HIP Pre-Design Information
City Example HIP Submittal Packet

Calculations are estimates and based on proposed project options. These numbers are subject to change based on final project determination.

Total Parcel Area: 24,000ft^2

Total Treatable Area: 24,000 ft^2

Minimum 25% treatment: 6,000 ft^2

Soil Information (see attached soil characterization sheets):

- Soil Test #1 – A Soil Drainage Test was completed for this site. No groundwater or bedrock was found, and the infiltration rate is marginal.
- Soil Test #2 –A Simple Investigation was completed to check for bedrock or groundwater. No bedrock or groundwater was discovered, and infiltration rate is assumed marginal based on information from Soil Test #1.

Proposed BMPs:

1. Rain Garden – Treating partial driveway, possibly piped flow

2. Infiltration trench – Treating piped flow from partial roof area and sheet flow from surrounding lawn and landscape

3. Dispersion Trench/Native Landscaping – Dispersing sheet flow off of lawn and landscaping areas to native landscaping at the south end of property

Estimated Area to Be Treated: 11,270 ft^2
Estimated Reimbursement Budget: $14,651

Soil Characterization Sheet – Soil Test #1(Rain Garden)

Step 1. Review available soil data and recommend on-site soil testing
To be completed by HIP Coordinator.

Off-site test pit data. Review map provided by HIP. If one test pit is within 100' of any property line, list only that data. Otherwise, please list three representative test pits, preferably within ¼ mile of the site.

Test Pit Number	Soil Type/ Infiltration Rate	Depth to Groundwater	Depth to Bedrock
2010GE TP-039	N/A	5.0 ft	N/A
NEP_PIT_3	.43	2.8	N/A
NEP_PIT_4	.45	5.5	N/A

Based on this information, the recommended soil investigation procedure to follow in Step 2 is (determined by HIP Coordinator):

SOIL DRAINAGE TEST

Step 2. On-site testing procedure to determine soil type
To be completed by HIP Coordinator or the project designer

Follow the soil testing methods and instructions for infiltration BMPs, found in the HIP Design Handbook (Infiltration Trench and Lake Whatcom Rain Garden).

Note: If designing for infiltration facilities in multiple locations, it is suggested that each location be checked for factors that might affect design considerations. Consult with the HIP Coordinator to determine the number of additional investigations recommended for each unique site.

I completed an on-site soil investigation using (check boxes of all completed tests):

X Soil Drainage Test

I used the Rain Garden Manual

After one wet season (or three dry season) tests I have determined that my soil drainage rate is 0.43 in/hr.

I've characterized my soil as:

- ☐ Good
- ☐ Moderate
- X Marginal
- ☐ Poor

☐ Simple Investigation

I dug to a depth of 3' below ground surface and found:

- ☐ Groundwater
- ☐ Bedrock
- ☐ Other: _____
  _____
  _____
- ☐ None of the above

☐ Soil Texture Test

I used this test method to determine soil type (circle one):

Clay	Clayey Silt
Silt/Loam	Sandy Loam/Sand

I've characterized my soil as:

- ☐ Good
- ☐ Moderate
- ☐ Marginal
- ☐ Poor

Soil Characterization Sheet – Soil Test #2(Infiltration)

Step 1. Review available soil data and recommend on-site soil testing
To be completed by HIP Coordinator.

Off-site test pit data. Review map provided by HIP. If one test pit is within 100' of any property line, list only that data. Otherwise, please list three representative test pits, preferably within ¼ mile of the site.

Test Pit Number	Soil Type/ Infiltration Rate	Depth to Groundwater	Depth to Bedrock
2010GE TP-039	N/A	5.0 ft	N/A
NEP_PIT_3	.43	2.8	N/A
NEP_PIT_4	.45	5.5	N/A

Based on this information, the recommended soil investigation procedure to follow in Step 2 is (determined by HIP Coordinator):

SIMPLE INVESTIGATION- based on Soil Test #1 Information

Step 2. On-site testing procedure to determine soil type
To be completed by HIP Coordinator or the project designer

Follow the soil testing methods and instructions for infiltration BMPs, found in the HIP Design Handbook (Infiltration Trench and Lake Whatcom Rain Garden).

Note: If designing for infiltration facilities in multiple locations, it is suggested that each location be checked for factors that might affect design considerations. Consult with the HIP Coordinator to determine the number of additional investigations recommended for each unique site.

I completed an on-site soil investigation using (check boxes of all completed tests):

☐ Soil Drainage Test

I used the Rain Garden Manual

After one wet season (or three dry season) tests I have determined that my soil drainage rate is _____ in/hr.

I've characterized my soil as:

- ☐ Good
- ☐ Moderate
- ☐ Marginal
- ☐ Poor

X Simple Investigation

I dug to a depth of 3' below ground surface and found:

- ☐ Groundwater
- ☐ Bedrock
- ☐ Other: _____
  _____
  _____

X None of the above

☐ Soil Texture Test

I used this test method to determine soil type (circle one):

Clay	Clayey Silt
Silt/Loam	Sandy Loam/Sand

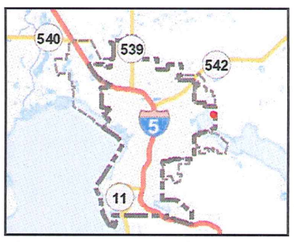
I've characterized my soil as:

- ☐ Good
- ☐ Moderate
- ☐ Marginal
- ☐ Poor

City of Bellingham WASHINGTON

CityIQ Map

Pre-Design - City Packet



Legend

- Address
- Park Labels
- Water Access Points
- Service Valve
  - Fireline Valve
  - Hydrant Valve
- Fitting
- Control Valve
  - Air Release
  - Blow Off
- Meters
  - Water Customer
  - Critical Water Customer
- Hydrants
  - COB
  - City Filling Station
  - Private Hydrants
- Water System Valve
  - Bypass Valve
  - Inline Valve
  - Tapping Valve
  - Zone Valve
- Network Structure
  - Enclosed Storage Facility
  - Pump Station
  - SamplingStation
  - Storage Basin
  - Treatment Plant
- SamplingStations
- Lateral Line
  - Fireline Service
  - Hydrant Service
  - Water Service Line
- Water Main
  - City Main; Active; Potable
  - City Main; Active; Untreated
  - City Main; Under Construction; Potable
  - Private Main; Active; Potable
  - Private Main; Active; Untreated
- Reservoirs
- Clean Outs
  - Active
  - Inactive
  - Under Construction
- Fitting
  - Active
  - Inactive
  - Under Construction
- Network Structures
- Sewer Access Points
- Sewer Lateral Lines
- Manholes
  - Active
  - Inactive
  - Under Construction
- Sewer Gravity Mains
  - City Mains, Inactive
  - City Mains, Active
  - City Mains, Under Construction
  - Private Mains, Active
  - Private Mains, Under Construction
- Sewer Pressurized Mains
  - COB - Active
  - COB - Under Constr.
  - COB - Inactive
  - Private, Active
- Tax Parcels
  - <all other values>
  - Care Facility
  - Hospital
  - Schools
- Contours - detail (ft)
  - 1000 FOOT
  - 100 FOOT
  - 25 FOOT
  - 5 FOOT
- Schools
  - Colleges/Universities
  - Elementary, Middle, High Schools
  - Private School or Preschool
- Fire Stations
- City Boundary

Notes

Printed: 3/8/2018 10:25:08 AM

O - Soil test locations

See attached sheets for details

31 0 16 31 Feet

THIS MAP IS NOT TO BE USED FOR NAVIGATION

City of Bellingham
City Hall - 210 Lottie Street
Bellingham, WA 98225
Phone: (360) 778-8300
Fax: (360) 778-8301
E-MAIL: permits@cob.org

LOCATION: [redacted]
DATE ISSUED: **6/2/2016**
EXPIRATION DATE:

PERMIT #: STM2016-[redacted]

LAND DISTURBANCE STORMWATER
GENERAL LAND DISTURBANCE

DESCRIPTION: **HIP Stormwater Retrofit Project**

SCOPE OF WORK: **HIP Project - Phase 2. Phase 1 already permitted per STM 2015[redacted]**

This phase involves a simple downspout dispersion system, the removal of impermeable pavement, and the installation of an infiltration drywell topped with permeable pavers to replace removed pavement

APPLICANT
, PHONE: Email: LIC #:
OWNER
[redacted] BELLINGHAM, WA [redacted] PHONE: Email: LIC #:

PROJECT VALUATION	$0.00

CONDITIONS

POST THIS PERMIT ONSITE WITH THE APPROVED PLANS

COMPLIANCE WITH ALL INSPECTIONS AND CONDITIONS REQUIRED PRIOR TO OCCUPANCY

ALL INSPECTIONS SHOULD BE SCHEDULED A MINIMUM OF 1 BUSINESS DAY IN ADVANCE
INSPECTION SCHEDULING INSTRUCTIONS
INSPECTION PHONE 360.778.8303 – 24 HOURS
WEB SCHEDULING WWW.COB.ORG/EPERMITS

Printed: 3/21/2018

Public Works

Permit Center
210 Lottie Street
Bellingham, WA 98225
phone: 360-778-8300
fax: 360-778-8301
www.cob.org

STORMWATER PERMIT APPLICATION

See separate handouts for complete submittal requirements and fees.

PROJECT INFORMATION

Site Address: 1234 Water Quality Dr. Parcel Number: 380322000000

Project Description: HIP Project

Install native landscaping, infiltration trench, rain garden, dispersion system

Total Site Area (SF): 24000 Total Land Disturbance (SF): 540 + tire tracks = ~650sf

Total Grading (CY): 36 Total Import (CY): 18 Total Export (CY): 18

*Grading over 500 CY requires a Major Grading Land Use Approval through Planning Department

STORMWATER MANAGEMENT REQUIREMENTS

☐ Minimum Req. #2 ☐ Minimum Req. #1-5 ☐ Minimum Req. #1-9 ☑ Lake Whatcom

Is this property subject to any **plat limitations** for stormwater or impervious surface?

☑ No ☐ Yes, _____

APPLICANT

Name: Jane and John Example

Address: 1234 Water Quality Drive

City/State/Zip: Bellingham, WA. 98226

Phone: 360-555-5555

E-mail: examplesjj@email.com

CONTRACTOR ☐ Same as applicant

Name:

Address:

City/State/Zip:

Phone:

E-mail:

PROPERTY OWNER ☒ Same as applicant

Name:

Address:

City/State/Zip:

Phone:

E-mail:

See Reverse / Next page

HARD SURFACE CALCULATION

When determining your permit level or if stormwater thresholds are met or exceeded the entire project must be considered. A project is that portion of a property, properties, or right of way subject to land disturbing activities, new hard surfaces and replaced hard surfaces. The hard surface on your property will determine the storm water utility fees and the stormwater development charge. All new or replaced hard surfaces should be accounted for, including any hard surface changes subsequent to 9/1/1995, that did not provide permanent water quality and quantity mitigation BMPs. If your project is in Lake Whatcom Watershed than you will also need to account for partially pervious surfaces. Below are excerpts from Bellingham Municipal Code 15.42 Stormwater Management that may assist you in your determination. Please also see the Stormwater Submittal Requirements packet.

"Hard surface" means an impervious surface, a permeable pavement, or a vegetated roof.

"Impervious surface" means 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. 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, packed gravel surfaces, packed earthen materials, or other surfaces which similarly impede the natural infiltration of stormwater.

"New impervious surface" means impervious surfaces that replace or supplant existing pervious surfaces. Further, any of the following are considered new impervious surfaces:

- Extending the pavement edge of a road or paving gravel shoulders
- Upgrading from dirt to gravel, asphalt, concrete or structural development
- Upgrading from gravel to asphalt, concrete or structural development
- Upgrading from chip seal to asphalt, concrete or structural development

"Replaced impervious surface" means, 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 is considered "replaced".

Description	Existing (SF)	Removed (SF)	Proposed Replaced (SF)	Proposed New (SF)
Non Pollution Generating (NPG) Hard Surface: Sidewalks, Paths, Patios etc.	3710	0	0	0
Pollution Generating (PG) (i.e. subject to vehicular traffic) Hard Surface: Driveway, Parking, etc.	1900	0	0	0
TOTAL HARD SURFACE	5610	0	0	0

I HEREBY ACKNOWLEDGE THAT I HAVE READ THIS PERMIT APPLICATION IN ITS ENTIRETY AND STATE THE INFORMATION IS CORRECT, AND AGREE TO COMPLY WITH ALL CITY ORDINANCES AND STATE LAWS REGULATING ACTIVITIES COVERED BY THIS PERMIT APPLICATION.

Applicant Signature

03/15/18
Date

Homeowner Incentive Program

Lake Whatcom Watershed Stormwater Considerations

Applicable to HIP-Eligible projects within Basin One of the Lake Whatcom Watershed, under the jurisdiction of the City of Bellingham and regulated by Bellingham Municipal Code.

Submitted on behalf of HIP-eligible participants by Eli Mackiewicz, City of Bellingham HIP representative in order to address *Lake Whatcom Stormwater Guidance* document and meet requirements for phosphorus- and/or flow-limiting projects as described in BMC 15.42.060, section B.3.d.

Contact:

Eli Mackiewicz
Engineering Technician / HIP Representative
City of Bellingham Public Works - Natural Resources
emackiewicz@cob.org
360-778-7800
www.lakewhatcomHIP.org

The Homeowner Incentive Program and the projects it supports are designed to go above and beyond all existing requirements for stormwater management, and specifically phosphorus reduction, applicable to single family lots in the Lake Whatcom Watershed. As such, HIP projects are compliant with land disturbing regulations, generally, and special regulations applicable to the Lake Whatcom watershed, specifically. Compliance can be demonstrated in multiple ways, as follows:

I. HIP Projects Meet the Phosphorus- and/or Flow-limiting Standard

All HIP Best Management Practices (BMPs) are specifically designed to maximize potential phosphorus reduction. Therefore, by definition, all HIP projects are phosphorus-limiting and most are flow-limiting as well. The following BMPs are defined by HIP and must follow specific HIP Design Guidelines in order to qualify for the program;

A. **Native Landscaping**. Replacing lawn or ineffective landscape, defined as landscape without adequate plant density and/or mulch layer, with a thick layer of low-Phosphorus mulch and native plants can reduce phosphorus discharge by up to 80%.

B. **Infiltration Trench/Drywell**. Based on modeling outputs derived through use of the Western Washington Hydrology Model (WWHM4 Pro), all HIP infiltration trenches will manage at least 92% of storm volumes via infiltration into native soil. Infiltration is assigned a phosphorus removal rate of 90%, per Department of Ecology data. Design and siting of this BMP requires intensive soil explorations in the immediate vicinity of the installation.

C. **Media Filter Drain (MFD)**. Based on modeling outputs derived through use of the Western Washington Hydrology Model (WWHM4 Pro), all HIP MFD installations will treat 95% of storm volumes via flow-through treatment media. MFDs are assigned a phosphorus removal rate of 87%, per Department of Ecology data. Design and siting of this BMP requires simplified soil explorations in the immediate vicinity of the installation.

D. **Dispersion**. Based on design standards common to local and state-wide guidance on full dispersion as a stormwater BMP, HIP Dispersion systems are expected to manage up to 100% of phosphorus and flow by spreading it into a properly-sized downstream vegetated area that varies in length from 25'-100' depending on the make-up of tributary surfaces.

E. **Lake Whatcom Rain Garden.** Based on modeling outputs derived through use of the Western Washington Hydrology Model (WWHM4 Pro), all HIP rain gardens will manage at least 92% of storm volumes via infiltration into native soil. Infiltration is assigned a phosphorus removal rate of 90%, per Department of Ecology data. Design and siting of

this BMP requires intensive soil explorations in the immediate vicinity of the installation. HIP Rain Garden design requirements have been adapted from the Rain Garden Handbook for Western Washington Homeowners, with changes made in order to maximize phosphorus reduction, specifically by the removal of underdrains and the modification of soil specifications.

F. **Permeable Surfacing**. This is a secondary HIP BMP only allowed as a protective surface over HIP Infiltration Trenches or MFDs. All materials must conform to manufacturer's specifications for depth of permeable subgrade, spacing, and infiltration rate.

G. **Rainwater Harvesting**. This is a secondary HIP BMP only allowed as a source of irrigation water for HIP-funded native landscaping areas. Cisterns used for other purposes are not eligible for HIP. Tanks exceeding particular dimensions and/or storage volumes will require a separate plumbing permit and separate submittal for review by the Building Services Department.

All HIP BMPs are required to be sized, located, and constructed following the HIP Design and Submittal Guidelines specific to each. This includes use and reference to HIP Standard Details, the HIP Material Specifications book, and HIP sizing calculators. Alternative sizing methods are not approved under the streamlined HIP design and submittal process, but may be utilized by qualified professionals at their discretion.

II. HIP Projects Comply with Minimum Requirements for Land Disturbing Projects

HIP Plans and Submittal Documents are intended to meet the minimum requirements for projects disturbing land and making changes to surfacing in the Lake Whatcom watershed. Specifically, these projects are not designed to result in the replacement of impervious or partially pervious surfaces in excess of thresholds set forth by Bellingham's redevelopment requirements. Stormwater management Minimum Requirements 1-5, as defined by the Department of Ecology and adopted by the City of Bellingham, are addressed as follows:

1. **Preparation of Stormwater Site Plans**. All HIP submittals will require the submission of an Existing Conditions sheet, a Proposed Improvements sheet, and a Temporary Erosion and Sediment Control Plan sheet. This plan set will contain all applicable considerations regarding stormwater management before, during, and after the proposed project. Existing site conditions will be addressed, quantified, and analyzed. All improvements and construction activities are illustrated in overview and detailed formats. The plan set and project details cover all temporary and permanent stormwater controls in detail.

2. **Construction Stormwater Pollution Prevention Plan**. In addition to the general SWPPP and construction details provided in the plan set, all HIP project applications will contain a completed, site-specific SWPPP that addresses all thirteen elements completely. TESC

Plans will be provided and are assumed to be performance-based, in that some activities such as native landscaping in mulch areas or delivery of material may not require BMPs if completed in summer weather without rain in the forecast. Special SWPPP considerations and requirements are in place to allow some select native landscaping activities to occur in the winter months, under a Director's Exemption from BMC 16.80.120 (Seasonal Restrictions on Earthwork). Those details will also be included in any submittal for a project wishing to do planting activities in the period between October 1 and June 1.

3. **Source Control of Pollutants.** Other than potential sediment transport via a turbid water surface discharge, there are no potential pollutant sources expected to be associated with HIP projects. Special care will be taken in site design steps and in the implementation of erosion and sediment controls to avoid sediment transport.

4. **Preservation of Natural Drainage Systems and Outfalls**. HIP projects will not concentrate storm flows outside of the basin in which they normally flow and discharge. In the event of a facility overflow or failure, excess water will be directed into the same drainage outfall as currently exists for that water. No new outfalls will be installed. No cross-vain drainage features will be installed. No additional flow will be introduced to downstream waterways in any appreciable way, other than the minor control of otherwise unmanaged surface flows entering waterways via overland flow.

5. **On-Site Stormwater Management**. Reforestation, infiltration, dispersion, and applicable low-impact development strategies are employed in HIP projects and designed and installed in such a way as to maximize on-site management of stormwater. No HIP project activities are expected to result in a need for additional stormwater management techniques or facilities beyond the HIP-specific BMPs.

III. HIP Project Submittals Exceed Permitting Requirements

For each HIP-eligible project, a Stormwater (STM) permit application will be completed and submitted to the City for review and approval. The application will be subject to intake, stormwater, and planning-level reviews, as well as reviews related to site history that ensure no other active permits conflict with the proposed HIP project. While HIP projects are expected to vary slightly in their detailed design, general information and site-level descriptions of work will be significantly more uniform in their content.

Developing consistent and understandable submittals is the responsibility of the homeowner and their chosen designer, but both parties receive significant support from the City's HIP-focused staff as well as a full-time project coordinator from the Whatcom Conservation District, a direct partner in HIP. It is expected that HIP submittals will have been reviewed and approved by the WCD, the homeowner, and the designer prior to submission to the City. For that reason,

it is anticipated that designs and submittal documents will be, in large part, complete, accurate, field-verified, and understood consistently by all stakeholders. Therefore, it is not expected that intensive review of these projects will be necessary, but due diligence is certainly required. The City's HIP staff will ensure that documents received are accurate and complete and that the rules of HIP (which incorporate compliance with the City's development regulations) are followed in the design. Additional review from the City's Engineering Section and Planning and Development Services Department will also be incorporated into the process to ensure that HIP projects comply with regulations and receive the appropriate level of review for a voluntary project meant solely to improve water quality.

All HIP-supported projects, as a broad rule, will comply with the following conditions:

1. The project is **voluntary** and intended solely to protect water quality in the Lake Whatcom watershed.
2. The methods used to design and construct provide reasonable assurance that the improvement will provide a **public benefit** in terms of water quality protection for Lake Whatcom.
3. The project follows applicable rules and regulations associated with work in the Lake Whatcom watershed.
4. Plans were developed in accordance with pre-approved HIP Best Management Practices (BMPs) to the maximum extent feasible and with reasonable considerations taken to adjust the project to site-specific conditions. **Variations from pre-approved BMPs have been assessed by HIP Staff and approved as effective and/or appropriate variations.** All unique or non-standard components result in improved water quality and provide a public benefit.

IV. Submittal Summary: Native Landscaping Projects

For projects consisting of only the HIP Native Landscaping BMP, and adhering to all HIP requirements of that BMP's design, the following items will constitute a complete submittal to be reviewed by City of Bellingham staff in concert with HIP staff at the City and Whatcom Conservation District. Example projects with all documents completed will be provided to designers and review staff in order to communicate the intent and proper use of the forms and the information required to be shown on plan sheets.

Plan Set (11"X17" minimum sheet size, with scale bar and north arrow):

1. Existing conditions with surfaces delineated and utilities shown
2. Proposed Native Landscaping areas

Submittal Documents:

1. City of Bellingham Stormwater Permit Application

2. Lake Whatcom Stormwater Considerations Page
3. Project Narrative
4. HIP Native Plant Density Calculator
5. Stormwater Pollution Prevention Plan (SWPPP) for Native Landscaping Projects
6. Language specific to work in the Lake Whatcom Watershed, consistent with BMC 15.42 and 16.80

V. Submittal Summary: All "Earthwork" projects (includes all other HIP BMPs)

For all projects that disturb soil, and are therefore limited to do work only in the period from June 1 - September 30th, the following items will constitute a complete submittal to be reviewed by City of Bellingham staff in concert with HIP staff at the City and Whatcom Conservation District. Example projects with all documents completed will be provided to designers and review staff in order to communicate the intent and proper use of the forms and the information required to be shown on plan sheets.

Plan Set (11"X17" minimum sheet size, with scale bar and north arrow):

1. Existing Conditions with surfaces delineated and utilities shown
2. Proposed Improvements with treated areas, HIP BMPs, and conveyance.
3. Erosion and Sediment Control Plan and generic SWPPP Details

Submittal Documents:

1. City of Bellingham Stormwater Permit Application
2. Lake Whatcom Stormwater Considerations Page
3. Project Narrative
4. Soil Exploration and Characterization (when applicable)
5. HIP-Approved BMP Sizing / Plant Density Calculators
6. HIP Standard Details and Specifications
7. Site Specific Stormwater Pollution Prevention Plan
8. Language specific to work in the Lake Whatcom Watershed, consistent with BMC 15.42 and 16.80

VI. Conclusion

The success of the HIP will depend on the effort of homeowners, the effectiveness of program staff to support those homeowners, and the efficiency of jurisdiction staff to process the wide variety of potential project scopes. This document is intended to outline the framework in which HIP projects will be in compliance with all regulations applicable to voluntary water quality improvement projects that do not include work that trips new or re-development requirements.

Seasonal Restrictions for Earthwork

Bellingham Municipal Code 16.80.120: Seasonal restrictions on land-disturbing activities.

A. No land-disturbing activity, including but not limited to clearing of vegetation, grading, filling, excavating or trenching of soil or earth materials, shall be permitted from October 1st through May 31st, with the exception of restoration work described in **BMC 16.80.080(E)** and approved in writing by the planning and public works directors.

B. All bare soil and earth areas in excess of 500 square feet shall be required to be covered during the above listed months with any of the following: (1) Well established grass, sod or a vegetated surface sufficient to prevent the erosion or transport of soil, sediment and silt laden water. No soil or earth may be visible; (2) a minimum of three inches cover of shredded wood chip/fiber, vegetative mulch, hay or straw; (3) crushed rock or gravel, not less than three-fourths inch in aggregate size and four inches deep; (4) or other approved coverage method approved in writing by the planning and public works directors.

C. The city may approve emergency exemptions to the seasonal restrictions as necessary to protect public health, safety, welfare, the environment and private or public property. Exemptions shall be construed narrowly and may be granted by the planning and public works directors. **Ord. 2009-06-040**; **Ord. 2001-01-001**].

Erosion and Sediment Control Considerations for Winter Work
Native Landscaping Projects ONLY (Oct-May)

Condition 1: Seasonal Restrictions on Land Disturbing Activities, with the following exceptions; a) allowance for individual plantings within a fully mulched area (at least 4" depth of approved mulch) in dry weather and b) exposed soil allowance of 4" radius (.347ft²) around the base of plantings.

Condition 2: Enforcement and Penalty, without exception.

Condition 3: Materials Handling for Watershed Work

I. Projects which import City of Bellingham approved mulch, topsoil, or bare root plantings during the dry season (June 1 – September 30) will be required to provide the following minimum protections to prevent sediment transport;

a) no material storage or staging shall occur on impervious surfaces OR on slopes greater than 10%,

b) distribution of materials on site will be done by hand OR applied by machinery (e.g. blown on) which shall not be driven onto the property, and

c) No heavy machinery, including delivery trucks, are to be driven over or parked on erodible or compactable surfaces on the property at any time for any reason.

II. During the wet season (October 1 – May 31) materials shall be handed as indicated in a), b), and c) above as well as meeting the following additional considerations;

d) importation, delivery, and spreading of materials shall not occur during adverse weather conditions, including precipitation events and strong winds with or without precipitation;

e) storage of materials shall be performed per BMP C123 Plastic Covering, found in the Washington State Department of Ecology Stormwater Management Manual for Western Washington, Volume II, Construction Stormwater Pollution Prevention, and

f) any activity which results in materials contacting impervious surfaces shall be mitigated by sweeping clean any impervious surfaces as soon as is reasonably possible.

Condition 4: Adaptive Management

If the owner or City of Bellingham staff determine that further erosion controls are necessary to prevent an illicit discharge, formal TESC measures shall be implemented as directed by City staff or a Certified Erosion and Sediment Control Lead (CESCL). The project owner shall immediately contact City staff if any potential discharge is witnessed or imminent. Failure to do so may result in fines per Condition 2: Enforcement and Penalty (BMC 16.80.150).

Condition 5: Permanent Site Stabilization

Upon completion of all planting activities, regardless of season, mulch must be applied to all erodible surfaces and must be maintained as needed to prevent exposed soils. A minimum of 2" of cover must be maintained in the long term.

Public Works Department
City of Bellingham

March 8, 2018

To All City of Bellingham Lake Whatcom Watershed Residents

Re: Directors' Exemption to Seasonal Restrictions on Land Disturbing Activities (BMC 16.80.120)

Dear Resident:

The City of Bellingham supports and encourages homeowners' efforts to take voluntary action on their properties to protect water quality in the Lake Whatcom basin. Many of these voluntary water quality improvements involve the replacement of lawns and hard surfaces with native landscapes which can better replicate the natural hydrology and nutrient cycling found in native forests. Native plants, either in container or in bare-root form, are available in desirable quantities and at reasonable costs during the time when the Lake Whatcom watershed area is normally closed to land disturbing activities (October 1 - May 30, per BMC 16.80.120).

Considering the benefits of establishing native plant landscapes in the Lake Whatcom Watershed, and considering that fall and winter months are the ideal time for installing native plants, the Public Works and Planning Department directors grant this exemption to Homeowner Incentive Program (HIP) participants.

The exemption allows homeowners to install native plants as part of a voluntary phosphorus- or flow- limiting project in the City portion of the Lake Whatcom watershed at any time of year when all of the following criteria are met:

1. The project shall be in compliance with BMC 16.80 (Lake Whatcom Regulatory Chapter) and BMC 15.42 (Stormwater Management).

2. The project shall be designed as a phosphorus- and flow- limiting feature that will not increase flows or phosphorus loading above that expected from a forested condition.

3. A no-fee stormwater permit shall be obtained prior to any activity. This permit review process will determine if the project meets the phosphorus- or flow- limiting definitions.

4. The project shall adhere to the following minimum requirements associated with participation in the Homeowner Incentive Program:

Engineering
104 W. Magnolia Street, Suite 109
Bellingham, WA 98225
Phone: (360) 778-7900
Fax: (360) 778-7901
TTY: (360) 778-8382
Email: pw@cob.org

Natural Resources
Physical: 2200 Nevada Street
Mailing: 2221 Pacific Street
Bellingham, WA 98229
Phone: (360) 778-7800
Fax: (360) 778-7801
Email: pw@cob.org

Operations
2221 Pacific Street
Bellingham, WA 98229
Phone: (360) 778-7700
Fax: (360) 778-7701
Email: pw@cob.org

a. The project is **voluntary** and intended solely to protect water quality in the Lake Whatcom watershed.

b. The methods used to design and construct provide **reasonable assurance** that the improvement will provide a **public benefit** in terms of water quality protection for Lake Whatcom.

c. The project follows **applicable rules and regulations** associated with work in the Lake Whatcom watershed.

d. Plans were developed in accordance with pre-approved HIP Best Management Practices (BMPs) to the maximum extent feasible and with reasonable considerations taken to adjust the project to site-specific conditions. **Variations from pre-approved BMPs have been assessed by HIP Staff and approved as effective and/or appropriate variations.** All unique or non-standard components result in improved water quality and provide a public benefit.

5. The planting project shall be installed following the guidance provided by the Homeowner Incentive Program's "Design Standards and Permitting Requirements: Native Landscaping" document. (Available online at www.lakewhatcomHIP.org/resources).

6. Work must follow, to the maximum extent practicable, the guidance provided in the HIP-required document titled "Winter Work Allowances and Exemptions", which must be included in the permit application packet in order to utilize this exemption. (Available online at www.lakewhatcomHIP.org/resources).

Sincerely,

Ted Carlson
Public Works Director

Rick Sepler
Planning and Community Development Director

References/Enclosures:
HIP Design Standards for Native Landscaping Projects
HIP Winter Work Allowances and Exemptions
Full Design Manual and all technical information for HIP Projects is available online here:
www.lakewhatcomHIP.org/resources

Cc: Jason Porter, Stormwater Manager
Renee LaCroix, Assistant Director of Public Works
Eli Mackiewicz, Engineering Technician
Kim Weil, Environmental Planner
Jessica Bennett, Project Engineer

Property Owner: John and Jane Example

Site Address: 1234 Water Quality Drive

Submittal Requirements Checklist

Use this checklist to determine which submittal documents are required for your project. Please make sure all of the required documents are included in the submittal packet and check the appropriate boxes.

Part I: Submittal requirements for all HIP projects

- [x] Project Summary & Project Narrative
- [x] Project Site Plan
  - [x] Existing Conditions Sheet with utilities, including approximate location of rights-of-way
  - [x] Proposed Improvements Sheet (BMP footprint, dimensions, and conveyance)
- [x] Stormwater Pollution Prevention Plan (SWPPP) -required for all ground-disturbing projects
  - [x] SWPPP Narrative
  - [x] Erosion and Sediment Control Plan Sheet
  - [x] Erosion and Sediment Control Details
- [x] Material Specifications

Part II: Submittal requirements for each primary BMP

- [x] **Native Landscaping**
  - [x] Design Submittal (Sections I - II)
  - [x] Plant Density Calculator
  - [x] Plant List
- [x] **Infiltration Trench**
  - [x] Design Submittal (Sections I - II)

  OR
  - [x] Sizing Calculator
  - [ ] Alternative Sizing Calculator
  - [x] Facility Cross Section
- [ ] **Media Filter Drain**
  - [ ] Design Submittal (Sections I - II)

  OR
  - [ ] Sizing Calculator
  - [ ] Alternative Sizing Calculator
  - [ ] Facility Cross Section

Part II (continued)

- [x] **Dispersion**
  - OR
    - [x] Design Submittal (Sections I - II)
    - [x] Sizing Calculator
    - [ ] Alternative Sizing Calculator
    - [x] Facility Cross Section
- [x] **Lake Whatcom Rain Garden**
  - OR
    - [x] Design Submittal (Sections I - II)
    - [x] Sizing Calculator
    - [ ] Alternative Sizing Calculator
    - [x] Facility Cross Section

Part III: Submittal requirements specific to the City or County

City Only:

- [x] Stormwater Permit Application*
- [x] Other City forms if applicable

**This project will not trip redevelopment thresholds regarding new or replaced impervious or partially-pervious surfaces. Therefore, this work qualifies for permitting exemptions for phosphorus- or flow-limiting projects as provided by applicable local codes and development standards.*

County Only:

- [ ] Natural Resource Notification of Activity
- [ ] Other County forms if applicable

Part IV: Signatures

	Printed Name	Signature	Date
Submittal Completed By:	Eli Mackiewicz, Designer		3/15/18
On Behalf Of:	Jane and John Example		3/15/18

These requirements were developed in accordance with the minimum requirements found in the Stormwater Management Manual for Western Washington and local regulations.

Project Summary

Address: 1234 Water Quality Drive (street address) (zip code) Parcel #: 380322000000

Owner: Jane and John Example	Phone: 360-555-5555	Email: examplesjj@email.com
HIP Staff: Jenny Coe	Phone: 360-528-2381 x106	Email: jcoe@whatcomcd.org
Designer: Eli Mackiewicz	Phone: 360-777-7777	Email: hipdesigner@email.com

Short Description:
Installation of four water quality BMPs. Rain garden in front of house, infiltration trench on east side of house, dispersion trench and flow path to south and native landscaping along all back of lot to south.

Check boxes below to characterize the project:

Best Management Practices	Additional Practices	Stormwater Calculations
☑ Native Landscaping	☐ Permeable Paving	☐ None (Landscaping Only)
☑ Infiltration Trench	☐ Rainwater Harvesting	☑ HIP Standard Calculations
☐ Media Filter Drain	☐ Invasive Species Removal	☐ WWHM Modeling
☐ MFD Clean Beach	☐ Other:	☐ MGS-Flood Modeling
☑ Dispersion		☐ Other:
☑ Lake Whatcom Rain Garden		

Measurement	Number	Notes
Total Treatable Area	24000 ft^2	
Area Landscaped by Project	5215 ft^2	
Area Infiltrated by Project	2585 ft^2	
Area Dispersed/Treated by Project	3350 ft^2	
New or Replaced Lawn	0 ft^2	
New or Replaced Hard Surface	0 ft^2	
Amount of Soil Excavated	18 yd^3	

Project Narrative

The following project, located at 1234 Water Quality Drive is proposed as a voluntary stormwater retrofit designed to protect and restore water quality in and around Lake Whatcom. The attached and enclosed information details the proposed phosphorus-reducing best management practices (BMPs) to be installed at the project site.

A summary of these BMPs is as follows:

- **BMP#1:** Rain Garden

  This component will be 222 ft² in size.

  This component addresses 1620 ft² of site area.

  Location of BMP relative to house: _____

- **BMP#2:** Infiltration Trench

  This component will be 85 ft² in size.

  This component addresses 965 ft² of site area.

  Location of BMP relative to house: _____

- **BMP#3:** Dispersion System

  This component will be 26 ft² in size.

  This component addresses 3350 ft² of site area.

  Location of BMP relative to house: South of site. Native Vegetated flow path installed too

If the project contains more than three BMPs, additional information must be attached to this project narrative.

Material Specifications

In order to ensure project approval and reimbursement for project expenses, HIP applications must clearly define the materials for each BMP. Designers are strongly encouraged to adhere verbatim to the material definitions found in the most current version of the *HIP 2.0 BMP - Material Specifications* book included as an appendix to this manual and available online at www.LakeWhatcomHIP.org/resources.

Pre-approved permits for HIP projects are based on the assumption that all materials will match those shown in the *HIP Specifications* book. Streamlined application review requires that these specs are followed exactly as published. Alternative specifications, if proposed, must be reviewed for compliance with design guidelines and regulations and may be subject to additional or conditional requirements. HIP cannot guarantee approval of alternative materials. Decisions on allowances for alternatives are made on a case-by-case basis.

Instructions:

Based on the project site plan and facility cross-section details, **check the box next to ALL materials selected for this project that will follow the *HIP 2.0 BMP - Material Specifications* book.** Note and clearly identify proposed alternative specifications, if any, in the space provided or attach additional pages with details and justifications. Materials submitted that do not meet HIP Specifications are not guaranteed for approval and may be subject to additional requirements or regulations.

Material Specifications List

Check Here	Material Name in HIP 2.0 BMP Material Spec Book	Check Here	Material Name in HIP 2.0 BMP Material Spec Book
✓	Native Plants (Page 15)	Pipe and Drains (Pages 9-10)	
Rock Materials (Pages 4-7)		✓	Atrium Grate
	Cascade Stone	✓	Catch Basin
	Media Filter Drain Mix	✓	Fine Mesh Screen
	Pea Gravel	✓	Perforated Pipe
	Permeable Ballast	✓	Pipe Couplings and Fittings
✓	Quarry Spalls	✓	Rigid Solid Pipe
✓	River Rock	✓	Solid Lids and Grates
	Sand		Trench Drain
	Shoreline Gravel		Trench Drain Grate
✓	Washed Drain Rock		Type 1 Catch Basin
		Permeable Pavement Materials (Pages 11-12)	
Mulch and Compost Materials (Pages 7-8)			Permeable Interlocking Paver System
	Compost		Permeable Pavers
	Hog Fuel		Permeable Paver Joint Filler
✓	Low-Phosphorus Mulch		Poured Permeable Surfacing
Soil-Based Materials (Pages 8-9)			Edge Restraints
✓	Low-P Rain Garden Soil Mix		Grid Paver System
	Low-P Topsoil		

Material Specifications List Continued			
Check Here	**Material Name in HIP 2.0 BMP Material Spec Book**	**Check Here**	**Material Name in HIP 2.0 BMP Material Spec Book**
Erosion Controls (Pages 12-14)		**Other (Pages 14-15)**	
	Catch Basin Inserts	✓	Dispersion Trench Edging
	Grass Seed	✓	Dispersion Trench Support Post
	Sandbags		Geotextile for Drainage
	Silt Fencing		Rigid, Waterproof Barrier
	Sod		
✓	Soil Coverage Tarp		
✓	Wattles		

Include any additional modifications here:

Stormwater Pollution Prevention Plan (SWPPP)

Describe all elements below that apply to your project. Refer to the current edition of the Stormwater Management Manual for Western Washington for drainage project instructions. If you are only completing a landscaping project, describe elements below that you will implement during the winter work season.

Elements of the SWPPP

Element 1 – Mark Clearing Limits: Orange construction fencing will be placed around all areas where vegetation is to be protected

Element 2 – Establish Stabilized Construction Access: There will be three (3) access pathways. To the north, access is via the paved driveway and no equipment should leave the paved areas. To the south, quarry spall and mulch pad construction entrances will be built.

Element 3 – Control Flow Rates:

HIP Projects are not intended to increase flow rates or stormwater discharge volumes by any amount. Therefore, no flow controls are necessary during construction. If point-discharges are created during construction, they will be mitigated by proper installation of sediment controls and will be disconnected at the completion of the project.

Element 4 – Install Sediment Controls: A mulch berm will be placed on the downhill side of the project area, to prevent all overland sediment flow. All soil piles will be covered with tarps and ringed with straw wattles if placed on paved areas.

Element 5 – Stabilize Soils:

All disturbed, exposed, stockpiled, or uncovered soil materials will be covered using an approved material (durable tarp, mulch, straw, etc.) during all rain events occurring during construction. Unworked soils that will be left exposed for more than 48 hours will be covered at the end of the last working day prior to that 48-hour duration. All disturbed soils will be covered completely between October 1 and May 30.

Element 6 – Protect Slopes: No slopes exist on the site

Element 7 – Protect Drain Inlets: No public drain inlets will be affected. The private drain boxes and inlets will be installed last to prevent sediment laden water from affecting their function during construction.

HIP

Element 8 – Stabilize Channels and Outlets:

No channels or outlets will be affected. Conveyance from the overflow of the rain garden will be directed to the ditch and protected with a rock pad to prevent ditch erosion.

Element 9 – Control Pollutants:

No pollution-generating activities in excess of the approved HIP project are allowed. Spills and leaks of fuels, fluids, or chemicals will not be allowed to enter storm systems. Any fuel, fluid, or chemical pollutants entering storm systems, including ditches, must be reported to the City of Bellingham or Whatcom County immediately upon discovery.

Element 10 – Control Dewatering:

Dewatering is not an expected activity related to a HIP project. Trenches, drywells, and other stormwater systems will not be used as sediment traps at any time. If sedimentation occurs, restoration (including dewatering) will not cause the discharge of sediment-laden water from the site by either surface or piped flow.

Element 11 – Maintain BMPs:

All erosion control BMPs will be maintained per manufacturer's recommendations and as directed by HIP, City of Bellingham, or Whatcom County Staff.

Element 12 – Manage the Project:

Work will occur as defined in an approved HIP project plan and per HIP rules and requirements. Contractor will exercise adaptive management to correct any unexpected deficiencies in erosion control efforts, as necessary. Adaptive management strategies may be reviewed by HIP, City of Bellingham, or Whatcom County staff to ensure compliance with applicable rules and regulations.

Element 13 - Protect LID Features:

All planned BMPs will be marked on the site with white paint prior to land disturbance.

No compaction or vehicle impacts are allowed within the BMP areas.

If left exposed during a rain event, all BMPs will be protected with a straw wattle uphill of the inlet to prevent sediment-laden water from entering the BMP during construction.

All site soils will be stabilized after the construction is complete.

HIP

Design Submittal

Lake Whatcom Rain Garden

Section I: System and Sizing Summary

☑	I have provided a site plan and facility cross-section. I have defined the area that will drain into the rain garden, by piping or sheet flow.
	The drainage area is 1,200 **ft² of impervious surface and/or** 420 **ft² of lawn/landscape**
☑	I have sized the system using approved methodology (HIP Sizing Calculator or stormwater hydrological modeling software) and attached that data.
	The ponding area of the rain garden will be at least 222 **ft² in size.**
☑	I have calculated the number of plants needed for the total rain garden area (square feet of ponding area divided by 16) and completed a plant list.
	I will need to install at least 14 **native plants in my rain garden.**
☑	I have calculated the amount of lake-friendly mulch (area divided by 80) I will need. I have chosen mulch from the HIP-approved mulch list.
	My rain garden plan requires 3 **cubic yards of approved mulch.**

Section II: Site-Specific Planning

☑	I have determined that the ponding area is at least 5' from known utilities.
☑	I have determined that the ponding area is at least 10' from structures or property lines.
☑	I have determined that the rain garden is not on a slope >10% or within 10' upgradient of a slope >15% or within 50' upgradient of a slope >35%.
☑	I have developed an erosion control plan for the excavation of the rain garden and completed a site-specific SWPP that is included with this application.

Sizing Calculator

Lake Whatcom Rain Garden

How to Use Sizing Calculator:
Input project-specific data into the table below to calculate the size of the ponding area of the rain garden facility. Choose soil type based on test results in Step 1. Insert amount of hard surface (roof, pavement, gravel) in square feet and amount of lawn and/or landscape area in square feet. Determine multipliers by using the table below and calculate required ponding area.

Soil Type	Impervious Surface (square feet)		Hard Surface Multiplier (Varies)*		Lawn/Landscape (square feet)		Lawn/LS Multiplier (Varies)*		Ponding Area Minimum (square feet)**
Good	[	×	]	+	[	×	]	=	
Moderate	[	×	]	+	[	×	]	=	
Marginal	[1200	×	0.15]	+	[420	×	0.10]	=	222 ft²
Poor	Infiltration Not Recommended. Use Treatment, Dispersion, or Native Landscaping BMPs								

*Use multiplier reference table below.

** The ponding area is defined as the area that will be flooded before the system overflows. All rain gardens will have side slopes extending at least 18" from the top of this ponding area in all directions. See Design Guidance for more details and examples.

MULTIPLIER REFERENCE TABLE
RAIN GARDEN SIZING

	Multiplier by Soil Type		
	Good	Moderate	Marginal
Hard Surface Area			
Less than 5,000 sf	0.09	0.12	0.15
More than 5,000 sf	0.07	0.09	0.12
Lawn/Landscape Area			
Less than 2,000 sf	0.05	0.07	0.10
Between 2,000-10,000 sf	0.04	0.06	0.08
Between 10,000 - 40,000 sf	0.03	0.05	0.07
More than 40,000 sf	0.02	0.04	0.06

Soil Characterization Sheet – Soil Test #1(Rain Garden)

Step 1. Review available soil data and recommend on-site soil testing
To be completed by HIP Coordinator.

Off-site test pit data. Review map provided by HIP. If one test pit is within 100' of any property line, list only that data. Otherwise, please list three representative test pits, preferably within ¼ mile of the site.

Test Pit Number	Soil Type/ Infiltration Rate	Depth to Groundwater	Depth to Bedrock
2010GE TP-039	N/A	5.0 ft	N/A
NEP_PIT_3	.43	2.8	N/A
NEP_PIT_4	.45	5.5	N/A

Based on this information, the recommended soil investigation procedure to follow in Step 2 is (determined by HIP Coordinator):

SOIL DRAINAGE TEST

Step 2. On-site testing procedure to determine soil type
To be completed by HIP Coordinator or the project designer

Follow the soil testing methods and instructions for infiltration BMPs, found in the HIP Design Handbook (Infiltration Trench and Lake Whatcom Rain Garden).

Note: If designing for infiltration facilities in multiple locations, it is suggested that each location be checked for factors that might affect design considerations. Consult with the HIP Coordinator to determine the number of additional investigations recommended for each unique site.

I completed an on-site soil investigation using (check boxes of all completed tests):

X Soil Drainage Test

I used the Rain Garden Manual

After one wet season (or three dry season) tests I have determined that my soil drainage rate is 0.43 in/hr.

I've characterized my soil as:

- ☐ Good
- ☐ Moderate
- X Marginal
- ☐ Poor

☐ Simple Investigation

I dug to a depth of 3' below ground surface and found:

- ☐ Groundwater
- ☐ Bedrock
- ☐ Other: _____
- ☐ None of the above

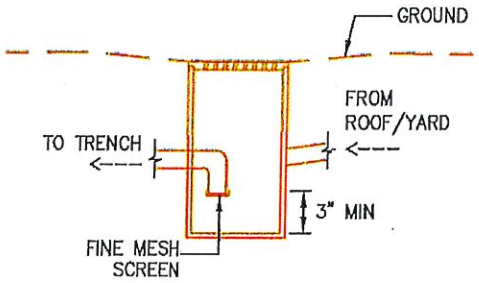
☐ Soil Texture Test

I used this test method to determine soil type (circle one):

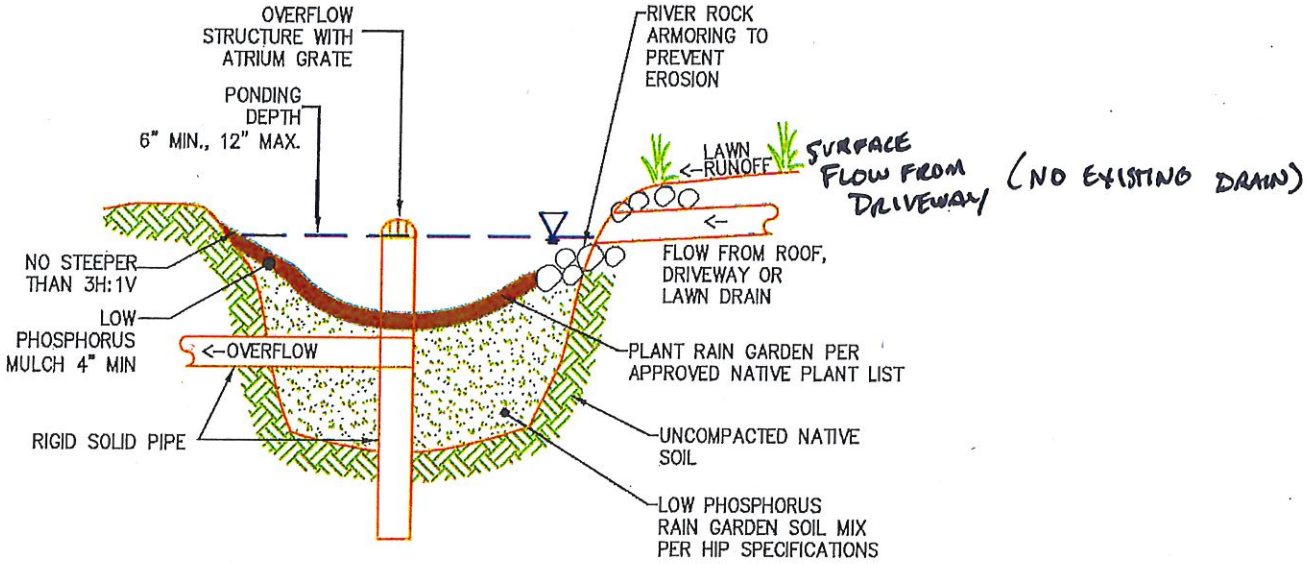
Clay	Clayey Silt
Silt/Loam	Sandy Loam/Sand

I've characterized my soil as:

- ☐ Good
- ☐ Moderate
- ☐ Marginal
- ☐ Poor



JUNCTION BOX



SECTION VIEW

LAKE WHATCOM RAIN GARDEN
HIP BMP "E" TYPICAL NTS

Construction Criteria for Infiltration Facilities

Initial basin excavation should be conducted to within 1-foot of the final elevation of the basin floor. Excavate infiltration trenches and basins to final grade only after all disturbed areas in the upgradient project drainage area have been permanently stabilized. The final phase of excavation should remove all accumulation of silt in the infiltration facility before putting it in service. After construction is completed, prevent sediment from entering the infiltration facility by first conveying the runoff water through an appropriate pretreatment system such as a pre-settling basin, wet pond, or sand filter.

Infiltration facilities should generally not be used as temporary sediment traps during construction. If an infiltration facility is to be used as a sediment trap, it must not be excavated to final grade until after the upgradient drainage area has been stabilized. Any accumulation of silt in the basin must be removed before putting it in service.

Traffic Control Relatively light-tracked equipment is recommended for this operation to avoid compaction of the basin floor. The use of draglines and trackhoes should be considered for constructing infiltration basins. The infiltration area should be flagged or marked to keep heavy equipment away.

Design Submittal
Infiltration Trench

Section I: System and Sizing Summary

☑	I have defined the area that will drain into the infiltration trench, by piping or sheet flow and have provided a site plan and facility cross-section.
	The drainage area is 450 ft² of impervious surface and/or 515 ft² of lawn/landscape
☑	I have sized the trench using approved methodology (HIP Sizing Calculator or stormwater hydrological modeling software) and attached that data.
	The trench will be at least 85 ft² in size and at least 1.5' (18 inches) deep.
☑	I have calculated the amount of rock needed to fill the trench (cubic feet of trench volume ÷ 27).
	I will need to install at least 5 yd³ of drain rock.

Section II: Site-Specific Planning

☑	I have determined that the trench is at least 5' from known public and private utilities.
☑	I have determined that the trench is at least 5' from structures with slab-on-grade foundations and 10' from structures with a basement or crawl space.
☑	If any portion of my trench is within 10' of a neighboring property, I have received written approval to proceed from that neighboring property owner.
☑	I have determined that the trench is not on a slope steeper than 10% and not within 10' upgradient of a slope steeper than 15% and not within 50' upgradient of a slope steeper than 35%.
☑	I have developed an erosion control plan for the excavation of the trench and completed a site-specific SWPPP that is included with this application.

Sizing Calculator
Infiltration Trench

Sizing Calculator: input soil characterization data into the table below to calculate the size of the facility.

Instructions: using the soil type identified on the Soil Characterization Sheet measure the amount of hard surface (roof, pavement, gravel) in square feet and amount of lawn and/or landscape area in square feet and insert values into table below. Use multipliers below to calculate required trench area.

Soil Type	Hard Surface (square feet)	Hard Surface Multiplier	Lawn/Landscape (square feet)	Lawn/LS Multiplier	Trench Minimum (square feet)
Good	[	0.06]	[	0.02]	
Moderate	[	0.09]	[	0.04]	
Marginal	[450	0.12] 54	[515	0.06] 31	85 ft²
Poor	Infiltration Not Recommended. Use Media Filter Drain or Dispersion BMPs.				

Soil Characterization Sheet – Soil Test #2(Infiltration)

Step 1. Review available soil data and recommend on-site soil testing
To be completed by HIP Coordinator.

Off-site test pit data. Review map provided by HIP. If one test pit is within 100' of any property line, list only that data. Otherwise, please list three representative test pits, preferably within ¼ mile of the site.

Test Pit Number	Soil Type/ Infiltration Rate	Depth to Groundwater	Depth to Bedrock
2010GE TP-039	N/A	5.0 ft	N/A
NEP_PIT_3	.43	2.8	N/A
NEP_PIT_4	.45	5.5	N/A

Based on this information, the recommended soil investigation procedure to follow in Step 2 is (determined by HIP Coordinator):

SIMPLE INVESTIGATION- based on Soil Test #1 Information

Step 2. On-site testing procedure to determine soil type
To be completed by HIP Coordinator or the project designer

Follow the soil testing methods and instructions for infiltration BMPs, found in the HIP Design Handbook (Infiltration Trench and Lake Whatcom Rain Garden).

Note: If designing for infiltration facilities in multiple locations, it is suggested that each location be checked for factors that might affect design considerations. Consult with the HIP Coordinator to determine the number of additional investigations recommended for each unique site.

I completed an on-site soil investigation using (check boxes of all completed tests):

☐ Soil Drainage Test

I used the Rain Garden Manual

After one wet season (or three dry season) tests I have determined that my soil drainage rate is _____ in/hr.

I've characterized my soil as:

- ☐ Good
- ☐ Moderate
- ☐ Marginal
- ☐ Poor

X Simple Investigation

I dug to a depth of 3' below ground surface and found:

- ☐ Groundwater
- ☐ Bedrock
- ☐ Other: _____

X None of the above

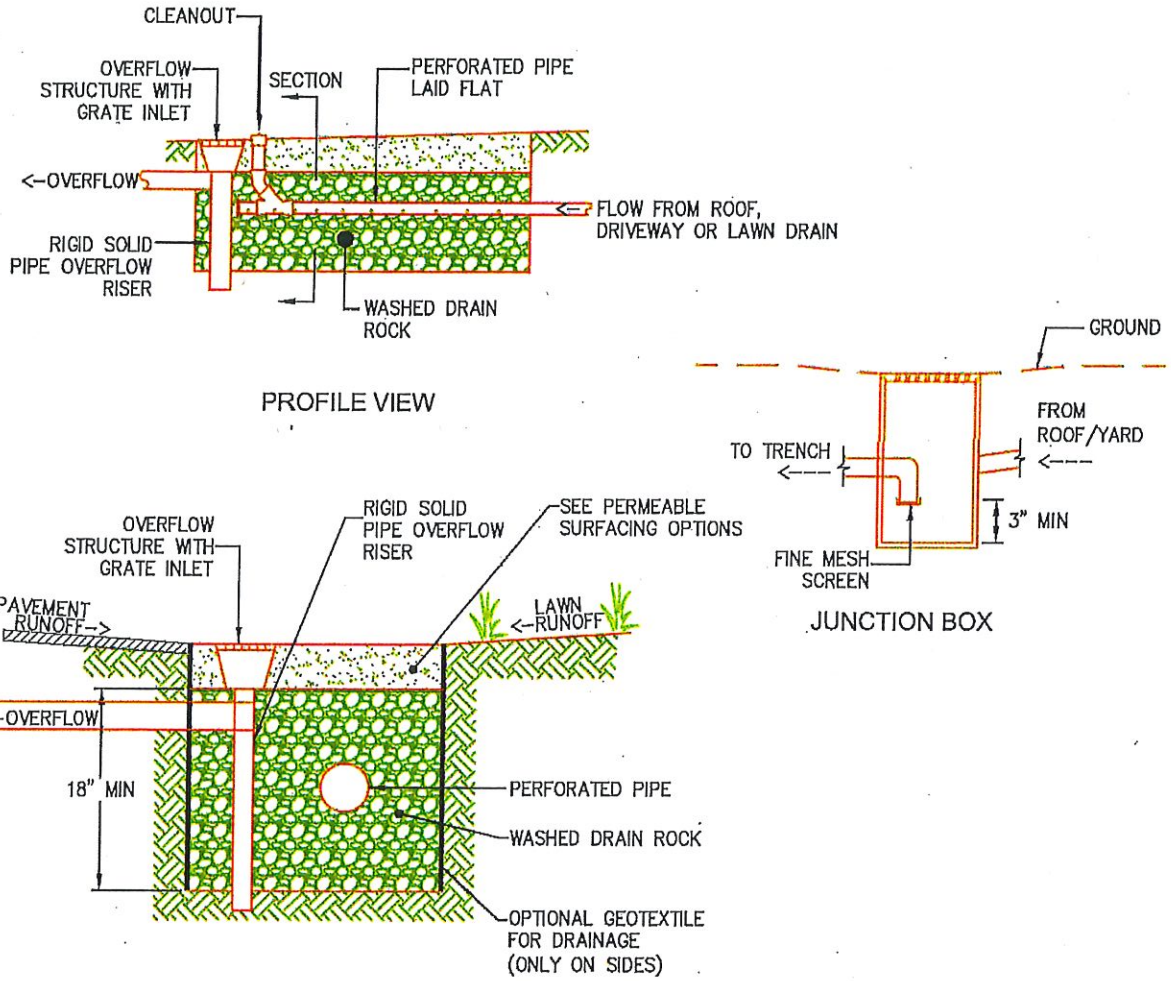
☐ Soil Texture Test

I used this test method to determine soil type (circle one):

Clay	Clayey Silt
Silt/Loam	Sandy Loam/Sand

I've characterized my soil as:

- ☐ Good
- ☐ Moderate
- ☐ Marginal
- ☐ Poor



ROCK-FILLED INFILTRATION TRENCH
HIP BMP "B" TYPICAL NTS

Construction Criteria for Infiltration Facilities

Initial basin excavation should be conducted to within 1-foot of the final elevation of the basin floor. Excavate infiltration trenches and basins to final grade only after all disturbed areas in the upgradient project drainage area have been permanently stabilized. The final phase of excavation should remove all accumulation of silt in the infiltration facility before putting it in service. After construction is completed, prevent sediment from entering the infiltration facility by first conveying the runoff water through an appropriate pretreatment system such as a pre-settling basin, wet pond, or sand filter.

Infiltration facilities should generally not be used as temporary sediment traps during construction. If an infiltration facility is to be used as a sediment trap, it must not be excavated to final grade until after the upgradient drainage area has been stabilized. Any accumulation of silt in the basin must be removed before putting it in service.

Traffic Control Relatively light-tracked equipment is recommended for this operation to avoid compaction of the basin floor. The use of draglines and trackhoes should be considered for constructing infiltration basins. The infiltration area should be flagged or marked to keep heavy equipment away.

Design Submittal
Dispersion

Section I: System and Sizing Summary

☑	I have provided a site plan and facility cross-section.
☑	I have defined the area that will drain into the trench by piping.
	The drainage area is ~~0~~ 2 **ft² of impervious surface and/or** ~~0~~ 1 **ft² of lawn/landscape**
☑	I have defined the area that will drain into the trench by sheet flow
	That area is 110 **ft² of impervious surface and/or** 3240 **ft² of lawn/landscape**
☑	I have sized the trench using approved methodology (HIP Sizing Calculator or stormwater hydrological modeling software) and attached that data.
	The trench will be at least 17 **feet long and the downstream vegetated flow path must be at least** 47 **feet in length.**

Section II: Site-Specific Planning

☑	I have determined that the trench is at least 5' from known private or public utilities.
☑	I have determined that the trench is at least 5' from structures with slab-on-grade foundations and 10' from structures with a basement or crawl space.
☑	I have determined that the trench is not on or next to a slope steeper than 15% and not within 50' upgradient of a slope steeper than 35%.
☑	I have developed an erosion control plan for the excavation of the trench and completed a site-specific SWPPP that is included with this application.

Sizing Calculator
Dispersion

Step 1: Determine Trench Length. Measure the hard surface area draining to the trench. Measure the lawn/landscaping surface area draining to the trench. Use the following formula to calculate the length of dispersion trench that is needed to adequately mange the runoff directed to the system. All dispersion trenches are 2' wide at minimum. Runoff from a pipe that crosses at least 25' of lawn or landscape before reaching the trench can be considered sheet flow.

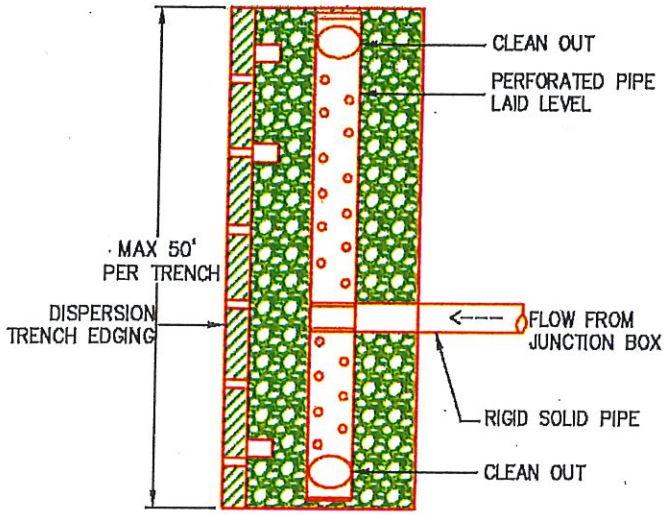
Drainage Type	Impervious Surface (square feet)	Hard Surface Multiplier	Lawn/Landscape (square feet)	Lawn/LS Multiplier	Minimum Trench Length (linear feet)
Sheet Flow	[110 ×	0.009] +	[3240 ×	0.005] / 180 =	17
Piped Flow	[∅ ×	0.014] +	[∅ ×	0.005] =	∅
Total length of trench needed (add trench lengths above):					17

Step 2: Determine Vegetated Flow Path Length. Use the following formula to calculate how far the dispersed water must travel, through vegetation, before it leaves your property or enters a water body. Runoff from a pipe that crosses at least 25' of lawn or landscape before reaching the trench can be considered sheet flow.

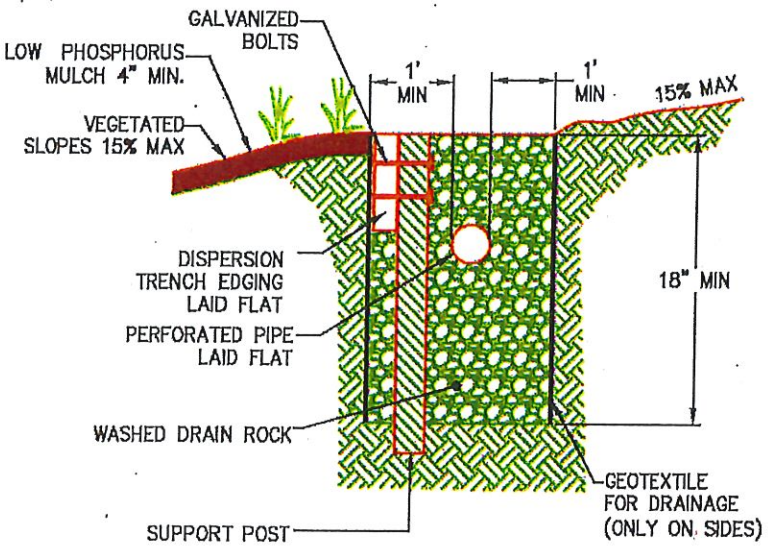
Drainage Type	Hard Surface (square feet) "A"	Lawn/Landscape (square feet) "B"	Lawn Length "C"	Formula	Minimum Flow Path Length* (linear feet)
Sheet Flow	Not part of formula	Not part of formula	90	((C-25)/3)+25	47
Piped Flow	∅	∅	Not part of formula	((A/(B+1))*100)+25	∅
Total length of vegetated flow path needed* (add flow path lengths above):					47

* Note that the total vegetated flow path length will never be less than 25' or more than 100'. If your calculation comes out below or above those numbers, adjust up to 25 or down to 100.

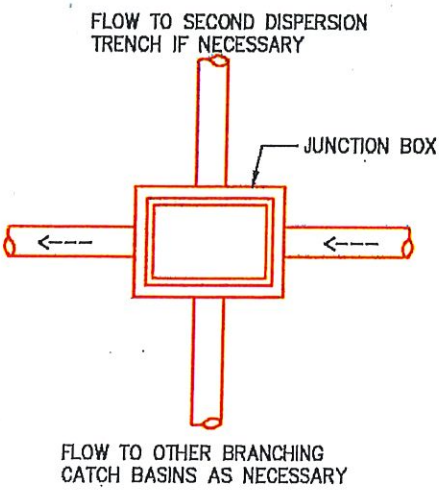
Step 3: If there is no existing established vegetated flow path on-site to disperse to and a vegetated flow path needs to be created, please use the Native Landscaping BMP and accompanying calculator and submittal page in addition to this Dispersion BMP.

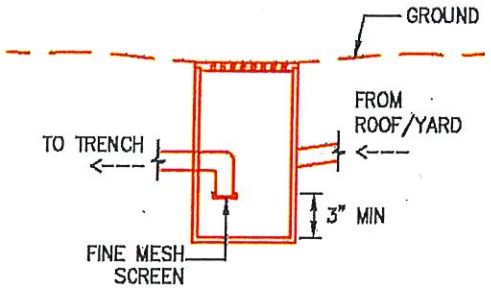


PLAN VIEW

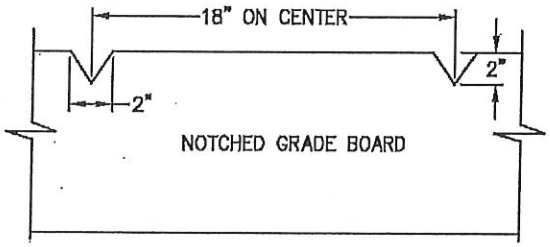


SECTION VIEW





JUNCTION BOX



DISPERSION TRENCH EDGING

DISPERSION TRENCH
HIP BMP "D" TYPICAL

NTS

Design Submittal

Native Landscaping

Section I: System and Sizing Summary

☑	I have defined the area that will be converted into native landscaping and have provided a site map showing the planting area.
	Native landscaping will replace 5,215 **ft² of lawn/existing landscape and/or** Ø **ft² of impervious surface**
☑	If any of my planting is in the public right-of-way, I have received written approval from the jurisdiction that manages the public area (City or County).
	The size of the area of the Right-of-Way I plan to landscape is Ø **ft²**
☑	I have selected a vegetation layer combination for each unique planting area (e.g., right-of-way area, front yard, back yard, etc...) and used the HIP plant density calculator to calculate the number of plants and yards of mulch required for each planting area.
	The total combined quantities for all of my planting areas are: 65 **cubic yards of approved mulch,** 23 **trees,** 81 **shrubs, and** 209 **groundcovers.**

Section II: Site-Specific Planning

☑	I have determined that I will not be planting trees or shrubs within 5' of a known utility, including septic systems (on private property) or 10' from a utility (in public ROW).
☑	I have determined that I will not need additional approvals for planting trees in the public right-of-way (if proposed, tree planting in ROW is not required).
☑	I have determined that the planting area is not on or next to a slope steeper than 35%.
☑	I have developed a plan to prevent erosion or runoff during my planting activities, including work during the wet season that complies with winter work provisions.

Plant Density Calculator

Native Landscaping

Instructions: Select one of the options listed below for each unique planting area and calculate the minimum required planting density and mulch. Note that existing plants may be counted to meet required plant density numbers.

Option	Vegetation Layer Combination	Plant Layer	Project area (sq ft)		Density Divider		Number of Plants
A	Tree, Shrub, and Groundcover	Trees	5215	÷	225 (15' o.c.*)	=	23
		Shrubs	5215	÷	64 (8' o.c.)	=	81
		Groundcovers	5215	÷	25 (5' o.c.)	=	209
B	Tree and Shrub Only (No Groundcovers)	Trees		÷	144 (12' o.c.)	=	
		Shrubs		÷	36 (6' o.c.)	=	
C	Tree and Groundcover Only (No Shrub)	Trees		÷	144 (12' o.c.)	=	
		Groundcovers		÷	16 (4' o.c.)	=	
D	Shrub and Groundcover Only (No Tree)	Shrubs		÷	49 (7' o.c.)	=	
		Groundcovers		÷	25 (5' o.c.)	=	
Cubic Yards of Mulch			5215	÷	80	=	65

*The abbreviation "o.c." stands for "on center", a convention used to describe the average distance between plants. For example, a tree that is planted 15' o.c. would be, on average, 15' from its nearest neighbor.

Plant List

Instructions: submit a list of native plants proposed for the project categorized by tree, shrub, and groundcover. List plant name (scientific preferred) and quantity. Include number of existing plants used to meet plant density requirements. Identify non-natives and cultivars and limit to no more than 10% of total plants.

Plant List for 1234 Water Quality Drive

Trees

Species	Count
Vine Maple	5
Serviceberry	4
Beaked Hazelnut	5
Shore Pine	3
Garry Oak	2
Red Elderberry	2
Western Redcedar	2
Total	23

Rain Garden Plants

Species	Count
Red Twig Dogwood	4
Blue-Eyed Grass	5
Slough Sedge	5
Lowbush Blueberry	4
Mock Orange	4
Kinnikinnick	4
Salal	4
Total	30

Shrubs

Species	Count
Hairy Manzanita	5
Tall Oregon Grape	10
Low Oregon Grape	10
Mock Orange	10
Red-Flowering Currant	10
Baldhip Rose	10
Evergreen Huckleberry	20
Snowberry	6
Total	81

Groundcovers

Species	Count
Kinnikinnick	20
Salal	20
Oregon Stonecrop	20
Prostrate Ceanothus	20
Showy Fleabane	20
Poverty Oatgrass	20
Beach Strawberry	20
Hnderson's Checker Mallow	20
Sword Fern	25
Deer Fern	24
Total	209

Project Summary

Address: 1234 Water Quality Drive _____ Parcel #: 380322000000
(street address) *(zip code)*

Owner: Jane and John Example	Phone: 360-555-5555	Email: examplesjj@email.com
HIP Staff: Jenny Coe	Phone: 360-528-2381 x106	Email: jcoe@whatcomcd.org
Designer: Eli Mackiewicz	Phone: 360-777-7777	Email: hipdesigner@email.com

Short Description:
Installation of four water quality BMPs. Rain garden in front of house, infiltration trench on east side of house, dispersion trench and flow path to south and native landscaping along all back of lot to south.

Check boxes below to characterize the project:

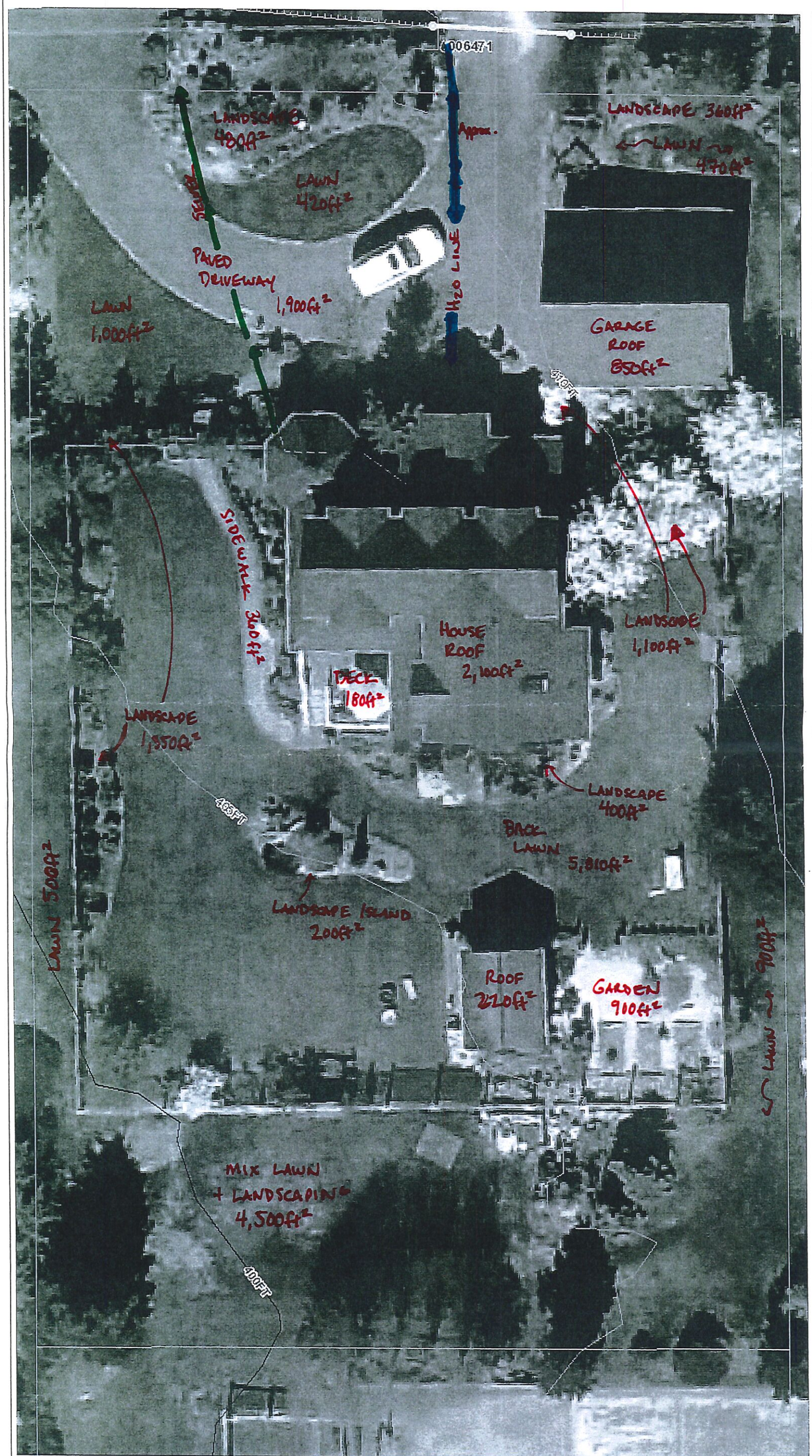
Best Management Practices	Additional Practices	Stormwater Calculations
☑ Native Landscaping	☐ Permeable Paving	☐ None (Landscaping Only)
☑ Infiltration Trench	☐ Rainwater Harvesting	☑ HIP Standard Calculations
☐ Media Filter Drain	☐ Invasive Species Removal	☐ WWHM Modeling
☐ MFD Clean Beach	☐ Other:	☐ MGS-Flood Modeling
☑ Dispersion		☐ Other:
☑ Lake Whatcom Rain Garden		

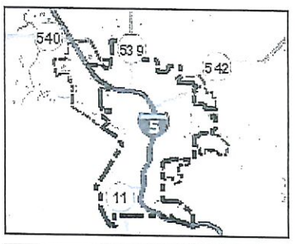
Measurement	Number	Notes
Total Treatable Area	24000 ft^2	
Area Landscaped by Project	5215 ft^2	
Area Infiltrated by Project	2585 ft^2	
Area Dispersed/Treated by Project	3350 ft^2	
New or Replaced Lawn	0 ft^2	
New or Replaced Hard Surface	0 ft^2	
Amount of Soil Excavated	18 yd^3	

City of Bellingham WASHINGTON

CityIQ Map

EXISTING CONDITIONS





Legend

- Catch Basins
- Manhole
- Clean Out
- Pipe End
- Fitting
- Lateral Line
  - Collector
  - Drain Line
  - Storm Service Line
- Culvert
- Storm Main
  - City Mains, Active
  - City Mains, Under Construction
  - Private Mains, Active
  - Private Mains, Under Construction
- Ditch
- Storm Access Points
  - Access Cover
  - Observation Well
- Storm Control Structures
- Storm Other Components
  - COB - Public Works
- Open Channel Streams
- Water Access Points
- Service Valve
  - Fireline Valve
  - Hydrant Valve
- Fitting
- Control Valve
  - Air Release
  - Blow Off
- Meters
  - Water Customer
  - Critical Water Customer
- Hydrants
  - COB
  - City Filling Station
  - Private Hydrants
- Water System Valve
  - Bypass Valve
  - Inline Valve
  - Tapping Valve
  - Zone Valve
- Network Structure
  - Enclosed Storage Facility
  - Pump Station
  - SamplingStation
  - Storage Basin
  - Treatment Plant
- SamplingStations
- Lateral Line
  - Fireline Service
  - Hydrant Service
  - Water Service Line
- Water Main
  - City Main; Active; Potable
  - City Main; Active; Untreated
  - City Main; Under Construction; Potable
  - Private Main; Active; Potable
  - Private Main; Active; Untreated
- Reservoirs
- Clean Outs
  - Active
  - Inactive
  - Under Construction
- Fitting
  - Active
  - Inactive
  - Under Construction
- Network Structures
- Sewer Access Points
- Sewer Lateral Lines
- Manholes
  - Active
  - Inactive
  - Under Construction
- Sewer Gravity Mains
  - City Mains, Inactive
  - City Mains, Active
  - City Mains, Under Construction
  - Private Mains, Active

Notes

Printed: 3/16/2018 12:32:41 PM

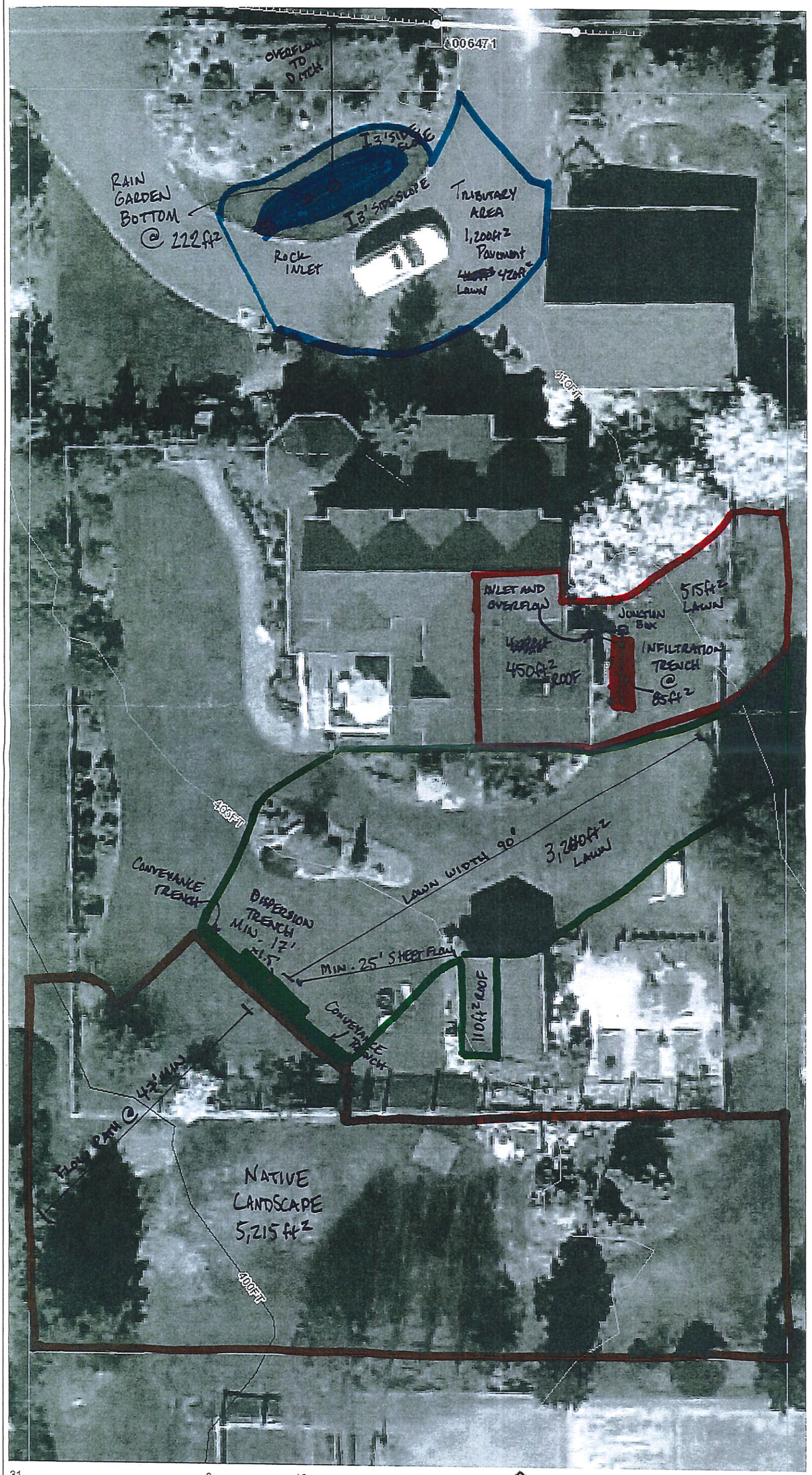
31 0 16 31 Feet

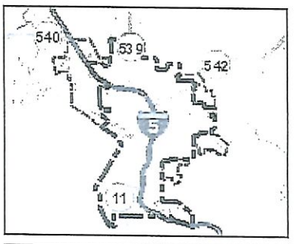
THIS MAP IS NOT TO BE USED FOR NAVIGATION

City of Bellingham WASHINGTON

CityIQ Map

PROPOSED IMPROVEMENTS





Legend

- Catch Basins
- Manhole
- Clean Out
- Pipe End
- Fitting
- Lateral Line
  - Collector
  - Drain Line
  - Storm Service Line
- Culvert
- Storm Main
  - City Mains, Active
  - City Mains, Under Construction
  - Private Mains, Active
  - Private Mains, Under Construction
- Ditch
- Storm Access Points
  - Access Cover
  - Observation Well
- Storm Control Structures
- Storm Other Components
  - COB - Public Works
- Open Channel Streams
- Water Access Points
- Service Valve
  - Fireline Valve
  - Hydrant Valve
- Fitting
- Control Valve
  - Air Release
  - Blow Off
- Meters
  - Water Customer
  - Critical Water Customer
- Hydrants
  - COB
  - City Filling Station
  - Private Hydrants
- Water System Valve
  - Bypass Valve
  - Inline Valve
  - Tapping Valve
  - Zone Valve
- Network Structure
  - Enclosed Storage Facility
  - Pump Station
  - SamplingStation
  - Storage Basin
  - Treatment Plant
- SamplingStations
- Lateral Line
  - Fireline Service
  - Hydrant Service
  - Water Service Line
- Water Main
  - City Main; Active; Potable
  - City Main; Active; Untreated
  - City Main; Under Construction; Potable
  - Private Main; Active; Potable
  - Private Main; Active; Untreated
- Reservoirs
- Clean Outs
  - Active
  - Inactive
  - Under Construction
- Fitting
  - Active
  - Inactive
  - Under Construction
- Network Structures
- Sewer Access Points
- Sewer Lateral Lines
- Manholes
  - Active
  - Inactive
  - Under Construction
- Sewer Gravity Mains
  - City Mains, Inactive
  - City Mains, Active
  - City Mains, Under Construction
  - Private Mains, Active

Notes

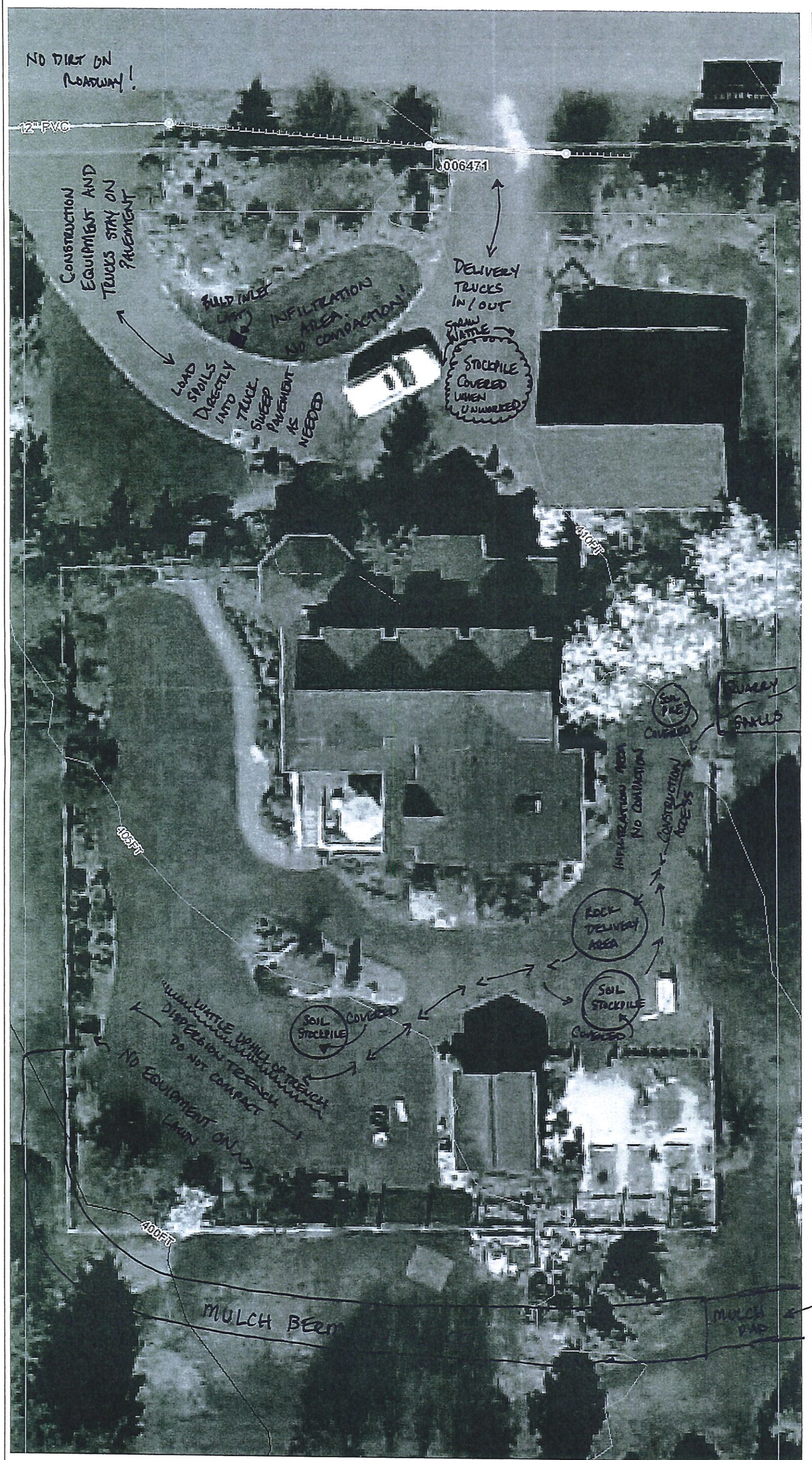
Printed: 3/16/2018 12:32:41 PM

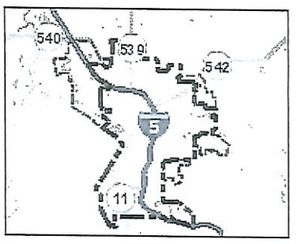
31 0 16 31 Feet

THIS MAP IS NOT TO BE USED FOR NAVIGATION

City of Bellingham WASHINGTON

CityIQ Map EROSION AND SEDIMENT CONTROL PLAN





Legend

- Catch Basins
- Manhole
- Clean Out
- Pipe End
- Fitting
- Lateral Line
  - Collector
  - Drain Line
  - Storm Service Line
- Culvert
- Storm Main
  - City Mains, Active
  - City Mains, Under Construction
  - Private Mains, Active
  - Private Mains, Under Construction
- Ditch
- Storm Access Points
  - Access Cover
  - Observation Well
- Storm Control Structures
- Storm Other Components
  - COB - Public Works
- Open Channel Streams
- Water Access Points
- Service Valve
  - Fireline Valve
  - Hydrant Valve
- Fitting
- Control Valve
  - Air Release
  - Blow Off
- Meters
  - Water Customer
  - Critical Water Customer
- Hydrants
  - COB
  - City Filling Station
  - Private Hydrants
- Water System Valve
  - Bypass Valve
  - Inline Valve
  - Tapping Valve
  - Zone Valve
- Network Structure
  - Enclosed Storage Facility
  - Pump Station
  - SamplingStation
  - Storage Basin
  - Treatment Plant
- SamplingStations
- Lateral Line
  - Fireline Service
  - Hydrant Service
  - Water Service Line
- Water Main
  - City Main; Active; Potable
  - City Main; Active; Untreated
  - City Main; Under Construction; Potable
  - Private Main; Active; Potable
  - Private Main; Active; Untreated
- Reservoirs
- Clean Outs
  - Active
  - Inactive
  - Under Construction
- Fitting
  - Active
  - Inactive
  - Under Construction
- Network Structures
- Sewer Access Points
- Sewer Lateral Lines
- Manholes
  - Active
  - Inactive
  - Under Construction
- Sewer Gravity Mains
  - City Mains, Inactive
  - City Mains, Active
  - City Mains, Under Construction
  - Private Mains, Active

Notes

Printed: 3/16/2018 4:58:58 PM

MULCH DELIVERY POINT
SPREAD AT LEAST 50% of necessary mulch prior to land-disturbance

31 0 16 31 Feet

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Design Guidance

Erosion and Sediment Control

GENERAL CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN

PURPOSE

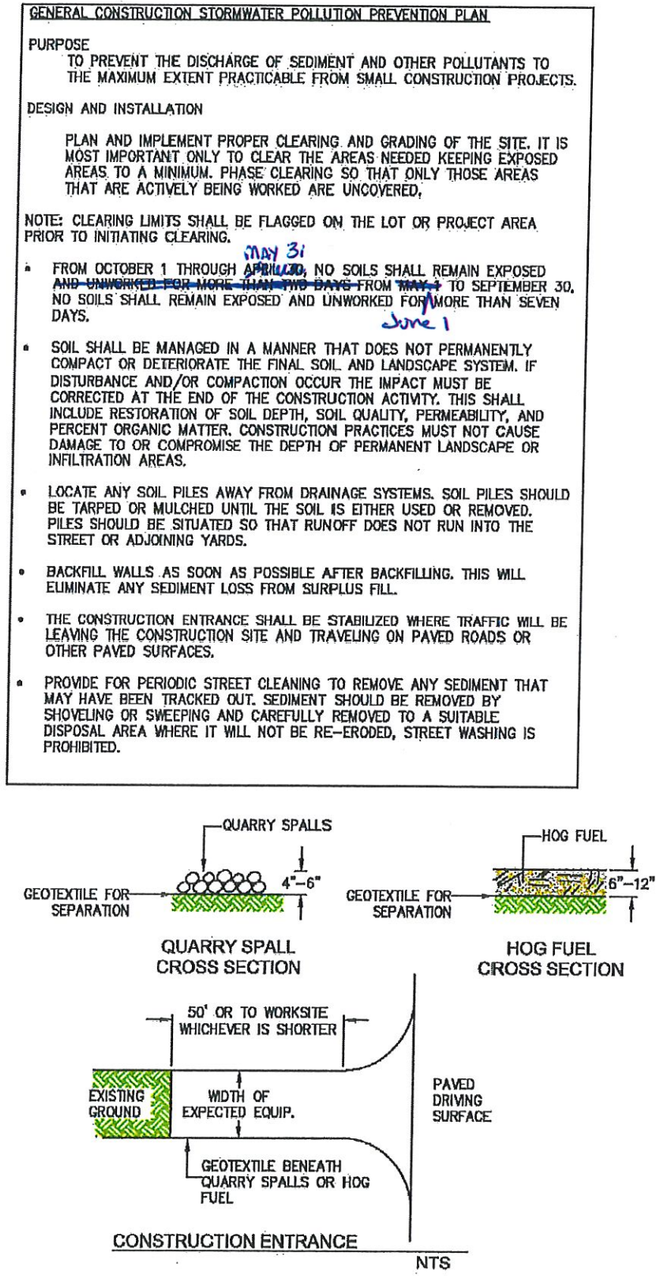
TO PREVENT THE DISCHARGE OF SEDIMENT AND OTHER POLLUTANTS TO THE MAXIMUM EXTENT PRACTICABLE FROM SMALL CONSTRUCTION PROJECTS.

DESIGN AND INSTALLATION

PLAN AND IMPLEMENT PROPER CLEARING AND GRADING OF THE SITE. IT IS MOST IMPORTANT ONLY TO CLEAR THE AREAS NEEDED KEEPING EXPOSED AREAS TO A MINIMUM. PHASE CLEARING SO THAT ONLY THOSE AREAS THAT ARE ACTIVELY BEING WORKED ARE UNCOVERED.

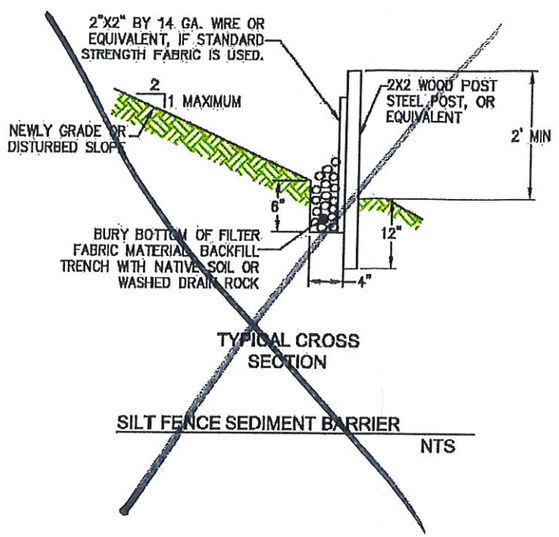
NOTE: CLEARING LIMITS SHALL BE FLAGGED ON THE LOT OR PROJECT AREA PRIOR TO INITIATING CLEARING.

- FROM OCTOBER 1 THROUGH ~~APRIL 30~~ MAY 31, NO SOILS SHALL REMAIN EXPOSED ~~AND UNWORKED FOR MORE THAN TWO DAYS~~ FROM ~~MAY 1~~ June 1 TO SEPTEMBER 30, NO SOILS SHALL REMAIN EXPOSED AND UNWORKED FOR MORE THAN SEVEN DAYS.
- SOIL SHALL BE MANAGED IN A MANNER THAT DOES NOT PERMANENTLY COMPACT OR DETERIORATE THE FINAL SOIL AND LANDSCAPE SYSTEM. IF DISTURBANCE AND/OR COMPACTION OCCUR THE IMPACT MUST BE CORRECTED AT THE END OF THE CONSTRUCTION ACTIVITY. THIS SHALL INCLUDE RESTORATION OF SOIL DEPTH, SOIL QUALITY, PERMEABILITY, AND PERCENT ORGANIC MATTER. CONSTRUCTION PRACTICES MUST NOT CAUSE DAMAGE TO OR COMPROMISE THE DEPTH OF PERMANENT LANDSCAPE OR INFILTRATION AREAS.
- LOCATE ANY SOIL PILES AWAY FROM DRAINAGE SYSTEMS. SOIL PILES SHOULD BE TARPED OR MULCHED UNTIL THE SOIL IS EITHER USED OR REMOVED. PILES SHOULD BE SITUATED SO THAT RUNOFF DOES NOT RUN INTO THE STREET OR ADJOINING YARDS.
- BACKFILL WALLS AS SOON AS POSSIBLE AFTER BACKFILLING. THIS WILL ELIMINATE ANY SEDIMENT LOSS FROM SURPLUS FILL.
- THE CONSTRUCTION ENTRANCE SHALL BE STABILIZED WHERE TRAFFIC WILL BE LEAVING THE CONSTRUCTION SITE AND TRAVELING ON PAVED ROADS OR OTHER PAVED SURFACES.
- PROVIDE FOR PERIODIC STREET CLEANING TO REMOVE ANY SEDIMENT THAT MAY HAVE BEEN TRACKED OUT. SEDIMENT SHOULD BE REMOVED BY SHOVELING OR SWEEPING AND CAREFULLY REMOVED TO A SUITABLE DISPOSAL AREA WHERE IT WILL NOT BE RE-ERODED. STREET WASHING IS PROHIBITED.



CONSTRUCTION ENTRANCE

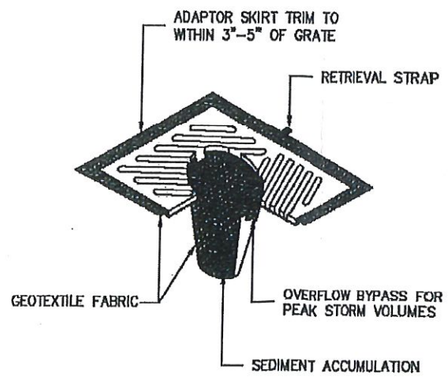
NTS



TYPICAL CROSS SECTION

SILT FENCE SEDIMENT BARRIER

NTS

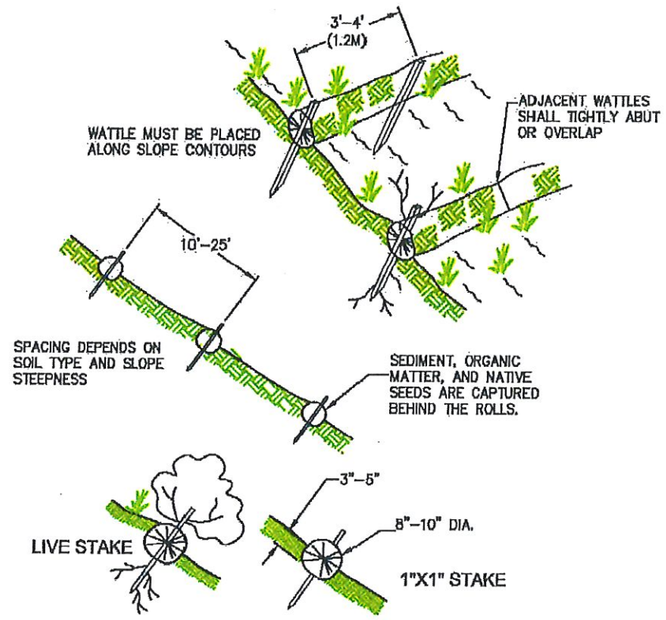


NOTES:

1. INSERT SHALL BE INSTALLED PRIOR TO CLEARING AND GRADING ACTIVITY, OR UPON PLACEMENT OF A NEW CATCH BASIN.
2. SEDIMENT SHALL BE REMOVED FROM THE UNIT WHEN IT BECOMES HALF FULL.
3. SEDIMENT REMOVAL SHALL BE ACCOMPLISHED BY REMOVING THE INSERT, EMPTYING, AND RE-INSERTING IT INTO THE CATCH BASIN.

CATCH BASIN INSERT (INLET PROTECTION) DETAIL

NTS



NOTE:

1. WATTLE INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE WATTLE IN A TRENCH, 3"–5" DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND WATTLE

WATTLES (SEDIMENT BARRIER)

NTS

MULCH BERM