

STORMWATER SITE PLAN

FINAL

ROOSEVELT ELEMENTARY SCHOOL MINI BUILDING

SC Project #16097

November 2016

OLYMPIA SCHOOL DISTRICT

1113 Legion Way SE
Olympia, WA 98501



Prepared By:



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ENGINEER'S CERTIFICATE

I hereby certify that this Drainage and Erosion Control Plan for the Roosevelt Elementary School Mini Building improvement has been prepared by myself or under my supervision and meets the minimum standards of the City of Olympia per the City of Olympia Drainage Design and Erosion Control Manual, dated October, 2009 and normal standards of engineering practice. I hereby acknowledge and agree that the jurisdiction does not assume liability for the sufficiency, suitability, or performance of drainage facilities designed by me.

Prepared By:

Ian Y. Lee, P.E.

SKILLINGS CONNOLLY, INC

Date

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Project Overview

The Olympia School District plans to add a new classroom building to the existing school site at Roosevelt Elementary School to replace two temporary classrooms (portables). The project consists of constructing a 17,000 SF two story classroom building adjacent to the existing elementary school on the same site. The purpose of the building is to provide permanent classroom space for classes currently housed in portables and provide additional classroom space to allow for class size reductions that will be required by the State of Washington.

Roosevelt Elementary School is located at 1417 San Francisco Ave NE, Olympia (TPN 73201400100) with a project area of 6.43 acres. The proposed project will include the construction of a two story classroom building, associated water, sewer and other utility connections, addition of a fire lane, and stormwater improvements.

The existing storm drainage system collects runoff from the paved parking area, bus turn around loop, and play areas using a system of catch basins, pipes, and roof drain lines. Existing catch basins #1 - #4 (located in the northeast parking area) collect surface runoff that is sent to an existing exfiltration gallery located at the southwest corner of the property (See existing drainage as-builts in Appendix A). The exfiltration gallery consists of approximately 554 LF of 12 in diameter perforated pipes within 2.5 ft of oversized washed rock. It has a bottom area of 130 ft by 130 ft at an approximate depth of 10 ft. The gallery is wrapped in a geotextile fabric to prevent fines from clogging the gallery. While the depth of the exfiltration gallery makes it impractical to visual inspect the element, no incidences of flooding have been observed or recorded at the site. The stormwater that is not infiltrated in the gallery is routed to release catch basin #10. Flows are routed to the City of Olympia's stormwater system at Tullis Street NE through a 12 in riser with a 4 3/8 in diameter orifice. The riser overflow is sized at 12 in diameter for emergency conditions. There is currently no stormwater treatment on site.

The proposed stormwater improvements consist of adjusting the existing stormwater system and providing new stormwater structures to service the proposed building, sidewalks, and fire lane. The existing storm drain lines will be rerouted with additional catch basins and storm drain lines to avoid conflicting with the new building footprint. The existing untreated stormwater runoff from the bus turn around loop and paved parking areas will be treated by retrofitting the existing system with a thirteen cartridge CONTECH 96" diameter manhole that will meet the Basic Treatment Performance Goal of 80% removal of total suspended solids. The proposed building, sidewalks, and fire lane will be served by a new network of roof drains, storm lines, and detention system. The new detention system will release stormwater using a new flow control structure. Stormwater will be conveyed from the detention system to the existing system. From there it will flow into the existing exfiltration gallery to be infiltrated or released into the City of Olympia's stormwater system at Tullis Street NE. lane. No other changes to the existing systems are anticipated. Please see Appendix A, Exhibits 'A' and 'B' for the existing and proposed conditions. It should also be noted that no incidences of flooding has been observed or recorded at the site.

Existing Conditions Summary (Section 3.1.1)

The existing project site presently consists of an existing two story school building, two portable classrooms, a parking area, a grass ball field and a wood chip play area. The existing storm drainage system consists of two collection systems of roof drains, storm drain pipes, and catch basins. The western stormwater system collects runoff from the roof and play areas on the western half of the site. This runoff is non-pollutant generating. The eastern system collects runoff from the roof drains, the bus turn around loop, the paved parking areas, and the paved play area. While the bus turn around loop and paved parking area are pollutant generating, there is currently no stormwater treatment for these flows. The site stormwater collection systems drain to a 130 ft by 130 ft exfiltration gallery located in the southwest corner of the parcel. The runoff then drains to the City of Olympia stormwater collection system on Tullis Street NE under flow control conditions. The release catch basin has a 12 in diameter overflow pipe for emergency conditions. The flows eventually discharge into East Bay. It should be noted that over the last number of years of rainy conditions, no flooding has been observed by the applicant, Olympia School District, on the site.

The NRCS soils information for the site consists of Alderwood gravelly sandy loam. The approximate slopes of the site vary between 0 to 8 percent. Alderwood gravelly sandy loam is classified as a type "B" soil and is considered moderately well drained. It should be noted that the City of Olympia has documented this site as Hydrologic Soil Group type "C." Therefore, type "C" was used for all design calculations.

No wells, septic systems or fuel tanks were observed on the site.

See existing drainage as-builts in Appendix A for reference.

Off-Site Analysis Report (Sections 2.6.2 & 3.1.3)

Based on Volume I, Section 3.1.3 of the Drainage Design and Erosion Control Manual for Olympia (2009 DDECM), the proposed project does not trigger the requirement for an offsite analysis as the new impervious surface added is less than 5,000 SF. It should be noted that the existing stormwater system does release water into the City of Olympia stormwater system. The runoff generated by the proposed 9,751 SF building footprint will be held in a detention system and released matching the predeveloped runoff flowrate to the existing exfiltration gallery. The rate of flow released into the City of Olympia stormwater system should not increase with the proposed improvements. Both a site visit and a review of the existing storm drainage as-builts were performed to assess any potential problems. The existing systems observed during the site visit conformed to the system as described by the as-builts, and no obvious problems or failures were observed.

Minimum Requirements (Sections 2.5)

The proposed project will consist of the construction of a new two story building located on the east side of the site where grass and pavement are located. The purpose of the building is to provide permanent classroom space for classes currently housed in portables and provide additional classroom space to allow for class size reductions that will be required by the State of Washington. A fire lane of porous and traditional asphalt pavement will be added directly to the south of the new building. Due to the minimal net increase in impervious surfaces, the existing underground exfiltration system under the existing play structure area in the southwest corner of the site will be considered sufficiently sized with the addition of a proposed 6,675 CF detention tank system to ensure the flows entering the existing gallery are less than or equal to existing conditions (see Appendix A, Exhibit 'B'). Additional proposed

developments include new catch basins and storm drain pipe to adjust the existing collection system around the proposed building footprint, new roof drain downspouts, and a stormwater treatment vault for the pollutant generating bus turn around and paved parking areas.

As the project is classified as Redevelopment, Figure 2.3(b) of the 2009 DDECM was used to determine applicable minimum requirements. It was determined that Minimum Requirements #1 through #10 and Additional Requirements apply to all impervious surfaces (see Appendix B, Minimum Requirements Flowchart). The proposed project will have a total of 0.30 acres (13,350 sq. ft.) of new plus replaced impervious surfaces with a new impervious surface total of 0.02 acres (1,190 sq. ft.)

Minimum Requirement #1

Preparation of Stormwater Site Plans:

Minimum Requirement number one is addressed by this Stormwater Site Plan and the contents contained within.

Minimum Requirement #2

Construction Stormwater Pollution Prevention Plan (SWPPP):

A SWPPP has been prepared for this project as part of the final drainage report and final construction plans and is included in Appendix E.

Minimum Requirement #3

Source Control of Pollution:

Per Volume IV of the 2009 DDECM, the proposed project would not be classified as a high-use site. No oil removal systems will be required. The existing stormwater maintenance agreement and pollution source control program for the school will need to be updated to document the addition of the new roof drains, detention system, and treatment system.

Minimum Requirement #4

Preservation of Natural Drainage Systems and Outfalls:

No change to the existing drainage patterns are anticipated. The existing exfiltration gallery will continue to discharge into the City of Olympia stormwater system at Tullis Street NE. The proposed improvements will create an additional impervious area of 1,190 SF. The additional runoff created by the proposed impervious area will not increase site discharge rate as all flows from the 9,751 SF proposed building will be held in a proposed detention system, releasing flows at the predeveloped flow rate. This will decrease the total impervious area runoff to the exfiltration gallery. No other changes will be made to existing flow directions or overflow systems.

Minimum Requirements #5

Onsite Stormwater Management, including Easements and Setbacks:

The stormwater generated by the site will continue to be collected and released by the existing exfiltration gallery and release catch basin. No additional easements are planned.

Minimum Requirements #6

Runoff Treatment:

The proposed improvements do not meet the thresholds for requiring construction of stormwater treatment facilities per Volume I, Section 2.5.6 of the 2009 DDECM. The proposed new building, sidewalks, and fire lane do not add additional pollution-generating impervious surfaces per Volume V, Section 4.1.3 of the 2009 DDECM. The fire lane is gated and not considered a regularly used surface.

However, the stormwater runoff from the existing bus turn around loop and paved parking areas do meet thresholds for stormwater treatment facilities and is currently untreated. These areas are not considered high use and, using Volume 5, Figure 2.1 Treatment Facility Selection Flow Chart, the flows can be treated using a Basic Treatment Facility. A CONTECH 96" diameter manhole will be installed downstream of the two catchbasins that collect the parking area runoff and will contain thirteen 27" filter cartridges that will meet the Basic Treatment Performance Goal of 80% removal of total suspended solids. This facility is an Approved Emerging Technology and is listed as such on the Washington State Department of Ecology website.

Minimum Requirements #7

Flow Control:

Per Volume 1, Section 2.5.7 of the 2009 DDECM, flow control is required and will be provided by an existing exfiltration gallery, an existing flow control structure, and a proposed detention system with a new flow control structure.

The proposed improvements will increase the site impervious area by 1,190 SF, none of which is pollutant generating. The new 6,675 CF detention tank system will mitigate for the entirety of the proposed 9,751 SF building footprint and release the runoff to the existing exfiltration gallery at the predeveloped rate through a flow control structure. The new detention system was sized using the continuous modeling program Western Washington Hydrology Model 2012 (WWHM2012) as approved by the Department of Ecology. The existing exfiltration system will continue to capture and detain runoff from the existing site and should continue to operate as the new detention system will have reduced and offset the contributing flows.

Minimum Requirements #8

Wetlands Protection:

The stormwater runoff of the site will be discharged into the City of Olympia stormwater collection system. This collection system eventually discharges into East Bay. Stormwater from the site will be discharged under flow control and all runoff from pollutant generating surfaces will be treated using the Basic Treatment Facility standard of 80% removal of total dissolved solids.

Minimum Requirements #9

Basin/Watershed Planning:

The project site is located within the East Bay drainage basin. This area does not currently have an adopted drainage basin plan.

Minimum Requirements #10

Operation and Maintenance:

The Olympia School District will be responsible for the operation and maintenance of the existing and proposed stormwater systems. Maintenance of the new treatment facility and detention system will still fall under the original agreement of the Roosevelt Elementary School site, to be updated to include the new facilities.

Additional Requirements #1***Financial Liability:***

A completion bond or other financial guarantee equal to 125% of the stormwater system construction costs shall be required to ensure construction of drainage facilities authorized by permit. The completion bond shall be released when the stormwater system is accepted by the City. The Bond Quantities Worksheet was completed and attached in Appendix D. The anticipated bond amount was calculated to be \$162,325.

Additional Requirements #2***Off Site Analysis and Mitigation:***

Based on Volume I, Section 3.1.3 of the Drainage Design and Erosion Control Manual for Olympia (2009 DDECM), the proposed project does not trigger the requirement for an offsite analysis as the new impervious surface added is less than 5,000 SF. It should be noted that the existing stormwater system does release water into the City of Olympia stormwater system. The runoff generated by the proposed 9,751 SF building footprint will be held in a detention system and released to the existing exfiltration gallery at the predeveloped runoff rate. The rate of flow released into the City of Olympia stormwater system should not increase with the proposed improvements. Both a site visit and a review of the existing storm drainage as-builts were performed to assess any potential problems. The existing systems observed during the site visit conformed to the system as described by the as-builts, and no obvious problems or failures were observed.

Permanent Stormwater Control Plan (Section 3.1.5)

Existing Site Hydrology

See Existing Conditions Summary for a narrative of existing site hydrology patterns. Existing drainage as-builts are included in Appendix A for reference.

The existing exfiltration gallery system, located in the southwest corner of the site, is approximately 130 ft by 130 ft with a 2 ½ ft depth. The total void volume of the existing infiltration gallery system was calculated to be approximately 12,675 CF. The gallery is set at approximately 10 feet depth and contains four 12-in diameter perforated pipes with a total combined length of 554 linear feet. No additional capacity will be added to this system.

The NRCS soils information for the site consists of Alderwood gravelly sandy loam. The approximate slopes of the site vary between 0 to 8 percent. Alderwood gravelly sandy loam is classified as a type “B” soil and is considered moderately well drained. It should be noted that the City of Olympia has documented this site as Hydrologic Soil Group type “C.” Therefore, type “C” was used for all design calculations.

Developed Site Hydrology

The developed site hydrology will remain similar to the existing site hydrology.

The proposed improvements will add 1,190 SF of new impervious surface off which the runoff must be mitigated. A geotechnical evaluation of the site soils was conducted by GeoResources, LLC in order to determine the infiltration rate. After an on-site investigation, their preliminary recommendation is that infiltration is not feasible for this site due to the presense of glacial till soil.

In accordance with this recommendation, the existing exfiltration gallery will not be expanded to accommodate the additional stormwater runoff generated by the proposed building, sidewalks, and fire lane. Instead, the additional stormwater runoff generated by the proposed 9,751 SF building footprint will be conveyed to a new detention system where it will be discharged to the existing exfiltration gallery via a new flow control structure. This will decrease the contributing impervious surface runoff to the exfiltration gallery by a net total of 8,561 SF and should ensure the gallery continues to operate.

The detention system was sized using WWHM2012. The predeveloped site was modeled as 0.22 acres of pervious surface, C Soil, Forested, Moderate Slope and generated 0.08 cfs and 0.14 cfs for the 25 year and 100 year storm respectively. Using the detention vault component, flow/stage analysis, and iterative sizing, it was found that the detention vault should be sized at 6,480 CF. The flow control structure consist of a 54” Type 2 catch basin with a T shaped, 5 ft riser. In order to best model the predeveloped runoff rate, there will be three orifices: 0.5” diameter set at 0 ft, 0.5” diameter set at 3 ft, and 0.5” diameter set at 4 ft. The riser overflow will be set at 5 feet. It should be noted that as the City of Olympia standards do not allow a flow control orifice smaller than 0.5 in diameter, the flows will exceed very low existing flows while still remaining minimal. The WWHM2012 inputs and calculations are included as part of Appendix B.

The existing stormwater system does not provide treatment for the pollution-generating paved parking area and bus turn around loop. The treatment flows were determined using WWHM2012. Total contributing basin area for the two existing catch basins were determined to be 1.55 acres, of which

0.80 acres were roads, 0.32 acres were roofs, 0.20 acres of sidewalk, and 0.23 acres of lawn. The WWHM2012 calculated water quality treatment flow for an on-line bmp was 0.2957 cfs. The proposed improvements will include a CONTECH 96" diameter manhole containing thirteen 27" filter cartridges to be installed just south of catch basin #2. This facility will meet the Basic Treatment Performance Goal of 80% removal of total suspended solids.

The existing stormwater system will be adjusted to accommodate the new building footprint. Several new catch basins and new storm drain piping will be added to reroute this section of the system, while maintaining existing pipe sizes.

All other existing drainage and structures will remain with no changes to emergency overflows.

Performance Standards and Goals

For this project there is one treatment facility and one flow control facility proposed. See below for a detailed description of each.

After project completion, the Olympia School District shall submit a facility monitoring and evaluation report in accordance with Volume III, Section 3.3.6 of the 2009 DDECM.

Flow Control System

Per Volume 1, Section 2.5.7 of the 2009 DDECM, flow control is required and will be provided by an existing exfiltration gallery, an existing flow control structure, and a proposed detention system with a new flow control structure.

The proposed improvements will increase the site impervious area by 1,190 SF, none of which is pollution generating. The new 6,675 CF detention tanks system will mitigate for the entirety of the proposed 9,751 SF building footprint and release the runoff to the existing exfiltration gallery at the predeveloped rate through a new flow control structure. The new detention system was sized using the continuous modeling program Western Washington Hydrology Model 2012 (WWHM2012) as approved by the Department of Ecology. The existing exfiltration system will continue to capture and detain runoff from the existing site and should continue to operate as the detention system has reduced and offset the contributing flows.

Water Quality System

The proposed improvements do not meet the thresholds for requiring construction of stormwater treatment facilities per Volume I, Section 2.5.6 of the 2009 DDECM. The proposed new building, sidewalks, and fire lane do not add additional pollution-generating impervious surfaces per Volume V, Section 4.1.3 of the 2009 DDECM. The fire lane is gated and not considered a regularly used surface.

However, the stormwater runoff from the existing bus turn around loop and paved parking areas does meet thresholds for stormwater treatment facilities and is currently untreated. These areas are not considered high use and, using Volume 5, Figure 2.1 Treatment Facility Selection Flow Chart, the flows can be treated using a Basic Treatment Facility. A CONTECH 96" diameter manhole will be installed online and contain thirteen 27" filter cartridges that will meet the Basic Treatment Performance Goal of 80% removal of total suspended solids. This facility is an Approved Emerging Technology and is listed as such on the Washington State Department of Ecology website.

Conveyance System Analysis and Design

A conveyance system analysis was not performed and the project does not include the replacement of the existing stormwater conveyance system. No significant change to the existing stormwater system is proposed, all replaced pipes will match or exceed existing pipe sizes with no major changes to slopes and inverts. No changes to the existing overflow system is proposed.

Construction Stormwater Pollution Prevention Plan (Section 3.1.6)

A SWPPP has been prepared for this project as part of the final drainage report and final construction plans and is included as Appendix E.

Special Reports and Studies (Section 3.1.7)

Geotechnical soils investigation has been performed. The geotechnical report was prepared by GeoResources, LLC and is included in Appendix C.

Other Permits (Section 3.1.7)

A grading permit and drainage permit will be required for the improvements.

Operation and Maintenance Manual (section 3.1.7)

Maintenance of the new treatment system and detention system will still conform to the original operation and maintenance manual for Roosevelt Elementary School site. The manual will be amended to document the addition of the new treatment system and detention system.

Maintenance Agreement (Section 3.1.7)

Maintenance of the new treatment system and detention system will fall under the original agreement of the Roosevelt Elementary School site, to be updated to include the new treatment system and detention system.

Bond Quantities Worksheet

A completion bond or other financial guarantee equal to 125% of the stormwater system construction costs shall be required to ensure construction of drainage facilities authorized by permit. The completion bond shall be released when the stormwater system is accepted by the City. The Bond Quantities Worksheet has been completed and attached in Appendix D as part of the final drainage report. The anticipated bond amount was calculated to be \$162,325.

APPENDIX A - Project Maps

Vicinity Map

Regional Topography

Exhibit 'A' Existing Conditions

Exhibit 'B' Proposed Final Conditions

Existing System As-Builts

Construction Plans

APPENDIX B – Water Quality Calculations

Minimum requirements Flow Chart

WWHM2012 Calculations

APPENDIX C - Supporting Data

NRCS Soils Map

Soils Data

NRCS Soil Description

Geotechnical Report

APPENDIX D – Maintenance Manual

Bond Quantities Worksheet
Stormwater Maintenance Agreement

Insert Worksheet

APPENDIX E – Construction Stormwater Pollution Prevention Plan (SWPPP)

Insert SWPPP