Cecil + Associates response (Includes only pages with redline comments) Date: 6/6/2025

STORMWATER SITE PLAN REPORT

FOR

STEP BY STEP EARLY LEARNING CENTER

C&A PROJ # 21-003

PREPARED FOR:

STEP BY STEP FAMILY SUPPORT CENTER 3303 8TH AVENUE SE #A PUYALLUP, WA 98372

PREPARED BY:



Cecil & Associates, LLC PO BOX 598 BOTHELL, WA 98041

MARCH 21, 2025 PERMIT #PRCCP20241109 required to replace the runoff treatment function originally intended for the wetland. The prior project included an offsite downstream capacity analysis. At the time of the study most of the downstream system consisted of open ditches with culverts under driveways and intersections. There were a couple of 18-inch culverts and a single 12-inch culvert that appeared to be the limiting factor in conveyance capacity. Since then, storm lines ranging from 24-inch to 42-inch diameter have been installed through most of the downstream to the river, except for approximately 680-feet of grass-line ditch that spans north of the project to the intersection of 5th Avenue SE (north of the project). The 2018 downstream drainage study was based on the 25-year peak runoff rate calculated using WWHM. The capacity of the 12-inch culvert (the restriction in the downstream) was estimated to be 5.2 cfs.

The site is relatively flat and will be considered 'flat,' 0–5% slopes for stormwater modeling purposes. Earthwork Solutions NW, LLC completed six test pits in February, 2017, and classified the site with up to six inches of top soil over predominately sandy silt with shallow groundwater encountered at 3–feet deep and mottling (evidence of higher groundwater) as shallow as 2–feet deep. The record septic drawings verify silty sand and silty loam with groundwater as shallow as 9 inches. The City has the site mapped as Briscot Loam. Based on this, the site will not be suitable for infiltration of stormwater. The landscape plan may contain permeable pavers or pervious landscape features; however, no credit for stormwater infiltration has been assumed for stormwater mitigation purposes. Permeable surfaces may provide unquantifiable benefits and/or be decorative in nature.

The table below was used to quantify existing land surface areas used for estimating existing peak runoff rates from the project area. <u>The table summarizes a takeoff of impervious area</u> <u>estimates based on the *current* site conditions.</u> An aerial photograph from the Pierce County parcel viewer, most current view, estimated to be imagery from a 2023 ortho shows the site area. Slopes across the site are considered 'flat' and soil class C was assumed for stormwater modeling purposes based on the subsurface description above. 15-minute time steps are assumed for calculating peaks in WWHM. The existing surface areas are quantified in the table below.

Existing Surfaces Conditions				
	SF	Acres		
Gravel & Hard Surface Paving Area	118,495	2.720		
Building (Roof) Areas	48,571	1.115		
Pond Area	6,714	0.154		
Offsite Impervious Area	8,563	0.197		
Total Impervious Area	173,780	3.989		
Total Pervious (Lawn) Area	99,110	2.275		
Total Property Area	264,327	6.068		
Total Project Area	272,890	6.264		

Existing Surfaces Conditions

Update Table-see comments on the revised basin exhibit, Figure 2 (sent via email to Cecil & Assoc. on 4/30/25). [Storm Report; Pg 7 of 103]

Table has been updated based on coordination with City engineer.

Runoff peaks from the existing site based on the areas above are shown in the table below.

Return Period	Flow(cfs)
2 year	1.489093
5 year	2.037959
10 year	2.442889
25 year	3.003798
50 year	3,458772
100 year	3.946734

The calculations were completed using version 4.2.19 of WWHM.

Update WWHM results-see comments on the revised basin exhibit, Figure 2 (sent via email to Cecil & Assoc. on 4/30/25). [Storm Report; Pg 8 of 103]

WWHM calc has been updated to address this comment.

Provide CSWPP document...it does not appear that one was provided through the permit portal. [Storm Report; Pg 10 of 103]

2. CONDITIONS AND REQUIREMENTS

The City has adopted the 2019 Department of Ecology Stormwater Management Manual for Western Washington (Stormwater Manual). The project includes more than 5,000 square feet of new or replaced impervious surface and therefore is required to comply with MR's #1through #9, outlined below.

2.1 MINIMUM REQUIREMENT #1 - PREPARATION OF STORMWATER SITE PLANS

Stormwater Site Plans have been prepared for this project. They are included in the Project's Permit Drawings. The Stormwater Site Plans have been prepared in accordance with Volume 1.3.4.1 Stormwater Manual.

2.2 MINIMUM REQUIREMENT #2 -STORMWATER POLLUTION PREVENTION PLANS (SWPPP)

A SWPPP (less than 1 acre project area), showing general construction BMPs, has been prepared. A Temporary Erosion Sedimentation Control Plan (CSWPPP) has also been prepared and included with the Permit Documents. Source control BMPs applicable to every site will be implemented on this project. See section 2.3 below for a list of applicable source control BMPs.

2.3 MINIMUM REQUIREMENT #3 - SOURCE CONTROL OF POLLUTION

Volume I.3.4.3 Stormwater Manual contains a list of operational and source control BMPs that projects must implement if the listed uses are proposed as part of the development. Operational and source BMPs are taken from Volume III, Section 1.1 of the Ecology Manual. The following BMPs are applicable to this project.

S417 BMPs for Maintenance of Stormwater Drainage and Treatment Systems: this is an operational BMP and not shown in the plans. An Operations & Maintenance Manual has been prepared to cover the upkeep of the proposed conveyance system. This project is not being permitted for maintenance activities that might result in point-source pollution such as oil spills, etc. Therefore, no additional point source BMPs are required for this project.

Section IV-1 contains a list of source control BMPs applicable to all construction sites including: S410 BMPs for Correcting Illicit Discharges to Storm Drains

- S453 BMPs for Formation of a Pollution Prevention Team
- S454 BMPs for Preventive Maintenance / Good Housekeeping
- S455 BMPs for Spill Prevention and Cleanup
- S456 BMPs for Employee Training
- S457 BMPS for Inspections
- S458 BMPs for Record Keeping

These BMPs will be implemented for this project.

3. EXISTING SITE AND BASIN ASSESSMENT

3.1: DOWNSTREAM ANALYSIS

A site visit was conducted on February 29, 2024, during a period of overcast skies (temps in the low 40's) to review the downstream conditions from the discharge point of the site to ¼ mile or the receiving water, whichever is closer.

The site discharges via culvert on the east side of 33rd Street SE and flows north for approximately 680-feet to the 5th Avenue SE intersection. There the ditch drains into a relatively new 24-inch diameter storm line that conveys runoff north for approximately 700-feet where to the 75th Street E intersection (3-way intersection). Runoff turns west in a 36-inch diameter line for 74th Revised approximately 30-feet. Then turns north again in a 42-inch line. Runoff generally continues in a 42-inch storm line until it discharges to the Puyallup River.

A photo looking north along 33rd Street SE from the project outfall is shown below.



4. PERMANENT STORMWATER CONTROL

4.1: DESIGN OVERVIEW

The project will expand an old auxiliary barn building to include classrooms, office space, admin, and common area (early learning center). A drop off area will be added to the parking area in addition to several parking stalls. The existing stormwater lines will remain intact to the extent feasible, which includes drainage for most of the existing property and parking area.

However, the improvements will fill an existing stormwater treatment wetland that provides water treatment for parking area permitted in 2018. This project will add impervious (pollution generating) parking area including additional parking stalls and a new drop off lane to the overall tributary area of the parking lot. So, while replacing the existing wetland treatment BMP, the new parking surfaces will be added to the treatment requirement. Roof area for the new/improved early learning center will bypass the water treatment BMP so the roof area does not need to be counted in the sizing of the water treatment BMP.

Runoff treatment for the parking area will be provided via Modular Wetland Linear (soil media contained in an underground concrete vault. A stormwater pump station will be required to pump the treated stormwater. <u>Pumped stormwater will flow through multiple onsite catch basins that will serve to dissipate pump energy and flow velocity prior to discharging to the ditch.</u>

The table below is illustrative of the project improvements and the final site impervious/pervious conditions.

	SF	Acres
New + Replaced Gravel & Hard Surface Paving Area	16,456	0.378
New Building (Roof) Areas	5,099	0.117
Existing Impervious Area Replaced with Landscape	29,449	0.676
Existing Impervious Area Left in Place	135,768	3.117
Total Impervious Area	157,323	3.612
Total Pervious (Lawn) Area	115,567	2.652
Total Property Area	264,327	6.068
Total Project Area	272,890	6.264

Developed Surfaces Conditions

See comments on the revised basin exhibit, Figure 3 (sent via email to Cecil & Assoc. on 4/30/25). [Storm Report; Pg 15 of 103]

Table has been updated based on coordination with City engineer.

Stormwater BMPs were sized using WWHM, the approved stormwater model assuming class C soils.

4.2: WATER QUALITY

The project discharges to a Basic Treatment for stormwater runoff from targeted surfaces. The project will be displacing and existing water treatment wetland designed to treat 1.18 acres of parking area. The new added PGIS includes the expanded parking area plus the walkway areas draining to it. The table below shows the total impervious area required to be treated.

Runoff Treatment Areas		
	SF	Acres
Parking Areas	56,165	1.289
Walkway Areas	4,736	0.109
Total Impervious Area	60,901	1.398

See comments on the revised basin exhibit, Figure 3 (sent via email to Cecil & Assoc. on 4/30/25). [Storm Report; Pg 16 of 103]

Table has been updated based on coordination with City engineer.

Modular Wetland Linear (MWL) filters are GULD approved by the WA State Ecology TAPE program for Basic treatment. MWL are designed as offline treatment filters since they contain an approved internal bypass for high flows (the GULD approval allows this sizing technique). They are sized by treating the water quality flow rate, 15-min time step, as determined using WWHM, the approved stormwater model. Runoff rates exceeding the water treatment event can bypass the filters.

4.3: FLOW CONTROL

In lieu of flow control the project is installing a storm main extension to connect the project area with the downstream storm line, approximately 680-feet downstream. The project will estimate the 25-year peak flow from the surrounding tributary basin area and conduct a backwater calculation from the Puyallup River to evaluate the capacity of the existing system. The 25-year peak flow will be calculated based on estimated land cover characteristics from aerial photographs and online topographic information, plus the developed project area. WWHM will be used to calculate peaks based on land cover with 15-minute time steps. The backwater calculation is attached in Appendix A. The backwater calculation is described in more detail in Section 4.4 below.

4.4: CONVEYANCE REQUIREMENTS

The capacity of the offsite storm system downstream of the project was evaluated to verify capacity for the project. The prior engineer associated with the Germaine Korum project did multiple cross sections with computational capacity calculations. It was determined that a 12– inch diameter culvert was had the smallest capacity at 5.2 cfs. The developed 25-year peak rate from the project is 2.81 cfs, calculated using WWHM. All other sections of the downstream evaluated for capacity exceeded the 25-year peak from the site. In addition, this project is paying a latecomer fee in accordance with the "Latecomers Agreement for Reimbursement of Storm Trunkline Extension Project Between the City of Puyallup and Viking JV LLC" (Rec #202306290155), dated 6/29/2023; for use of the downstream storm lines.

Update WWHM results-see comments on the revised basin exhibit, Figure 2 (sent via email to Cecil & Assoc. on 4/30/25). [Storm Report; Pg 16 of 103]

Peak rate has been updated based on new calc.

Proposed onsite Pump System:

A pump system will be installed downstream of Modular Wetland Linear filter to lift runoff up to a level where it can drain via gravity to the City's storm system, approximately 10 feet. The pump has been sized to pump the peak rate discharged from the vault at the 25-year peak to account for water treatment overflow, as calculated using WWHM.

4.5: STORMWATER BMP ANALYSIS (MR #5)

The project cannot meet the LID Performance standard; and, therefore, is opting to use List #3 to address this requirement. List #3 divides the developed surfaces into three categories consisting of Lawn and Landscape Areas, Roofs, and Other Hard Surfaces. Stormwater BMPs from the list must be implemented to the maximum extent feasible/possible in the order of priority listed unless the site meets certain infeasibility criteria outlined in each specific BMP specification. The summary below categorizes each surface and describes the BMPs that will be used from the list OR why the BMPs are infeasible in order of priority from the list.

Lawn and Landscape Areas: BMP T5.13: Post-Construction Soil Quality and Depth is required and will be implemented for landscape areas. Conclusion: BMP T5.13 will be implemented to the maximum extent feasible.

Roof Areas: 1) The first BMPs to be considered is Full Infiltration. The project does not have soils suitable for infiltration due to high groundwater. Therefore, this BMP is considered infeasible. 2) Downspout Dispersion – the site does not contain a vegetated flow path required for downspout dispersion. This BMP is infeasible. 3) Perforated stub–out connections – the roof area is approximately 15,150 square feet that will be drained via downspout connections around the perimeter of the building. A dedicated storm line for roof water will bypass the parking area treatment BMP. The perforated stubout is designed at a rate of 10 lineal feet per 5,000 square feet required; 31 lineal feet of perforated stub–out connection BMP are required. Conclusion: Perforated stub–out connections will be used.

Other Hard Surfaces: 1) Sheet Flow Dispersion or Concentrated Flow Dispersion – the site does not contain a vegetated flow path required for dispersion. This BMP is infeasible. Conclusion: Other Hard Surface BMPs are infeasible.

Confirm feasibility-Per Geotech Report dated 7/16/2018, seasonal high groundwater elevation is approx. 1ft BGS. Ecology restricts perforated stubouts when groundwater is within 1ft of the bottom of trench. [Storm Report; Pg 17 of 103]

Updated to reflect infeasibility of perforated stubouts.







WWHM2012 PROJECT REPORT

Low Flow Threshold for POC 1 : 50 Percent of the 2 Year

Project Name: Peaks (Used for Conveyance)

: 38 IN CENTRAL

Site Name: Farm 12 Site Address:

City : Puyallup Report Date: 3/20/2025

Version : 4.2.19

Data Start : 10/01/1901 Data End : 09/30/2059 Precip Scale: 1.00

Version Date: 2023/01/27

Gage



Element Flows To: Surface Interflow Groundwater

MITIGATED LAND USE

Name : Basin 1 Bypass: No

GroundWater: No

WWHM2012 PROJECT REPORT

Project Name: Water Quality
Site Name: Farm 12
Site Address:
City : Puyallup
Report Date: 3/21/2025
Gage : 38 IN CENTRAL
Data Start : 10/01/1901
Data End : 09/30/2059
Precip Scale: 1.00
Version Date: 2023/01/27
Version : 4.2.19

Low Flow Threshold for POC 1 : 50 Percent of the 2 Year

High Flow Threshold for POC 1: 50 year



Calcs have been updated. PAGE___OF__ BARGHAUSEN Verify per comments on Figure 2 DATE: and Figure 3 exhibits sent via email CONSULTING ENGINEER: to Cecil & Assoc on 04/30/25. [Storm Report; Pg 36 of 103] ENGINEERS, INC. PROJECT #: STEP by STEP PROJECT/SUBJECT: Down Stream Drinage analysis Conclusion 2.81 CFS 1. ESTimated 25 year discharge From Site = 2.65 CFS 2. Estimated 25 year Peak Flow From road = 0.880Fs Total Estimated 25 year Flow = 35 3.69 CFS 3. ESTimated ditch / Culvert Capacity: Q = 13.35 CFS Section A-A Q = 20.97 CFSSection B-B Section C-C Q = 6.02 CFS Section D-D Q: 39.31 CFS 12 Culvert Under Head = 5.2 CFS Existing ditch / Pipe has Sufficient Capacito For Temporary discharge. IT is recommended that Existing ditch & culverts to be Cleaned & over grown Vegetation To be removed.