/TIME: 1967/ 8/31 24: 0

RCHRES : 1

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Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR is the storage of material in the processing unit (land-segment or reach/reservoir) at the end of the present interval.
STORS is the storage of material in the pu at the start of the present printout reporting period.
MATIN is the total inflow of material to the pu during the present printout reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the present printout reporting period.

The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:
DATE/TIME: 2002/ 8/31 24: 0

RCHRES : 1

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Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR is the storage of material in the processing unit (land-segment or reach/reservoir) at the end of the present interval.
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