

Clearing & Grading Development Standards

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Issued by

**CITY OF BELLEVUE
DEVELOPMENT SERVICES DEPARTMENT**



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Contents

Chapter CG1 – General Requirements	6
CG1-01: Purpose	6
CG1-02: Code Authority	6
CG1-03: Responsibility for Implementing Standards.....	6
CG1-04: Definitions	6
CG1-05: Abbreviations and Acronyms.....	12
Chapter CG2 – Permit Requirements.....	14
CG2-01: General.....	14
CG2-02: Clearing and Tree Removal	14
CG2-02.1: Clearing	14
CG2-02.2: Tree Removal	15
CG2-03: Grading	15
CG2-04: Hard Surface	15
CG2-05: Rockeries and Modular Block Walls	16
CG2-06: Critical Areas	16
CG2-07: Exemptions.....	17
Chapter CG3 - Permit Application Submittal	18
CG3-01: General	18
CG3-01.1: Permit Types.....	18
CG3-01.2: Submittal Requirements	18
CG3-01.3: Completeness	19
CG3-01.4: Request for Deviation from Clearing & Grading Development Standards	19
CG3-02: Plans & Drawings	20
CG3-02.1: General.....	20
CG3-02.2: Combining Plans.....	20
CG3-03: Written Reports and Plans.....	20
CG3 - 03.1: Construction Stormwater Pollution Prevention Plan (CSWPPP)	20
GC3-03.2: Geotechnical Report.....	21
CG3- 03.3: Turbidity & pH Monitoring Plan.....	22
CG3-04: Application Forms and Other Documents.....	22
CG3- 04.1: Application Forms.....	22

CG3- 04.2: Rights of Entry and Construction Easements	22
CG3- 04.3: Abatement Security	22
CG3-05: Professional Qualifications	23
CG3- 05.1: Engineering.....	23
CG3-05.2: Landscape Design.....	23
CG3-05.3: Certified Erosion and Sediment Control Lead (CESCL).....	24
CG3-05.4: Arborist	24
CG3-05.5: Other Professionals	24
Chapter CG4 – Permit Issuance	25
CG4-01: Associated Permits and Approvals	25
CG4-01.1: Land Use Approvals.....	25
CG4-01.2: Construction Permits.....	25
CG4-01.3 Permits from other jurisdictions.....	26
CG4-02: Vesting and Expiration of Permits and Applications	26
CG4-02.1: Projects Requiring Only Clearing and Grading Permits.	26
CG4-02.2: Projects Requiring Prior Discretionary Land Use Permit or Approval... ..	27
CG4-02.3: Projects Requiring Building Permits and No Prior Discretionary Land Use Permit or Approval.	28
Chapter CG5 – Standards for Clearing & Grading	30
CG5-01: General	30
CG5-02: Preserving Natural Vegetation	30
CG5-03: Clearing and Grading Around Trees to be Preserved.....	30
CG5-04: Protection of Soils for On-Site Stormwater Management	32
CG5-05: Clearing and Grading for Plats and Short Plats.....	33
CG5-06: Grading Adjacent to Sensitive and Critical Areas.....	33
CG5-07: Grading Around Structures.....	33
CG5-08: Excavation and Filling	33
CG5-09: Engineered Fill and Reinforced Fill.....	33
CG5-11: Rockeries And Modular Block Walls.....	34
CG5-11.1: General	34
GC 5-11.2: Rockeries.....	34
CG5-11.3: Modular Block Walls	35
CG5-12: Wall Drains.....	35

CG5-13: Temporary Shoring.....	35
CG5-14: Blasting.....	36
CG5-15: Bulkheads	36
CG5-16: In-Water Work	36
CG5-17: Drains	36
CG-17.1: Surface-water and Downspout Drains	37
CG5-17.2: Subsurface Drains.....	37
CG5-18: Underground Utility Lines	37
CG5-19: Restrictions On Clearing And Grading	38
CG5-19.1: Temporary Restrictions	38
CG5-19.2: Noise Restrictions.....	38
CG5-20: Interruption, Suspension, or Abandonment of Work.....	39
CG5-21: Post-Construction Soils.....	39
Chapter CG6 – Slopes.....	40
CG6-01: General	40
CG6-02: Topography	40
CG6-03: Geotechnical Requirements	40
CG6-04: Foundation Clearances From Slopes.....	40
CG6-05: Slope Drainage	41
Chapter CG7 - Construction Stormwater Pollution Prevention	42
CG7-01: General.....	42
CG7-02: Planning.....	42
CG7-03: Standards and Specifications for Best Management Practices.....	42
Chapter CG8 – Inspection	43
CG8-01: Inspection by the Permittee.....	43
CG8-01.1: Recordkeeping and Reporting.....	43
CG8-02: Inspection by the City	43
CG8-03: Final Approval	44
Chapter CG9 – Violations.....	45
CG9-01: General	45
CG9-02: Enforcement Process.....	45
Appendix A.....	46
Construction Stormwater Pollution Prevention Planning.....	46

A. 1 General Guidelines	46
A.2 CSWPPP Requirements.....	48
A. 3 Step-By-Step Procedure.....	51
Construction Stormwater Pollution Prevention Plan Checklist	66
Appendix B.....	70
Best Management Practices Standards and Specifications	70
B.1 Source Control BMPs.....	70
B.2 Runoff Conveyance and Treatment BMPs.....	74
Appendix C.....	77
Construction Stormwater Pollution Prevention Additional Standards and Specifications for Local Regulations and Practices.....	77
Construction Emergency Contact Form.....	78
Construction Emergency Contact Information	79
CSWPPP Site Inspection Form	80
CSWPPP Site Inspection Form	81
Standard Notes for Erosion Control Plans	83
Background Information on Chemical Treatment.....	85

Chapter CG1 – General Requirements

CG1-01: Purpose

The purpose of the Clearing and Grading Standards is to provide the minimum design and construction standards for land alteration, clearing, grading, and erosion control work. The clearing and grading code (Chapter 23.76 of the Bellevue City Code (BCC)), and the city's National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for Discharges from Small Municipal Separate Storm Sewers in Western Washington provide the authority for and are the basis for these development standards.

Although these standards are intended to apply to land disturbing activities, not all the standards will apply in all situations. Compliance with these standards does not relieve the professional civil engineer or contractor from the responsibility of applying conservative and sound professional judgment. These are minimum standards and are intended to assist, but not substitute for, competent work by engineers and contractors. The Development Services Department (DSD) may, at its sole discretion, due to special conditions and/or environmental constraints, require more stringent requirements than would normally be required under these standards.

CG1-02: Code Authority

The standards imposed by this document are under authority of the City of Bellevue clearing & grading code (Bellevue City Code Chapter 23.76); the City of Bellevue land use code (Bellevue City Code Chapter 20); the Bellevue utilities code (Bellevue City Code Chapter 24); and/or the City of Bellevue civil violations code (Bellevue City Code Chapter 1.18).

CG1-03: Responsibility for Implementing Standards

The clearing & grading permit holder (permittee) is responsible for implementing these standards. Project engineering and design must conform to the City of Bellevue codes and standards, including the clearing & grading code and these development standards. Compliance with codes and standards does not relieve the designer of the responsibility to apply sound professional judgment to protect the health, safety, and welfare of the public.

Site conditions and environmental constraints may require a greater level of protection than would normally be required by city codes and standards. Design elements of any proposed project may have to be revised to comply with the requirements of these standards, or any other City of Bellevue permit conditions, codes and regulations.

CG1-04: Definitions

The following terms as used in this document shall be defined and interpreted as follows:

Abandoned construction site: a lot or group of lots, including subdivisions, building or buildings, or other development where work has ceased for any reason for a period of 90 days. Circumstances indicating abandonment of a construction site include, but are not limited

to, failure to call for inspections, absence of workers, or removal of equipment and supplies. A valid permit or approval issued by the city does not alter the status of a construction site deemed abandoned.

Applicant: the individual, partnership, association, or corporation applying for a permit to do work under the clearing and grading code, including the property owner, and any employee, agent, consultant or contractor acting on behalf of the applicant, and any successor in interest.

Best management practices (BMPs): the schedules of activities, prohibitions of practices, maintenance procedures, and structural and/or managerial practices that, when used singly or in combination, prevent or reduce the release of pollutants and other adverse impacts to the city's storm and surface water system or receiving waters.

Building site: shall have the meaning set forth in Chapter 20.50 LUC, now or as hereafter amended.

Clearing: the act of destroying or removing the existing soil cover (both vegetative and non- vegetative).

Clearing and Grading Permit: the written permission of the director to the permittee to proceed with the act of clearing and grading within the provisions of the clearing and grading code. The clearing and grading permit includes the associated approved plans and any conditions of approval as well as the permit form itself.

Code: unless noted otherwise, "code" refers to the clearing and grading code.

Construction stormwater pollution prevention plan (CSWPPP): a written plan to implement measures to identify, prevent, and control the contamination of point source discharge of stormwater. The CSWPPP explains and illustrates the measures, usually in the form of best management practices (BMPs), to take on a construction site to control potential pollution problems.

Critical Area: shall have the meaning set forth in Chapter 20.25 LUC, now or as hereafter amended.

Director: The director of the development services department or his/her designee or other person designated by the City Manager.

Ecology: the Washington State Department of Ecology.

Ecology Manual: the 2024 Stormwater Management Manual for Western Washington.,

Engineered fill: Soil fill which is wetted or dried to near its optimum moisture content, placed in lifts of 12 inches or less and each lift compacted to a minimum percent compaction as specified by a geotechnical engineer.

Excavation: the removal of material such as earth, soil, sand, peat, gravel, rock, asphalt, or concrete

Fill: earth, soil, sand, peat, gravel, rock, asphalt, concrete or other solid material used above or below the ordinary-high water mark to increase the ground surface elevation or to replace excavated material.

Filling: any act by which fill is deposited or placed.

Geotechnical Engineer: a Professional Engineer currently registered in the State of Washington, qualified by reason of experience and education in the practice of geotechnical engineering, and designated by the owner as the geotechnical engineer of record for the project.

Grading: any excavating or filling or combination thereof.

Ground water: water in a saturated zone or stratum beneath the surface of the land or below a surface water body.

Hard Surface: an impervious surface, a permeable pavement, or a vegetated roof.

Hazardous Tree: shall have the meaning set forth in LUC 20.20.900, now or as hereafter amended.

Heavy rain: rainfall at a rate greater than or equal to 0.03 inches per 6 minutes or 0.30 inches per hour

Illicit discharge: Any direct or indirect non-storm water discharge to the storm and surface water system, except as expressly allowed by the storm and surface water utility code (BCC 24.06).

Impervious surface: A non-vegetated surface area that either prevents or retards the entry of water into the soil mantle as under natural conditions prior to development. It is also a non-vegetated surface area which causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions prior to development.

Common impervious surfaces include, but are not limited to, roof tops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, and oiled, macadam or other surfaces which similarly impede the natural infiltration of stormwater. Open, uncovered retention/detention facilities shall not be considered as impervious surfaces for purposes of determining whether the thresholds for application of minimum requirements are exceeded. Open, uncovered retention/detention facilities shall be considered impervious surfaces for purposes of runoff modeling.

Land disturbing activity: Any activity that results in a change in the existing soil cover (both vegetative and non-vegetative) and/or the existing soil topography. Land disturbing activities include, but are not limited to clearing, grading, filling, and excavation. Compaction that is associated with stabilization of structures and road construction shall also be considered a land disturbing activity. Maintenance of existing landscape, as described in LUC 20.25H.055(C), is not considered a land disturbing activity.

Landmark Tree: shall have the meaning set forth in Chapter 20.50 LUC, now or as hereafter amended.

Landscaping or landscaped areas: land that has been modified by altering soil levels and/or vegetation for aesthetic or practical purposes.

Landslide: the movement of a mass of rocks and/or earth down a slope.

Landslide deposit: a large mass of earth and/or rock that has moved physically downslope by gravity and broken into discrete fragments.

LID: Low Impact Development

LID BMP: Low impact development best management practices.

Live crown: The crown of a tree containing live foliage

Low Impact Development: A stormwater and land use management strategy that strives to mimic pre-disturbance hydrologic processes of infiltration, filtration, storage, evaporation and transpiration by emphasizing conservation, use of on-site natural features, site planning, and distributed stormwater management practices that are integrated into a project design.

Low impact development best management practices: Distributed stormwater management practices, integrated into a project design, that emphasize pre-disturbance hydrologic processes of infiltration, filtration, storage, evaporation and transpiration. LID BMPs include, but are not limited to, bio retention/rain gardens, permeable pavements, roof downspout controls, dispersion, soil quality and depth, vegetated roofs, minimum excavation foundations, and water re-use.

Minimum Requirements (MRs): the regulation contained in BCC 23.76.090 and BCC 24.06.065, now or as hereafter amended, and applicable development and engineering standards, which describe requirements for storm water management for development and redevelopment as required by the NPDES Permit.

Modular block wall: a wall constructed of manufactured modular wall units acting as a protective facing for an exposed soil face or as a gravity retaining wall.

New development: Land disturbing activities, including Class IV – General Forest Practices that are conversions from timber land to other uses; structural development, including construction or installation of a building or other structure; creation of hard surfaces; and subdivision, short subdivision and binding site plans, as defined and applied in Chapter 58.17 RCW, now or as hereafter amended. Projects meeting the definition of redevelopment shall not be considered new development.

NPDES: National Pollutant Discharge Elimination System.

NPDES permit: an authorization, license, or equivalent control document issued by either the United States Environmental Protection Agency or authorized state authority, which in Washington is the Department of Ecology, to authorize point source discharges to surface water and implement the provisions of 33 U.S.C. 1342 (Section 402) of the federal Clean Water Act.

Peak volumetric stream flow: the maximum instantaneous rate of flow, expressed in terms of volume per unit of time, during a storm.

Permanent erosion control: permanent improvements, such as landscaping or drainage control structures that cover the soil such that erosion is minimized or eliminated.

Permeable pavement: Pervious concrete, porous asphalt, permeable pavers or other forms of pervious or porous paving material intended to allow passage of water through the pavement section. It often includes an aggregate base that provides structural support and acts as a stormwater reservoir.

Permit: unless noted otherwise, refers to the clearing and grading permit - see clearing and grading permit.

Permittee: the property owner to whom the clearing and grading permit is issued. The property owner may be a person(s), partnership, association, or corporation. Both the property owner and its agent are considered the permittee and are responsible for ensuring compliance with this chapter.

Potential slide block (failure envelope): the area near the surface of a slope between the toe of the slope and a line extended upward at two feet horizontal to one foot vertical from the toe to the surface of the ground above the slope, or as otherwise determined by a geotechnical engineer.

Qualified Tree Professional: shall have the meaning set forth in Chapter 20.50 LUC, now or as hereafter amended.

Rain Garden: a non-engineered shallow landscaped depression, with compost-amended native soils and adapted plants. The depression is designed to pond and temporarily store stormwater runoff from adjacent areas, and to allow stormwater to pass through the amended soil profile.

Rainy season: that period from October 1 through April 30 unless the director modifies these dates based on weather patterns and forecasts.

Receiving waters: Naturally and/or reconstructed naturally occurring surface water bodies, such as creeks, streams, rivers, lakes, wetlands, estuaries, and marine waters or ground water to which a municipal separate storm sewer system (MS4) discharges.

Redevelopment: On a site that is already substantially developed, (i.e. has 35% or more of existing hard surface coverage), the creation or addition of hard surfaces; the expansion of a building footprint or addition or replacement of a structure; structural development including construction, installation or expansion of a building or other structure; replacement of hard surface that is not part of a routine maintenance activity; and land disturbing practices.

Reinforced fill or reinforced soil: soil fill, designed by an engineer that includes reinforcement consisting of metal or synthetic materials in bars, strips, grids or sheets.

Replaced impervious surfaces: For structures, the removal and replacement of any exterior impervious surfaces or foundation. For other impervious surfaces, the removal down to bare soil or base course and replacement

Responsible person(s): one, multiple, or all the following person(s) (if applicable): Property owners, agents, contractors, operators, developers, applicants, occupants of property, or any person(s) causing or contributing to a violation of the provision of the clearing and grading code, these standards or related manuals

Retaining wall: a wall designed to resist the lateral displacement of soil or other materials.

Rockery or rock wall: one or more courses of rocks stacked against an exposed soil face to protect the soil face from erosion and sloughing. The bottom course of rocks bears on the foundation soils and the upper rocks bear partially or entirely on the rocks below. The face inclination of a rockery varies from near vertical to about 1H:4V. A rockery or rock wall is not considered a retaining wall.

Runoff: Water that travels across the land surface and discharges to water bodies either directly or through a collection and conveyance system. See also "stormwater."

Significant tree: shall have the meaning set forth in Chapter 20.50 LUC, now or as hereafter amended.

Site: shall have the meaning set forth in Chapter 20.50 LUC, now or as hereafter amended

Slide or Landslide: the movement of a mass of loosened rocks and/or earth down a slope.

Soil: unaggregated or uncemented deposits of mineral and/or organic particles or fragments derived from the breakdown of massive rocks or decay of living matter.

Soil Cover: vegetative or non-vegetative material that is covering soil and which provides a barrier against erosion. Vegetative soil cover includes vegetation such as grass, weeds, groundcover, brush, shrubs, and the canopy of trees. Non-vegetative soil cover includes material such as rocks, mulch (wood, bark, rock, stone, etc.), wood, asphalt or cement concrete, metal, plastic, lumber, paper, and trash.

Storm and Surface Water System: the entire system within the city, both public and private, naturally existing and manmade, for the drainage, conveyance, detention, treatment or storage of storm and surface waters. Facilities directly associated with buildings or structures such as foundation drains, rockery/retaining wall drains, gutters and downspouts or groundwater are not considered parts of the Storm and Surface Water System.

Stormwater: runoff during and following precipitation and snowmelt events, including surface runoff and drainage. See also “runoff.”

Uncontrolled fill: fill which has been placed under unknown conditions or without any controls such as geotechnical inspection or monitoring.

Unstable slopes: those sloping areas of land which have in the past exhibited, are currently exhibiting, or will likely exhibit mass movement of earth.

Vegetated roof: thin layers of engineered soil and vegetation constructed on top of a conventional flat or sloped roof. All vegetated roofs consist of four basic components: a waterproof membrane, a drainage layer, a light-weight growth medium, and vegetation.

Wall drain: a drainage system behind retaining walls, rockeries, rock walls or modular block walls used to collect water moving through the soil or rock behind the wall or rockery.

Water Quality Standards: the Surface Water Quality Standards, Chapter 173-201A WAC, Ground Water Quality Standards, Chapter 173-200, WAC, and Sediment Management Standards, Chapter 173-204 WAC, now or as hereafter amended.

Waters of the State: includes those waters as defined as “waters of the United States: in 40 CFR Subpart 122.2 within the geographic boundaries of Washington State and “water of the state” as defined in Chapter 90.48 RCW, now or as hereafter amended, which includes lakes, rivers, ponds, streams, inland waters, underground waters, salt waters and all other surface water and water courses within the jurisdiction of the State of Washington.

CG1-05: Abbreviations and Acronyms

The following acronyms or abbreviations may appear in this document Codes and Standards

BCC	Bellevue City Code
BUDES	Bellevue Utility Department Engineering Standards
IBC	International Building Code (current edition adopted by COB)
IRC	International Residential Code (current edition adopted by COB)
LUC	City of Bellevue Land Use Code
RCW	Revised Code of Washington (Laws of the State)
SWMMWW	024 Stormwater Management Manual for Western Washington, (Ecology Manual)
WAC	State of Washington Administrative Code

Terms: These abbreviations are used in plans and specifications as defined here:

ATB	Asphalt Treated Base
BMP	Best Management Practice
BTD	City of Bellevue Transportation Department
BUD	Bellevue Utility Department
CESCL	Certified Erosion and Sediment Control Lead
CKD	Cement Kiln Dust
COB	City of Bellevue
CPESC	Certified Professional in Erosion and Sediment Control
CPSWQ	Certified Professional in Storm Water Quality
C&G	Clearing & Grading
CSWPPP	Construction Stormwater Pollution Prevention Plan
DFW	Washington State Department of Fish and Wildlife
DNR	Washington State Department of Natural Resources
DOE	Washington State Department of Ecology
DSD	City of Bellevue Development Services Department
EPA	Federal Environmental Protection Agency
ESC	Erosion and Sediment Control
HPA	Hydraulic Project Approval (by DFW)
IBC	International Building Code
ISA	International Society of Arboriculture

NPDES	National Pollutant Discharge Elimination System
NGPE	Native Growth Protection Easement
NRCS	Natural Resources Conservation Service (Dept. of Agriculture)
NTU	Nephelometric Turbidity Unit (A unit of turbidity measurement)
ROW	City of Bellevue Right-of-Way
SEPA	State Environmental Policy Act
TESC	Temporary Erosion and Sediment Control
WSDOT	Washington State Department of Transportation

CG2-01: General

The purpose of clearing & grading permits is to ensure that the proposed work complies with codes enacted to prevent potential adverse impacts associated with land disturbing activities and to provide for and promote the health, safety and welfare of the public. Permit requirements are provided in section 23.76.035 of the clearing and grading code.

CG2-02: Clearing and Tree Removal

CG2-02.1: CLEARING

The act of clearing means destruction or removal of existing soil cover, both vegetative and non-vegetative. "Soil cover" includes any vegetative or non-vegetative material that provides a barrier to soil erosion. Vegetative cover includes, but is not limited to, the following:

- grass
- weeds
- groundcover
- brush
- shrubs
- the canopy of trees

Non-vegetative cover includes, but is not limited to, the following:

- rocks
- mulch (wood, bark, compost, rock, stone, paper, etc.)
- wood
- asphalt concrete
- cement concrete
- bricks
- glass
- ceramic
- pavers
- metal
- plastic
- lumber
- paper
- automobiles
- appliances
- trash

Cutting of vegetation to ground level, or near ground level, such that the underlying soils are exposed is considered clearing. Destruction of vegetation with chemicals or by burying with soil is also considered clearing. Clearing does not include trimming or pruning that does not result in the death of the vegetation, such as mowing grass and minor trimming or pruning of vegetative cover.

A clearing and grading permit is required for any project which involves clearing of over 1,000 square feet as measured at ground level within any 1-year period. A permit is also required for any clearing in a Critical Area (see Section CG2-06).

CG2-02.2: TREE REMOVAL

Tree removal means any action that results in the death of or severe decline of a tree. Methods of tree removal include but are not limited to:

- Topping, heading, pollarding, or the use of indiscriminate pruning methods that results in the loss of 25% or greater of live tree canopy (unless historical evidence exists to show such pruning has taken place legally);
- Girdling of the tree (removal of a strip of bark, including the cambium layer, around the circumference of a significant portion of the main stem(s));
- Application of herbicides that kill or damage the tree;
- Cutting off or damage to main tree roots that results in the death of the tree or require actions to remove a significant portion of the tree for safety;
- Severe compaction of the soil of or changes of soil grade within the critical root zone;
- Significant mechanical damage to the tree trunk or other main stems, or;
- Removal of 25% or more of the live crown of a tree

The most recent version of the [City of Bellevue Pruning Guidelines](#) presents pruning techniques that reflect industry standards and acceptable best management practices for trees in the city.

A clearing and grading permit is required for a project that involves any of the following:

- Removal of any Significant Tree or of any Landmark Tree; or
- Removal of more than 25 percent of the live crown of any Significant Tree or of any Landmark Tree that is required to be preserved by the Bellevue City Code, the Land Use Code, a plat condition, or another legal requirement enforceable by the city. The live crown is the crown of the tree containing live foliage or any branch or stem with functioning cambium.

CG2-03: Grading

Grading is defined as the removal or placement of material such as earth, soil sand, peat, gravel, rock, asphalt, concrete, or other solid material. A permit is required for grading when the total amount of grading exceeds 50 cubic yards. A permit is also required for any grading in a Critical Area (see Section CG2-06). Total grading is calculated by determining the quantities of fill and excavation separately and adding them together, even if the excavated material is used as fill on the same site.

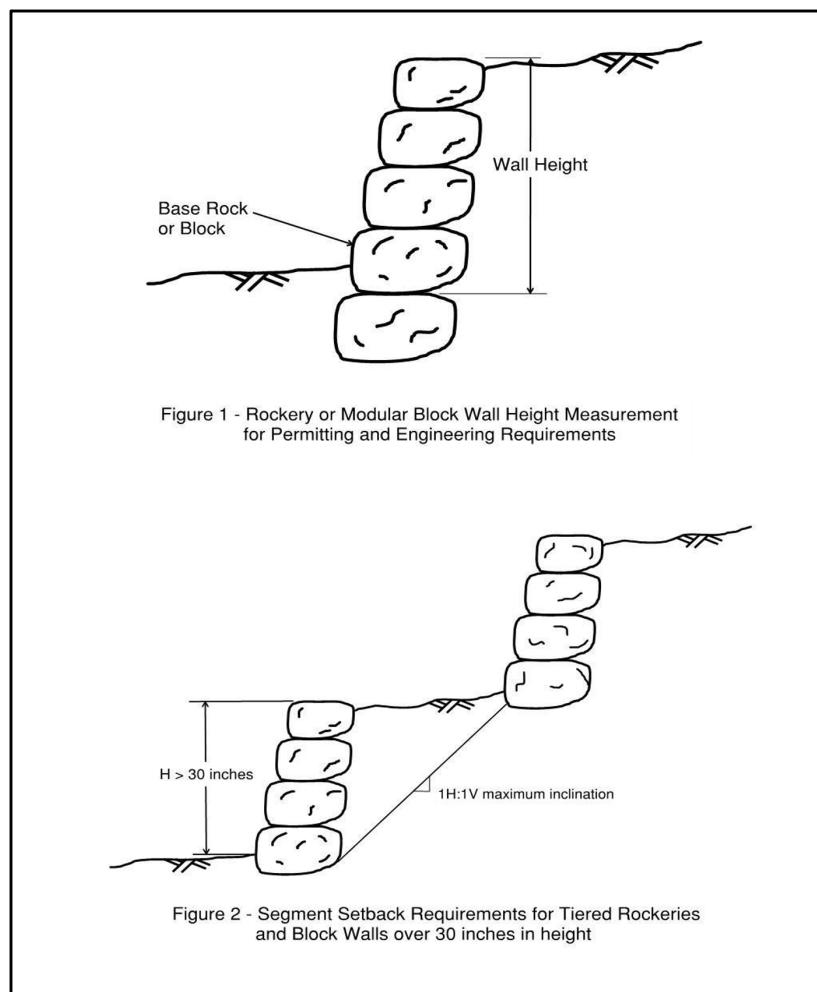
CG2-04: Hard Surface

A clearing and grading permit is required for 2,000 square feet or more of new plus replaced hard surface area within a 1-year period. Hard surface is defined in Section CG1-04 above, and includes impervious surfaces, permeable pavement, and vegetated roofs. Regardless of permitting requirements, creation of additional impervious surface service may be limited by the dimensional requirement of the Land Use Code (20.20.010 LUC and 20.25D.080 LUC),

CG2-05: Rockeries and Modular Block Walls

Construction or reconstruction of any rockery or modular block wall over 4 feet in height requires a clearing and grading permit (a separate building permit is not required for rockeries or modular small-block walls). The height is measured from the bottom of the base rock or block to the top of the top rock or block. The base rock or block is the bottom-most rock or block that is not entirely below grade (see Figure 1). For tiered rockeries where the sum of the heights of the tiers is over 4 feet, the tier segments must be separated horizontally a distance equal to at least the height of the lower segment (see Figure 2), unless an engineered design is provided.

Shoring, cast-in-place and pre-cast concrete retaining walls, timber retaining walls, and modular large-block (ecology block) walls 3 blocks or more in height (gravity wall with no soil reinforcing) are regulated under the requirements of the current building codes (IBC or IRC) and may require a building permit. A clearing and grading permit may also be required if the associated work involves clearing and/or grading over the thresholds described above.



CG2-06: Critical Areas

A clearing and grading permit is required for any land disturbing activities in any critical area or critical area buffer, when allowed by the Land Use Code. The Land Use Code generally does not allow land disturbing activities in critical areas with some exceptions (20.25H LUC). Critical areas include:

- Streams and the associated buffers
- Wetlands and the associated buffers
- Shorelines, shoreline aquatic environments, and shoreline vegetation conservation areas
- Geologic Hazard Areas and the associated buffers
- Habitat Associated with Species of Local Importance and the associated buffers
- Areas of Special Flood Hazard.

Additional requirements or limitations may apply when conducting land disturbing activities in the shoreline (see the Bellevue Land Use Code, Part 20.25E, Shoreline Overlay District, now or hereafter amended). Land disturbing activities in portions of the critical areas, if allowed by the Land Use Code, require environmental review under the State Environmental Policy Act (SEPA) (see the Bellevue Environmental Procedures Code, Chapter 22.02). In-water work will also require a Hydraulic Project Approval (HPA) permit from the Department of Fish & Wildlife (see Section CG5-16).

CG2-07: Exemptions

The clearing and grading code provides exemptions from permit requirements for certain types of activities or situations. An exemption from a clearing and grading permit does not exempt the person doing the work from meeting all applicable City codes. Exemptions to the requirements for a clearing and grading permit apply to the following activities:

- Agricultural crop management of existing farmed areas.
- Routine landscape maintenance, as described in LUC 20.25H.055.C.3.h, as now or hereafter amended.
- Work needed to correct an immediate danger to life or property in an emergency as declared by the mayor or the city manager or his/her designee.
- Cemetery graves involving less than 50 cubic yards of excavation, and related filling, per each cemetery plot.
- Routine drainage maintenance of existing, constructed stormwater drainage facilities located outside of a critical area or critical area buffer, including, but not limited to, detention/retention ponds, wetponds, sediment ponds, constructed drainage swales, water quality treatment facilities such as filtration systems, and regional storm facilities that are necessary to preserve the water quality treatment and flow control functions of the facility. This exemption does not apply to any expansion and/or modification to already excavated and constructed stormwater drainage facilities.
- Roadway repairs and overlays within public street rights-of-way for the purpose of maintaining the pavement on existing paved roadways, such that asphalt removal or milling does not expose more than 1,000 square feet of gravel base or subgrade. This exemption does not apply to curbs, gutters, sidewalks, utilities, new traffic calming devices, new roadways, or the widening of the paved surface of existing roadways.

Chapter CG3 - Permit Application Submittal

CG3-01: General

CG3-01.1: PERMIT TYPES

The Director has categorized clearing and grading permits into different types for administrative purposes. A clearing and grading permit may be issued as a separate permit or as a component of another permit. A permit that encompasses more than one permit type is usually referred to as a “combination permit.” The clearing and grading component may be included in a building permit, a land use approval, or a right-of-way use permit. Also, a clearing and grading permit may include approvals from other departments or sections, including Land Use, Transportation, Utilities, and/or Fire. For larger projects, such as commercial buildings, construction permits (building and clearing & grading) and Land Use approvals are issued separately.

CG3-01.2: SUBMITTAL REQUIREMENTS

The current clearing & grading permit submittal requirements are available on the [City's website](#)

The applicant may request a waiver or modification to certain clearing and grading permit submittal requirements. The waiver or modification must be approved by a clearing & grading reviewer or land use planner on behalf of the Director. Additional submittals may be required by the clearing & grading or land use project reviewer during the project review, including items that were previously waived when that information is necessary to confirm compliance with applicable codes and standards.

Permit types that require report submittals (such as geotechnical reports) are listed on the [Clearing and Grading Permits Submittal Requirements webpage](#). Requirements for report contents are provided in the submittal requirements webpage as well. Additional reports may be required by the clearing and grading project reviewer during the project review. The property owner and their agent are responsible for the accuracy and completeness of all information provided with or affecting the application submittal.

After a clearing and grading permit application has been submitted through the [MyBuildingPermit.com](#) portal, any proposed changes to the construction plans must be submitted as a revision to the permit application. Revised plans showing the changes must be submitted on-line through [MyBuildingPermit.com](#). The new plans must be approved by all relevant COB departments prior to issuance of the permit. If revisions are proposed after the permit has been issued, plans with the proposed changes must also be submitted on-line through [MyBuildingPermit.com](#) for review by the relevant reviewing departments. The revised plans must be approved and issued to the permitted before the changes are constructed in the field.

Procedures for clearing and grading and land use decisions are described in the City of Bellevue Land Use Code Chapter 20.35. Design and construction requirements for clearing and grading permits are detailed in the clearing & grading code (BCC Chapter 23.76).

CG3-01.3: COMPLETENESS

Clearing and grading permit applications are screened for completeness at intake. Applications that are deemed incomplete by the Permit Technicians are returned to the applicant through the [MyBuildingPermit.com](https://mybuildingpermit.com) portal with a request to include the needed information. If the application is accepted by a Permit Processing technician, and deemed incomplete by any of the reviewers within 28 days of submittal, the application will be labeled “incomplete” in the permit tracking system and the applicant will be sent a revision request for the needed information. No further review will be done by any of the reviewers until the requested information is submitted to a Permit Processing technician through the [MyBuildingPermit.com](https://mybuildingpermit.com) portal. If the permit application is not deemed incomplete within 28 days of application submittal, it will be considered complete.

CG3-01.4: REQUEST FOR DEVIATION FROM CLEARING & GRADING DEVELOPMENT STANDARDS

A deviation from the requirements of these standards may be considered by the City for a project design if there are extreme difficulties involved in carrying out the provisions of these standards. A written modification request that addresses the criteria set forth in these standards must be submitted to the project reviewer. The written request must be made on the [Alternate Materials, Methods, or Modifications Request Form](#), and must include plans that are completed by the project design engineer.

The request for deviation from clearing and grading development standards must meet all of the following criteria:

1. The deviation is in conformity with the intent and purpose of the clearing and grading code and development standards;
2. Such deviation provides equivalent environmental and public safety protection; is in the overriding public interest; and meets the objectives of safety, function, and environmental protection;
3. The granting of the deviation will not be detrimental to the public health and welfare, and will not create adverse impacts to nearby property, slopes, water bodies, and surrounding environmental systems; and
4. The deviation provides the least possible deviation from the requirements of the clearing & grading code and other city codes.

The following information must be included on an [Alternate Materials, Methods, or Modifications Request Form](#) to request a deviation from clearing and grading development standards:

1. Clearly identify the specific sections and requirements of the development standards to be modified;
2. Describe the design proposed to mitigate impacts created by the deviation; and
3. Submit all relevant review information, such as preliminary approval conditions, vicinity maps, photographs, engineering plans, or sketches to illustrate the impact of applying the deviation to the project through the [MyBuildingPermit.com](https://mybuildingpermit.com) portal

CG3-02: Plans & Drawings

CG3-02.1: GENERAL

Plans and drawings submitted for review must be in accordance with the City's "Standards for Plans & Drawings" requirements. These requirements are available at the [MyBuildingPermit.com](#) website. Plans that may be required include:

- Boundary & topographic survey
- Site plan B
- Construction Storm Water Pollution Prevention Plan (CSWPPP) [Short Form](#) or [Long Form](#)
- Clearing & grading and erosion and sedimentation control (ESC) plan
- Road plan
- Final landscape plan
- Street lighting plan
- [Turbidity and pH monitoring plan](#)

For each of these plans or drawings, the City provides submittal requirements that describe in detail what information must be provided. These submittal requirements are available on the website at on the [Forms and Publications page](#).

CG3-02.2: COMBINING PLANS

The site plan identified for the permit should be used as the underlying base map for the clearing & grading plan and the ESC Plan. The site plan, clearing & grading plan, ESC plan, and the tree protection plan can be combined on one sheet for smaller projects, provided the elements of each plan can be easily read. For larger projects, the site plan is on a separate sheet and the clearing & grading, ESC plans, and the tree protection plan are combined on a single sheet. If the project is large and complex, the clearing & grading, ESC plans, and the tree protection plan are on separate sheets.

CG3-03: Written Reports and Plans

CG3 - 03.1: CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN (CSWPPP)

All new development and redevelopment projects are responsible for preventing erosion and discharge of sediment and other pollutants into receiving waters. A Construction Stormwater Pollution Prevention Plan (CSWPPP) is required for all projects that meet the thresholds for permitting in section 23.76.035 of the clearing and grading code. The CSWPPP must be implemented beginning with initial soil disturbance and until final stabilization. Sediment and Erosion control BMPs shall be consistent with the BMPs contained in these standards.

The CSWPPP must include a narrative, drawings, and a turbidity and pH monitoring plan. The required elements of a CSWPPP are described below in Section CG7, Construction Stormwater Pollution Prevention. All BMPs must be clearly referenced in the narrative and marked on the drawings, and a copy of the referenced BMPs must be included in the CSWPPP. The CSWPPP narrative shall include documentation to explain and justify the pollution prevention strategies made for the project. Permitted clearing and grading areas and any other areas required to preserve critical or sensitive areas, buffers, native growth protection easements, or tree retention areas as may be required by the city, must be delineated on the site plans.

Appendix A, CSWPP Planning details the required content of a CSWPPP.

Appendix C provides links, forms and documents to be used for the CSWPPP preparation. For projects that involve clearing less than 7,000 square feet and grading less than 1500 cubic yards, the CSWPPP may consist of a completed [CSWPPP Short Form for Small Construction Projects](#) and a site plan that includes ESC.

The requirement for a turbidity and pH monitoring plan may be waived by the Director, depending on site characteristics, such as topography, soil type, proximity to receiving waters, retention of vegetation, extent of land disturbing activities, or location of critical areas and critical area buffers.

GC3-03.2: GEOTECHNICAL REPORT

A geotechnical report must be submitted with most clearing & grading and building permit applications. A [geotechnical report and stability analysis requirements](#) are included in the submittal requirements. The sheet explains when a geotechnical report is required and what must be included in the report.

Geotechnical report submittal requirements may be waived or modified only by a clearing and grading reviewer or land use planner on behalf of the Director. City reviewers may also require additional geotechnical information submittals during permit review.

Applicants for single family clearing and grading permits that require a site geotechnical report or letter may submit the report for the associated plat or short plat unless specific information regarding the parcel and the proposal is required by the plat conditions or the DSD reviewer.

A new geotechnical report may not be required for a clearing and grading permit application if a prior geotechnical report (no more than 5 years old) for the project on the same property is provided. For projects where the geotechnical report is more than 5 years old and for sites where the original project has changed, the clearing and grading reviewer may require a letter from the geotechnical engineer. The letter must state that the recommendations and conclusions in the report are relevant to the current proposed project, and/or provide additional information as needed.

Geotechnical Report Addendum:

If the original geotechnical report for a proposed project was a “preliminary” geotechnical report, an addendum to the preliminary report must be submitted to the clearing and grading reviewer before the permit can be issued. The geotechnical engineer must review the latest revision to the clearing and grading plans and prepare the geotechnical report addendum that includes:

1. **New site information** discovered since the date of the preliminary report;
2. **Verification** that the proposed project is designed following the recommendations in the preliminary geotechnical report;
3. **Revised recommendations** for construction, based on any new information; and
4. The addendum report must be **stamped with the engineer’s professional seal and signed**.

Geotechnical Construction Summary Report

A summary report is required if construction monitoring is provided by the geotechnical engineer. The Geotechnical Construction Summary Report must include:

1. Description of the construction techniques used;
2. Compaction test results and the results of any analyses of the materials that were used;
3. A description of any conditions found in the field that varied from conditions as described in initial geotechnical reports and how the variations affected the project;
4. A comparison of the previously approved plans with the as-built improvements;
5. Other information which may be deemed pertinent by the geotechnical engineer, the clearing and grading reviewer or the clearing and grading inspector; and construction summary reports must be submitted to the clearing and grading inspector prior to the issuance of any Certificate of Occupancy, or final approval by the inspector.

CG3- 03.3: TURBIDITY & PH MONITORING PLAN

Turbidity and pH monitoring is required for all projects with land disturbing activities over 7,000 square feet, unless waived by the clearing and grading reviewer on behalf of the Director. The turbidity and pH monitoring plan must be included in the CSWPPP and must include the elements presented in the [Turbidity and pH Monitoring Requirements](#) and are included in the submittal requirements.

CG3-04: Application Forms and Other Documents

CG3- 04.1: APPLICATION FORMS

Forms required for a complete application may include, but are not limited to, the Application form and "Bill To" form. These forms are available on the city's Forms and Publications page for each application type.

CG3- 04.2: RIGHTS OF ENTRY AND CONSTRUCTION EASEMENTS

Rights-of-entry or temporary or permanent construction easements may be necessary if clearing and grading and construction is planned on easements or on adjacent properties. Copies of all rights-of-entry or offsite construction easements must be submitted to the clearing and grading reviewer prior to the approval of any clearing and grading permit.

Erosion and sedimentation control must be included on the ESC plans for all off-site work, including utility installation in the ROW.

CG3- 04.3: ABATEMENT SECURITY

An abatement security device is collected for permitted clearing and grading projects to correct or eliminate problems related to earth or water resources, either on or off-site, caused by project clearing and grading. An abatement security device is required for all projects that are not individual single-family homes and that involve more than 5,000 square feet of clearing and/or more than 250 cubic yards of excavation and/or fill. In addition, the Director may require an abatement security device for other projects, including individual single-family homes, that can cause problems related to earth and water resources such as erosion and sedimentation or slope instability. The abatement security device must be established and an original of the signed forms must be submitted to the clearing and grading reviewer before the permit can be issued.

The amount of the abatement security device, usually in the form of an assignment of savings, an irrevocable letter of credit, or a bond, is determined by the clearing and grading reviewer, usually based on an [estimate of the erosion control](#) value of the erosion and sediment control BMPs provided by the applicant or the applicant's engineer.

If the City finds it necessary to expend all or part of the abatement security device for corrective work, a stop work order will be issued, prohibiting any additional work until the permittee re-establishes the original amount of the abatement security.

The City will release the abatement security once final clearing and grading approval has been given. Interest from any interest-bearing form of the abatement security device will accrue to the depositor.

CG3-05: Professional Qualifications

City of Bellevue codes contain minimum standards for professional licensing or certification of engineering, design, and environmental disciplines. The following requirements apply to clearing and grading permit applications.

CG3- 05.1: ENGINEERING

Civil Engineer

Plans for clearing, grading and erosion control shall be prepared and signed by a professional Civil Engineer (PE), licensed in the State of Washington, who has significant professional experience and education in the design of grading, erosion and drainage control, and site development.

Plans prepared for a Single Family Building Permit are generally exempted from the professional engineering requirement. A clearing and grading reviewer will be able to answer questions regarding engineering requirements.

Engineering Geologist

An Engineering Geologist must be licensed by the State of Washington in the specialty of engineering geology. The Engineering Geologist may provide stand-alone designs for cuts, fills, roads, trails, utilities, rockeries and modular block walls.

Geotechnical Engineer

The Geotechnical Engineer must be a professional Civil Engineer (PE), licensed in the State of Washington, and qualified by experience and education in the practice of geotechnical engineering. The applicant must designate the engineer the Geotechnical Engineer of Record for the project.

Change of Engineer

If the Civil Engineer or the Geotechnical Engineer of Record is changed by the applicant during permit application review, the applicant must submit the name and firm of the new engineer in writing to the clearing and grading reviewer. If the Civil Engineer or the Geotechnical Engineer of Record is changed by the applicant during construction, the permittee must submit the name and firm of the new engineer in writing to the clearing & grading reviewer and to the clearing & grading inspector.

CG3-05.2: LANDSCAPE DESIGN

Landscape designs required under the LUC (20.20.520.D) must be executed by a registered Landscape Architect, Washington Certified Nurseryman, or Washington Certified Landscaper.

CG3-05.3: CERTIFIED EROSION AND SEDIMENT CONTROL LEAD (CESCL)

The project certified erosion and sediment control lead (CESCL) must be certified as described in Appendix B, Standards and Specifications for Best Management Practices, BMP CI60, Conditions of Use.

CG3-05.4: ARBORIST

Project arborists must be certified by the International Society of Arboriculture (ISA).

CG3-05.5: OTHER PROFESSIONALS

For professions for which there is no license or certification, a qualified professional is a person who meets the definition in LUC 20.50.042

CG4-01: Associated Permits and Approvals

Clearing and grading permits can generally be issued only in conjunction with, or as part of, one or more permits or approvals. Section 23.76.040.A of the clearing and grading code describes which permits and/or approvals must accompany a clearing and grading permit. Section 23.76.040.B. describes the criteria where a clearing and grading permit can be issued without an accompanying permit or approval.

CG4-01.1: LAND USE APPROVALS

Land Use approvals associated with a clearing and grading permit generally must be issued before the clearing and grading permit can be issued. Land use approvals include the following:

- Design Review
- Conditional use permit
- Planned unit development approval
- Preliminary plat or short plat approval
- Critical Areas land use permit
- Shoreline conditional use permit
- Shoreline substantial development permit
- Shoreline management exemption
- Temporary use permit
- Variance

CG4-01.2: CONSTRUCTION PERMITS

A clearing and grading permit may be issued before an associated building permit is issued provided that a complete and valid building permit application has been submitted. For demolition of a building where clearing grading is required, the demolition permit must be issued before or concurrently with the clearing and grading permit.

Other permit approvals are often required before the clearing and grading permit can be issued or before construction can commence. Additional construction permits that may be required include, but are not limited to, the following:

1. Building, Land Use, and Clearing & Grading Permits
 - Clearing and grading permits for stockpiling, mobilization, or preloading
 - Building department permits for demolition, accessory structure (vaults/walls) or shoring
 - Land use permits for off-site construction parking, staging, or stockpiling (temporary use permit)
2. Transportation Permits
 - Valid right-of-way use permit application for haul routes, if required, must be submitted before the clearing and grading permit can be issued.
3. Utility Permits
 - A utility permit is required for abandonment, construction, and connection of utilities.
 - A utility system extension agreement must be submitted concurrently with the clearing and grading permit application.

CG4-01.3 PERMITS FROM OTHER JURISDICTIONS

The applicant is responsible for determining whether it is necessary to obtain Federal, State and County permits, and for obtaining these permits from the appropriate jurisdiction.

A copy of the conditions of approval for permits issued by other governing agencies may be required by the clearing and grading reviewer prior to clearing and grading permit approval.

Below is a list of common outside permits or approvals that apply to construction projects. Others may also apply.

Forest Practices Approval (issued by DNR)

Approval to discharge construction stormwater to sewer (issued by King County) Joint Application for Hydraulic Project Approvals (HPA) (issued by DFW)

Approval for use of chemical treatment BMPs (issued by DOE) Shoreline Management Permits

Exceedance of Water Quality Standards Approvals Water Quality Certifications National Pollutant Discharge Elimination System (NPDES) Permit (issued by DOE) Removal or abandonment of any underground storage tanks

Well abandonment (issued by King County)

CG4-02: Vesting and Expiration of Permits and Applications

CG4-02.1: PROJECTS REQUIRING ONLY CLEARING AND GRADING PERMITS.

1. Vesting Date. An application for an independent clearing and grading permit, pursuant to BCC 23.76.040, shall vest to this chapter, Chapter 24.06 BCC, now or as hereafter amended, and the corresponding development and engineering standards, on the date that a complete clearing and grading permit application is submitted consistent with the requirements of BCC 23.76.035(E), now or as hereafter amended.
2. Expiration of Permit Application.
 - a) Before Issuance. An application for clearing and grading permit shall expire as follows:
 - i) An application for a clearing and grading permit for which no permit is issued within one year following the date of application shall expire by limitation and plans and other data submitted for review may thereafter be returned to the applicant or destroyed in accordance with state law. The director may, prior to expiration, extend the time for action by the applicant for a period not exceeding 180 days.
 - ii) An application for a clearing and grading permit may be canceled for inactivity if an applicant fails, without reasonable justification, to respond to the department's written request for revisions or corrections within 90 days. The director may extend the response period beyond 90 days if the applicant provides and adheres to a reasonable schedule for submitting the full revisions.
 - iii) In addition to the extension allowed in subsections (A)(2)(a)(i) and (A)(2)(a)(ii) of this section, the director may extend the life of an application if any of the following conditions exist:
 - (1) Compliance with the State Environmental Policy Act is in progress; or

- (2) Any other city review is in progress; provided the applicant has submitted a complete response to city requests or the director determines that unique or unusual circumstances exist that warrant additional time for such response, and the director determines that the review is proceeding in a timely manner toward final city decision; or
 - (3) Litigation against the city or the applicant is in progress, the outcome of which may affect the validity or the provisions of any permit issued pursuant to such application.
 - iv) In no event may the director extend the application for a period of more than 180 days following the conclusion of the applicable condition described in this subsection.
3. Expiration of Permit.
- a) The clearing and grading permit shall expire as follows:
 - i) The permit shall expire if the authorized work is not begun within one year from the date of permit issuance, or if work is abandoned for over 180 days.
 - ii) If the authorized work is continually performed, the permit shall expire one year from the date of issuance unless a different time frame is specified on the permit or an extension is granted. Two one-year extensions may be granted by the director; provided, that conditions which were relevant to issuance of the permit have not changed substantially and no material detriment to the public welfare will result from the extension.
4. Expiration of Vested Status.
- a) If the clearing and grading permit application expires pursuant to subsection (A)(2) of this section or is otherwise canceled, the vested status of the clearing and grading permit application shall expire on the date of expiration or cancellation.
 - b) If the clearing and grading permit is revoked pursuant to BCC 23.76.175, now or as hereafter amended, expires pursuant to subsection (A)(3) of this section or is otherwise canceled, the vested status of the clearing and grading permit shall expire on the date of revocation, expiration, or cancellation.

CG4-02.2: PROJECTS REQUIRING PRIOR DISCRETIONARY LAND USE PERMIT OR APPROVAL.

1. Vesting Date. The vesting date for a clearing and grading permit requiring a prior discretionary land use permit or approval is contingent on the level of engineering detail provided by the applicant as described below:
 - a) Engineering Details Provided. For applicants that satisfy the submittal requirements of the director specified in BCC 23.76.035(E), and also satisfy the storm and surface code submittal requirements for site development engineering, the vesting date to this chapter, Chapter 24.06 BCC, and the corresponding development and engineering standards is the date of issuance of the discretionary land use decision.
 - b) Conceptual Details Provided. For applicants that choose not to provide submittal requirements for site development engineering, the vesting date to this chapter, Chapter 24.06 BCC, and the corresponding development and engineering standards is

the date that a complete building permit application is submitted consistent with the requirements of BCC 23.05.090(E), now or as hereafter amended.

2. Expiration of Permit Application

- a) An application for a clearing and grading permit shall expire pursuant to subsection (A)(2) of this section

3. Expiration of Permit.

- a) The clearing and grading permit shall expire pursuant to subsection (A)(3) of this section.
- b) For projects requiring building permits, the life of the clearing and grading permit shall be automatically extended for the life of the building permit.

4. Expiration of Vested Status.

- a) Clearing and Grading Permit Vested with a Discretionary Permit or Approval. The vested status of a clearing and grading permit with a vesting date established pursuant to subsection (B)(1)(a) of this section shall run with the vested status of the underlying land use permit or approval and expire pursuant to the terms of LUC 20.40.500, now or as hereafter amended.
- b) Clearing and Grading Permit Vested with a Complete Building Permit Application. The vested status of a clearing and grading permit with a vesting date established pursuant to subsection (B)(1)(b) of this section shall expire as follows:
 - i) Before Building Permit Issuance. The vested status of the clearing and grading permit shall run with the vested status of the building permit application and expire pursuant to the terms of BCC 23.05.090(H), now or as hereafter amended.
 - ii. After Building Permit Issuance. The vested status of the clearing and grading permit shall run with the vested status of the issued building permit and expire pursuant to the terms of BCC 23.05.100(E), now or as hereafter amended. The vested status of the clearing and grading permit shall be automatically extended for the life of the building permit. If the building permit expires, or is revoked or canceled pursuant to BCC 23.05.100, now or as hereafter amended, or otherwise, then the vested status of a clearing and grading permit shall also expire, or be revoked or canceled.

CG4-02.3: PROJECTS REQUIRING BUILDING PERMITS AND NO PRIOR DISCRETIONARY LAND USE PERMIT OR APPROVAL.

- 1. Vesting Date. A clearing and grading permit for a project that requires building permits and no prior discretionary land use permit or approval shall vest to this chapter, Chapter 24.06 BCC, and the corresponding development and engineering standards on the date that a complete building permit application is submitted consistent with the requirements of BCC 23.05.090(E), now or as hereafter amended.
- 2. Expiration of Permit Application.

- a) An application for clearing and grading permit shall expire pursuant to subsection (A)(2) of this section.
- 3. Expiration of Permit.
 - a) The clearing and grading permit shall expire pursuant to subsection (A)(3) of this section.
 - b) The life of the clearing and grading permit shall be automatically extended for the life of the building permit.
- 4. Expiration of Vested Status.
 - a) Before Building Permit Issuance. The vested status of the clearing and grading permit shall run with the vested status of the building permit application and expire pursuant to the terms of BCC 23.05.090(H), now or as hereafter amended.
 - b) Post Building Permit Issuance. The vested status of the clearing and grading permit shall run with the vested status of the issued building permit and expire pursuant to the terms of BCC 23.05.100(E), now or as hereafter amended. The vested status of the clearing and grading permit shall be automatically extended for the life of the building permit. If the building permit expires, or is revoked or canceled pursuant to BCC 23.05.100, now or as hereafter amended, or otherwise, then the vested status of a clearing and grading permit shall also expire, or be revoked or canceled.

Chapter CG5 – Standards for Clearing & Grading

CG5-01: General

Clearing & grading within the City of Bellevue is subject to the requirements and restrictions in these standards, the clearing and grading code, and all other applicable City of Bellevue codes. Land disturbing activities that require a clearing and grading permit are listed in Section Chapter CG2, Permit Requirements. Projects that do not meet these thresholds are subject to the above-mentioned codes, but are not subject to the review and inspection associated with larger projects.

Vegetative cover plays an extremely important role in controlling erosion on construction sites. In most cases, existing, natural vegetation provides the greatest protection of soil surfaces from erosive forces. Grading can have adverse effects on the environment by loosening of soil and making it more susceptible to erosion, changing drainage patterns, possibly reducing the stability of slopes, and creating an inhospitable environment for new plant growth through removal of organic material and compaction.

Bellevue's Comprehensive Plan policies seek to preserve and maintain natural vegetation and existing grades, where possible, for erosion and sedimentation control and water quality and quantity control. As such, clearing and grading for other than approved development proposals is generally prohibited.

CG5-02: Preserving Natural Vegetation

Preserve existing vegetation on sites in areas where no construction activity is planned or will occur at a later date. BMPs C101, C102, C103 and C104 provide methods of preserving and protecting vegetation that will provide erosion and sediment control during construction. Areas where vegetation is to be preserved must be shown on the ESC plan.

CG5-03: Clearing and Grading Around Trees to be Preserved

The City of Bellevue Land Use codes require that trees be retained, replaced or planted as a condition of approval on many development projects. Trees and natural vegetation are required to be preserved for several reasons, including maintaining the urban forest, reducing stormwater runoff and erosion, providing habitat for wildlife, and for aesthetic reasons.

Trees can be impacted during construction and often the damage is not seen for several months or years after construction. Any tree previously required to be retained or planted pursuant to any provision of the Bellevue City Code or Land Use Code shall be retained unless it constitutes a hazardous tree.

To assure proper tree protection during construction the limits of clearing must be marked and established in the field prior to any clearing. Markings shall be retained until final inspection, unless otherwise allowed by the inspector.

A tree protection plan shall be incorporated into the clearing and grading drawings. The tree protection plan shall define spatial limits for tree protection and include detailed drawings of

tree protection and mitigation. The plan must be prepared by a Qualified Tree Professional and should become part of all construction documentation. Tree protection methods shall follow BMP T 101 and be installed prior to initial Clearing and Grading inspection and retained until final inspection, unless otherwise allowed by the inspector. To ensure compliance with the tree protection plan during clearing or grading, the Director may require a report from the Qualified Tree Professional that prepared the tree protection plan confirming whether, during clearing or grading, tree protection methods were employed consistent with the tree protection plan.

When clearing activity is interrupted or suspended for any reason, the permittee shall stabilize the site and maintain the erosion control BMPs consistent with BCC 23.76.090 and the clearing and grading development standards, now or as hereafter amended. If the city deems a site to be an abandoned construction site, the applicant or permittee shall install permanent erosion and sedimentation measures pursuant to BCC 23.76.090.F.

When any significant tree or landmark tree that is not subject to the requirements of LUC 20.20.900, Part 20.25H LUC, or Part 20.25E LUC is proposed for removal, the following rules apply:

1. Annual Replanting Threshold for Residential Land Use Districts. The following standards apply only to sites located fully or partially within the R-1, R-1.8, R-2.5, R-3.5, R-4, R-5, R-7.5, R-10, R-15, R-20, and R-30 land use districts established under Chapter 20.10 LUC.
 - a) Table 23.76.060.G sets the number, based on site size, of significant trees or landmark trees that may be removed from a site during any continuous 12-month period without requiring any replacement planting under subsection G.2 below.
 - b) During any continuous 12-month period, any removal of a significant tree or landmark tree in excess of the annual replanting threshold specified in Table 23.76.060.G for the site requires replacement planting pursuant to subsection G.2 below.
 - c) During any continuous 12-month period, any removal of significant trees or landmark trees that would not exceed the annual replanting threshold specified in Table 23.76.060.G for the site, but would result in the number of significant trees or landmark trees remaining on the site following removal to be less than or equal to the corresponding number specified on Table 23.76.060.G for the site, then replacement planting pursuant to subsection G.2 is required.
 - d) Removal of a hazardous tree does not count toward the annual replanting threshold for a specific site.

Table 23.76.060.G. Residential Tree Removal Allowances Without Replacement

Site Size	Annual Replanting Threshold	Significant or Landmark Trees Remaining on the Site
Up to 10,000 square feet	Removal of 1 landmark tree or 2 significant trees	2
10,001 to 20,000 square feet	Removal of 1 landmark tree or 3 significant trees	3
20,001 to 40,000 square feet	Removal of 1 landmark trees or 4 significant trees	4
40,001 square feet or greater	Removal of 1 landmark trees or 4 significant trees	8

2. Replanting Requirements. Except as otherwise provided in subsection G.1, any removal of a significant tree or a landmark tree requires replanting in accordance with the following standards.
 - a) Replacement Tree Minimum Standards. Each replacement tree shall be single-stemmed and a minimum of two inches caliper (for deciduous trees) or single-stemmed and six feet in height (for conifer trees).
 - b) For each significant tree requiring replacement, the permittee shall plant one replacement tree on the site. For each landmark tree requiring replacement, the permittee shall plant either three replacement trees, or two large conifer species trees approved by the Director, on the site.
 - c) Hazardous Trees. Replacement requirements do not apply to any hazardous tree except when required to maintain any applicable landscaping standards, including but not limited to LUC 20.20.520.
 - d) Adequate Tree Density. The number of replacement trees required to be planted on the site may be reduced by the Director if the permittee demonstrates that the site will still meet the applicable minimum tree density provided in LUC 20.20.900.E and any other applicable landscaping standards, including but not limited to LUC 20.20.520.

CG5-04: Protection of Soils for On-Site Stormwater Management

On-site stormwater management can include several stormwater BMPs that use the native soils for infiltration, dispersion, and retention of stormwater. Such BMPs include bioretention, pervious pavement, and amended soils. These BMPs are designed using, among other variables, the measured infiltration capacity of site soils. Soil infiltration capacity can be adversely affected during construction from compaction of the soil and clogging from sediment; therefore, care must be taken to protect native soils in areas where on-site stormwater BMPs are to be constructed. These areas must be shown on the ESC plan, and appropriate erosion and sediment control methods must be included in the CSWPPP. BMPs C101, C102, C103, C104 and T101 may be appropriate for providing erosion and sediment control for on-site soils. Completed on- site stormwater facilities must also be protected until the site is stabilized.

CG5-05: Clearing and Grading for Plats and Short Plats

Section 23.76.040 of the clearing and grading code limits land disturbing activities under permits issued for preliminary plat or short plat approvals to infrastructure construction only, and does not allow for clearing or grading of building sites. Section 23.76.042 of the clearing and grading code allows the Director to approve clearing of building sites, provided certain criteria are met. The criteria are listed in section 23.76.042.A. For approval to clear building sites during plat infrastructure construction, a written request must be sent to the clearing and grading reviewer during review of the clearing and grading permit application.

CG5-06: Grading Adjacent to Sensitive and Critical Areas

Heavy equipment is not allowed in buffers for wetlands, streams, and slopes unless approved in advance by DSD. Constructed slopes must be graded and compacted in a manner that protects adjacent sensitive and critical areas during and after construction. On the clearing and grading plans and on the ESC plan, the applicant must show the dimensions for construction access that will be used to construct proposed walls, rockeries, and roadway embankments located adjacent to sensitive and protected areas. Include these access areas in the disturbance limits for the project.

CG5-07: Grading Around Structures

Final site grading must direct drainage away from all building structures, as directed by the IBC or the IRC.

CG5-08: Excavation and Filling

All movement of earth materials must be done in a manner that will minimize erosion and sedimentation. Soil stockpiles, exposed slopes, and disturbed areas must be covered in accordance with BMP C123. Excavation and filling are limited to the area inside of the grading limits that are shown on the approved clearing and grading permit plans.

CG5-09: Engineered Fill and Reinforced Fill

Engineered fill and reinforced fill must be placed and compacted as specified by the project geotechnical engineer. During construction, the compacted soils must be monitored and/or tested by the geotechnical engineer. The monitoring and/or testing must include an evaluation of the subgrade onto which the fill is to be placed; evaluation and approval of fill soil type, moisture content and lift thickness; placement of reinforcing elements; and moisture and density testing.

The engineer's field testing reports must be submitted to the clearing & grading inspector daily. Areas of engineered and/or reinforced fill must be shown on the grading plans.

CG5-10: Soil Amendments

Cement kiln dust (CKD) may not be used as a bulking agent for site dewatering, for stabilizing or lowering the moisture content on-site or fill soils. Cement may be used if appropriate pH testing is conducted, water treatment is provided as needed to meet water quality standards, and dust control is implemented during cement application and mixing. Cement treatment must be approved by the clearing and grading reviewer before cement application.

If polymers are to be added to soils to prevent dust or to control erosion, approval must be obtained from the Washington State Department of Ecology (Ecology). Runoff from polymer treated areas must be collected in a sediment pond. The effluent must be tested and treated before being released to the storm drain or to the sanitary sewer.

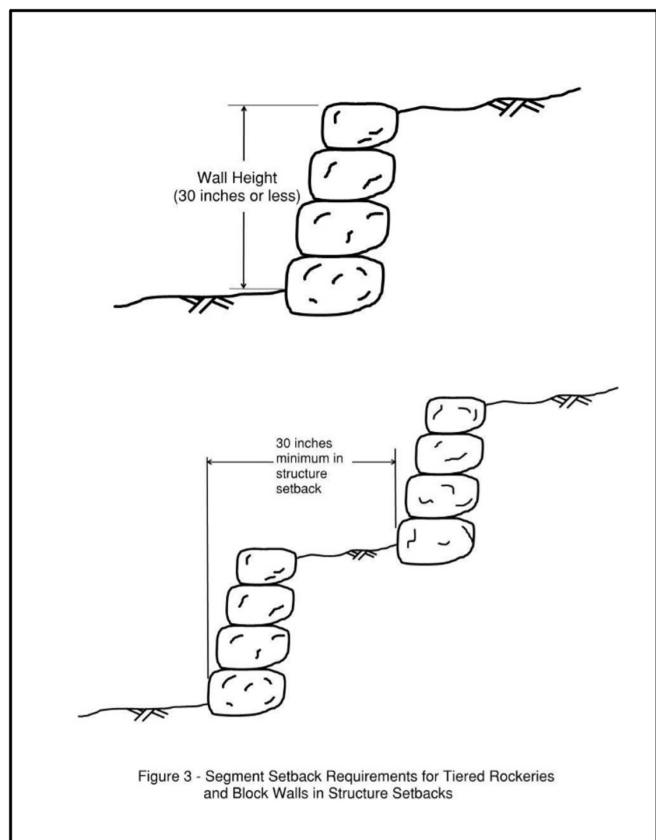
CG5-11: Rockeries And Modular Block Walls

CG5-11.1: GENERAL

Rockeries and modular block walls are treated similarly with respect to height, permit requirements, drainage, and setback requirements. Rockeries and modular block walls over 30 inches in height are considered structures in the Land Use Code and are; therefore, not allowed in structure setbacks (LUC 20.20.025. D.). An exception is allowed if there is no feasible alternative to location or height, based on the existing grade. For determining wall height in setbacks, walls are measured from finished grade to the top of the rockery or modular block wall. Where rockeries or modular block walls are stepped or tiered in a structure setback, there must be at least 30 inches of separation between the segments. The separation must be measured from the face of one rockery at its base at grade to the face of the next rockery at its base at grade (see Figure 3).

GC 5-11.2: ROCKERIES

Rockeries or rock walls serve as a protective facing against an exposed cut soil face in native soils or as a protective system against the face of engineered fill or reinforced fill. Rockeries are not considered to be retaining walls, and, as such, are not allowed where the soil face is uncontrolled fill over 4 feet in height. In no case are rockeries allowed to exceed 12 feet in height. Rockeries over 4 feet in height are required to be designed by a geotechnical, civil, or structural engineer and must include a wall drain. The locations of rockeries must be shown on the grading plan and must include the top and bottom elevations at the ends, the midpoint and at the maximum height.



CG5-11.3: MODULAR BLOCK WALLS

Modular block walls are walls constructed of manufactured concrete units acting as a protective facing for an exposed soil face, as a facing for a reinforced soil mass, or as gravity retaining walls. Modular blocks are manufactured in two general sizes; small blocks, such as Keystone® and Allan Block®, which typically weigh less than 120 pounds, and large blocks such as Lock-Block® and Redi-Rock™ where the standard units weigh between 1,000 and 5,000 pounds. Large blocks are commonly referred to as ecology blocks.

The safe height of modular block walls, when used as a protective facing for exposed soils (cut face in native soils or engineered fill), is limited because the soil pressure tends to push the wall over. The safe height of an unreinforced modular block wall depends on the size and weight of the blocks, the batter of the wall face, and the properties of the protected soil. In any case, all modular block walls over 4 feet in height must be designed by a geotechnical, civil, or structural engineer and must include a wall drain.

Modular blocks can also be used in conjunction with soil reinforcement to create a reinforced soil retaining wall. In this case, the reinforced soil acts as the retaining mass, and the blocks act as a protective facing that is attached to the soil mass by the reinforcing elements (typically geogrids). These walls are generally over 4 feet in height and must be designed by a geotechnical, civil, or structural engineer and must include a wall drain.

Large blocks can be configured to form a gravity retaining wall using the mass of the blocks alone (no soil reinforcing). In this case, walls 3 blocks or more in height require a building permit and are regulated under the requirements of the current building codes (IBC or IRC). Large block walls less than 3 blocks high, and large block walls over 4 feet in height with soil reinforcing, are reviewed under a clearing and grading permit.

CG5-12: Wall Drains

Wall drains are required to be installed behind retaining walls, rockeries, rock walls or modular block walls over 4 feet in height to collect water moving through the soil or rock. The purpose of the drain is to prevent water from building up behind the structure and causing excessive hydrostatic pressures that may result in failure of the structure. A wall drain typically consists of a minimum 4-inch diameter perforated pipe bedded in washed rock and located at the base of the rockery or wall. If a collection pipe is used, it must discharge to an appropriate drainage location. A wall drain can also be designed to use granular material without a collection pipe; however, it must provide sufficient relief of hydrostatic pressure and it must discharge to a location that does not cause damage to nearby property. Wall drains must be included in the rockery or wall design provided by the geotechnical, civil, or structural engineer. The location of all wall drains and their point of discharge must be shown on the clearing and grading plans.

CG5-13: Temporary Shoring

Temporary shoring for the protection of existing utilities, roadways or adjacent structures may be necessary during construction. Design and construction of temporary shoring must meet the requirements and standards of the IBC. Shoring locations and details must be shown on the clearing & grading plans.

CG5-14: Blasting

Use and storage of explosive materials requires a permit from the Bellevue Fire Department, and is also subject to restrictions in the COB Noise Ordinance. Coordinate with the clearing & grading inspector and the clearing and grading reviewer a minimum of one week prior to the proposed blasting. Notification of the adjacent property owners may be required.

CG5-15: Bulkheads

A bulkhead is a wall or embankment adjacent to a water body used for holding back earth. A “normal protective” bulkhead is constructed at or near the ordinary high water mark to protect a single-family residence and is for protecting land from erosion. A bulkhead cannot be constructed for creating land. Where an existing bulkhead is being replaced, it cannot be constructed further waterward of the existing bulkhead than is necessary for construction of new footings. Design and location of bulkheads must conform to the LUC Shoreline Overlay District (20.25E) requirements.

CG5-16: In-Water Work

Anyone who plans to conduct any construction activity that will use, divert, obstruct, or change the natural flow or bed of state waters must do so under the terms of an HPA permit issued by the Washington Department of Fish and Wildlife. An HPA permit normally specifies a window of time to complete the work, called a “fish window,” to minimize the impact on fish residing in or migrating through the work area. In-stream work may require that a stream by-pass be installed to route the stream around the work area during construction. Shoreline work typically requires a silt curtain to separate the work area from other areas of the lake and minimize the spread of sediment that becomes suspended by the activity in the lake.

In-water work will also typically require permits from the City of Bellevue. Required permits include a land use approvals, such as a shoreline or critical areas permits; a clearing and grading permit; and possibly a building permit if a structure, such as a dock or pier, is included in the project.

CG5-17: Drains

Drains covered under this section include the underground portions of downspout drains, yard drains, retaining wall drains; French drains, interceptor drains, and footing (foundation) drains where these drains are not covered under the Bellevue Utilities Surface Water Engineering Standards or the City of Bellevue plumbing code (BCC 23.60).

Pipes for the drains covered in this section must be smooth wall polyethylene (PE) meeting ASTM F810 or a more durable standard, or smooth wall polyvinyl chloride (PVC) meeting ASTM D2729 or a more durable standard. Use of corrugated HDPE pipe is not permitted due to difficulty with cleaning and problems with buckling, crushing and cracking. Pipes must be a minimum of 4 inches in diameter with cleanouts at 50' intervals, and at all changes of direction totaling 135 degrees or more. Pipe sections must be glued or secured with screws at the joints. If screws are used to secure the joints, each joint must have at least 3 screws (one at

the crown and one on each side of the pipe, at or above the spring line). The screws must be maximum ½-inch long, stainless or galvanized steel, and include flexible sealing washers (such as neoprene). The locations of all drains must be shown on the grading plan.

CG-17.1: SURFACE-WATER AND DOWNSPOUT DRAINS

Surface-water and downspout drains collect water from the ground surface or roof areas and convey it to an appropriate stormwater discharge location such as a rain garden, infiltration trench, municipal storm drain or other storm outfall. The pipes for these drains are solid (non-perforated), but may convey water from a perforated subsurface drain and/or may discharge to an outfall using a perforated pipe, such as in an infiltration trench or level spreader. Wherever a subsurface drain connects to a surface-water or downspout drain, the perforated portion of the pipe must be at least 1 foot vertically upgradient from the connection. Use outlet protection as necessary to reduce water velocity and prevent scour.

CG5-17.2: SUBSURFACE DRAINS

Subsurface drains collect water from below the ground and include footing (foundation) drains, wall drains, French drains, and interceptor drains. The purpose and use of these drains, excepting foundation drains and deep excavation drains, are described in BMP C205. Foundation drainage requirements for residences are provided in the IRC, Section R405.

Perforated sections of pipe must be installed with the holes down and must be bedded in washed gravel that is at least one sieve size larger than the size of the perforations in the pipe. Wherever a subsurface drain connects to a surface-water or downspout drain, the perforated portion of the pipe must be at least 1 foot vertically upgradient from the connection.

CG5-18: Underground Utility Lines

When constructing underground utility lines, no more trench should be opened than can be completed in a single day. Excavated material must be placed on the uphill side of the trench where consistent with safety and space considerations. Temporary trench dewatering devices must be discharged into a sediment trap or pond. Trenches must be filled at the end of each day unless otherwise allowed by the Director.

Generally, cable, gas, and electric utility installations within new plats are included in the plat infrastructure permit and the locations of the proposed utilities must be shown on the plat engineering plans. Installation of private utilities on a single-family lot for new home construction is included in the combination permit for the single family dwelling, and must be shown on the site plan.

A clearing and grading permit is required for installation of private utilities not connected with plat infrastructure construction or construction of a new building, if the installation involves clearing over 1,000 square feet and/or grading over 50 cubic yards. Clearing and grading approval for installation of underground utilities in the public right-of-way is required if the clearing and grading thresholds are exceeded. For utility installations that are entirely within the right-of-way, the clearing and grading approval can be included on the right-of-way use permit.

CG5-19: Restrictions On Clearing And Grading

CG5-19.1: TEMPORARY RESTRICTIONS

Rainy Season Restrictions

From October 1 through April 30, clearing and grading may be permitted to continue or to be initiated, only if the Director grants specific approval per Section 23.76.093.C. of the clearing and grading code. If a clearing and grading permit is issued and the city subsequently issues three stop work orders (or fewer as provided as a condition of the project permit) for insufficient erosion and sedimentation control, the permit will be suspended until the dry season. If the third violation occurs during the dry season, the permit will be suspended until weather conditions are favorable and effective erosion and sedimentation control is in place.

Suspension of Work

When clearing and grading is suspended during the rainy season or interrupted at any time of the year, due to heavy rain or for other reasons, the permittee must stabilize the site and maintain the erosion and sedimentation control BMPs

Heavy Rain

Clearing and grading, including hauling of fill or excavated material, may be temporarily stopped during periods of heavy rain. Heavy rain is defined as a rate greater than or equal to 0.03 inches per 6 minutes or 0.30 inches per hour

CG5-19.2: NOISE RESTRICTIONS

The City of Bellevue noise control ordinance applies to all commercial and multifamily construction and new single-family homes. Construction noise outside the allowable hours is prohibited per BCC 9.18.040. To be considered a violation, the construction-related noise must be audible across a property line or at least 75 feet from the source. Any violation is a civil noise infraction and the City may assess a monetary penalty to the individual creating the noise. A citation will be issued and a \$250 fine imposed on the first infraction.

Construction-related noise violations are called into 911. Reports of noise violations to the police department are communicated to the Code Enforcement Division and may result in a stop work order.

Construction-related noise **is allowed:**

7 a.m.-8 p.m. on weekdays

8 a.m.-6 p.m. on Saturdays

Construction-related noise **is not allowed:**

Outside of allowable hours, Sundays or the following holidays:

- New Year's Day
- Martin Luther King Day
- President's Day
- Memorial Day
- 4th of July
- Labor Day
- Veteran's Day

- Thanksgiving Day
- Day after Thanksgiving
- Christmas Day

CG5-20: Interruption, Suspension, or Abandonment of Work

If site work is interrupted or suspended, the permittee must stabilize the site and maintain the erosion and sediment control BMPs. Inspections must be conducted by the permittee on a regular basis and after each significant storm event. BMPs that are not functioning properly must be repaired, and additional BMPs must be installed as necessary to control erosion.

Any site where work has been abandoned must be stabilized with permanent erosion and sediment control. Any areas that are not covered by existing vegetation or permanent improvements such as buildings, parking lots, driveways, decks, walkways, and patios must be permanently stabilized. Permanent stabilization includes turf or sod (BMP C124), placing topsoil (BMP C125) followed by planting and/or seeding (BMP C120), installing permanent erosion control blankets or mats (BMP C122), mulching, or a combination of these practices that will result in permanent stabilization of the soil. Seeded areas must be stabilized using tackifier, turf reinforcement mats, mulch, hydromulch, or erosion control blankets/mats until the seed has established adequate cover to minimize erosion and remain stable during the wet season.

Permanent mulch must be limited to small areas with minimal slope and must be heavy enough to remain in place during successive wet seasons. Permanent mulch includes gravel and compost. Compost must be placed in a layer at least 4 inches thick. Wood based mulch, such as hog fuel, sawdust, and chipped wood should not be used as permanent erosion control except in very small areas. Straw is not to be used as permanent erosion control.

CG5-21: Post-Construction Soils

For sites that must comply with Minimum Requirement #5, as set forth in BCC 24.06.065, all soils in disturbed areas that have not been covered by impervious surface, incorporated into a drainage facility or engineered as structural fill or slope must be amended with organic matter. Amended soils must meet the specifications of BMP T5.13, as a part of permanent site stabilization.

Chapter CG6 – Slopes

CG6-01: General

Slope is defined as ground that forms a natural or artificial incline. For the purposes of these standards, slope is calculated using the percent method. Slope percent is defined as ‘rise divided by run’, or the ratio of the vertical grade change (the elevation change) to horizontal distance divided by one hundred. For example, a slope with a 10-foot elevation change over a 25-foot horizontal distance, has a 40% slope.

Constructed or artificial slopes are limited to a gradient of 50% unless a geotechnical engineering report and slope stability analysis is provided and shows that a factor of safety of at least 1.5 for static loads and 1.1 for dynamic loads can be met. Cut and fill slopes (temporary and permanent) must be set back from property boundaries as far as necessary to protect adjacent properties and to prevent damage.

CG6-02: Topography

Topographic surveys shall be stamped by a currently licensed Land Surveyor or the Civil Engineer of Record. Only the area proposed for or adjacent to the land alteration must be surveyed, however, the survey should extend at least 100 feet beyond the property boundaries if feasible. Slopes shall be measured based upon a current field or aerial topographic survey in 2-foot contour intervals accurate to within 1 foot of elevation.

CG6-03: Geotechnical Requirements

The geotechnical engineer must perform a preliminary review and evaluation of the stability of natural, temporary, and permanently constructed slopes on or adjacent to the property to be developed. If, in the opinion of the City, the review indicates that the stability of the slopes are reduced by the proposed development, or that the natural slopes may have a factor of safety of less than 2.0 in the static case or 1.5 in a dynamic (seismic) case, then the geotechnical engineer must perform additional, more detailed review and evaluation of the stability of the slope.

A more detailed review and evaluation is also required if the applicant proposes development on a steep slope, a landslide hazard area, the associated buffers or the associated structure setbacks. The standards for slope stability analysis are provided in the [Geotechnical Report and Stability Analysis](#) Submittal Requirements.

Once the City considers a slope stability study to be complete and accurate, the information within the report shall be considered the best available information until a new slope stability report for the area is completed.

CG6-04: Foundation Clearances From Slopes

Constructed slopes should be set back from buildings a sufficient distance to protect building foundations from slope drainage, erosion and shallow failure. Chapter 1805.4 of the International Building Code (IBC) provides clearance, setback and elevation requirements for foundations on or adjacent to slopes.

CG6-05: Slope Drainage

Cut slopes shall be provided with surface and subsurface drainage as necessary for permanent erosion control and stability. Any drains must be designed by a civil engineer and must discharge it at a location approved by the Director in consultation with the Bellevue Utilities department.

Chapter CG7 - Construction Stormwater Pollution Prevention

CG7-01: General

The purpose of this chapter is to provide guidance for complying with local, state, and federal environmental laws and for protecting water and earth resources, fish and wildlife habitat, and public health and safety from the potential adverse impacts associated with clearing and grading private and public land in the city. The erosion and sediment control BMPs include Chapters 3 and 4 of Volume II of the 2024 Stormwater Management Manual for Western Washington. (Ecology Manual) plus additional BMPs that reflect local regulations and practices. Appendix A of presents a step-by-step method for site planning and developing a CSWPPP. Appendix B contains BMPs for construction stormwater control and site management.

The Ecology Manual uses the terms “local permitting authority”, “local government” or “local permitting agency”. For these standards, those terms refer to the City of Bellevue.

CG7-02: Planning

Appendix A contains information consistent with Chapter 3 of Volume II of the Ecology Manual. Chapter 3 provides guidelines and procedures for developing a CSWPPP, including 13 elements to be considered in developing a CSWPPP. Requirements for the narrative and drawings are listed, and a worksheet is included to aid in developing the CSWPPP.

For projects that require a clearing and grading permit and that involve clearing of less than 7,000 square feet and grading less than 500 cubic yards, the City of Bellevue will allow a simpler [CSWPPP Short Form](#) consisting of a small project checklist and a site plan with a simple ESC plan.

CG7-03: Standards and Specifications for Best Management Practices

Appendix B of these standards is consistent with Chapter 4 of Volume II of the Ecology Manual. Chapter 4 provides BMPs for source control (Section I) and for Runoff, conveyance, and treatment (Section 2). Appendix C includes additional BMPs that reflect local regulations and practices. These BMPs are to be used in combination to satisfy each of the 13 elements listed in Chapter 3.

Chapter CG8 – Inspection

CG8-01: Inspection by the Permittee

In accordance with Element #12 of the Ecology Manual, the permittee is required to inspect, maintain, and repair all erosion and sediment control BMPs to assure continued performance of their intended function. Site inspections must be conducted by a person who is knowledgeable in the principles and practices of erosion and sediment control, and who is on-site or on-call at all times. Site inspections must be conducted at least once every calendar week, and the inspector must summarize the results of each inspection in an inspection report that is entered into the logbook. For construction sites of one acre or larger that discharge stormwater to the waters of the state, a Certified Erosion and Sediment Control Specialist (CESCL or CPESC) must be identified in the CSWPPP.

Whenever inspection and/or monitoring reveals that the BMPs identified in the CSWPPP are inadequate, due to the actual discharge of or potential to discharge a significant amount of any pollutant, appropriate BMP or design changes shall be implemented as soon as possible.

The Director shall specify inspection and testing requirements applicable to a given project prior to permit issuance; however, the Director may require additional inspection, testing, or professional analysis and recommendations when conditions exist that were not covered in the permit application documents or were not sufficiently known at the time of permit issuance.

CG8-01.1: RECORDKEEPING AND REPORTING

A logbook must be maintained for all on-site construction activities and must include a record of the implementation of the CSWPPP, any updates to the CSWPPP and the ESC Plan, site inspections, and the results of any stormwater quality monitoring. A Construction Emergency Contact Sheet must also be kept in the logbook and updated regularly. A copy of a construction emergency contact sheet for is provided in Appendix C.

Updating of the CSWPPP must be shown on the CSWPPP and on the ESC plan, and must be recorded in the logbook. Revisions to the CSWPPP must be recorded within 48 hours of implementing the revisions.

Site inspections must be recorded on a site inspection form and placed in the logbook within 24 hours of the inspection. An example site inspection form with instructions is included in Appendix C. The inspection report must include the information provided in the instructions.

Turbidity and pH monitoring must be conducted and reported as described in the [Turbidity and pH Monitoring Requirements](#). An example data sheet is provided with the turbidity monitoring requirements.

CG8-02: Inspection by the City

All projects with a clearing and grading permit are subject to city inspections to ensure compliance with the permit. As a condition of permit issuance, the applicant must grant right of entry for such inspections and city emergency corrective measures.

At a minimum, city inspections are required before clearing, grading, or construction and during construction to verify proper installation and maintenance of required erosion and sediment

controls, and upon completion of construction. The Director will specify other stages of work when city inspection is required.

The permittee must request routine inspections through the [MyBuildingPermit.com](https://mybuildingpermit.com) portal. The system is accessible 24 hours a day, seven days a week and provides real-time information.

Clearing & grading inspections can be scheduled up to 3 days in advance, and the permittee can schedule an inspection until 4:30 a.m. to schedule a same-day inspection in most cases.

Inspections can also be requested through the interactive voice response (IVR) system (425-452-6875) until the IVR system is retired.

Normal inspection time for clearing and grading inspectors is 7 a.m. to 2:30 p.m. Monday through Friday. When inspections are requested outside of those times, special arrangements and additional fees are required. When off-hours inspections are required, the permittee must contact the Inspector or the Inspector's Supervisor at least 72 hours prior to the expected inspection, the date and time will need to be definite. When it is confirmed that the inspection staff is available to perform the inspection, the contractor will be contacted by the inspector to coordinate the inspection time, exchange contact information, etc. A fee will be charged for the off-hours inspection. The amount of the fee is based on the inspection time and date. Inspection time performed, subject to these additional fees, will be posted by the Development Services Inspector in the City's permit tracking system under the permit for which the inspection was performed. All fees are required to be paid within five (5) days of the scheduled off-hours inspection.

CG8-03: Final Approval

The permittee or contractor must notify the clearing and grading inspector when site construction completed and ready for final inspection. Final clearing and grading approval will be given upon completion of the following tasks:

- All permanent erosion control measures are installed (or bonded for, in the case of plats);
- All items on the final clearing & grading check list are completed; and
- All necessary reports have been submitted to the City.

Chapter CG9 – Violations

CG9-01: General

BCC 1.18.075 states what actions constitute civil violations of chapters BCC 24.06 and BCC 23.76, provides enforcement procedures for violations of these chapters and violations relating to illicit discharges, and specifies how penalties will be assessed.

CG9-02: Enforcement Process

BCC 1.18.075.E provides for an enforcement process with escalating enforcement actions for violations of the related codes and standards. For a first violation that does not result in an emergency, is not an illicit connection, or otherwise does not require issuance of a notice of violation, the city must attempt to secure voluntary correction from the responsible party. A request for voluntary compliance may be presented in the form of a written correction notice or a stop work order. These documents must include a description of the violation, a description of the corrective action required to bring the property into compliance, and a date by which the corrective action must be completed. The correction notice or stop work order must be personally served on the responsible person(s), posted conspicuously on the premises, or mailed to the responsible person(s) with delivery confirmation.

Enforcement for a repeat violation where the initial enforcement action was issuance of a correction notice may result in issuance of a stop work order, a voluntary correction agreement, or a notice of violation, depending on the severity of the violation. Posting of a stop work order requires that no further work be done on the property until the code violations have been corrected and the stop work order has been removed by the city. Issuance of a notice of violation will result in the responsible person(s) being scheduled to appear before the hearing examiner not less than 10 calendar days after the notice of civil violation is issued. The procedures for a hearing are provided in BCC 1.18.050. Rules for the assessment of penalties are provided in BCC 1.18.075.G.

Construction Stormwater Pollution Prevention Planning

This appendix provides an overview of the important components of, and the process for, developing and implementing a Construction Stormwater Pollution Prevention Plan (CSWPPP), consistent with Chapter 3 of Volume II of the 2024 Washington State Department of Ecology Stormwater Management Manual for Western Washington.

Section A.1 contains general guidelines with which site planners should become familiar. It describes criteria for plan format and content and ideas for improved plan effectiveness.

Section A.2 discusses the two main components of a CSWPPP, the narrative and the drawings.

Section A.3 outlines and describes a recommended step-by-step procedure for developing a Construction SWPPP from data collection to finished product. Step 3 in Section A.3 provides a description of each of the CSWPPP elements. This procedure is written in general terms to be applicable to all types of projects. Section A.3 also includes a checklist for developing a CSWPPP.

Design standards and specifications for Best Management Practices (BMPs) referred to in this appendix are found in Appendix B.

The CSWPPP may be a subset of the Stormwater Site Plan or construction plan set. Chapter 3, of Volume I, of the 2024 Washington State Department of Ecology Stormwater Management Manual for Western Washington, discusses how to prepare a Stormwater Site Plan.

A. 1 GENERAL GUIDELINES

A.1.1 What is a Construction Stormwater Pollution Prevention Plan?

Construction Stormwater Pollution Prevention Plan (CSWPPP) means a written plan to implement measures to identify, prevent, and control the contamination of point source discharge of stormwater. The CSWPPP explains and illustrates the measures, usually in the form of best management practices (BMPs), to take on a construction site to control potential pollution problems.

A CSWPPP is required for projects meeting the Bellevue clearing and grading permit requirements.

While it is a good idea to include standards and specifications from the CSWPPP in the contract documents, the CSWPPP should be a separate document that can stand alone.

As site work progresses, the plan must be modified in prescribed time periods to reflect changing site conditions, subject to the rules for plan modification by the City.

A.1.2 Who is responsible for the CSWPPP?

The owner or lessee of the land being developed has the responsibility for CSWPPP preparation and submission to the City. The owner or lessee may designate someone (i.e., an engineer, architect, contractor, etc.) to prepare the CSWPPP, but the owner retains the ultimate responsibility for environmental protection at the site.

The CSWPPP must be located on the construction site or within reasonable access to the site for construction and inspection personnel, although a copy of the drawings must be kept on the construction site at all times.

A.1.3 What is an Adequate Plan?

The CSWPPP must contain sufficient information to satisfy the permitting authority (state, local, or both) that the problems of construction pollution have been adequately addressed for the proposed project.

An adequate CSWPPP includes a narrative and drawings. The narrative is a written statement to explain and justify the pollution prevention decisions made for a particular project. The narrative contains concise information about existing site conditions, construction schedules, and other pertinent items that are not contained on the drawings. The drawings show, on a site map, the specific BMPs which shall be installed. Provide text notes on the drawings to describe, the performance standards the BMPs should achieve, and actions to take if the performance goals are not achieved.

Reports summarizing the scope of inspections, the personnel conducting the inspection, the date(s) of the inspection, major observations relating to implementing the Construction SWPPP, and actions taken because of these inspections must be prepared and retained as part of the CSWPPP.

On construction sites that discharge to surface water, the primary concern in the preparation of the CSWPPP is compliance with Washington State Water Quality Standards.

On construction sites that infiltrate all stormwater runoff, the primary concern in the preparation of the CSWPPP is the protection of the infiltration facilities from fine sediments during the construction phase and protection of ground water from other pollutants. Several of the other elements are very important at these sites as well, such as marking the clearing limits, establishing the construction access, and managing the project.

Whether the stormwater discharges to surface water or completely infiltrates, each of the 13 elements must be included in the CSWPPP unless an element is determined not to be applicable to the project and the exemption is justified in the narrative.

The step-by-step procedure outlined in this Appendix is recommended for the development of the CSWPPPs. The checklist may be helpful in preparing the CSWPPP.

A.1.4 BMP Standards and Specifications

BMPs refer to schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control:

- Stormwater associated with construction activity
- Ground water associated with construction activity
- Spillage or leaks
- Sludge or waste disposal
- Drainage from raw material storage

Appendix B contains standards and specifications for the BMPs commonly used in Construction SWPPPs to address the 13 elements. BMPs can be used singularly or in combination. If a CSWPPP makes use of a BMP, the narrative and drawings must clearly reference the specific BMP title and number.

The standards and specifications are not intended to limit any innovative or creative effort to effectively control erosion and sedimentation. CSWPPPs can contain experimental BMPs or

make minor modifications to standard BMPs. However, the City must approve such practices before use. All experimental BMPs and modified BMPs must achieve the same or better performance than the BMPs listed in Appendix B.

CSWPPPs can also contain BMPs from other guidance documents or manuals which Ecology has approved as providing an equivalent level of pollution prevention.

If a CSWPPP uses an experimental, modified, or approved equivalent BMP, then the CSWPPP must contain the following:

1. The technical basis for the selection of the experimental, modified, or approved equivalent BMP (scientific, technical studies, and/or modeling) that support the performance claims for the BMP.
2. An assessment of how the experimental, modified, or approved equivalent BMP will satisfy all known, available, and reasonable methods of prevention, control and treatment (AKART) requirements and the applicable federal technology-based treatment requirements under 40 Code of Federal Regulations (CFR) part 125.3.

A.1.5 General Principles

The CSWGP (Construction Stormwater General Permit) outlines numerous specific requirements related to elements 1 through 13 that the CSWPPP must address..

A.2 CSWPPP REQUIREMENTS

The CSWPPP consists of two parts: a narrative and the drawings. Both parts shall contain information specific to the construction site. Not all items listed below are applicable to all construction projects. The author of the CSWPPP should ensure that the applicable sections are addressed. The following two sections describe the contents of the narrative and the drawings. A checklist is included in this Appendix as a quick reference to determine if all the major items are included in the CSWPPP.

A.2.1 Narrative

The author of the CSWPPP should evaluate the following subject areas for inclusion in the Construction SWPPP narrative. The subject areas below are not an outline for the Construction SWPPP narrative.

- General Information on the Existing Site and Project
 - ▶ Project description: Describe the nature and purpose of the construction project. Include the total size of the area, any increase in existing impervious area; the total area expected to be disturbed by clearing, grading, excavation or other construction activities, including off-site borrow and fill areas; and the volumes of grading cut and fill that are proposed.
 - ▶ Existing site conditions: Describe the existing topography, vegetation, and drainage. Include a description of any structures or development on the parcel including the area of existing impervious surfaces.
 - ▶ Adjacent areas: Describe adjacent areas, including streams, lakes, wetlands, residential areas, and roads that might be affected by the construction project. Describe how upstream drainage areas may affect the site. Provide a description of the upstream drainage leading to the site and the downstream drainage leading from the site to the receiving body of water.

- ▶ Critical areas: Describe areas on or adjacent to the site that are classified as critical areas. Critical areas that receive runoff from the site shall be described up to ¼ mile away. The City may increase the distance. Describe special requirements for working near or within these areas.
 - ▶ Soil: Describe the soil on the site, giving such information as soil names, mapping unit, erodibility, settleability, permeability, depth, depth to ground water, texture, and soil structure.
 - ▶ Potential erosion problem areas: Describe areas on the site that have potential erosion problems.
- Thirteen (13) elements: Describe how the CSWPPP addresses each of the 13 required elements. Include the type and location of BMPs used to satisfy the required element. Often using a combination of BMPs is the best way to satisfy required elements. If an element is not applicable to a project, provide a written justification for why it is not necessary.
 - Construction Schedule and phasing: Describe the construction schedule. If the schedule extends into the wet season, describe what activities will continue during the wet season and how the transport of sediment from the construction site to receiving waters will be prevented. Describe the intended sequence and timing of construction activities and any proposed construction phasing.
 - Financial/ownership responsibilities: Describe ownership and obligations for the project. Include bond forms and other evidence of financial responsibility for environmental liabilities associated with construction.
 - Engineering calculations: Attach any calculations made for the design of such items as sediment ponds, diversions, and waterways, as well as calculations for runoff and stormwater detention design (if applicable). Engineering calculations must bear the signature and stamp of an engineer licensed in the state of Washington.
 - Certified Erosion and Sediment Control Lead (CESCL): Identify along with their contact information and expiration of their CESCL certification.

A 2.2 Drawings

- Vicinity map: Provide a map with enough detail to identify the location of the construction site, adjacent roads, and receiving waters.
- Site map: Provide a site map(s) showing the features numbered below. The site map requirements may be met using multiple plan sheets for ease of legibility.
 1. A legal description of the property boundaries or an illustration of property lines (including distances) in the drawings.
 2. The direction of north in relation to the site.
 3. Existing structures and roads, if present.
 4. The boundaries of and labels indicating different soil types.
 5. Areas of potential erosion problems.
 6. Any on-site and adjacent surface waters, critical areas, their buffers, FEMA base flood boundaries, and Shoreline Management boundaries.
 7. Existing contours and drainage basins and the direction of flow for the different drainage areas.
 8. Final and interim grade contours as appropriate, drainage basins, and the direction of stormwater flow during and upon completion of construction.

9. Areas of soil disturbance, including all areas affected by clearing, grading and excavation.
 10. Locations where stormwater discharges to surface waters during and upon completion of construction.
 11. Existing unique or valuable vegetation and the vegetation that is to be preserved.
 12. Cut and fill slopes indicating top and bottom of slope catch lines.
 13. Stockpile, waste storage, and vehicle storage/maintenance areas.
 14. Total cut and fill quantities and the method of disposal for excess material.
- **Conveyance systems:** Show on the site map the following temporary and permanent conveyance features:
 - (1) Locations for temporary and permanent swales, interceptor trenches, or ditches.
 - (2) Drainage pipes, ditches, or cut-off trenches associated with erosion and sediment control and stormwater management.
 - (3) Temporary and permanent pipe inverts and minimum slopes and cover.
 - (4) Grades, dimensions, and direction of flow in all ditches and swales, culverts, and pipes.
 - (5) Details for bypassing off-site runoff around disturbed areas.
 - (6) Locations and outlets of any dewatering systems.
 - **Location of detention BMPs:** Show on the site map the locations of stormwater detention BMPs.
 - **Erosion and Sediment Control (ESC) BMPs:** Show on the site map all major structural and nonstructural ESC BMPs including:
 - (7) The location of sediment pond(s), pipes and structures.
 - (8) Dimension pond berm widths and inside and outside pond slopes.
 - (9) The trap/pond storage required and the depth, length, and width dimensions.
 - (10) Typical section views through pond and outlet structure.
 - (11) Typical details of gravel cone and standpipe, and/or other filtering devices.
 - (12) Stabilization technique details for inlets and outlets.
 - (13) Control/restrictor device location and details.
 - (14) Stabilization practices for berms, slopes, and disturbed areas.
 - (15) Rock specifications and detail for rock check dam, if used.
 - (16) Spacing for rock check dams as required.
 - (17) Front and side sections of typical rock check dams.
 - (18) The location, detail, and specification for silt fence.
 - (19) The construction entrance location and a detail.
 - **Detailed drawings:** Any structural source control practices used that are not referenced in this manual or other local manuals must be explained and illustrated with detailed drawings.
 - **Other pollutant BMPs:** Indicate on the site map the location of BMPs to be used for the control of pollutants other than sediment such as high or low pH and hydrocarbons.
 - **Monitoring locations:** Indicate on the site map the water quality sampling locations, if required by the City or the Department of Ecology. Sampling stations must be located in accordance with applicable permit requirements.

- Standard notes are suggested in Appendix B. Notes addressing construction phasing and scheduling must be included on the drawings.

A. 3 STEP-BY-STEP PROCEDURE

There are three basic steps in producing a CSWPPP:

Step 1 - Data Collection

Step 2 - Data Analysis

Step 3 - CSWPPP Development and Implementation

A CSWPPP is required for projects meeting the requirements in Section 23.76.035 of the clearing & grading code. The City of Bellevue will allow small construction projects to prepare a simpler CSWPPP, consisting of a short form and drawings. Permittees should check with Bellevue's clearing and grading section about requirements related to construction stormwater.

A.3.1 Step 1 - Data Collection

Evaluate existing site conditions and gather information that will help develop the most effective CSWPPP. The Construction SWPPP author may use the information collected during the development of the Stormwater Site Plan to augment the information discussed below.

Topography: Prepare a topographic drawing of the site to show the existing contour elevations at intervals of 1 to 5 feet depending upon the slope of the terrain.

Drainage: Locate and clearly mark existing drainage swales and patterns on the drawing, including existing storm drain pipe systems.

Soils: Identify and label soil type(s) and erodibility (low, medium, high or an index value) on the drawing or in the narrative.

Characterize soils for permeability, percent organic matter, and effective depth. Express these qualities in averaged or nominal terms for the subject site or project. This information is frequently available in published literature by qualified soil professionals or engineers.

For example, the 1983 Soil Survey of Snohomish County lists the following information for each soil mapping unit or designation (e.g., a Sultan silt loam):

- A sieve analysis of the soils
- Permeability (in/hr)
- Available water-holding capacity (in/in)
- The percent of organic matter

Soils information can be obtained from a Natural Resource Conservation Service (NRCS) manual (if one has been published for the county where the construction project is located) or the NRCS' Web Soil Survey website at <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>. If a soil survey is not available, make a request to a District NRCS. Additionally, soil data can be obtained through site soil analysis as a part of preparation of a Stormwater Site Plan (See Volume I, Chapter 3 of the SWMMWW).

Ground Cover: Label existing vegetation on the drawing. Show features such as tree clusters, grassy areas, and unique or sensitive vegetation. Unique vegetation may include existing trees above a given diameter. Investigate local requirements regarding tree preservation. Indicate existing denuded or exposed soil areas.

Critical Areas: Delineate critical areas adjacent to or within the site on the drawing. Show features such as steep slopes, streams, floodplains, lakes, wetlands, sole source aquifers, and geologic hazard areas. Delineate setbacks and buffer limits for these features on the drawings. On the drawings, show other related jurisdictional boundaries such as Shorelines Management and the Federal Emergency Management Agency (FEMA) base floodplain.

Adjacent Areas: Identify existing buildings, roads, and facilities adjacent to or within the project site on the drawings. Identify existing and proposed utility locations, construction clearing limits and erosion and sediment control BMPs on the drawings.

Existing Encumbrances: Identify wells, existing and abandoned septic drain field, utilities, easements, setbacks, and site constraints.

Precipitation Records: Determine the average monthly rainfall and rainfall intensity for the required design storm events. These records may be available from the City. Volume III of the SWMMWW also has resources for determining rainfall values.

A.3.2 Step 2 - Data Analysis

Consider the data collected in Step 1 to visualize potential problems and limitations of the site. Determine those areas that have critical erosion hazards. The following are some important factors to consider in data analysis:

Topography: The primary topographic considerations are slope steepness and slope length. Steeper and longer slopes have greater erosion potential than do flat and short slopes. A qualified engineer, soil professional, or certified erosion control specialist should determine erosion potential.

Drainage: Convey runoff through the use of natural drainage patterns that consist of overland flow, swales and depressions to avoid constructing an artificial drainage system. Properly stabilize man-made ditches and waterways so they do not create erosion problems. Take care to ensure that increased runoff from the site will not erode or flood the existing natural drainage system. Consider possible sites for temporary stormwater retention and detention.

Direct construction away from areas of saturated soil where ground water may be encountered and away from critical areas where drainage will concentrate. Preserve natural drainage patterns on the site.

Soils: Evaluate soil properties such as surface and subsurface runoff characteristics, depth to impermeable layer, depth to seasonal ground water table, permeability, shrink-swell potential, texture, settleability, and erodibility. Develop the CSWPPP based on known soil characteristics. Protect Infiltration sites from clay and silt which will reduce infiltration capacities.

Ground Cover: Ground cover is the most important factor in terms of preventing erosion. Existing vegetation that can be saved will prevent erosion better than constructed BMPs. Trees and other vegetation protect the soil structure. If the existing vegetation cannot be saved, consider such practices as phasing construction, temporary seeding, and mulching. Phasing of construction involves stabilizing one part of the site before disturbing another. In this way, the entire site is not disturbed at once.

Critical Areas: Critical areas may include flood hazard areas, mine hazard areas, slide hazard areas, sole source aquifers, wetlands, streambanks, fish-bearing streams, and other water

bodies. Any critical areas within or adjacent to the development should exert a strong influence on land development decisions. Delineate critical areas and their buffers on the drawings and clearly flag critical areas in the field. For example, chain link fencing may be more useful than flagging to assure that equipment operators stay out of critical areas. Only unavoidable work should take place within critical areas and their buffers. Such unavoidable work will require special BMPs, permit restrictions, and mitigation plans-documented routinely in the CSWPPP.

Adjacent Areas: An analysis of adjacent properties should focus on areas upslope and downslope from the construction project. Water bodies that will receive direct runoff from the site are a major concern. Evaluate the types, values, and sensitivities of and risks to downstream resources, such as private property, stormwater facilities, public infrastructure, or aquatic systems. Select erosion and sediment controls accordingly.

Precipitation Records: Refer to Volume III of the SWMMWW to determine the required rainfall records and the method of analysis for design of BMPs.

Timing of the Project: Consider the timing and duration of the project when selecting BMPs. Projects that will proceed during the wet season and projects that will last through several seasons must take all necessary precautions to remain in compliance with the water quality standards.

A.3.3 Step 3 - CSWPPP Development and Implementation

After collecting and analyzing the data to determine the site limitations, the planner can then develop a CSWPPP. Each of the 13 elements below must be considered and included in the CSWPPP unless site conditions render the element unnecessary and the exemption from that element is clearly justified in the narrative of the CSWPPP.

Element #1: Preserve Vegetation/Mark Clearing Limits

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

- Before beginning 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.
- Retain the duff layer, native top soil, and natural vegetation in an undisturbed state to the maximum extent practicable.

Additional Guidance

- Plastic, metal, or fabric fence may be used to mark the clearing limits. [Note: the difference between the practical use and proper installation of silt fencing and the proper use of clearing boundary fencing.]
- If it is not practical to retain the duff layer in place, then stockpile it on-site, cover it to prevent erosion, and replace it immediately when you finish disturbing the site.

Suggested BMPs

- BMP C101: Preserving Natural Vegetation
- BMP C102: Buffer Zones
- BMP C103: High Visibility Plastic or Metal Fence
- BMP C233: Silt Fence

Element #2: Establish Construction Access

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

- Limit construction vehicle access and exit to one route, if possible.
- Stabilize access points with a pad of quarry spalls, crushed rock, or other equivalent BMPs, to minimize the tracking of sediment onto roads.
- Locate wheel wash or tire baths on site, if stabilized construction entrance is not effective in preventing tracking sediment onto roads.
- If sediment is tracked off site, clean the affected roadway thoroughly at the end of each day, or more frequently as necessary (for example, during wet weather). Remove sediment from roads by shoveling, sweeping, or pickup and transport the sediment to a controlled sediment disposal area.
- Conduct street washing only after sediment is removed in accordance with the above bullet.
- Control street wash wastewater by pumping back on site or otherwise preventing it from discharging into systems tributary to waters of the State.

Additional Guidance

- Minimize construction site access point along linear projects, such as roadways. Street washing may require City approval.

Suggested BMPs

- BMP C105: Stabilized Construction Entrance/Exit
- BMP C106: Wheel Wash
- BMP C107: Construction Road/Parking Area Stabilization

Element #3: Control Flow Rates

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

- Protect properties and waterways downstream of development sites from erosion and the associated discharge of turbid waters due to increases in the velocity and peak volumetric flow rate of stormwater runoff from the project site, as required by City plan approval authority.
- Where necessary to comply with the bullet above, construct stormwater retention or detention facilities as one of the first steps in grading. Assure that detention facilities function properly before constructing site improvements (e.g. impervious surfaces)
- If permanent infiltration ponds are used for flow control during construction, these facilities should be protected from siltation during the construction phase.

Additional Guidance

- Conduct downstream analysis if changes in off-site flows could impair or alter conveyance systems, streambanks, bed sediment, or aquatic habitat. See Volume I, Chapter 3 of the SWMMWW for offsite analysis guidelines.
- Even gently sloped areas need flow controls such as straw wattles or other energy dissipation / filtration structures. Place dissipation facilities closer together on steeper slopes. These methods prevent water from building higher velocities as it flows downstream within the construction site.
- Outlet structures designed for permanent detention ponds are not appropriate for use during construction without modification. If used during construction, install an

outlet structure that will allow for long-term storage of runoff and enable sediment to settle. Verify that the pond is sized appropriately for this purpose. Restore ponds to their original design dimensions, remove sediment, and install a final outlet structure at completion of the project.

- Erosion has the potential to occur because of increases in the volume, velocity, and peak flow rate of stormwater runoff from the project site. The local permitting agency may require pond designs that provide additional or different stormwater flow control. These requirements may be necessary to address local conditions or to protect properties and waterways downstream.
- Sites that must implement flow control for the developed site condition must also control stormwater release rates during construction. Construction site stormwater discharges shall not exceed the discharge durations of the pre-developed condition for the range of predeveloped discharge rates from ½ of the 2-year flow through the 10-year flow as predicted by an approved continuous runoff model. The pre-developed condition to be matched shall be the land cover condition immediately prior to the development project. This restriction on release rates can affect the size of the storage pond and treatment cells.

Suggested BMPs

- BMP C203: Water Bars
- BMP C207: Check Dams
- BMP C209: Outlet Protection
- BMP C235: Wattles
- BMP C240: Sediment Trap
- BMP C241: Temporary Sediment Pond
- Refer to Volume 3 of the SWMMWW, Detention Facilities, Infiltration Stormwater Quantity and Flow Control

Element #4: Install Sediment Controls

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

The Permittee must design, install and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, the Permittee must design, install and maintain such controls to:

- Construct sediment control BMPs (sediment ponds, traps, filters, etc.) as one of the first steps in grading. These BMPs shall be functional before other land disturbing activities take place.
- 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 runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site.
- Direct stormwater runoff from disturbed areas through a sediment pond or other appropriate sediment removal BMP, before the runoff leaves a construction site or before discharge to an infiltration facility. Runoff from fully stabilized areas may be discharged without a sediment removal BMP, but must meet the flow control performance standard in Element #3, bullet #1.
- Locate BMPs intended to trap sediment on site in a manner to avoid interference

with the movement of juvenile salmonids attempting to enter off-channel areas or drainages.

- Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal, and maximize stormwater infiltration, unless infeasible.
- Where feasible, design outlet structures that withdraw impounded stormwater from the surface to avoid discharging sediment that is still suspended lower in the water column.

Additional Guidance

- Outlet structures that withdraw impounded stormwater from the surface to avoid discharging sediment that is still suspended lower in the water column are for the construction period only. If the pond using the construction outlet control is used for permanent stormwater controls, the appropriate outlet structure must be installed after the soil disturbance has ended
- Seed and mulch earthen structures such as dams, dikes, and diversions per the timing indicated in Element #5.
- 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 City may inspect and approve areas fully stabilized by means other than pavement or quarry spalls.
- If installing a floating pump structure, include a stopper to prevent the pump basket from hitting the bottom of the pond.

Suggested BMPs

- BMP C231: Brush Barrier
- BMP C232: Gravel Filter Berm
- BMP C233: Silt Fence
- BMP C234: Vegetated Strip
- BMP C235: Wattles
- BMP C240: Sediment Trap
- BMP C241: Temporary Sediment Pond
- BMP C250: Construction Stormwater Chemical Treatment
- BMP C251: Construction Stormwater Filtration

Element #5: Stabilize Soils

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

- Stabilize exposed and unworked soils by application of effective BMPs that prevent erosion. Applicable BMPs include, but are not limited to: temporary and permanent seeding, sodding, mulching, plastic covering, erosion control fabrics and matting, soil application of polyacrylamide (PAM), the early application of gravel base early on areas to be paved, and dust control.
- Control stormwater volume and velocity within the site to minimize soil erosion.
- Control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion.

- Soils must not remain exposed and unworked for more than the time periods set forth below to prevent erosion.
- During the dry season (May 1 - Sept. 30): 7 days.
- During the wet season (October 1 - April 30): 2 days.
- Stabilize soils at the end of the shift before a holiday or weekend if needed based on the weather forecast.
- Stabilize soil stockpiles from erosion, protect with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways, and drainage channels.
- Minimize the amount of soil exposed during construction activity.
- Minimize the disturbance of steep slopes.
- Minimize soil compaction and, unless infeasible, preserve topsoil.

Additional Guidance

- Soils must not remain exposed and unworked for more than the time periods set forth above to prevent erosion for linear projects.
- Soil stabilization measures should be appropriate for the time of year, site conditions, estimated duration of use, and potential water quality impacts that stabilization agents may have on downstream waters or ground water.
- Ensure that gravel base used for stabilization is clean and does not contain fines or sediment.

Suggested BMPs

- BMP C120: Temporary and Permanent Seeding
- BMP C121: Mulching
- BMP C122: Nets and Blankets
- BMP C123: Plastic Covering
- BMP C124: Sodding
- BMP C125: Topsoiling/Composting
- BMP C126: Polyacrylamide for Soil Erosion Protection
- BMP C130: Surface Roughening
- BMP C131: Gradient Terraces
- BMP C140: Dust Control

Element #6: Protect Slopes

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

- Design and construct cut and fill slopes in a manner that will 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 off-site stormwater (run-on) or ground water away from slopes and disturbed areas with interceptor dikes, pipes, and/or swales. Off-site stormwater should be managed separately from stormwater generated on the site.
- At the top of slopes, collect drainage in pipe slope drains or protected channels to prevent erosion.
 - Temporary pipe slope drains shall handle the peak volumetric flow rate calculated using a 10-minute time step from a Type 1A, 10 year, 24-hour frequency storm for

the developed condition. Alternatively, the 10-year, 1-hour flow rate predicted by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the Western Washington Hydrology Model (WWHM) to predict flows, bare soil areas should be modeled as “landscaped” area.

- 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.

Additional Guidance

- Where 15-minute time steps are available in an approved continuous runoff model, they may be used directly without a correction factor.
 - ▶ Consider soil type and its potential for erosion.
 - ▶ Stabilize soils on slopes, as specified in Element #5.
 - ▶ BMP combinations are the most effective method of protecting slopes with disturbed soils. For example, use both mulching and straw erosion control blankets in combination.

Suggested BMPs

- 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)

Element #7: Protect Drain Inlets

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

- Protect all storm drain inlets made operable during construction so that stormwater runoff does not enter the conveyance system without first being filtered or treated to remove sediment.
- Keep all approach roads clean. Do not allow sediment and street wash water to enter storm drains without prior and adequate treatment unless treatment is provided before the storm drain discharges to waters of the State.

- Inlets should be inspected weekly at a minimum and daily during storm events.

Suggested BMPs

- BMP C220: Storm Drain Inlet Protection

Element #8: Stabilize Channels and Outlets

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

- Design, construct, and stabilize all on-site conveyance channels to prevent erosion from the following expected peak flows:
 - ▶ Channels must handle the peak volumetric flow rate calculated using a 10-minute time step from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10- year, 1-hour flow rate indicated by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the Western Washington Hydrology Model (WWHM) to predict flows, bare soil areas should be modeled as “landscaped area.
- Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent streambanks, slopes, and downstream reaches at the outlets of all conveyance systems.

Additional Guidance

The best method for stabilizing channels is to completely line the channel with a blanket product first, then add check dams as necessary to function as an anchor and to slow the flow of water.

Suggested BMPs

- BMP C202: Channel Lining
- BMP C122: Nets and Blankets
- BMP C207: Check Dams
- BMP C209: Outlet Protection

Element #9: Control Pollutants

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

- Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants
- Handle and dispose of all pollutants, including waste materials and demolition debris that occur onsite 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 or the environment. On-site fueling tanks shall include secondary containment. Secondary containment means placing tanks or containers within an impervious structure capable of containing 110 percent 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.
- Discharge wheel wash or tire bath wastewater to a separate on-site treatment system that prevents discharge to surface water, such as closed-loop recirculation or upland land application, or to the sanitary sewer with City of Bellevue and King County approval.
- Apply fertilizers and pesticides in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Follow manufacturers' label requirements for application rates and procedures.
- Use BMPs to prevent contamination of stormwater runoff by pH modifying sources. The sources for this contamination include, but are not limited to: 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, concrete pumping and mixer washout waters.
- Adjust the pH of stormwater if necessary to prevent violations of water quality standards.
- Assure that washout of concrete trucks is performed off-site or in designated concrete washout areas only. Do not wash out concrete trucks onto the ground, or into storm drains, open ditches, streets, or streams. Do not dump excess concrete on site, except in designated concrete washout areas. Concrete spillage or concrete discharge to surface waters of the State is prohibited.
- Obtain written approval from Ecology before using chemical treatment other than CO₂ or dry ice to adjust pH.

Additional Guidance

- Wheel wash or tire bath wastewater should not include wastewater from concrete washout areas.
- Do not use upland land applications for discharging wastewater from concrete washout areas.
- Woody debris may be chopped and spread on site.
- Conduct oil changes, hydraulic system drain down, solvent and de-greasing 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 runoff using spill prevention measures, such as drip pans.
- Clean contaminated surfaces immediately following any discharge or spill incident. Emergency repairs may be performed on-site using temporary plastic placed beneath and, if raining, over the vehicle.

Suggested BMPs

- BMP C151: Concrete Handling
- BMP C152: Sawcutting and Surfacing Pollution Prevention
- BMP C153: Material Delivery, Storage and Containment
- BMP C154: Concrete Washout Area
- BMP C250: Construction Stormwater Chemical Treatment
- BMP C251: Construction Stormwater Filtration
- BMP C252: High pH Neutralization Using CO₂

- BMP C253: pH Control for High pH Water
- See SMMWW, Volume IV – Source Control BMPs

Element #10: Control De-Watering

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

- Discharge foundation, vault, and trench de-watering water, which have similar characteristics to stormwater runoff at the site, into a controlled conveyance system before discharge to a sediment trap or sediment pond.
- Discharge clean, non-turbid de-watering water, such as well-point ground water, to systems tributary to, or directly into state surface waters, as specified in Element #8, provided the de-watering flow does not cause erosion or flooding of receiving waters or interfere with the operation of the system. Do not route clean dewatering water through stormwater sediment ponds. Note that “surface waters of the State” may exist on a construction site as well as off site; for example, a creek running through a site.
- Handle highly turbid or contaminated dewatering water separately from stormwater.
- Other disposal options may include:
 1. Infiltration
 2. Transport offsite in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters,
 3. Ecology-approved on-site chemical treatment or other suitable treatment technologies,
 4. Sanitary sewer discharge with City of Bellevue and Metro approval, if there is no other option.
 5. Use of a sedimentation bag with outfall to a ditch or swale for small volumes of localized dewatering.

Additional Guidance

- Channels must be stabilized, as specified in Element #8.
- Construction equipment operation, clamshell digging, concrete tremie pour, or work inside a cofferdam can create highly turbid or contaminated dewatering water.
- Discharging sediment-laden (muddy) water into waters of the State likely constitutes violation of water quality standards for turbidity. The easiest way to avoid discharging muddy water is through infiltration and preserving vegetation.

Suggested BMPs

- BMP C203: Water Bars
- BMP C236: Vegetative Filtration

Element #11: Maintain BMPs

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

- Maintain and repair all temporary and permanent erosion and sediment control BMPs as needed to assure continued performance of their intended function in accordance with BMP specifications.
- Remove all temporary erosion and sediment control BMPs within 30 days after achieving final site stabilization or after the temporary BMPs are no longer needed.

Additional Guidance

- Note: Some temporary erosion and sediment control BMPs are bio- degradable and designed to remain in place following construction such as compost socks
- Provide protection to all BMPs installed for the permanent control of stormwater from sediment and compaction. All BMPs that are to remain in place following completion of construction shall be examined and placed in full operating conditions. If sediment enters the BMPs during construction, it shall be removed and the facility shall be returned to the conditions specified in the construction documents.
- Remove or stabilize trapped sediment on site. Permanently stabilize disturbed soil resulting from removal of BMPs or vegetation.

Suggested BMPs

- BMP C150: Materials on Hand
- BMP C160: Certified Erosion and Sediment Control Lead

Element #12: Manage the Project

Construction Stormwater General Permit and Municipal Stormwater Permit Requirements

- Phase development projects to the maximum degree practicable and consider seasonal work limits.
- Inspection and monitoring – Inspect, maintain, and repair all BMPs as needed to assure continued performance of their intended function. Conduct site inspections and monitoring in accordance with the Construction Stormwater General Permit or local plan approval authority.
- Maintaining an updated construction SWPPP – Maintain, update, and implement the SWPPP in accordance with the Construction Stormwater General Permit.

Municipal Stormwater Permit Requirements

- Projects that disturb one or more acres must have, site inspections conducted by a Certified Erosion and Sediment Control Lead (CESCL). Project sites less than one acre (not part of a larger common plan of development or sale) may have a person without CESCL certification conduct inspections. By the initiation of construction, the SWPPP must identify the CESCL or inspector, who shall be present on-site or on-call at all times.

Additional Guidance for Site Inspections

The CESCL or inspector (project sites less than one acre) must have the skills to assess the:

- 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.
- The CESCL or inspector must examine stormwater visually for the presence of suspended sediment, turbidity, discoloration, and oil sheen. They must evaluate the effectiveness of BMPs and determine if it is necessary to install, maintain, or repair BMPs to improve the quality of stormwater discharges.
- Based on the results of the inspection, construction site operators must correct the problems identified by:
- Reviewing the SWPPP for compliance with the 13 construction SWPPP elements and making appropriate revisions within 7 days of the inspection.
- Immediately beginning the process of fully implementing and maintaining appropriate

source control and/or treatment BMPs as soon as possible, addressing the problems no later than within 10 days of the inspection. If installation of necessary treatment BMPs is not feasible within 10 days, the construction site operator may request an extension within the initial 10-day response period.

- Documenting BMP implementation and maintenance in the site log book (applies only to sites that have coverage under the Construction Stormwater General Permit).
- The CESCL or inspector must inspect all areas disturbed by construction activities, all BMPs, and all stormwater discharge points at least once every calendar week and within 24 hours of any discharge from the site. (For purposes of this condition, individual discharge events that last more than one day do not require daily inspections. For example, if a stormwater pond discharges continuously over the course of a week, only one inspection is required that week.) The CESCL or inspector may reduce the inspection frequency for temporary stabilized, inactive sites to once every calendar month.

Additional Guidance

Phasing of Construction

- Phase development projects where feasible to prevent soil erosion and, to the maximum extent practical, and prevent transporting sediment from the site during construction. Revegetate exposed areas and maintain that vegetation as an integral part of the clearing activities for any phase.
- Clearing and grading activities for developments shall be permitted only if conducted using an approved site development plan (e.g., subdivision approval) that establishes permitted areas of clearing, grading, cutting, and filling. Minimize removing trees and disturbing or compacting native soils when establishing permitted clearing and grading areas. Show on the site plans and the development site permitted clearing and grading areas and any other areas required to preserve critical or sensitive areas, buffers, native growth protection easements, or tree retention areas as may be required by local jurisdictions.

Seasonal Work Limitations

- From October 1 through April 30, clearing, grading, and other soil disturbing activities is permitted only if shown to the satisfaction of the City that the site operator will prevent silt-laden runoff from leaving the site through a combination of the following:
 1. Site conditions including existing vegetative coverage, slope, soil type, and proximity to receiving waters.
 2. Limit activities and the extent of disturbed areas.
 3. Proposed erosion and sediment control measures.
- Based on the information provided and/or local weather conditions, the City may expand or restrict the seasonal limitation on site disturbance. The City has the authority to take enforcement action—such as a notice of violation, administrative order, penalty, or stop-work order under the following circumstances:
 - If, during the course of any construction activity or soil disturbance during the seasonal limitation period, sediment leaves the construction site causing a violation of the surface water quality standard; or
 - If clearing and grading limits or erosion and sediment control measures shown in the approved plan are not maintained.

- The following activities are exempt from the seasonal clearing and grading limitations:
 1. Routine maintenance and necessary repair of erosion and sediment control BMPs;
 2. 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.
 3. Activities where there is one hundred percent infiltration of surface water runoff within the site in approved and installed erosion and sediment control facilities.

Coordination with Utilities and Other Contractors

The primary project proponent shall evaluate, with input from utilities and other contractors, the stormwater management requirements for the entire project, including the utilities, when preparing the Construction SWPPP.

Inspection and Monitoring

All BMPs must be inspected, maintained, and repaired as needed to assure continued performance of their intended function. Site inspections must be conducted by a person knowledgeable in the principles and practices of erosion and sediment control. The person must have the skills to 1) assess the site conditions and construction activities that could impact the quality of stormwater, and 2) assess the effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges.

For construction sites one acre or larger that discharge stormwater to surface waters of the state, a CESCL must be identified in the construction SWPPP; this person must be on-site or on-call at all times. Certification must be obtained through an approved training program that meets the erosion and sediment control training standards established by Ecology.

Appropriate BMPs or design changes shall be implemented as soon as possible whenever inspection and/or monitoring reveals that the BMPs identified in the Construction SWPPP are inadequate, due to the actual discharge of /or potential to discharge a significant amount of any pollutant.

- Maintaining an Updated Construction SWPPP
- Retain the Construction SWPPP on-site 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.

The SWPPP must be modified if, during inspections or investigations conducted by the owner/ operator, or the applicable local or state regulatory authority, 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.

Suggested BMPs

- BMP C150: Materials on Hand
- BMP C160: Certified Erosion and Sediment Control Lead
- BMP C162: Scheduling

Element #13: Protect Low Impact Development BMPs

Municipal Stormwater Permits Requirements

- Protect all Bioretention and Rain Garden BMPs from sedimentation through installation and maintenance of erosion and sediment control BMPs on portions of the site that drain into the Bioretention and/or Rain Garden BMPs. Restore the BMPs to their fully functioning condition if they accumulate sediment during construction. Restoring the BMP must include removal of sediment and any sediment-laden Bioretention/rain garden soils, and replacing the removed soils with soils meeting the design specification.
- Prevent compacting Bioretention and rain garden BMPs by excluding construction equipment and foot traffic. Protect completed lawn and landscaped areas from compaction due to construction equipment.
- Control erosion and avoid introducing sediment from surrounding land uses onto permeable pavements. Do not allow muddy construction equipment on the base material or pavement. Do not allow sediment-laden runoff onto permeable pavements.
- Pavements fouled with sediments or no longer passing an initial infiltration test must be cleaned using procedures from the local stormwater manual or the manufacturer's procedures.
- Keep all heavy equipment off existing soils under LID facilities that have been excavated to final grade to retain the infiltration rate of the soils.

Additional Guidance

See Chapter 5: Precision Site Preparation, Construction & Inspection of LID Facilities in the LID Technical Guidance Manual for Puget Sound (2012) for more detail on protecting LID integrated management practices.

Note that the LID Technical Guidance Manual for Puget Sound (2012) is for additional informational purposes only. You must follow the guidance within this manual if there are any discrepancies between this manual and the LID Technical Guidance Manual for Puget Sound (2012).

Suggested BMPs

- 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 (TSD) (Geotextile-Encased Check Dam)
- BMP C231: Brush Barrier
- BMP C233: Silt Fence
- BMP C234: Vegetated Strip

Construction Stormwater Pollution Prevention Plan Checklist

Project Name: _____

City Reference No. _____

Construction Permit No. _____

Review Date: _____

On-site Inspection Review Date: _____

Construction SWPPP Reviewer: _____

Section I – CSWPPP Narrative

Construction Stormwater Pollution Prevention Elements

1. _____ Describe how each of the Construction Stormwater Pollution Prevention Elements has been addressed through the Construction SWPPP.
2. _____ Identify the type and location of BMPs used to satisfy the required element.
3. _____ Provide written justification identifying the reason an element is not applicable to the proposal.

Thirteen Required Elements - Construction Stormwater Pollution Prevention Plan

1. _____ Mark Clearing Limits
2. _____ Establish Construction Access
3. _____ Control Flow Rates
4. _____ Install Sediment Controls
5. _____ Stabilize Soils
6. _____ Protect Slopes
7. _____ Protect Drain Inlets
8. _____ Stabilize Channels and Outlets
9. _____ Control Pollutants
10. _____ Control De-Watering
11. _____ Maintain BMPs
12. _____ Manage the Project
13. _____ Protect Low Impact Development BMPs

Project Description

1. _____ Total project area
2. _____ Total proposed impervious area
3. _____ Total proposed area to be disturbed, including off-site borrow and fill areas
4. _____ Total volumes of proposed cut and fill

Existing Site Conditions

1. _____ Description of the existing topography
2. _____ Description of the existing vegetation
3. _____ Description of the existing drainage

Adjacent Areas

1. Description of adjacent areas which may be affected by site disturbance or drain to project site.
 - _____ a) Streams
 - _____ b) Lakes
 - _____ c) Wetlands
 - _____ d) Residential Areas
 - _____ e) Roads
 - _____ f) Other
2. _____ Description of the downstream drainage path leading from the site to the receiving body of water. (Minimum distance of 400 yards.)

Critical Areas

1. _____ Description of critical areas that are on or adjacent to the site.
2. _____ Description of special requirements for working in or near critical areas.

Soils

1. Description of on-site soils.
 - _____ a) Soil name(s)
 - _____ b) Soil mapping unit
 - _____ c) Erodibility
 - _____ d) Settleability
 - _____ e) Permeability
 - _____ f) Depth
 - _____ g) Texture
 - _____ h) Soil Structure

Erosion Problem Areas

1. _____ Description of potential erosion problems on site.

Construction Phasing

1. _____ Construction sequence
2. _____ Construction phasing (if proposed)

Construction Schedule

1. _____ Provide a proposed construction schedule.
2. _____ Wet Season Construction Activities
 - _____ a) Proposed wet season construction activities.
 - _____ b) Proposed wet season construction restraints for environmentally sensitive/critical areas.

Financial/Ownership Responsibilities

1. _____ Identify the property owner responsible for the initiation of bonds and/or other financial securities.
2. _____ Describe bonds and/or other evidence of financial responsibility for liability associated with erosion and sedimentation impacts.

Engineering Calculations

1. _____ Provide Design Calculations.
 - _____ a) Sediment Ponds/Traps
 - _____ b) Diversions
 - _____ c) Waterways
 - _____ d) Runoff/Stormwater Detention Calculations

Section II - Erosion and Sediment Control Plans

General

1. _____ Vicinity Map
2. _____ City/County of _____ Clearing and Grading Approval Block
3. _____ Erosion and Sediment Control Notes

Site Plan

1. _____ Note legal description of subject property.
2. _____ Show North Arrow.
3. _____ Indicate boundaries of existing vegetation, e.g. tree lines, pasture areas, etc.
4. _____ Identify and label areas of potential erosion problems.
5. _____ Identify on-site or adjacent surface waters, critical areas and associated buffers.
6. _____ Identify FEMA base flood boundaries and Shoreline Management boundaries (if applicable).
7. _____ Show existing and proposed contours.
8. _____ Indicate drainage basins and direction of flow for individual drainage areas.
9. _____ Label final grade contours and identify developed condition drainage basins.
10. _____ Delineate areas that are to be cleared and graded.
11. _____ Show all cut and fill slopes indicating top and bottom of slope catch lines.

Conveyance Systems

1. _____ Designate locations for swales, interceptor trenches, or ditches.
2. _____ Show all temporary and permanent drainage pipes, ditches, or cut-off trenches required for erosion and sediment control.
3. _____ Provide minimum slope and cover for all temporary pipes or call out pipe inverts.
4. _____ Show grades, dimensions, and direction of flow in all ditches, swales, culverts and pipes.
5. _____ Provide details for bypassing off-site runoff around disturbed areas.
6. _____ Indicate locations and outlets of any dewatering systems.

Location of Detention BMPs

1. _____ Identify location of detention BMPs.

Erosion and Sediment Control Facilities

1. _____ Show the locations of sediment trap(s), pond(s), pipes and structures.
2. _____ Dimension pond berm widths and inside and outside pond slopes.
3. _____ Indicate the trap/pond storage required and the depth, length, and width dimensions.
4. _____ Provide typical section views through pond and outlet structure.

5. _____ Provide typical details of gravel cone and standpipe, and/or other filtering devices.
6. _____ Detail stabilization techniques for outlet/inlet.
7. _____ Detail control/restrictor device location and details.
8. _____ Specify mulch and/or recommended cover of berms and slopes.
9. _____ Provide rock specifications and detail for rock check dam(s), if applicable.
10. _____ Specify spacing for rock check dams as required.
11. _____ Provide front and side sections of typical rock check dams.
12. _____ Indicate the locations and provide details and specifications for silt fabric.
13. _____ Locate the construction entrance and provide a detail.

Detailed Drawings

1. _____ Any structural practices used that are not referenced in the Ecology Manual should be explained and illustrated with detailed drawings.

Other Pollutant BMPs

1. _____ Indicate on the site plan the location of BMPs to be used for the control of pollutants other than sediment, e.g., concrete wash water.

Monitoring Locations

1. _____ Indicate on the site plan the water quality sampling locations to be used for monitoring water quality on the construction site, if applicable.

Best Management Practices Standards and Specifications

This appendix contains standards and specifications for construction stormwater pollution prevention best management practices consistent with Chapter 4 of Volume II of the 2024 Washington State Department of Ecology Stormwater Management Manual for Western Washington.

Best Management Practices (BMPs) are defined as schedules of activities, prohibitions of practices, maintenance procedures, and structural and/or managerial practices, that when used singly or in combination, prevent or reduce the release of pollutants to waters of Washington State. This Appendix contains standards and specifications for temporary BMPs to be used as applicable during the construction phase of a project. Often using BMPs in combination is the best method to meet Construction Stormwater Pollution Prevention Plan (CSWPPP) requirements.

None of the BMPs listed below will work successfully through the construction project without inspection and maintenance. Regular inspections to identify problems with the operation of each BMP, and the timely repair of any problems are essential to the continued operation of the BMPs

Section B.1 contains the standards and specifications for Source Control BMPs.

Section B.2 contains the standards and specifications for Runoff Conveyance and Treatment BMPs.

The standards for each individual BMP are divided into four sections:

1. Purpose
2. Conditions of Use
3. Design and Installation Specifications
4. Maintenance Standards

Note that the “Conditions of Use” always refers to site conditions. As site conditions change, BMPs must be changed to remain in compliance.

B.1 Source Control BMPs

This section contains the standards and specifications for Source Control BMPs. Table B.1.1, below, shows the relationship of the BMPs in Section B.1 to the Construction Stormwater Pollution Prevention Plan (CSWPPP) Elements described in Section A.3.3. Elements not shown on Table B.1.1 are not satisfied through installation of Source Controls.

Table B.1.1 Source Control BMPs by SWPPP Element

BMP or Element Name	Element #1: Preserve Vegetation/ Mark Clearing Limit	Element #2: Establish Construction Access	Element #5: Stabilize Soils	Element #6: Protect Slopes	Element #8: Stabilize Channels and Outlet	Element #9: Control Pollutants	Element #11: Maintain BMPs	Element #12: Manage the Project	Element #13: Protect Low Impact Development
BMP C101: Preserving Natural Vegetation	✓								
BMP C102: Buffer Zones	✓								✓
BMP C103: High Visibility Fence	✓								✓
BMP C105: Stabilized Construction Entrance / Exit		✓							
BMP C106: Wheel Wash		✓							
BMP C107: Construction Road/Parking Area Stabilization		✓							
BMP C120: Temporary and Permanent Seeding			✓	✓					
BMP C121: Mulching			✓	✓					
BMP C122: Nets and Blankets			✓	✓	✓				
BMP C123: Plastic Covering			✓	✓					
BMP C124: Sodding			✓	✓					
BMP C125: Topsoiling / Composting			✓						
BMP C126: Polyacrylamide (PAM) for Soil Erosion Protection			✓						

Table B.1.1 Source Control BMPs by SWPPP Element (continued)

BMP or Element Name	Element #1: Preserve Vegetation/ Mark Clearing Limit	Element #2: Establish Construction Access	Element #5: Stabilize Soils	Element #6: Protect Slopes	Element #8: Stabilize Channels and Outlet	Element #9: Control Pollutants	Element #11: Maintain BMPs	Element #12: Manage the Project	Element #13: Protect Low Impact Development
BMP C130: Surface Roughening			✓	✓					
BMP C131: Gradient Terraces			✓	✓					
BMP C140: Dust Control			✓						
BMP C150: Materials on Hand							✓	✓	
BMP C151: Concrete Handling						✓			
BMP C152: Sawcutting and Surfacing Pollution Prevention						✓			
BMP C153: Material Delivery, Storage and Containment						✓			
BMP C154: Concrete Washout Area						✓			
BMP C160: Certified Erosion and Sediment Control Lead							✓	✓	
BMP C162: Scheduling								✓	

[BMP T101: Tree Protection Requirements](#)

[BMP-C101: Preserving Natural Vegetation](#)

[BMP-C102: Buffer Zones](#)

[BMP-C103: High Visibility Fence](#)

[BMP-C105: Stabilized Construction Entrance/Exit](#)

[BMP-C106: Wheel Wash](#)

[BMP-C107: Construction Road/Parking Area Stabilization](#)

[BMP T5.13: Post-Construction Soil Quality and Depth](#)

[BMP-C120: Temporary and Permanent Seeding](#)

[BMP-C121: Mulching](#)

[BMP-C122: Nets and Blankets](#)

[BMP-C123: Plastic Covering](#)

[BMP-C124: Sodding](#)

[BMP-C125: Topsoiling / Composting](#)

[BMP-C126: Polyacrylamide \(PAM\) for Soil Erosion Protection](#)

[BMP-C130: Surface Roughening](#)

[BMP-C131: Gradient Terraces](#)

[BMP-C140: Dust Control](#)

[BMP-C150: Materials on Hand](#)

[BMP-C151: Concrete Handling](#)

[BMP-C152: Sawcutting and Surfacing Pollution Prevention](#)

[BMP-C153: Material Delivery, Storage and Containment](#)

[BMP-C154: Concrete Washout Area](#)

[BMP-C160: Certified Erosion and Sediment Control Lead](#)

[BMP-C162: Scheduling](#)

B.2 Runoff Conveyance and Treatment BMPs

This section contains the standards and specifications for Runoff Conveyance and Treatment BMPs. Table B.2.1, below, shows the relationship of the BMPs in Section B.2 to the Construction Stormwater Pollution Prevention Plan (SWPPP) Elements described in Section A.3.3.

Table B.2.1 Runoff Conveyance and Treatment BMPs by SWPPP Element

BMP or Element Name	Element #3: Control Flow Rates	Element #4: Install Sediment Controls	Element #6: Protect Slopes	Element #7: Protect Drain Inlets	Element #8: Stabilize Channels and Outlets	Element #9: Control Pollutants	Element #10: Control DeWatering	Element #13: Protect Low Impact Development
BMP C200: Interceptor Dike and Swale			✓					✓
BMP C201: Grass-Lined Channels			✓					✓
BMP C202: Channel Lining					✓			
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 (TSD) (Geotextile Encased Check Dam)			✓					✓
BMP C209: Outlet Protection	✓				✓			

Table B.2.1 Runoff Conveyance and Treatment BMPs by SWPPP Element (continued)

BMP or Element Name	Element #3: Control Flow Rates	Element #4: Install Sediment Controls	Element #6: Protect Slopes	Element #7: Protect Drain Inlets	Element #8: Stabilize Channels and Outlets	Element #9: Control Pollutants	Element #10: Control DeWatering	Element #13: Protect Low Impact Development
BMP C220: Storm Drain Inlet Protection				✓				
BMP C231: Brush Barrier		✓						✓
BMP C232: Gravel Filter Berm		✓						
BMP C233: Silt Fence		✓						✓
BMP C234: Vegetated Strip		✓						✓
BMP C235: Wattles	✓	✓						
BMP C236: Vegetated Filtration							✓	
BMP C240: Sediment Trap	✓	✓						
BMP C241: Temporary Sediment Pond	✓	✓						
BMP C250: Construction Stormwater Chemical TreatmentSediment Pond		✓				✓		
BMP C251: Construction Stormwater Filtration		✓				✓		
BMP C252: High pH Neutralization Using CO2						✓		
BMP C253: pH Control for High pH Water						✓		

[BMP-C200: Interceptor Dike and Swale](#)

[BMP-C201: Grass-Lined Channels](#)

[BMP-C202: Channel Lining](#)

[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 \(TSD\) \(Geotextile-Encased Check Dam\)](#)

[BMP-C209: Outlet Protection](#)

[BMP-C220: Storm Drain Inlet Protection](#)

[BMP-C231: Brush Barrier](#)

[BMP-C232: Gravel Filter Berm](#)

[BMP-C233: Silt Fence](#)

[BMP-C234: Vegetated Strip](#)

[BMP-C235: Wattles](#)

[BMP-C236: Vegetative Filtration](#)

[BMP-C240: Sediment Trap](#)

[BMP-C241: Temporary Sediment Pond](#)

[BMP-C250: Construction Stormwater Chemical Treatment](#)

[BMP-C251: Construction Stormwater Filtration](#)

[BMP-C252: High pH Neutralization Using CO₂](#)

[BMP-C253: pH Control for High pH Water](#)

Appendix C

Construction Stormwater Pollution Prevention Additional Standards and Specifications for Local Regulations and Practices

APPENDIX CONTENTS AND FIGURES:

Links:

[Alternate Materials, Methods, or Modifications Request form](#)

[Turbidity and pH Monitoring Requirements Standards for Plans](#)

[CSWPPP Short Form for Small Construction Projects](#)

[CSWPPP \(Construction Stormwater Pollution Prevention Plan\) Long Form](#)

[Erosion Control Estimate Form](#)

[Geotechnical Report Requirements](#)

Forms:

Construction Emergency Contact Sheet

Site Inspection Form

Standard Notes for Erosion Control Plans

Background Information on Chemical Treatment

Construction Emergency Contact Form

Date _____

Project Name: _____

Project Address: _____

Type of Work: _____

.....

Developer: _____

Contact: _____ Office: _____ 24-hr: _____

General Contractor: _____

Contact: _____ Office: _____ 24-hr: _____

Utilities Sub-Contractor: _____

President/Owner: _____

Office: _____ Home: _____ 24-hr: _____

Project Manager: _____

Office: _____ Home: _____ 24-hr: _____

Superintendent: _____

Office: _____ Home: _____ 24-hr: _____

Foreman: _____

Office: _____ Home: _____ 24-hr: _____

Erosion Control Lead: _____

Office: _____ Home: _____ 24-hr: _____

City of Bellevue Inspectors

Clearing & Grading Inspector: _____

Office: (425) 452- _____

Building Inspector: _____

Office: (425) 452- _____

Construction Emergency Contact Information

Injury Or Fire – Call 9-1-1

Project Location or Address (If no address, describe the location of the construction access so that it can be relayed to emergency responders)

.....

Spill

(Any hazardous materials including diesel fuel, gasoline, hydraulic fluid that enters the storm drain system or receiving waters)

- Call Washington State Department of Ecology (24 hrs.) 425-649-7000
 - Call Utilities Operations & Maintenance 425-452-7840
 - Call Clearing & Grading Inspector or 425-452-4570
-

Fish Kill Or Distress

- Call Washington Department of Fish and Wildlife Area Habitat Biologist 425-313-5683
 - Call Clearing & Grading Inspector or 425-452-4570
-

Water Quality Impacts

(Site stormwater runoff turbidity exceeds 250 ntu)

- Call Washington State Department of Ecology (24 hrs.) 425-649-7000
 - Call Clearing & Grading Inspector or 425-452-4570
-

Archaeological Finds

- Call Clearing & Grading Inspector or 425-452-4570
- Call Army Corps of Engineers, Seattle office, Lyz Ellis, 206-764-3634 (This is all you need to do under the permit). Or if there is no response and there is a need for immediate help, call Dr. Whitlam at the Washington State Office of Historic and Archaeological Program (OHAP), 360-407-0771.

CSWPPP Site Inspection Form

Project _____ Permit No. _____

Inspector _____ Date _____ Time _____

Inspection Type: ☐ After a rain event ☐ Weekly ☐ Turbidity benchmark exceedance

☐ Other - explain: _____

Weather: _____

Precipitation: Since last inspection _____ inches In last 24 hours _____ inches

Description of General Site Conditions: _____

Will existing BMPs need to be modified or removed, or other BMPs installed ☐ YES ☐ NO

If YES, list the action items to be completed on the following table:

Actions to be Completed	Date Completed/Initials
1.	
2.	
3.	
4.	
5.	

Was water quality sampling (turbidity and pH) part of this inspection? ☐ YES ☐ NO

If yes, attach Turbidity & pH Monitoring Data Sheet

Is the site in compliance with the CSWPPP and the permit requirements? ☐ YES ☐ NO

If no, indicate the tasks necessary to bring the site into compliance on the "Actions to be Completed" table above, and include dates each job will be completed.

■ If no, has the non-compliance been reported to the City of Bellevue? ☐ YES ☐ NO

■ If no, should the CSWPPP be modified? ☐ YES ☐ NO

I certify that this report is true, accurate, and complete, to the best of my knowledge and belief.

Name of Inspector (print) _____

Title/Qualification _____

Signature _____ Date _____

CSWPPP Site Inspection Form

Project _____

Permit No. _____

Inspector _____

Date _____ Time _____

G=Good, F=Fair, P=Poor, Y=Yes, N=No

Site BMPs	Overall Condition			Need Repair?		Comments/Observations
Element 1: Clearing Limits						
■ Existing Vegetation	G	F	P	Y	N	
■ Plastic or Metal Fence	G	F	P	Y	N	
	G	F	P	Y	N	
Element 2: Construction Access						
■ Stabilized Construction Entrance	G	F	P	Y	N	
	G	F	P	Y	N	
	G	F	P	Y	N	
Element 3: Control Flow Rates						
■ Sediment Trap	G	F	P	Y	N	
	G	F	P	Y	N	
	G	F	P	Y	N	
Element 4: Sediment Controls						
■ Silt Fence	G	F	P	Y	N	
■ Straw Wattles	G	F	P	Y	N	
	G	F	P	Y	N	
	G	F	P	Y	N	
Element 5: Stabilize Soils						
■ Mulch	G	F	P	Y	N	
■ Plastic Covering	G	F	P	Y	N	
	G	F	P	Y	N	
	G	F	P	Y	N	

Site BMPs	Overall Condition			Need Repair?		Comments/Observations
Element 6: Protect Slopes						
■ Plastic Covering	G	F	P	Y	N	
■ Seeding	G	F	P	Y	N	
	G	F	P	Y	N	
Element 7: Protect Drain Inlets						
■ Storm Drain Inlet Protection	G	F	P	Y	N	
	G	F	P	Y	N	
Element 8: Stabilize Channels & Outlets						
■ Outlet Protection	G	F	P	Y	N	
	G	F	P	Y	N	
	G	F	P	Y	N	
Element 9: Control Pollutants						
■ Concrete Handling	G	F	P	Y	N	
■ Material Delivery, Storage Containment	G	F	P	Y	N	
Element 10: Control Dewatering						
	G	F	P	Y	N	
	G	F	P	Y	N	
	G	F	P	Y	N	
Element 13: Protect Low Impact Development BMPs						
■ Buffer Zones	G	F	P	Y	N	
■ High Visibility Fence	G	F	P	Y	N	
■ Silt Fence	G	F	P	Y	N	
■ Vegetated Strip	G	F	P	Y	N	
	G	F	P	Y	N	

Standard Notes for Erosion Control Plans

1. All clearing & grading construction must be in accordance with City of Bellevue (COB) Clearing & Grading Code, Clearing & Grading Development Standards, Land Use Code, Uniform Building Code, permit conditions, and all other applicable codes, ordinances, and standards. The design elements within these plans have been reviewed according to these requirements. Any variance from adopted erosion control standards is not allowed unless specifically approved by the City of Bellevue Development Services (DSD) prior to construction.
2. It shall be the sole responsibility of the applicant and the professional civil engineer to correct any error, omission, or variation from the above requirements found in these plans. All corrections shall be at no additional cost or liability to the COB.
3. Approval of this erosion/sedimentation control (ESC) plan does not constitute an approval of permanent road or drainage design (e.g. size and location of roads, pipes, restrictors, channels, retention facilities, utilities, etc.).
4. A copy of the approved plans and drawings must be on-site during construction. The applicant is responsible for obtaining any other required or related permits prior to beginning construction.
5. The implementation of these ESC plans and the construction, maintenance, replacement, and upgrading of these ESC facilities is the responsibility of the applicant/contractor until all construction is completed and approved and vegetation/landscaping is established.
6. The ESC facilities shown on this plan must be constructed in conjunction with all clearing and grading activities, and in such a manner as to ensure that sediment and sediment laden water do not enter the drainage system, roadways, or violate applicable water standards.
7. The ESC facilities shown on this plan are the minimum requirements for anticipated site conditions. During the construction period, these ESC facilities shall be upgraded as needed for unexpected storm events and to ensure that sediment and sediment-laden water do not leave the site.
8. All locations of existing utilities have been established by field survey or obtained from available records and should, therefore, be considered only approximate and not necessarily complete. It is the sole responsibility of the contractor to independently verify the accuracy of all utility locations and to discover and avoid any other utilities not shown which may be affected by the implementation of this plan.
9. The boundaries of the clearing limits shown on this plan shall be clearly flagged in the field prior to construction. During the construction period, no disturbance beyond the flagged clearing limits shall be permitted. The flagging shall be maintained by the applicant/contractor for the duration of construction.
10. Clearing shall be limited to the areas within the approved disturbance limits. Exposed soils must be covered at the end of each working day when working from October 1st through April 30th. From May 1st through September 30th, exposed soils must be covered at the end of each construction week and at the threat of rain.
11. At no time shall more than one foot of sediment be allowed to accumulate within a trapped catch basin. All catch basins and conveyance lines shall be cleaned prior to paving. The cleaning operation shall not flush sediment laden water into the downstream system.

12. Stabilized construction entrances shall be installed at the beginning of construction and maintained for the duration of the project.
13. The contractor must maintain a sweeper on site during earthwork and immediately remove soil that has been tracked onto paved areas as result of construction.
14. The ESC facilities shall be inspected daily by the applicant/contractor and maintained as necessary to ensure their continued functioning.
15. Any excavated material removed from the construction site and deposited on property within the City limits must be done in compliance with a valid clearing & grading permit. Locations for the mobilization area and stockpiled material must be approved by the Clearing and Grading Inspector at least 24 hours in advance of any stockpiling.
16. The ESC facilities on inactive sites shall be inspected and maintained a minimum of once a month or within the 48 hours following a major storm event.
17. Final site grading must direct drainage away from all building structures at a minimum 5% slope, per the International Residential Code (IRC) R401.3.

Background Information on Chemical Treatment

Coagulation and flocculation have been used for over a century to treat water. It is used less frequently for the treatment of wastewater. The use of coagulation and flocculation for treating stormwater is a very recent application. Experience with the treatment of water and wastewater has resulted in a basic understanding of the process, in particular factors that affect performance. This experience can provide insights as to how to most effectively design and operate similar systems in the treatment of stormwater.

Fine particles suspended in water give it a milky appearance, measured as turbidity. Their small size, often much less than 1 μm in diameter, give them a very large surface area relative to their volume. These fine particles typically carry a negative surface charge. Largely because of these two factors, small size and negative charge, these particles tend to stay in suspension for extended periods of time. Thus, removal is not practical by gravity settling. These are called stable suspensions. Polymers, as well as inorganic chemicals such as alum, speed the process of clarification. The added chemical destabilizes the suspension and causes the smaller particles to agglomerate. The process consists of three steps: coagulation, flocculation, and settling or clarification. Each step is explained below as well as the factors that affect the efficiency of the process.

Coagulation: Coagulation is the first step. It is the process by which negative charges on the fine particles that prevent their agglomeration are disrupted. Chemical addition is one method of destabilizing the suspension, and polymers are one class of chemicals that are generally effective. Chemicals that are used for this purpose are called coagulants. Coagulation is complete when the suspension is destabilized by the neutralization of the negative charges. Coagulants perform best when they are thoroughly and evenly dispersed under relatively intense mixing. This rapid mixing involves adding the coagulant in a manner that promotes rapid dispersion, followed by a short time for destabilization of the particle suspension. The particles are still very small and are not readily separated by clarification until flocculation occurs.

Flocculation: Flocculation is the process by which fine particles that have been destabilized bind together to form larger particles that settle rapidly. Flocculation begins naturally following coagulation, but is enhanced by gentle mixing of the destabilized suspension. Gentle mixing helps to bring particles in contact with one another such that they bind and continually grow to form “flocs.” As the size of the flocs increases they become heavier and tend to settle more rapidly.

Clarification: The final step is the settling of the particles. Particle density, size and shape are important during settling. Dense, compact flocs settle more readily than less dense, fluffy flocs. Because of this, flocculation to form dense, compact flocs is particularly important during water treatment. Water temperature is important during settling. Both the density and viscosity of water are affected by temperature; these in turn affect settling. Cold temperatures increase viscosity and density, thus slowing down the rate at which the particles settle.

The conditions under which clarification is achieved can affect performance. Currents can affect settling. Currents can be produced by wind, by differences between the temperature of the incoming water and the water in the clarifier, and by flow conditions near the inlets and outlets. Quiescent water such as that which occurs during batch clarification provides a good

environment for effective performance as many of these factors become less important in comparison to typical sedimentation basins. One source of currents that is likely important in batch systems is movement of the water leaving the clarifier unit.

Given that flocs are relatively small and light the exit velocity of the water must be as low as possible. Sediment on the bottom of the basin can be resuspended and removed by fairly modest velocities.

Coagulants: Polymers are large organic molecules that are made up of subunits linked together in a chain- like structure. Attached to these chain-like structures are other groups that carry positive or negative charges, or have no charge. Polymers that carry groups with positive charges are called cationic, those with negative charges are called anionic, and those with no charge (neutral) are called nonionic.

Cationic polymers can be used as coagulants to destabilize negatively charged turbidity particles present in natural waters, wastewater and stormwater. Aluminum sulfate (alum) can also be used as this chemical becomes positively charged when dispersed in water. In practice, the only way to determine whether a polymer is effective for a specific application is to perform preliminary or on-site testing.

Polymers are available as powders, concentrated liquids, and emulsions (which appear as milky liquids). The latter are petroleum based, which are not allowed for construction stormwater treatment. Polymer effectiveness can degrade with time and from other influences. Thus, manufacturers' recommendations for storage should be followed. Manufacturer's recommendations usually do not provide assurance of water quality protection or safety to aquatic organisms. Consideration of water quality protection is necessary in the selection and use of all polymers.

Application Considerations: Application of coagulants at the appropriate concentration or dosage rate for optimum turbidity removal is important for management of chemical cost, for effective performance, and to avoid aquatic toxicity. The optimum dose in each application depends on several site-specific features. Turbidity of untreated water can be important with turbidities greater than 5,000 NTU. The surface charge of particles to be removed is also important. Environmental factors that can influence dosage rate are water temperature, pH, and the presence of constituents that consume or otherwise affect polymer effectiveness. Laboratory experiments indicate that mixing previously settled sediment (floc sludge) with the untreated stormwater significantly improves clarification, therefore reducing the effective dosage rate. Preparation of working solutions and thorough dispersal of polymers in water to be treated is also important to establish the appropriate dosage rate.

For a given water sample, there is generally an optimum dosage rate that yields the lowest residual turbidity after settling. When dosage rates below this optimum value (under dosing) are applied, there is an insufficient quantity of coagulant to react with, and therefore destabilize, all of the turbidity present. The result is residual turbidity (after flocculation and settling) that is higher than with the optimum dose. Overdosing, application of dosage rates greater than the optimum value, can also negatively impact performance. Again, the result is higher residual turbidity than that with the optimum dose.

Mixing in Coagulation/Flocculation: The G-value, or just "G", is often used as a measure of the mixing intensity applied during coagulation and flocculation. The symbol G stands for "velocity

gradient”, which is related in part to the degree of turbulence generated during mixing. High G-values mean high turbulence, and vice versa. High G-values provide the best conditions for coagulant addition. With high G’s, turbulence is high and coagulants are rapidly dispersed to their appropriate concentrations for effective destabilization of particle suspensions.

Low G-values provide the best conditions for flocculation. Here, the goal is to promote formation of dense, compact flocs that will settle readily. Low G’s provide low turbulence to promote particle collisions so that flocs can form. Low G’s generate sufficient turbulence such that collisions are effective in floc formation, but do not break up flocs that have already formed.

Design engineers wishing to review more detailed presentations on this subject are referred to the following textbooks.

- Fair, G., J. Geyer and D. Okun, Water and Wastewater Engineering, Wiley and Sons, NY, 1968.
- American Water Works Association, Water Quality and Treatment, McGraw-Hill, NY, 1990.
- Weber, W.J., Physiochemical Processes for Water Quality Control, Wiley and Sons, NY, 1972.

Adjustment of the pH and Alkalinity: The pH must be in the proper range for the polymers to be effective, which is 6.5 to 8.5 for Calgon CatFloc 2953, the most commonly used polymer. As polymers tend to lower the pH, it is important that the stormwater have sufficient buffering capacity. Buffering capacity is a function of alkalinity. Without sufficient alkalinity, the application of the polymer may lower the pH to below 6.5. A pH below 6.5 not only reduces the effectiveness of the polymer, it may create a toxic condition for aquatic organisms. Stormwater may not be discharged without readjustment of the pH to above 6.5. The target pH should be within 0.2 standard units of the receiving water pH

Experience gained at several projects in the City of Redmond has shown that the alkalinity needs to be at least 50 mg/L to prevent a drop-in pH to below 6.5 when the polymer is added.



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