Combined Stormwater Site Plan (SSP) and Construction Stormwater Pollution Prevention Plan Report Short Form

Ruston Multifamily

Prepared For

SDEV25-XXXX

Project Location

5324 N Commercial St

2365000343

Stormwater Site Plan Prepared By

Name	Organization	Contact Telephone Number	Email Address
Jack Ryan	McInnis Engineering	253-414-1992	jack@mcinnisengineering.com

Date Prepared

04/08/25

Project Engineer's Certification:

"I hereby state that this Storm Drainage Report and Stormwater Pollution Prevention Plan for the SDEV 1405 E 29th Street project has been prepared by me or under my supervision and meets the standard of care and expertise which is usual and customary in this community for professional engineers. I understand that the City of Ruston does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me."

04/08/2025

1. Project Information

A. Project Contacts

See Title Page for Stormwater Site Plan Development Team

B. Property Owner

Name	Organization	Mailing Address	Contact Telephone Number	Email Address
Mathew Hockin	-	4814 N Mildred St. Tacoma, WA 98407	-	-

C. Applicant (if different than Property Owner)

Name	Organization	Mailing Address	Contact Telephone Number	Email Address
Jack Ryan	McInnis Engineering	202 East 34th St Tacoma, WA 98404	253-414-1992	jack@mcinnisengineering.com

D. Associated Permits

i) Associated City of Tacoma Permit Number(s)

SDEV25-XXXX

ii) Other Federal, State, or Local Associated Permit Types and Numbers

N/A

E. Vesting

i) City of Tacoma Stormwater Management Manual Edition Used

2021 Stormwater Management Manual (SWMM)

ii) If using a manual other than the most current version, provide vesting justification:

N/A

2. Project Overview

A. Provide a brief description of the proposed project.

The project address is 5324 N Commercial St, Ruston, WA 98407. Parcel Number 2365000343. The project is new multifamily development comprised of three connected townhomes and a shared detached garage.

The proposed project limits and clearing area consist of approximately 6,759 sq. ft. This includes the area of the buildings and garage.

The project is accessed from N Commercial St to the north of the project area and from an alley to the south of the project site.

3. Existing Project Site Conditions

A. Answer the following questions, provide additional description, and provide figures (if necessary) to describe the existing site conditions.

i) Describe in one or two sentences the existing project site use:

The lot is currently vacant and undeveloped.

ii) Describe in words or show on a figure the stormwater runoff patterns (natural and artificial) and the points where stormwater enters and exits the project site.

The stormwater is currently infiltrating into the native soils on site.

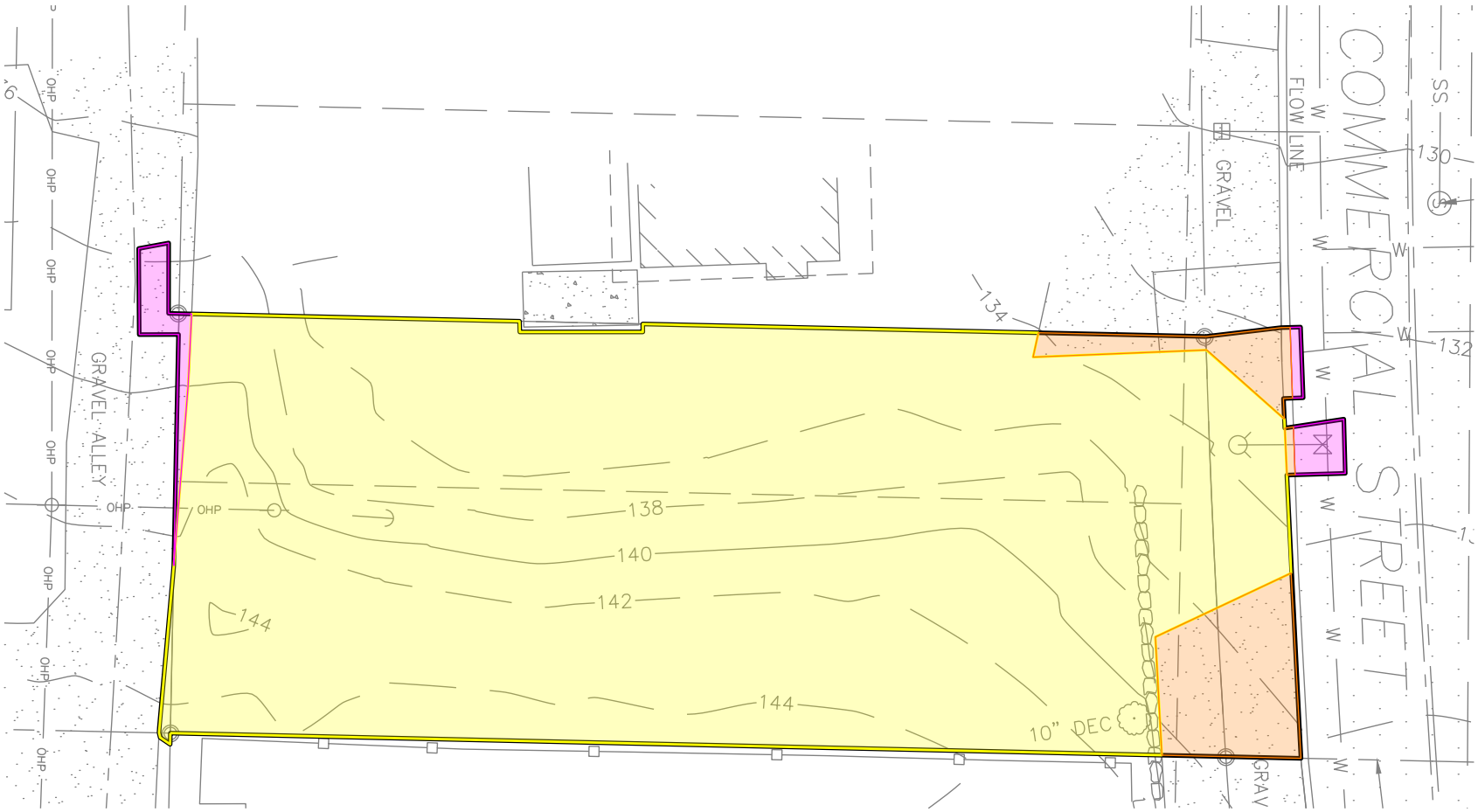
iii) Answer the following questions to help describe the existing site conditions. If Answer is Yes, include an associated figure(s) that shows location. Answers must be based upon site reconnaissance and readily available mapping data. See SWMM – Volume 2, Chapter 3 for resources.

Questions	**Answer**
Are groundwater protection areas located on the project site or within 500 feet of the project site?	☐Yes ☒No ☐Unknown
Are wetlands and/or their buffers located on the project site or within 500 feet of the project site?	☐Yes ☒No ☐Unknown
Are steep slopes located on the project site or within 500 feet of the project site?	☒Yes ☐No ☐Unknown
Are floodplains located on the project site or within 500 feet of the project site?	☐Yes ☒No ☐Unknown
Are streams located on the project site or within 500 feet of the project site?	☐Yes ☐No ☒Unknown
Are creeks located on the project site or within 500 feet of the project site?	☐Yes ☐No ☒Unknown
Are ravines located on the project site or within 500 feet of the project site?	☒Yes ☐No ☐Unknown
Are springs located on the project site or within 500 feet of the project site?	☐Yes ☒No ☐Unknown

Are any other sensitive areas or critical areas located on the project site or within 500 feet of the project site?	☐Yes ☒No ☐Unknown
Are any structures located on the project site?	☐Yes ☒No ☐Unknown
Are any fuel tanks or other storage tanks (above or below-ground) located on the project site?	☐Yes ☒No ☐Unknown
Are any groundwater wells located on the project site or within 100 feet of the project site?	☐Yes ☒No ☐Unknown
Are any septic systems located on the project site or within 100 feet of the project site?	☐Yes ☒No ☐Unknown
Are any Superfund sites located on the project site or within 100 feet of the project site?	☐Yes ☒No ☐Unknown
Are any Flood Hazard Areas located on the project site or within 100 feet of the project site?	☐Yes ☒No ☐Unknown
Is the project located in the South Tacoma Groundwater Protection District?	☐Yes ☒No ☐Unknown
Are any public or private easements located on the project site?	☒Yes ☒No ☐Unknown

B. Existing Project Site Condition Basin Map

Figure 1: Existing Conditions Basin Map



LEGEND

EXISTING POLLUTION GENERATING HARD SURFACE (114 SQ FT)

EXISTING NON POLLUTION GENERATION HARD SURFACE (417 SQ FT)

VEGETATION (6,228 SQ FT)

N

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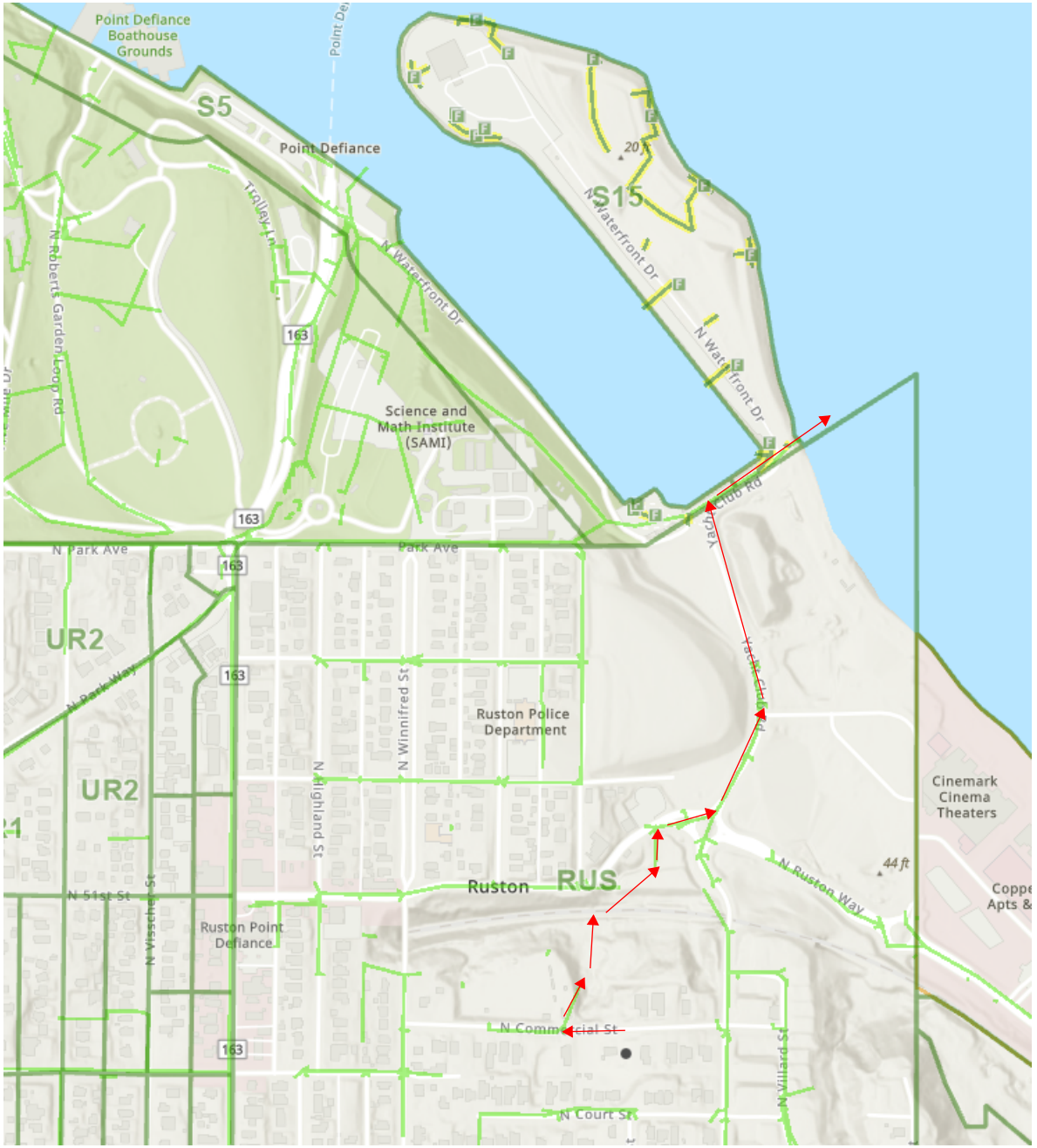
Ruston Multifamily
Existing Conditions Basin Map

Figure 1

C. Downstream Flowpath

The City of Tacoma GIS shows the stormwater drain line we plan to direct our stormwater runoff to discharging directly into the nearby ravine. Since the GIS does not show stream flowing through this ravine we are assuming based off of the topography of the area and the proximity of the discharge point to the Puget Sound that this water if not infiltrated into the native soils of the ravine would eventually make its way to the Puget Sound.

Figure 2: Downstream Analysis



McInnis ENGINEERING

Ruston Multifamily
Downstream Analysis

Figure 2

4. Proposed Project Site Conditions

A. Describe in words and provide figure(s) or drawing(s) that describe the proposed project site conditions.

i) Describe in one or two sentences the proposed project site use:

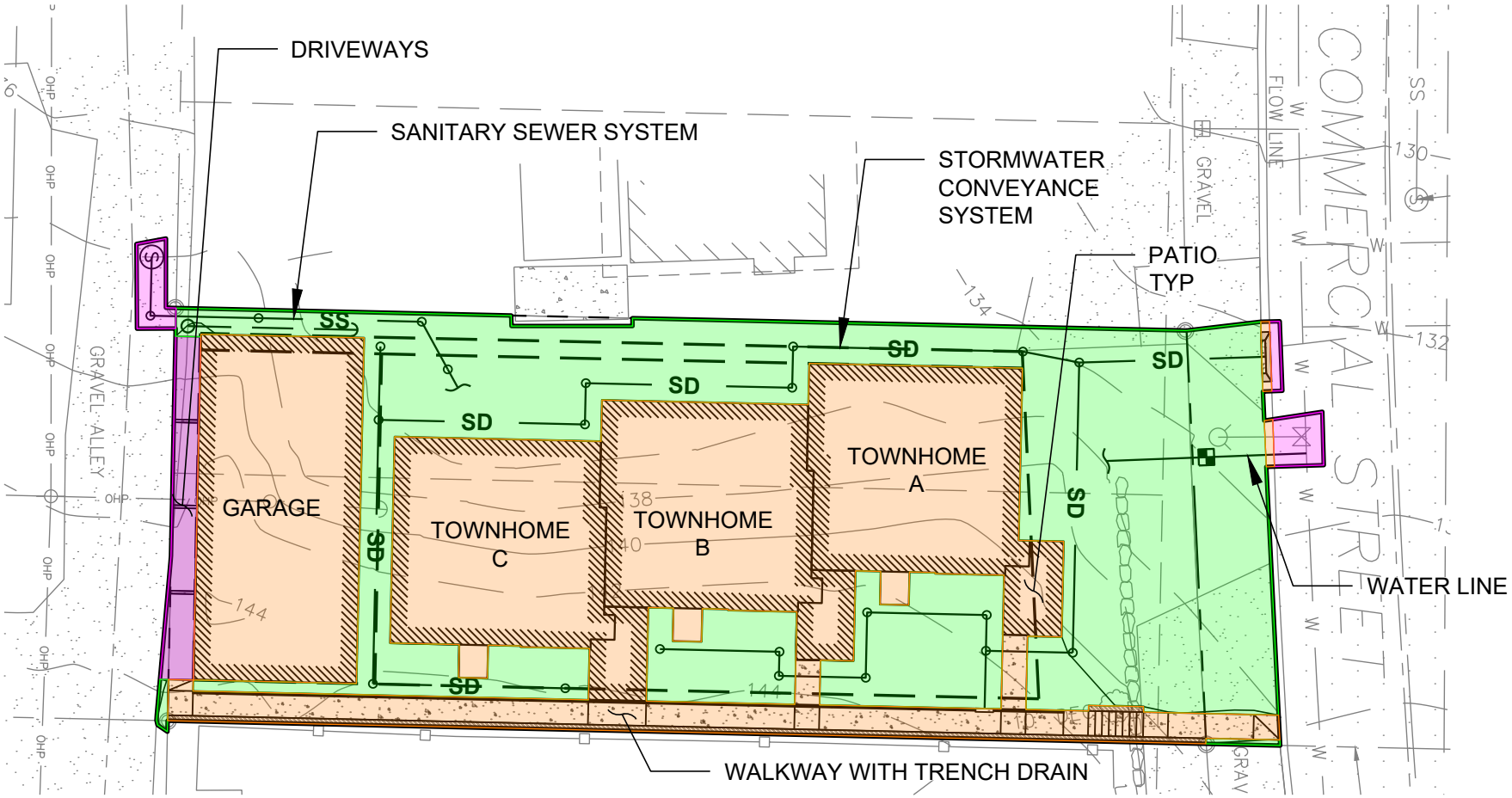
The proposed site use will be a multifamily development comprised of three townhome units and a shared detached garage.

ii) Describe in words or show on a figure the stormwater runoff patterns (natural and artificial) and the points where stormwater enters and exits the project site.

The site project will utilize catch and convey to mitigate stormwater. A storm drain line will collect stormwater from the roofs of the buildings and a trench rain will collect stormwater from the access walkway. Once collected this water will be conveyed to the curb where it will be discharged to the gutter to flow to an existing city catch basin. Ultimately this water will flow to a nearby ravine and ultimately the Puget Sound, as shown in the downstream analysis. Stormwater runoff from this site will not adversely affect the city storm system.

iii) Provide a figure showing:

Figure 3: Proposed Conditions Basin Map



LEGEND

NEW OR REPLACE POLLUTION GENERATING HARD SURFACE (222 SQ FT)

NEW OR REPLACED NON POLLUTION GENERATION HARD SURFACE (3,547 SQ FT)

LANDSCAPING (2,990 SQ FT)

N

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Ruston Multifamily
Proposed Conditions Basin Map

Figure 3

5. Minimum Requirement Determination

A. Project Thresholds

Complete the following project threshold table. Onsite includes any work on the parcel or parcels of land associated with the project. Offsite includes any work within the City Right-of-Way.

Surface Type	Onsite
Proposed Roof Area (ft^2)	2,786
Proposed Walkways and Sidewalks (ft^2) – includes gravel walkways	540
Proposed Deck/Patio Area (ft^2)	206
Proposed Driveway (ft^2)	134
Other proposed driving surfaces (parking pads, street improvements, etc.) (ft^2)	103
Total Amount of All Proposed Surfaces Above (ft^2). (Total proposed hard surface area.)	3769
Amount of Land Disturbed (ft^2)	6,759

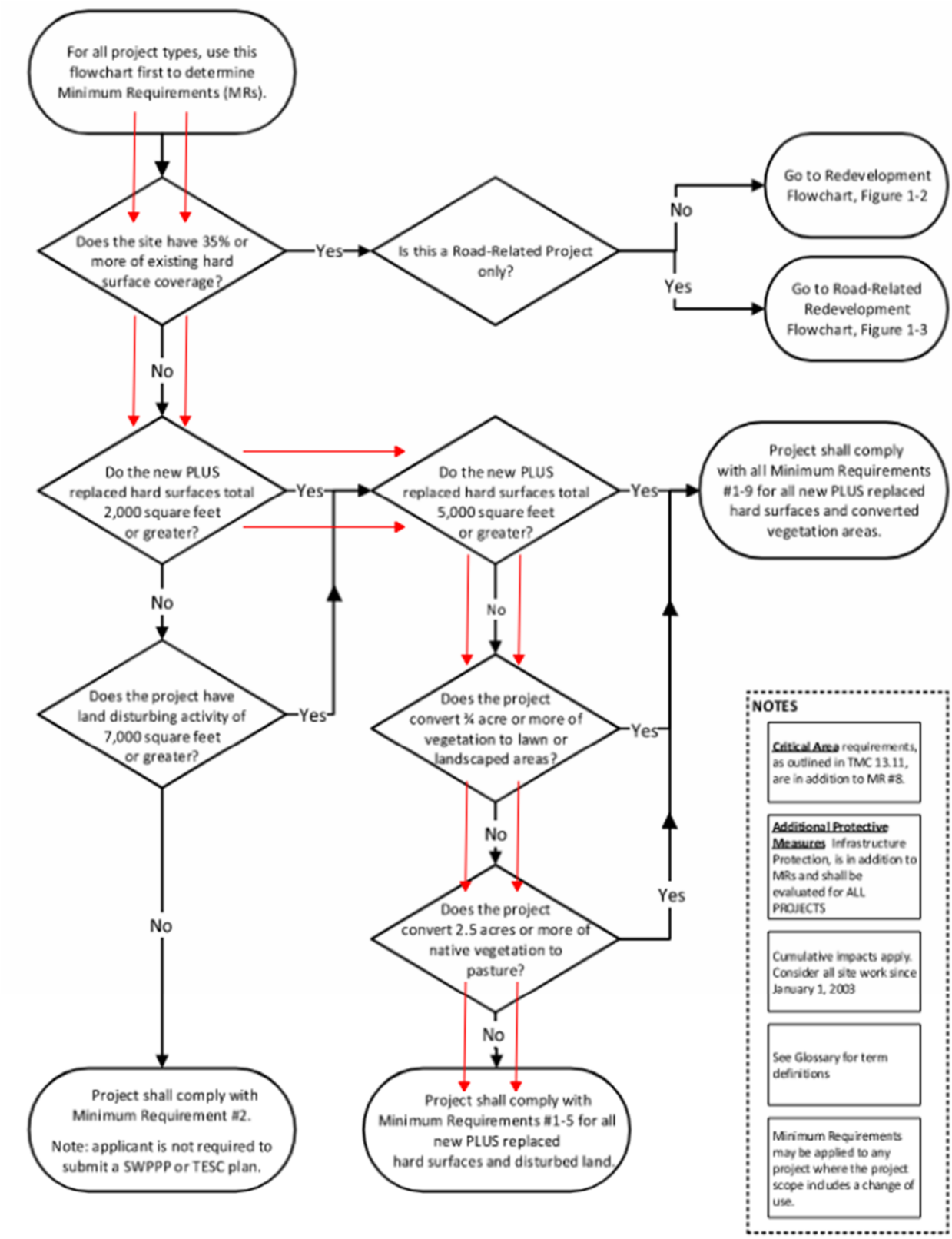
B. Receiving Waterbody Table

Receiving Waterbody Name	Type of Receiving Waterbody
Puget Sound	Marine

C. Minimum Requirements Required

Applicable Minimum Requirements	Applicable Surface Type Requiring Mitigation
Minimum Requirements 1-5	New and Replaced Hard Surfaces and Converted Vegetation Areas and Land Disturbed

D. Flowcharts



6. Discussion of Minimum Requirements

A. Minimum Requirement #1 – Preparation of a Stormwater Site Plan

This Stormwater Site Plan Report and the associated Site Plans and Building Permit Drawings (Insert name of associated Civil Plan Set or drawings) are being used to meet Minimum Requirement #1.

Description of Site Appropriate Development Principles

Where practicable, projects shall use the following site appropriate development principles. Put a checkmark next to the principles that will be used for the project. Project design is not required to be changed in order to accommodate site appropriate development principles, but where feasible, these principles must be used. If none of the site development principles are feasible, place a checkmark next to that box below.

☒ Minimization of land disturbance by fitting development to the natural terrain.

☒ Minimization of land disturbance by confining construction to the smallest area feasible and away from critical areas.

☐ Preservation of natural vegetation.

☐ Locating impervious surfaces over less permeable soils.

☒ Clustering buildings.

☒ Minimizing impervious surfaces.

☐ Site appropriate development principles are not practicable because of project design.

B. Minimum Requirement #2 – Construction Stormwater Pollution Prevention Plan

The Construction Stormwater Pollution Prevention Plan is available in this document before the appendices.

C. Minimum Requirement #3 – Source Control

i. Description of Final Site Use

The final site use will be a multifamily development comprised of three townhome units and a shared detached garage.

ii. Source Control BMPs

☒ Single Family Residence: The occupant shall comply with BMP S168: BMPs for Homeowners.

☐ Commercial or Industrial Facilities: n/a

D. Minimum Requirement #4 – Preserving Drainage Patterns and Outfalls

i. Description of Drainage Patterns and Outfalls

All boxes should be checked for this Minimum Requirement. If all boxes cannot be checked an Exception or Adjustment to the Minimum Requirement may be required per Volume 1 of the SWMM.

☒ The natural (or existing) drainage patterns are maintained to the maximum extent feasible.
☒ Discharges from the project site occur at the natural (or existing) location to the maximum extent feasible.
☒ Discharge from the project site will not cause adverse impacts to downstream receiving waters and downgradient properties.

E. Minimum Requirement #5 – Onsite Stormwater Management

i. The List Approach.

This project will utilize The List Approach.

If a BMP is not considered to be feasible, insert infeasibility checklist below this table.

Surface Type: Roofs	
Not Flow Control Exempt	
Analyze Each BMP in the order listed below. Where there is more than one BMP listed, put a checkmark next to the one analyzed. If a BMP is feasible, that BMP must be used and it is not necessary to analyze other BMPs for feasibility.	Is BMP Feasible?
1. Choose One: ☐ BMP L614: Full Dispersion or ☒ BMP L602: Downspout Full Infiltration	☐ Yes ☒ No
2. Choose One: ☐ BMP L601: Rain Gardens or ☒ BMP L630: Bioretention	☐ Yes ☒ No
3. BMP L603: Downspout Dispersion	☐ Yes ☒ No
4. BMP L604: Perforated Stub-Out Connection	☐ Yes ☒ No
Surface Type: Other Hard Surfaces	
Not Flow Control Exempt	
Analyze Each BMP in the order listed below. Where there is more than one BMP listed, put a checkmark next to the one analyzed. If a BMP is feasible, that BMP must be used and it is not necessary to analyze other BMPs for feasibility.	Is BMP Feasible?
1. BMP L614: Full Dispersion	☐ Yes ☒ No
2. Choose One: ☒ BMP L633: Permeable Pavement, or ☐ BMP T1050: Compost-Amended Vegetated Filter Strip (CAVFS), or ☐ BMP L601: Rain Gardens, or ☐ BMP L630: Bioretention	☐ Yes ☒ No
3. Choose One:	☐ Yes

☒ BMP L612: Sheet Flow Dispersion, or ☐ BMP L611: Concentrated Flow Dispersion	☒ No
Surface Type: Lawn/Landscaped Areas	
Not Flow Control Exempt	
Analyze the BMP below for feasibility. If the BMP is feasible if must be used.	Is BMP Feasible?
BMP L613: Post-Construction Soil Quality and Depth	☒ Yes ☐ No

Since all the BMPs for hard surfaces and roofs are infeasible for this project site, the site will utilize collect and convey to flow the stormwater to the gutter on N Commercial St where it will be conveyed to an existing city catch basin. Ultimately it is assumed that this water will flow to the Puget Sound, as shown in the downstream analysis. Stormwater runoff from this site will not adversely affect the city storm system.

ii. Minimum Requirement #5 – Infeasibility Checklists and BMP Sizing Sheets

iii. City of Tacoma Stormwater Management Manual – Infeasibility Checklist
iv. Surface Type: Roofs
v. BMP L602: Downspout Full Infiltration (Infiltration Trenches and Drywells)
vi.
vii. Version: 07/01/2021

Number	Question	Yes	No	NA
1	Can the infiltration trench or drywell be placed 10 feet or more from any building structure?	☐	☒	☐
2	Can the infiltration trench or drywell be placed 5 feet or more from any other structure or property line?	☐	☐	☒
3	Can the infiltration trench or drywell be placed 50 feet or more from the top of any slope 20% or greater?	☐	☐	☒
4	Can the infiltration trench or drywell be placed 50 feet or more from geologically hazardous areas?	☐	☐	☒
5	Can the infiltration trench or drywell meet setback requirements from Onsite Sewage Systems per WAC 246-272A-0210?	☐	☐	☒
6	Will installing an infiltration trench or drywell cause conflicts with any of the following? (An answer of yes means this BMP is infeasible.) Place a checkmark next to the applicable item (6a-6e).	☐	☐	☒
6a	Requirements of the Historic Preservation Laws and Archeology Laws, Federal Superfund or Washington State Model Toxics Control Act, Federal Aviation Administration requirements for airports, or Americans with Disability Act	☐		
6b	Special zoning district design criteria adopted and being implemented through any City of Tacoma planning efforts	☐		
6c	Public health and safety standards	☐		
6d	Transportation regulations to maintain the option for future expansion or multi-modal use of public rights-of-way	☐		
6e	Critical Area Preservation Ordinance	☐		
7	Can the design standards in BMP L602 be met?	☐	☐	☒
7a	Describe the design standards that cannot be met:			
8	Was the soil classified as being clay, sandy clay, clay loam, silty clay loam, sandy clay loam, or silt according to the USDA Textural Soil Triangle? (An answer of yes means this BMP is not feasible).	☐	☐	☒
9	Is the depth from proposed final grade to the seasonal high groundwater table or other impermeable layer equal to or greater than 3 feet?	☐	☐	☒
10	Is the depth from the bottom of the infiltration trench or drywell to the seasonal high groundwater table equal to or greater than 1 foot?	☐	☐	☒

City of Tacoma Stormwater Management Manual – Infeasibility Checklist
Surface Type: Roofs or Other Hard Surface
BMP L630: Bioretention

Version: 07/01/2021

It is not necessary to answer all questions when determining if a BMP is feasible for Minimum Requirement #5 – The List Approach. Unless otherwise noted, a single answer of No means the BMP is considered infeasible for meeting Minimum Requirement #5 – The List Approach. Applicant may choose which questions to answer when determining feasibility.

Questions #1-18 relate to infeasibility criteria that are based on conditions such as topography and distances to predetermined boundaries. Citation of the following do not need site-specific written recommendations from a Washington State Licensed Professional Engineer or Washington State Licensed Professional Geologist though some criteria may require professional services to determine if the infeasibility criteria apply.

Question Number	Question	Yes	No	NA
1	Can the bioretention facility be placed 10 feet or more from any building structure?	☐	☒	☐
2	Can the bioretention facility be placed 5 feet or more from any other structure or property line?	☐	☐	☒
3	Can the bioretention facility be placed 50 feet or more from the top of any slope greater than 20%?	☐	☐	☒
4	Can the bioretention facility be placed 50 feet or more from geologically hazardous areas?	☐	☐	☒
5	Can the bioretention facility be located outside of designated erosion or landslide hazard areas?	☐	☐	☒
6	Can the bioretention facility be located greater than 100 feet from an underground storage tank whose capacity including tank and underground connecting pipe is 1100 gallons or more?	☐	☐	☒
7	Can the bioretention facility be located greater than 10 feet from an underground storage tank (tank used for petroleum product, chemical, or liquid hazardous waste storage) whose capacity including tank and underground connecting pipe is 1100 gallons or less?	☐	☐	☒
8	Can the bioretention facility be located greater than 100 feet of a closed or active landfill?	☐	☐	☒
9	Can the bioretention facility be located greater than 100 feet from drinking water well or a spring used for drinking water supply?	☐	☐	☒
10	Can the bioretention facility be placed 10 feet or more from small on-site sewage disposal drainfields? (For large on-site sewage disposal setbacks see WAC Chapter 246-727B).	☐	☐	☒
11	Can the bioretention facility be located on slopes less than 8%?	☐	☐	☒
12	Is the bioretention facility compatible with the surrounding drainage system (e.g., project drains to an existing stormwater system whose elevation precludes proper connection to the bioretention facility)?	☐	☐	☒
13	For properties with known soil or groundwater contamination, can the bioretention facility be located greater than 100 feet from an area known to have deep soil contamination?	☐	☐	☒
14	For properties with known soil or groundwater contamination, can the bioretention facility be located such that infiltration will not increase or change the direction of the migration of pollutants in the groundwater? (Based upon groundwater modeling).	☐	☐	☒
15	For properties with known soil or groundwater contamination, can the bioretention facility be located in an area that does not have contaminated surface soils that are proposed to remain in place?	☐	☐	☒
16	For properties with known soil or groundwater contamination, can the bioretention facility be located in areas not prohibited by an approved	☐	☐	☒

	cleanup plan under the state Model Toxics Control Act or Federal Superfund Law, or an environmental covenant under Chapter 64.70 RCW?			
17	For bioretention facilities that are constructed with imported compost materials, can the bioretention facility be located greater than ¼ mile from a phosphorus-sensitive waterbody? (Does not apply to discharges to Wapato Lake).	☐	☐	☒
18	Will installing a bioretention facility cause conflicts with any of the following? (An answer of yes means this BMP is infeasible.) Place a checkmark next to the applicable item (18a-18e).	☐	☐	☒
18a	Requirements of the Historic Preservation Laws and Archeology Laws, Federal Superfund or Washington State Model Toxics Control Act, Federal Aviation Administration requirements for airports, or Americans with Disability Act	☐		
18b	Special zoning district design criteria adopted and being implemented through any City of Tacoma planning efforts	☐		
18c	Public health and safety standards	☐		
18d	Transportation regulations to maintain the option for future expansion or multi-modal use of public rights-of-way	☐		
18e	Critical Area Preservation Ordinance	☐		
Questions #19-21 relate to infeasibility criteria that are based upon subsurface characteristics and require a soils report to determine infeasibility.				
19	Is the depth from the lowest level of the bioretention soil mix or any underlying gravel layer to the seasonal high groundwater table or other impermeable layer equal to or greater than 1 foot? This applies only if the contributing area to the bioretention facility has less than 5,000 square feet of pollution-generating impervious surface, and less than 10,000 square feet of impervious surface, and less than ¾ acre pervious surface.	☐	☐	☒
20	Is the depth from the lowest level of the bioretention soil mix or any underlying gravel layer to the seasonal high groundwater table or other impermeable layer equal to or greater than 3 feet? This applies only if the contributing area to the bioretention facility has: 5,000 square feet or greater of pollution-generating impervious surface, or 10,000 square feet or greater of impervious surface, or more ¾ acre pervious surface AND the bioretention facility cannot be broken down into amounts smaller than those listed above.	☐	☐	☒
21	Was the soil classified as having a measured native soil saturated hydraulic conductivity of 0.3 in/hour or more?	☐	☐	☒
Questions 22-29 require evaluation of site specific conditions and a written recommendation from an appropriate Washington State Licensed Professional (e.g., Professional Engineer, Professional Geologist, Professional Hydrogeologist).				
22	Will the proposed bioretention facility location threaten the safety or reliability of preexisting underground utilities, preexisting underground storage tanks, preexisting structures, or preexisting road or parking lot surfaces? (An answer of yes means the BMP is infeasible).	☐	☐	☒
23	Will the proposed bioretention facility location allow for a safe overflow pathway to the City stormwater system or a private stormwater system?	☐	☐	☒
24	Are there reasonable concerns about erosion, slope failure, or downgradient flooding due to infiltration? (An answer of yes means the BMP is infeasible).	☐	☐	☒

25	Is the project located in an area whose groundwater drains into an erosion hazard or landslide hazard area? (An answer of yes means the BMP is infeasible).	☐	☐	☒
26	Will infiltrating water threaten existing below grade basements? (An answer of yes means the BMP is infeasible).	☐	☐	☒
27	Will infiltrating water threaten shoreline structures such as bulkheads? (An answer of yes means the BMP is infeasible).	☐	☐	☒
28	Is there lack of usable space onsite for bioretention facilities at redevelopment sites? (An answer of yes means the BMP is infeasible).	☐	☐	☒
29	For public road projects, is there insufficient space within the ROW to install a bioretention facility? (An answer of yes means this BMP is infeasible).	☐	☐	☒

City of Tacoma Stormwater Management Manual – Infeasibility Checklist
Surface Type: Roofs
BMP L603: Downspout Dispersion (Dispersion Trenches and Splashblocks)

Version: 07/01/2021

Questions #1-10 relate to infeasibility criteria that are based on conditions such as topography and distances to predetermined boundaries and certain design criteria.

Question Number	Question	Yes	No	NA
1	Can the dispersion trench or splashblocks be placed 10 feet or more from any building structure?	☐	☐	☒
2	Can the dispersion trench or splashblocks be placed 5 feet or more from any other structure or property line?	☐	☐	☒
3	Can the dispersion trench or splashblocks be placed 50 feet or more from the top of any slope 15% or greater?	☐	☐	☒
4	Can the dispersion trench or splashblocks be placed 50 feet or more from geologically hazardous areas?	☐	☐	☒
5	Can the dispersion trench or splashblock maintain setbacks from Onsite Sewage Systems per WAC 246-272A-0210?	☐	☐	☒
6	Is it possible to maintain or construct a vegetated flowpath of at least 25 feet from the outlet of a dispersion trench and any property line, structure, stream, wetland, other infiltration or dispersion system, or impervious surface?	☐	☒	☐
7	Is it possible to maintain or construct a vegetated flowpath of at least 50 feet from the outlet of a dispersion trench and any slope greater than 15%?	☐	☐	☒
8	Is it possible to maintain or construct a vegetated flowpath of at least 50 feet from the outlet of splashblock and any property line, structure, slope over 15%, stream, wetland, other infiltration or dispersion system, or impervious surface?	☐	☐	☒
9	Will installing a dispersion trench or splashblocks cause conflicts with any of the following? (An answer of yes means this BMP is infeasible.) Place a checkmark next to the applicable item (9a-9e).	☐	☐	☒
9a	Requirements of the Historic Preservation Laws and Archeology Laws, Federal Superfund or Washington State Model Toxics Control Act, Federal Aviation Administration requirements for airports, or Americans with Disability Act	☐		
9b	Special zoning district design criteria adopted and being implemented through any City of Tacoma planning efforts	☐		
9c	Public health and safety standards	☐		

9d	Transportation regulations to maintain the option for future expansion or multi-modal use of public rights-of-way	☐		
9e	Critical Area Preservation Ordinance	☐		
10	Can the design standards in BMP L603 be met?	☐	☐	☒
10a	Describe the design standard that cannot be met:			
11	Will the use of a dispersion trench or splashblocks cause erosion or flooding problems onsite or on adjacent properties? (An answer of yes means this BMP is not feasible).	☐	☐	☒

City of Tacoma Stormwater Management Manual – Infeasibility Checklist
Surface Type: Other Hard Surface
BMP L633: Permeable Pavement

Version: 07/01/2021

It is not necessary to answer all questions when determining if a BMP is feasible for Minimum Requirement #5 – The List Approach. Unless otherwise noted, a single answer of No means the BMP is considered infeasible for meeting Minimum Requirement #5 – The List Approach. Applicant may choose which questions to answer when determining feasibility.

Questions #1-24 relate to infeasibility criteria that are based on conditions such as topography and distances to predetermined boundaries. Citation of the following do not need site-specific written recommendations from a Washington State Licensed Professional Engineer or Washington State Licensed Professional Geologist though some criteria may require professional services to determine if the infeasibility criteria apply.

Question Number	Question	Yes	No	NA
1	**Can the permeable pavement be placed 10 feet or more from any building structure?**	☐	☐	☒
2	Can the permeable pavement be placed 5 feet or more from any other structure or property line?	☐	☒	☐
3	Can the permeable pavement be placed 50 feet or more from the top of any slope greater than 20%?	☐	☐	☒
4	Can the permeable pavement be placed 50 feet or more from geologically hazardous areas?	☐	☐	☒
5	Can the permeable pavement be located outside of designated erosion or landslide hazard areas?	☐	☐	☒
7	Can the permeable pavement be located greater than 10 feet from an underground storage tank (tank used for petroleum product, chemical, or liquid hazardous waste storage) whose capacity including tank and underground connecting pipe is 1100 gallons or less?	☐	☐	☒
8	Can the permeable pavement be located greater than 100 feet of a closed or active landfill?	☐	☐	☒
9	Can the permeable pavement be located greater than 100 feet from drinking water well or a spring used for drinking water supply if the permeable pavement is (or has run-on from) a pollution-generating hard surface?	☐	☐	☒
10	Can the permeable pavement be placed 10 feet or more from small on-site sewage disposal drainfields? (For large on-site sewage disposal setbacks see WAC Chapter 246-727B).	☐	☐	☒
11	Can the permeable pavement be constructed such that the subgrade is less than 6%?	☐	☐	☒

12	Can the permeable pavement be constructed such that the wearing course is less than 6% (after reasonable attempts have been made to design the grade)?	☐	☐	☒
13	Is the location for permeable pavement a multi-level parking garage, above a culvert, or a bridge? An answer of yes means the BMP is not feasible.	☐	☐	☒
14	Does the road receive more than very low traffic volumes? (Roads with a projected average daily traffic volume of 400 vehicles or less). This infeasibility criterion cannot be used for sidewalks or non-traffic bearing surfaces. An answer of yes means the BMP is not feasible.	☐	☐	☒
15	Does the road receive more than very low truck traffic? (Roads not subject to through truck traffic but may receive up to weekly use by utility trucks, daily school bus use, and multiple daily use by pick-up trucks, mail/parcel delivery trucks, and maintenance vehicles.). This infeasibility criterion cannot be used for sidewalks or non-traffic bearing surfaces. An answer of yes means the BMP is not feasible.	☐	☐	☒
16	Does the area typically generate high concentrations of oil due to high traffic turnover or frequent transfer of oil? (See SWMM for additional guidance.) An answer of yes means the BMP is not feasible.	☐	☐	☒
17	Can the permeable pavement be located outside of areas with industrial activity as identified in 40 CFR 122.26(b)14?	☐	☐	☒
18	Can permeable pavement be located outside of areas where the risk of concentrated pollutant spills is likely such as gas stations, truck stops, and industrial chemical storage areas?	☐	☐	☒
19	Can permeable pavement be located outside of areas likely to have long-term excessive sediment deposition after construction?	☐	☐	☒
20	For properties with known soil or groundwater contamination, can the permeable pavement be located greater than 100 feet from an area known to have deep soil contamination?	☐	☐	☒
21	For properties with known soil or groundwater contamination, can the permeable pavement be located such that infiltration will not increase or change the direction of the migration of pollutants in the groundwater? (Based upon groundwater modeling).	☐	☐	☒
22	For properties with known soil or groundwater contamination, can the permeable pavement be located in an area that does not have contaminated surface soils that are proposed to remain in place?	☐	☐	☒
23	For properties with known soil or groundwater contamination, can the permeable pavement be located in areas not prohibited by an approved cleanup plan under the state Model Toxics Control Act or Federal Superfund Law, or an environmental covenant under Chapter 64.70 RCW?	☐	☐	☒
24	Will installing permeable pavement cause conflicts with any of the following? (An answer of yes means this BMP is infeasible.) Place a checkmark next to the applicable item (24a-24e).	☐	☐	☒
24a	Requirements of the Historic Preservation Laws and Archeology Laws, Federal Superfund or Washington State Model Toxics Control Act, Federal Aviation Administration requirements for airports, or Americans with Disability Act	☐		
24b	Special zoning district design criteria adopted and being implemented through any City of Tacoma planning efforts	☐		
24c	Public health and safety standards	☐		
24d	Transportation regulations to maintain the option for future expansion or multi-modal use of public rights-of-way	☐		

24e	Critical Area Preservation Ordinance	☐		
Questions #25-28 relate to infeasibility criteria that are based upon subsurface characteristics and require a soils report to determine infeasibility.				
25	Is the depth from the lowest layer designed as part of the permeable pavement section to the seasonal high groundwater elevation, bedrock, or other impermeable layer equal to or greater than 1 foot?	☐	☐	☒
26	For pollution generating pervious pavement surfaces, can the soil suitability criteria for treatment be met? (See SWMM – BMP L633)	☐	☐	☒
27	Was the soil classified as having a measured native soil saturated hydraulic conductivity of 0.3 in/hour or more?	☐	☐	☒
28	Is the existing impervious surface that will be replaced non-polluting generating and located over an outwash soil with a saturated hydraulic conductivity of 4 inches/hour or greater?	☐	☐	☒
Questions 29-40 require evaluation of site specific conditions and a written recommendation from an appropriate Washington State Licensed Professional (e.g., Professional Engineer, Professional Geologist, Professional Hydrogeologist).				
29	Will the proposed permeable pavement location threaten the safety or reliability of preexisting underground utilities, preexisting underground storage tanks, preexisting structures, or preexisting road or parking lot surfaces? (An answer of yes means the BMP is infeasible).	☐	☐	☒
30	Will infiltrating and ponded water compromise existing adjacent impervious pavements? (An answer of yes means the BMP is infeasible).	☐	☐	☒
31	Are there reasonable concerns about erosion, slope failure, or downgradient flooding due to infiltration? (An answer of yes means the BMP is infeasible).	☐	☐	☒
32	Can the permeable pavement be located outside area whose groundwater drains into an erosion hazard or landslide hazard area?	☐	☐	☒
33	Will infiltrating water threaten existing below grade basements? (An answer of yes means the BMP is infeasible).	☐	☐	☒
34	Will infiltrating water threaten shoreline structures such as bulkheads? (An answer of yes means the BMP is infeasible).	☐	☐	☒
35	Can permeable pavement be located away from the bottom of steep, erosion prone areas that are likely to erode sediment?	☐	☐	☒
36	Can permeable pavement be located away from fill soils that can become unstable when saturated?	☐	☐	☒
37	Will permeable pavement construction on steep slopes cause erosion and structural failure? (An answer of yes means the BMP is infeasible).	☐	☐	☒
38	Will permeable pavement construction on steep slopes cause runoff velocities that preclude adequate infiltration at the pavement surfaces? (An answer of yes means the BMP is infeasible).	☐	☐	☒
39	Can permeable pavement provide sufficient strength to support the anticipated loads?	☐	☐	☒
40	Are underlying soils suitable for supporting traffic loads when saturated?	☐	☐	☒

City of Tacoma Stormwater Management Manual – Infeasibility Checklist
Surface Type: Roofs
BMP L604: Perforated Stub-out Connections.

Version: 07/01/2021

Question Number	Question	Yes	No	NA
1	Can the perforated stub-out connection be placed 10 feet or more from any building structure?	☐	☐	☒

2	Can the perforated stub-out connection be placed 5 feet or more from any other structure or property line?	☐	☐	☒
3	Can the perforated stub-out connection be placed 50 feet or more from the top of any slope 20% or greater?	☐	☐	☒
4	Can the perforated stub-out connection be placed 50 feet or more from geologically hazardous areas?	☐	☐	☒
5	Can the perforated stub-out connection meet setback requirements from Onsite Sewage Systems per WAC 246-272A-0210?	☐	☐	☒
6	Will installing a perforated stub-out connection cause conflicts with any of the following? (An answer of yes means this BMP is infeasible.) Place a checkmark next to the applicable item (6a-6e).	☐	☐	☒
6a	Requirements of the Historic Preservation Laws and Archeology Laws, Federal Superfund or Washington State Model Toxics Control Act, Federal Aviation Administration requirements for airports, or Americans with Disability Act	☐		
6b	Special zoning district design criteria adopted and being implemented through any City of Tacoma planning efforts	☐		
6c	Public health and safety standards	☐		
6d	Transportation regulations to maintain the option for future expansion or multi-modal use of public rights-of-way	☐		
6e	Critical Area Preservation Ordinance	☐		
7	Can the design standards in BMP L604 be met?	☐	☒	☐
7a	Describe the design standard that cannot be met:			
8	Is the depth from the bottom of the perforated stub-out connection to the seasonal high groundwater table equal to or greater than 1 foot?	☐	☐	☒

City of Tacoma Stormwater Management Manual – Infeasibility Checklist
Surface Type: Other Hard Surfaces
BMP L612: Sheet Flow Dispersion

Version: 07/01/2021

It is not necessary to answer all questions when determining if a BMP is feasible for Minimum Requirement #5 – The List Approach. Unless otherwise noted, a single answer of No means the BMP is considered infeasible for meeting Minimum Requirement #5 – The List Approach. Applicant may choose which questions to answer when determining feasibility.

Questions #1-9 relate to infeasibility criteria that are based on conditions such as topography and distances to predetermined boundaries and certain design criteria.

Question Number	Question	Yes	No	NA
1	Can the sheet flow dispersions system be placed 10 feet or more from any building structure?	☐	☒	☐

2	Can the sheet flow dispersion system be placed 5 feet or more from any other structure or property line?	☐	☐	☒
3	Can the sheet flow dispersion system be placed 50 feet or more from the top of any slope 15% or greater?	☐	☐	☒
4	Can the sheet flow dispersion system be placed 50 feet or more from geologically hazardous areas?	☐	☐	☒
5	Can the sheet flow dispersion system maintain setbacks from Onsite Sewage Systems per WAC 246-272A-0210?	☐	☐	☒
6	Is it possible to provide a vegetated flowpath width of 10 feet or greater for up to 20 feet of width of paved or impervious surface?	☐	☐	☒
7	For paved or impervious surfaces widths 20 feet or greater, is it possible to provide a vegetated flowpath width of 20 feet or greater (additional 10 feet of width must be added for each increment of 20 feet or more in width)?	☐	☐	☒
8	Will installing sheet flow dispersion cause conflicts with any of the following? (An answer of yes means this BMP is infeasible.) Place a checkmark next to the applicable item (8a-8e).	☐	☐	☒
8a	Requirements of the Historic Preservation Laws and Archeology Laws, Federal Superfund or Washington State Model Toxics Control Act, Federal Aviation Administration requirements for airports, or Americans with Disability Act	☐		
8b	Special zoning district design criteria adopted and being implemented through any City of Tacoma planning efforts	☐		
8c	Public health and safety standards	☐		
8d	Transportation regulations to maintain the option for future expansion or multi-modal use of public rights-of-way	☐		
8e	Critical Area Preservation Ordinance	☐		
9	Can the design standards in BMP L612 be met?	☐	☐	☒
9a	Describe the design standard that cannot be met:			
Questions #10 require evaluation of site specific conditions and a written recommendation from an appropriate Washington State Licensed Professional (e.g., Professional Engineer, Professional Geologist, Professional Hydrogeologist).				
10	Will the use of sheet flow dispersion cause erosion or flooding problems onsite or an adjacent properties? (An answer of yes means this BMP is not feasible).	☐	☐	☒

F. Minimum Requirement #6 – Stormwater Treatment

i. Description of Compliance Need

Minimum Requirement #6 is not required for this project because the project adds less than 5,000 square feet of new hard surface, converts less than ¾ acre of vegetation to lawn or landscape, and converts less than 2.5 acres of native vegetation to pasture.

G. Minimum Requirement #7 – Flow Control

i. Description of Compliance Need

Minimum Requirement #7 is not required for this project because the project adds less than 5,000 square feet of new hard surface, converts less than ¾ acre of vegetation to lawn or landscape, and converts less than 2.5 acres of native vegetation to pasture.

H. Minimum Requirement #8 – Wetlands Protection

i. Description of Compliance Need

Minimum Requirement #8 is not required for this project because the project adds less than 5,000 square feet of new hard surface, converts less than ¾ acre of vegetation to lawn or landscape, and converts less than 2.5 acres of native vegetation to pasture.

I. Minimum Requirement #9 – Operation and Maintenance

Pick the statement or statements below that apply to this project.

☒ This project does not propose to install any permanent stormwater facilities. An Operation and Maintenance Manual is not required.

☐ The Operation and Maintenance Manual is available as a stand-alone document as part of the Permit submittal.

☐ For facilities to be maintained by the City of Ruston (facilities located in the City Right-of-Way designed to manage stormwater from the City Right-of-Way) include the following language: The City of Ruston is responsible for creating and keeping an Operation and Maintenance Manual for all facilities to be maintained by the City of Ruston.

J. Additional Protective Measure – Infrastructure Protection

i. Description of Compliance Need

A quantitative downstream analysis is not required because the project is not increasing the surface area contributing to the downstream system by 5,000 square feet or more and is not increasing the surface area converted from pervious to impervious contributing to the downstream system by 5,000 square feet or more.

7. Conveyance System Design – Collect and Covey

Onsite collection of stormwater and conveyance to the City of Ruston stormwater system may be necessary if onsite stormwater management BMPs cannot fully infiltrate or disperse stormwater onsite. This may include conveyance to either the curb and gutter or wedge curb, if present, or a structure of the stormwater conveyance system. Connections directly to the pipes are not allowed. Stormwater runoff shall not be conveyed over driveways, sidewalks, or other areas reserved for pedestrian traffic.

All connections shall comply with Volume 5, Chapter 4 of the SWMM.

Connections to the curb and gutter or asphalt wedge curb shall comply with City of Tacoma Standard Plans SU-29 and SU-29a. The minimum pipe size for conveyance to the curb shall be 3" in diameter. Where capacity greater than 3" is required, storm main extension may be required.

Answer the following questions to determine if onsite collection of stormwater and conveyance to the curb is allowed. If any question has an answer of No, extension of the City stormwater system or on-site management is necessary. Extension of the City stormwater system requires a separate Work Order Permit.

Question	**Yes**	**No**
Is a catch basin or other inlet to the conveyance system located within 350 feet downstream of the discharge location?	✓	☐
Can stormwater from the project site remain in the gutter line to the nearest stormwater inlet (ie, is there curb and gutter or asphalt wedge curb all the way to an inlet)?	✓	☐
If that gutter line at least 3" tall all the way to the downstream inlet?	✓	☐
Can stormwater from the project site enter a stormwater inlet before the next downstream intersection?	✓	☐
Can stormwater be discharged on the low side of a full warp street section?	✓	☐

Construction Stormwater Pollution Prevention Plan (SWPPP) Report

Erosion and Sediment Control Lead

Name	Organization	Contact Telephone Number	Email Address	CESCL/CPESC Number (if applicable)
TBD	-	-	-	-

1. Proposed Construction Schedule

i. Proposed Start Date: Spring 2026

ii. Proposed End Date: Fall 2026

iii. Describe proposed phasing or sequencing (if any): There is no phasing proposed with this project

2. 13 Elements of Construction Stormwater Pollution Prevention

Below the 13 Elements of Construction Stormwater Pollution Prevention are provided. For each element, place a checkmark next to the BMP that will be used to satisfy the element. If Other is checked describe how the element will be addressed in detail. If an element is not required, justification for why that element is not required must be included. Volume 3, Table 3-1: Construction Stormwater BMPs by SWPP Element is a guide that can be used to help determine appropriate BMPs to address each Element.

A. Element #1: Preserve Vegetation and Mark Clearing Limits

- Before beginning any land disturbing activities, including clearing and grading, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area to prevent damage and offsite impacts. Mark clearing limits both in the field and on the plans.
- Retain the duff layer, native topsoil, and natural vegetation in an undisturbed state to the maximum degree practicable. If it is not practicable to retain the duff layer in place, stockpile it onsite, cover it to prevent erosion, and replace it immediately upon completion of the ground-disturbing activities.
- Plastic, metal, fabric fence, or other physical barriers may be used to mark the clearing limits.

The BMP(s) proposed to meet this element are:

☐ BMP C101: Preserving Natural Vegetation
☐ BMP C102: Buffer Zone
☒ BMP C103: High Visibility Fence

☐ Other: (Insert description of how element will be addressed)

☐ This Element is not required for this project because: (Insert justification as to why Element is not required)

B. Element #2: Establish Construction Access

- Limit construction vehicle ingress and egress to one route, if possible.
- Stabilize access points with a pad of quarry spalls, crushed rock, or other equivalent BMPs to minimize tracking of sediment.
- Locate wheel wash or tire baths onsite if other measures fail to control sediment from leaving the site.
- No tracking of sediment offsite is allowed. If sediment is tracked offsite, offsite areas (including roadways) shall be thoroughly and immediately cleaned by shoveling or pickup sweeping. Transport sediment to a controlled sediment disposal area.
- Keep streets clean at ALL times. Clean tracked sediment immediately.
- Washing of sediment to the stormwater system is not allowed.

The BMP(s) proposed to meet this element are:

☒ BMP C105: Stabilized Construction Entrance

☐ BMP C106: Wheel Wash

☐ BMP C107: Construction Road/Parking Area Stabilization

☐ Other: (Insert description of how element will be addressed)

☐ This Element is not required for this project because: (Insert justification as to why Element is not required)

C. Element #3: Control Flow Rates

- Protect downstream properties, receiving waters, and conveyance systems from erosion and other damage due to increases in the velocity and peak volumetric flowrate of stormwater from the project site. A quantitative downstream analysis may be required to ensure no damage to the downstream conveyance system during construction. See Additional Protective Measure - Infrastructure Protection.
- Where necessary, construct flow control facilities as one of the first steps in grading.
- Flow control facilities shall be functional prior to construction of site improvements (e.g. impervious surfaces). It may be necessary to install temporary flow control facilities to meet flow control requirements during construction.
- Control structures designed for permanent flow control BMPs are not appropriate for use during construction without modification. If used during construction, modify the control structure to allow for long-term storage of runoff and enable sediments to settle. Verify that the BMP is sized appropriately for this purpose. Restore BMPs to their original design dimensions, remove sediment, and install a final control structure at completion of the project.
- Velocity of water leaving the site shall not exceed 3 feet/second if the discharge is to a stream or ditch.
- Permanent infiltration facilities shall not be used for flow control during construction unless lined. The bottom of the facility shall be scarified to ensure any compaction that occurred during construction is mitigated.

The BMP(s) proposed to meet this element are:

☒ BMP C203: Water Bars
☐ BMP C207: Check Dams
☐ BMP C209: Outlet Protection
☐ BMP C235: Wattles
☐ BMP C240: Sediment Trap
☐ BMP C241: Temporary Sediment Pond
☐ Other: (Insert description of how element will be addressed)
☐ This Element is not required for this project because: (Insert justification as to why Element is not required)

D. Element #4: Install Sediment Controls

- Design, install, and maintain effective erosion controls and sediment control to minimize the discharge of pollutants.
- Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater, and soil characteristics, including the range of soil particle sizes expected to be present on the site.
- Prior to leaving a construction site or prior to discharge to an infiltration facility, stormwater from disturbed areas shall pass through a sediment removal BMP.
- Construct sediment control BMPs as one of the first steps in grading. These BMPs shall be functional before other land disturbing activities take place.
- Locate BMPs in a manner to avoid interference with the movement of juvenile salmonids attempting to enter off-channel areas or conveyance channels.
- Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize infiltration, where feasible.
- Seed and mulch earthen structures such as dams, dikes, and diversions according to the timing indicated in Element #5.
- Design outlet structures to withdraw impounded stormwater from the surface to avoid discharging sediment that is still suspended lower in the water column. If installing a floating pump structure, include a stopper to prevent the pump basket from hitting the bottom of the pond.
- Full stabilization includes concrete or asphalt paving; quarry spalls used as ditch lining; or the use of rolled erosion products, a bonded fiber matrix product, or vegetative cover in a manner that will fully prevent soil erosion.

The BMP(s) proposed to meet this element are:

☐ BMP C231: Brush Barrier
☐ BMP C232: Gravel Filter
☒ BMP C233: Silt Fence
☐ BMP C234: Vegetated Filter Strip
☐ BMP C235: Wattles
☐ BMP C240: Sediment Trap
☐ BMP C241: Temporary Sediment Pond

☐ BMP C250: Construction Stormwater Chemical Treatment

☐ Other: (Insert description of how element will be addressed)

☐ This Element is not required for this project because: (Insert justification as to why Element is not required)

E. Element #5: Stabilize Soils

- Stabilize exposed and unworked soils by application of effective BMPs that prevent erosion.
- From October 1 through April 30, no soils shall remain exposed and unworked for more than 2 days. From May 1 to September 30, no soils shall remain exposed and unworked for more than 7 days. This stabilization requirement applies to all soils onsite, whether at final grade or not.
- Stabilize soils at the end of the shift, before a holiday or weekend, if needed, based on the weather forecast.
- Select appropriate soil stabilization measures for the time of year, site conditions, estimated duration of use, and the potential water quality impacts that stabilization agents may have on downstream waters or groundwater.
- Stabilize soil stockpiles from erosion, protect stockpiles with sediment trapping measures, and where possible, locate piles away from stormwater system inlets, waterways, and conveyance channels.
- Control stormwater volume and velocity within the site to minimize soil erosion.
- Control stormwater discharges, including peak volumetric flowrates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion.
- Minimize the amount of soil exposed during construction activity.
- Minimize the disturbance of steep slopes.
- Minimize soil compaction and, unless infeasible, preserve topsoil.
- Ensure the gravel base used for stabilization is clean and does not contain fines or sediment.

The BMP(s) proposed to meet this element are:

☒ BMP C120: Temporary and Permanent Seeding

☒ BMP C121: Mulching

☐ BMP C122: Nets and Blankets

☒ BMP C123: Plastic Covering

☐ BMP C124: Sodding

☐ BMP C125: Compost

☐ BMP C126: Topsoiling

☐ BMP C127: Polyacrylamide for Soil Erosion Protection

☐ BMP C130: Surface Roughening

☐ BMP C131: Gradient Terraces

☐ BMP C140: Dust Control

☐ Other: (Insert description of how element will be addressed)

☐ This Element is not required for this project because: (Insert justification as to why Element is not required)

F. Element #6: Protect Slopes

- Design and construct cut-and-fill slopes in a manner to minimize erosion. Applicable practices include, but are not limited to, reducing continuous length of slope with terracing and diversions, reducing slope steepness, and roughening slope surfaces (for example, track walking).
- Divert offsite stormwater (sometimes called run-on) or groundwater away from slopes and disturbed areas with interceptor dikes and/or swales. Manage offsite stormwater separately from stormwater generated on the site.
- At the top of the slopes, collect stormwater in pipe slope drains or protected channels to prevent erosion. Size temporary pipe slope drains to convey either:
    - The peak volumetric flowrate calculated using a 10-minute time step from a Type 1A, 10-year, 24-hour frequency storm using a single event model, or
    - The 10-year return period flowrate, indicated by an Ecology-approved continuous simulation model, using a 15-minute time step.
- Use the existing land cover condition for predicting flowrates from tributary areas outside the project limits. For tributary areas on the project site, use the temporary or permanent project land cover condition, whichever will produce the highest flowrate. If using, a continuous simulation model, model bare soils as landscaped areas.
- Provide temporary or permanent conveyance to remove groundwater seepage from the slope surface of exposed soil areas.
- Place excavated material on the uphill side of trenches, consistent with safety and space considerations.
- Place check dams at regular intervals within channels that are cut down a slope.
- Stabilize soils on slopes, as specified in Element #5.

The BMP(s) proposed to meet this element are:

☒ BMP C120: Temporary and Permanent Seeding
☒ BMP C121: Mulching
☐ BMP C122: Nets and Blankets
☒ BMP C123: Plastic Covering
☐ BMP C124: Sodding
☐ BMP C130: Surface Roughening
☐ BMP C131: Gradient Terraces
☐ BMP C200: Interceptor Dike and Swale
☐ BMP C201: Grass-Lined Channels
☐ BMP C203: Water Bars
☐ BMP C204: Pipe Slope Drains
☐ BMP C205: Subsurface Drains
☐ BMP C206: Level Spreader
☐ BMP C207: Check Dams
☐ BMP C208: Triangular Silt Dike (Geotextile-Encased Check Dam)
☐ Other: (Insert description of how element will be addressed)
☐ This Element is not required for this project because: (Insert justification as to why Element is not required)

G. Element #7: Protect Stormwater System Inlets

- Protect all stormwater system inlets that are operable during construction so that stormwater does not enter the conveyance system without first being filtered or treated to remove sediment.
- Clean or remove and replace inlet protection devices when sediment has filled 1/3 of the available storage (unless a different standard is specified by the product manufacturer).
- Keep all approach roads clean. Do not allow sediment to enter the stormwater system.
- Inspect inlets weekly at a minimum and daily during storm events.

The BMP(s) proposed to meet this element are:

☒ BMP C220: Stormwater System Inlet Protection

☐ Other: (Insert description of how element will be addressed)

☐ This Element is not required for this project because: (Insert justification as to why Element is not required)

H. Element #8: Stabilize Channels and Outlets

- Design, construct, and stabilize all temporary onsite conveyance channels to prevent erosion from either:
    - The peak volumetric flowrate calculated using a 10-minute time step from a Type 1A, 10-year, 24-hour frequency storm using a single event model, or
    - The 10-year return period flowrate, indicated by an Ecology-approved continuous simulation model, using a 15-minute time step.
- Use the existing land cover condition for predicting flowrates from tributary areas outside the project limits. For tributary areas on the project site, use the temporary or permanent project land cover condition, whichever will produce the highest flowrate. If using a continuous simulation model, model bare soils as landscaped areas.
- Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches at the outlets of all conveyance systems.

The BMP(s) proposed to meet this element are:

☐ BMP C122: Nets and Blankets

☐ BMP C202: Rip Rap Channel Lining

☐ BMP C207: Check Dams

☐ BMP C209: Outlet Protection

☐ Other: (Insert description of how element will be addressed)

☒ This Element is not required for this project because: there are no channels or outlets on this project site.

I. Element #9: Control Pollutants

- Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants.
- All discharges to the City of Tacoma wastewater system require City approval. Some discharges to the City of Tacoma stormwater system require City approval. The approval may include a separate Special Approved Discharge (SAD) permit. Visit

https://www.cityoftacoma.org/government/city_departments/environmentalservices/wastewater/wastewater_permits_and_manuals for additional information about SAD Permits.

- Handle and dispose of all pollutants, including waste materials and demolition debris that occur on site in a manner that does not cause contamination of stormwater.
- Provide cover, containment, and protection from vandalism for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health and the environment. Provide secondary containment for tanks holding pollutants including onsite fueling tanks. Secondary containment means placing tanks or containers within an impervious structure capable of containing 110% of the volume contained in the largest tank within the containment structure. Double-walled tanks do not require additional secondary containment.
- Conduct maintenance, fueling, and repair of heavy equipment and vehicles using spill prevention and control measures. Clean contaminated surfaces immediately following any spill incident.
- Conduct oil changes, hydraulic system drain down, solvent and degreasing cleaning operations, fuel tank drain down and removal, and other activities, which may result in discharge or spillage of pollutants to the ground or into stormwater using spill prevention measures, such as drip pans.
- Discharge wheel wash or tire bath wastewater to a separate onsite treatment system that prevents discharge to surface water. Alternatively, discharge wheel wash or tire bath wastewater to the wastewater system (only allowed with SAD Permit approval).
- Apply fertilizers and pesticides in a manner and at application rates that will not result in loss of chemicals to stormwater. Follow manufacturers' recommendations for application rates and procedures.
- Use BMPs to prevent or treat contamination of stormwater by pH modifying sources. These sources include, but are not limited to, recycled concrete stockpiles, bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, dewatering concrete vaults, and concrete pumping and mixer washout waters.
- Adjust the pH of stormwater if necessary to prevent violations of water quality standards.
- Manage concrete washout appropriately.
    - Washout concrete truck drums or concrete handling equipment in onsite or offsite designated concrete washout areas only.
        - Do not washout concrete truck drums or concrete handling equipment to streets, the stormwater system, receiving waterbodies, or the ground.
    - Washout of small concrete handling equipment may be disposed of in a formed areas awaiting concrete where it will not contaminate stormwater and surface water or groundwater.
    - Do not use upland land applications for discharging wastewater from concrete washout areas.
    - Do not dump excess concrete onsite, except in designated concrete washout areas.
    - Do not washout anything contaminated with concrete into formed areas awaiting infiltration BMPs.
    - Concrete spillage or concrete discharge directly to groundwater or surface waters of the State is prohibited.
- Written approval from the Department of Ecology is required prior to using chemical treatment other than CO2, dry ice, or food grade vinegar to adjust pH.
- Clean contaminated surfaces immediately following any discharge or spill incident.
- Uncontaminated water from water-only based shaft drilling for construction of building, road, and bridge foundations may be infiltrated provided the wastewater is managed in a way that prohibits discharge to surface waters. Prior to infiltration, water from water-only based shaft drilling that

comes into contact with curing concrete must be neutralized until pH is in the range of 6.5 to 8.5.

The BMP(s) proposed to meet this element are:

☒ BMP C151: Concrete Handling
☒ BMP C152: Sawcutting and Surface Pollution Prevention
☐ BMP C153: Material Delivery, Storage and Containment
☒ BMP C154: Concrete Washout Area
☐ BMP C250: Construction Stormwater Chemical Treatment
☐ Other: (Insert description of how element will be addressed)
☐ This Element is not required for this project because: (Insert justification as to why Element is not required)

J. Element #10: Dewatering

- Dewatering discharges to the City of Tacoma stormwater conveyance system or the City of Tacoma wastewater system may require City approval through a Special Approved Discharge (SAD) Permit. See https://www.cityoftacoma.org/government/city_departments/environmentalservices/wastewater/wastewater_permits_and_manuals for more information on the SAD Permit Process.
- Discharge foundation, vault, and trench dewatering water that has similar characteristics to site stormwater into a controlled conveyance system prior to discharge to a sediment trap or sediment pond. Stabilize channels as specified in Element #8.
- Clean, non-turbid dewatering water, such as well-point groundwater, can be discharged to systems tributary to state surface waters, as specified in Element #8, provided the dewatering flow does not cause erosion or flooding of receiving waters. Do not route clean dewatering water through TESC BMPs.
- Handle highly turbid or contaminated dewatering water separately from stormwater at the site.
- Other disposal options, depending on site constraints, may include:
    - Infiltration
    - Transport offsite in vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters
    - Ecology approved onsite chemical treatment or other suitable treatment technologies
    - Use of a sedimentation bag that discharges to a ditch or swale for small volumes of localized dewatering

The BMP(s) proposed to meet this element are:

☐ BMP C203: Water Bars
☐ BMP C206: Level Spreader
☐ BMP C236: Vegetative Filtration
☐ Other: (Insert description of how element will be addressed)
☒ This Element is not required for this project because: Dewatering will not be required for this project site since no groundwater seepage was observed per the Geotech report.

K. Element #11: Maintain BMPs

- Maintain and repair as needed all temporary and permanent erosion and sediment control BMPs to assure continued performance of their intended function. Conduct maintenance and repairs in accordance with BMP specifications.
- Remove temporary erosion and sediment control BMPs within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment shall be removed or stabilized onsite. Permanently stabilize disturbed soil resulting from removal of BMPs or vegetation.

The BMP(s) proposed to meet this element are:

☐ BMP C150: Materials on Hand
☒ BMP C160: Erosion and Sediment Control Lead
☐ BMP C236: Vegetative Filtration
☐ Other: (Insert description of how element will be addressed)
☐ This Element is not required for this project because: (Insert justification as to why Element is not required)

L. Element #12: Manage the Project

- *Phasing of Construction* – Phase development projects in order to prevent soil erosion and the transport of sediment from the project site during construction, unless the Erosion and Sediment Control Lead can demonstrate that construction phasing is infeasible. Revegetation of exposed areas and maintenance of that vegetation shall be an integral part of the clearing activities for any phase.
- *Seasonal Work Limitations* – From October 1 through April 30, clearing, grading, and other soil disturbing activities shall only be permitted if shown to the satisfaction of the City that silt-laden stormwater will be prevented from leaving the site through a combination of the following:
    - Site conditions including existing vegetative coverage, slope, soil type, and proximity to receiving waters;
    - Limitations on activities and the extent of disturbed areas; and
    - Proposed erosion and sediment control measures.

  Based on the information provided and local weather conditions, the City may expand or restrict the seasonal limitation onsite disturbance. The following activities are exempt from the seasonal clearing and grading limitations:

    - Routine maintenance and necessary repair of erosion and sediment control BMPs
    - Routine maintenance of public facilities or existing utility structures that do not expose the soil or result in the removal of the vegetative cover to soil
    - Activities where there is one hundred percent infiltration of stormwater within the site in approved and installed erosion and sediment control facilities
- *Inspection and Monitoring*
    a. Inspect, maintain, and repair all BMPs as needed to assure continued performance of their intended function. Projects regulated under the Construction Stormwater General Permit (CSWGP) must conduct site inspections and monitoring in accordance with Special Condition S4 of the CSWGP.

b. Projects that disturb one or more acres must have site inspections conducted by a Certified Erosion and Sediment Control Lead (CESCL) or Certified Professional in Erosion and Sediment Control (CPESC).
c. Projects disturbing less than one acre must have an Erosion Sediment Control Lead (ESC) conduct inspections. The ESC Lead does not have to have CESCL or CPESC certification.
d. The CESCL, CPESC, or ESC Lead shall be identified in the SWPPP and shall be onsite or on-call at all times.
e. The CESCL, CPESC, or ESC Lead must examine stormwater visually for the presence of suspended sediment, turbidity, discoloration, and oil sheen and evaluate the effectiveness of BMPs to determine if it is necessary to install, maintain, or repair BMPs.
f. The CESCL, CPESC, or ESC Lead must inspect all areas disturbed by construction activities, all BMPs, and all locations where stormwater leaves the site at least once every calendar week and within 24 hours of any discharge from the site. (Individual discharge events that last more than one day do not require daily inspections). The CESCL, CPESC, or ESC Lead may reduce the inspection frequency for temporary stabilized, inactive sites to once every calendar month.
g. Construction site operators must correct any problems identified by the CESCL, CPESC, or ESC Lead by:
    - Reviewing the SWPPP for compliance with the 13 construction SWPPP elements and making appropriate revisions within 7 days of the inspection.
    - Fully implementing and maintaining appropriate source control and/or treatment BMPs as soon as possible but correcting the problem within 10 days.
    - Documenting BMP implementation and maintenance in the site log book. (Required for sites larger than 1 acre but recommended for all sites).

    Sampling and analysis of the stormwater discharges from a construction site may be necessary on a case-by-case basis to ensure compliance with standards. Ecology or the City will establish these monitoring and associated reporting requirements.

- *Responsible Party* – For all projects, a 24-hour responsible party shall be listed in the SWPPP, along with that person's telephone number and email address.
- *Maintenance of the Construction SWPPP* – Keep the Construction SWPPP onsite or within reasonable access to the site. Modify the SWPPP whenever there is a change in the design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the state.
  Modify the SWPPP if, during inspections or investigations conducted by the owner/operator, City staff, or by local or state officials, it is determined that the SWPPP is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site. Modify the SWPPP as necessary to include additional or modified BMPs designed to correct problems identified. Complete revisions to the SWPPP within seven (7) days following the inspection. City of Tacoma Environment Services (review staff or inspector) may require that a modification to the SWPPP go through additional City review.

The BMP(s) proposed to meet this element are:

☐ BMP C150: Materials on Hand
☒ BMP C160: Erosion and Sediment Control Lead
☐ BMP C162: Scheduling
☐ Other: (Insert description of how element will be addressed)

☐ This Element is not required for this project because: (Insert justification as to why Element is not required)

M. Element #13: Protect Permanent Stormwater BMPs

- Protect all permanent stormwater BMPs from sedimentation through installation and maintenance of erosion and sediment control BMPs on portions of the site that drain into the BMPs. Restore all BMPs to their fully functioning condition if they accumulate sediment during construction. Sediment impacting Best Management Practices shall be removed before system start-up. Restoring the BMP shall include removal of all sediment and full replacement of treatment media.
- Prevent compacting infiltration facilities by excluding construction equipment and foot traffic.
- Keep all heavy equipment off native soils under infiltration BMPs that have been excavated to final grade to retain the infiltration rate of the soils.
- Protect lawn and landscaped areas from compaction due to construction equipment and material stockpiles.
- Do not allow muddy construction equipment on the base material of permeable pavement or on the permeable pavement section.
- Do not allow sediment laden runoff onto permeable pavements or base materials of permeable pavements.
- Permeable pavements fouled with sediment or that can no longer pass an initial infiltration test must be cleaned prior to final acceptance.

The BMP(s) proposed to meet this element are:

☐ BMP C102: Buffer Zone
☒ BMP C103: High Visibility Fence
☐ BMP C200: Interceptor Dike and Swale
☐ BMP C201: Grass-Lined Channels
☐ BMP C207: Check Dams
☐ BMP C208: Triangular Silt Dike (Geotextile-Encased Check Dam)
☐ BMP C231: Brush Barrier
☒ BMP C233: Silt Fence
☐ BMP C234: Vegetated Strip
☐ Other: (Insert description of how element will be addressed)
☐ This Element is not required for this project because: (Insert justification as to why Element is not required)

3. Soils Report

The Soils Report is available as a stand-alone document as part of the Permit submittal. It is titled: GeoResources.E29thSt.RG

4. Operation and Maintenance Manual

An operations and maintenance manual is not required for this site as there are no permanent stormwater facilities installed for this project.

5. Temporary Erosion and Sediment Control BMPs

1.3 BMP C103: High Visibility Fence

1.3.1 Purpose

Fencing is intended to:

- Restrict clearing to approved limits.
- Prevent disturbance of sensitive areas, their buffers, and other areas required to be left undisturbed.
- Limit construction traffic to designated construction entrances or roads.
- Protect areas where marking with survey tape or flagging may not provide adequateprotection.

1.3.2 Conditions of Use

To establish clearing limits, plastic, fabric, or metal fence may be used:

- At the boundary of sensitive areas, their buffers, and other areas required to be leftuncleared.
- As necessary to control vehicle access to and on the site.

1.3.3 Design and Installation Specifications

- High visibility plastic fence shall be composed of a high-density polyethylene material andshall be at least four feet in height. Posts for the fencing shall be steel or wood and placed every 6 feet on center (maximum) or as needed to ensure rigidity. The fencing shall be fastened to the post every six inches with a polyethylene tie. On long continuouslengths of fencing, a tension wire or rope shall be used as a top stringer to prevent sagging between posts. The fence color shall be high visibility orange. The fence tensilestrength shall be 360 lbs./ft. using the ASTM D4595 testing method.
- If appropriate, install fabric silt fence in accordance with BMP C233: Silt Fence to act ashigh visibility fence. Silt fence shall be at least 3 feet high and must be highly visible to meet the requirement of this BMP.
- Design and install metal fences according to the manufacturer's specifications.
- Metal fences shall be at least 3 feet high and must be highly visible.
- Do not wire or staple fences to trees.

1.3.4 Maintenance Standards

- If the fence has been damaged or its visibility reduced, it shall be repaired or replaced immediately, and visibility restored.

1.4 BMP C105: Stabilized Construction Entrance/Exit

1.4.1 Purpose

Construction entrances are stabilized to reduce the amount of sediment transported onto paved roads by vehicles or equipment by constructing a stabilized pad of quarry spalls at entrances and exits to construction sites.

1.4.2 Conditions of Use

Construction entrances shall be stabilized wherever traffic will be leaving a construction site and traveling on paved roads or other paved areas within 1,000 feet of the site.

Construction vehicle ingress and egress shall be limited to one route. Additional routes may be allowed for very large projects or linear projects.

For residential construction provide stabilized construction entrances/exits for each residence. Stabilized surfaces shall be of sufficient length/width to provide vehicle access/parking based upon lot size and configuration. See Figure 3 - 1: Stabilized Construction Entrance.

1.4.3 Design and Installation Specifications

- The stabilized construction entrance shall be:
  - A minimum of 15' wide; and a minimum of 100' feet long.

    The length of the entrance may be reduced to the maximum practicable size when the size or configuration of the site does not allow the full lengths.

- Construct stabilized construction entrance with a pad that is:
  - A minimum 12" thick pad of 4" to 8" quarry spalls, or
  - A minimum 4" course of asphalt treated base, or
  - Existing pavement, or
  - A minimum 12" thick pad of permeable ballast meeting the requirements of WSDOT's Standard Specifications for Road, Bridge, and Municipal Construction Section 9-03.9(2).
  - For single-family residence construction, the concrete pad may be clean 1 ½" minimum aggregate placed at least 8" thick.
  - Manufactured alternatives to construction entrance may be used provided they ensure no track-out.
- Do not use crushed concrete, cement or asphalt rubble for the stabilized construction entrance.
- Place a separation geotextile under the spalls to prevent fine sediment from pumping up into the rock pad. The geotextile shall meet WSDOT Standard Specification 9-33.2(1) Table 3 - Geotextile for Separation or Soil Stabilization or the following standards:
  - Grab Tensile Strength (ASTM D4751) – 200 psi min.

- Grab Tensile Elongation (ASTM D4632) – 30% max.
- Mullen Burst Strength (ASTM D3786-80a) – 400 psi min.
- AOS (ASTM D4751) – 20 to 45 (U.S. standard sieve size)

- Consider early installation of the first lift of asphalt or extra concrete in areas that will be paved; this can be used as a stabilized entrance.
- Install fencing (see BMP C103: High Visibility Fence) as necessary to restrict traffic to the construction entrance.
- Whenever possible, construct the entrance on a firm, compacted subgrade. This can substantially increase the effectiveness of the pad and reduce the need for maintenance
- If possible, install the stabilized construction entrance on the uphill side of the site so that stormwater will not pond near the stabilized construction entrance.
- Construction entrance should avoid crossing existing sidewalks if possible. If a construction entrance must cross a sidewalk, the sidewalk must be covered and protected from sediment leaving the site.

1.4.4 Maintenance Standards

- Add quarry spalls or additional permeable ballast if the pad is no longer in accordance with the specifications.
- If the entrance is not preventing sediment from being tracked onto pavement, alternative measures to keep the streets free of sediment shall be used. This may include replacement of the stabilized construction entrance, street sweeping, an increase in the dimensions of the entrance, or the installation of a wheel wash.
- No tracking of sediment onto the roadway is allowed. If sediment is tracked onto the road, immediately clean the road thoroughly by shoveling or pickup sweeping. Transport sediment to a controlled sediment disposal area.
- Perform street sweeping by hand or with a high efficiency sweeper. Do not use a non-high efficiency mechanical sweeper because this creates dust and throws soils into storm systems or conveyance ditches.
- Keep streets clean at ALL times. Clean tracked sediment immediately.
- Street washing of sediment to the stormwater system is not allowed.
- If sediment is discharged to the stormwater system it is the responsibility of the applicant to clean the downstream system.
- Immediately remove any materials that are loosened from the pad and end up on the roadway.
- Install fencing if vehicles are entering or exiting the site at points other than the construction entrance(s).
- Upon project completion and site stabilization, permanently stabilize all construction accesses intended as permanent access for maintenance.

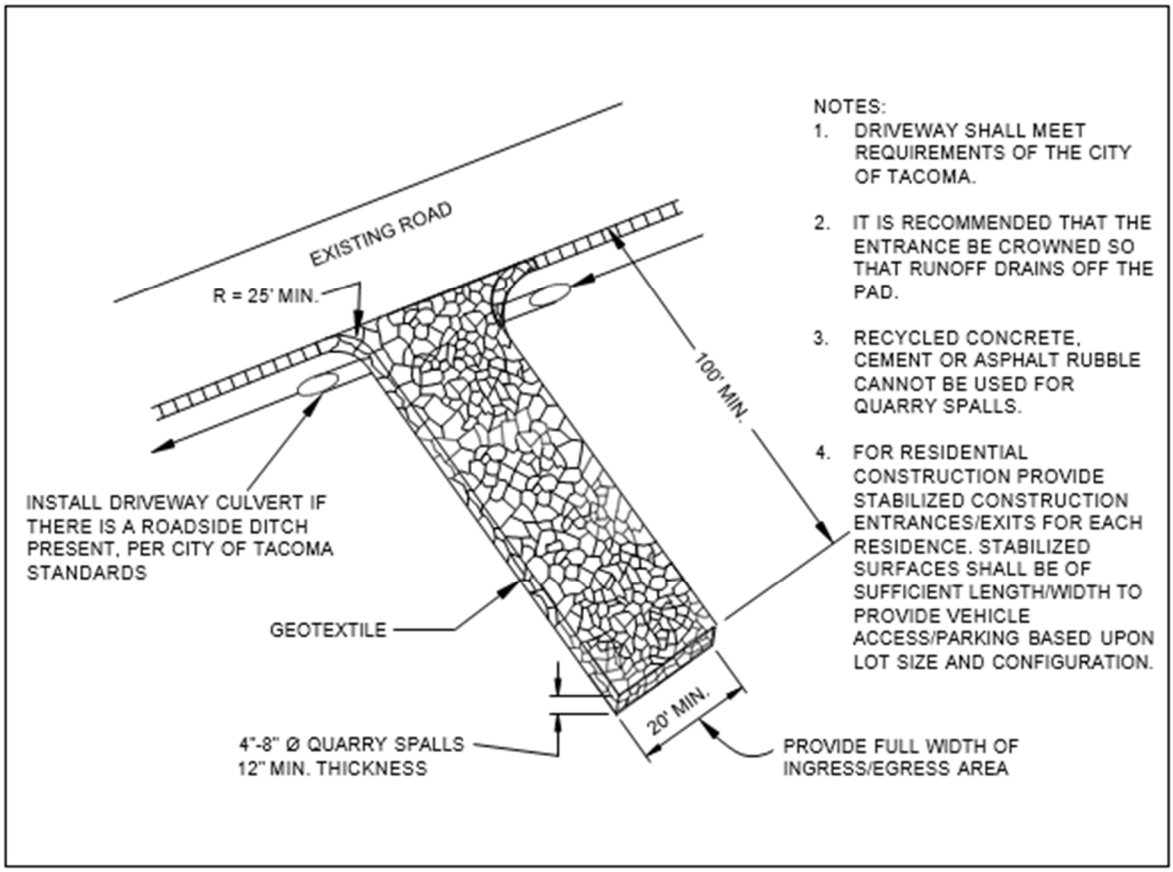


Figure 3 - 1: Stabilized Construction Entrance

1.28 BMP C203: Water Bars

1.28.1 Purpose

A water bar is a small ditch or ridge of material is constructed diagonally across a road or right-of-way to divert stormwater runoff from the road surface, wheel tracks, or a shallow road ditch.

1.28.2 Conditions of Use

Clearing right-of-way and construction of access for power lines, pipelines, and other similar installations often require long, narrow right-of-ways over sloping terrain. Disturbance and compaction promotes gully formation in these cleared strips by increasing the volume and velocity of runoff. Gully formation may be especially severe in tire tracks and ruts. To prevent

gullying, runoff can often be diverted across the width of the right-of-way to undisturbed areas by using small predesigned diversions.

Give special consideration to each individual outlet area, as well as to the cumulative effect of added diversions. Use gravel to stabilize the diversion where significant vehicular traffic is anticipated.

1.28.3 Design and Installation Specifications

- Height: 8-inch minimum measured from the channel bottom to the top of the ridge.
- Side slope of channel: 2H:1V maximum; 3H:1V or flatter when vehicles will cross.
- Base width of ridge: 6-inch minimum.
- Locate them to use natural grades and conveyance channels and to discharge into wellvegetated stable areas.
- Guideline for Spacing:

Slope %	Spacing (ft)
< 5	125
5 - 10	100
10 - 20	75
20 – 35	50
> 35	Use rock lined ditch

- Grade of water bar and angle: Select angle that results in ditch slope of less than 2percent.
- Install as soon as clearing and grading is complete. Reconstruct when construction iscomplete on a section when utilities are being installed.
- Compact the ridge when installed.
- Stabilize, seed, and mulch portions that are not subject to traffic. Gravel areas crossedby vehicles.

1.28.4 Maintenance Standards

- Periodically inspect right-of-way diversions for wear and after every heavy rainfall inspectfor erosion damage.
- Immediately remove sediment from the flow area and repair the dike.
- Check outlet areas and make timely repairs as needed.
- When permanent road conveyance systems are established and the area above the temporary right-of-way diversion is permanently stabilized, remove the dike and fill the channel to blend with the natural ground, and appropriately stabilize the disturbed area.

1.38 BMP C233: Silt Fence

1.38.1 Purpose

Silt fence reduces the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow.

1.38.2 Conditions of Use

- Silt fence may be used downslope of all disturbed areas.
- Silt fence shall prevent sediment carried by runoff from going beneath, through, or over the top of the silt fence, but shall allow the water to pass through the fence.
- Silt fence is not intended to treat concentrated flows, nor is it intended to treat substantial amounts of overland flow. Convey concentrated flows to a sediment trapping BMP.
- Do not construct silt fences in streams or use them in V-shaped ditches. Silt fences do not provide an adequate method of silt control for anything deeper than sheet or overland flow.

1.38.3 Design and Installation Specifications

- Use in combination with other construction stormwater BMPs.
- Maximum slope steepness (perpendicular to the silt fence line) 1H:1V.
- Maximum sheet or overland flow path length to the silt fence of 100 feet.
- Do not allow flows greater than 0.5 cfs.
- Use geotextile fabric that meets the following standards or WSDOT Standard Specification 9-33.2(1) Table 6 - Geotextile for Temporary Silt Fence. All geotextile properties listed below are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in Table 3 - 12: Geotextile Fabric Standards for Silt Fence):

Table 3 - 12: Geotextile Fabric Standards for Silt Fence

Standard	Description
Polymeric Mesh AOS (ASTM D4751)	0.60 mm maximum for silt film wovens (#30 sieve). 0.30 mm maximum for all other geotextile types (#50 sieve). 0.15 mm minimum for all fabric types (#100 sieve).
Water Permittivity (ASTM D4491)	0.02 sec^{-1} minimum
Grab Tensile Strength (ASTM D4632)	180 lbs. minimum for extra strength fabric. 100 lbs. minimum for standard strength fabric.
Grab Tensile Strength (ASTM D4632)	30% maximum
Ultraviolet Resistance (ASTM D4355)	70% minimum

- Support standard strength fabrics with wire mesh, chicken wire, 2-inch x 2-inch wire, safety fence, or jute mesh to increase the strength of the geotextile. Silt fence materials are available that have synthetic mesh backing attached.
- Silt fence material shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0° F to 120° F.
- 100 percent biodegradable silt fence is available that is strong, long lasting, and can be left in place after the project is completed, if permitted by the local jurisdiction.

- Refer to Figure 3 - 23: Silt Fence for standard silt fence details. Include the following Standard Notes for silt fence on construction plans and specifications:
  - The Contractor shall install and maintain temporary silt fences at the locations shown in the Plans.
  - Construct silt fences in areas of clearing, grading, or where runoff will drain prior to starting those activities.
  - The silt fence shall have a 2-feet min. and a 2½-feet max. height above the original ground surface.
  - The geotextile fabric shall be sewn together at the point of manufacture to form fabric lengths as required. Locate all sewn seams at support posts. Alternatively, two sections of silt fence can be overlapped, provided that the overlap is long enough and that the adjacent silt fence sections are close enough together to prevent silt laden water from escaping through the fence at the overlap.
  - Attach the geotextile fabric on the up-slope side of the posts and secure with staples, wire, or in accordance with the manufacturer's recommendations. Attach the geotextile fabric to the posts in a manner that reduces the potential for tearing.
  - Support the geotextile fabric with wire or plastic mesh, dependent on the properties of the geotextile selected for use. If wire or plastic mesh is used, fasten the mesh securely to the up-slope side of the posts with the geotextile fabric up-slope of the mesh.
  - Mesh support, if used, shall consist of steel wire with a maximum mesh spacing of 2-inches, or a prefabricated polymeric mesh. The strength of the wire or polymeric mesh shall be equivalent to or greater than 180 lbs. grab tensile strength. The polymeric mesh must be as resistant to the same level of ultraviolet radiation as the geotextile fabric it supports.
  - Bury the bottom of the geotextile fabric 4-inches min. below the ground surface. Backfill and tamp soil in place over the buried portion of the geotextile fabric, so that no flow can pass beneath the silt fence and scouring cannot occur. When wire or polymeric back-up support mesh is used, the wire or polymeric mesh shall extend into the ground 3-inches min.
  - Drive or place the silt fence posts into the ground 18-inches min. A 12–inch min. depth is allowed if topsoil or other soft subgrade soil is not present and 18-inches cannot be reached. Increase fence post min. depths by 6 inches if the fence is located on slopes of 3H:1V or steeper and the slope is perpendicular to the fence. If required post depths cannot be obtained, the posts shall be adequately secured by bracing or guying to prevent overturning of the fence due to sediment loading.
  - Use wood, steel or equivalent posts. The spacing of the support posts shall be a maximum of 6-feet. Posts shall consist of either:
    - Wood with minimum dimensions of 2 inches by 2 inches by 3 feet. Wood shall be free of defects such as knots, splits, or gouges.
    - No. 6 steel rebar or larger.
    - ASTM A 120 steel pipe with a minimum diameter of 1-inch.
    - U, T, L, or C shape steel posts with a minimum weight of 1.35 lbs./ft.
    - Other steel posts having equivalent strength and bending resistance to

the post sizes listed above.

- Locate the silt fences on contour as much as possible, except at the ends of the fence, where the fence shall be turned uphill such that the silt fence captures the runoff water and prevents water from flowing around the end of the fence.
- If the fence must cross contours, with the exception of the ends of the fence, place check dams perpendicular to the back of the fence to minimize concentrated flow and erosion..The slope of the fence line where contours must be crossed shall not be steeper than 3H:1V.
  - Check dams shall be approximately 1-foot deep at the back of the fence. Check dams shall be continued perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface behind the fence.
  - Check dams shall consist of crushed surfacing base course, gravel backfill for walls, or shoulder ballast. Check dams shall be located every 10 feet along the fence where the fence must cross contours.

- Refer to Figure 3 - 24: Silt Fence Installation by Slicing for slicing method details. The following are specifications for silt fence installation using the slicing method:
  - The base of both end posts must be at least 2 to 4 inches above the top of the geotextile fabric on the middle posts for ditch checks to drain properly. Use a hand level or string level, if necessary, to mark base points before installation.
  - Install posts 3 to 4 feet apart in critical retention areas and a maximum of 6 feet apart in standard applications.
  - Install posts 24 inches deep on the downstream side of the silt fence, and as close as possible to the geotextile fabric, enabling posts to support the geotextile fabric from upstream water pressure.
  - Install posts with the nipples facing away from the geotextile fabric.
  - Attach the geotextile fabric to each post with three ties, all spaced within the top 8 inches of the fabric. Attach each tie diagonally 45 degrees through the fabric, with each puncture at least 1 inch vertically apart. Each tie should be positioned to hang on a post nipple when tightening to prevent sagging.
  - Wrap approximately 6 inches of geotextile fabric around the end posts and secure with 3 ties.
  - No more than 24 inches of a 36-inch geotextile fabric is allowed above ground level.
  - Compact the soil immediately next to the geotextile fabric with the front wheel of a tractor, skid steer, or roller exerting at least 60 pounds per square inch. Compact the upstream side first and then each side twice for a total of four trips. Check and correct the silt fence installation for any deviation before compaction. Use a flat-bladed shovel to tuck the fabric deeper into the ground if necessary.

1.38.4 Maintenance Standards

- Repair any damage immediately.
- Intercept and convey all evident concentrated flows uphill of the silt fence to a sediment trapping BMP.
- Check the uphill side of the fence for signs of the fence clogging and acting as a barrier to

flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence and remove the trapped sediment.

- Remove sediment deposits when the deposit reaches approximately one-third the height of the silt fence, or install a second silt fence.
- Replace geotextile fabric that has deteriorated due to ultraviolet breakdown.

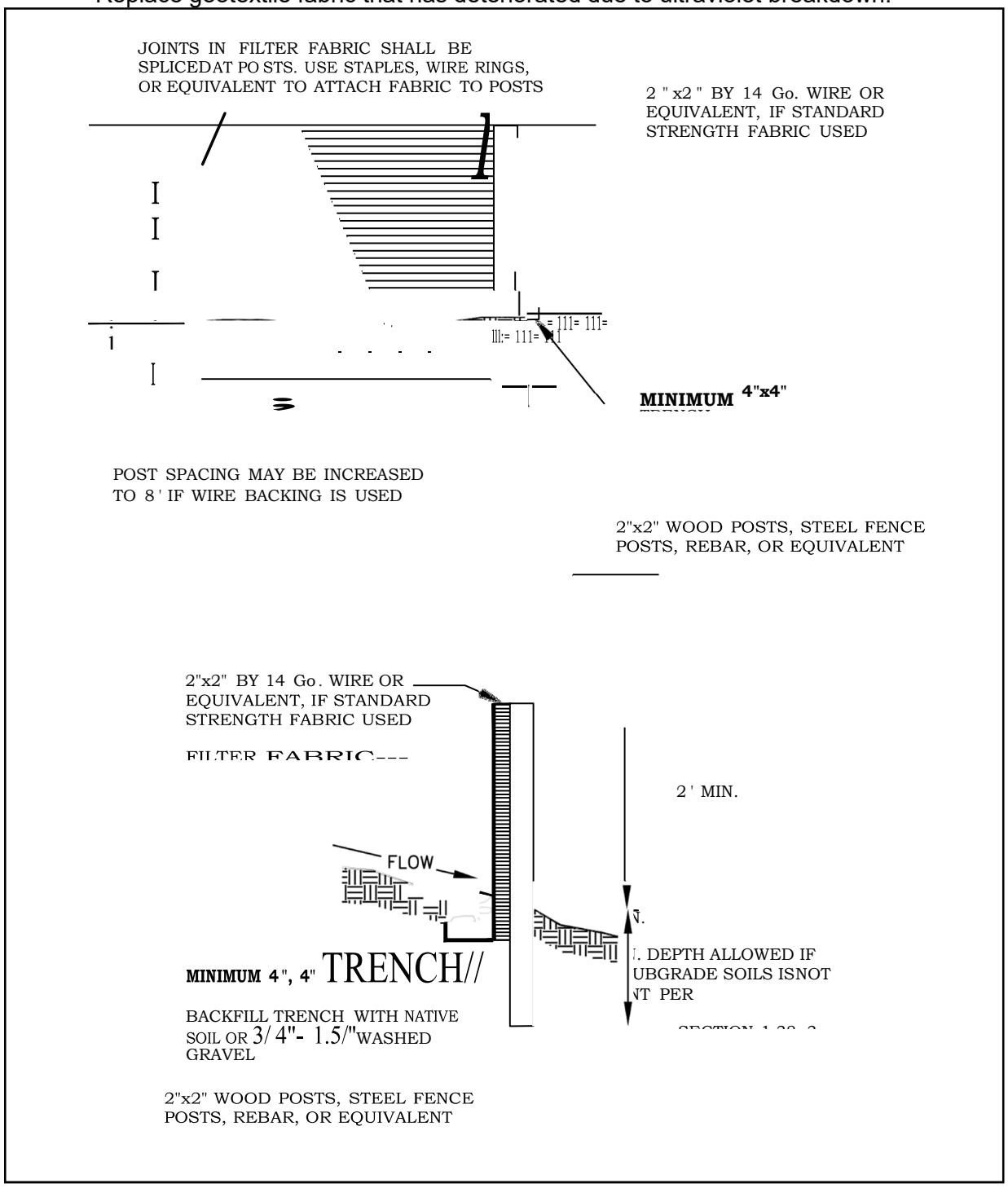


Figure 3 - 23: Silt Fence

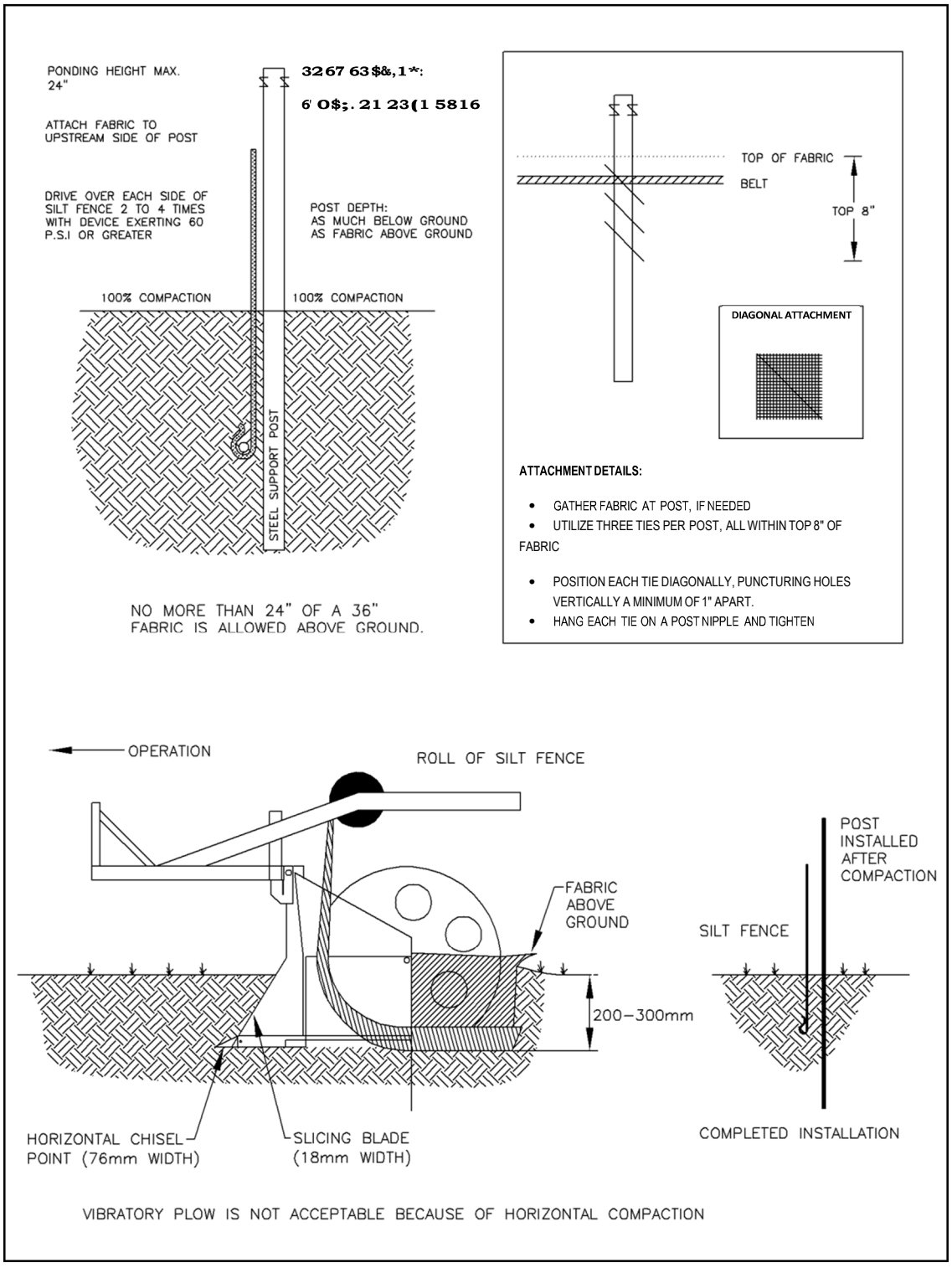


Figure 3 - 24: Silt Fence Installation by Slicing

1.7 BMP C120: Temporary and Permanent Seeding

1.7.1 Purpose

Seeding reduces erosion by stabilizing exposed soils. A well-established vegetative cover is one of the most effective methods of reducing erosion.

1.7.2 Conditions of Use

- Seeding may be used throughout the project on disturbed areas that have reached final grade or that will remain unworked.
- Channels that will be vegetated should be installed before major earthwork and hydroseeded with a Bonded Fiber Matrix. The vegetation should be well established (i.e., 75 percent cover) before water is allowed to flow in the ditch. With channels that will have high flows, install erosion control blankets over the hydroseed. If vegetation cannot be established from seed before water is allowed in the ditch, sod should be installed in the bottom of the ditch over hydromulch and blankets.
- Seed detention ponds as required.
- Mulch is required at all times because it protects seeds from heat, moisture loss, and transport due to runoff.

Mulch can be applied on top of the seed or simultaneously by hydroseeding. See BMPC121: Mulching for specifications.

- All disturbed areas shall be reviewed in late August to early September and all seeding shall be completed by the end of September. Otherwise, vegetation will not establish itself enough to provide more than average protection.
- At final site stabilization, seed and mulch all disturbed areas not otherwise vegetated or stabilized.

1.7.3 Design and Installation Specifications

- Seed during seasons most conducive to plant growth.
    - The optimum seeding windows for western Washington are April 1 through June 30 and September 1 through October 1.
    - Seeding that occurs between July 1 and August 30 will require irrigation until 75 percent grass cover is established.
    - Seeding that occurs between October 1 and March 30 will require a mulch or an erosion control blanket until 75 percent grass cover is established.
- To prevent seed from being washed away, confirm that all required surface water control measures have been installed.
- The seedbed should be firm and rough. All soil should be roughened no matter what the slope. If compaction is required for engineering purposes, track walk slopes before seeding. Backblading or smoothing of slopes greater than 4:1 is not allowed if they are to be seeded.
- New and more effective restoration-based landscape practices rely on deeper incorporation than that provided by a simple single-pass rototilling treatment. Wherever practical, the subgrade should be initially ripped to improve long-term permeability, infiltration, and water inflow qualities. At a minimum for permanent areas, use soil

amendments to achieve organic matter and permeability performance defined in engineered soil/landscape systems. For systems that are deeper than 8 inches, complete the rototilling process in multiple lifts, or prepare the soil system properly andthen place it to achieve the specified depth.

- The use of fertilizers is discouraged. Fertilizers should only be used where necessary to ensure growth. Amending soils per BMP L613: Post-Construction Soil Quality and Depth should be considered (and may be required for permanent lawn and landscaped areas) as the first measure for ensuring vegetation growth. If fertilization is necessary, naturally-derived fertilizers should be chosen over chemically-derived fertilizers. Apply fertilizers per manufacturer's direction. Always use slow-release fertilizers.
- Hydroseed applications shall include a minimum of 1,500 pounds per acre of mulch with 3 percent tackifier. See BMP C121: Mulching for specifications.
- On steep slopes, Bonded Fiber Matrix (BFM) or Mechanically Bonded Fiber Matrix (MBFM) products should be used. BFM/MBFM products are applied at a minimum rate of 3,000 pounds per acre of mulch with approximately 10 percent tackifier. Application is made so that a minimum of 95 percent soil coverage is achieved. Numerous products are available commercially and should be installed per manufacturer's instructions. Most products require 24-36 hours to cure before a rainfall and cannot be installed on wet or saturated soils. Generally, these products come in 40-50 pound bags and include all necessary ingredients except for seed and fertilizer.
- BFMs and MBFMs have some advantages over blankets:
    - No surface preparation required;
    - Can be installed via helicopter in remote areas;
    - On slopes steeper than 2.5:1, blanket installers may need to be roped and harnessed for safety;
- In most cases, the shear strength of blankets is not a factor when used on slopes, only when used in channels. BFMs and MBFMs are good alternatives to blankets in most situations where vegetation establishment is the goal.
- When installing seed via hydroseeding operations, only about 1/3 of the seed actually ends up in contact with the soil surface. This reduces the ability to establish a good stand of grass quickly. One way to overcome this is to increase seed quantities by up to 50 percent.
- Vegetation establishment can also be enhanced by dividing the hydromulch operation into two phases:
    - Phase 1- Install all seed and fertilizer with 25-30 percent mulch and tackifier onto soil in the first lift;
    - Phase 2- Install the rest of the mulch and tackifier over the first lift.
- An alternative is to install the mulch, seed, fertilizer, and tackifier in one lift. Then, spread or blow straw over the top of the hydromulch at a rate of about 800-1000 pounds per acre. Hold straw in place with a standard tackifier. Both of these approaches will increase cost moderately but will greatly improve and enhance vegetative establishment. The increased cost may be offset by the reduced need for:
    - Irrigation
    - Reapplication of mulch
    - Repair of failed slope surfaces

- This technique works with standard hydromulch (1,500 pounds per acre minimum) and BFM/MBFMs (3,000 pounds per acre minimum).

- Provide a healthy topsoil to areas to be permanently landscaped. This will reduce the need for fertilizers, improve overall topsoil quality, provide for better vegetal health and vitality, improve hydrologic characteristics, and reduce the need for irrigation. See the Post-Construction Soil Quality and Depth BMP in Volume 4 for more information. Compost shall meet specification in A900: Compost. City of Tacoma Tagro Potting Soil can be used as an alternative to the compost component. Areas that will be seeded only and not landscaped may need compost or meal-based mulch included in the hydroseed in order to establish vegetation. Replace native topsoil on the disturbed soil surface before application.
- Seed that is installed as a temporary measure may be installed by hand if it will be covered by straw, mulch, or topsoil. Seed that is installed as a permanent measure may be installed by hand on small areas (usually less than 1 acre) that will be covered with mulch, topsoil, or erosion blankets.
- Unless otherwise stated, seed mixes shall be applied at a rate of 120 pounds per acre. This rate may be reduced is soil amendments of slow-release fertilizers are used.
- See Table 3 - 2: Standard Temporary Erosion Control Seed Mix to Table 3 - 8: Native Wet Biofiltration Swale Seed Mix for recommended seed mixes. Seed mixes are also shown in A1000: Vegetation. Seed mix should be chosen based upon location, exposure, soil type, slope, and expected foot traffic. Alternative seed mixes may be used provided justification is provided for their use.
    - Table 3 - 2: Standard Temporary Erosion Control Seed Mix is a standard mix where only temporary vegetative cover is required.

Table 3 - 2: Standard Temporary Erosion Control Seed Mix

Scientific Name	Common Name	Percent By Weight
Festuca rubra var. commutata	Chewings fescue	40
Lolium perenne	perennial rye	40
Agrostis capillaris	colonial bentgrass	10
Trifolium repens	white Dutch clover	10

- Table 3 - 3: Native Temporary Erosion Control Seed Mix is a mix made from native species that can be used where only temporary vegetative cover is required.

Table 3 - 3: Native Temporary Erosion Control Seed Mix

Scientific Name	Common Name	Percent By Weight
Bromus carinatus	California brome	25
Deschampsia caespitosa	Tufted hairgrass	15
Festuca rubra	native red fescue	20
Hordeum brachyantherum	meadow barley	40

- Table 3 - 4: Landscaping Seed Mix is a mix appropriate as a final vegetative cover for lawn areas.

Table 3 - 4: Landscaping Seed Mix

Scientific Name	Common Name	Percent By Weight
Lolium perenne	perennial rye	70
Festuca rubra var. commutata	Chewings fescue	30

- Table 3 - 5: Low Growing Turf Seed Mix is a mix appropriate for dry situations and requires little maintenance once established.

Table 3 - 5: Low Growing Turf Seed Mix

Scientific Name	Common Name	Percent By Weight
Festuca arundinaceae	dwarf tall fescue	45
Lolium perenne var. barclay	dwarf perennial rye	30
Festuca rubra	red fescue	20
Agrostis capillaris	colonial bentgrass	5

- Table 3 - 6: Native Meadow Seed Mix is a mix recommended for areas that will be maintained infrequently or not at all and where native plant colonization is desirable.

Table 3 - 6: Native Meadow Seed Mix

Scientific Name	Common Name	Percent By Weight
grasses		
Bromus carinatus	California brome	30
Deschampsia caespitosa	tufted hairgrass	10
Elymus glaucus	blue wildrye	10
Festuca roemerii	Roemer's fescue	20
perennials		
Achillea millefolium	yarrow	5
Eriophyllum lanatum	Oregon sunshine	5
Eschscholzia californica	California poppy	3

Scientific Name	Common Name	Percent By Weight
Lupinus bicolor	bicolor lupine	6
Solidago canadensis	Canada goldenrod	3
annuals		
Clarkia amoena	farewell to spring	5
Gilia capitata	globe gilia	3

- Table 3 - 7: Native Basic Biofiltration Swale Seed Mix represents a mix appropriate for intermittently wet areas.

Table 3 - 7: Native Basic Biofiltration Swale Seed Mix

Scientific Name	Common Name	Percent by Weight
Beckmannia syzigachne	American slough grass	5
Danthonia californica	California oat grass	5
Deschampsia caespitosa	tufted hairgrass	15
Elymus glaucus	blue wildrye	30
Glyceria occidentalis	western mannagrass	15
Hordeum brachyantherum	meadow barley	30

- Table 3 - 8: Native Wet Biofiltration Swale Seed Mix represents a mix appropriate for wet areas that are not regulated wetlands.
  - Apply this mix at a rate of 60 pounds per acre.

Table 3 - 8: Native Wet Biofiltration Swale Seed Mix

Scientific Name	Common Name	Percent by Weight
Beckmannia syzigachne	American slough grass	10
Carex obnupta	lough sledge	40
Carex stipata	beaked sedge	5
Eleocharis palustris	common spikerush	5
Glyceria occidentalis	western mannagrass	20
Juncus patens	spreading rush	15
Scirpus microcarpus	small-fruited bullrush	5

1.7.4 Maintenance Standards

- Reseed any seeded areas that fail to establish at least 75 percent cover within 6 weeks from the initial seeding (100 percent cover for areas that receive sheet or concentrated flows). If reseeding is ineffective, use an alternate method, such as sodding, mulching, or nets/blankets. If winter weather prevents adequate grass growth, this time limit may be relaxed at the discretion of the City.
- After adequate cover is achieved, reseed and protect with mulch any areas that experience erosion. If the erosion problem is stormwater and surface water related, the problem shall be fixed and the eroded area reseeded and protected by mulch.
- Water seeded areas if necessary. Watering shall not cause runoff.

1.10 BMP C123: Plastic Covering

1.10.1 Purpose

Plastic covering provides immediate, short-term erosion protection to slopes and disturbedareas.

1.10.2 Conditions of Use

- Plastic covering may be used on disturbed areas that require cover measures for less than 30 days, except as stated below.
- Plastic is particularly useful for protecting cut and fill slopes and stockpiles.
- The relatively rapid breakdown of most polyethylene sheeting makes it unsuitable for long-term (greater than six months) applications.
- Due to rapid runoff caused by plastic covering, this method shall not be used upslope of areas that might be adversely impacted by concentrated runoff. Such areas include steep and/or unstable slopes.
- Whenever plastic is used to protect slopes, water collection measures must be installed at the base of the slope. These measures include plastic-covered berms, channels, and pipes used to convey clean rainwater away from bare soil and disturbed areas. At no time is clean runoff from a plastic covered slope to be mixed with dirty runoff from a project.
- Other uses for plastic include:
    - Temporary ditch liner;
    - Pond liner in temporary sediment pond;
    - Liner for bermed temporary fuel storage area if plastic is not reactive to the type of fuel being stored;
    - Emergency slope protection during heavy rains; and
    - Temporary conveyance used to direct stormwater and surface water.

1.10.3 Design and Installation Specifications

Plastic slope cover must be installed as follows:

- Run plastic up and down slope, not across slope.
- Plastic may be installed perpendicular to a slope if the slope length is less than 10 feet.

- Minimum of 8-inch overlap at seams.
- On long or wide slopes, or slopes subject to wind, all seams should be taped.
- Place plastic into a small (12-inch wide by 6-inch deep) slot trench at the top of the slope and backfill with soil to keep water from flowing underneath.
- Place sand filled burlap or geotextile bags every 3 to 6 feet along seams and pound a wooden stake through each to hold them in place. Alternative options for holding plastic in place exist and may be considered with COT approval.
- Inspect plastic for rips, tears, and open seams regularly and repair immediately. This prevents high velocity runoff from contacting bare soil, which causes extreme erosion;
- Plastic sheeting shall have a minimum thickness of 6 mil.
- If erosion at the toe of a slope is likely, a gravel berm, riprap, or other suitable protection shall be installed at the toe of the slope in order to reduce the velocity of runoff.

1.10.4 Maintenance Standards

- Torn sheets must be replaced and open seams repaired.
- If the plastic begins to deteriorate due to ultraviolet radiation, it must be completely removed and replaced.
- When the plastic is no longer needed, it shall be completely removed.
- Properly dispose of products used to weigh down covering.

1.35 BMP C220: Stormwater System Inlet Protection

1.35.1 Purpose

To prevent coarse sediment from entering stormwater systems prior to permanent stabilization ofthe disturbed area.

1.35.2 Conditions of Use

- Use where inlets are to be made operational before permanent stabilization of the disturbed area.
- Provide protection for all stormwater system inlets downslope and within 500 feet of a disturbed or construction area, unless those inlets are preceded by another sediment trapping device.
- Table 3 - 11: Stormwater System Inlet Protection lists several options for inlet protection. All of the methods for stormwater system inlet protection are prone to plugging and require a high frequency of maintenance. Contributing areas should be limited to 1 acre or less. Emergency overflows may be required where stormwater ponding would cause a hazard. If an emergency overflow is provided, additional end-of-pipe treatment may be required.

Table 3 - 11: Stormwater System Inlet Protection

Type of Inlet Protection	Emergency Overflow	Applicable for Paved/ Earthen Surfaces	Conditions of Use
Excavated drop inlet protection	Yes, temporary flooding will occur	Earthen	Applicable for heavy flows. Easy to maintain. Large area requirement: 30’ x 30’ per acre.
Block and gravel drop filter	Yes	Paved or earthen	Applicable for heavy concentrated flows. Will not pond.
Gravel and mesh filter	No	Paved	Applicable for heavy concentrated flows. Will pond. Can withstand traffic.
Catch basin filters	Yes	Paved or earthen	Frequent maintenance required.
Curb inlet protection with a wooden weir	Small capacity overflow	Paved	Used for sturdy, more compact installation.
Block and gravel curb inlet protection	Yes	Earthen	Sturdy, but limited filtration.
Culvert inlet sediment trap			18-month expected life.

1.35.3 Design and Installation Specifications

Excavated Drop Inlet Protection

- An excavated impoundment around the inlet. Sediment settles out of the stormwater prior to entering the stormwater conveyance system.
- Provide depth of 1 to 2 feet, as measured from the crest of the inlet structure.
- Slope sides of excavation no steeper than 2H:1V.
- Minimum volume of excavation 35 cubic yards.
- Shape excavation to fit site with longest dimension oriented toward the longest inflow area.
- Install provisions for collection and conveyance to prevent standing water problems.
- Clear the area of all debris.
- Grade the approach to the inlet uniformly.
- Drill weep holes into the side of the inlet.
- Protect weep holes with screen wire and washed aggregate.
- Seal weep holes when removing structure and stabilizing area.
- It may be necessary to build a temporary dike to the down slope side of the structure to prevent bypass flow.

Block and Gravel Filter

- A block and gravel filter is a barrier formed around the stormwater system inlet with

standard concrete blocks and gravel. See Figure 3 - 17: Drop Inlet with Block and Gravel Filter.

- Provide a height 1 to 2 feet above inlet.
- Recess the first row 2 inches into the ground for stability.
- Support subsequent courses by placing a piece of 2x4 lumber through the block opening.
- Do not use mortar.
- Lay some blocks in the bottom row on their side for dewatering the pool.
- Place hardware cloth or comparable wire mesh with ½-inch openings over all block openings.
- Place gravel just below the top of blocks on slopes of 2H:1V or flatter.
- An alternative design is a gravel berm surrounding the inlet with the following characteristics:
  - Provide an inlet slope of 3H:1V.
  - Provide an outlet slope of 2H:1V.
  - Provide a 1-foot wide level stone area between the structure and the inlet.
  - Use inlet slope stones 3 inches in diameter or larger.
  - For outlet slope use gravel ½- to ¾-inch at a minimum thickness of 1-foot.

Gravel and Wire Mesh Filter

- A gravel and wire mesh filter is a gravel barrier placed over the top of the inlet (see). This structure does not provide an overflow.
- Use a hardware cloth or comparable wire mesh with 1/2-inch openings.
  - Place wire mesh over the drop inlet so that the wire extends a minimum of 1-foot beyond each side of the inlet structure.
  - Overlap the strips if more than one strip of mesh is necessary.
- Place coarse aggregate over the wire mesh.
  - Provide at least a 12-inch depth of aggregate over the entire inlet opening and extend at least 18-inches on all sides.

Catch Basin Filters

- Inserts (Figure 3 - 19: Catch Basin Filter) shall be designed by the manufacturer for use at construction sites. The limited sediment storage capacity increases the frequency of inspection and maintenance required, which may be daily for heavy sediment loads. The maintenance requirements can be reduced by combining a catch basin filter with another type of inlet protection. This type of inlet protection provides flow bypass without overflow and therefore may be a better method for inlets located along active rights-of-way.
- Provide a minimum of 5 cubic feet of storage.
- Requires dewatering provisions.
- Provide a high-flow bypass that will not clog under normal use at a construction site.
- The catch basin filter is inserted in the catch basin just below the grating.

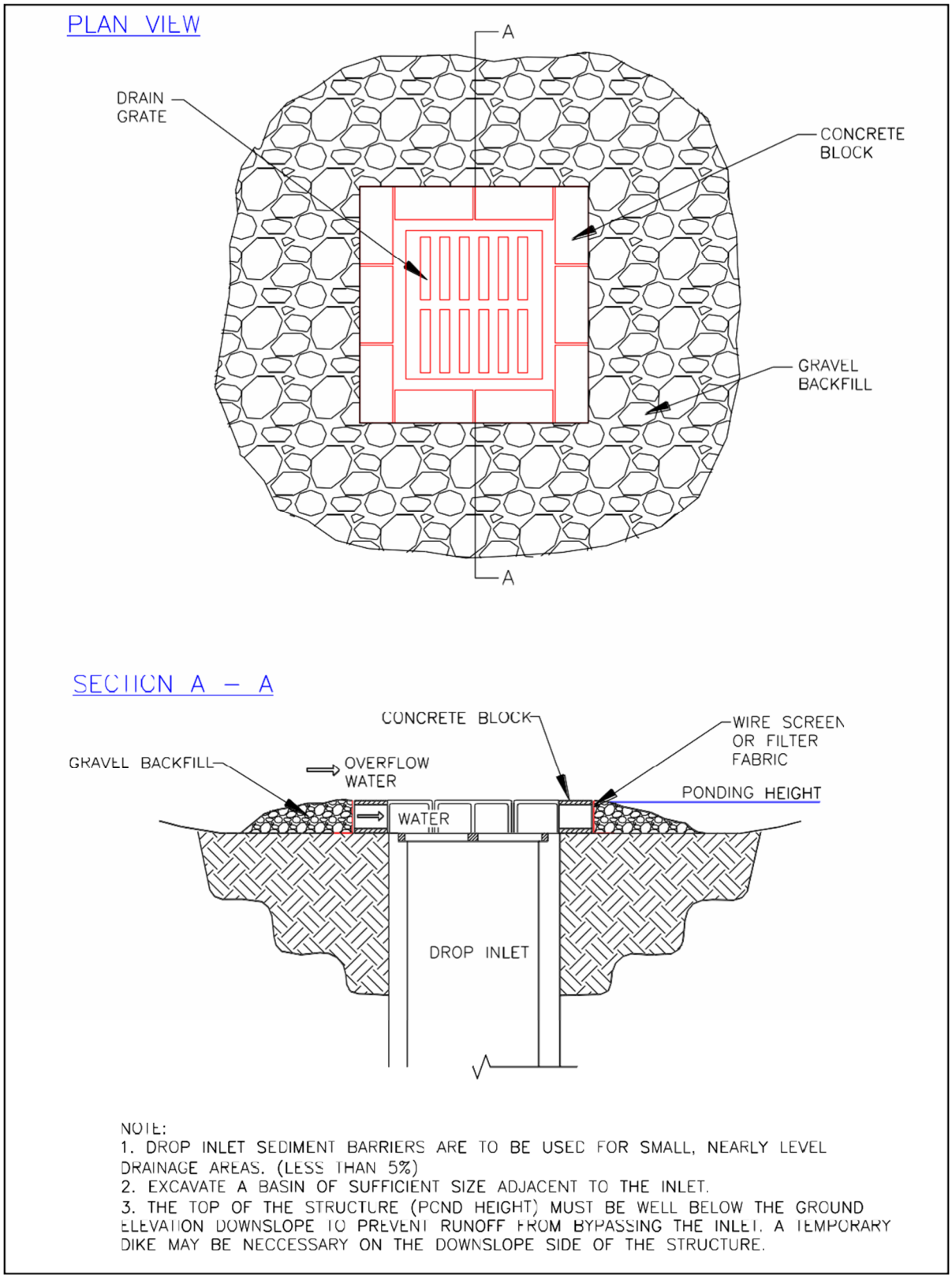


Figure 3 - 17: Drop Inlet with Block and Gravel Filter

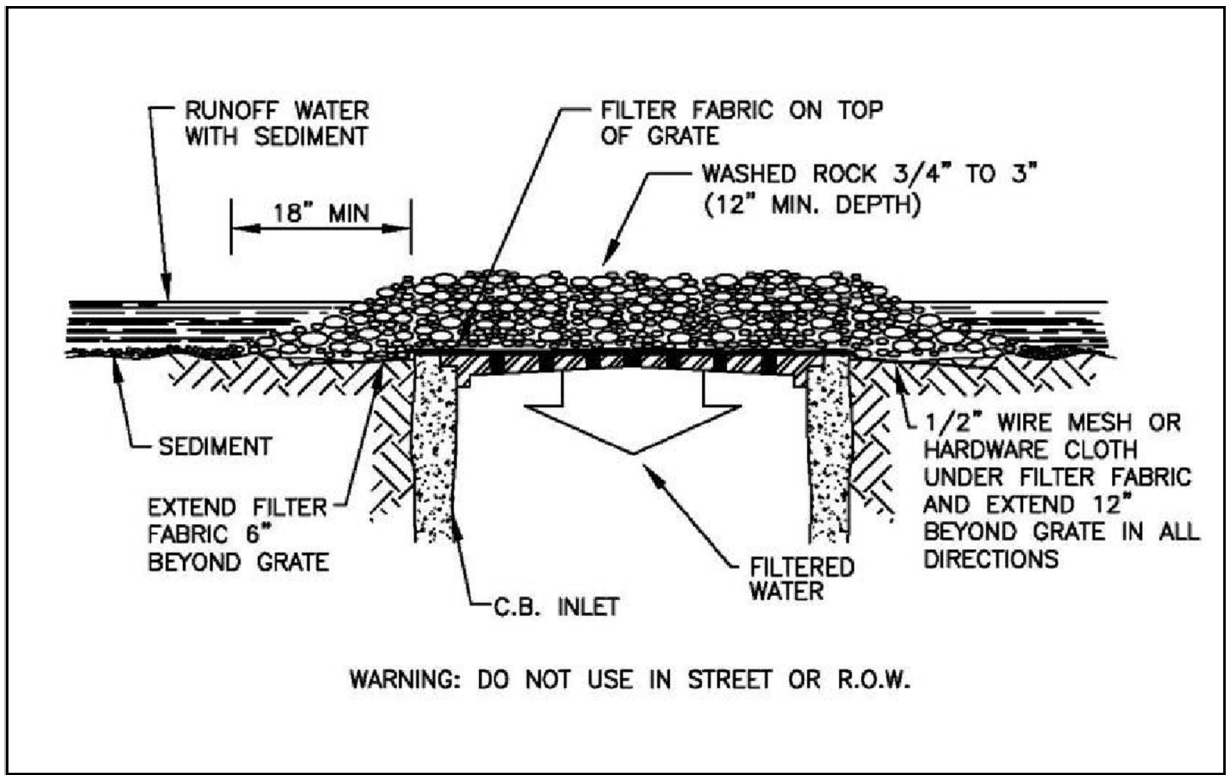
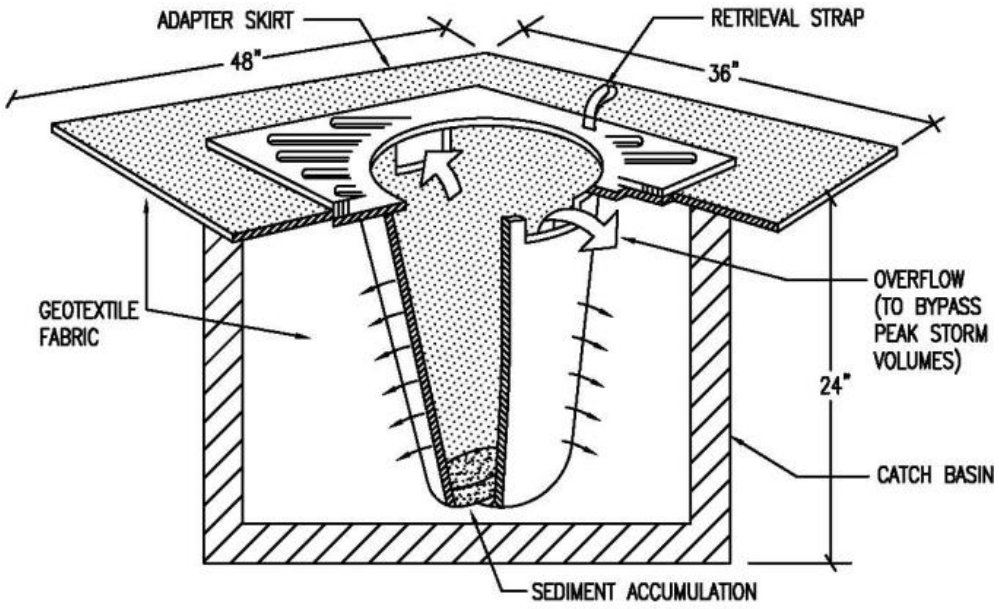


Figure 3 - 18: Gravel and Wire Mesh Filter



INLET PROTECTION NOTES:

1. FILTERS SHALL BE INSPECTED AFTER EACH STORM EVENT AND CLEANED OR REPLACED WHEN 1/3 FULL.

Figure 3 - 19: Catch Basin Filter

Curb Inlet Protection with Wooden Weir

Barrier formed around a curb inlet with a wooden frame and gravel.

- Use wire mesh with ½-inch openings.
- Use extra strength filter cloth.
- Construct a frame.
- Attach the wire and filter fabric to the frame.
- Pile coarse washed aggregate against the wire and fabric.
- Place weight on frame anchors.

Block and Gravel Curb Inlet Protection

Barrier formed around an inlet with concrete blocks and gravel. See Figure 3 - 20: Block andGravel Curb Inlet Protection.

- Use wire mesh with ½-inch openings.
- Place two concrete blocks on their sides abutting the curb at either side of the inlet opening. These are spacer blocks.
- Place a 2x4 stud through the outer holes of each spacer block to align the front blocks.
- Place blocks on their sides across the front of the inlet and abutting the spacer blocks.
- Place wire mesh over the outside vertical face.
- Pile coarse aggregate against the wire to the top of the barrier.

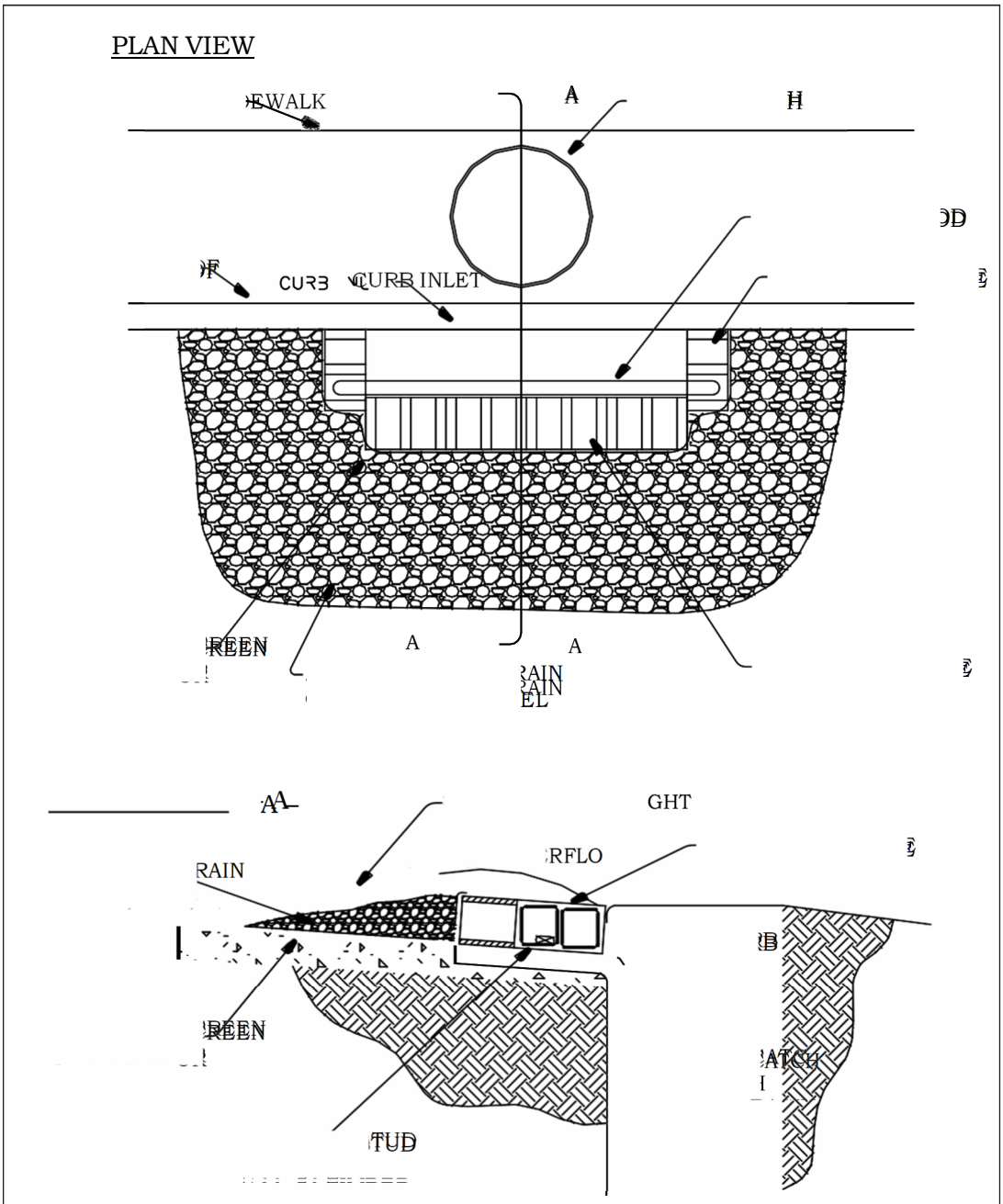


Figure 3 - 20: Block and Gravel Curb Inlet Protection

Curb and Gutter Sediment Barrier

Sandbag or rock berm (riprap and aggregate) 3 feet high and 3 feet wide in a horseshoe shape.See Figure 3 - 21: Curb and Gutter Sediment Barrier.

- Construct a horseshoe shaped berm, faced with coarse aggregate if using riprap, 3 feet high and 3 feet wide, at least 2 feet from the inlet.
- Construct a horseshoe shaped sedimentation trap on the outside of the berm sized to sediment trap standards for protecting a culvert inlet.

1.35.4 Maintenance Standards

- Inspect inlet protection frequently, especially after storm events. If the insert becomes clogged, clean or replace it.
- For systems using stone filters: If the stone filter becomes clogged with sediment, the stones must be pulled away from the inlet and cleaned or replaced. Since cleaning of gravel at a construction site may be difficult, an alternative approach would be to use the clogged stone as fill and put fresh stone around the inlet.
- Do not wash sediment into the stormwater system while cleaning. Spread all excavated material evenly over the surrounding land area or stockpile and stabilize as appropriate.
- Do not allow accumulated sediment to enter the stormwater system.
- Inlet protection shall be removed when area is fully stabilized and erosion and sediment controls are no longer needed.

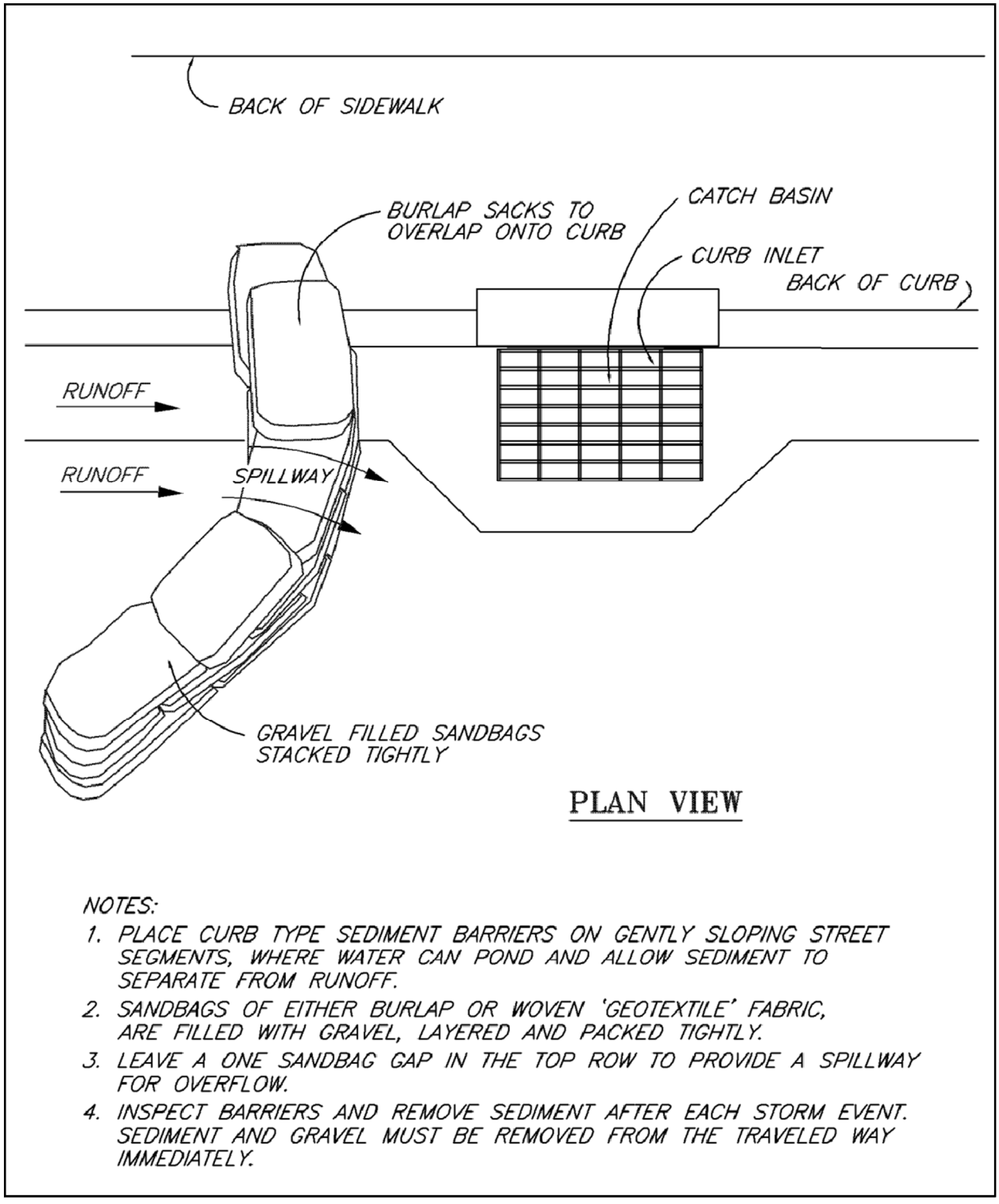


Figure 3 - 21: Curb and Gutter Sediment Barrier

1.19 BMP C151: Concrete Handling

1.19.1 Purpose

Concrete work can generate process water and slurry that contain fine particles and high pH, both of which can violate water quality standards in the receiving water. Concrete spillage or

concrete discharge to waters of the State is prohibited. Use this BMP to minimize and eliminate concrete, concrete process water, and concrete slurry from entering waters of the State.

1.19.2 Conditions of Use

Utilize these management practices any time concrete is used.

Concrete construction projects include, but are not limited to, the following:

- Curbs
- Sidewalks
- Roads
- Bridges
- Foundations
- Floors
- Runways

Disposal options for concrete, in order of preference are:

1. Offsite disposal
2. Concrete washout areas
3. De minimus washout to formed areas awaiting concrete

1.19.3 Design and Installation Specifications

- Wash concrete truck drums at an approved offsite location or in designated concrete washout areas only.
    - Return unused concrete remaining in the truck and pump to the originating batch plant for recycling. Do not dump excess concrete onsite, except in designated concrete washout areas as allowed in BMP C154: Concrete Washout Area.
- Do not wash out concrete trucks onto the ground (including formed areas awaiting concrete), or into the stormwater conveyance system, open ditches, streets, or streams.
- Wash small concrete handling equipment (e.g. hand tools, screeds, shovels, rakes, floats, trowels, and wheelbarrows) into designated concrete washout areas or into formed areas awaiting concrete pour.
- At no time shall concrete be washed off into the footprint of an area where an infiltration feature will be installed.
- Wash equipment difficult to move, such as concrete paving machines, in areas that do not directly drain to natural or constructed stormwater conveyance or potential infiltration areas.
- Do not allow washwater from areas, such as concrete aggregate driveways, to discharge directly (without detention or treatment) to natural or constructed stormwater conveyances.
- Contain washwater and leftover product in a lined container when no designated concrete washout areas (or formed areas, allowed as described above) are available. Dispose of contained concrete and concrete washwater (process water) properly. Always use forms or solid barriers for concrete pours within 15-feet of surface waters.
- Refer to BMP C252: Treating and Disposing of High pH Water and BMP C253: Portable

Sediment Tank for pH adjustment requirements.

- Refer to the Construction Stormwater General Permit for pH monitoring requirements if the project involves one of the following activities:
  - Significant concrete work (as defined in the Construction Stormwatwer General Permit).
  - The use of engineered soils amended with (but not limited to) Portland cement-treated base, cement kiln dust or fly ash.
  - Discharging stormwater to segments of water bodies on the 303(d) list (Category 5) for high pH.

1.19.4 Maintenance Standards

Containers shall be checked for holes in the liner daily during concrete pours and repaired the same day.

1.20 BMP C152: Sawcutting and Surfacing Pollution Prevention

1.20.1 Purpose

Sawcutting and surfacing operations generate slurry and process water that contains fine particles and high pH (concrete cutting), both of which can violate water quality standards in the receiving water. This BMP is intended to minimize and eliminate process water and slurry from entering waters of the State

1.20.2 Conditions of Use

Anytime sawcutting or surfacing operations take place, use these management practices. Sawcutting and surfacing operations include, but are not limited to, the following:

- Sawing
- Coring
- Grinding
- Roughening
- Hydro-demolition
- Bridge and road surfacing

1.20.3 Design and Installation Specifications

- Vacuum slurry and cuttings during cutting and surfacing operations.
- Do not leave slurry and cuttings on permanent concrete or asphalt pavement overnight.
- Do not allow slurry and cuttings to enter any natural or constructed conveyance system.
- Dispose of collected slurry and cuttings in a manner that does not violate groundwater or surface water quality standards.
- Do not allow process water that is generated during hydro-demolition, surface roughening, or similar operations to enter any natural or constructed conveyance system. Dispose of process water in a manner that does not violate groundwater or surface water quality standards.

- Handle and dispose of cleaning waste material and demolition debris in a manner that does not cause contamination of water. If the area is swept with a pick-up sweeper, haul the material out of the area to an appropriate disposal site.

1.20.4 Maintenance Standards

Continually monitor operations to determine whether slurry, cuttings, or process water could enter waters of the state. If inspections show that a violation of water quality standards could occur, stop operations and immediately implement preventive measures such as berms, barriers, secondary containment, and vacuum trucks.

1.23 BMP C160: Erosion and Sediment Control Lead

1.23.1 Purpose

The project proponent must designate at least one person as the responsible representative in charge of erosion and sediment control (ESC) and water quality protection. The designated person shall be the erosion and sediment control (ESC) lead, who is responsible for ensuring compliance with all local, state, and federal erosion and sediment control and water quality requirements.

1.23.2 Conditions of Use

- An erosion and sediment control contact is required for all project sites.
- A certified erosion and sediment control lead (CESCL) or certified professional in erosion and sediment control (CPESC) is required on projects that include, but are not limited to:
  - Construction activity that disturbs one acre of land or more.
- Projects disturbing less than one acre must have an Erosion Sediment Control Lead (ESC) conduct inspections. The ESC Lead does not have to have CESCL or CPESC certification.
- The CESCL, CPESC, or ESC Lead shall be identified in the SWPPP and shall be onsite or on-call at all times.
- The CESCL, CPESC, or ESC Lead must be knowledgeable in the principles and practices of erosion and sediment control and have the skills to assess:
  - Site conditions and construction activities that could impact the quality of stormwater.
  - Effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges.

1.23.3 Specifications

- The CESCL lead shall:
  - Have a current certified erosion and sediment control lead (CESCL) certificate proving attendance in an erosion and sediment control training course that meets the minimum ESC training and certification requirements established by Ecology.
- For additional information concerning the Certified Professional in Erosion and Sediment Control program please go to https://envirocertintl.org/cpesc/.
- The ESC lead shall have authority to act on behalf of the contractor or developer and shall be available, on call, 24 hours per day throughout the period of construction.
- The Construction SWPPP shall include the name, telephone number, email, and address

of the designated ESC lead.

- An ESC lead may provide inspection and compliance services for multiple construction projects in the same geographic region.
- Duties and responsibilities of the ESC lead shall include, but are not limited to, the following:
  - Inspecting all areas disturbed by construction activities, all BMPs and all locations where runoff leaves the site at least once every calendar week and within 24 hours of any discharge from the site. The ESC lead may reduce the inspection frequency for temporary stabilized, inactive sites to monthly.
  - Examining stormwater visually for the presence of suspended sediment, turbidity, discoloration, and oil sheen.
  - Evaluating the effectiveness of BMPs.
  - Maintaining a permit file onsite at all times which includes the SWPPP and any associated permits and plans.
  - Directing BMP installation, inspection, maintenance, modification, and removal.
  - Updating all project drawings and the Construction SWPPP with changes made.
  - Keeping daily logs and inspection reports. Inspection reports should include:
    - Inspection date/time.
    - Weather information, general conditions during inspection, and approximate amount of precipitation since the last inspection.
    - A summary or list of all BMPs implemented, including observations of all erosion/sediment control structures or practices. The following shall be noted:
      - Locations of BMPs inspected,
      - Locations of BMPs that need maintenance,
      - Locations of BMPs that failed to operate as designed or intended, and
      - Locations where additional or different BMPs are required.
    - Visual monitoring results, including a description of discharged stormwater. The presence of suspended sediment, turbid water, discoloration, and oil sheen shall be noted, as applicable.
    - Any water quality monitoring performed during inspection.
    - General comments and notes, including a brief description of any BMP repairs, maintenance, or installations made as a result of the inspection.
  - Facilitate, participate in, and take corrective actions resulting from inspections performed by outside agencies or the owner.
  - Keep an inventory of equipment onsite.

1.22 BMP C154: Concrete Washout Area

1.22.1 Purpose

Prevent or reduce the discharge of pollutants to stormwater from concrete waste by conducting washout offsite, or performing onsite washout in a designated area to prevent pollutants from entering surface waters or groundwater.

1.22.2 Conditions of Use

Use concrete washout best management practices on construction projects where:

- It is not possible to dispose of all concrete wastewater and washout offsite (ready mix plant, etc.)
- Concrete truck drums are washed onsite.
- Concrete is used as a construction material.

At no time shall concrete be washed off into the footprint of an area where an infiltration featurewill be installed.

Note: Auxiliary concrete truck components (e.g. chutes and hoses) and small concrete handling equipment (e.g. hand tools, screeds, shovels, rakes, floats,trowels, and wheelbarrows) may be washed into formed areas awaiting concrete pour.

1.22.3 Design and Installation Specifications

Implementation

- Perform washout of concrete truck drums at an approved offsite location or in designated concrete washout areas only.
- Do not wash out concrete trucks onto the ground, or into the stormwater conveyance system, open ditches, streets, or streams.
- Do not allow excess concrete to be dumped onsite, except in designated concrete washout areas.
- Wash equipment difficult to move, such as concrete paving machines, in areas that do not directly discharge to natural or constructed stormwater conveyance or potential infiltration areas.
- Concrete washout areas may be prefabricated concrete washout containers, or self-installed structures (above-grade or below-grade).
- Prefabricated containers are most resistant to damage and protect against spills and leaks. Companies may offer delivery service and provide regular maintenance and disposal of solid and liquid waste.
- If self-installed concrete washout areas are used, below-grade structures are preferred over above-grade structures because they are less prone to spills and leaks.
- Self-installed above-grade structures should only be used if excavation is not practical.

- Identify concrete washout area on the TESC plan.

- Concrete washout areas shall be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

Education

- Discuss the concrete management techniques described in this BMP with the ready-mix concrete supplier before any deliveries are made.
- Educate employees and subcontractors on the concrete waste management techniques described in this BMP.
- Arrange for the contractor's superintendent or Erosion and Sediment Control Lead (BMP C160: Erosion and Sediment Control Lead) to oversee and enforce concrete waste management procedures.
- Install a sign adjacent to each temporary concrete washout facility to inform concrete equipment operators to utilize the proper facilities.

Contracts

Incorporate requirements for concrete waste management into concrete supplier andsubcontractor agreements.

Location and Placement Considerations:

- Locate washout area or temporary concrete washout facilities at least 50 feet from sensitive areas such as stormwater system inlets, open conveyance ditches, or waterbodies, including wetlands.
- Allow convenient access for concrete trucks, preferably near the area where the concrete is being poured.
- If trucks need to leave a paved area to access washout, prevent track-out with a pad of rock or quarry spalls (BMP C105: Stabilized Construction Entrance/Exit). These areas should be far enough away from other construction traffic to reduce the likelihood of accidental damage and spills.
- The washout area volume installed should depend on the expected demand for storage capacity.
- On large sites with extensive concrete work, washouts may be placed in multiple locations for ease of use by concrete truck drivers.

Concrete Truck Washout Procedures

- Washout concrete truck drums in designated concrete washout areas only.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated concrete washout areas or properly disposed of offsite.

Concrete Washout Area Installation

- Install concrete washout areas prior to starting concrete work.
- Construct concrete washout areas of sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations. It is recommended that the minimum length and width be 10 feet.

- Plastic lining should be a minimum of 10-mil polyethylene sheeting and free of holes, tears, or other defects that compromise impermeability.
- Lath and flagging should be commercial grade.
- Install liner seams per manufacturer's recommendations.
- Prepare soil base free of rocks or other debris that may cause tears of holes in plastic lining.

1.22.4 Inspection and Maintenance

- Inspect and verify that concrete washout BMPs are in place prior to the commencement of concrete work.
- Once concrete wastes are washed into designated washout areas and allowed to harden, the concrete should be broken up, removed, and disposed of per applicable solid waste regulations. Dispose of hardened concrete on a regular basis.
- During periods of concrete work, inspect daily to verify continued performance.
    - Check overall condition and performance.
    - Check remaining capacity (% full).
    - If using self-installed washout facilities, verify plastic liners are intact and sidewalls are not damaged.
    - If using prefabricated containers, check for leaks.
- Maintain washout facilities to provide adequate holding capacity with a minimum freeboard of 12 inches.
- Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.
- If the washout is nearing capacity, vacuum and dispose of the waste material in an approved manner.
    - Do not discharge liquid or slurry to streets, the stormwater system, receiving waterbodies, or the ground..
    - Do not use wastewater system without obtaining a City of Tacoma Special Approved Discharge permit. Call Source Control at 253.591.5588 for more information.
    - Place a secure, non-collapsing, non-water collecting cover over the concrete washout facility prior to predicted wet weather to prevent accumulation and overflow of precipitation.
    - Remove and dispose of hardened concrete and return the structure to a functional condition. Concrete may be reused onsite or hauled away for disposal or recycling.
- When you remove materials from the self-installed concrete washout, build a new structure; or, if the previous structure is still intact, inspect for signs of weakening or damage, and make any necessary repairs. Re-line the structure with new plastic after each cleaning.

1.22.5 Removal of Temporary Concrete Washout Facilities

- When temporary concrete washout facilities are no longer required for the work, remove and properly dispose of the hardened concrete, slurries and liquids.

- Remove materials used to construct temporary concrete washout facilities from the site of the work and dispose of or recycle it.
- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities shall be backfilled, repaired, and stabilized to prevent erosion.

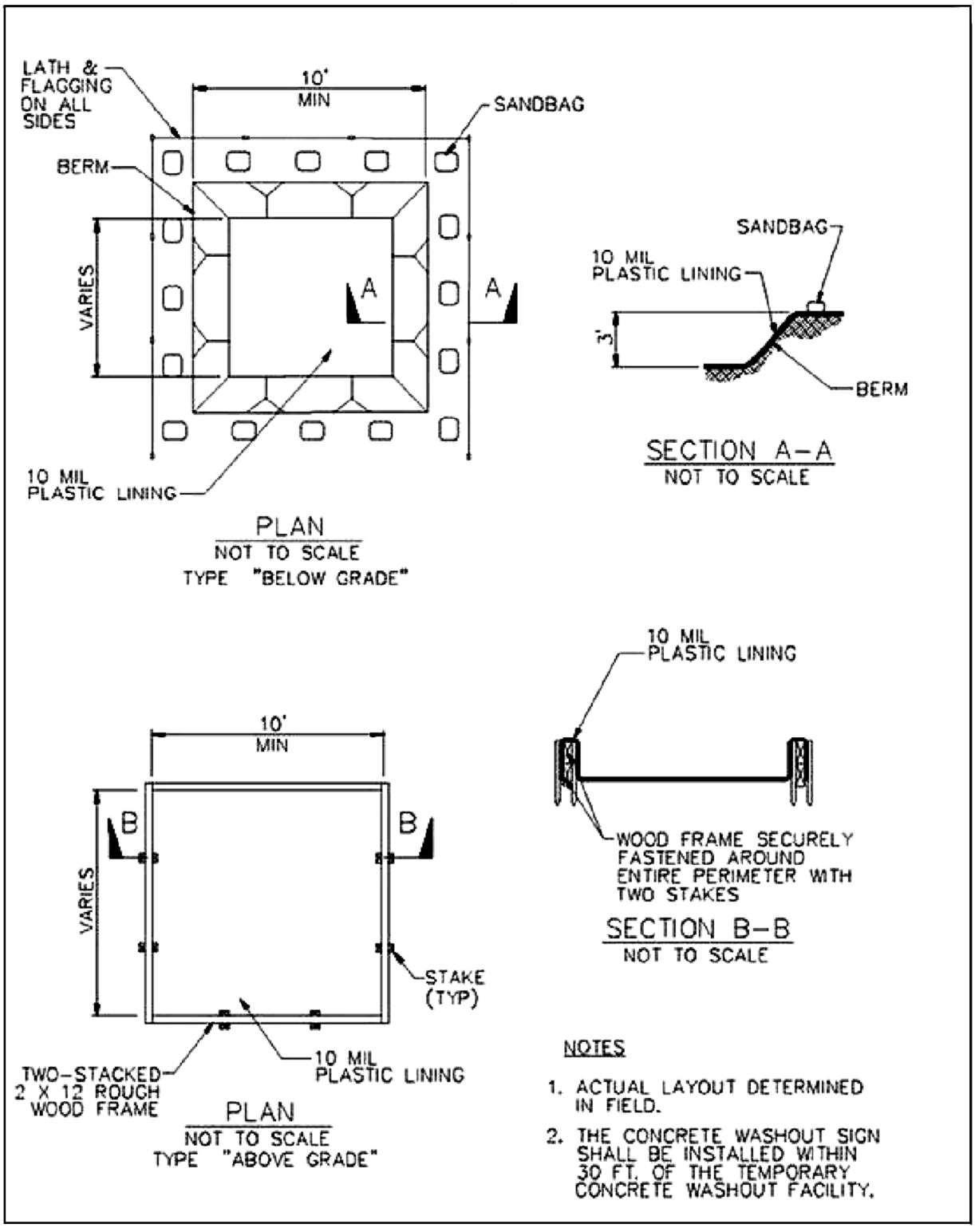


Figure 3 - 7: Temporary Concrete Washout Facility

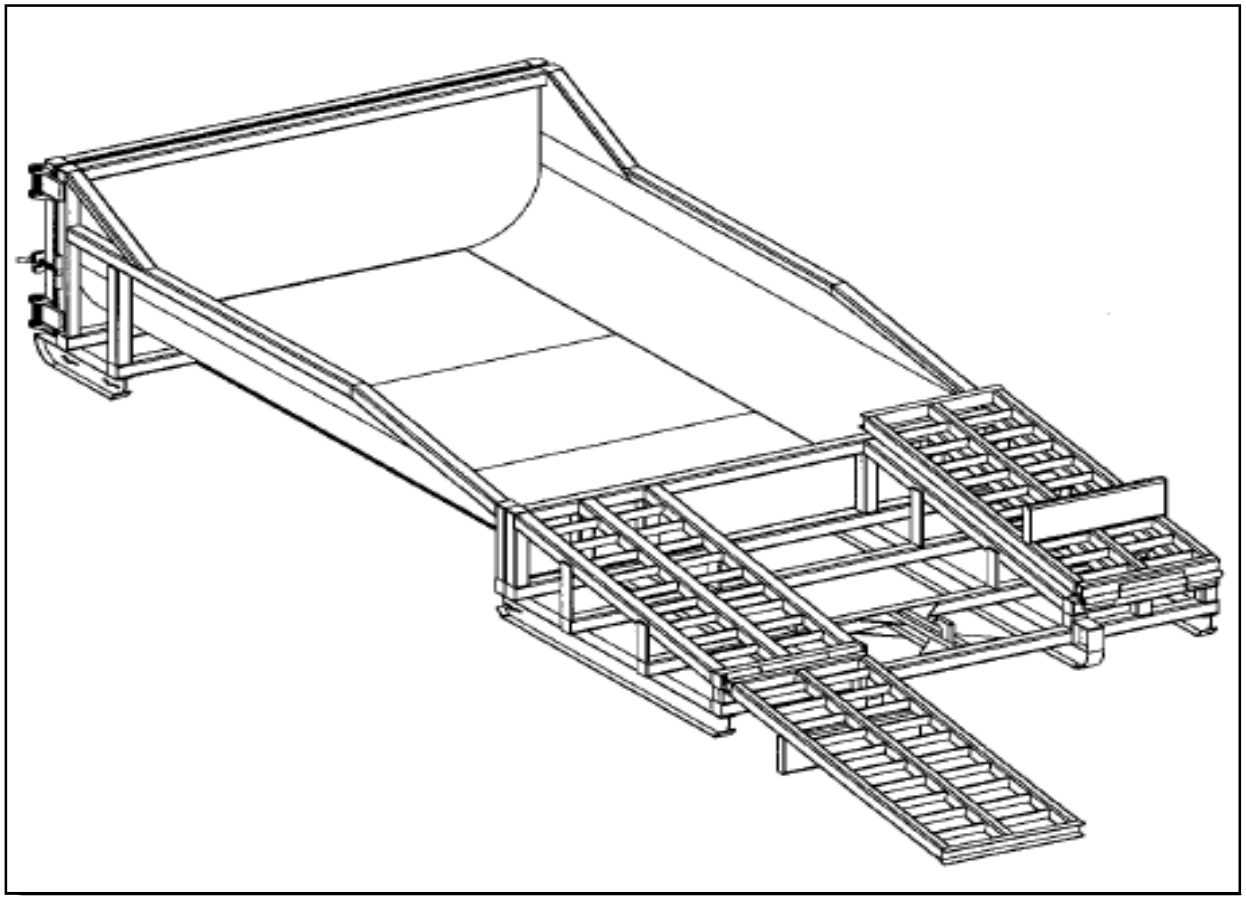


Figure 3 - 8: Prefabricated Concrete Washout Container with Ramp