
Homeowner Incentive Program
Designer Certification Training
WELCOME!

Part 1:

Introductions, Workshop Objectives, Certification

Jenny Coe
Whatcom Conservation District

YOU CAN EXPECT TO…

1. Understand the role of the HIP in the larger effort to reduce phosphorus in Lake Whatcom
2. Understand the 10-step process of HIP, the roles of all involved, and where you fit in.
3. Understand how to navigate the design portion of HIP, including eligible projects, design specs, permitting and submittal requirements.
4. Know what your resources are, how to access and use them.
5. How to become a HIP certified professional

Agenda Review

Materials Review

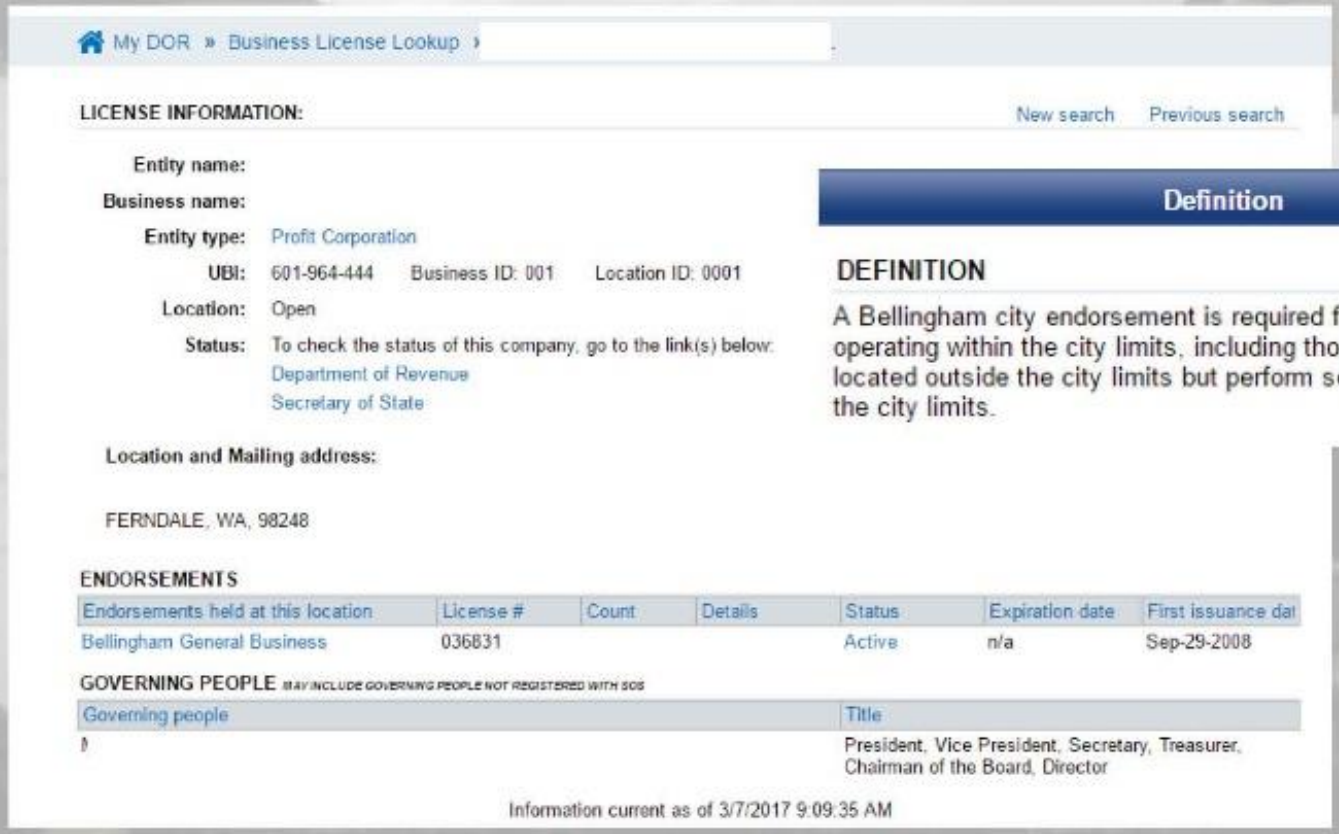
Questions Parking Lot

Certification Process

- Take the training
- Study the manual very very very very very carefully
- Pass the exam (3 chances to pass)
- Follow-up from Eli
- Business info added to HIP certified list
- Maintain certification

IMPORTANT: Rules for Reimbursement

1. Washington State Business License
2. City of Bellingham Endorsement (in City Limits)



My DOR » Business License Lookup »

LICENSE INFORMATION: New search Previous search

Entity name:
Business name:
Entity type: Profit Corporation
UBI: 601-964-444 Business ID: 001 Location ID: 0001
Location: Open
Status: To check the status of this company, go to the link(s) below:
Department of Revenue
Secretary of State

Location and Mailing address:

FERNDALE, WA, 98248

ENDORSEMENTS

Endorsements held at this location	License #	Count	Details	Status	Expiration date	First issuance dat
Bellingham General Business	036831			Active	n/a	Sep-29-2008

GOVERNING PEOPLE MAY INCLUDE GOVERNING PEOPLE NOT REGISTERED WITH SOS

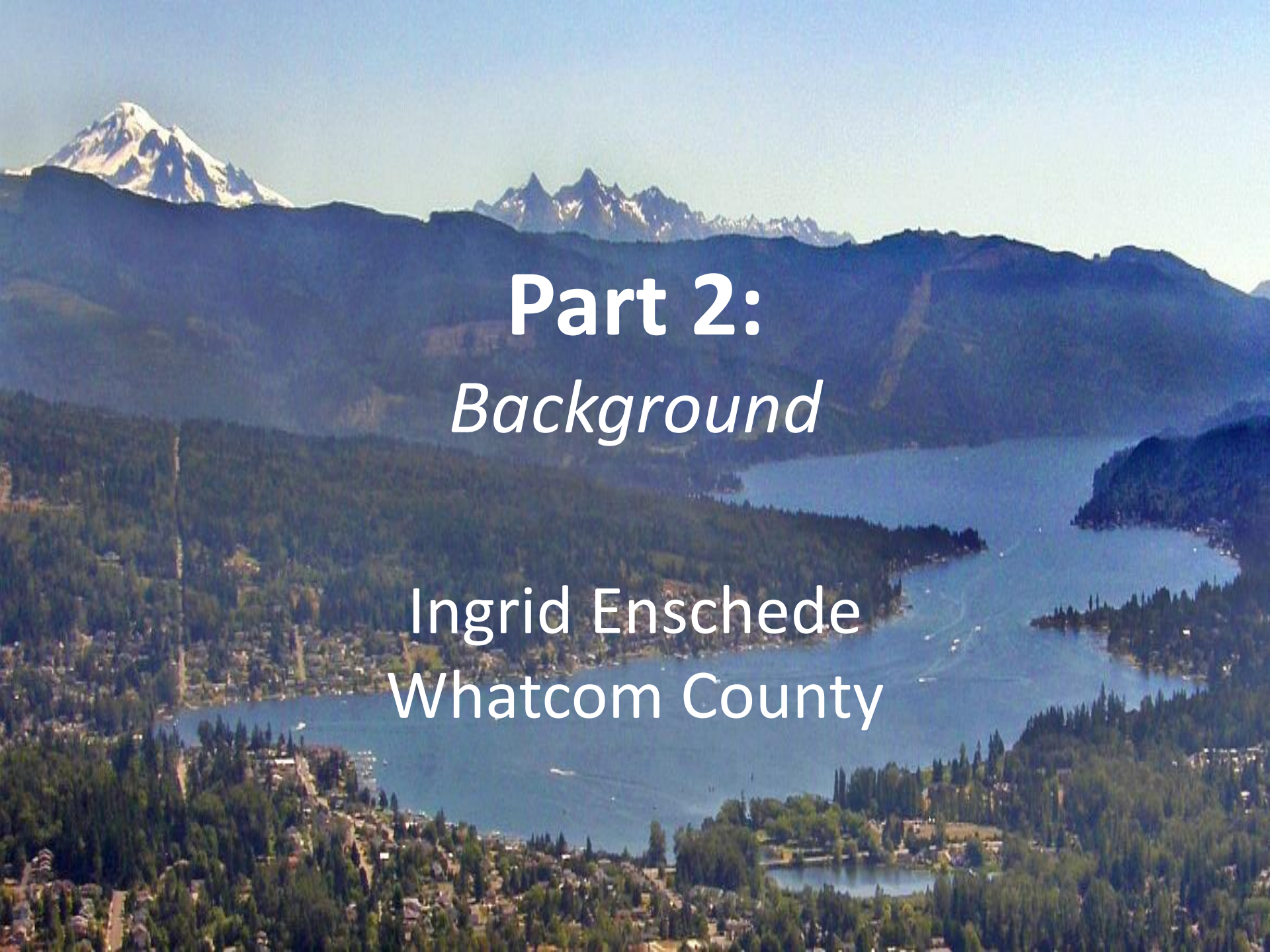
Governing people	Title
	President, Vice President, Secretary, Treasurer, Chairman of the Board, Director

Information current as of 3/7/2017 9:09:35 AM

Definition

DEFINITION

A Bellingham city endorsement is required for business locations operating within the city limits, including those businesses that are located outside the city limits but perform services for customers inside the city limits.

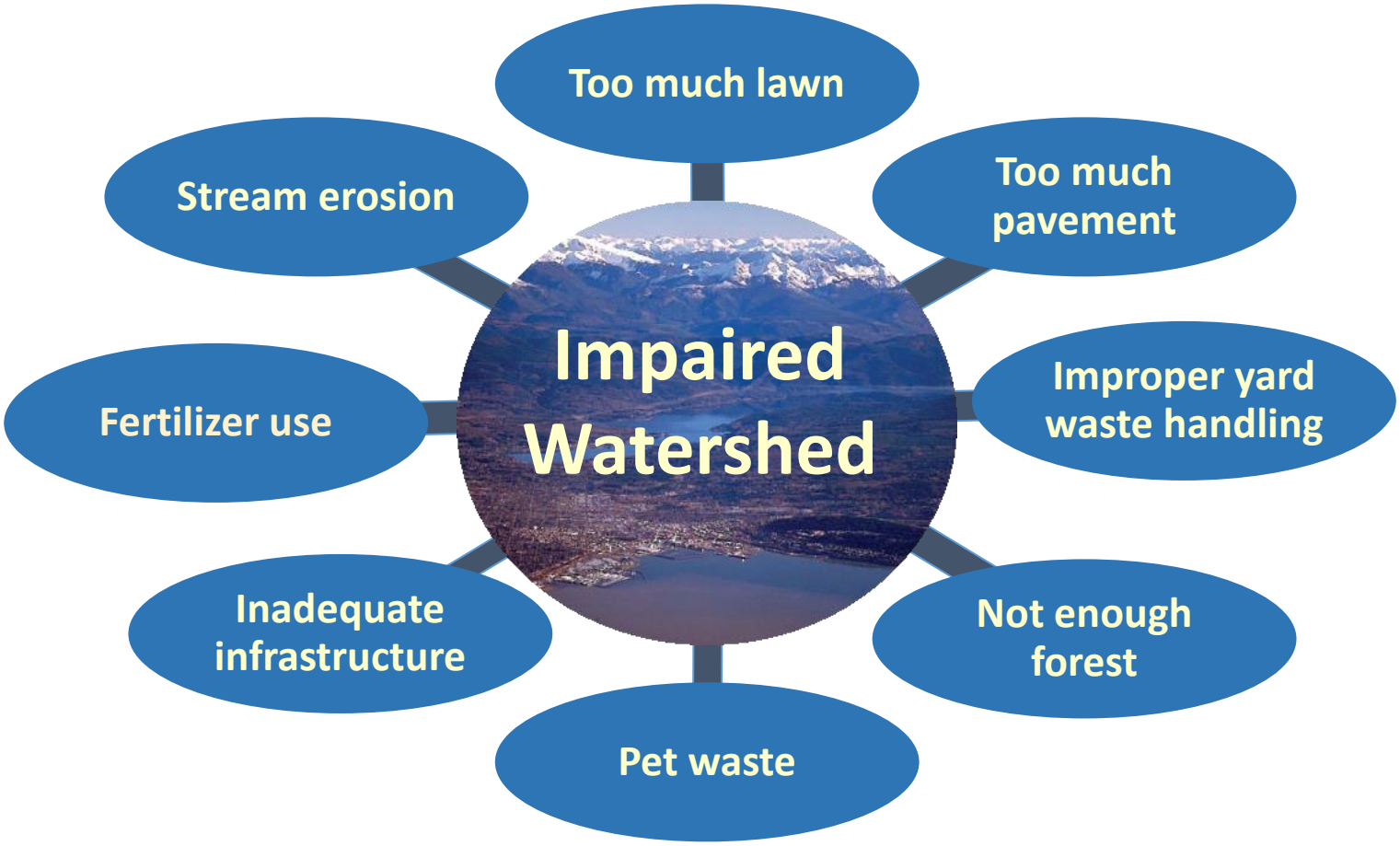


Part 2:

Background

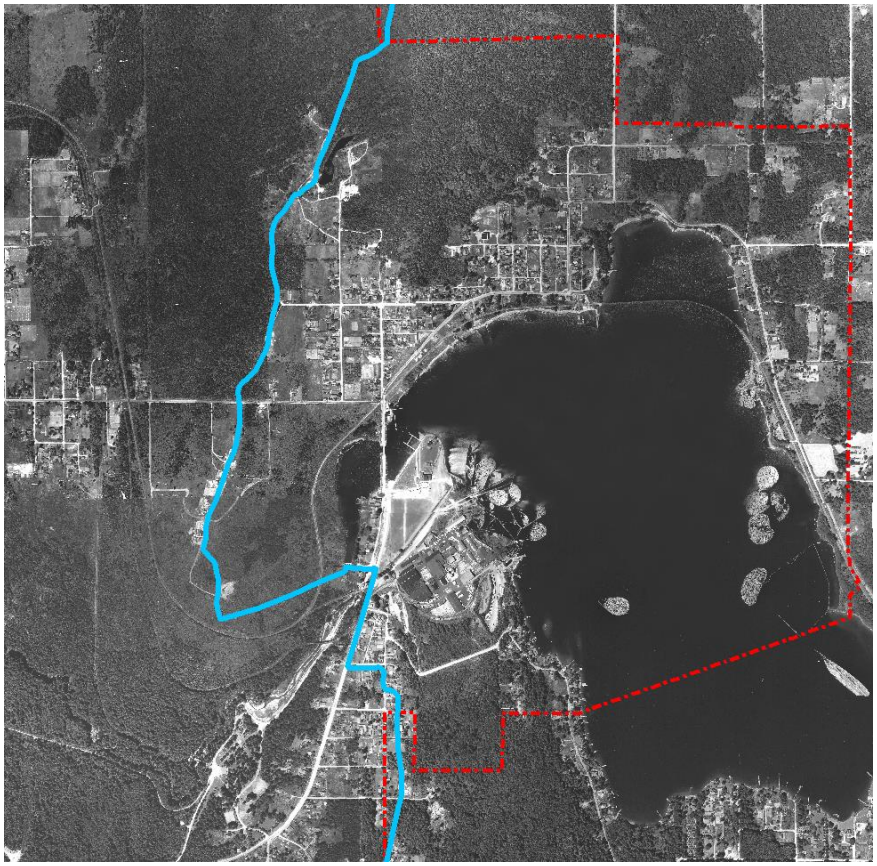
Ingrid Enschede
Whatcom County

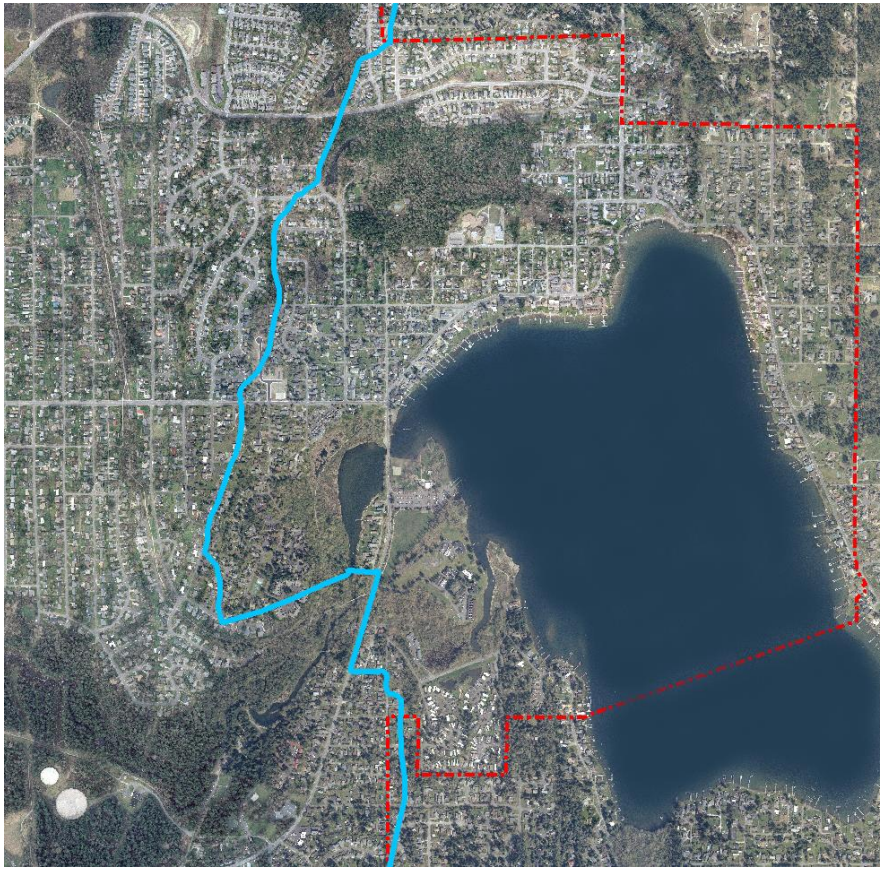
Lake Whatcom Problems



1950

2008

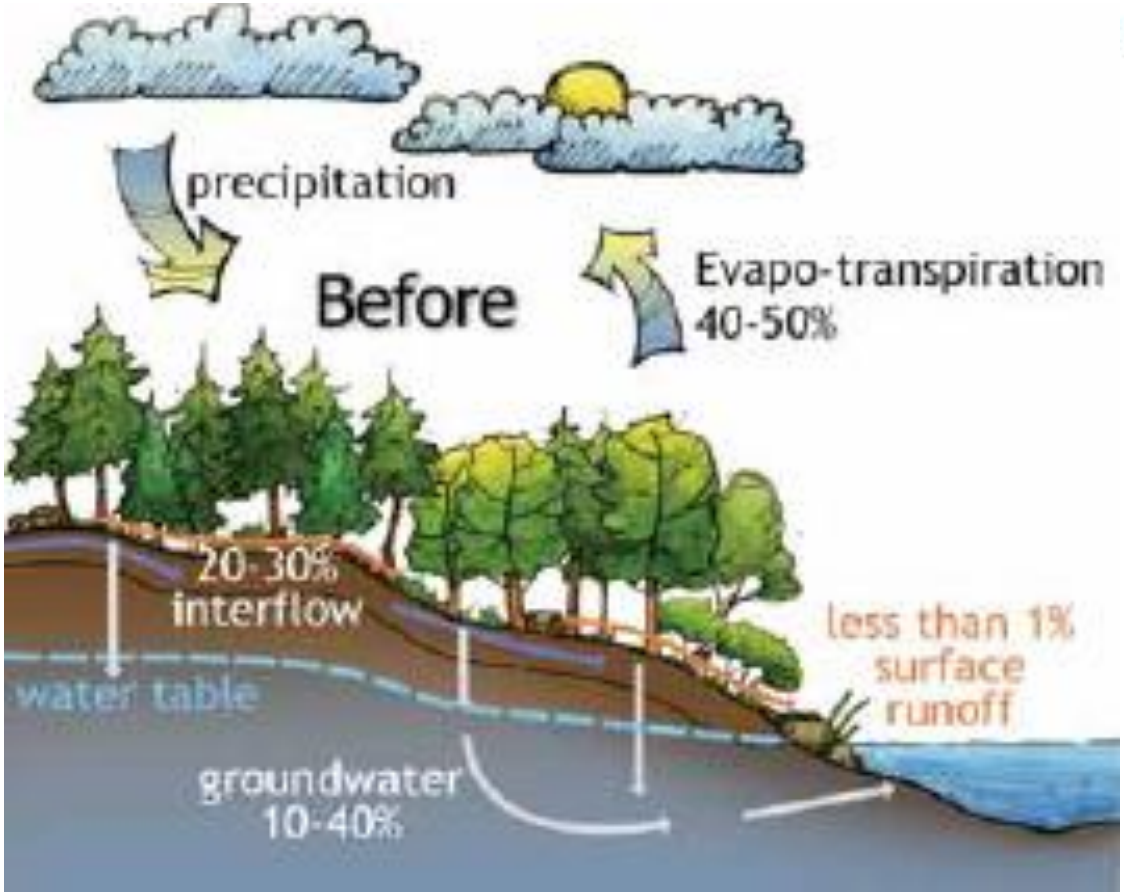




City Limits

Lake Whatcom Watershed

Comparison of Conditions: *Pre-development*

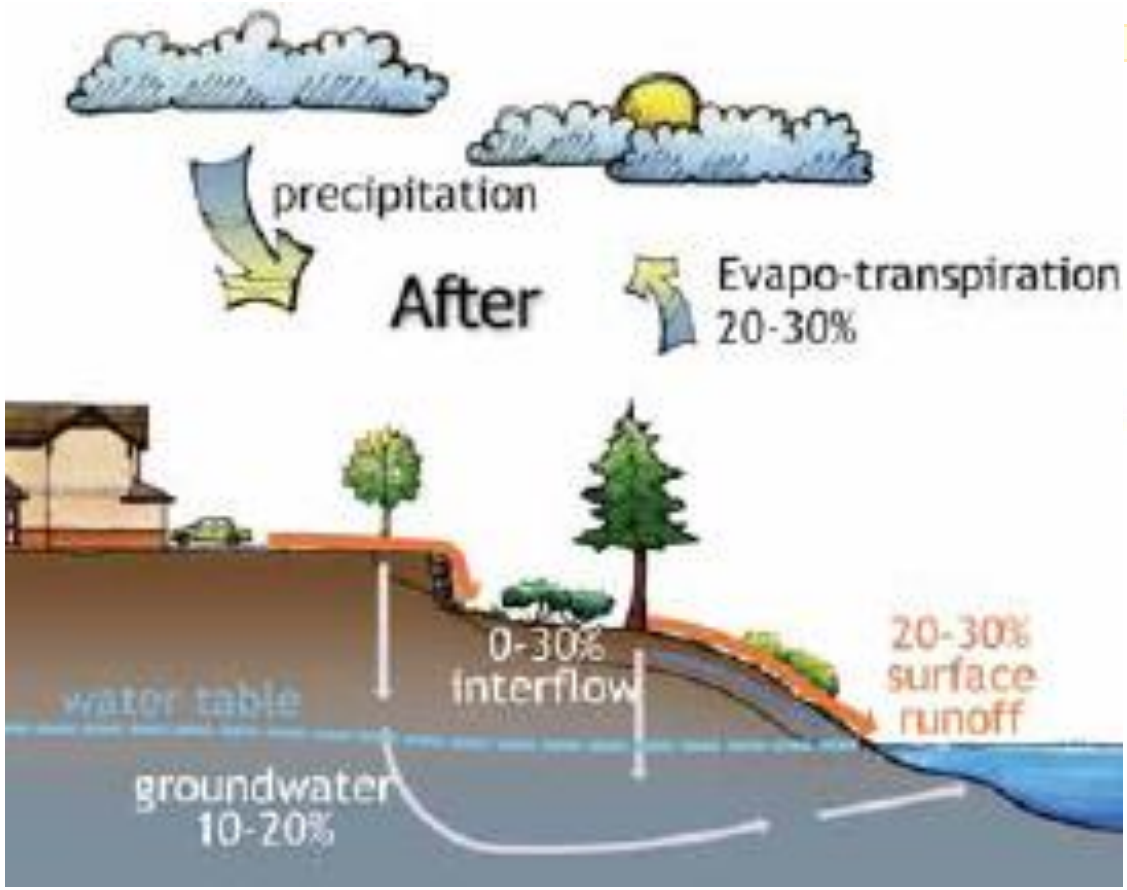


Pre-development forest

- During winter months, evaporation continues to be active while the transpiration component is minimal.
- Storm events are moderated by infiltration, evaporation, and transpiration.
- Water is available in substrata to sustain stream base flows during summer months.
- As winter progresses, the interflow component of stream flow increases.
- During the summer and fall, streams are maintained primarily by glacial melt water and/or groundwater flow.

Graphic courtesy of Washington State University/Puget Sound Action Team – ***Low Impact Development Technical Guidance Manual for Puget Sound***

Comparison of Conditions: *Post-development*



Developed Conditions

- Overland flow increases and time of concentation decreases.
- Less water in substrata available to sustain base stream flows.
- Interflow is highly variable depending on level of development.

Graphic courtesy of Washington State University/Puget Sound Action Team – ***Low Impact Development Technical Guidance Manual for Puget Sound***

The Math…

10 acres of Native Forest =

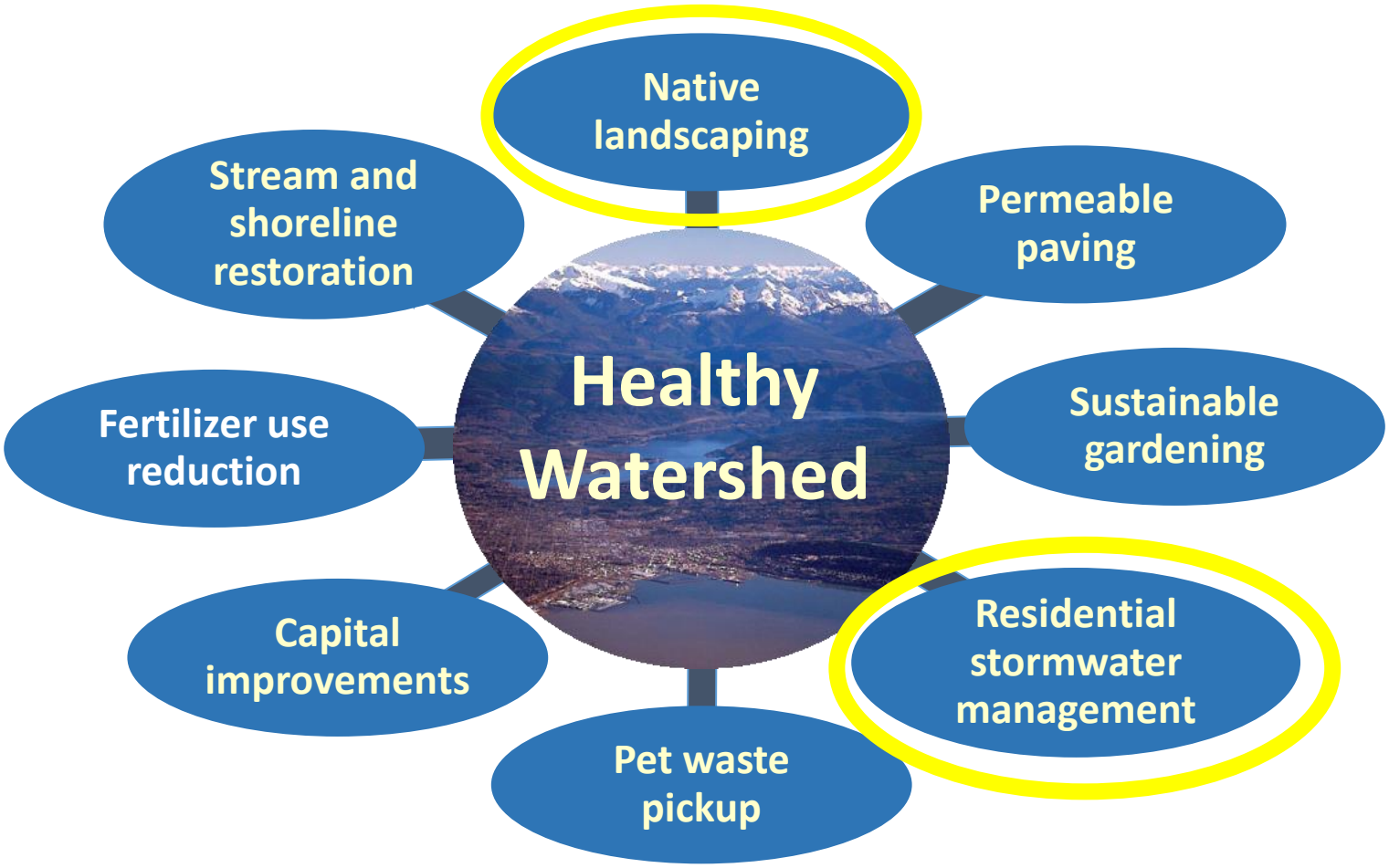
1 lb of phosphorus runoff per year

10 acres of Developed Land =

10.7 lbs of phosphorus runoff per year

Development = **10x more phosphorus** going into the lake

Lake Whatcom Solutions



The Math…

Jurisdictions MUST reduce phosphorus in runoff by **87%**, but…

…the best "end-of-pipe" treatment is only **~70%** effective.

HIP helps fill the gap

Homeowner Incentive Program (HIP)

Provides technical assistance and financial reimbursement to watershed residents for voluntary Lake Whatcom-friendly retrofit projects on residential sites

Shoreline Native Landscaping

HIP

The HIP Partnership

Lake Whatcom Management Program, Whatcom County, and City of Bellingham

- Administer and fund HIP

Whatcom Conservation District

- Technical assistance to landowners; supports the HIP Coordinator Position

Homeowners

- Voluntary landscape improvements

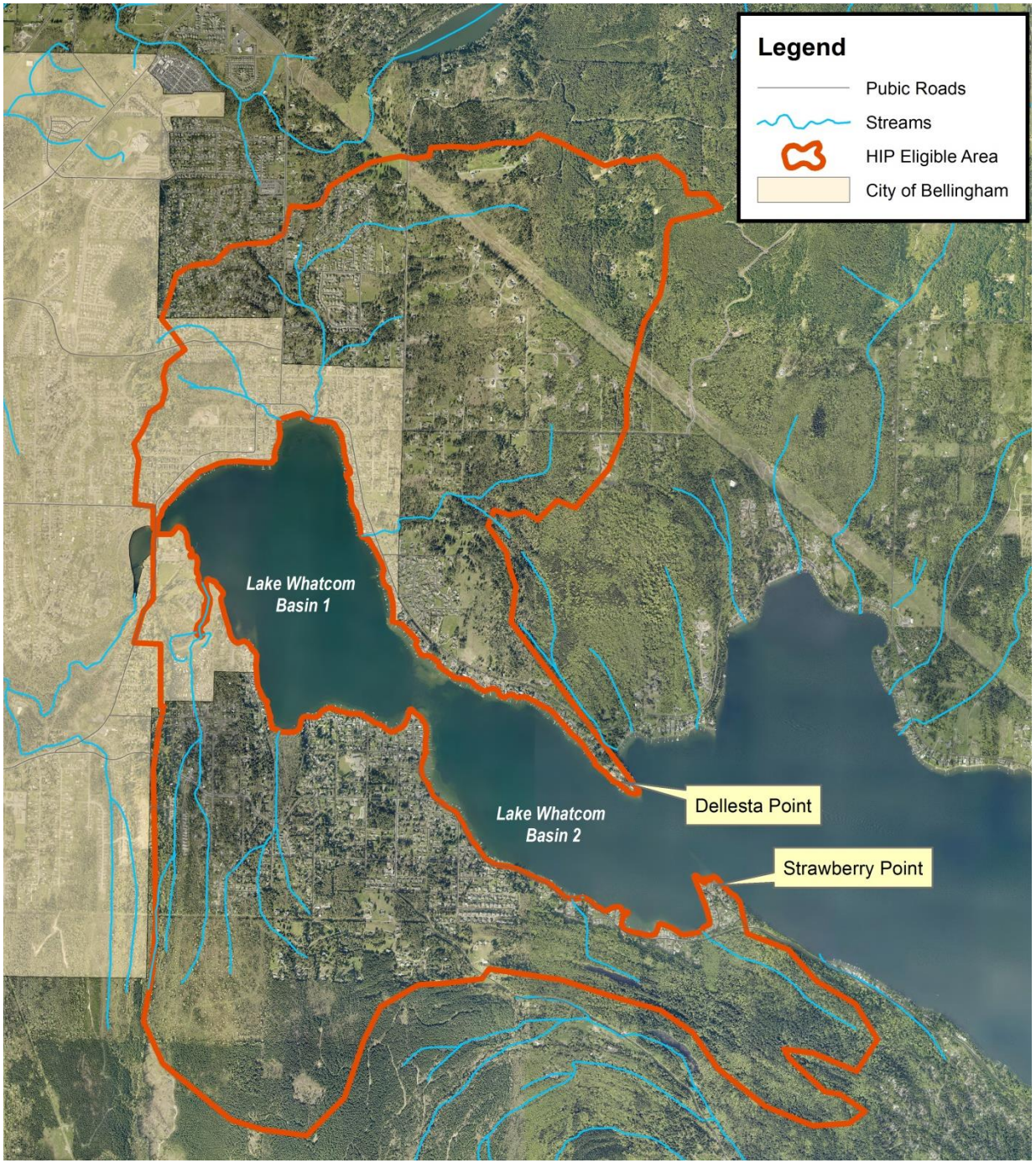
Professionals

- Design and construction expertise and services

Program Changes in 2017

1. Expand program to new areas and increase number of eligible properties (all of basins 1 & 2)
2. Change messenger from City and County staff to Whatcom Conservation District (non-regulatory)
3. Simplify projects and reduce number of eligible BMPs
4. Certify private designers/contractors
5. Focus incentive on highest impact
6. Revise incentive structure to increase to $1.30/sf improved

Eligible Area



Two-Tier Program

- Tier 1 – most opportunity for P-reduction
  - Shoreline
  - Creekside
  - Large lawns >10,000 square feet
  - No cap on maximum reimbursement

Design & Labor Fees Reimbursable

- Tier 2 – less opportunity for P-reduction
  - Native Landscaping only
  - Assistance through DIY workshops
  - Design/labor fees NOT reimbursable
  - $6,000 maximum reimbursement

HIP Project Requirements

1. Voluntary project that doesn't trigger development or redevelopment regulations
2. Homeowner signs HIP Participant Agreement
3. At least 25% developed area improved
4. Improvement achieved with primary HIP Best Management Practices (BMPs)
5. Meets HIP design guidelines & submittal requirements
6. Easement and Maintenance Agreement

HIP Limitations

HIP Does NOT Provide assistance or resources for:

- Required mitigation
- New or redevelopment projects
- Anything that provides a private benefit without a public benefit for water quality
- Additional work outside the scope of the HIP BMPs

Primary HIP Best Management Practices (BMPs)

Native Landscaping

- create forests, replace lawn or rehabilitate existing landscape
- nutrient retention and recycling (up to 85% P reduction)

Infiltration *Rain Garden, Infiltration Trench*

- soak runoff into native soil (up to 95% P reduction)

Treatment *Media Filter Drain*

- filter runoff (~85% P reduction)

Dispersion – spread runoff

- Spread runoff out into native vegetation
- Plants recycle P into vegetation (~85% P reduction)

Secondary HIP Best Management Practices (BMPs)

- Permeable Paving
- Rainwater Collection
- ONLY as addition to primary BMPs
- 25% improvement must be achieved through the primary BMPs

25% Developed Area Improvement

FOREST	FOREST
ROOF	LAWN
ROOF	LAWN
ROOF	LAWN
DRIVEWAY	DRIVEWAY

FOREST	FOREST
ROOF	LAWN
ROOF	LAWN
ROOF	Lawn and lower driveway to Rain Garden
DRIVEWAY	

25% Developed Area Improvement

FOREST	FOREST
ROOF	LAWN
ROOF	LAWN
ROOF	LAWN
DRIVEWAY	DRIVEWAY

FOREST	FOREST
ROOF	New Native Landscaping
ROOF	LAWN
Roof to Infiltration	LAWN
DRIVEWAY	DRIVEWAY

25% Developed Area Improvement

FOREST	FOREST
ROOF	LAWN
ROOF	LAWN
ROOF	LAWN
DRIVEWAY	DRIVEWAY

FOREST	FOREST
ROOF	LAWN
ROOF	LAWN
ROOF	LAWN
Driveway to Dispersion Area	

Homeowner Reimbursement

- **Reimbursement rate =** $1.30/square foot of treated area (covers approx. 80-85% of the cost of an average project)

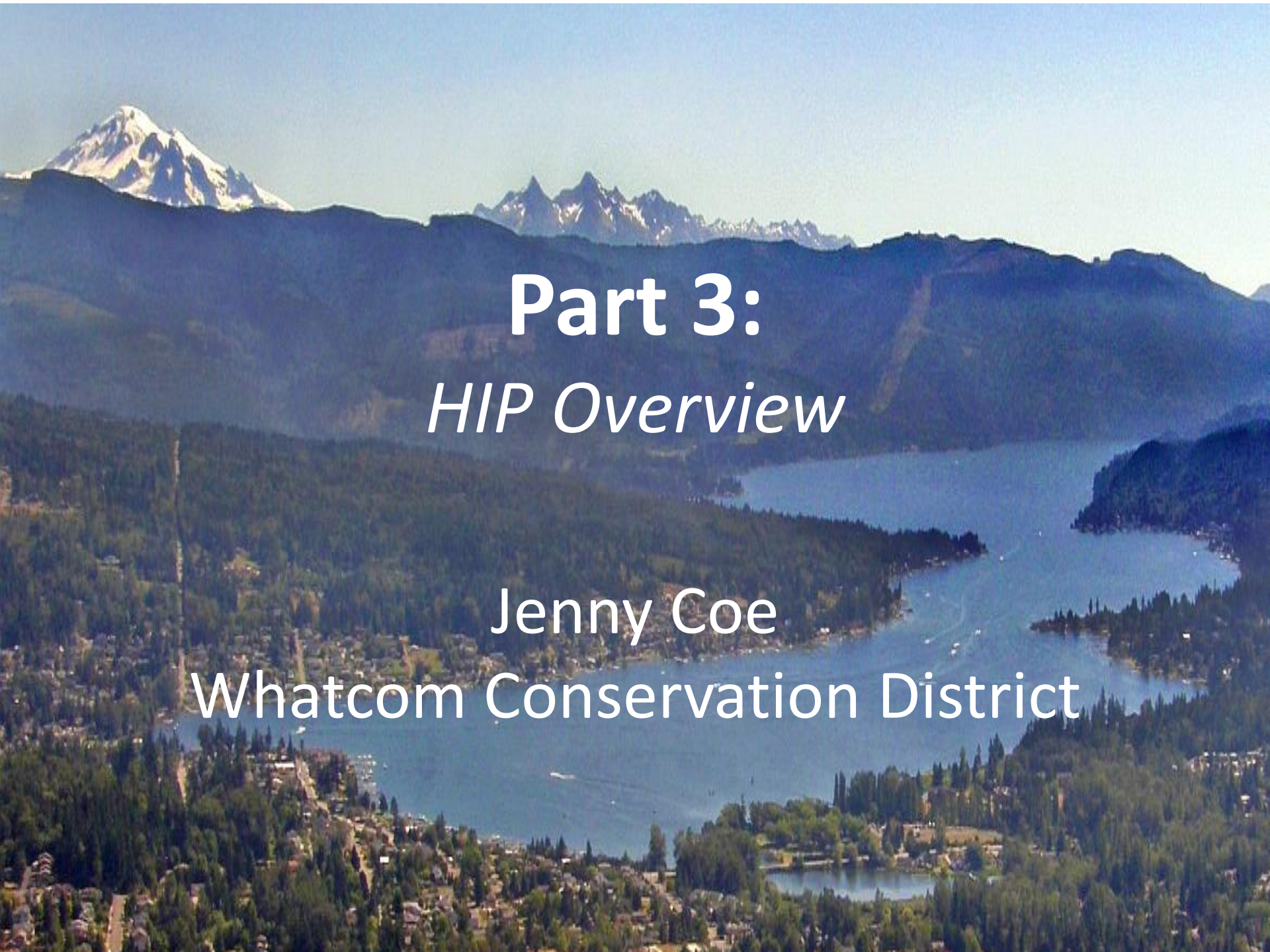
- Paid after project is complete

- Reimburses approved expenses (e.g., labor, approved materials, design)

Example

10,000 ft2 improved area x $1.30 = $13,000 reimbursement budget

Goal is to maximize treated area to maximize reimbursement budget

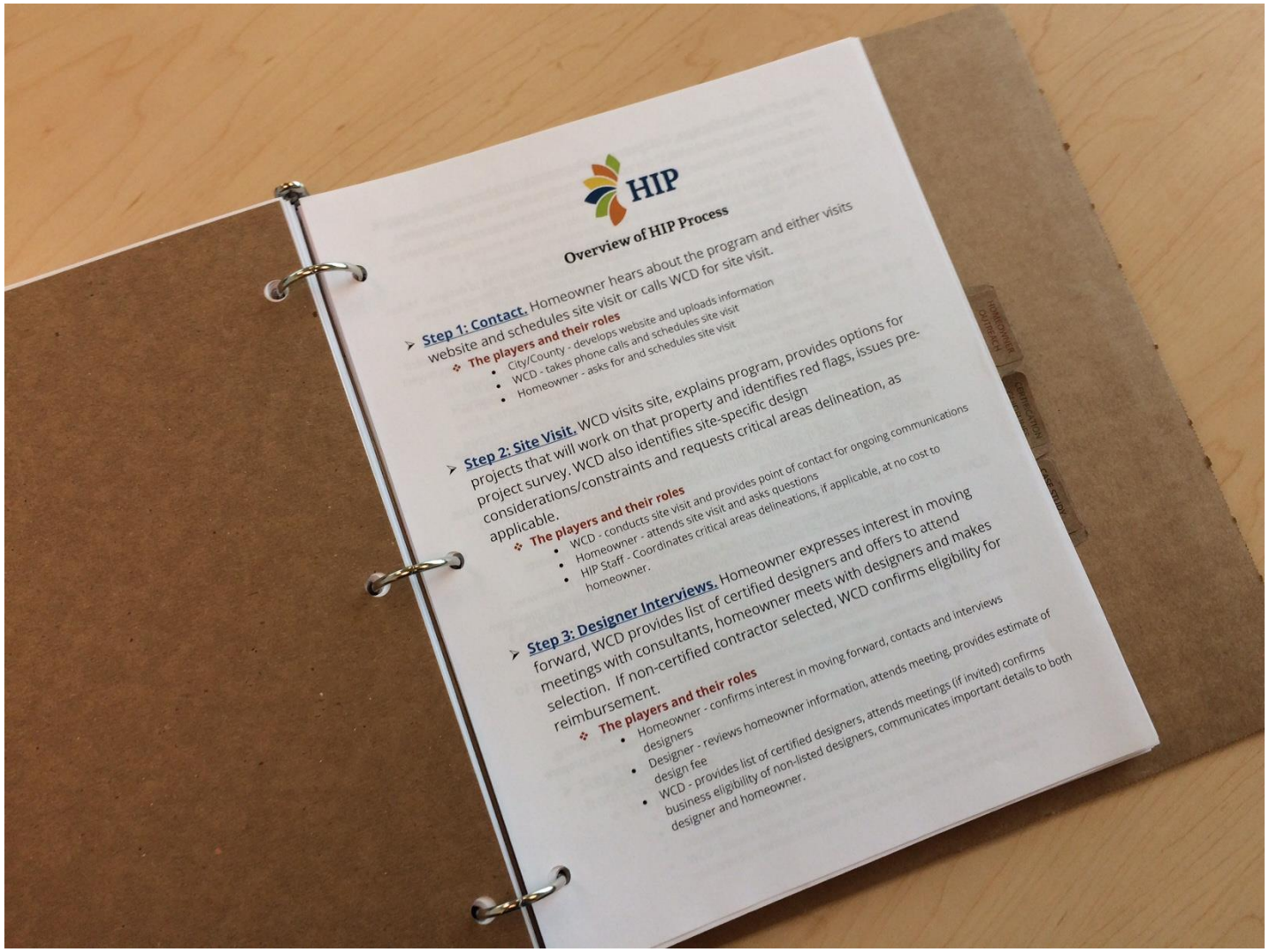


Part 3:

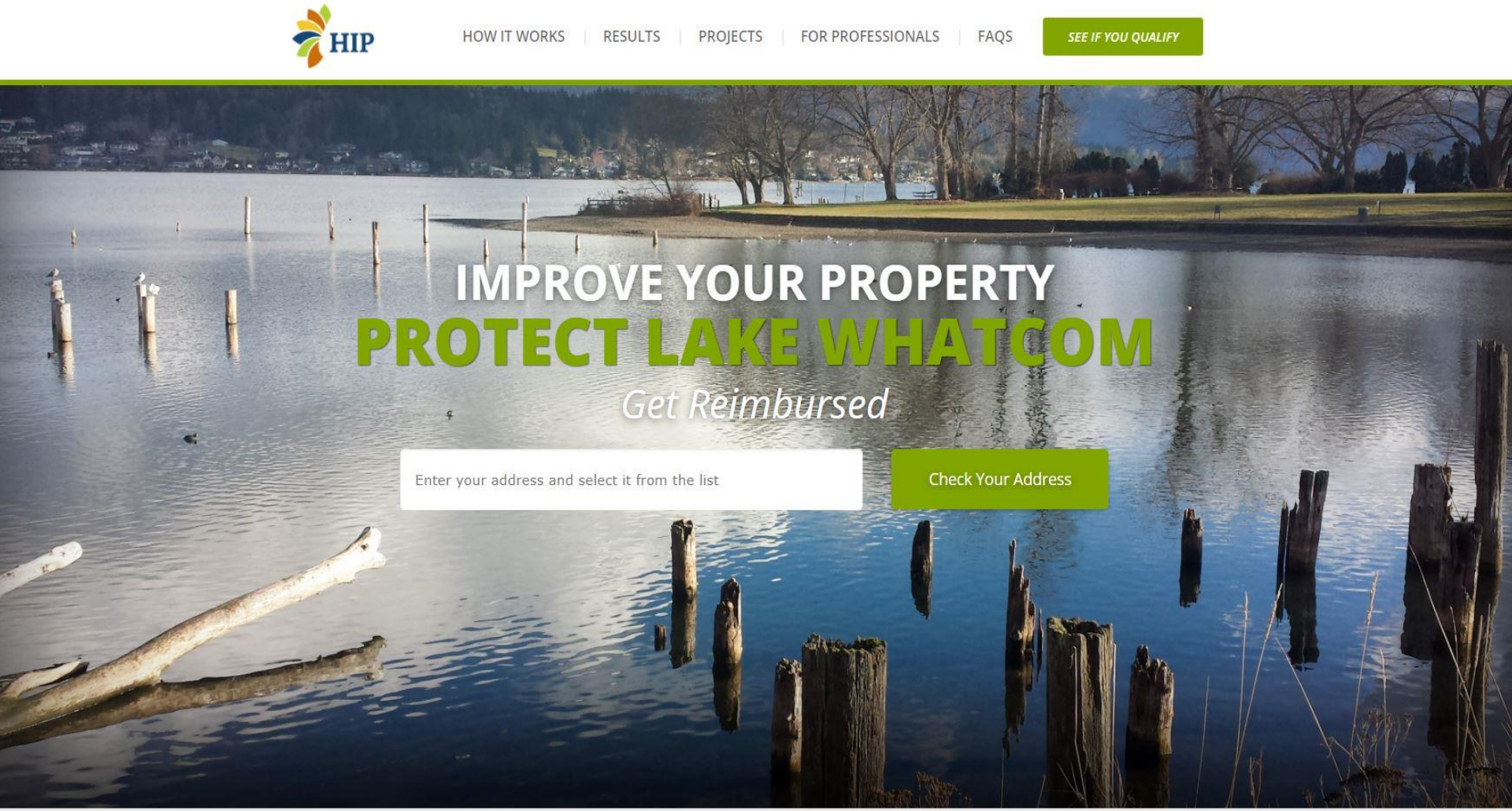
HIP Overview

Jenny Coe
Whatcom Conservation District

The HIP Process



www.lakewhatcomHIP.org



Standard Pre-Design

- MAP
- NARRATIVE
- SOIL INFORMATION (if applicable)

Information Included:

- Public & private utilities & setbacks for BMP placement
- Presence of noxious weeds
- Existing easements
- Rights of Way (if applicable)
- Proposed BMPs
- Preliminary soil test information

Critical Areas Pre-Design

- MAP
- NARRATIVE
- SOIL INFORMATION (if applicable)
- CRITICAL AREAS CHECKLIST/INFO

Information Included:

- Same as Standard Pre-Design, but with
  - Critical Areas and buffers/setback requirements identified on map
  - Critical Areas Checklist
  - Any additional critical areas information required

DESIGNER SPECIFIC STEPS
Steps 3, 4, 5

DESIGNER INTERVIEWS

- Homeowners are given a list of HIP Certified Designers
- Homeowners are recommended to interview more than one designer
- Homeowners may ask the HIP Coordinator to attend designer interviews

Resources:

HIP Pre-Design Report

The HIP website

HIP Coordinator

DESIGNER SPECIFIC STEPS
Steps 3, 4, 5

PROJECT DESIGN

- Work with homeowners AND work with HIP Coordinator
  - At least one site visit together
- HIP Coordinator ensures that design and paperwork meets program needs AND jurisdiction needs
- HIP Coordinator signs off on Design

DESIGNER SPECIFIC STEPS
Steps 3, 4, ⑤

REVIEW & APPROVAL

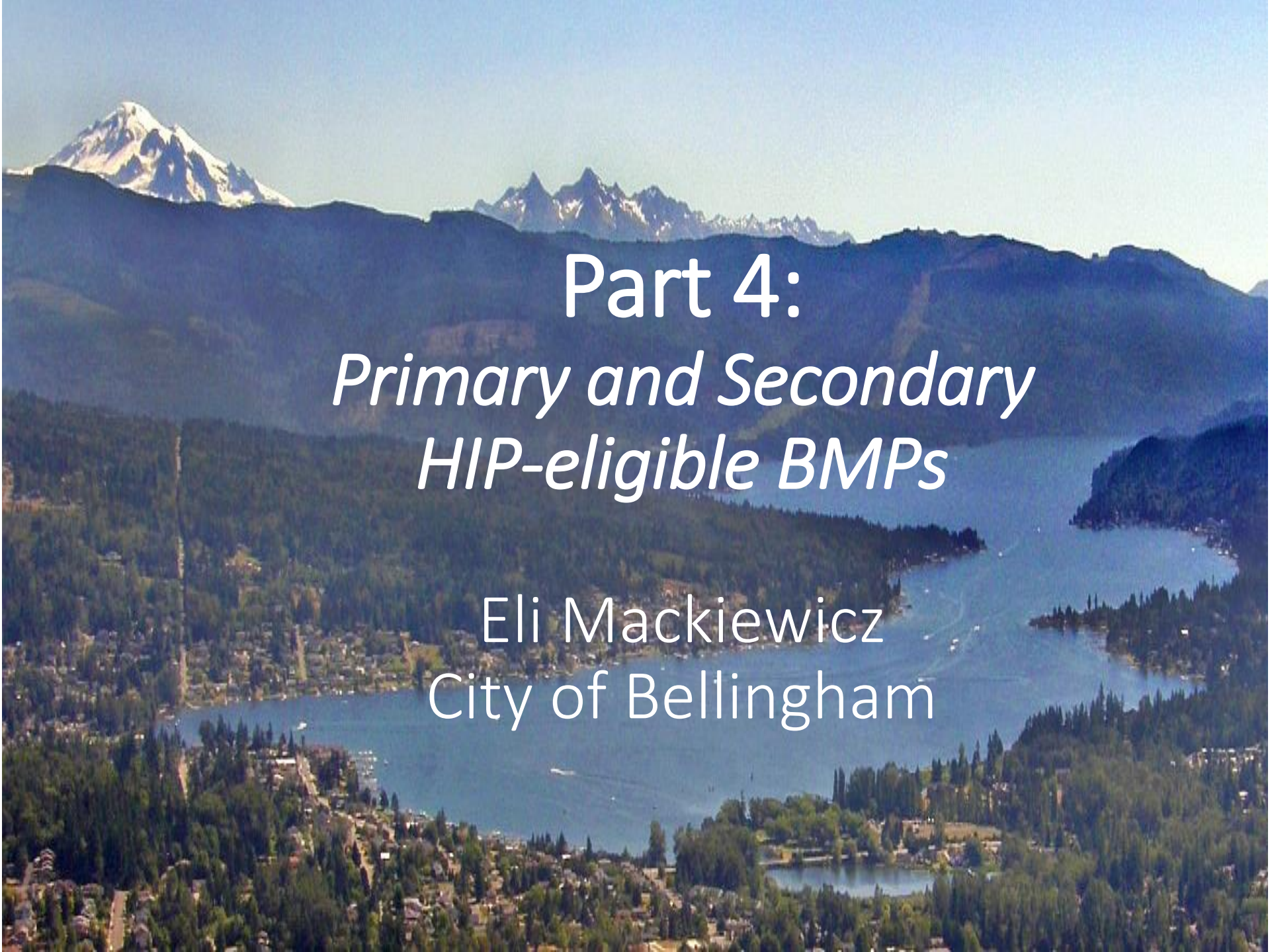
- Potentially act as agent/contact for homeowner

- Provide additional information or revised plans if needed

What Makes a Successful Project?

- Good communication and realistic expectations
- Design that meets homeowner needs
- Right BMP for the site conditions
- BMPs sized correctly
- BMPs installed according to plan
- Paperwork complete
- No question left unasked
- Adaptive management

Questions?



Part 4:
Primary and Secondary HIP-eligible BMPs

Eli Mackiewicz
City of Bellingham

Primary and Secondary BMPs

Five primary BMPs

A. Native Landscaping
B. Infiltration Trench
C. Media Filter Drain
    1. Sheet Flow Media Filter Drain Trench
    2. End of Pipe
    3. Clean Beach Media Filter
D. Dispersion
E. Lake Whatcom Rain Garden

Two secondary BMPs

S1. Permeable Paver Surfacing

S2. Rainwater Collection

BMP Description and Details

For each BMP will cover:

- Description
- Photos
- Plan example
- Material specifications
- Limitations
- Resources

Primary BMPs

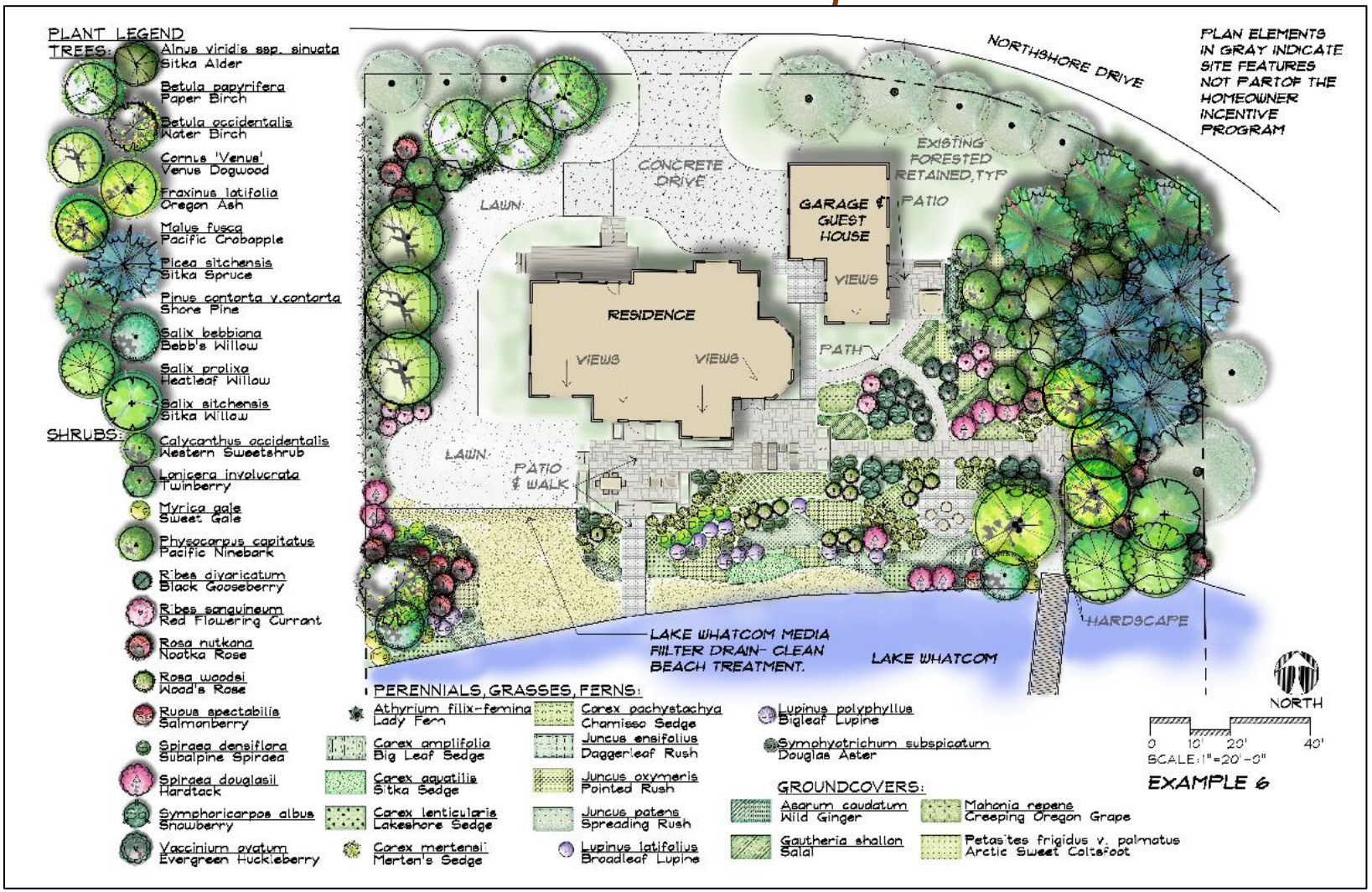
A. Native Landscaping
B. Infiltration Trench
C. Media Filter Drain
    1. Sheet Flow Media Filter Drain Trench
    2. End of Pipe
    3. Clean Beach Media Filter
D. Dispersion
E. Lake Whatcom Rain Garden

BMP A – Native Landscaping

- Install at least 4” of Low-P mulch.
- Provide at least two layers of plant cover. Trees are NOT required.
- Existing plants and mulch count.

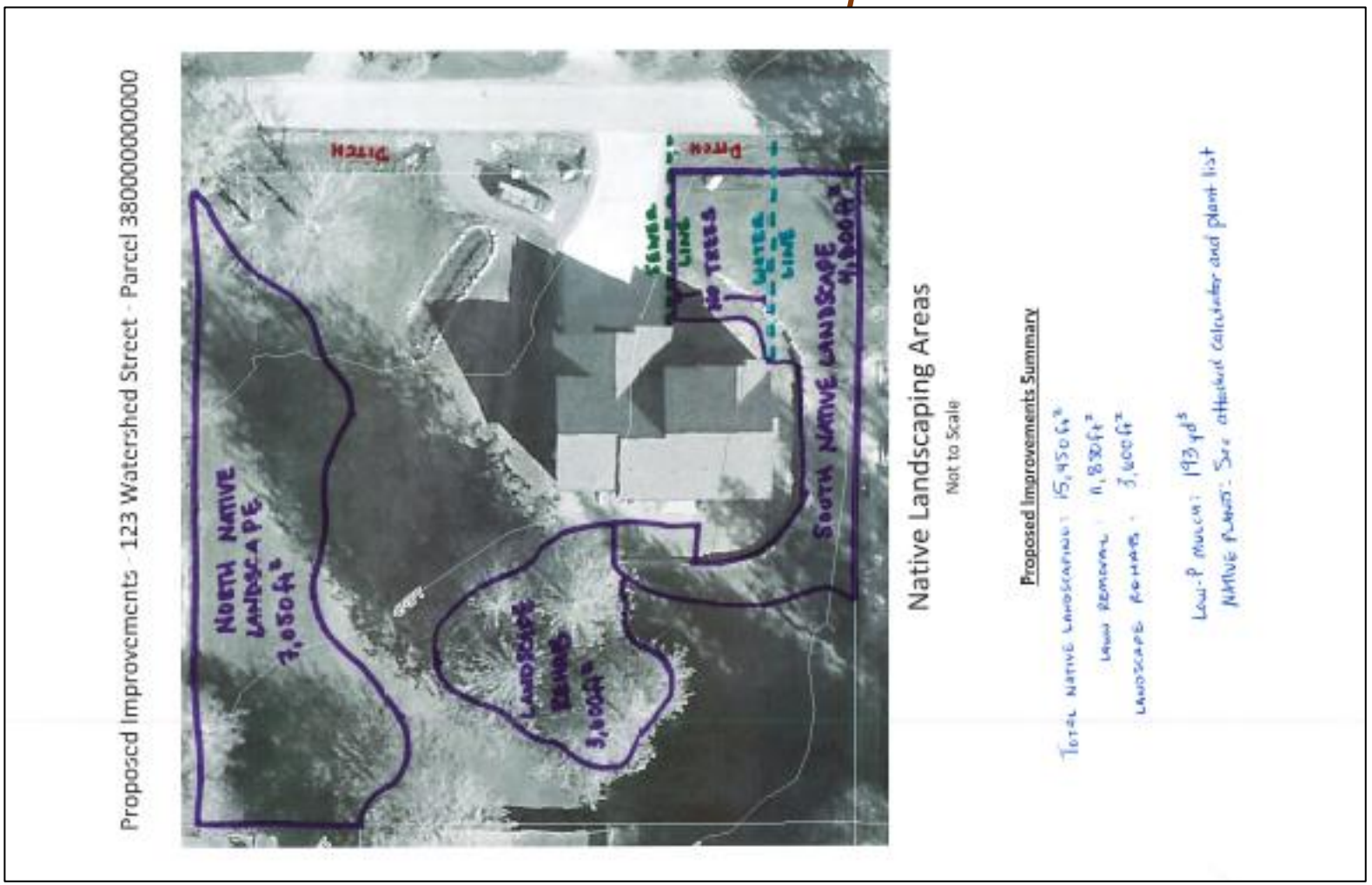
BMP A: Native Landscaping

Plan Example



BMP A: Native Landscaping

Plan Example



BMP A: Native Landscaping
Plant List

My HIP Project will meet the required density for the following layers (Choose AND CIRCLE at least two)

Canopy (Native Trees)	Understory (Native Shrubs)	Groundcover (Small Native Plants)

	If you chose:	Then your minimum density will be...		
A	Canopy, Understory, and Groundcover	Divide project area by 225 (15' o.c.)	17	Trees
		Divide project area by 64 (8' o.c.)	59	Shrubs
		Divide project area by 25 (5' o.c.)	152	Groundcovers
B	Canopy and Understory Only (No Groundcovers)	Divide project area by 144, (12' o.c.)	26	Trees
		Divide project area by 36 (6' o.c.)	106	Shrubs
C	Canopy and Groundcovers Only (No Understory)	Divide project area by 144 (12' o.c.)	26	Trees
		Divide project area by 16 (4' o.c.)	238	Groundcovers
D	Understory and Groundcover Only (No Canopy)	Divide project area by 49 (7' o.c.)	78	Shrubs
		Divide project area by 25 (5' o.c.)	152	Groundcovers

Total Project Area (in square feet)
3800

Plant List, Please complete with species name (common or scientific) and desired number

Native Trees	
Species Name	**#**
Western Redcedar	2
Pacific Crabapple	4
Bitter Cherry	4
Douglas Fir	4
Grand Fir	3
Total	17

Native Shrubs	
Species Name	**#**
Red Huckleberry	6
Evergreen Huckleberry	6
Blueberry	4
Oceanspray	6
Bald Hip Rose	10
Indian Plum	6
Pacific Rhododendron	6
Salal	15
Total	59

Native Groundcovers	
Species Name	**#**
Nodding Onion	27
Sword Fern	30
Deer Fern	25
Lady Fern	25
Beach Strawberry	10
Woodland Strawberry	25
Camas	10
Total	152

BMP A: Native Landscaping
Materials

- HIP-eligible Materials
  - Mulch
  - Rock
  - Edging
  - Deer Fencing/Netting
  - Irrigation
  - Native Plants

- What do you mean **native** plant?

www.plants.usda.gov

https://green2.kingcounty.gov/gonative/index.aspx

BMP A: Native Landscaping *Limitations*

- No trees near building foundations or utilities, including septic systems
- No trees in public right-of-way* or within utility easements
- No planting on slopes greater than 35%*
- 10% non-natives maximum (not reimbursable)

* = special permission may be granted on a case-by-case basis. Check with the jurisdiction for more info.

BMP A: Native Landscaping *Resources*

HIP

Design Guidance and Permitting Requirements

Native Landscaping

DESCRIPTION

Vegetated areas consisting of a thick mulch layer and a minimum density of plants common to forests of the Pacific Northwest. Native plants are defined as those found in forests west of the Cascade range prior to the arrival of European settlers, along with cultivars of those species.

METHOD OF PHOSPHORUS REDUCTION

Native landscaping re-creates the natural soil chemistry and biology found in forested areas. Plants and mulch in the vegetated area capture, neutralize, and recycle phosphorus into a healthy forest ecosystem. Up to 40% of rainfall is captured by plants prior to reaching the ground, resulting in less runoff.

Sketch of Native Landscaping Design

APPROVED HIP VARIATIONS

"Landscaped Depression" where wet-loving plants are installed in an existing wet area that may or may not receive runoff from other surfaces

- "Vegetated Berm" where strategically-placed soil piles are used to create visual complexity in the design
- "Shoreline Buffer" includes all native planting areas within 25' of Lake Whatcom's shoreline
- "Riparian Buffer" includes all native planting areas within 25' of streams or creeks leading to the Lake

Note: This design methodology is applicable for HIP projects only. These methods may not be suitable for, and have not been evaluated for, compliance with regulations which require professional engineering.

Approved Mulches

City of Bellingham Approved Mulch, Topsoil, and Compost for Use in the Lake Whatcom Watershed

Last Updated 05/08/2014

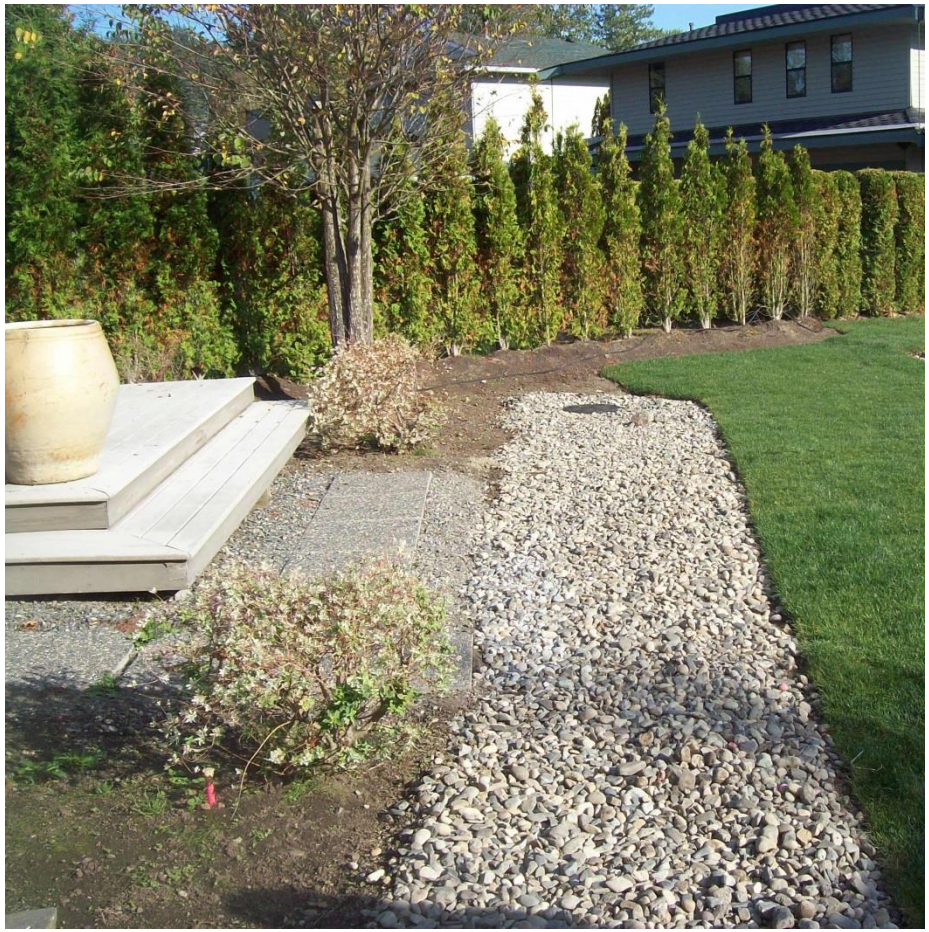
Source	Product Name	Phosphorus Concentration*	Address**	Phone	Website
Perry Pallet	Appearance Grade Chip	3	742 Delta Line Road, Ferndale	366-5239	www.perrypallet.com
Lenz Enterprises	Fine Eco-Mulch	8	Locally Available By Delivery Only	961-3112 629-2933	www.lenz-enterprises.com
GrowSource	Cedar Chips	9	2200 Division St	318-8554	www.growsource.com
Lenz Enterprises	Cedar Chips	9	Locally Available By Delivery Only	961-3112 629-2933	www.lenz-enterprises.com
De Wilde's Nursery	5-Way Topsoil	20	3410 Northwest Ave.	733-8190	www.dewildesnursery.com
North Star Stone & Landscape	4-Way Topsoil Mix	30	4840 Pacific Hwy	383-9090	www.northstar-stone.com
Lenz Enterprises	Black Bark Mulch	38	Locally Available By Delivery Only	961-3112 629-2933	www.lenz-enterprises.com
GrowSource	3-Way Topsoil	64	2200 Division St	318-8554	www.growsource.com
GrowSource	4-Way Topsoil	75	2200 Division St	318-8554	www.growsource.com
De Wilde's Nursery	Medium Bark	83	3410 Northwest Ave	733-8190	www.dewildesnursery.com
North Star Stone & Landscape	Medium Bark	94	4840 Pacific Hwy	383-9090	www.northstar-stone.com
North Star Stone & Landscape	3-Way Topsoil Mix	116	4840 Pacific Hwy	383-9090	www.northstar-stone.com
De Wilde's Nursery	Fine Bark	118	3410 Northwest Ave	733-8190	www.dewildesnursery.com
North Star Stone & Landscape	Fine Bark	174	4840 Pacific Hwy	383-9090	www.northstar-stone.com
GrowSource	Medium Bark	175	2200 Division St	318-8554	www.growsource.com
Plantas Nativa	Black Mulch	190	210 E. Laurel St	715-9655	www.plantasnativa.com
Beautiscape Bark Express	Blow-Soil	199	Locally Available By Delivery Only	354-2359	www.beautiscapes.com

* Soluble Reactive Phosphorus (SRP) in µg (micrograms) per kg (kilograms). One kilogram is equal to one liter of water. Phosphorus amounts for materials on this list considered functionally-equivalent. No preference is given to materials based on this number, and all materials on this list are Homeowner Incentive Program (HIP)-eligible.

** All addresses are in Bellingham unless otherwise noted. Products Marked "Locally Available By Delivery Only" do not have local locations for pick-up.

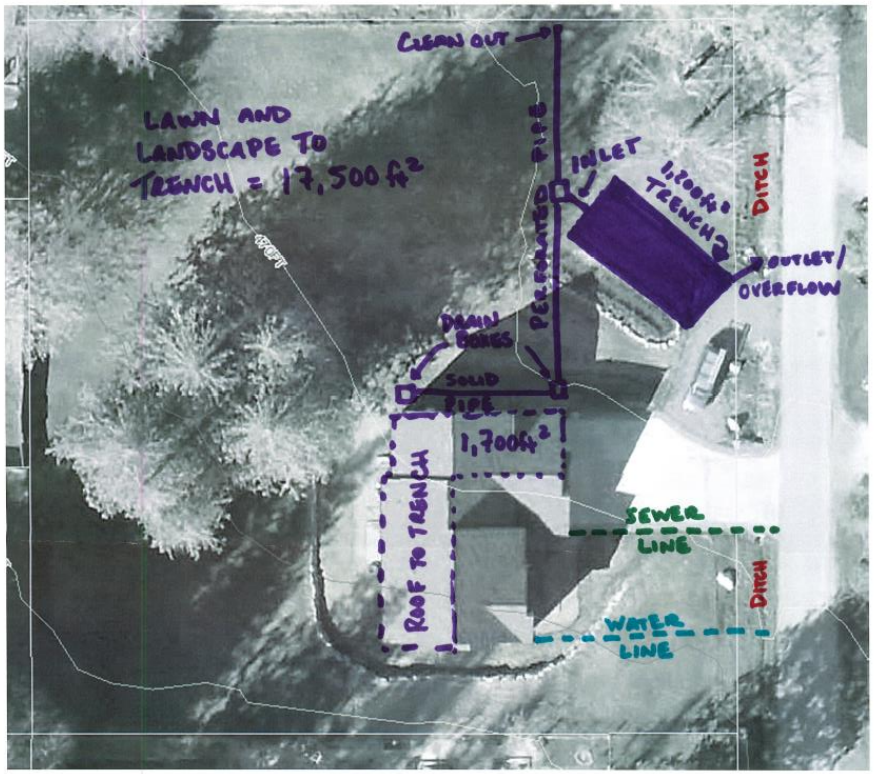
BMP B - Infiltration Trenches

- Washed drain rock trench. Pipe in, overflow out.
- Minimum depth is 18” of rock. Minimum width 24”. Any shape ok.
- Consider soils, utilities, slopes, structures, and property lines



BMP B - Infiltration Trenches *Plan Example*

Proposed Improvements - 123 Watershed Street - Parcel 380000000000



Infiltration Trench and Associated Conveyance

Not to Scale

Proposed Improvements Summary

See attached Standard Detail for components

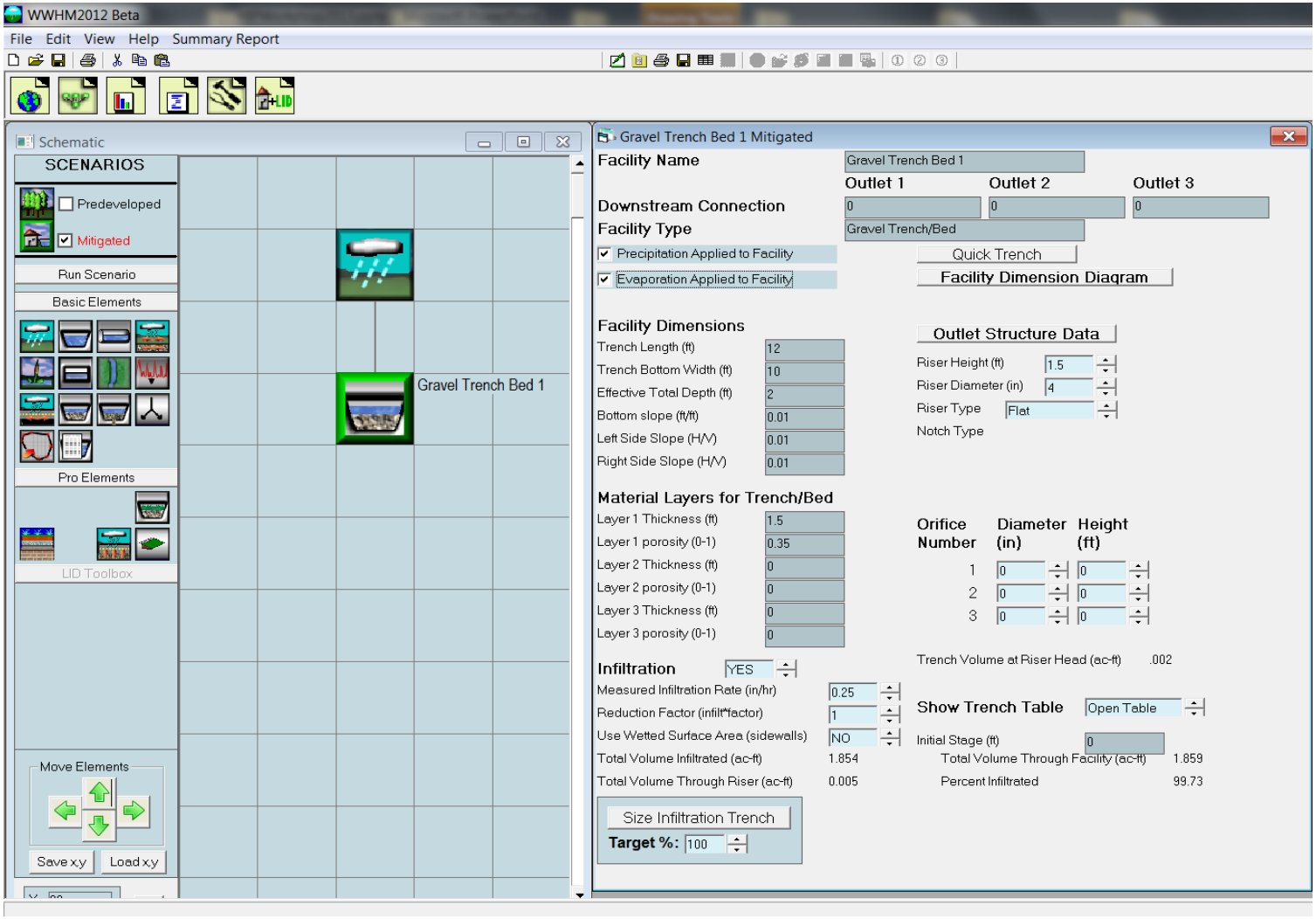
Tributary Area: 19,200 ft²
Lawn: 17,500 ft²
Roof: 1,700 ft²

Trench Area: 1,200 ft²

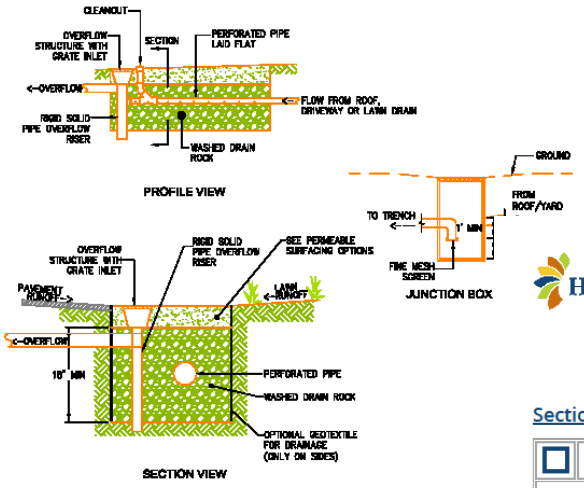
Trench Surfacing: Permeable-Interlocking Pavers (P-I-P)
See attached manufacturer's specifications

BMP B - Infiltration Trenches

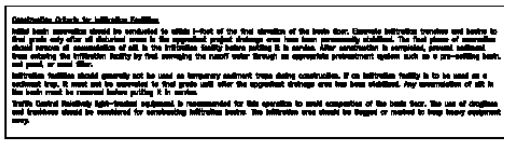
Model



BMP B – Infiltration Trenches



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



HIP

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_____ ft² of impervious surface and/or _____ ft² of lawn/landscape
☐	I have sized the trench using approved methodology (HIP Sizing Calculator or stormwater hydrological modeling software) and attached the data.
	The trench will be at least _____ 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 _____ 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.
☐	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.

HIP

Soil Characterization Sheet

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

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

_____

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 Manual (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	☐ Simple Investigation	☐ Soil Texture 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	I dug to a depth of 3' below ground surface and found: ☐ Groundwater ☐ Bedrock ☐ Other: _____ _____ _____ ☐ None of the above	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

BMP B - Infiltration Trenches

Materials

Rock examples to pass around

BMP B - Infiltration Trenches
Limitations

- **Slopes** – stay away from top of steep slopes
- **Structures** – waterproof as needed
- **Utilities** - stay 5' away, more for septic systems
- **Creeks / Shorelines / Wetlands** - not within 25'
- **Surfacing** - open rock *only* within critical area buffers, permeable pavers okay elsewhere

BMP B - Infiltration Trenches *Resources*

HIP

Design Guidance and Permitting Requirements

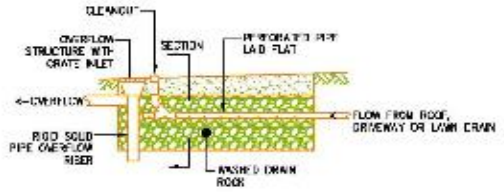
Infiltration Trench

DESCRIPTION

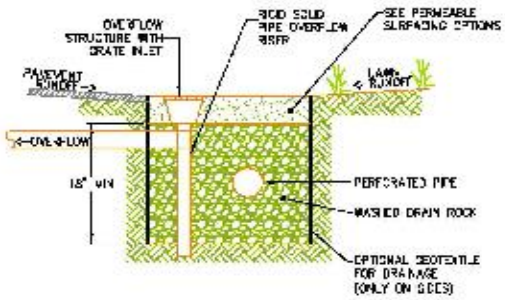
An underground drainage facility, consisting of washed rock and constructed with a flat bottom, intended to capture and infiltrate runoff from impervious and pervious surfaces. This facility does not have an underdrain or bypass structure, so it requires a dedicated and protected overflow structure.

METHOD OF PHOSPHORUS REDUCTION

Treatment via infiltration through native soils. Runoff entering the infiltration trench is detained and allowed to slowly pass through subsoils, where phosphorus is bound by, captured within, and recycled into the soil matrix.



PROFILE VIEW



SECTION VIEW

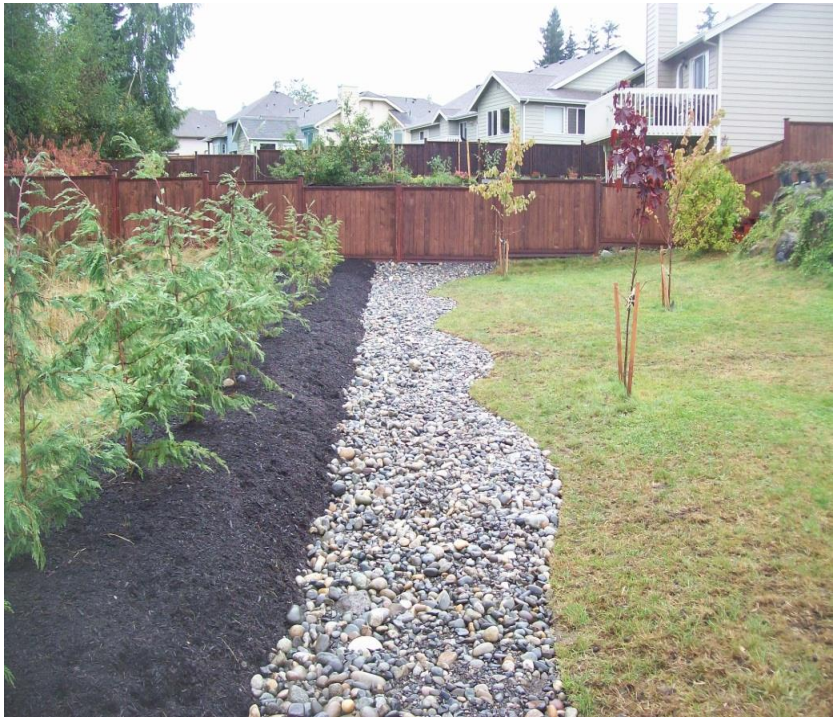
APPROVED HIP VARIATIONS

- "Dry Creek Bed" topped with river rock
- "Patio Drywell" topped with spaced pavers with gaps. (See HIP Standard Detail for Permeable Surfacing)
- "Walkway Trench" topped with pea gravel or permeable or spaced pavers (See HIP Standard Detail for Permeable Surfacing)
- "Garden Path" topped with non-woven geotextile and low-P mulch or clean pea gravel

Note: This design methodology is applicable for HIP projects only. These methods may not be suitable for, and have not been evaluated for, compliance with regulations which require professional engineering.

BMP C - Media Filter Drain Trench

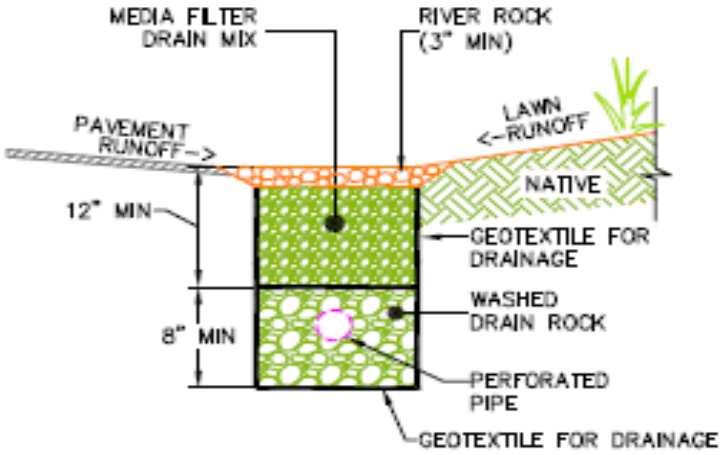
- Can be built in smaller footprint than infiltration systems and on poor soil
- Special media (mineral aggregate, perlite, dolomite, gypsum) is available locally
- Dirty water needs to flow through at least 12” of media
- Needs an underdrain pipe connected downstream
- 3 configurations
  - 2 upland
  - 1 specific to shorelines




Soil Building Conditioner
BREAKS UP HARD CLAY SOILS


08/21/2014

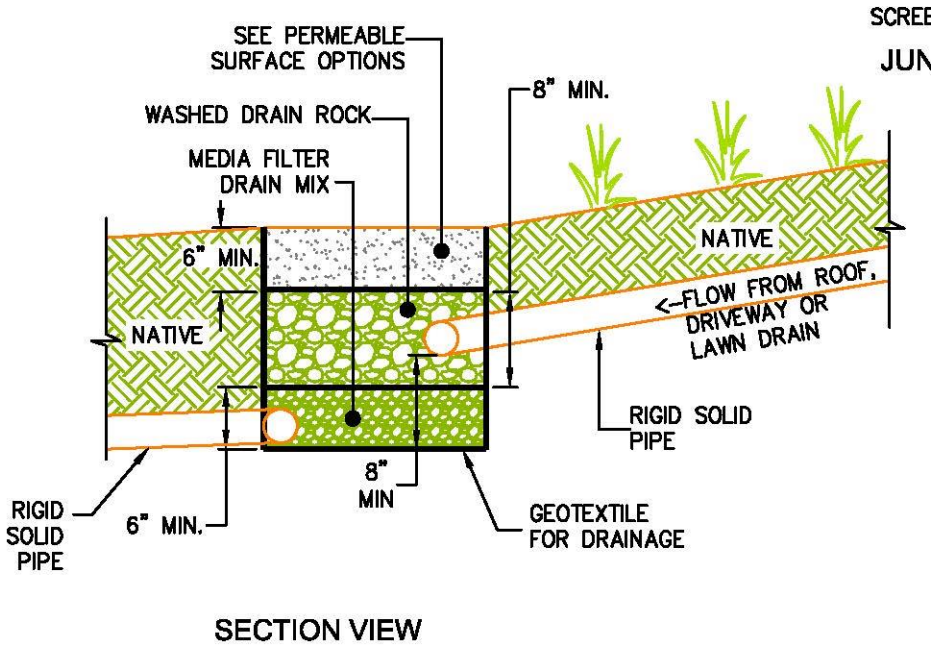
BMP C.1 – Upland MFD
Sheet Flow Media Filter Drain (MFD) Trench



SECTION VIEW

MEDIA FILTER DRAIN ; SHEET FLOW CONFIGURATION
HIP BMP "C.1", TYPICAL NTS

BMP C.2 – Upland MFD
End-of-Pipe Media Filter Drain Trench



Upland MFDs – Key Differences

Sheet Flow MFD

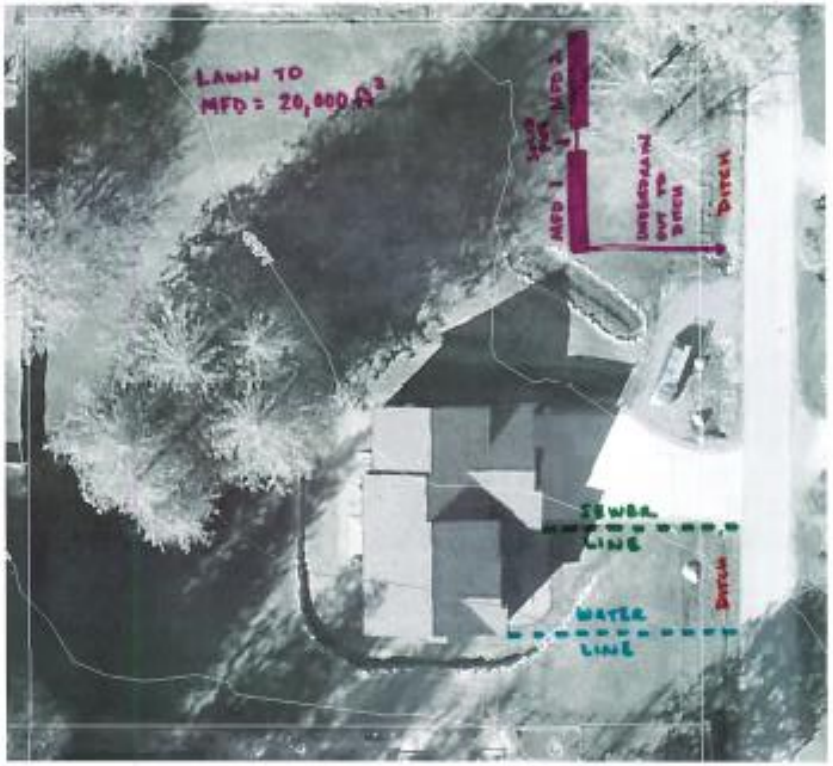
- No pipe in
- Drain rock on bottom, MFD mix on top
- Surface is river rock *or* pea gravel

End-of-Pipe MFD

- Piped inflow
- Drain rock on top; MFD mix on bottom
- Surface is river rock, pea gravel, washed rock, *or* spaced pavers

BMP C.1: Sheet Flow MFD *Plan Example*

Proposed Improvements - 123 Watershed Street - Parcel 380000000000



Media Filter Drain (Sheet Flow) and Associated Conveyance

Not to Scale

Proposed Improvements Summary

See attached HP Standard Detail for components

Tributary Area: 20,000 ft²

Total MFD length: 60 ft

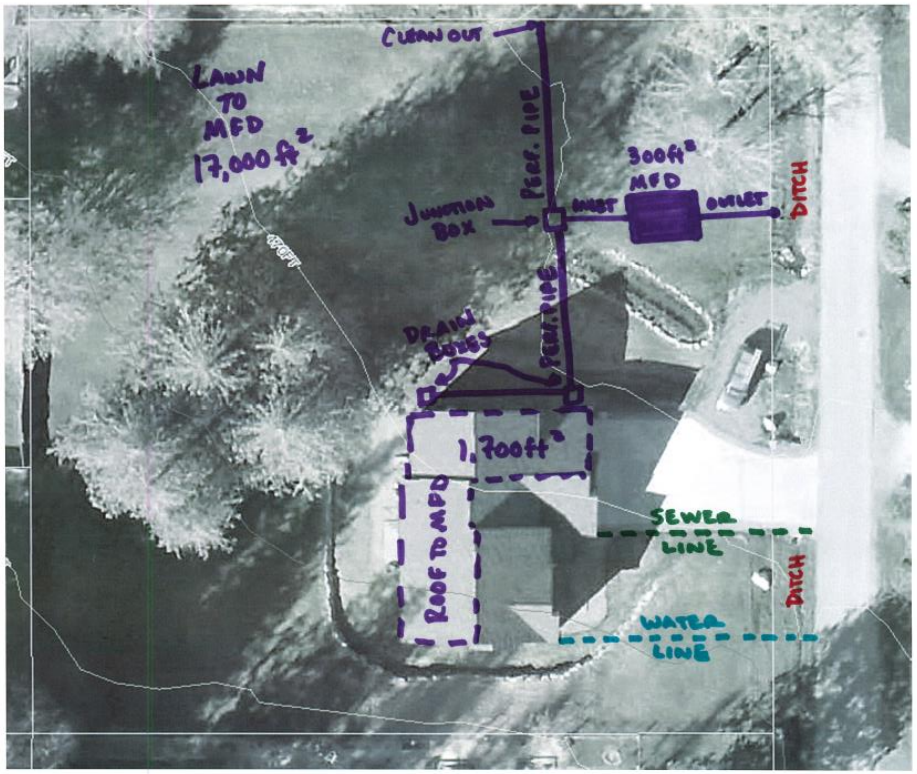
Total MFD Square footage: 200 ft²

Minimum width: 2 ft

Surfacing: River rock

BMP C.2: End-of-Pipe MFD *Plan Example*

Proposed Improvements - 123 Watershed Street - Parcel 380000000000



Media Filter Drain (End-of-Pipe) and Associated Conveyance

Not to Scale

Proposed Improvements Summary

See attached HIP Standard Detail for components

Tributary Area: 18,700ft²
Lawn : 17,000ft²
Roof : 1,700ft²

Total MFD Square footage: 300ft²
Minimum width : 3ft
Surfacing: Permeable Interlocking Pavers (P-I-P)
See attached manufacturer's specifications

BMP C: Media Filter Drain

Materials


KUBOTA
KX121-3
SEP/24/2015

Upland MFDs
Sizing

HIP

Design Submittal
Media Filter Drain System

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 MFD by piping.
	That area is_____ft² of impervious surface and/or _____ft² of lawn/landscape
☐	I have defined the area that will drain into the MFD by sheet flow.
	That area is_____ft² of impervious surface and/or _____ft² of lawn/landscape
☐	I have sized the MFD using approved methodology (HIP Sizing Calculator or stormwater hydrological modeling software) and attached that data.
	My trench will need to be at least _____ feet wide and _____ft² in filter area

Section II: Site-Specific Planning

☐	I have determined that the MFD is at least 5' from known public and private utilities.
☐	I have determined that the MFD 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 MFD 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.

Upland MFDs
Sizing (contd.)

HIP

Sizing Calculator
Media Filter Drain System

Instructions: Measure hard surface area and lawn/landscaping surface area draining to trench. Characterize flow as sheet flow or piped flow. Insert values in the table below and use the following formula to calculate the size of MFD trench that is needed to adequately manage the runoff directed to the system. Sheet flow trenches must be at least 2' wide while piped flow trenches must be at least 3' wide in order for this calculation to be applicable.

Drainage Type	Hard Surface (square feet)		Hard Surface Multiplier		Lawn/Landscape (square feet)		Lawn/LS Multiplier		Minimum Trench Area (square feet)
Sheet Flow	[ ]	×	0.03	+	[ ]	×	0.01	=	
Piped Flow	[ ]	×	0.04	+	[ ]	×	0.01	=	
Total area of trench needed (add trench areas above):									

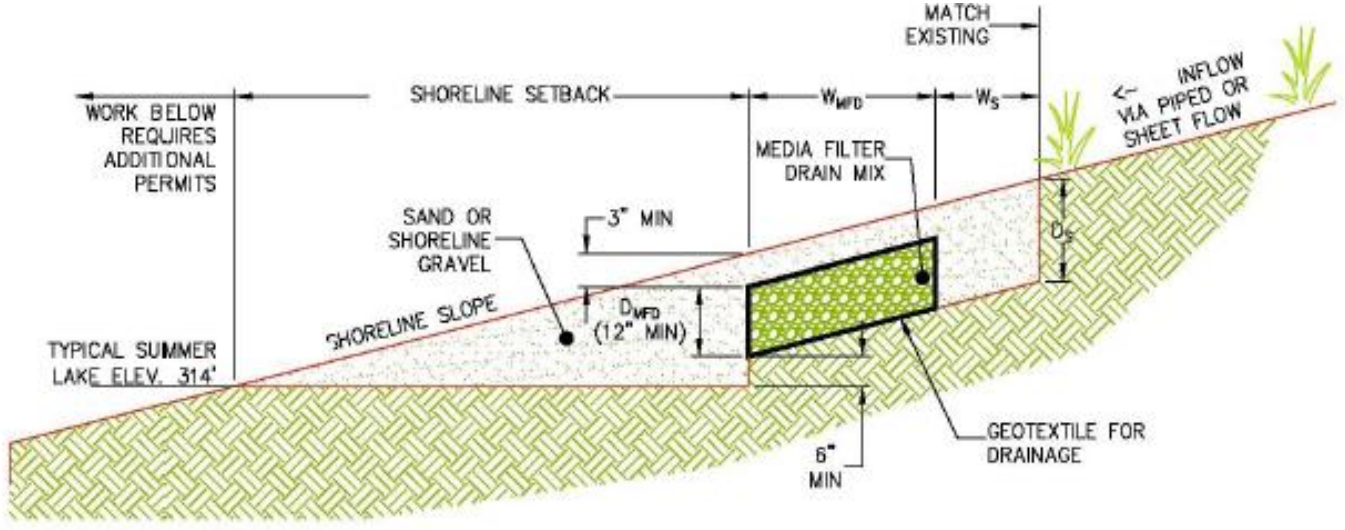
Upland MFDs
Limitations

- **Slopes** – stay away from top of steep slopes
- **Utilities** - stay 5' away, more for septic systems
- **Creeks / Wetlands** - not within 25'
- **Surfacing** - open rock **only** within critical area buffers, permeable pavers end-of-pipe only
- **Pipe Connections** – underdrain pipe must connect downstream
- **Groundwater** – MFD mix cannot be saturated during winter months

BMP C.3. Clean Beach MFD

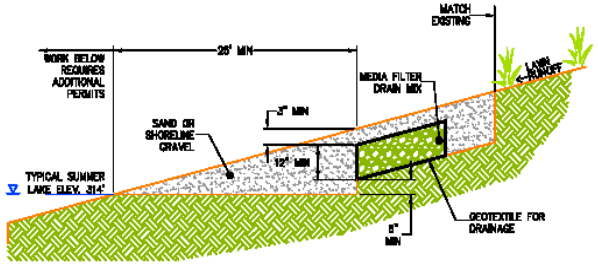
- MFD uphill of beach built with C33 sand
- No work below high water mark
- Covered under programmatic shoreline permits*

**Exemptions vary by jurisdiction due to differences in code language. Check with HIP Coordinator and pre-design report.*



BMP C.3. Clean Beach MFD *(cont'd)*

- No removal of native plants, only lawn can be replaced with beach
- MFD must be 25' from shoreline.
- May be built behind bulkhead without slope or directly on shore with slope.
- Pipe or no pipe in. No underdrain.

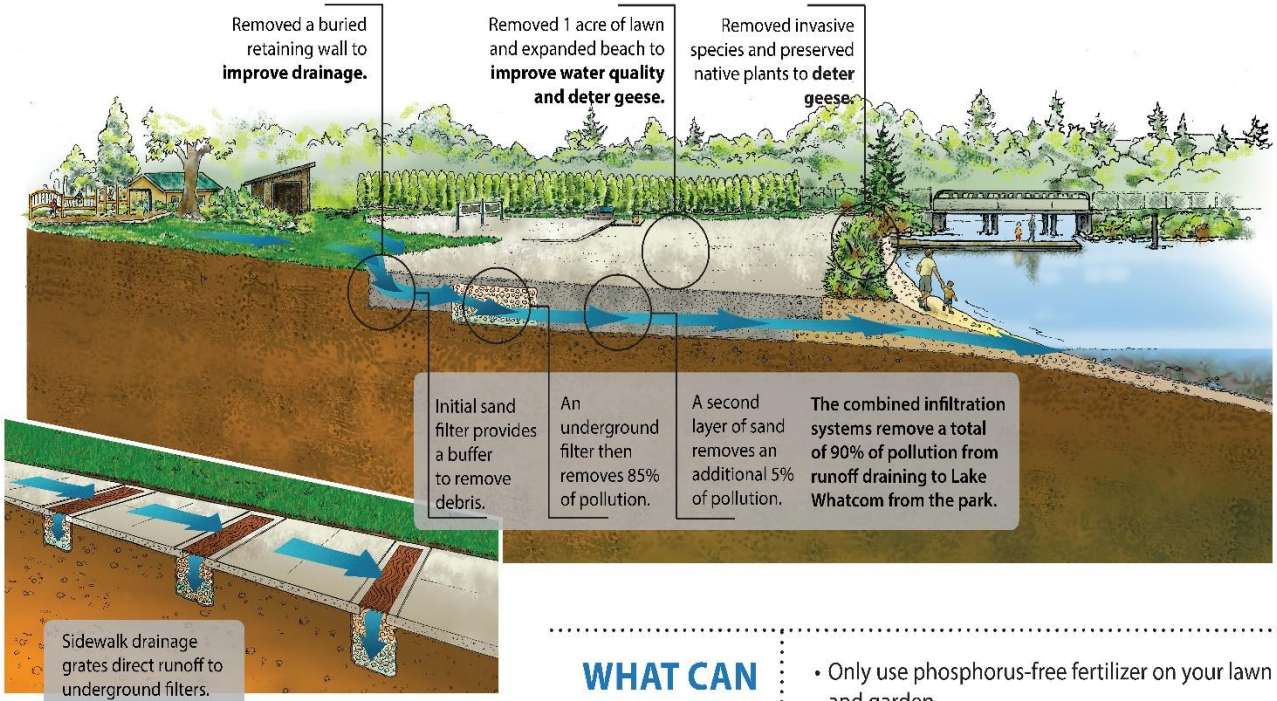


Sand Beach Protects Lake Whatcom

Polluted stormwater runoff is one of the leading threats to the health of Lake Whatcom. According to Clean Water Act standards, the lake is currently considered impaired due to excess nutrients (mainly phosphorus) and bacteria in runoff from developed land. Excess nutrients feed the growth of algae, which leads to a lack of oxygen for aquatic life. Lake Whatcom is important to us all. So here at the park, the City of Bellingham is taking action to protect Lake Whatcom.

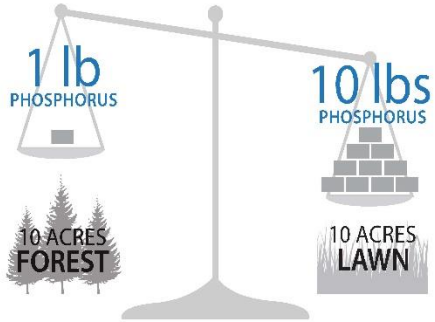
A LOOK UNDERGROUND

New infiltration systems in the expanded beach capture polluted runoff from 5 acres of lawn, roof, and pavement in the park. These systems collectively remove approximately 90% of pollution, reducing the park's phosphorus load into Lake Whatcom from 6 lbs. to less than 0.5 lbs.



WHAT CAUSES EXCESS PHOSPHORUS?

Phosphorus is not just found in fertilizer—it comes from sediment, leaves, grass clippings, dog poop, and goose droppings. Even an unfertilized lawn generates excess phosphorus. And just 1 lb. of phosphorus can grow 100 lbs. of algae.



A LAWN GENERATES 10x MORE PHOSPHORUS THAN A FOREST.

WHAT CAN YOU DO?

- Only use phosphorus-free fertilizer on your lawn and garden.
- At home, pick up dog poop at least weekly, ideally daily.
- At the park, pick up dog poop immediately.
- Update your landscaping to protect water quality and deter geese just like we did here at the park—get assistance through the Homeowner Incentive Program at www.cob.org (search "HIP").

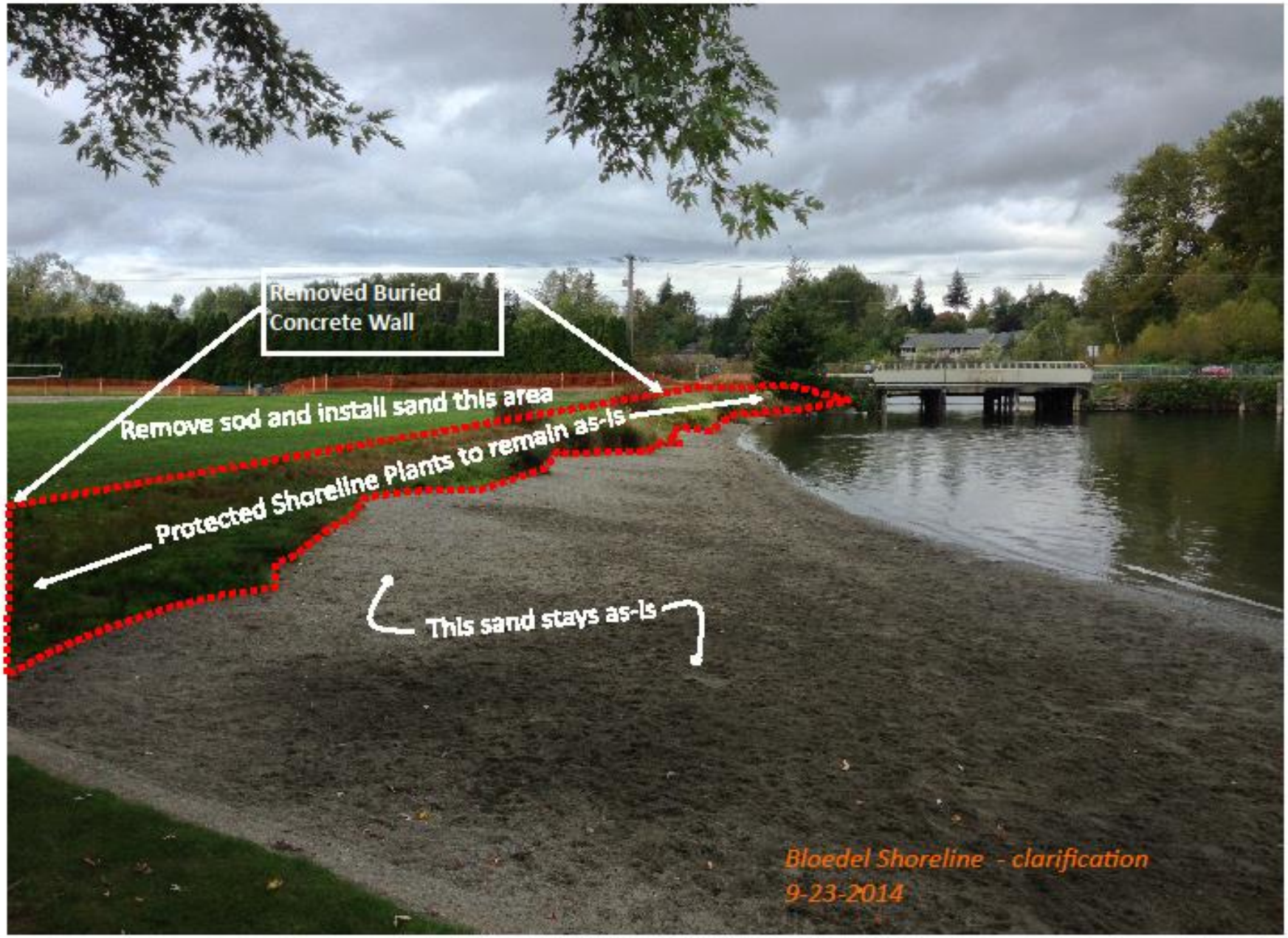
FUNDING FOR THIS PROJECT PROVIDED BY:

Aquatic Lands Enhancement Account
A COOPERATIVE PROJECT

City of Bellingham Washington

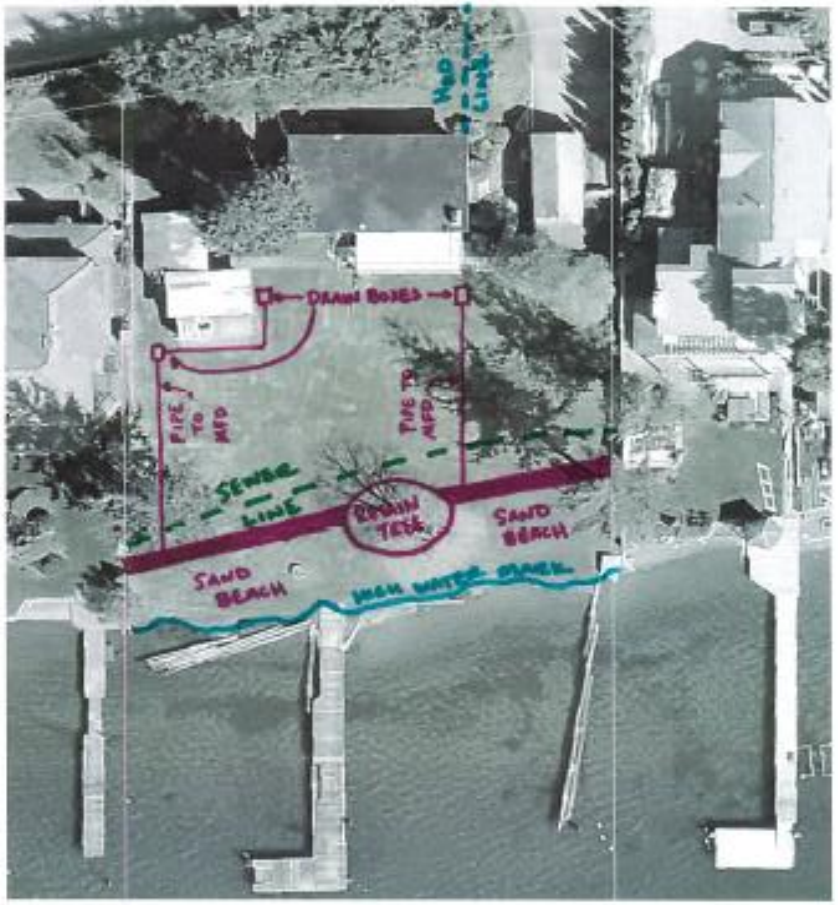
Lake Whatcom Cooperative Management

Department of Ecology
State of Washington


Removed Buried Concrete Wall
Remove sod and install sand this area
Protected Shoreline Plants to remain as-is
This sand stays as-is
Bloedel Shoreline - clarification
9-23-2014

BMP C.3.
Clean Beach MFD
Plan Example

Proposed Improvements - 123 Lakeshore Street - Parcel 380000000000



Media Filter Drain (Clean Beach) and Associated Conveyance

Not to Scale

Proposed Improvements Summary – See Attached Hif Standard Detail for Components

Tributary Area: 21,000 ft²
Lawn/Landscape: 15,820 ft²
Roof/Impervious: 5,180 ft²

Total MFD Length: 100 ft
Minimum Width: 2 ft²
Total MFD Square Footage: 200 ft²
Surfacing: Open sand

Sand Beach: 2,500 ft²

BMP C.3. Clean Beach MFD *Limitations*

- No Hard Surfacing.
- No digging in groundwater.
- No work below high water mark. Period. Exclamation Point.

BMP C. Media Filter Drain *Resources*

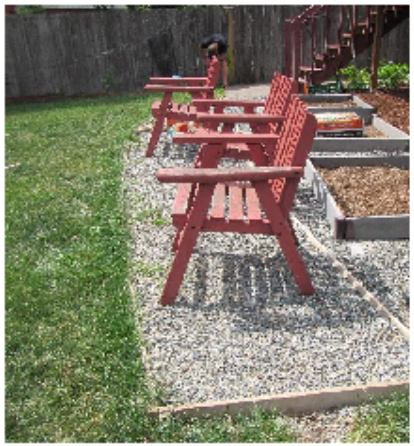
HIP

Design Guidance and Permitting Requirements

Media Filter Drain (MFD)

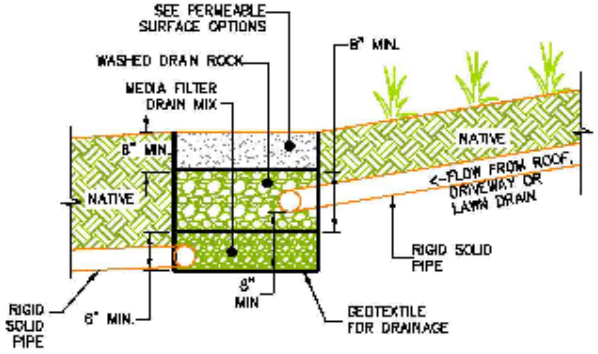
DESCRIPTION

An underground drainage facility, consisting of specially-mixed media (MFD mix), intended to treat runoff from hard surfaces and lawn and landscaped areas. Configurations are slightly different depending on how runoff enters the facility (via pipe or sheet flow). This facility does have an underdrain and requires either a controlled bypass structure or a robust overflow to function properly.



METHOD OF PHOSPHORUS REDUCTION

Treatment via media (MFD mix). Runoff entering the facility passes through the media, where perlite, dolomite, and gypsum provide physical, chemical, and biological treatment for total and dissolved phosphorus.



SECTION VIEW

APPROVED HIP VARIATIONS

- 'Patio MFD' topped with pea gravel or spaced pavers with gaps (see HIP Standard Detail for Permeable Surfacing)
- 'Sidewalk MFD' topped with pea gravel or spaced pavers with gaps (see HIP Standard Detail for Permeable Surfacing)
- 'Parking Spot MFD' topped with permeable interlocking pavers or another traffic-rated permeable paving system. This design requires a review of proposed surfacing before approval.

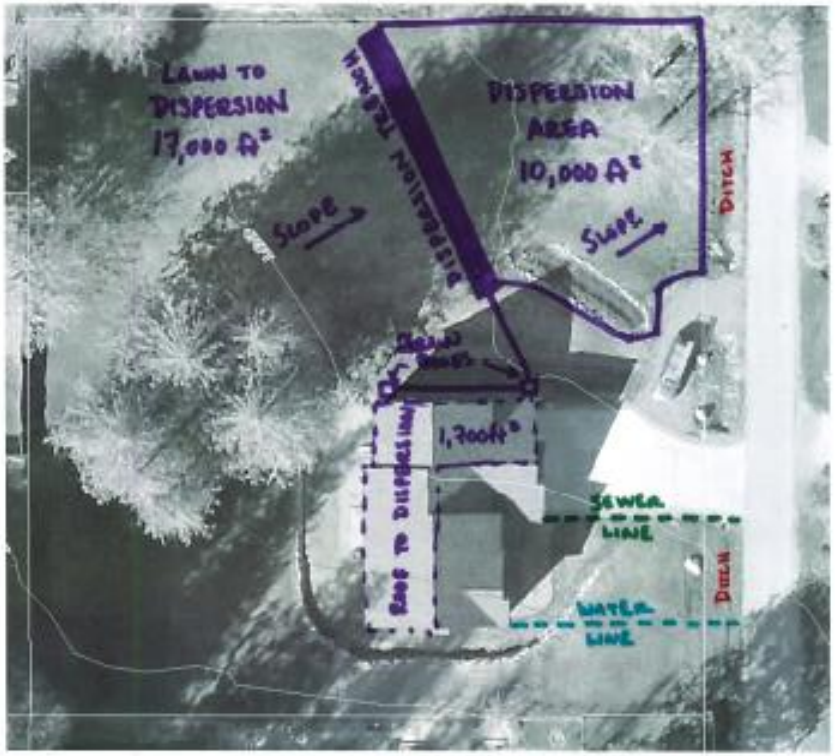
Note: This design methodology is applicable for HIP projects only. These methods may not be suitable for, and have not been evaluated for, compliance with regulations which require professional engineering.

BMP D. Dispersion System

- Washed drain rock trench. Pipe in, even drainage out.
- No pipe needed for even flows over flat lawn.
- Minimum depth is 18” of rock.
- Must drain to vegetated area of minimum width.

BMP D. Dispersion System *Plan Example*

Proposed Improvements - 123 Watershed Street - Parcel 380000000000



Dispersion System and Associated Conveyance

Not to Scale

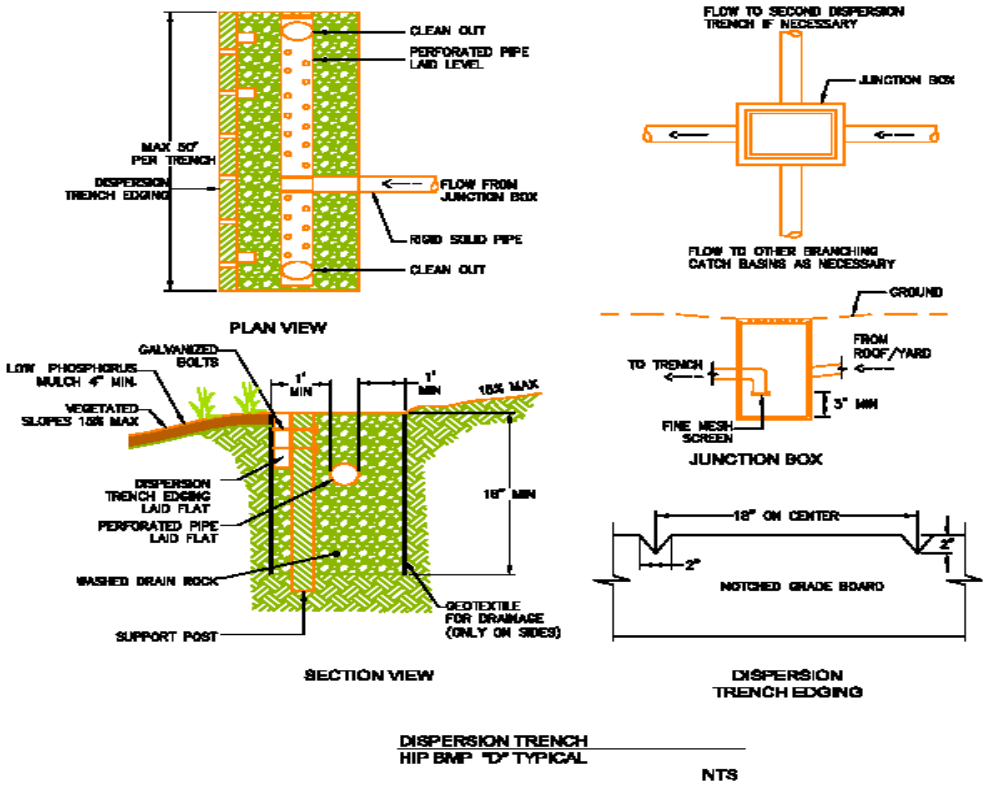
Proposed Improvements Summary

See attached NH Standard Detail for Components

Tributary Area: 18,700 ft²
Lawn: 17,000 ft²
Roof: 1,700 ft²

Dispersion Trench Length: 50 ft²
Dispersion Area: 10,000 ft²
Vegetated Flow Path Length: 90 ft

BMP D. Dispersion System *Design*



DISPERSION TRENCH
HIP BMP "D" TYPICAL

NTS

BMP D. Dispersion System *Design (cont'd.)*

My HIP Project will meet the required density for the following layers (Choose AND CIRCLE at least two)

Canopy (Native Trees)	Understory (Native Shrubs)	Groundcover (Small Native Plants)

If you chose:		Then your minimum density will be...		
A	Canopy, Understory, and Groundcover	Divide project area by 225 (15' o.c.)	17	Trees
		Divide project area by 64 (8' o.c.)	59	Shrubs
		Divide project area by 25 (5' o.c.)	152	Groundcovers
B	Canopy and Understory Only (No Groundcovers)	Divide project area by 144, (12' o.c.)	26	Trees
		Divide project area by 36 (6' o.c.)	106	Shrubs
C	Canopy and Groundcovers Only (No Understory)	Divide project area by 144 (12' o.c.)	26	Trees
		Divide project area by 16 (4' o.c.)	238	Groundcovers
D	Understory and Groundcover Only (No Canopy)	Divide project area by 49 (7' o.c.)	78	Shrubs
		Divide project area by 25 (5' o.c.)	152	Groundcovers

Total Project Area (in square feet)
3800

Plant List, Please complete with species name (common or scientific) and desired number

Native Trees	
Species Name	**#**
Western Redcedar	2
Pacific Crabapple	4
Bitter Cherry	4
Douglas Fir	4
Grand Fir	3
Total	17

Native Shrubs	
Species Name	**#**
Red Huckleberry	6
Evergreen Huckleberry	6
Blueberry	4
Oceanspray	6
Bald Hip Rose	10
Indian Plum	6
Pacific Rhododendron	6
Salal	15
Total	59

Native Groundcovers	
Species Name	**#**
Nodding Onion	27
Sword Fern	30
Deer Fern	25
Lady Fern	25
Beach Strawberry	10
Woodland Strawberry	25
Camas	10
Total	152

BMP D. Dispersion System *Sizing*

HIP

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_____ft² of impervious surface and/or _____ft² of lawn/landscape
☐	I have defined the area that will drain into the trench by sheet flow
	That area is_____ft² of impervious surface and/or _____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 _____feet long and the downstream vegetated flow path must be at least that wide and _____feet long.

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.

BMP D. Dispersion System
Sizing (cont'd.)

HIP

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	[ ]	×	0.009	+	[ ]	×	0.005	=	
Piped Flow	[ ]	×	0.014	+	[ ]	×	0.005	=	
Total length of trench needed (add trench lengths above):									

Step 2: Determine 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 Width "C"	Formula	Minimum Flow Path Length (linear feet)
Sheet Flow	Not part of formula	Not part of formula		((C-25)/3)+25	
Piped Flow			Not part of formula	((A/B)*100)+25	
Total length of flow path needed (add flow path lengths above):					

BMP D. Dispersion System *Limitations*

- **Slopes** – 15% max *average* over dispersion area.
- **Structures** – not in flow path.
- **Utilities** – stay 5’ away, more for septic systems.
- **Creeks / Shorelines / Wetlands** - trench can’t be inside buffer, but buffer vegetation can be part of dispersion area.
- **Surfacing** – open rock in most cases. Fabric and mulch an option if landscaped on both sides.

BMP D. Dispersion System *Resources*

HIP

Design Guidance and Permitting Requirements

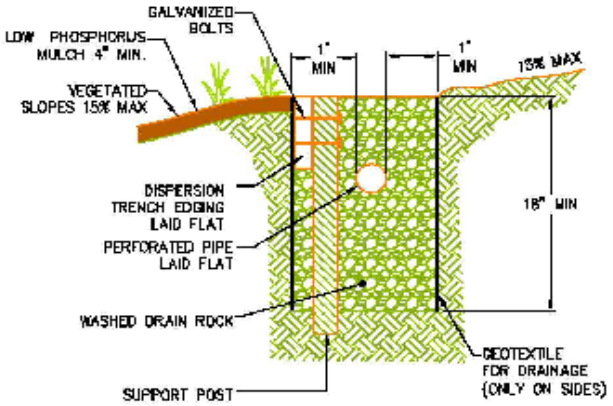
Dispersion

DESCRIPTION

A surface drainage facility, consisting of washed rock and constructed with a flat bottom, intended to convert concentrated flows into sheet flows for dispersion into established vegetated areas. This facility does not have underdrain, bypass, or overflow structures.

METHOD OF PHOSPHORUS REDUCTION

Treatment via dispersion into native forested areas. Runoff entering the rock trench is spread evenly throughout the trench and then overflows evenly into the vegetated area. Plants and mulch in the vegetated area capture, neutralize, and recycle phosphorus into healthy plants and soil.



SECTION VIEW

APPROVED HIP VARIATIONS

- 'Dry Creek Bed' topped with river rock
- 'Dispersion Walkway' topped with pea gravel
- 'Garden Path' topped with non-woven geotextile and low-P mulch or clean pea gravel

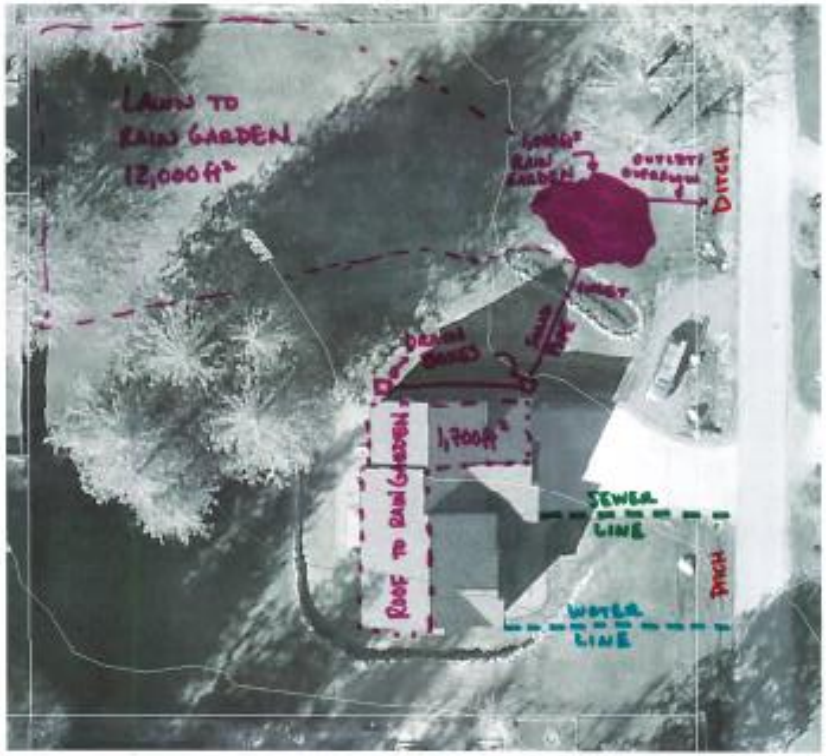
Note: This design methodology is applicable for HIP projects only. These methods may not be suitable for, and have not been evaluated for, compliance with regulations which require professional engineering.

BMP E. Lake Whatcom Rain Garden

- Infiltration system, but with plants and mulch instead of rock
- Minimum depth is 18” of Rain Garden Soil Mix
- NO UNDERDRAIN!!
- Consider soils, utilities, slopes, structures, and property lines

BMP E.
Lake Whatcom Rain Garden
Plan Example

Proposed Improvements - 123 Watershed Street - Parcel 380000000000



Lake Whatcom Rain Garden and Associated Conveyance

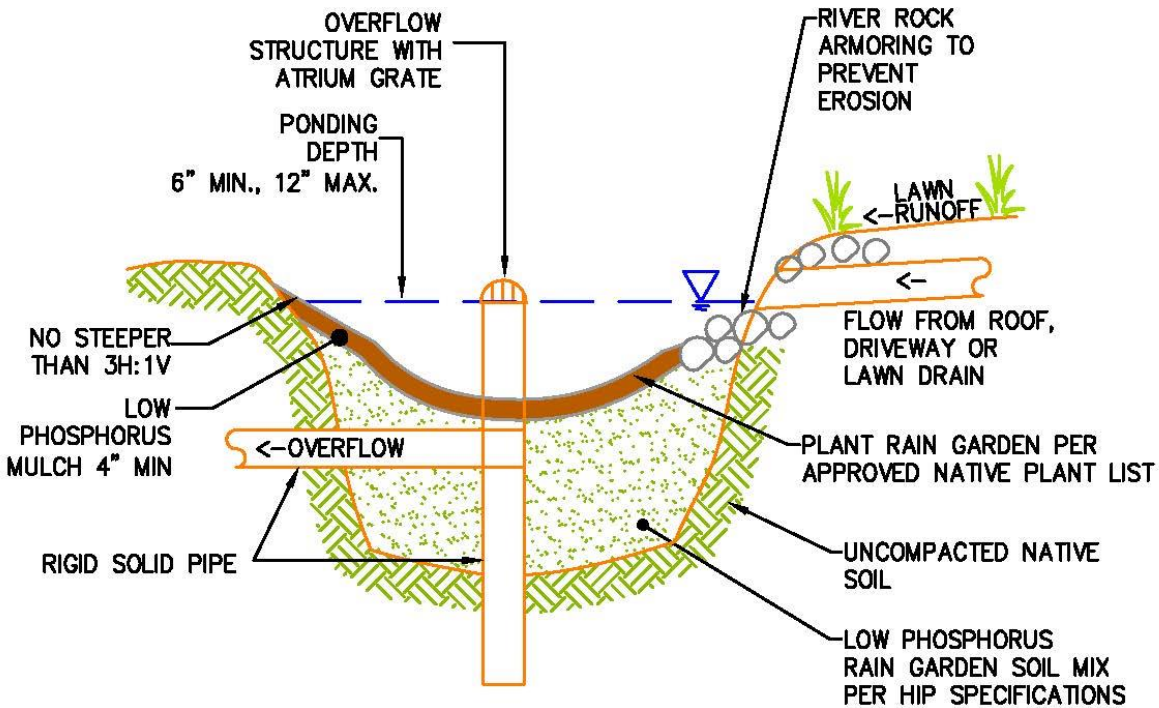
Not to Scale

Proposed Improvements Summary

See attached HIP Standard Detail for components

Tributary Area: 13,700ft²
Lawn: 12,000ft²
Roof: 1,700ft²
Ponding Area: 600ft²
Rain Garden Footprint: 1,000ft²
Planting Plan: See attached plant list

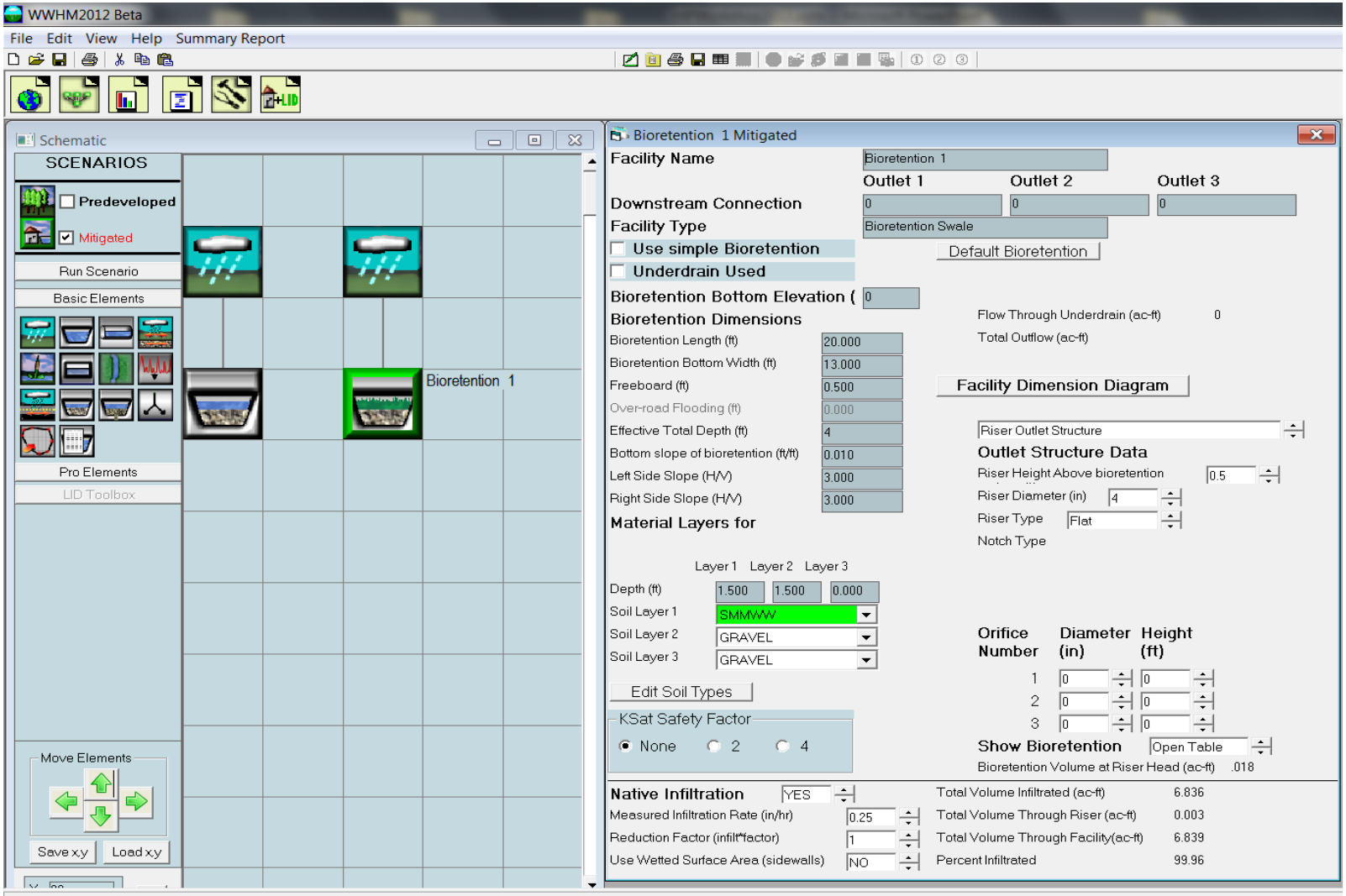
BMP E. Lake Whatcom Rain Garden *Detail*



SECTION VIEW

BMP E. Lake Whatcom Rain Garden

Model



BMP E. Lake Whatcom Rain Garden

Design

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 wi into the rain garden, by piping or sheet flow.
- **The drainage area is _____ft² of impervious surface and/or _____ft² of lawn/landscape**
- ☐ I have sized the system using approved methodology (HIP Sizing Calculator or stori hydrological modeling software) and attached that data.
- **The ponding area of the rain garden will be at least _____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 _____ native plants in my rain garden.**
- ☐ I have chosen mulch from the HIP-approved mulch list.
- **Mulch type: _____ Mulch supplier: _____**

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
- ☐ 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.

HIP

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Soil Characterization Sheet

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

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

Step 2. On-site testing procedure to determine soil

To be completed by HIP Coordinator or the project design

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

Note: If designing for infiltration facilities in multiple locations, it is suggested that each locat for factors that might affect design considerations. Consult with the HIP Coordinator to deter 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

☐ Simple Investigation
I dug to a depth of 3' below ground surface and found:
- ☐ Groundwater
- ☐ Bedrock
- ☐ Other: _____
- ☐ None of the above

☐ Soil Textu
I used this test meth determine soil type

Clay	Claye
Silt/Loam	Sandy

I've characterized n
- ☐ Good
- ☐ Mod
- ☐ Mar
- ☐ Poor

HIP

Step 2: Use Sizing Calculator. Input project-specific data into the table below to calculate the size of the facility. Instructions: 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	[ ]	x	[ ]	+	[ ]	x	[ ]	=	
Moderate	[ ]	x	[ ]	+	[ ]	x	[ ]	=	
Marginal	[ ]	x	[ ]	+	[ ]	x	[ ]	=	
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

BMP E. Lake Whatcom Rain Garden

- Ponding Area Discussion

BMP E. Lake Whatcom Rain Garden

- Planting Plan and Plant Layout
- One plant every 16 square feet

BMP E. Lake Whatcom Rain Garden *Materials*

Low-Phosphorus Rain Garden Soil Mix; *(Bioretention soil mix; Lake Whatcom Friendly Rain Garden soil mix)*:

Shall be a well-blended mixture of mineral aggregate and compost measured on a volume basis.

Consist of approximately two parts HIP-approved compost (35 to 40%) by volume and three parts mineral aggregate (sand component) (60 to 65%).

Any soil-based or organic materials used, or added to, this mixture shall conform to the definition of compost in the HIP specification book and be found on the **City of Bellingham Approved Mulch, Topsoil, and Compost for Use in the Lake Whatcom Watershed**. Located online at: lakewhatcomhip.org, search "Resources for Professionals"

The mixture shall be well blended to produce a homogeneous mix, and have an organic matter content of 4% to 8%.

BMP E.
Lake Whatcom Rain Garden
Resources

HIP

Design Guidance and Permitting Requirements

Lake Whatcom Rain Garden

Lake Whatcom Rain Gardens are designed and constructed to manage nutrients effectively during most storm events. The Lake Whatcom Rain Garden facility does not have an underdrain in order to reduce phosphorus transport to the lake. Lake Whatcom Rain Gardens also include robust overflow structures that help prevent flooding during large, infrequent storms by removing excess water from the property.

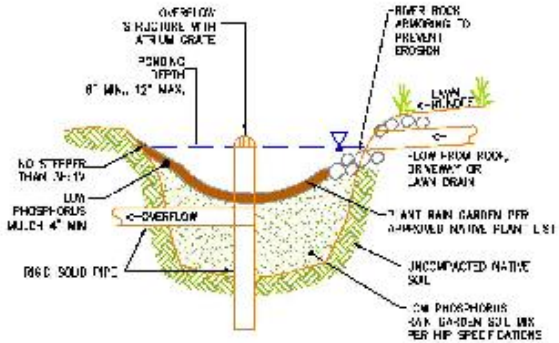
DESCRIPTION

A hybrid underground/surface drainage facility, consisting of special soil mixes and vegetation and constructed with a flat bottom, intended to capture and infiltrate runoff from impervious and pervious surfaces.

Photo source: Stewardship Partners

METHOD OF PHOSPHORUS REDUCTION

Treatment via infiltration through native soils. Runoff entering the rain garden is detained and allowed to slowly pass through imported and native soil mixes, where phosphorus is bound by, captured within, and recycled into the soil matrix. Plants in the facility attenuate flows through evapotranspiration and reduce nutrient loading by uptake and binding in the vegetative biomass.



SECTION VIEW

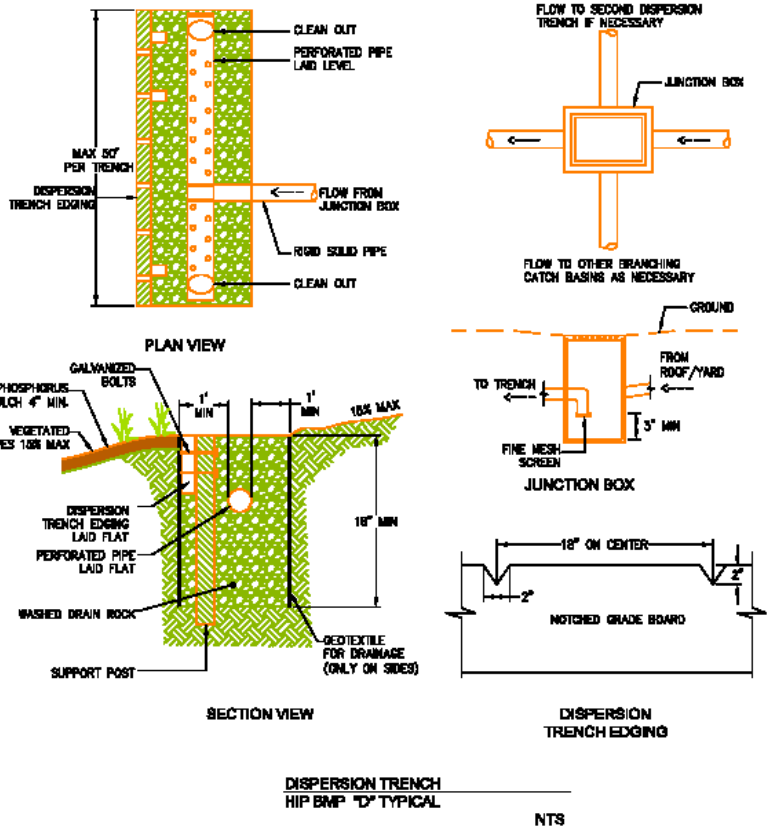
Note: This design methodology is applicable for HIP projects only. These methods may not be suitable for, and have not been evaluated for, compliance with regulations which require professional engineering.

Secondary BMPs

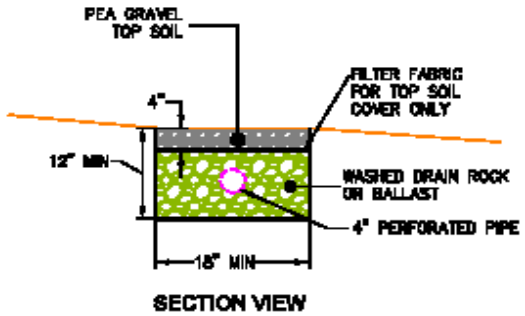
S.1. Permeable Paver Surfacing

S.2. Rainwater Collection

Conveyance



DISPERSION TRENCH
HIP BMP "D" TYPICAL
NTS



HIP PIPE TRENCH CONVEYANCE DETAIL (TYPICAL)
NTS

Primer on Soil Information

- Only for Infiltration BMPs
  - Infiltration Trenches
  - Rain Gardens
- Preliminary soil information provided in pre-design
- Consult HIP Coordinator for additional soil investigation work that might be needed

Soil Characterization Sheet

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

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

_____

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 Manual (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:

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- ☐ 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):

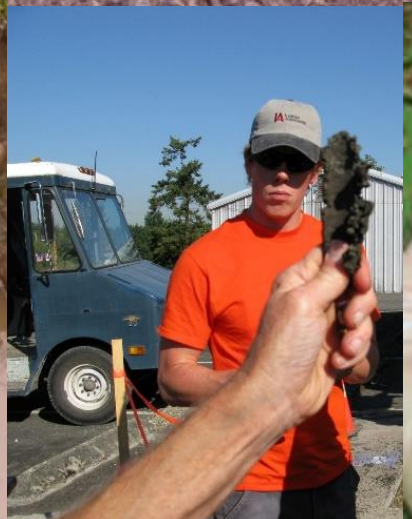
Clay	Clayey Silt
Silt/Loam	Sandy Loam/Sand

I've characterized my soil as:

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

A quick note about soil testing

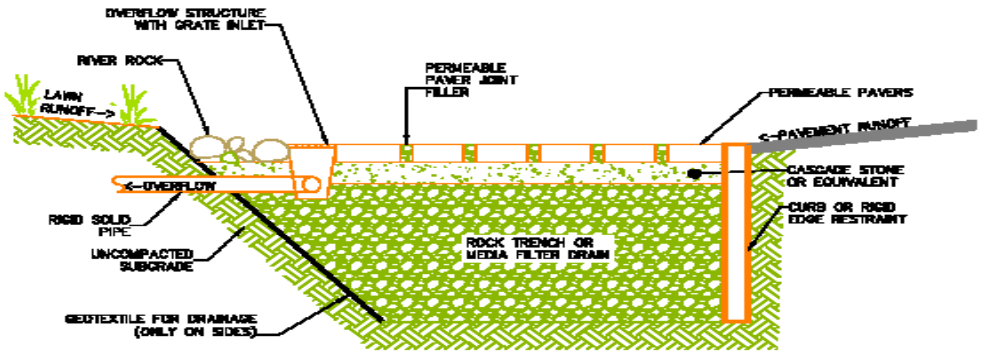
Test	Conducted By, Phase	Infiltration Rate	Soil Type (Grain size)	Restrictive Layer (Clay or Bedrock)	Ground -water	Confirmation of other test method
Pilot Infiltration Test (PIT)	HIP Staff, Pre-design	X	X	X	X	
Hand-Augured Test Hole (HA)	HIP Staff, Pre-design		X	X	X	X
Soil Drainage (RG Manual)	Designer, Design phase	X		X	X	X
Soil Texture	Either, As needed		X			X
Simple Investigation	Either, As needed			X	X	X



BMP S.1. Permeable Paver Surfacing

- Protect infiltration trenches, and some MFDs with permeable pavers
- Cover other infiltration trenches, MFDs, and dispersion trenches with pea gravel or river rock
- Must follow manufacturer's specifications at all times

BMP S.1. Permeable Paver Surfacing



SECTION VIEW

PERMEABLE PAVING SURFACING
HIP BMP "S.1", TYPICAL NTS


09/04/2014

BMP S.1. Permeable Paver Surfacing
Materials

Note: These surfaces cannot be installed within 200’ of shorelines or 100’ of creeks <u>without additional approval</u> from the City of Bellingham or Whatcom County.

BMP S.2. HIP Rainwater Collection

- Collect and re-use roof runoff for irrigation or toilet flushing
- Indoor use requires plumbing permit
- Tanks less than 320 gal. do not require permits if for outdoor use only

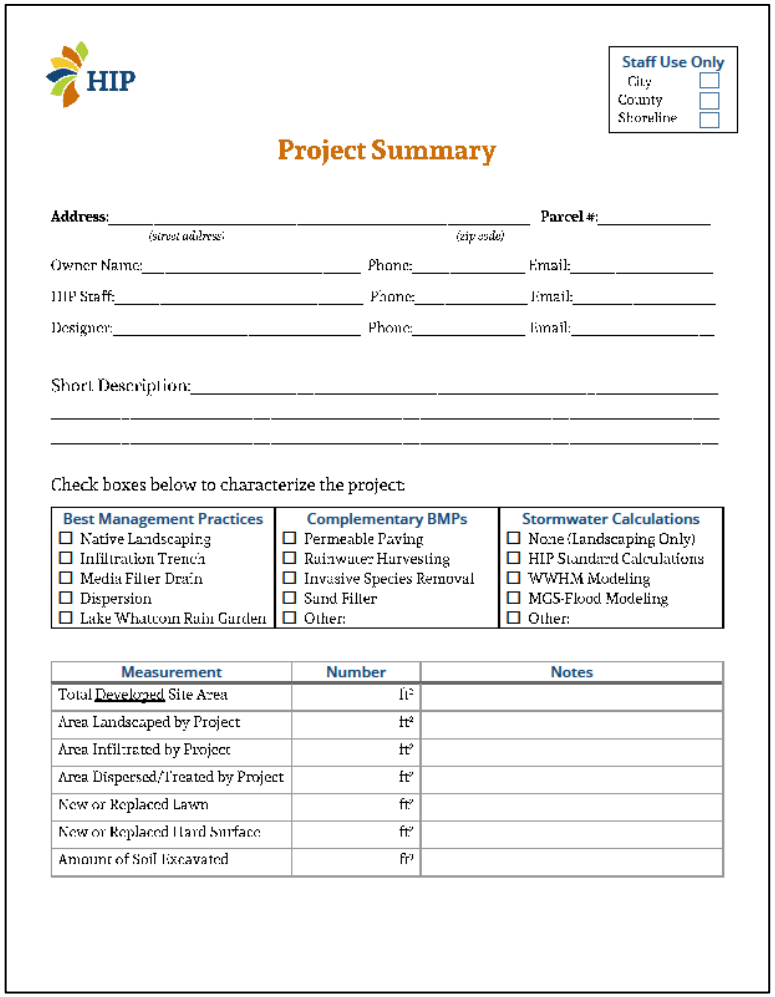
LUNCHTIME!

Part 5A:
Navigating the Design Steps 1: Plan

Eli Mackiewicz
City of Bellingham

Congratulations, You've Been Selected! Now What?

- Its time to do paperwork
- And, the fun part… creative design and, you know, getting paid



HIP

Staff Use Only
City ☐
County ☐
Shoreline ☐

Project Summary

Address:_____ **Parcel #:**_____
(street address) *(zip code)*

Owner Name:_____ Phone:_____ Email:_____

HIP Staff:_____ Phone:_____ Email:_____

Designer:_____ Phone:_____ Email:_____

Short Description:_____

Check boxes below to characterize the project:

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

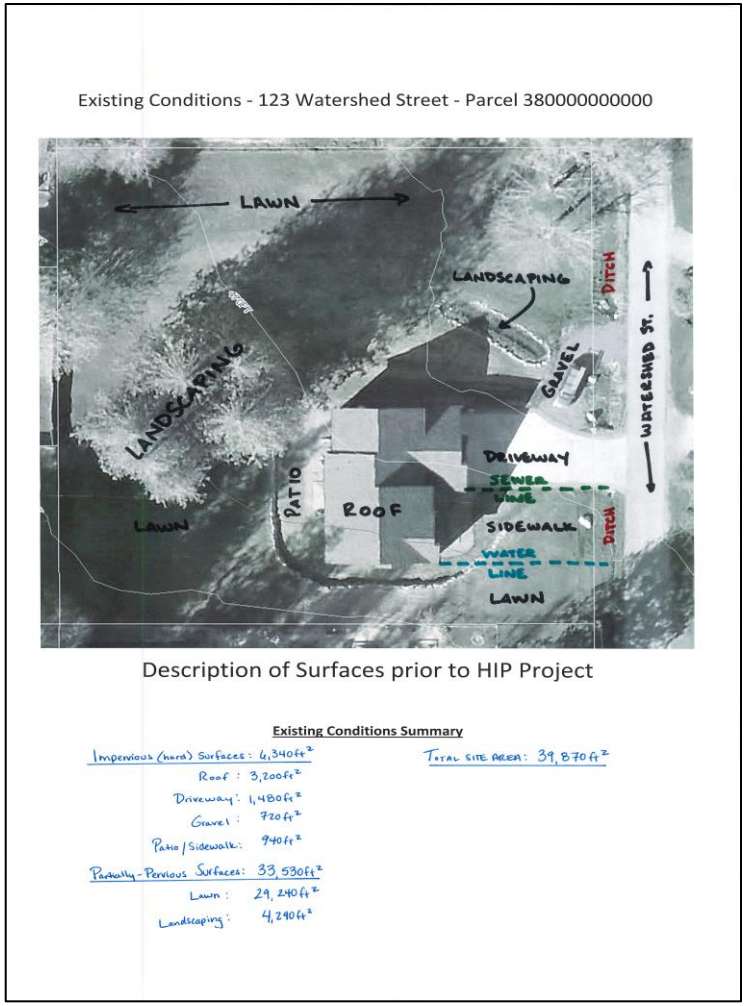
Measurement	Number	Notes
Total Developed Site Area	ft²	
Area Landscaped by Project	ft²	
Area Infiltrated by Project	ft²	
Area Dispersed/Treated by Project	ft²	
New or Replaced Lawn	ft²	
New or Replaced Hard Surface	ft²	
Amount of Soil Excavated	ft³	

What Makes a Successful Project?

- Good communication and realistic expectations
- Design that meets homeowner needs
- Right BMP for the site conditions
- BMPs sized correctly
- BMPs installed according to plan
- Paperwork complete
- No question left unasked
- Adaptive management

HIP Site Plan

- Existing conditions sheet
- Proposed improvements sheet
- Erosion and sediment control plan sheet (part of SWPPP)



Existing Conditions - 123 Watershed Street - Parcel 380000000000

Description of Surfaces prior to HIP Project

Existing Conditions Summary

Impervious (hard) Surfaces: 6,340ft²
- Roof: 3,200ft²
- Driveway: 1,480ft²
- Gravel: 720ft²
- Patio / Sidewalk: 940ft²

Partially-Pervious Surfaces: 33,530ft²
- Lawn: 29,240ft²
- Landscaping: 4,290ft²

Total Site Area: 39,870ft²

City IQ Tutorial – Creating a Base Map

- www.cob.org
- www.maps.google.com

Utility Information

Information Provided

- Public utilities inside ROW in City of Bellingham
  - Water
  - Sewer
  - Storm Drainage

1. CALL 811!

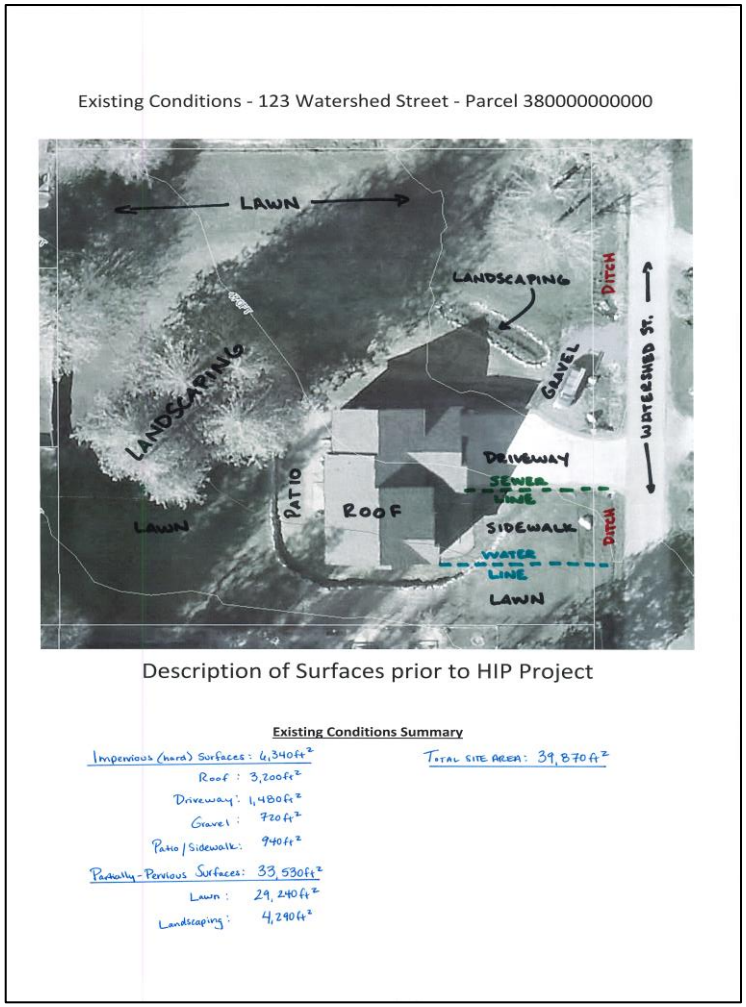
2. Use Brain!

Information MAY NOT BE Provided

- Non-public ROW utilities
  - Electric
  - Natural Gas
  - Fiber/Cable
- All ROW utilities in Whatcom County areas
- ALL private-site utilities

Minimum Plan Set

- Existing conditions
- Proposed improvements
- Erosion and sediment control plan



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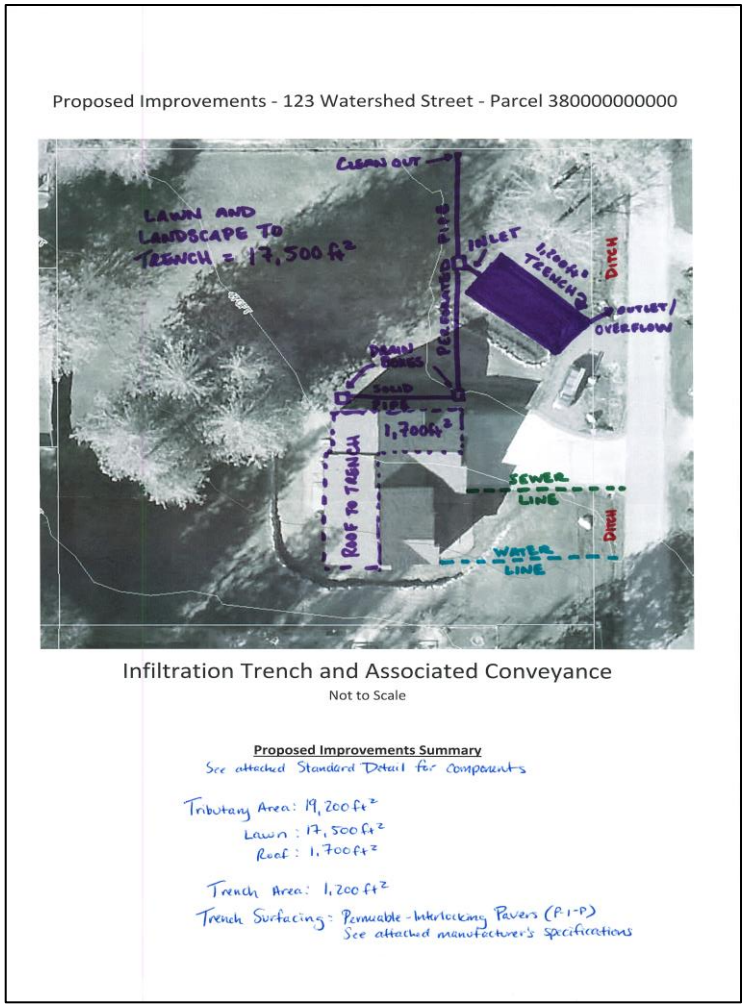
Total Site Area: 39,870ft²

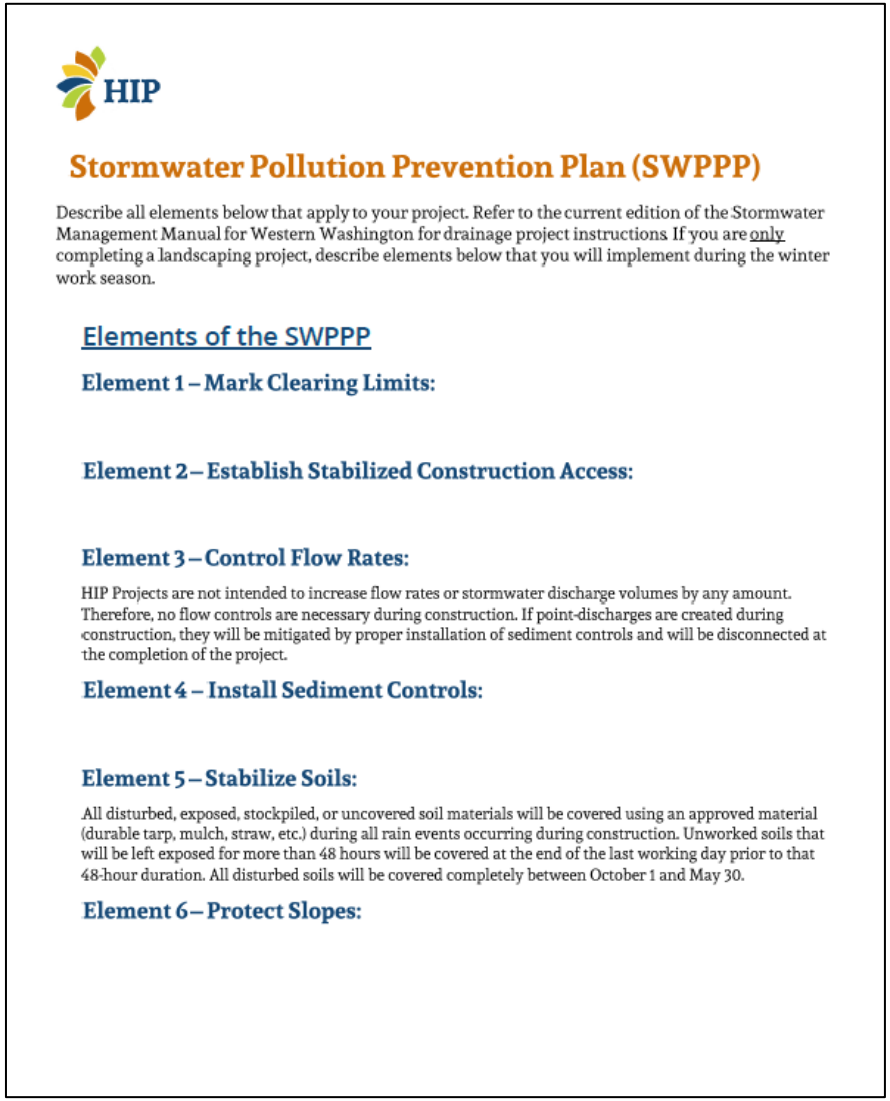
Minimum Plan Set

- Existing conditions
- Proposed improvements
- Erosion and sediment control plan



Erosion Control Section

- Address blank items in SWPPP with project-specific details
- Use Ecology Stormwater Management Manual for suggestions
- Include all items on your TESC Sketch



HIP

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:

Element 2 – Establish Stabilized Construction Access:

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:

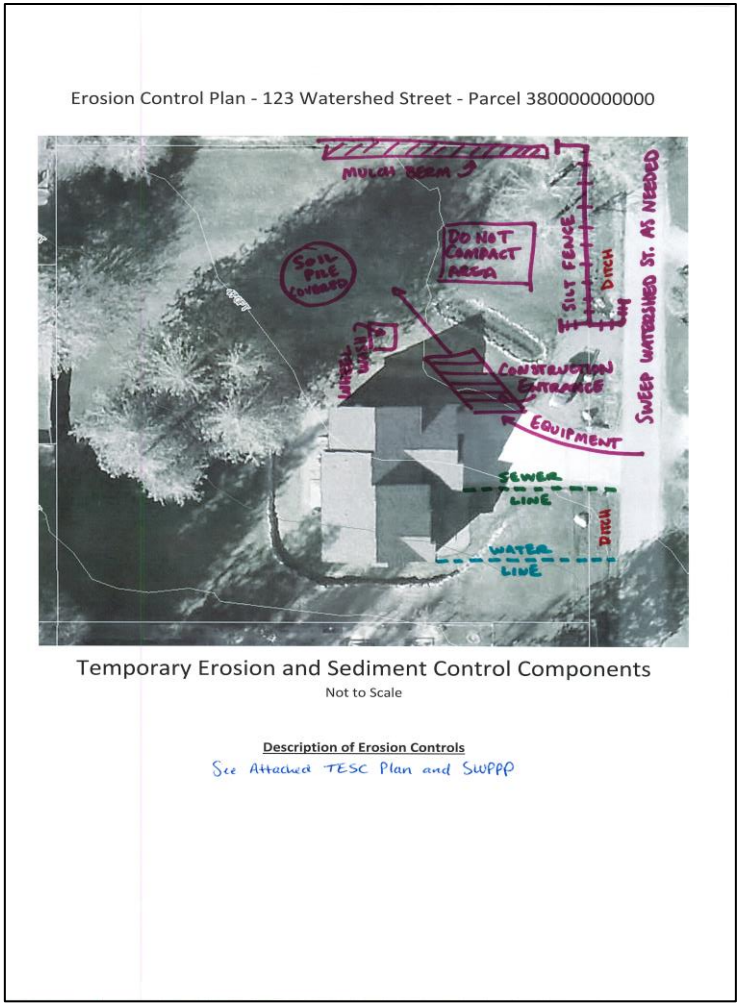
Element 5 – Stabilize Soils:

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.

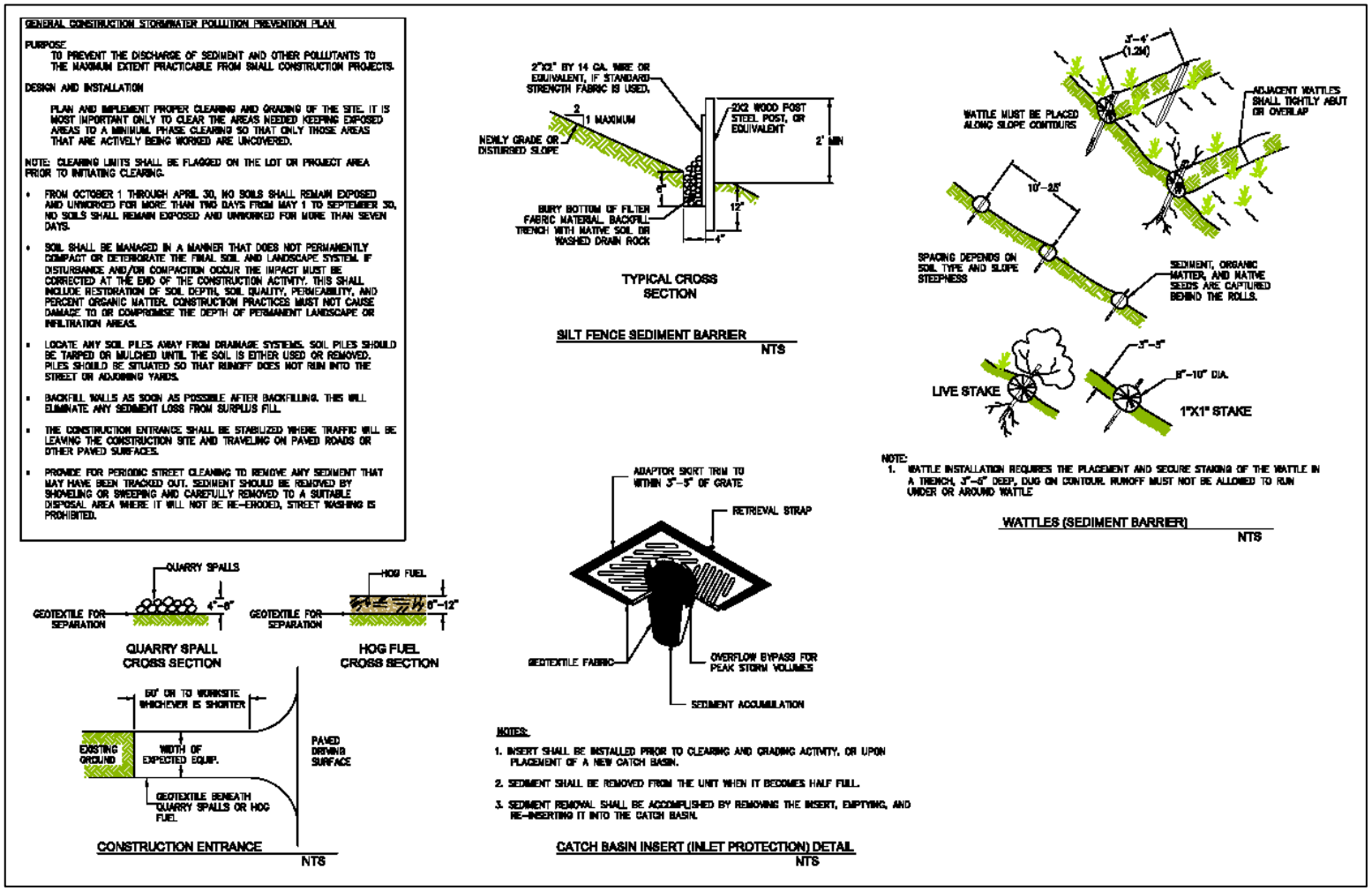
Element 6 – Protect Slopes:

Minimum Plan Set

- Existing conditions
- Proposed improvements
- Erosion and sediment control plan



Standard Erosion Control Page



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, NO SOILS SHALL REMAIN EXPOSED AND UNWORKED FOR MORE THAN TWO DAYS FROM MAY 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.

TYPICAL CROSS SECTION

SILT FENCE SEDIMENT BARRIER

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

QUARRY SPALL CROSS SECTION

HOG FUEL CROSS SECTION

CONSTRUCTION ENTRANCE

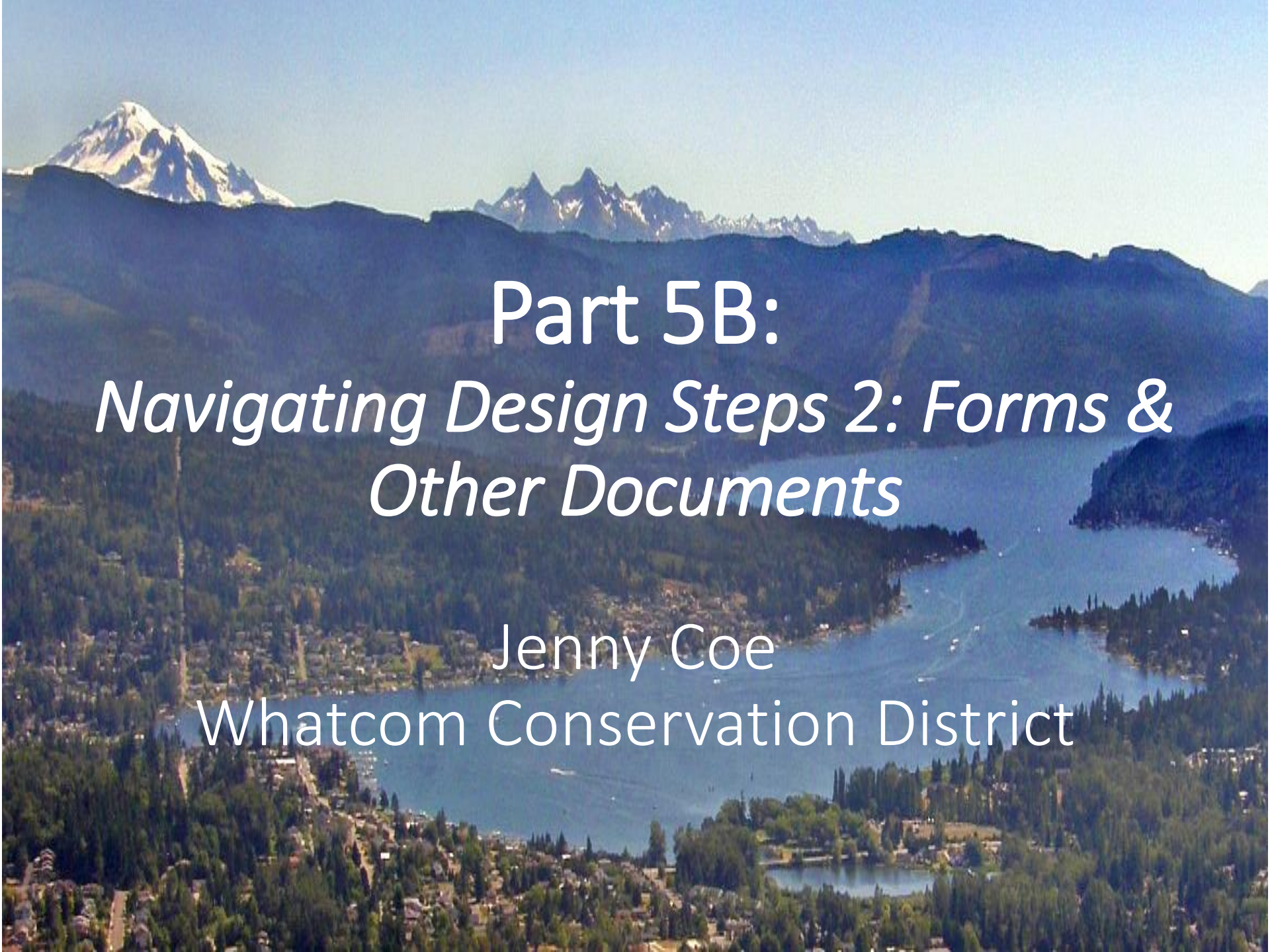
NTS

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



Part 5B:
Navigating Design Steps 2: Forms & Other Documents

Jenny Coe
Whatcom Conservation District

Part 6:

Putting it All Together: Site-Specific Design Considerations & Plan Changes

Ingrid Enschede
Whatcom County

Doing Work in the Lake Whatcom Watershed

- Regulations to limit phosphorus in stormwater runoff (earth work window, rules about impervious, partially impervious, and hard surfaces)
- Regulation to protect critical areas (shorelines, streams, steep slopes, wetlands)
- HIP offers streamlined permitting process in both City and County
- HIP requirements and design guidelines crafted to avoid triggering additional permit requirements

We are here to help!

- Each property will have unique features to incorporate into your design
- Don’t panic…remember the Pre-Design Report
- Our goal is to identify site constraints before you begin design

Placing BMPs - Resources

- Design Standards and Permitting Requirements for each BMP (manual part II)
- Pre-Design Report
- HIP Coordinator and City/County HIP staff

Constraints on BMP Location

- Road rights-of-way
- Utilities
  - gas/phone/electric
  - water/sewer
  - septic system
- Conservation easements
- Estimated location in pre-design report
- Confirm location as needed during design

Constraints on BMP Location *(cont'd)*

- Critical Areas
  - Shorelines
  - Streams
  - Wetlands
  - Steep Slopes
- Identified and mapped in pre-design report
- Whatcom Conservation District provides technical expertise to delineate and troubleshoot **before** designer begins

Limitations in Shoreline & Stream Buffers

- Note special restrictions on permeable pavers within shoreline and stream buffers (varies by parcel)
- Shoreline paths must be approved low-Phosphorus (P) mulch or maintain current surface (e.g., no gravel or flagstone paths to shoreline)

Example 1

Possible road right-of-way

Drain field set back 30’ downgradient

Drain field set back 10’ upgradient

Septic tank set back 5’

Confirm slope and slope set backs (15% slope front yard)

Stream set back 25’ (varies, check pre-design report)

Example 2

Basement set back 10’

Maintain existing path

Fringe wetland mapped by WCD (set back will varies, check pre-design report)

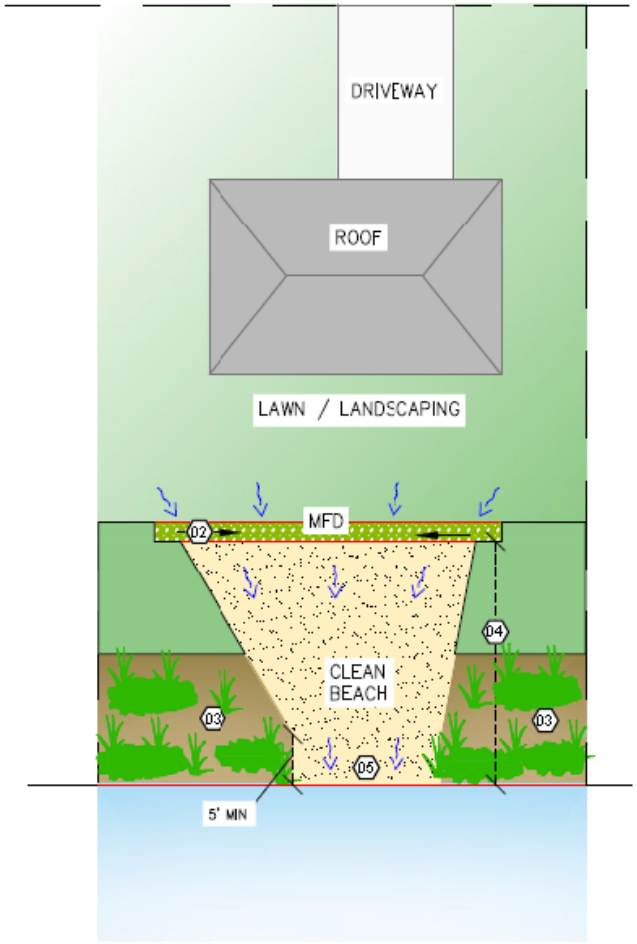
Shoreline set back 25’ (varies, check pre-design report)

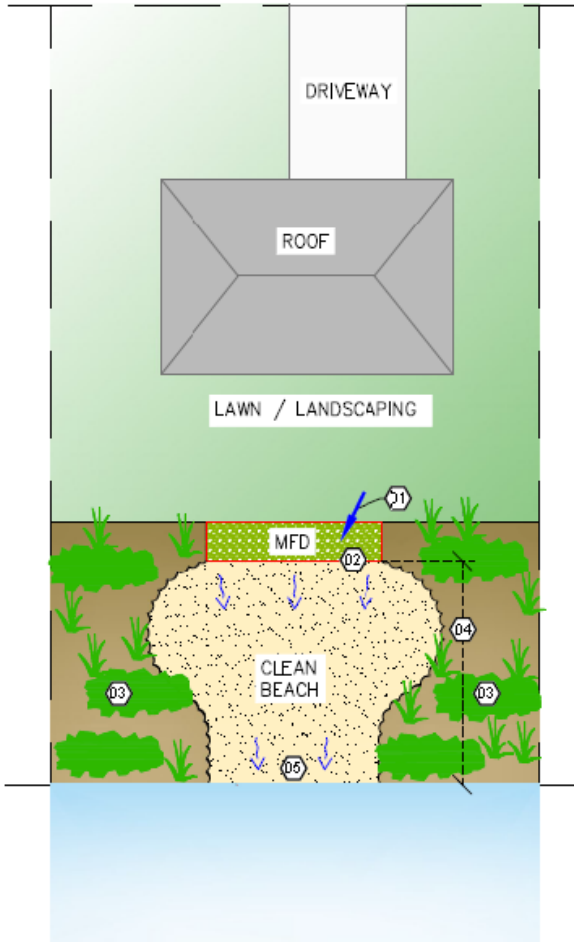
Noxious Weeds

- Identified and documented in Pre-Design Report
- May require proper removal and disposal as part of the HIP project

Special Considerations for **County** Projects with Shorelines

30% Clean Beach with Native Landscaping Buffer





Special Considerations for County Projects with Wetlands & Streams

- Fringe wetlands may be found around shoreline
- WCD provides technical expertise to delineate, locate buffers, and troubleshoot before designer begins
- HIP Coordinator will consult with Whatcom County Planning and Development Services staff on conceptual design and provide additional guidance

Plan Amendments and Changes

- Plans change…what to do
- Simple material substitutions that don't affect design plan or area treated may be allowed
- <u>Communicate with HIP Coordinator</u>
- Examples:
  - Substituting one approved, low-Phosphorus mulch for another
  - Substituting one native plant for another within a given category (e.g., tree, shrub, groundcover)

Plan Amendments and Changes

- Other changes may require that a plan amendment be submitted and approved
- Changes could affect
  - Permit rules and conditions
  - Reimbursement amount
  - HIP eligibility
- Not all changes go through the designer to revise submittal documents
- Changes that affect BMP design and size may require designer participation

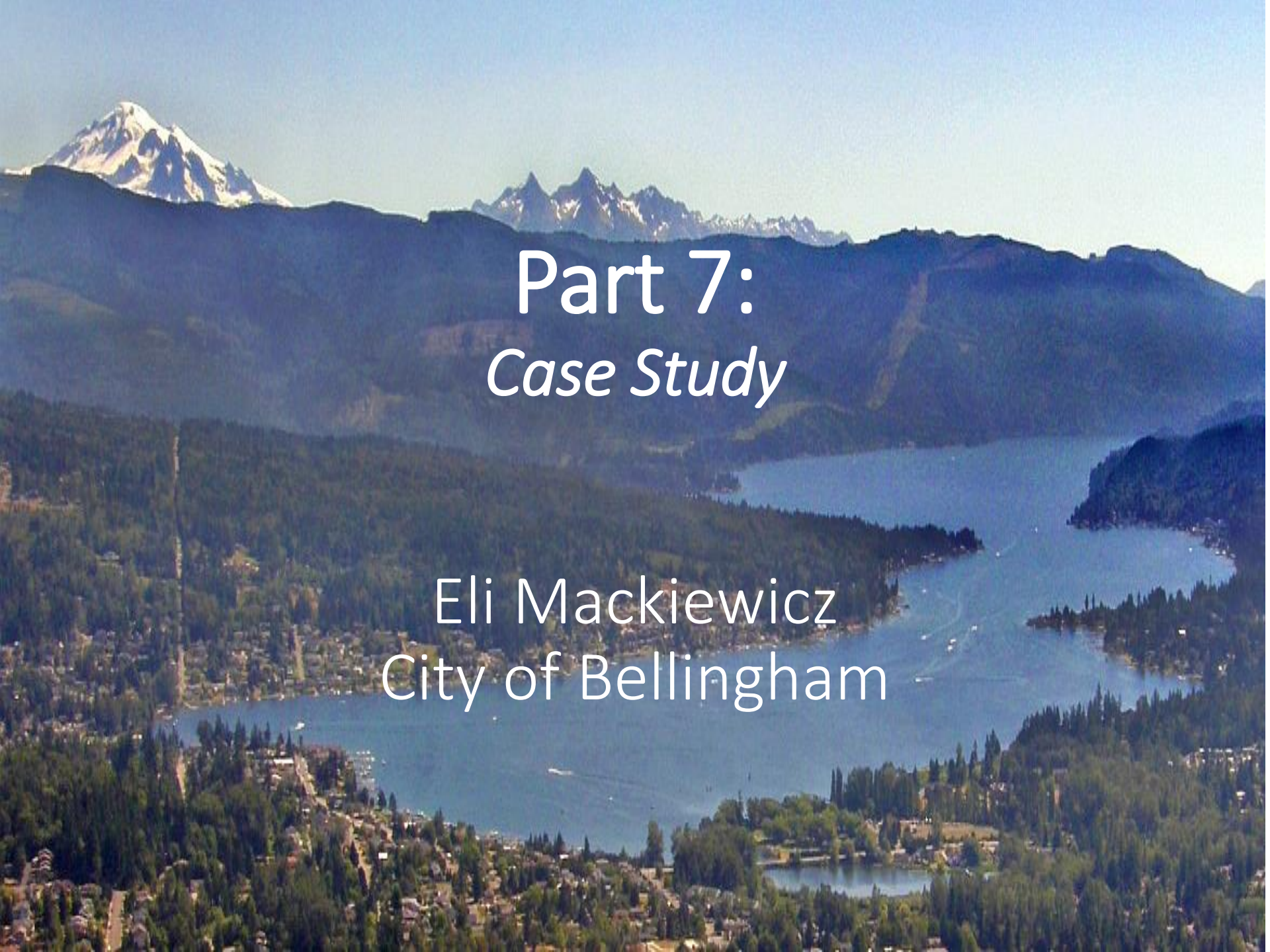
Plan Amendments and Changes

Examples:

- Changing the number of trees in a planting plan
- Removing a BMP from the plan
- **Adding a BMP to the plan**
- **Changing the size, configuration, or location of a BMP**

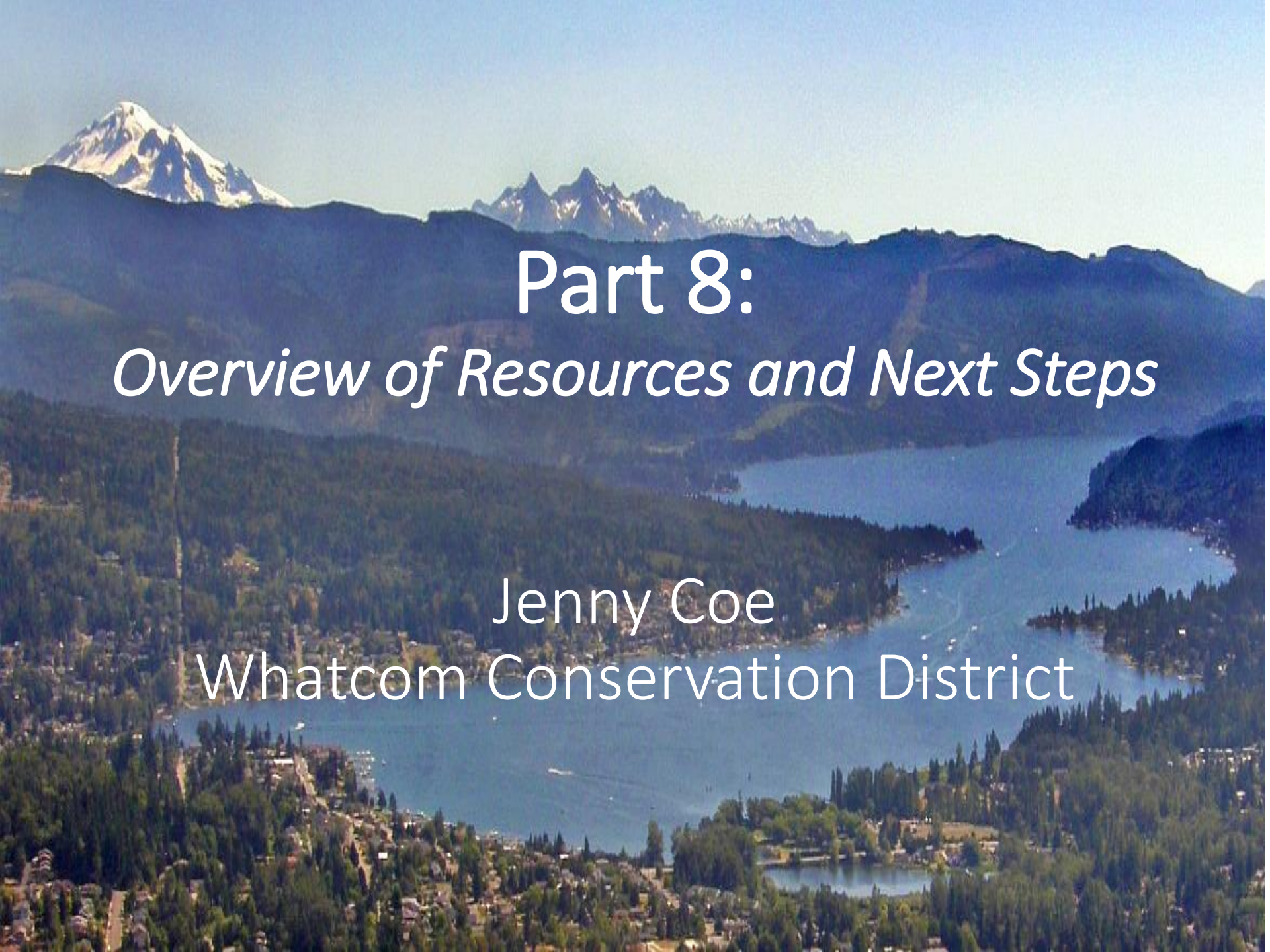
Plan Amendment Process

1. Homeowner or contractor identifies need to change the plan
2. Consult with HIP Coordinator; determine if designer involvement is required
3. Contacts designer to discuss and confirm change is possible
4. Designer works with homeowner/contractor to complete the plan amendment form and required revised submittals
5. Plan amendment form submitted to HIP Coordinator for review
6. HIP Coordinator forwards to jurisdiction for review and approval



Part 7:
Case Study

Eli Mackiewicz
City of Bellingham



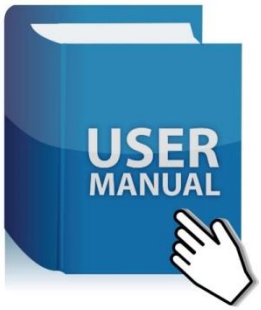
Part 8:

Overview of Resources and Next Steps

Jenny Coe
Whatcom Conservation District

Summary of Resources

- Design manual
- Pre-design report
- Friendly humans with phone numbers and emails



- The HIP website www.lakewhatcomHIP.org
- Certification Guidance Document (provided in your manual)

Who Ya Gonna Call?

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Program Specialist
Whatcom Co. Public Works
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360-778-6229

Eli Mackiewicz
Engineering Technician
City of Bellingham Public Works
emackiewicz@cob.org
360-778-7742

Next Steps

- Pat yourself on the back for putting in the time to learn about the HIP
- Go home and study the manual
- Take the exam
- Submit the exam via mail or scan and email to Eli and wait for follow-up

Next Steps *(cont'd)*

- If you passed the test, your name will be added to the HIP certified designers list given to homeowners

- Promotional materials– you will be given access to the HIP logo and may use your HIP certified professional credentials in marketing materials

Certification Guidance Document

- What it means to be a HIP-certified professional
- Requirements for maintaining your certification
- Marketing guidance
- Conduct expectations

Summary of Re-certification Requirements

Certification is good for 3 years!

- Must earn 9 CEUs (= 9 hours) for re-certification
- 90 days to report CEUs (report earned CEUs to HIP Coordinator via email with some form of proof)
- Must follow HIP conduct rules

Examples of Relevant CEUs

- Any additional trainings offered through HIP
- Sustainable Landscaping classes
- Low Impact Development classes/training
- Shoreline/creek restoration training
- Volunteer to show or talk about HIP project for education/tour purposes

Parking Lot Questions Answered


THANK YOU!