

# Marymoor Gateway Trail

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## Full Drainage Review

Project No. 1137036



August 3rd, 2023



Department of Natural Resources and Parks

Water and Land Resources Division

Stormwater Services Section

King Street Center, KSC-NR-5600

201 South Jackson Street, Suite 5600

Seattle, WA 98104

206-477-4800

[www.kingcounty.gov/stormwater](http://www.kingcounty.gov/stormwater)

# Marymoor Gateway Trail

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## Full Drainage Review

**Project Name:** Marymoor Gateway Trail

**Project Number:** 1137036

**Prepared For:** Capital Improvement Projects  
Parks and Recreation Division  
Dept. of Natural Resources and Parks  
King County

**Prepared By:** Brianna Celaya, EIT, Capital Project Manager II  
DNRP/WLRD/SWS - Capital Services Unit

**Reviewed By:** Wes Kameda, P.E., Engineer IV  
DNRP/WLRD/SWS – Capital Services Unit

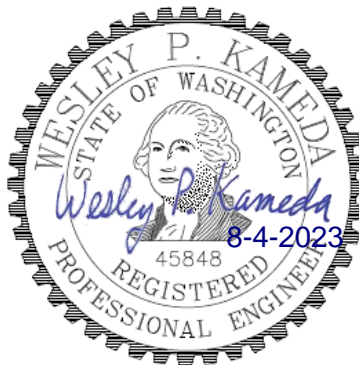


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## Marymoor Gateway Trail TIR

The Technical Information Report is a comprehensive document that discusses the stormwater management plan for the project. The report addresses flow control, water quality treatment, onsite and offsite flow conveyance systems, and erosion control measures. The document is organized in accordance with Chapter 2 of King County's 2021 *Surface Water Design Manual*.

## Figure 1 - TIR Worksheet and Drainage Review Requirements

### TECHNICAL INFORMATION REPORT (TIR) WORKSHEET

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #e0e0e0;"> <th style="text-align: left; padding: 2px;">Part 1 PROJECT OWNER AND PROJECT ENGINEER</th> </tr> <tr> <td style="padding: 5px;">                     Project Owner: <i>King County DNRP – Parks and Recreation Division</i>                      Phone: (206) 477-4527                      Address: <i>201 S. Jackson Street, Seattle WA 98104</i>                      Project Engineer:  <i>Prepared by: Brianna Celaya</i>  <i>Project Manager: Shazaad Jarrahan</i>                      Company: <i>King County</i>                      Phone: (206)-200-7280                 </td> </tr> </table>	Part 1 PROJECT OWNER AND PROJECT ENGINEER	Project Owner: <i>King County DNRP – Parks and Recreation Division</i> Phone: (206) 477-4527 Address: <i>201 S. Jackson Street, Seattle WA 98104</i> Project Engineer: <i>Prepared by: Brianna Celaya</i> <i>Project Manager: Shazaad Jarrahan</i> Company: <i>King County</i> Phone: (206)-200-7280	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #e0e0e0;"> <th style="text-align: left; padding: 2px;">Part 2 PROJECT LOCATION AND DESCRIPTION</th> </tr> <tr> <td style="padding: 5px;">                     Project Name: <i>Marymoor Gateway Trail</i>                      DPER Permit # <i>TBD</i>                      Location: <i>SE - 12 - 25 - 5</i>                      Site Address: <i>16325 NE Marymoor Way, Redmond, WA 98052</i>                      Parcel No. <i>12205059037</i> </td> </tr> </table>	Part 2 PROJECT LOCATION AND DESCRIPTION	Project Name: <i>Marymoor Gateway Trail</i> DPER Permit # <i>TBD</i> Location: <i>SE - 12 - 25 - 5</i> Site Address: <i>16325 NE Marymoor Way, Redmond, WA 98052</i> Parcel No. <i>12205059037</i>			
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Part 6 SWDM ADJUSTMENT APPROVALS								

Marymoor Gateway Trail TIR

Type (circle one): Standard / Experimental / Blanket Description: (include conditions in TIR Section 2) <i>None</i> _____
Approved Adjustment No. _____ Date of Approval: _____

Part 7 MONITORING REQUIREMENTS	
Monitoring Required: TBD Start Date: _____ Completion Date: _____	Describe: TBD Refer to Clearing and Grading permit approval conditions if applicable Re: _____

Part 8 SITE COMMUNITY AND DRAINAGE BASIN
Community Plan: East Sammamish Special District Overlays: None that impact drainage review Drainage Basin: Sammamish River Basin Stormwater Requirements: Full Drainage Review due to new plus replaced impervious > 2000 sf

Part 9 ONSITE AND ADJACENT SENSITIVE AREAS	
<input type="checkbox"/> River/Stream _____ <input checked="" type="checkbox"/> Lake _____ <input type="checkbox"/> Wetlands _____ <input type="checkbox"/> Closed Depression _____ <input checked="" type="checkbox"/> Floodplain _____ <input type="checkbox"/> Other _____	<input type="checkbox"/> Steep Slope _____ <input type="checkbox"/> Erosion Hazard _____ <input type="checkbox"/> Landslide Hazard _____ <input type="checkbox"/> Coal Mine Hazard _____ <input checked="" type="checkbox"/> Seismic Hazard _____ <input type="checkbox"/> Habitat Protection _____

Part 10 SOILS			
<table> <tr> <td>Soil Type <i>Indianola (outwash)</i> <i>Earlmont (till)</i></td> <td>Slopes <i>Flat</i></td> <td>Erosion Potential <i>Low to moderate</i></td> </tr> </table> <input type="checkbox"/> High Groundwater Table (within 5 feet) <input type="checkbox"/> Sole Source Aquifer <input type="checkbox"/> Other _____ <input type="checkbox"/> Seeps/Springs <input type="checkbox"/> Additional Sheets Attached. See Figure 4	Soil Type <i>Indianola (outwash)</i> <i>Earlmont (till)</i>	Slopes <i>Flat</i>	Erosion Potential <i>Low to moderate</i>
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Marymoor Gateway Trail TIR

Part 11 DRAINAGE DESIGN LIMITATIONS	
REFERENCE	LIMITATION / SITE CONSTRAINT
<input type="checkbox"/> Core 2 – Offsite Analysis _____	_____
<input checked="" type="checkbox"/> Sensitive/Critical Areas _____	_____
<input checked="" type="checkbox"/> SEPA _____	_____
<input type="checkbox"/> LID Infeasibility _____	_____
<input type="checkbox"/> Other _____	_____
<input type="checkbox"/> Additional Sheets Attached.	



Marymoor Gateway Trail TIR

Part 12 TIR SUMMARY SHEET	
Threshold Discharge Area: <b>TDA 1 – South Project Site</b>	
Core Requirements (all 8 apply):	
1. Discharge at Natural Location	Number of Natural Discharge Locations: 1
2. Offsite Analysis	Level: <input checked="" type="checkbox"/> 1 / 2 / 3 dated: May 2023
3. Flow Control (include facility summary sheet)	Level: 1 / <input checked="" type="checkbox"/> 2 / 3 or Exemption Number: 2 (pg. 1-44) Less than 0.15 CFS increase Flow Control BMPs: Basic Dispersion
4. Conveyance System	Ditch located downstream of Facility D98803
5. Erosion and Sediment Control / Construction Stormwater Pollution Prevention	CSWPP/CESCL/ESC Site Supervisor: <u>TBD</u> Contact Phone: _____ After Hours Phone: _____
6. Maintenance and Operation	Responsibility (circle one): Private / <input checked="" type="checkbox"/> Public If Private, Maintenance Log Required: Yes / No
7. Financial Guarantees and Liability	Provided: Yes / <input checked="" type="checkbox"/> No
8. Water Quality (include facility summary sheet)	Type (circle one): <input checked="" type="checkbox"/> Basic / Sens. Lake / Enhanced Basic / Bog or Exemption No. <u>Exemption No. 1 (pg. 1-69)</u> Landscape Management Plan: Yes / <input checked="" type="checkbox"/> No
<b>Special Requirements (as applicable):</b> None	
9. Area Specific Drainage Requirements	Type: CDA / SDO / MDP / BP / LMP / Shared Fac. / <input checked="" type="checkbox"/> None Name: _____
10. Floodplain/Floodway Delineation	Type (circle one): Major / Minor / Exemption / <input checked="" type="checkbox"/> None 100-year Base Flood Elevation (or range): _____ Datum: NAVD88
11. Flood Protection Facilities	Describe: None
12. Source Control (commercial / industrial landuse)	Describe land use: NA Describe any structural controls: NA
13. Oil Control N/A	High-use Site: Yes / <input checked="" type="checkbox"/> No Treatment BMP: _____ Maintenance Agreement: Yes / <input checked="" type="checkbox"/> No with whom? _____
<b>Other Drainage Structures</b>	
Describe:	

Marymoor Gateway Trail TIR

Part 12 TIR SUMMARY SHEET	
Threshold Discharge Area: <b>TDA 2 – Center Project Site</b>	
Core Requirements (all 8 apply):	
1. Discharge at Natural Location	Number of Natural Discharge Locations: 1
2. Offsite Analysis	Level: <input type="checkbox"/> 1 / <input type="checkbox"/> 2 / <input type="checkbox"/> 3 dated: May 2023
3. Flow Control (include facility summary sheet)	Level: 1 / <input type="checkbox"/> 2 / <input type="checkbox"/> 3 or Exemption Number: 2 (pg. 1-44) Less than 0.15 CFS increase Flow Control BMPs: Basic Dispersion
4. Conveyance System	Spill containment located at: Facility D98803
5. Erosion and Sediment Control / Construction Stormwater Pollution Prevention	CSWPP/CESCL/ESC Site Supervisor: <u>TBD</u> Contact Phone: _____ After Hours Phone: _____
1. Maintenance and Operation	Responsibility (circle one): Private / <input checked="" type="checkbox"/> Public If Private, Maintenance Log Required: Yes / No
2. Financial Guarantees and Liability	Provided: Yes / <input checked="" type="checkbox"/> No
3. Water Quality (include facility summary sheet)	Type (circle one): <input checked="" type="checkbox"/> Basic / Sens. Lake / Enhanced Basic / Bog or Exemption No. <u>Exemption No. 1 (pg. 1-69)</u> Landscape Management Plan: Yes / <input checked="" type="checkbox"/> No
<b>Special Requirements (as applicable):</b> None	
4. Area Specific Drainage Requirements	Type: CDA / SDO / MDP / BP / LMP / Shared Fac. / <input checked="" type="checkbox"/> None Name: _____
5. Floodplain/Floodway Delineation	Type (circle one): Major / Minor / Exemption / <input checked="" type="checkbox"/> None 100-year Base Flood Elevation (or range): _____ Datum: NAVD88
6. Flood Protection Facilities	Describe: None
7. Source Control (commercial / industrial landuse)	Describe land use: NA Describe any structural controls: NA
8. Oil Control N/A	High-use Site: Yes / <input checked="" type="checkbox"/> No Treatment BMP: _____ Maintenance Agreement: Yes / <input checked="" type="checkbox"/> No with whom? _____
<b>Other Drainage Structures</b>	
Describe:	

Marymoor Gateway Trail TIR

Part 12 TIR SUMMARY SHEET	
Threshold Discharge Area: <b>TDA 3 – South Project Site</b>	
Core Requirements (all 8 apply):	
1. Discharge at Natural Location	Number of Natural Discharge Locations: 1
2. Offsite Analysis	Level: <input type="checkbox"/> 1 / <input type="checkbox"/> 2 / <input type="checkbox"/> 3 dated: May 2023
3. Flow Control (include facility summary sheet)	Level: 1 / <input type="checkbox"/> 2 / <input type="checkbox"/> 3 or Exemption Number: 2 (pg. 1-44) Less than 0.15 CFS increase Flow Control BMPs: Basic Dispersion
4. Conveyance System	Ditch located south of Marymoor Way that drains to Sammamish River, downstream
5. Erosion and Sediment Control / Construction Stormwater Pollution Prevention	CSWPP/CESCL/ESC Site Supervisor: <u>TBD</u> Contact Phone: _____ After Hours Phone: _____
6. Maintenance and Operation	Responsibility (circle one): Private / <input type="checkbox"/> Public If Private, Maintenance Log Required: Yes / No
7. Financial Guarantees and Liability	Provided: Yes / <input type="checkbox"/> No
8. Water Quality (include facility summary sheet)	Type (circle one): <input type="checkbox"/> Basic / <input type="checkbox"/> Sens. Lake / <input type="checkbox"/> Enhanced Basic / <input type="checkbox"/> Bog or Exemption No. <u>Exemption No. 1 (pg. 1-69)</u> Landscape Management Plan: Yes / <input type="checkbox"/> No
<b>Special Requirements (as applicable):</b> None	
9. Area Specific Drainage Requirements	Type: CDA / SDO / MDP / BP / LMP / Shared Fac. / <input type="checkbox"/> None Name: _____
10. Floodplain/Floodway Delineation	Type (circle one): Major / Minor / Exemption / <input type="checkbox"/> None 100-year Base Flood Elevation (or range): _____ Datum: NAVD88
11. Flood Protection Facilities	Describe: None
12. Source Control (commercial / industrial landuse)	Describe land use: NA Describe any structural controls: NA
13. Oil Control N/A	High-use Site: Yes / <input type="checkbox"/> No Treatment BMP: _____ Maintenance Agreement: Yes / <input type="checkbox"/> No with whom? _____
<b>Other Drainage Structures</b>	
Describe:	



Marymoor Gateway Trail TIR

Part 15 EASEMENTS/TRACTS	Part 16 STRUCTURAL ANALYSIS
<input type="checkbox"/> Drainage Easement <input type="checkbox"/> Covenant <input type="checkbox"/> Native Growth Protection Covenant <input type="checkbox"/> Tract <input type="checkbox"/> Other	<input type="checkbox"/> Cast in Place Vault <input type="checkbox"/> Retaining Wall <input type="checkbox"/> Rockery > 4' High <input type="checkbox"/> Structural on Steep Slope <input type="checkbox"/> Other _____

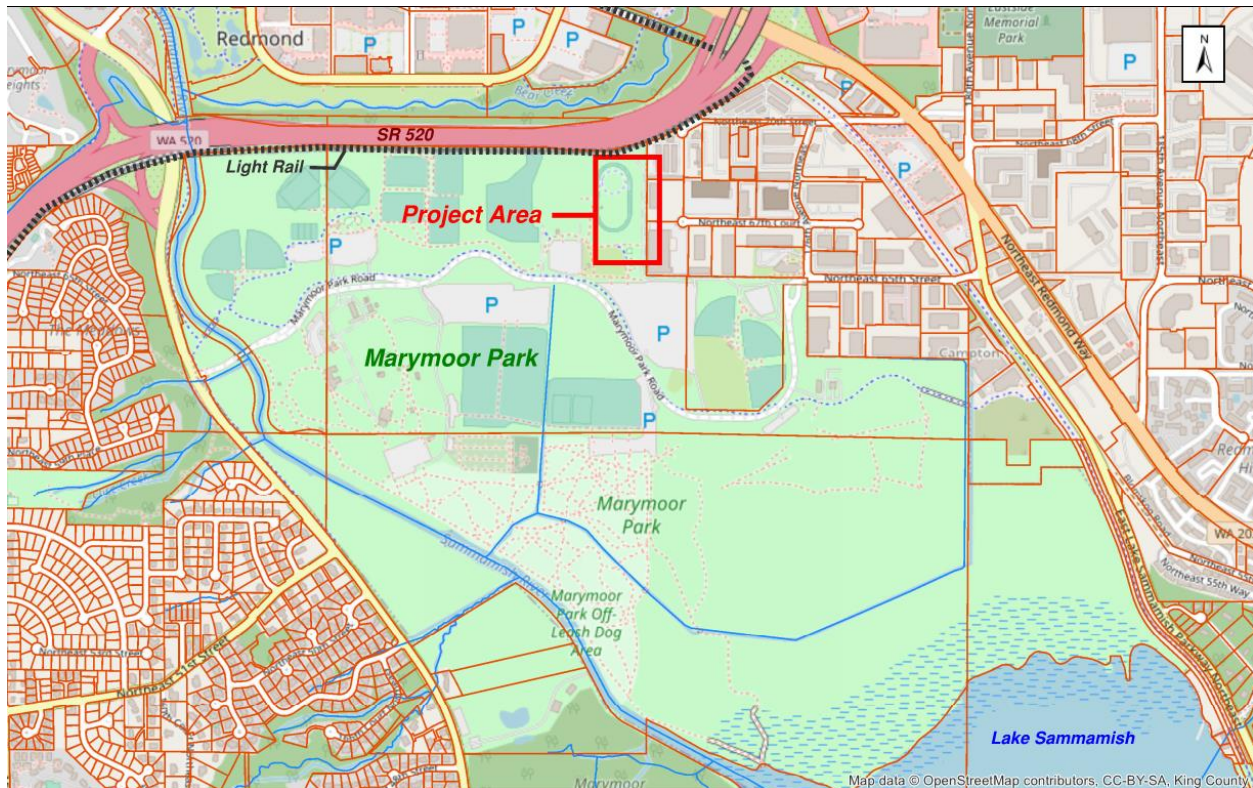
Part 17 SIGNATURE OF PROFESSIONAL ENGINEER
<p>I, or a civil engineer under my supervision, have visited the site. Actual site conditions as observed were incorporated into this worksheet and the attached Technical Information Report. To the best of my knowledge the information provided here is accurate.</p> <p>Signed/Date <i>Wesley P. Kamada</i> 8-4-2023</p>

**Figure 1 - TIR Worksheet**

## Section 1.0 PROJECT OVERVIEW

### 1.1 Introduction and Purpose

Marymoor Park is located in unincorporated King County at the northern tip of Lake Sammamish. The King County Department of Natural Resources and Parks, Parks and Recreation Division is proposing to construct a new trail in the northeast corner of Marymoor Park to provide a pedestrian entrance to the Park from southeast Redmond and the SE Redmond Light Rail station. Figure 2 shows the project location.



**Figure 2 - Site Location**

This project is located entirely within Marymoor Park, in King County parcel 122505-9037, a 177-acre R-1 zoned parcel that makes up a part of the 640-acre park. This project is near the existing velodrome, although the velodrome is not a part of this project area. The project area is bordered by State Route (SR) 520 along the north end of Marymoor Park, to the east is an industrial area situated within the City of Redmond, to the south is a paved roadway, NE Marymoor Way, and a gravel parking area. To the west of the project area, is an asphalt parking area that is used as event space. By the year 2024 SR 520 will be paralleled by a Sound Transit Light Rail route, whose ridership will increase the pedestrian activity within the park. The adjacent parcels within the City of Redmond are zoned MDD1, MDD2 and MDD5 which provide transit-oriented housing and employment, mixed use multifamily and commercial uses.

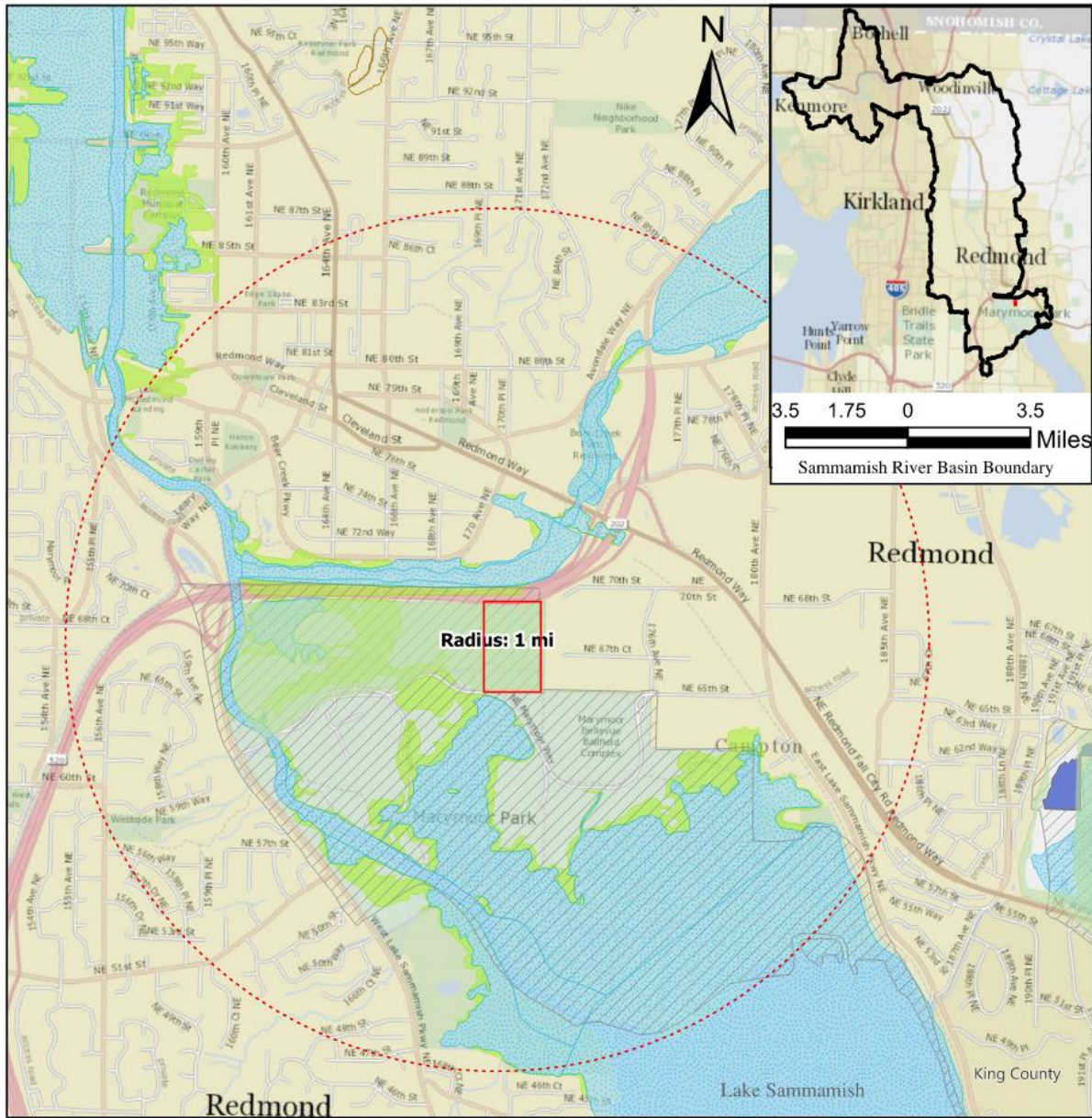
## Marymoor Gateway Trail TIR

The Marymoor Gateway Trail Project (Project) will add lighted pedestrian and bicycle trails, a paved plaza, and trail and park amenities such as benches, signage, and art. The project will add approximately 1,400 linear feet of new trail, replace approximately 300 linear feet of trail and add a 2,400 square foot plaza. Basic dispersion from the trail across a vegetated flow path will be used for stormwater management.

The project site is located within the Sammamish River drainage basin in Water Resource Inventory Area (WRIA) 8. The site is within the southwestern corner of section 12, township 25 north, range 5 east. The headwaters of the Sammamish River begin at the northern outlet of Lake Sammamish. The river flows north through sections of the developed cities of the Redmond, Kirkland, Woodinville, Bothell, and parts of Kenmore. The river enters Lake Washington on the west side of Kenmore.



# Marymoor Gateway Trail TIR



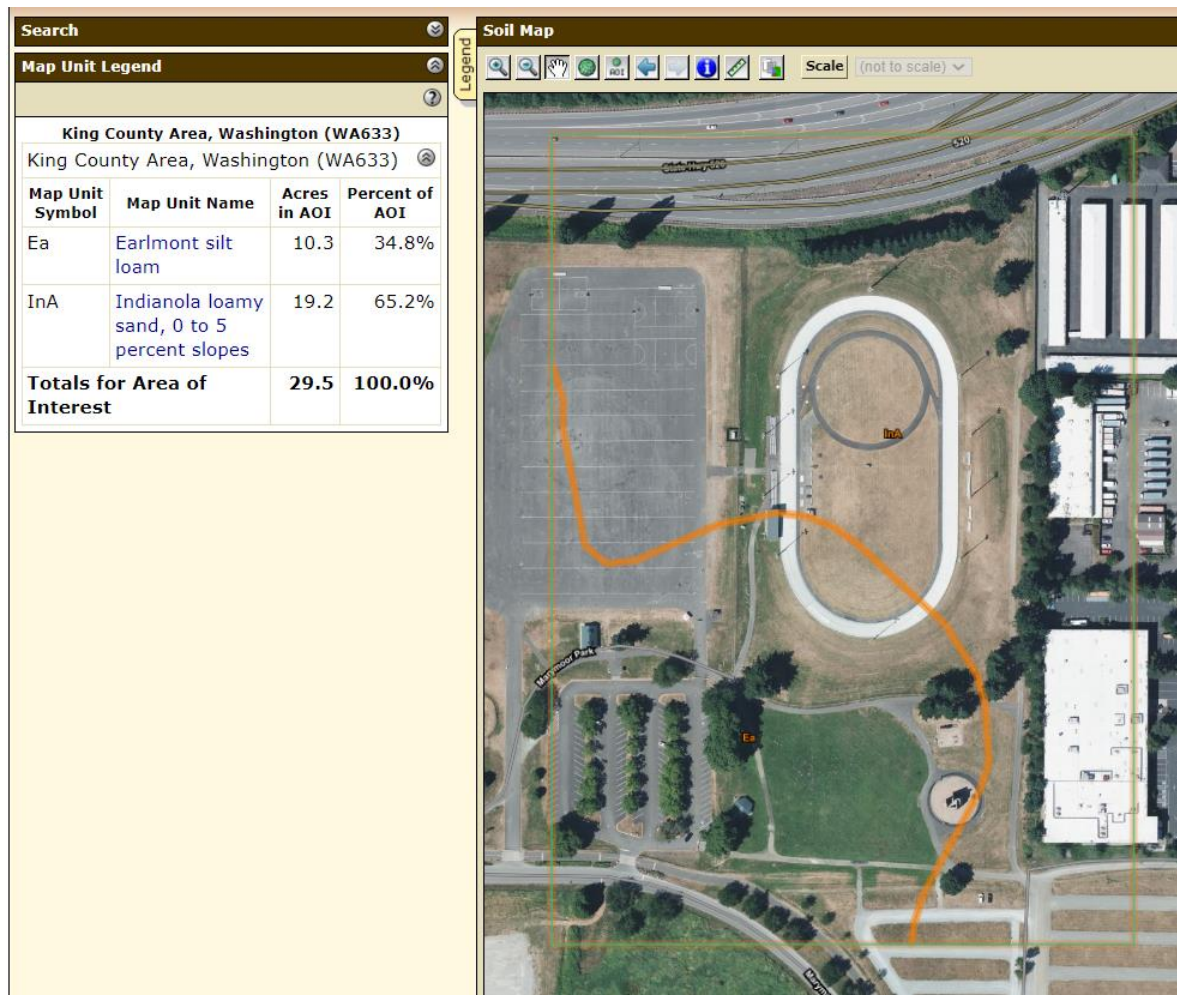
- Project Location
- Basin boundaries derived from terrain data
- FEMA 100 year floodplain
- FEMA 500 year floodplain
- Designated Critical Areas
- Seismic Hazards
- Landslide Hazards along River Corridors-Landslide outline (polygon contains all features of a deep-seated landslide)
- Wetlands defined from CAO surveys in King County
- WETLAND\_RATING
- <Null>
- 0
- 1
- 2
- 3
- 4
- <all other values>
- Critical Aquifer Recharge Areas
- CAT\_CODE
- 1
- 2
- 3
- <all other values>
- 1-Mile Radius from Project Site

**Figure 3 - Existing Drainage Basins, Subbasins, and Site Characteristics**



This project meets the criteria for a full drainage review per the 2021 King County Surface Water Design Manual (SWDM). This Technical Information Report (TIR) shows that the proposed project is following the applicable requirements of the SWDM.

The project is being implemented by the King County Department of Natural Resources and Parks (DNRP), Parks and Recreation Division. The DNRP Water and Land Resources Division (WRLD) Stormwater Services Capital Services Unit will be assisting in the design, analysis, and drainage review of the stormwater facilities proposed as part of the project. Permits will be sought from the King County Department of Local Services, Permitting Division.



**Figure 4 - Soils (Map from USDA, NRCS Web Soil Survey)**

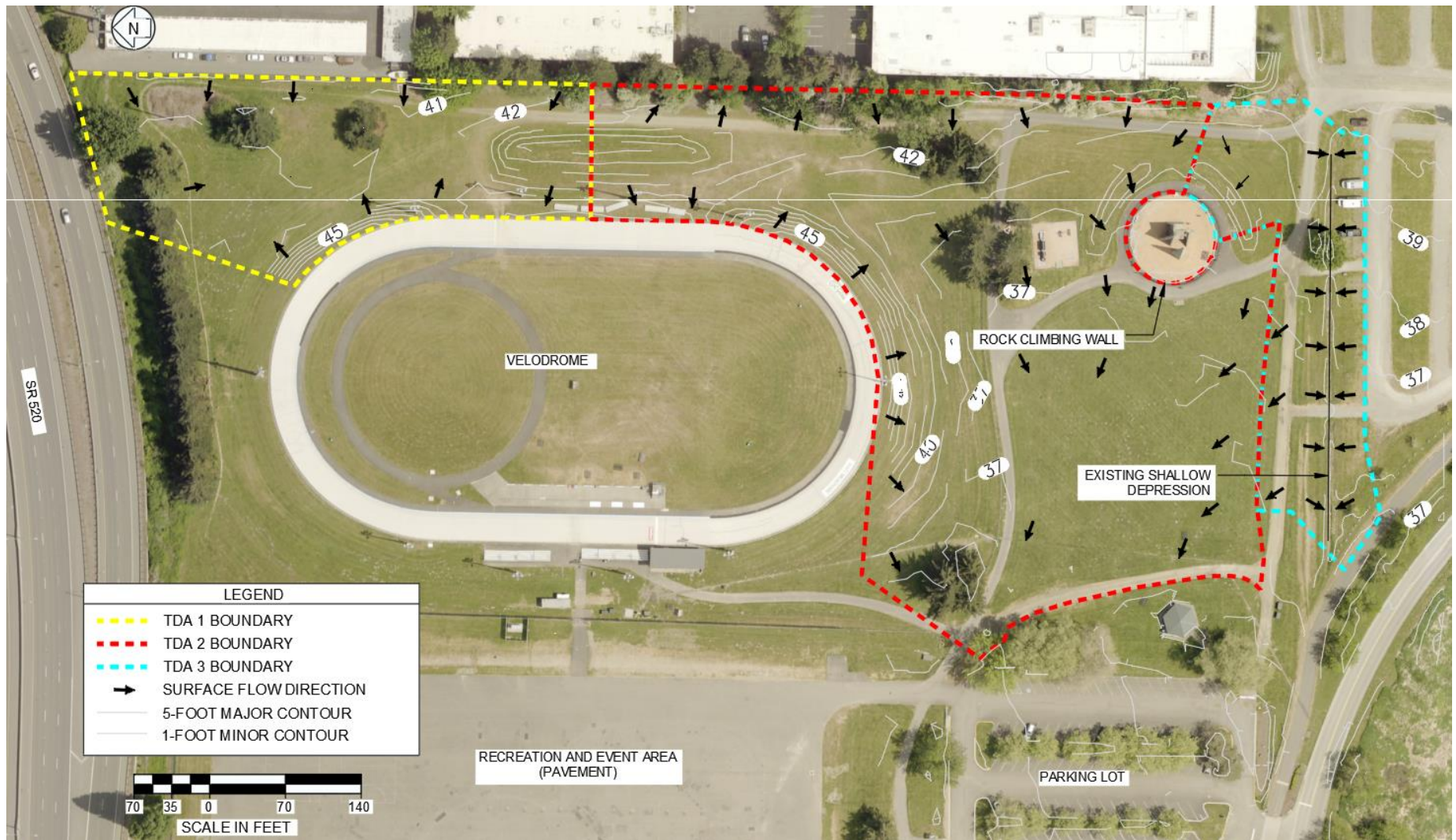
The soils within the project site were investigated in a geotechnical investigation conducted by Golder Associates Inc as part of the larger Sound Transit extension project. The investigation report is included in Appendix A. Two 10-ft deep test pits were dug onsite and encountered poorly graded sand. The water table was not observed at either test pit. Two Small-Scale Pilot Infiltration Tests (PIT) were completed onsite, and the field data analysis resulted in uncorrected infiltration rates of 74 inches per hour (in/hr) and 71 in/hr. These rates will not be used for design. Per the

SWDM, a maximum design infiltration rate is limited to 20 in/hr. The U.S. Department of Agriculture, Natural Resources Conservation Service's (NRCS) Web Soil Survey classifies similar subsurface conditions. The basin is composed of two soil map units: Indianola loamy sand (InA) and Earlmont silt loam (Ea). The soil characteristics shown in Figure 4 are consistent with the soils observed onsite in the geotechnical study.

## **1.2 Existing Conditions**

The project site is fairly flat with the exception of an existing berm located east of the velodrome track. Stormwater runoff that is generated within the project site is either absorbed by the vegetated lawn or flows overland to the southwest. There is an existing shallow depression, without an outfall, located between the climbing wall and a gravel parking area that may collect runoff. Parks maintenance staff have commented that they have not experienced any drainage issues with the site except for some ponding during larger storm events in the grass area near the confluence of the existing walking trails near the access path to the velodrome. te.

Figure 5 shows the existing conditions of the project site.



**Figure 5 - Existing On-Site Flow Conditions**

### 1.2.1 *Existing Threshold Discharge Area*

The project has three existing threshold discharge areas, as shown in te.

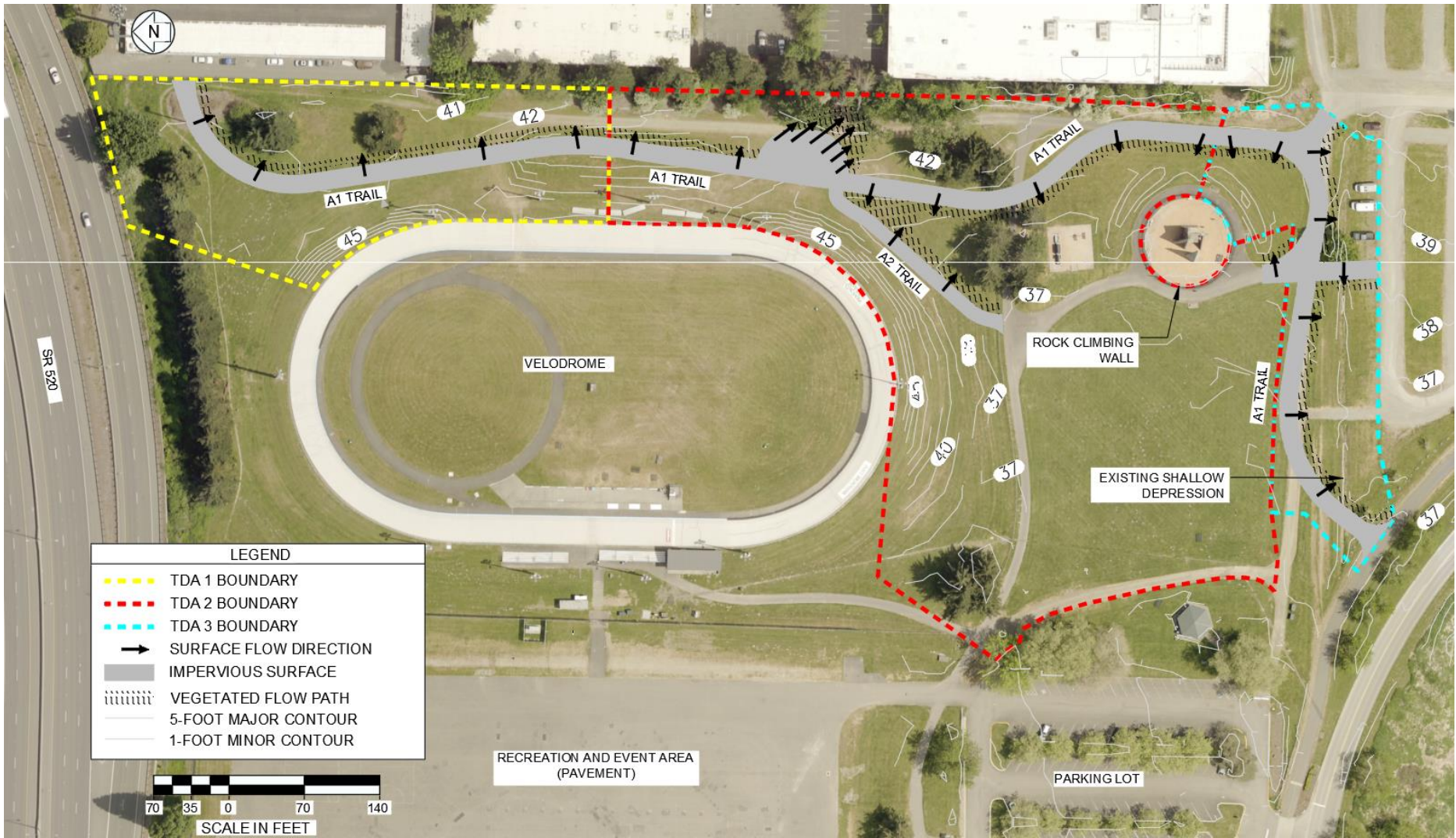
Figure 5. The existing land use within the TDA's was analyzed using GIS and ariel imagery. Table in Section 4.2 shows the land use areas for each Threshold Discharge Area on site. The existing and proposed conditions for the project site do not include any area that meets the criteria for pollution-generating impervious (PGIS) or pervious (PGPS) surface, therefore, the values for PGIS and PGPS are both zero square feet. For all non-pollution generating impervious surface values, see Table .

### **1.3 Proposed Conditions**

Stormwater runoff from the project site will sheet flow through the surrounding vegetated area, as it currently does. Stormwater runoff generated within the project site will be mitigated through basic dispersion methods and will be dispersed by the vegetated flow path or existing vegetated shallow depression to the south of the project site. A cross slope, perpendicular to the trail alignment, will be used to define surface flow path direction along the new impervious surface. The proposed trail will be 16 feet wide along the A1 trail alignment and 12 feet wide along the A2 trail alignment. Stormwater from the new impervious surface will drain across the walking path into 2 feet of gravel shoulders and at least 10 feet of vegetated flow path in the surrounding lawn. The stormwater runoff from the plaza area has a maximum flow path of 68 feet across the impervious surface. The vegetated flow path for the plaza area was increased by 10 feet for every additional 20 feet that stormwater flowed across the impervious area. This accommodation for increased vegetated flow path is in compliance with section C.2.4.5 - *Use of Sheet Flow for Basic Dispersion*.

Figure 6 shows the proposed drainage conditions with the proposed discharge areas, stormwater flow path directions, and vegetated flow path areas.





**Figure 6 - Proposed On-Site Flow Conditions**

### 1.3.1 *Proposed Threshold Discharge Area*

The proposed project has three threshold discharge areas, as shown in



Figure 6. The proposed land use within the TDA's was analyzed using GIS and ariel imagery. Table provides values for proposed impervious surface cover and target surfaces within the project site.

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## Section 2.0 CONDITIONS AND REQUIREMENTS SUMMARY

This proposed project includes more than 7,000 square feet of new plus replaced impervious surface and therefore requires Full Drainage Review. This section will address the requirements set forth by the SWDM Core and Special Requirements listed in Chapter 1. Also listed are the requirements of the most recent Critical Areas Ordinance (CAO) pertaining to the project.

### 2.1 Core Requirements

**Core Requirement #1: Discharge at the natural location (1.2.1):** All flow patterns leaving the site will remain unchanged. No runoff will leave the property limits and runoff generated at the project site will be dispersed onsite as described in Section 1.3.

**Core Requirement #2: Offsite Analysis (1.2.2):** An offsite analysis is required for this project. The Offsite Analysis is addressed in Section 3.0 of this report.

**Core Requirement #3: Flow Control (1.2.3):** This project is exempt from an onsite flow control facility. The three different threshold discharge areas will each have less than 5,000 square feet of target surfaces. Each TDA's stormwater runoff will remain on site and be mitigated with basic dispersion through sheet flow.

**Core Requirement #4: Conveyance System (1.2.4):** Onsite flow conditions will remain unchanged from existing conditions. See analysis of existing and proposed conveyance systems in Section 3.

**Core Requirement #5: Erosion and Sedimentation Control Plan (1.2.5):** This project will require erosion and sediment controls related to the specific conditions of the site. These controls are discussed in Section 8 of this report and on the project construction plans.

**Core Requirement #6: Maintenance and Operations (1.2.6):** King County Parks Maintenance is currently responsible for the maintenance of the facilities and systems within Marymoor Park. Care will be taken to ensure that all maintenance work is consistent with the SWDM requirements and other agency permit conditions. See Section 10 for applicable maintenance requirements.

**Core Requirement #7: Financial Guarantees and Liability (1.2.7):** Not applicable to County projects. See Section 9.

**Core Requirement #8: Water Quality (1.2.8):** This project meets exemption #1 from Core Requirement #8. There are no pollution generating surfaces within the project.

**Core Requirement #9: Flow Control BMPs (1.2.9):** This project will use basic dispersion to mitigate stormwater runoff.

## 2.2 Special Requirements

### 2.2.1 #1 Other Adopted Area-Specific Requirements (1.3.1)

**Critical Drainage Areas:** There are currently no Critical Drainage Areas (CDA's) designated in unincorporated King County. The protection measures of former CDA's have been incorporated into the stormwater standards found in the SWDM.

**Master Drainage Plans:** There are no applicable master drainage plans.

**Basin or Community Plans:** The SWDM requirements for this project meet or exceed the basin and community plan requirements.

**Salmon Conservation Plans (SCP's):** This project is not a salmon habitat restoration project and does not propose any work in a fish-bearing stream.

**Stormwater Compliance Plans (SWCP's):** Not Applicable

**Lake Management Plans:** Not applicable

**Flood Hazard Reduction Plan Updates (FHRP's):** Not Applicable

**Shared Facility Plans:** There are no shared facility plans covering the project site.

### 2.2.2 #2 Flood Hazard Area Delineation (1.3.2)

**Flood Hazard Area Delineation (1.3.2):** The project is not within a Federal Emergency Management Agency (FEMA) designated floodplain or a channel migration zone. A FEMA map of the project area is shown in Figure 8 - National Flood Hazard Layer.

### 2.2.3 #3 Flood Protection Facilities (1.3.3)

**Flood Protection Facilities (1.3.3):** There are no existing or proposed flood protection facilities within the project area.

### 2.2.4 #4 Source Controls (1.3.4)

**Source Control (1.3.4):** There will be no pollution generating activities, commercial building or commercial site development associated with this project; therefore source control is not applicable.

### 2.2.5 #5 Oil Control (1.3.5)

**Oil Control (1.3.5):** This site does not meet the definition of a high use site (SWDM, p-1-3), therefore, oil control is not applicable to this project.

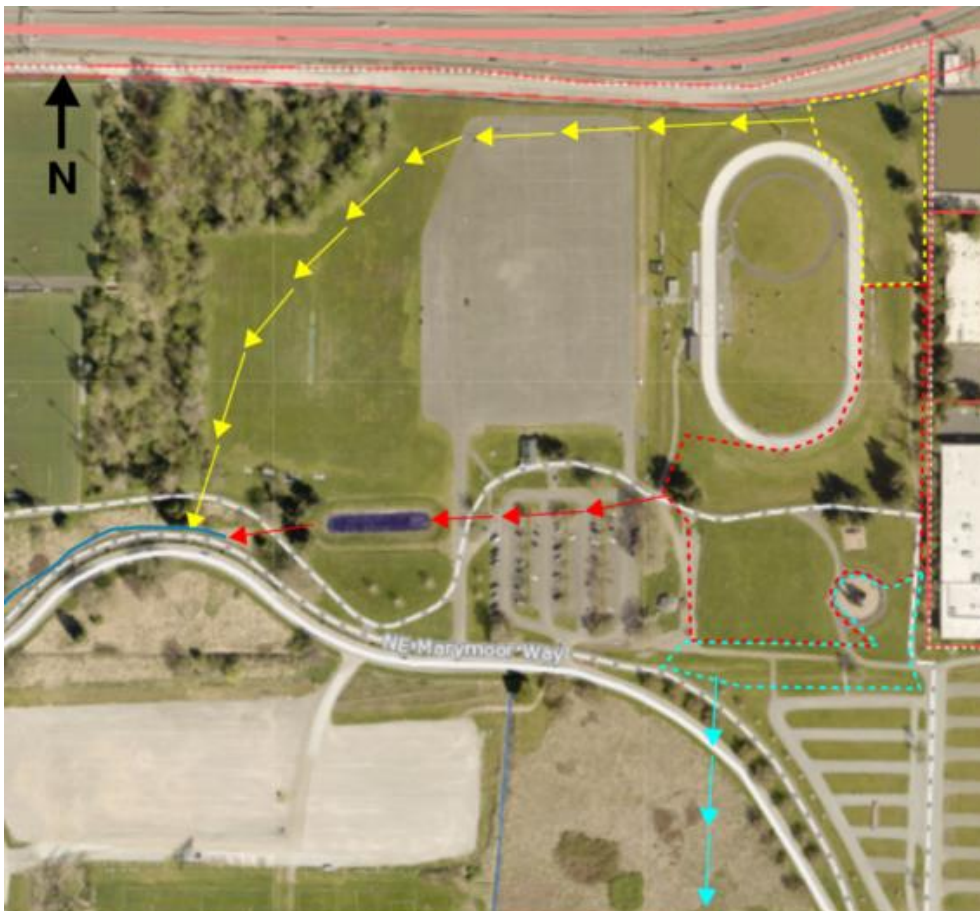
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## Section 3.0 OFFSITE ANALYSIS

This section evaluates the onsite and tributary basins areas upstream and downstream of the project site. The intent of this section is to demonstrate that the proposed project will neither aggravate existing problems nor create new drainage problems. A Level 1 downstream analysis was conducted for the project.

### 3.1 Task 1 - Study Area Definition and Maps

The study area for this technical report includes at least quarter mile downstream of the project site. The entire project site is located within the Sammamish River Drainage Basin and includes three different threshold discharge area. Figure 7, below, provides an analysis of a one-quarter mile flow path of surface water leaving the project site. The surface water flow paths of each TDA are outside of the quarter-mile flow path distance before combing at a point later downstream.



**Figure 7 - 1/4 Mile Downstream Flow Path Analysis**

### 3.2 Task 2 – Resource Review

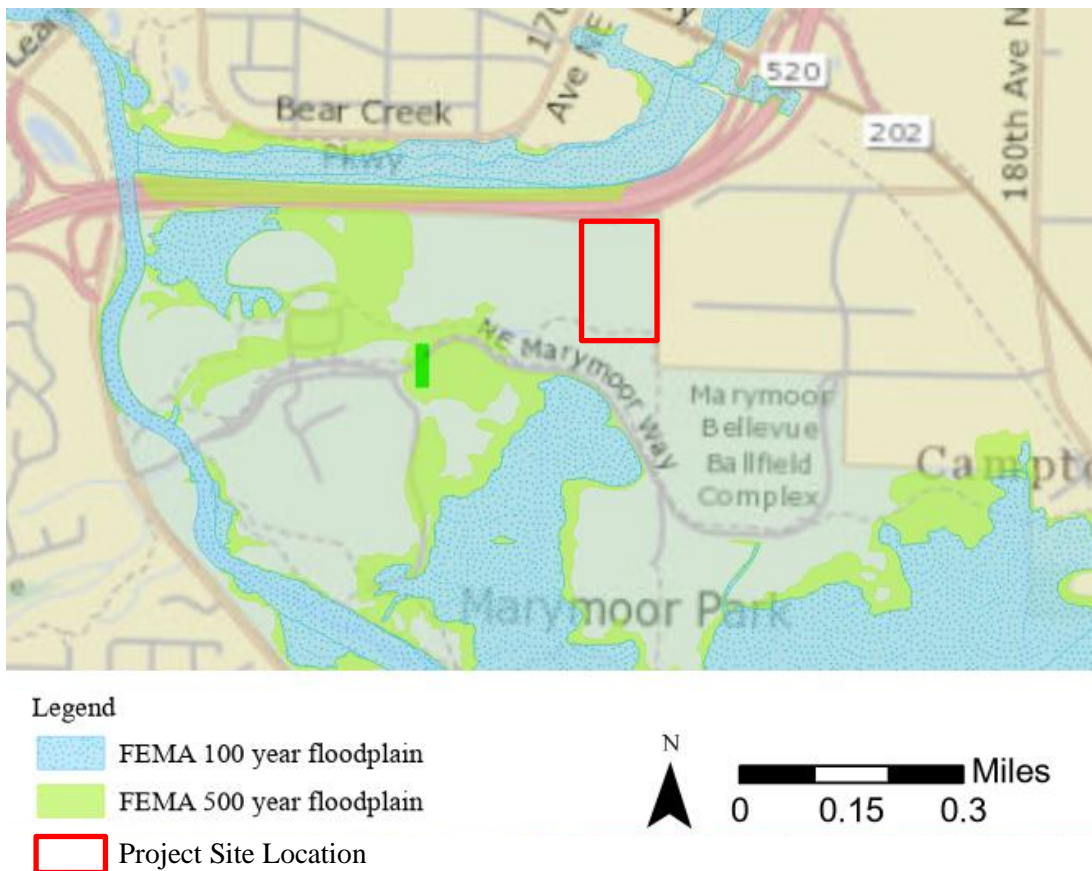
Available resources, such as King County iMap, GIS and previous studies, were used to prepare the downstream/offsite analysis.

The site is within a Basic Water Quality Treatment Area and a Conservation Flow Control Area per the 2021 King County Surface Water Design Manual. The project is located within the county's Urban Growth Area.

The entire project site is classified as a Seismic hazard area. The area is also defined as a Critical Aquifer Recharge Area Category 2, which is defined as areas of Unincorporated King County as an area with 'Medium' susceptibility of groundwater contamination

No wetlands or wetland buffers are located within the Project site.

The project site is located on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) map number 53033C0386H. The site is outside of the 100-year and 500-year floodplain.



**Figure 8 - National Flood Hazard Layer**



### 3.3 Task 3 - Field Inspection

A Level 1 field inspection was conducted on 7/27/2021 using the guidelines provided in Section 2.3.1.1 of the SWMMWW. The weather was sunny, and it had not rained in several weeks. There were no observed drainage problems and the site reflected the documented conditions in this report. The following figures are photos from the aforementioned the site visit.



**Figure 9 – Site Photo**

Northeast corner of project site. Future location of connector to Downtown Redmond Trail.  
Picture facing north.



**Figure 10 – Site Photo**  
Berm area east of velodrome, facing south.



**Figure 11 – Site Photo**  
Grass area south of Velodrome. Proposed location for pedestrian pathway, facing east.





**Figure 12 – Site Photo**

Existing shallow depression. Located south of climbing wall, facing west.

### **3.4 Task 4 - Drainage System Description and Problem Descriptions**

#### **3.4.1 Existing Drainage System within Marymoor Park**

The project is in the Sammamish River Drainage Basin. The Sammamish River begins at the outlet of Lake Sammamish at the southern end of Marymoor Park. The river is classified by the Washington State Department of Natural Resources as a Type “S” river, (formerly type 1). This classification is assigned to streams and water bodies that designated “shorelines of the state” as defined in chapter 90.58.030 RCW.

The topography in the park is very flat. Drainage within the park is generally from east to west, with park runoff collecting in an open east-west drainage conveyance channel located predominantly north of NE Marymoor Way, excepting the portion in the center of the Park where Marymoor Way curves toward the north. This channel, outfalls to the Sammamish River north of the main entrance to the Park from West Lake Sammamish Parkway. Most impervious areas within the park drain to this channel via sheet flow or through collection in catch basins and shallow interceptor storm drains that outfall to the channel. Some pervious (vegetated) areas of the park that have more permeable superficial soils appear to infiltrate stormwater with no evidence of concentrated surface water flow from those areas.

A second north-south aligned channel extends south of NE Marymoor Way and drains other impervious surfaces including a large gravel lot B south to an upstream outfall to Lake Sammamish/Sammamish River above the Willowmoor lake outlet weir.

### 3.4.2 Existing Drainage within the Project Area

Surface water runoff from the existing hard and soft surface pathways within the project site are managed through dispersion into the surrounding lawn except for the paved walkway to the south of the climbing structure. Flows from this walkway sheet flow south of the project site to a shallow ground depression.

Runoff from the paved velodrome bicycle track sheet flows to the vegetated center area of the track. The runoff is then infiltrated into the ground and enters a perforated pipe system beneath the center of the velodrome, with an outlet conveyance to the east-west drainage ditch north of Marymoor Way before entering a stormwater collection system which outlets to the main east-west channel in the Park. Additionally, runoff from the climbing structure drains through peripheral footing drains to a drain rock sump outside the project site. Neither of these flows will be affected by the proposed project. See Figure 14 for existing conveyance system analysis.

The project will not change the existing drainage patterns or drainage systems.

The existing drainage system does not show signs of excessive erosion nor is there a history of flooding at the project location. The King County Water and Land Resources Division (WLRD)

### 3.4.3 Drainage Complaints within the Project Area

Drainage Complaint records found within the parcel are provided in Table 1. No drainage complaints relating to conveyance, ponding, or flooding were identified, only water quality complaints. All drainage complaints identified are closed and any issues associated with the complaints would not be affected by the proposed project. The proposed project will have no impact on water quality or existing drainage conditions.

## 3.5 Task 5 – Mitigation of Existing or Potential Problems

With the proposed BMP's and consideration of the modeled hydrologic impacts, described in Section 4.2 and Appendix B, this project is not expected to exacerbate any existing drainage issues on this site or downstream areas. Drainage complaints identified within a quarter mile of the project site are provided, below, in Table .

**Table 1 - Drainage Complaints**

<b>Complaint Number</b>	<b>Problem</b>	<b>Date Closed</b>	<b>Parcel</b>	<b>Address</b>
2004-0981	REM	2/14/2005	1125059016	16300 NE MARYMOOR WAY
2012-0693	WQAI	12/19/2012	9435300034	156XX NE 62ND CT
2015-0066	WQAI	3/20/2015	1125059016	16305 NE MARYMOOR WAY
2015-0067	WQAI	3/20/2015	1225059195	17525 NE 65TH ST
2015-0068	WQAI	12/2/2016	1225059037	16325 NE MARYMOOR WAY
2015-0069	WQAI	3/20/2015	1325059001	16519 NE MARYMOOR WAY
2017-0033	WQAI	5/15/2017	9435300034	165XX NE 62ND CT
2018-0175	WQAI	1/25/2018	1225059037	17630 NE Marymoor Way



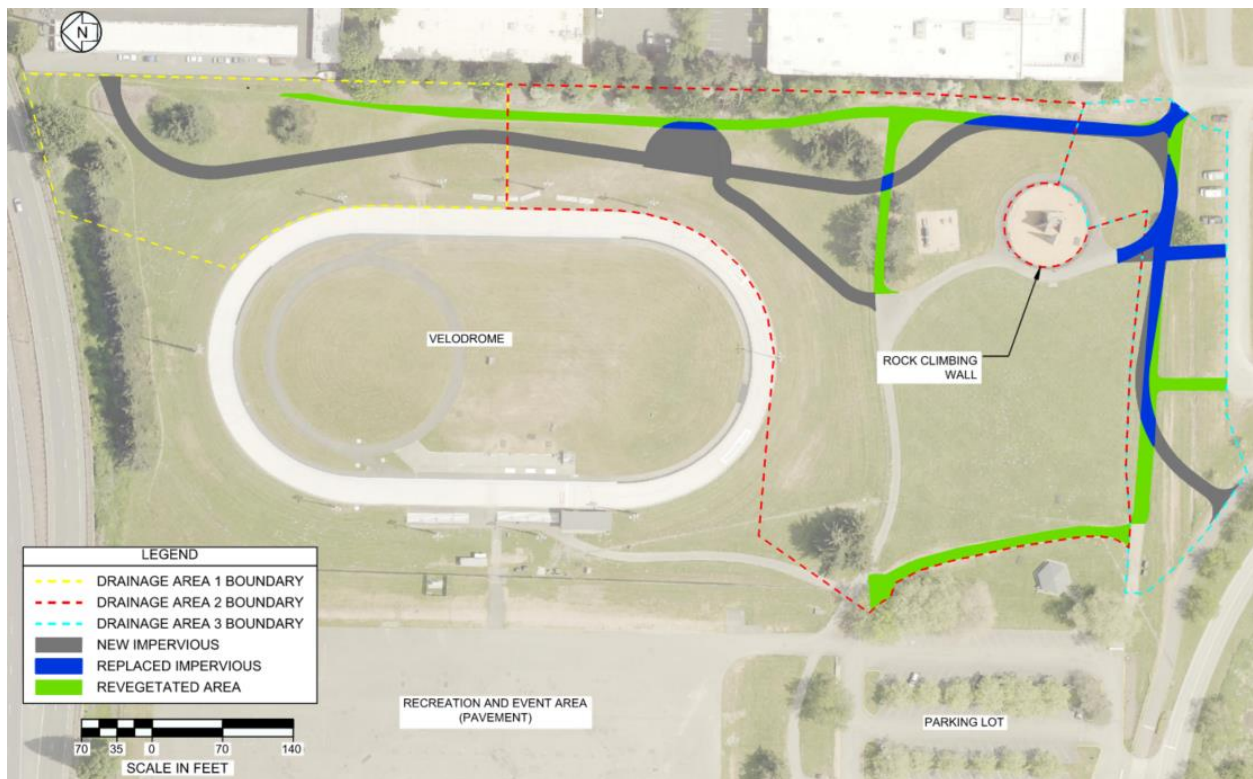
## Section 4.0 FLOW CONTROL. LOW IMPACT DEVELOPMENT (LID), AND WATER QUALITY FACILITY ANALYSIS AND DESIGN

### 4.1 Existing Site Hydrology

The site hydrology for the basin discharging into the project was analyzed using available GIS data and land cover imagery. The basin was modeled using MGS Flood which utilizes a continuous simulation hydrologic model to calculate the peak flow rate. Tables 2 and 3 provide a summary of the land cover changes and model results.

### 4.2 Developed Site Hydrology

The proposed project will create or replace 25,782 sq ft of impervious walkways. No flow patterns will be altered by the proposed design; runoff generated on the new walkways will sheet flow to the adjacent lawn area and disperse. Target surfaces for this proposed project were calculated by adding new plus replaced impervious surface and subtracting revegetated surfaces. Runoff flows were calculated using land use conditions shown in Figure 13. Table 2 provides a summary of target surface calculation results while Table 3 provides a summary of MGS Flood results for each TDA. All MGS Flood results are provided in Appendix B.



**Figure 13 - Project Site Land Use Area**

**Table 2 Target Surface Areas**

TDA		1	2	3
	Replaced Impervious (SF)	-	1,599	4,506
	New Impervious (SF)	5,462	10,930	3,285
	Revegetated Impervious (SF)	1,267	8,549	3,395
<b>Target Surface Areas</b>				
Area (SF)		4,195	3,980	4,396
Area (AC)		0.096	0.091	0.101

$$\text{Target Surface} = \text{New} + \text{Replaced} - \text{Revegetated}$$

$$\text{Target Threshold} \leq 6,512 \text{ SF (0.149 AC)}$$

**Table 3 MGS Food Results Summary**

Calculation	TDA 1	TDA 2	TDA 3
100 Year Predev. Runoff (cfs)	1.65E-04	1.57E-04	1.73E-04
100 Year Postdev. Runoff (cfs)	9.71E-02	9.22E-02	1.02E-01
Increase in 100 Year Runoff (cfs)	0.10	0.09	0.10

Each drainage area falls below the 0.15 cfs increase in runoff and are exempt from a facility requirement as defined in Section 1.2.3, pg 1-46 of the 221 SWDM.

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## **Section 5.0 EXISTING CONVEYANCE SYSTEM ANALYSIS AND DESIGN**

In accordance with SWDM Core Requirement 4, Section 1.2.4.2., existing onsite conveyance systems that will not experience a change in flow characteristics (e.g., peak flows or volume of flows) because of the proposed project need not be analyzed for conveyance capacity. The runoff from this project site will remain onsite and be mitigated using basic dispersion.

### **5.1 Flows from Offsite Conveyance Systems**

The flows from offsite will continue to and from the proposed project as with the existing conditions. Offsite flows are conveyed as described in Section 3.4.1 and the proposed project will not have an impact on this flow. Figure 14 shows the existing conveyance system.



**Figure 14 - Existing Conveyance System**

## **5.2 Onsite Conveyance Systems**

On the south end of the project site, there are currently two culverts beneath trail crossings over an existing shallow depression. Two new culverts will be installed to provide trail crossings over an existing shallow depression: one replaced and one new installation. The existing conditions is that runoff from the south trail section drains into the existing shallow depression. There is no outfall for the existing shallow depression, therefore, water entering this feature does not leave the site. There will be negligible flow through the proposed culverts.

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## Section 6.0 SPECIAL REPORTS AND STUDIES

Geotechnical support was provided by Golder Associates. A geotechnical data study and report was completed on January 16, 2019. An infiltration memo was provided based on the findings and is provided in Appendix A along with a map of test pit locations.

A wetland study report was provided by Environmental Science Associates on July 26, 2023 to investigate the existing shallow depression near the south project boundary. It was determined that the existing shallow depression is not a wetland. The proposed project area is outside of wetland limits and all wetland buffers. Significant wetland study findings are provided in Appendix C.

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## Section 7.0 OTHER PERMITS

The following permits are anticipated for this project:

- **Clearing and Grading Permit** from the King County Department of Local Services Permitting Division.
- **State Environmental Policy Act (SEPA) Environmental Checklist Determination of Non-Significance** will be issued by King County Parks, the lead agency on SEPA reviews.

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## Section 8.0 CSWPP PLAN ANALYSIS AND DESIGN

### 8.1 Erosion and Sediment Control Analysis and Design (Part A)

The intent of the Erosion and Sedimentation Control (ESC) Plan is to minimize, to the maximum extent possible, the transport of sediment from the project site to downstream ditches or properties. The project proposes to implement all appropriate and necessary measures to minimize the extent and duration of erosion and sediment transport. ESC measures will be inspected and monitored to ensure continued performance of their intended function. Facilities and measures shall be maintained and repaired as needed.

Erosion and sediment control measures were chosen to fit the proposed condition and topography of the site.

#### 8.1.1 *Erosion and Sediment Control Standard Measures*

The following measures were selected to fit the site conditions. Selection was based on meeting the criteria set forth in the 2016 King County *Surface Water Design Manual*, Appendix D (Erosion and Sediment Control Standards). During construction, ESC plans will be revised as necessary to address changing site conditions to maintain the minimal extent and duration of erosion and sediment transport.

1. **Clearing Limits:** Prior to any land-disturbing activities, including clearing or grading, all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area will be clearly marked with the use of plastic, metal, or stake wire fencing.
2. **Cover Measures:** Temporary and permanent cover measures will be used to protect disturbed areas that are to remain unworked for more than 7 days during the dry season and 12 hours during the wet season. The use of mulch and plastic will be extensive in that they are temporary protective devices where the intent is to minimize the extent and duration of such areas exposed. Cleared areas will be revegetated as soon as practical after grading.
3. **Perimeter Protection:** Silt fencing, compost socks, or other commercially available products will be used to control surface water and trap sediment. The contractor will install other types of perimeter protection measures around the site as necessary to minimize, to the maximum extent possible, the transport of sediment from the project site downstream to the onsite ditches, any adjacent wetlands and any adjacent properties.
4. **Traffic Area Stabilization:** Unsurfaced entrances shall be stabilized by installing a stabilized construction entrance.
5. **Sediment Retention:** Coir log check dams within the open ditches will be used to capture and control sediment.

6. **Surface Water Controls:** Outlet protection will be installed at the outfall of all conveyance systems in the form of an 8' x 8' x 1' thick rip rap pad. Catch basin inlet protection will be installed on all catch basins that will receive sediment laden water.
7. **Wet Season Requirements:** Temporary and permanent cover measures will be used to protect disturbed areas that are to remain un-worked for more than 12 hours during the wet season. The wet season is from October 1 to April 30.
8. **Critical Areas Restrictions:** Critical areas, their buffers, and trees that are to be preserved within the construction area will be delineated and clearly marked with the use of plastic, metal, or stake wire fencing.
9. **Dust Control:** Water is to be used if a traffic hazard may be created by dust or when wind-transported sediment is likely to be deposited into the receiving water. Care will be taken to ensure that runoff will not be generated.

## **8.2 Stormwater Pollution Prevention and Spill Plan Design (Part B)**

The intent of the Stormwater Pollution Prevention and Spill (SWPPS) Plan is to identify, to the maximum extent possible, activities that could contribute pollutants to surface and storm water, and any adjacent properties during construction. The project proposes to implement all appropriate and necessary measures to minimize the potential of pollutants to surface and stormwater. SWPPS Plan measures will be monitored to ensure continued performance of their intended function. Activities measured shall be maintained and revised as needed to address changing site conditions.

### *8.2.1 Stormwater Pollution Prevention and Spill Activity Measures*

The following activities are typically associated with construction and are addressed to the maximum extent possible herein. The contractor or owner will be required to develop a more in-depth SWPPS that is specific to his/her construction method or procedures and equipment. During construction, SWPPS plans will be revised as necessary to address changing site conditions so as to maintain the minimal contribution of pollutants.

1. **Storage and Handling of Liquids:** The Contractor will identify liquids he/she and his subcontractors will or intend to handle or store on the site.
2. **Storage and Stockpiling of Construction Materials and Wastes:** The Contractor will identify construction materials stockpiled and wastes that may be generated on-site. This will include the type of cover measure used to keep rainwater from contacting the materials and wastes.
3. **Fueling:** The Contractor will specify method of onsite fueling and provide a description of containment methods for fuel spills.
4. **Maintenance, Repairs, and Storage of Vehicles and Equipment:** It is not anticipated that the Contractor will have a maintenance and repair area. In any event of equipment failure that raises the potential of pollutant contamination, methods for containment will be employed.

5. **Concrete Saw Cutting, Slurry, and Washwater Disposal:** No truck washouts will be located in Critical Areas or in other delineated and marked prohibited areas.
6. **Application of Chemicals, including Pesticides and Fertilizers:** The Contractor will provide a list of chemicals that will be used or stored on the site.

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## **Section 9.0 BOND QUANTITIES, FACILITY SUMMARIES, AND DECLARATION OF COVENANT**

Per King County Municipal Code Section 27A.30.060, a financial guarantee is not required as a condition of permit approval for county projects. If requested by the Permitting Division, the applicant will submit construction quantities and a Bond Quantity Worksheet. This project will be constructed under contract at a later date with inspection and acceptance by King County DNRP staff.

Declaration of Covenant is not required for King County owned property.

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## **Section 10.0 OPERATIONS AND MAINTENANCE MANUAL**

Marymoor Park is currently maintained by King County Parks and Maintenance crews who has staff dedicated to maintaining Marymoor Park full-time and year-round. Maintenance frequency is seasonal, depending on weather and amount of public use. Regular maintenance operations for Marymoor Park include, but are not limited to, grass mowing, trail clearing, waste bin emptying, tree trimming, amenity inspections, and vandalism repairs. In addition to regular park maintenance, the project site will also be subject to the maintenance requirements defined in Appendix A of the SWDM. These requirements include:

<b>Maintenance Requirement</b>	<b>Applicable Project Area</b>
No. 6 Conveyance Pipes and Ditches	Existing shallow depression to south of project site
No. 9 Fencing	Perimeter of velodrome
No. 27 Gravel Filled Dispersion Trench	Road shoulders
No. 28 Native Vegetated Surface	NVFP from trail shoulders to flow path extents
No. 34 Sheetflow	Trail shoulders

Marymoor Gateway Trail TIR

**Appendix A**

Geotechnical Report – PIT Tables and Map



Marymoor Gateway Trail TIR

**Appendix B**

Hydrologic and Hydraulic Calculations, MGS Flood Results

Marymoor Gateway Trail TIR

**Appendix C**

Wetland Study Findings