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KING COUNTY D.P.E.R.

ENUMCLAW RECYCLE

KING COUNTY, WASHINGTON

FINAL TECHNICAL INFORMATION REPORT

June 8, 2017

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CPH Project No. 0164-17-001

Site Planning
Civil Engineering
Project Management
Land Development Consulting

TECHNICAL INFORMATION REPORT

ENUMCLAW RECYCLE

KING COUNTY, WA

TABLE OF CONTENTS

SECTION 1 – PROJECT OVERVIEW	3
FIGURE 1 – VICINITY MAP	
FIGURE 2 – TIR WORKSHEET	
SECTION 2 – CONDITIONS AND REQUIREMENTS SUMMARY	9
SECTION 3 – OFFSITE ANALYSIS	11
SECTION 4 – FLOW CONTROL AND WATER QUALITY FACILITY ANALYSIS AND DESIGN	13
SECTION 5 – CONVEYANCE SYSTEM ANALYSIS AND DESIGN	16
SECTION 6 – SPECIAL REPORTS AND STUDIES	17
SOIL AND INFILTRATION LETTER, BY LEROY SURVEYORS & ENGINEERS, INC. (FEBRUARY 2, 2017)	
CRITICAL AREAS SITE RECONNAISSANCE STUDY, BY SNR COMPANY (JUNE 6, 2016)	
TRAFFIC IMPACT ANALYSIS, BY HEATH & ASSOCIATES, INC. (JULY 2016)	
NOISE MITIGATION REPORT, BY SSA ACOUSTICS (FEBRUARY 2, 2017)	
SECTION 7 – OTHER PERMIT	18
SECTION 8 – CSWPPP ANALYSIS AND DESIGN	19
SECTION 9 – BOND QUANTITIES, FACILITY SUMMARIES, AND DECLARATION OF COVENANT	21
SECTION 10 – OPERATIONS AND MAINTENANCE MANUAL	22
FIGURES	
FIGURE 3 – EXISTING SITE CONDITIONS	
FIGURE 4 – DEVELOPED SITE CONDITIONS	
FIGURE 5 – SUB-BASINS	
FIGURE 6 - DOWNSTREAM MAP	
APPENDICES	

APPENDIX A – NRCS SOILS REPORT AND SOIL AND INFILTRATION LETTER

APPENDIX B – WWHM REPORTS

APPENDIX C – BIOSWALE DESIGN SPREADSHEET

APPENDIX D – DOWNSTREAM PHOTOS

SECTION 1 – PROJECT OVERVIEW

This Technical Information Report (TIR) is provided to describe the stormwater conditions and proposed drainage improvements for the Enumclaw Recycle project. The project proposes to clear and develop an existing parcel into a recycling center including paved processing area, office, shop, and associated access and laydown areas within unincorporated King County. This report is provided to identify the applicable storm drainage standards and to summarize the analyses and design provisions proposed for the project to comply with county surface water standards. The information provided within this TIR represents the basis of design for the storm drainage systems and surface water conditions for the project.

The project is located approximately 4 miles north of the City of Enumclaw. The vicinity map provided below as Figure 1 illustrates the general location of the property along SR 169 to the west and Enumclaw Franklin Rd SE dividing the site in two. There is no street address associated with the site (King County tax parcel nos. 362106-9004, 362106-9013, 362106-9014). More generally, the site is located in the NW $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Section 36 of Township 21 North, Range 6 East, in King County, Washington (see Vicinity Map below).

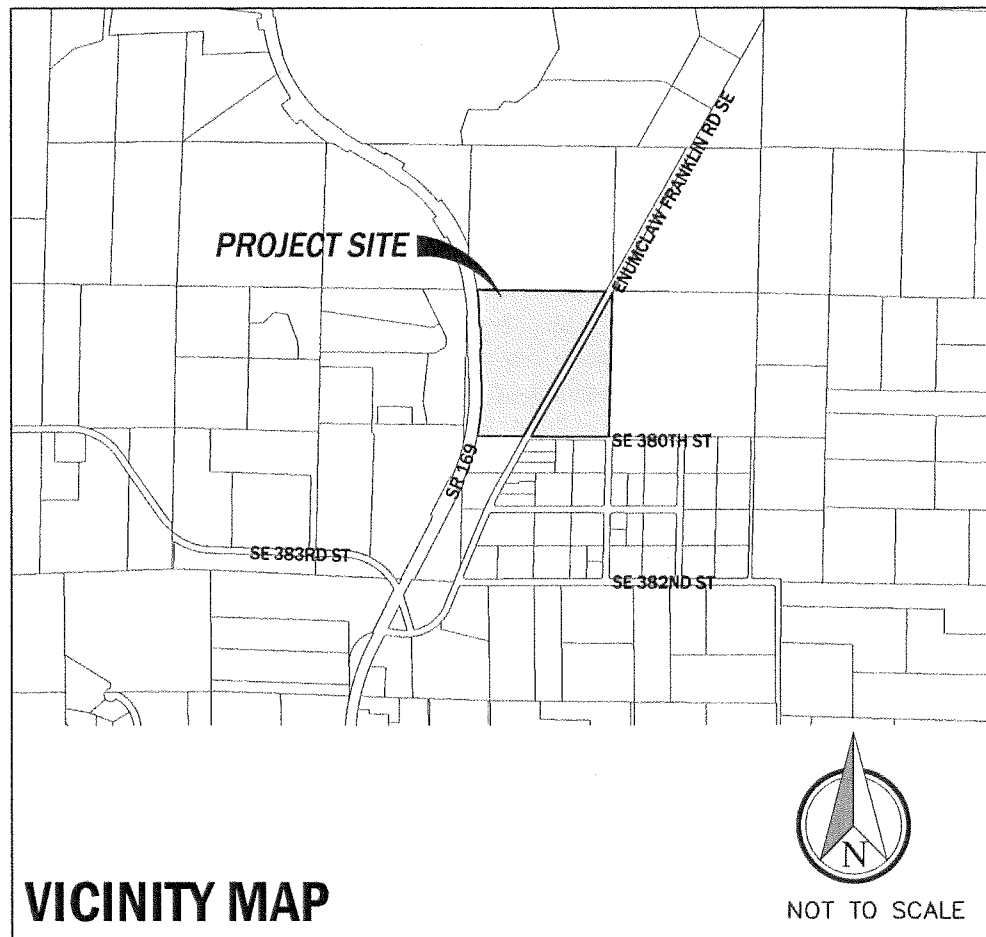


Figure 1– Location/Vicinity Map – Not to Scale

The project site is comprised of a three parcels; totaling approximately 102.86 acres. The project is currently divided by the right-of-way of Enumclaw Franklin Road SE. The parcels are currently zoned RA-5 and almost completely forested. A number of trees of varying type, age, and health condition exist on the site. Figure 3 in the Appendix displays the existing site conditions.

The proposed project will create a paved processing area, office, shop and associated access and laydown area. Total site impervious coverage limited to 40% by the current site zoning. The storm drainage analysis performed for this report considered this maximum coverage. The proposed site plan is shown in Figure 4.

The developed site is required to provide Enhanced Basic Water Quality treatment in addition to Level 2 (i.e., conservation) flow control per current 2016 King County surface water standards. Water quality storm volumes are proposed to be treated by bioswales and combined infiltration pond/large sand filters.

All of the storm water runoff from the improved site will be collected, controlled, and released by either dispersion devices or infiltration to the existing subsurface soil media. A series of on-site swales, ditches, catch basin inlets, and underground pipes will collect and convey the surface water runoff on the west side of Enumclaw Franklin Rd SE south for the developed area to the infiltration/detention facility. On the east side of Enumclaw Franklin Rd SE the runoff will be collected from the roof areas and conveyed south to dispersion devices; pollution generating areas such as parking areas and laydown areas will be treated by biofiltration swales and conveyed to combined sand filters and infiltration ponds.

Storm drainage controls for this project are proposed in accordance with King County surface water standards and the 2016 King County Surface Water Design Manual (KCSWDM).

On-site Soil Conditions

The soils of the area are characterized generally by the Natural Resource Conservation Services (NRCS) as Everett very gravelly sandy loam (EvC) and Beausite gravelly sandy loam (BeC). A site-specific investigation of the existing site geotechnical conditions was performed by Leroy Surveyors & Engineers, Inc. A copy of the NRCS soils report is provided in Appendix A of this report for reference.

Figure 2 – Technical Information Report (TIR) Worksheet, 2009 Surface Water Design Manual

Part 1 PROJECT OWNER AND PROJECT ENGINEER Project Owner: Ron Shear, Buckley Recycle Center, Inc. Phone: (253) 223-8586 Address: P.O. Box 2330 Buckley, WA 98321 Project Engineer: Jamie Schroeder Phone: (425) 285-2390	Part 2 PROJECT LOCATION AND DESCRIPTION Project Name: Enumclaw Recycle DDES Permit #: _____ Location: Township: 21 N Range: 6 E Section: 36 Site Address: Enumclaw Franklin Rd SE Enumclaw, WA 98022
Part 3 TYPE OF PERMIT APPLICATION <input type="checkbox"/> Landuse Services Subdivision / Short Subd. / UPD <input checked="" type="checkbox"/> Building Services M/F / <u>Commercial</u> / SFR <input checked="" type="checkbox"/> Clearing and Grading <input type="checkbox"/> Right-of-Way Use <input type="checkbox"/> Other:	Part 4 OTHER REVIEWS AND PERMITS <input type="checkbox"/> DFW HPA <input type="checkbox"/> Shoreline <input type="checkbox"/> COE 404 Management <input type="checkbox"/> DOE Dam Safety <input type="checkbox"/> Structural <input type="checkbox"/> FEMA Floodplain Rockery/Vault/ _____ <input type="checkbox"/> COE Wetlands <input type="checkbox"/> ESA Section 7 <input type="checkbox"/> Other _____
Part 5 PLAN AND REPORT INFORMATION	
Technical Information Report Type of Drainage <u>Full</u> / Targeted / Review (circle): Large Site Date (include revision dates): 6/5/17 Date of Final: _____	Site Improvement Plan (Engr. Plans) Type (circle one): <u>Full</u> / Modified / Small Site Date (include revision dates): 6/5/17 Date of Final: _____
Part 6 ADJUSTMENT APPROVALS Type (circle one): Standard / Complex / Preapplication / Experimental / Blanket Description: (include conditions in TIR Section 2) Date of Approval: _____	

Figure 2 – Technical Information Report (TIR) Worksheet, 2009 Surface Water Design Manual (cont'd.)

Part 7 MONITORING REQUIREMENTS

Monitoring Required: Yes / No Describe: _____
 Start Date: _____
 Completion Date: _____

Part 8 SITE COMMUNITY AND DRAINAGE BASIN

Community Plan: Rural Area RA-5
 Special District Overlays: None
 Drainage Basin: Green-Duwamish River Watershed
 Stormwater Requirements: Conservation Flow

Part 9 ONSITE AND ADJACENT SENSITIVE AREAS

<input type="checkbox"/> River/Stream	_____	<input type="checkbox"/> Steep Slope	_____
<input type="checkbox"/> Lake	_____	<input type="checkbox"/> Erosion Hazard	_____
<input type="checkbox"/> Wetlands	_____	<input type="checkbox"/> Landslide Hazard	_____
<input type="checkbox"/> Closed Depression	_____	<input type="checkbox"/> Coal Mine Hazard	_____
<input type="checkbox"/> Floodplain	_____	<input type="checkbox"/> Seismic Hazard	_____
<input type="checkbox"/> Other	_____	<input type="checkbox"/> Habitat Protection	_____

Part 10 SOILS

Soil Type	Slopes	Erosion Potential
<u>EvC</u>	<u>8% - 15%</u>	<u>Yes</u>
<u>BeC</u>	<u>6% - 15%</u>	<u>Yes</u>
_____	_____	_____
_____	_____	_____

☐ High Groundwater Table (within 5 feet)
 ☐ Sole Source Aquifer
☒ Other Critical Aquifer
Recharge Area
☐ Seeps/Springs
☐ Additional Sheets Attached

Figure 2 – Technical Information Report (TIR) Worksheet, 2009 Surface Water Design Manual (cont'd.)

Part 11 DRAINAGE DESIGN LIMITATIONS	
REFERENCE	LIMITATION / SITE CONSTRAINT
<input type="checkbox"/> Core 2 – Offsite Analysis	
<input checked="" type="checkbox"/> Sensitive/Critical Areas	Critical Aquifer Recharge Area, Steep Slopes
<input type="checkbox"/> SEPA	
<input type="checkbox"/> Other	
<input type="checkbox"/>	
<input type="checkbox"/> Additional Sheets Attached	

Part 12 TIR SUMMARY SHEET (provide one TIR Summary Sheet per Threshold Discharge Area)	
Threshold Discharge Area:	Wetland
(name or description)	
Core Requirements (all 8 apply)	
Discharge at Natural Location	Number of Natural Discharge Locations: 1
Offsite Analysis	Level: <u>1</u> / 2 / 3 Dated: _____
Flow Control (include a facility summary sheet)	Level: 1 / <u>2</u> / 3 or Exemption Number: Small Site BMP's: Full Dispersion
Conveyance System	Spill containment located at:
Erosion and Sediment Control	ESC Site Supervisor: TBD Contact Phone: After Hours Phone:
Maintenance and Operation	Responsibility: <u>Private</u> / Public If Private, Maintenance Log Required: <u>Yes</u> / No
Financial Guarantees and Liability	Provided: <u>Yes</u> / No
Water Quality (include facility summary sheet)	Type: Basic / Sens. Lake / <u>Enhanced Basic</u> / Bog or Exemption No. _____ Landscape Management Plan: Yes / <u>No</u>
Special Requirements (as applicable)	
Area Specific Drainage Requirements	Type: CDA / SDO / MDP / BP / LMP / Shared Fac / None Name: _____
Floodplain/Floodway Delineation	Type: Major / Minor / Exemption / <u>None</u> 100-year Base Flood Elevation (or range): _____ Datum: _____
Flood Protection Facilities	Description: _____
Source Control (comm./industrial landuse)	Describe landuse: Commercial Describe any structural controls: _____
Oil Control	High-use Site: Yes / <u>No</u> Treatment BMP: _____ Maintenance Agreement: Yes / No with whom?: _____
Other Drainage Structures	
Describe: _____	

Figure 2 – Technical Information Report (TIR) Worksheet, 2009 Surface Water Design Manual (cont'd.)**Part 13 EROSION AND SEDIMENT CONTROL REQUIREMENTS****MINIMUM ESC REQUIREMENTS
DURING CONSTRUCTION**

- ☒ Clearing Limits
- ☒ Cover Measures
- ☒ Perimeter Protection
- ☒ Traffic Area Stabilization
- ☒ Sediment Retention
- ☒ Surface Water Control
- ☒ Dust Control
- ☒ Construction Sequence

**MINIMUM ESC REQUIREMENTS
AFTER CONSTRUCTION**

- ☒ Stabilize Exposed Surfaces
- ☒ Remove and Restore Temporary ESC Facilities
- ☒ Clean and Remove All Silt and Debris Ensure Operation of Permanent Facilities
- ☒ Flag Limits of SAO and open space preservation areas
- ☐ Other _____

Part 14 STORMWATER FACILITY DESCRIPTIONS (Note: Include Facility Summary and Sketch)

Flow Control	Type/Description	Water Quality	Type/Description
<input type="checkbox"/> Detention		<input checked="" type="checkbox"/> Biofiltration	Bioswales
<input checked="" type="checkbox"/> Infiltration	Infiltration Pond	<input type="checkbox"/> Wetpool	
<input type="checkbox"/> Regional Facility		<input checked="" type="checkbox"/> Media Filtration	Large Sand Filter
<input type="checkbox"/> Shared Facility		<input checked="" type="checkbox"/> Oil Control	Oil Control Tee
<input checked="" type="checkbox"/> Small Site BMP's	Full Dispersion Trench	<input type="checkbox"/> Spill Control	
<input type="checkbox"/> Other		<input type="checkbox"/> Small Site BMP's	
		<input type="checkbox"/> Other	

Part 15 EASEMENTS / TRACTS

- ☐ Drainage Easement
- ☐ Access Easement
- ☐ Native Growth Protection Covenant
- ☐ Tract
- ☐ Other

Part 16 STRUCTURAL ANALYSIS

- ☐ Cast in Place Vault
- ☐ Retaining Wall
- ☐ Rockery > 4' High
- ☐ Structural on Steep Slope
- ☐ Other

Part 17 SIGNATURE OF PROFESSIONAL ENGINEER

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.

Signed _____

Date _____

SECTION 2 – CONDITIONS AND REQUIREMENTS SUMMARY

Compliance with Project Drainage Requirements

The storm drainage and temporary erosion control standards for the project are established by the 2016 King County Surface Water Design Manual (KCSWDM). The project requires Full Drainage Review as it exceeds the impervious threshold for Small Site Review (Type I or Type II) and proposes more than 2,000 square feet of new impervious surface coverage. The KCSWDM specifies eight core and six special requirements that are to be met for this project. Compliance and/or applicability of each of these design standards are summarized below:

SWDM Core Requirements

1. **Discharge at Natural Location:** The project site currently slopes and drains south. Runoff is conveyed south via a roadside ditch along Enumclaw Franklin Rd SE. On-site storm water will maintain this existing drainage pattern and ultimate downstream discharge in accordance with current flow control standards.
2. **Offsite Analysis:** Summarized in Section 3 – Off-site Analysis.
3. **Flow Control:** The project requires Level 2 (i.e., Conservation) flow control according to the KCSWDM Flow Control Map. Flow control will be provided by multiple infiltration/detention ponds facility. A detailed description of the facility is provided in Section 4 – Flow Control and Water Quality Facility Analysis and Design.
4. **Conveyance System:** The project proposes to collect on-site runoff and convey within open channel swales, ditches or underground pipes to the proposed on-site infiltration/detention facility for the west portion of the site. Runoff from the east portion of the site will be collected and conveyed to swales, dispersion devices and infiltration/detention facilities. These improvements are shown in Figures 4 and 5 and are described further in Section 5 – Conveyance System Analysis and Design.
5. **Erosion and Sediment Control:** Temporary controls are as described in Section 8 – CSWPPP Analysis and Design.
6. **Maintenance and Operations:** The on-site storm drainage facilities are proposed to be privately maintained. Refer to Appendix A of the King County Surface Water Design Manual for the Maintenance Requirements.
7. **Financial Guarantees and Liability:** A Bond Quantity Worksheet will be prepared for this project prior to the final engineering package. Approval and all financial guarantees will be provided by the developer.
8. **Water Quality:** Enhanced Basic Water Quality treatment is required for the proposed project. This treatment level is to be achieved by means of infiltration as shown on Figures 4 and 5 and as described in Section 4 – Flow Control and Water Quality Facility Analysis and Design.

KCSWDM Special Requirements

1. **Other Adopted Area-Specific Requirements:** No area-specific requirements apply to this project site.

2. **Flood Hazard Area Delineation:** The limits of this project are not located within or in proximity to a 100-year floodplain.
3. **Flood Protection Facilities:** Not applicable.
4. **Source Control:** The site is required to provide source controls as it requires a commercial site development permit.
5. **Oil Control:** The project is not considered a high-use area and no special oil control provisions are required.

SECTION 3 – OFF-SITE ANALYSIS

Task 1: Study Area Definition and Maps

The proposed project site is located along Enumclaw Franklin Rd SE approximately 1,500 feet northeast of the Enumclaw Franklin Rd Se/SE 384th St intersection. The site is currently undeveloped with the existing ground cover consisting mostly forested vegetation with various trees of varying age and health. The existing site topography consists of slopes ranging from 0% to 15%. The existing site conditions are shown in Figure 3.

The project site currently slopes and drains south and east towards adjacent properties with no formal or natural drainage course. Runoff that reaches Enumclaw Franklin Rd SE is conveyed south along a roadside ditch for approximately 800' before discharging to localized lowland areas. The ditch appeared to be in good working order and no indications of overtopping, excessive sediment transport, or flooding was observed during our site visit.

Task 2: Resource Review

King County iMAP and GIS Data were reviewed to identify any potential sensitive areas in the proximity of the project site.

- Wetlands: iMap does not identify any wetlands on the project site.
- Streams and 100-year Floodplain: The project site is not located in the 100-year floodplain.
- Erosion Hazard Areas: iMap Maps identifies erosion hazard areas in the east portion of the site.
- Seismic Hazard Areas: iMap Maps identifies no seismic hazard areas on the project site.
- Coal Mine Hazard Areas: iMap Maps identifies coal mine hazard areas northeast corner of the site.
- Critical Aquifer Recharge Area: The project site is located within a critical aquifer recharge area per iMAP records
- Basin Condition: iMap indicates the majority of the site as a medium basin condition. The northwest corner of the project site is indicated as a high basin condition.
- Areas Susceptible to Groundwater Contamination: iMap shows the project site as being susceptible to groundwater contamination with a designation of medium.

Task 3: Field Inspection

A field inspection was performed on Monday, March 20, 2017 on a partly cloudy day with a temperature of approximately 52 degrees. The site is currently undeveloped and almost completely forested. The portion west of Enumclaw Franklin Rd SE generally slopes to the south. The east portion generally slopes east toward Enumclaw Franklin Rd SE.

Onsite Drainage Basin

The existing topography of the site has slopes ranging from 0% to 15% over most of its area. The project site is comprised of a single drainage basin with surface runoff traveling primarily as sheet and shallow concentrated flows over pervious areas. The drainage basin is comprised mostly of forested vegetation with a paved public road dividing the site in two. Based on visual inspection during the site visit and survey contour data there is a low point on the east portion of the site. One of the infiltration/detention facilities will be located in this general area.

Task 4: Drainage System Description*Downstream Basin*

Excess runoff from the drainage basin is conveyed south across the adjacent properties via sheet flow. Runoff from the portion on the east side of Enumclaw Franklin Rd SE is conveyed west until it reaches an existing ditch along Enumclaw Franklin Rd SE. Flow from the ditch is conveyed south. Based on the soil information provided by Leroy Surveyors & Engineers, Inc. and the NRCS soils map it is highly unlikely any runoff is generated from the site. In the case where excess runoff is discharged from the site it will be collected and conveyed in the roadside ditches along both sides of Enumclaw Franklin Rd SE. From here it will be conveyed south for approximately 800' then discharge into localized lowland areas on both sides of the road. Discharge from these lowland areas via overland sheet flow would flow south towards SE 384th St. From here the runoff would flow over SE 384th St and disperse onto the adjacent property to the south approximately 1,400' downstream of the project site. See Figure 6 for Downstream Map and Appendix E for downstream photos.

Upstream Basin

The project site is bordered by undeveloped properties with forested ground cover to the north and east, SR 169 to the west, and single family residences to the south. Based on the site visit and information obtained from topographic maps it was determined that runoff from properties east of the site could flow onto the site. Properties north and east of the site contain entirely forested ground cover with high infiltration rates so it is highly unlikely that runoff would be generated from these surfaces. Runoff generated from impervious surfaces along SR 169 and Enumclaw Franklin Rd SE corridors could flow onto the site but based on the soil information provided by Leroy Surveyors & Engineers, Inc. and the NRCS soils map it is highly unlikely any runoff is generated from upstream areas. Runoff generated from SR 169 northwest of the site is collected by a ditch and conveyed west under the highway via an 18" concrete culvert.

SECTION 4 – FLOW CONTROL AND WATER QUALITY FACILITY ANALYSIS AND DESIGN

The hydrologic analysis of the runoff conditions for this project is based on drainage characteristics such as basin area, soil type, and land use (i.e., pervious vs. impervious) for the project site as well as areas upstream of the project site. The Western Washington Hydraulic Model (WWHM) software was used to evaluate the storm water runoff conditions for the project site and upstream basins to verify that the existing conveyance system could safely and efficiently convey flows downstream of the site. The following is a summary of the results of the analysis and the proposed drainage facility improvements for this project.

Existing Site Hydrology

The existing site conditions are shown in Figure 3 of the Appendix. Existing site conditions within the area were be considered in the analysis of the pre-developed conditions for all on-site targeted developed surfaces in accordance with KCSWDM standards for Conservation Flow Control. Existing site conditions were modeled based on the basin configurations summarized in Table 4.1 below. The Western Washington Hydraulic Model (WWHM) software was used to model the existing site hydrology and calculate runoff peak rates. The results of the existing site runoff analysis are provided in Appendix B.

Table 4.1 – Land Use Cover, Existing Site Conditions

Basin ID	Total Area (AC)	Land Cover (AC)		
		Impervious	Forest	Grass
Total Site	102.86	0.00	102.86	0.00
West Basin	23.40	0.00	23.40	0.00
East Basin	79.01	0.00	79.01	0.00

The total site is comprised of three parcels totaling approximately 102.86 acres.

Input and output parameters for this model are provided in Appendix B of this report.

Developed Site Hydrology

The site is planned to be improved with storm drainage, and utility infrastructure in support of a paved processing area, office, shop, and associated access and laydown areas. Site improvements will be completed in accordance with county road standards as conditions with the preliminary plat approval.

The developed site drainage is contained within three basins. The developed conditions of the site were modeled using the WWHM modeling software. All building roof drains, on-site paved surfaces and most landscape areas on the site are collected and directed to on-site flow control devices such as dispersion trenches or infiltration pond/large sand filters. Runoff within the West Basin from the paved processing area as shown in Figure 4 will be routed to a lined storage pond and recirculated to provide moisture for materials in the processing area. The materials processed consist of organic tree branches, leaves, grass and other yard waste. Any runoff not captured from the processing area will be routed to the infiltration facility. Areas along the west and south perimeters of the west portion of the site and areas along the east and south perimeters of the east portion of the site will not be routed to any water quality or flow control facilities as these areas will remain undisturbed natural vegetation. Runoff from non-pollution generating surfaces (roofs) within the East

Basin will be routed to dispersion trenches south of the developed areas. Runoff from the remaining surfaces will be conveyed to a combined infiltration pond/large sand filter.

Fully developed conditions were modeled using measured and land cover standards established by the current Zoning Code, which states that up to 40 % of the site can be impervious surfaces for nonresidential land uses in RA zones. The impervious and pervious areas were calculated directly by measuring the new paves areas and roofs as impervious, and all other areas as pervious.

The sub-basin information is summarized in table 4.2 below:

Table 4.2 – Land Use Cover, Developed Conditions

Basin ID	Total Area (AC)	Land Cover (AC)		
		Impervious	Forest	Grass
West Basin #1	7.66	5.09	1.42	1.15
West Basin #2	11.32	5.53	2.83	2.96
East Basin #1	6.03	1.62	3.75	0.66
East Basin #2	10.57	10.57	0.00	0.00
East Basin #3	12.39	12.39	0.00	0.00
Total Project Basin	47.97	35.20	8.00	4.77

A small area west of SR 169 comprised of approximately 0.5 acres was not included in the stormwater analysis because it is not part of the project site.

Flow Control

Level 2 flow control is required for this project. The on-site infiltration facility has been designed to detain and infiltrate flows to the groundwater system. An emergency spillway is proposed to prevent flooding and route excess runoff from the developed West Basin to the conveyance system downstream of the project site in the instance that all runoff does not fully infiltrate. The overflow structure and emergency spillway have been designed to pass the 100-year, 15-minute developed peak flow as required in section 5.1.1.1 of the KCSWDM.

To mitigate runoff from the multiple developed East Basins, full dispersion is proposed in the form of dispersion trenches for non-pollution generating surfaces (i.e. roofs). Discharge from the dispersion trenches will be to a native vegetated surface being preserved by a clearing limit. A length of flowpath of least 100 feet will be provided downstream of the dispersion trenches. The remaining runoff will be conveyed to the combined infiltration facility/large sand filters. Emergency spillways are proposed to prevent flooding and route excess runoff from the developed East Basins to the conveyance system downstream of the project site. The overflow structure and emergency spillway have been designed to pass the 100-year, 15-minute developed peak flow as required in section 5.1.1.1 of the KCSWDM.

Table 4.3 below lists the design parameters for the infiltration pond.

Table 4.3 – WWHM Infiltration Pond Results

Infiltration/Sand Filter Pond Information			
Pond ID	#1	#2	#2
Depth (incl. 1' above 100-yr stage)	10 ft	5 ft	8 ft

Detention Volume (Live)	224,028 cf	15,568 cf	297,776 cf
Total Volume Infiltrated	2,072 ac-ft	319 ac-ft	4,204 ac-ft
Percent Infiltrated	100%	100%	100%

Water Quality Design

The KCSWDM requires that all proposed projects assess the requirement to provide water quality facilities to treat runoff of pollution-generating impervious surfaces. Storm drainage runoff from pollution generating impervious surfaces (PGIS) will require Enhanced Basic Water Quality treatment prior to discharge to the downstream, off-site system. For both the west and east portions of the project this treatment level is proposed to be achieved by a treatment train consisting of a bioswale followed by a combined infiltration pond/large sand filter. Two separate bioswales will provide water quality for both the west portion and northeast portion of the site. Per section 5.2.1 of the KCSWDM all infiltration facilities shall have a spill control device upstream of the facility. This will be achieved by a spill control tee within a structure at the downstream end of the bioswales.

The water quality facilities were designed per section 6.3.1 and 6.5.2 of the KCSWDM for the bioswales and combined infiltration pond/large sand filters, respectively. The ponds consist of a single cell and have 3H:1V side slopes. The inlet to the ponds are submerged followed by a flow spreader at the toe of the slope. An emergency spillway will be provided per section 5.1.1.1 of the KCSWDM in the case that infiltration is hindered.

The design can be seen in Figure 4. The flowrates for the water quality facilities are provided in Table 4.4.

Table 4.4 – WQ Flowrates

Basin	Area (AC)	Water Quality Flowrate (cfs)
West Basin #1	7.66	2.33
West Basin #2	11.32	2.55
East Basin #1	10.20	0.55
East Basin #2	10.57	4.81
East Basin #3	12.39	5.71

SECTION 5 – CONVEYANCE SYSTEM ANALYSIS AND DESIGN

Conveyance analysis for the project was performed in accordance with Chapter 4 of the KCSWDM which requires that new and existing conveyance systems be designed with sufficient capacity to convey and contain at minimum the 25 year peak flow. The proposed conveyance system was analyzed to contain runoff rates generated by a 100 year storm event. Sections 6.3.1 and 6.3.3 of the KCSWDM was used as the basis for design of the east and west bioswales, respectively.

An 18" culvert will convey flow under the south entrance on the west side of the site and a 12" culvert will convey flow under the pond access road on the east side of the site.

Runoff from the bioswales are conveyed to the infiltration ponds/sand filters via type 2 – 48" catchbasins with birdcage inlets and a conveyance pipe that discharges to flow spreaders at the foot of the pond slopes. The size of the conveyance pipe discharging to the pond serving the west bioswales is 18". The size of the conveyance pipe discharging to the pond serving East Bioswale #1 is 12". The sizes of the conveyance pipes discharging to the pond serving East Bioswales #2 and #3 are 18".

Surface water collection and conveyance for the project is proposed by means of grading, bioswales and ditches. All paved and gravel areas, and most landscape areas on the site are graded to these facilities. Runoff from the buildings on the east side of the project are collected and routed to dispersion trenches that discharge to native vegetated areas as the runoff from roofs are not considered pollution generating and do not mix with pollution generating runoff.

The storm drainage conveyance systems are illustrated in Figures 4, and 5.

SECTION 6 – SPECIAL REPORTS AND STUDIES

Soil and Infiltration Letter, by Leroy Surveyors and Engineers, Inc., February 2, 2017

Critical Areas Site Reconnaissance Study, by SNR Company, June 6, 2016

Traffic Impact Analysis, by Heath & Associates, Inc., July 2016

Noise Mitigation Report, by SSA Acoustics, February 2, 2017

SECTION 7 – OTHER PERMITS

A Commercial Development Permit will be obtained from King County.

The project will also require a NPDES General Construction Stormwater Permit from the Washington State Department of Ecology to discharge stormwater during construction.

SECTION 8 – CSWPPP ANALYSIS AND DESIGN

Site specific details and provisions for the temporary erosion and sediment control (ESC) facilities are provided with the improvement plans that accompany this TIR. The proposed facilities have been selected and sized in accordance with the recommendations provided in the KCSWDM standards. In addition to the site-specific ESC measures, the following general Best Management Practices (BMPs) for sediment control shall also be implemented in accordance with the provisions of the KCSWDM:

1. *Clearing Limits*

Construction clearing limits fence or silt fence will be installed by the contractor along the entire project corridor to prevent disturbance of project areas not designated for construction. These fences will be installed prior to clearing and grading activities where appropriate.

2. *Cover Measures*

Temporary and permanent cover measures will be provided by the contractor to protect disturbed areas. Disturbed areas will be seeded and mulched to provide permanent cover measure and to reduce erosion within seven days, if those areas not scheduled for immediate work.

3. *Perimeter Protection*

The contractor will install silt fences as indicated on the drawings prior to any up slope clearing, grading and trenching activities in order to reduce the transport of sediment offsite.

4. *Traffic Area Stabilization*

Stabilized pads of quarry spalls will be installed by the contractor at all egress points from the project site as required to reduce the amount of sediment transported onto paved roads or other offsite areas by motor vehicles. It is not anticipated that a construction entrance will be required given the existing roadway.

5. *Sediment Retention*

Sediment retention will be provided by silt fencing and catch basin inlet protection at the locations and dimensions shown on the project drawings.

6. *Surface Water Control*

Surface water control will include ditches, temporary culverts, check dams, and/or other inlet and outlet protection at the locations and dimensions shown on the drawings.

7. *Dust Control*

Water and/or street sweeping equipment will be used by the contractor to control dust emissions during construction operations.

8. *Wet Season Requirements*

If soils are exposed during the period of October 1 to March 31, the contractor will mulch and seed or otherwise cover as much disturbed area as possible by the first week of October, in order to provide protective ground cover for the wet season. The contractor will also conform to the following wet season special provisions:

- A. Apply cover measures to disturbed areas that are to remain unworked for more than two days.

- B. Protect stockpiles that are to remain unworked for more than 12 hours. No area is to be left uncovered/denuded longer than 12 hours during the winter months.
- C. Provide onsite stockpiles of cover materials sufficient to cover all disturbed areas.
- D. Seed all areas that are to be unworked during the wet season by the end of the first week of October.
- E. Apply mulch to all seeded areas for protection.
- F. Provide onsite storage of 50 linear feet of silt fence (and the necessary stakes) for every acre of disturbed area. Straw bales are to be stockpiled onsite for use in an emergency.
- G. Provide construction road and parking lot stabilization areas for all sites.
- H. Provide additional sediment retention as required by the City of Renton Engineer.
- I. Provide additional surface water controls as required by the City of Renton Engineer.
- J. Implement construction phasing and more conservative BMPs for construction activity near surface waters (to be evaluated).
- K. Review and maintain TESC measures on a weekly basis and within 24-hours after any runoff-producing event.

9. *Sensitive Areas Restrictions*

No sensitive areas are located on-site.

10. *Maintenance Requirements*

All ESC measures will be maintained and reviewed on a regular basis following the standard maintenance requirements identified in the project drawings. An ESC supervisor will be designated by the contractor and the name, address and phone number of the ESC supervisor will be given to the City prior to the start of construction. A sign will be posted at the primary entrance to the project site identifying the ESC supervisor and his/her phone number.

The ESC supervisor will inspect the site at least once a month during the dry season, weekly during the wet season, and within 24 hours of each runoff-producing storm. A standard ESC maintenance report will be used as a written record of all maintenance.

The contractor will be responsible for phasing of erosion and sediment controls during construction so that they are coordinated with construction activities. The contractor will also be responsible for maintenance of temporary controls during construction, including removal of accumulated sediment, and for the removal of the controls and remaining accumulated sediment at the completion of construction.

11. *Final Stabilization*

Prior to obtaining final construction approval, the site shall be stabilized, the structural ESC measures removed and drainage facilities cleaned. To obtain final construction approval, the following conditions must be met:

- All disturbed areas of the site should be vegetated or otherwise permanently stabilized in accordance with project BMPs. At a minimum, disturbed areas should be seeded and mulched to provide a high likelihood that sufficient cover will develop shortly after final approval. The plans include erosion control notes and specifications for hydro-seeding and mulching disturbed areas.
- Structural measures such as silt fences, pipe slope drains, storm drain inlet protection and sediment traps and ponds shall be removed once the proposed improvements are complete and vegetated areas are stabilized. All permanent surface water facilities shall be cleaned completely and restored to working order prior to removal of ESC facilities.

SECTION 9 – BOND QUANTITIES, FACILITY SUMMARIES, AND DECLARATION OF COVENANT

All required bonds, facility summaries, and covenants will be provided prior to final approval.

SECTION 10 – OPERATIONS AND MAINTENANCE MANUAL

The on-site storm drainage conveyance facilities for this project will be privately maintained by the owner. The water quality facilities will be privately maintained and designed in accordance with KCSWDM. A site specific operations and maintenance manual for the private facilities will be completed prior to final recording.

