City of Gig Harbor
Stormwater Management and Site Development Manual

Volume I
Minimum Technical Requirements and Site Planning

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Modified for:
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Chapter 1 - Introduction

1.1 Objective

The objective of this manual is to provide guidance and requirements to control the quantity and quality of stormwater produced by new development and redevelopment, such that they comply with water quality standards and contribute to the protection of beneficial uses of the receiving waters.

Water quality standards include:

- Chapter 173-200 of the Washington Administrative Code (WAC), Water Quality Standards for Groundwaters of the State of Washington
- Chapter 173-201A WAC, Water Quality Standards for Surface Waters of the State of Washington
- Chapter 173-204 WAC, Sediment Management Standards.

This volume identifies the minimum requirements for stormwater control and site development requirements for all new development and redevelopment in the city and applies to all sites as detailed in Chapter 2 – Minimum Requirements for New Development and Redevelopment, and Chapter 3 – Drainage Control and Abbreviated Plan Submittal Requirements. These requirements are, in turn, satisfied by the application of best management practices (BMPs) from Volumes II through VI. The Director shall have the authority to increase requirements to protect the health, safety, and welfare of the public on the basis of information regarding threatened water quality, erosion problems, habitat destruction, historic flooding, protection of uninterruptible services, endangerment to property, or increases in requirements imposed by state or federal agencies or other pertinent factors.

Water quantity design criteria, water quality controls, erosion and sediment control practices, and site development are outlined in this manual and apply throughout the city, and within the jurisdictional boundaries of any governmental entity which adopts this manual. This manual is applicable to all types of land development – including residential, commercial, industrial, and roads.

The intent and purpose of this manual is to:

- Establish criteria for review and analysis of all development
- Manage stormwater to minimize contact with contaminants
- Mitigate the impacts of increased runoff due to urbanization
- Manage runoff from developed property and that being developed
- Protect the health, safety, and welfare of the public.

It is not the intent of this manual to preclude alternative engineering solutions to design situations. It is expected that the professional engineer will bring to each project the best of his/her skills and abilities to see that the project is thoroughly analyzed and designed correctly, accurately, and in compliance with generally accepted engineering practices. Alternatives to standard plans, specifications, and design details found in this manual will be accepted if they meet or exceed the performance of these standards as determined by the City. Engineers are encouraged to be innovative. The burden of proof, however, is on the engineer to document that his/her innovations meet or exceed the performance of the standards.

This manual is based on the premise that development and redevelopment shall not negatively impact adjacent and/or downstream property owners nor degrade groundwater or the natural drainage system, including but not limited to streams, ravines, wetlands, potholes, and rivers. Further, development activities should not impact adjacent and/or downstream property owners in a detrimental manner compared to the predeveloped condition.

It is not the intent of this manual to make the City of Gig Harbor a guarantor or protector of public or private property with regards to land development activities.

Through this manual, the City of Gig Harbor is complying with the Clean Water Act, the Puget Sound Water Quality Management Plan, and the National Pollutant Discharge Elimination System (NPDES) Stormwater Permit. Where requirements in this document are also covered in any other law, ordinance, resolution, rule, or regulation of any kind the more restrictive law shall govern.

1.2 Organization of this Manual

1.2.1 Overview of Manual Content

To accomplish the objective described in Section 1.1, the manual includes the following:

- *Minimum requirements* that cover a range of issues, such as submittal requirements, pollution prevention during the construction phase of a project, control of potential pollutant sources, treatment of runoff, control of stormwater flow volumes, protection of wetlands, and long-term operation and maintenance (O&M). The minimum requirements applicable to a project vary depending on the type and size of the proposed project.

- *Best management practices (BMPs)* that can be used to meet the minimum requirements. BMPs are schedules of activities, prohibitions of practices, maintenance procedures, managerial practices, or structural features that prevent or reduce pollutants or other adverse impacts to waters of Washington. BMPs are divided into those for short-term control of stormwater from construction sites (Volume II), and those addressing long-term management of stormwater at developed sites. Long-term BMPs are further subdivided into those covering management of the volume and timing of

stormwater flows (Volume III and VI), prevention of pollution from potential sources (Volume IV), treatment of runoff to remove sediment and other pollutants (Volume V), and BMPs designed to achieve Comprehensive Low Impact Development (LID) Site Designs (Volume VI, as required by Title 17 Gig Harbor Municipal Code (GHMC)).

- *Guidance on how to prepare and implement stormwater submittals.* Chapter 3 of this volume covers City of Gig Harbor submittals required depending on the nature of the project or site characteristics.

1.2.2 Organization of this Manual

Volume I of this manual serves as an introduction, summarizes minimum requirements, and describes submittal requirements. The remaining volumes of this manual cover BMPs for specific aspects of stormwater management. Volumes II through VI are organized as follows:

- Volume II covers BMPs for short-term stormwater management at construction sites.
- Volume III covers hydrologic analysis and BMPs to control flow rates and volumes from developed sites. Appendix III-D also provides a summary of onsite stormwater management BMP infeasibility criteria, to aid single family residential and other small project applicants.
- Volume IV addresses BMPs to minimize pollution generated by potential pollution sources at developed sites.
- Volume V presents BMPs to treat runoff that contains sediment or other pollutants from developed sites.
- Volume VI presents strategies, BMPs, and related guidelines and requirements for achieving Comprehensive LID Site Designs.

1.2.3 Organization of Volume I

Following this introduction, Volume I contains three additional chapters:

- *Chapter 2 – Minimum Requirements for New Development and Redevelopment* identifies the minimum requirements for stormwater management at all new development and redevelopment projects.
- *Chapter 3 – Drainage Control Plan and Abbreviated Plan Submittal Requirements* describes submittal requirements. One or more of the following submittals will be required depending on the nature of the project: Drainage Control Plan, Construction Stormwater Pollution Prevention Plan, Abbreviated Plan, and Maintenance and Source Control Manual. Chapter 3 describes each of these submittals and provides step-by-step guidance on how to develop these plans.

- *Chapter 4 – BMP and Facility Selection Process for Permanent Stormwater Control Plans* describes the process for selecting BMPs for long-term management of stormwater flows and quality.
- *Appendix I-A – Example Maintenance Checklists* provides information on drainage facility O&M requirements.
- *Appendix I-B – Wetland Protection Guidelines* provides information on stormwater management impacts and mitigation related to wetlands.
- *Appendix I-C – Underground Injection Control (UIC) Program Guidelines* provides information on site suitability, treatment requirements and design criteria for UIC Wells.

This volume concludes with a glossary of terms.

1.3 How to Use this Volume

To ensure that projects are in compliance with state, federal, and local regulations pertaining to stormwater, it is recommended that, at a minimum, project applicants refer to the following manual sections:

1. Chapter 1, Section 1.7 for general information on permits, regulations, and requirements that may apply to a project depending on its location and specific concerns of receiving waters.
2. Chapter 2 to determine what minimum requirements apply.
3. Chapter 3 to determine what submittal requirements apply. Submittal forms can be obtained from the City of Gig Harbor Public Works Department.
4. Chapter 4 to select appropriate BMPs.

These manual sections will direct the user to other relevant sections of the manual for specific BMP design guidance (Volumes III through VI) and construction practices (Volume II). For specific measures that must be implemented to achieve the City's Comprehensive LID Site Design requirements (per GHMC Title 17), refer to Volume VI.

1.4 Site Design Techniques and Requirements

The design professional is strongly encouraged to address the issue of stormwater management, both quantity and quality, in the early phases of the site planning process. Through careful consideration of site planning, effective impervious areas (EIAs) can be reduced thereby reducing the size and costs for facilities; efficient stormwater facilities can be integrated into the specific site parameters such as topography, soils, etc.; and source control measures can be utilized to prevent problems both during and post construction.

1.4.1 Site Planning and Layout

Some of the things that should be considered during site planning and layout include: minimizing creating impervious surfaces (e.g., roofs; and non-permeable roadways, roofs, sidewalks, parking, etc.); clustering buildings and preserving larger areas of open space; minimizing directly connected impervious areas (try to separate impervious surfaces with areas of turf, or other vegetation); incorporation of low maintenance landscaping that doesn't need frequent applications of fertilizers, herbicides, and pesticides; and minimizing the impact area and soil compaction during construction.

The approach to considering and minimizing stormwater impacts at the site layout stage is commonly referred to as low impact development (LID). Low impact development is a land use development strategy that emphasizes protection and use of onsite natural features integrated with engineered, small-scale hydrologic controls at the parcel and subdivision scale to manage stormwater and more closely mimic predevelopment watershed hydrologic functions. This is achieved by recognizing and focusing on the relationship among the overland and subsurface flow, infiltration, storage, and evapotranspiration characteristics of the site. Low impact development strategies focus on evaporating, transpiring, and infiltrating stormwater onsite through native or amended soils, vegetation, and bioengineering applications to reduce and treat overland flow. Additional details on LID approaches and requirements in the City of Gig Harbor are outlined in Volume III. Requirements for meeting the city's specific requirements for Comprehensive LID Site Designs (per Title 17 GHMC) are provided in Volume VI.

1.4.2 Protection and Establishment of Natural Buffer Areas

Natural buffer areas may be required to protect drainage courses from erosion and pollutants. Natural buffer areas are required adjacent to all wetlands, per the City's requirements, as documented in Chapter 18.08 Critical Areas Gig Harbor Municipal Code (GHMC). Where development is proposed near buffer zones that have been established by the City near an environmentally sensitive area, obtain the City's regulations regarding buffer zones.

Natural buffer areas are not to be confused with vegetated filter strips. Specifically, untreated sediment laden waters will not be allowed to discharge directly to a natural buffer area for treatment. Further, concentrated flows that could cause erosive damages will not be allowed.

1.5 Maintenance of Stormwater Best Management Practices

The importance of maintenance for the proper functioning of stormwater control facilities cannot be over-emphasized. Maintenance is crucial to performance of runoff treatment and flow control BMPs with a substantial portion of failures (clogging of filters, resuspension of sediments, loss of storage capacity, etc.) of such facilities resulting from inadequate maintenance. In addition, maintenance must be a basic consideration in design and in determination of cost. Therefore, provisions to facilitate maintenance operations must be built into the project when the BMP is installed.

Likewise, for both private and public facilities, it is important to include maintenance personnel early and throughout the design process. During discussions with maintenance personnel, describe the maintenance procedures that will need to be performed on the BMP. This will help ensure that future maintenance work and potential access needs are clearly understood.

The description of each BMP in subsequent volumes includes a brief section on facility maintenance. Appendix I-A includes additional information on stormwater maintenance, including a detailed checklist of maintenance requirements for all drainage facilities. In addition, Section 3.3.6 outlines the specific requirements related to the project Maintenance and Source Control Manual submittal.

1.6 Development of BMPs for Stormwater Management

1.6.1 Best Management Practices

BMPs are activities, restrictions, or constructed stormwater facilities, that when used singly or in combination, prevent or reduce the release of pollutants and other adverse impacts to waters of Washington. The types of BMPs are source control, treatment, flow control, and LID (also referred to as onsite stormwater management BMPs). BMPs that involve construction of engineered structures are often referred to as facilities in this manual. For instance, the BMPs referenced in the menus in Volume V, Chapter 3 are called treatment facilities.

The primary purpose of using BMPs is to protect beneficial uses of water resources through the reduction of pollutant loads and concentrations, through reduction of discharges (volumetric flow rates) causing stream channel erosion, and through reductions in deviations from natural hydrology. If it is found that, after the implementation of BMPs advocated in this manual, beneficial uses are still threatened or impaired, additional controls may be required.

1.6.2 Construction Stormwater BMPs (Volume II)

Construction stormwater BMPs can be source control, treatment, or flow control BMPs. Examples include stabilized construction entrances, silt fences, check dams, and sediment traps. Volume II contains construction stormwater BMPs.

1.6.3 Flow Control BMPs (Volume III)

Flow control BMPs typically control the volume, rate, frequency, and flow duration of stormwater surface runoff. The need to provide flow control BMPs depends on where the development site runoff is discharged to, e.g., to a stream system, wetland, or closed depression – either directly or indirectly.

Construction of a detention pond is probably the most common means of meeting flow control requirements. Construction of an infiltration facility is the preferred option but is feasible only where more permeable soils are available.

Previous versions of the City of Gig Harbor Stormwater Management and Site Development Manual (2006 and earlier) focused primarily on controlling the peak flow release rates for recurrence intervals of concern – the 2-, 10-, and 100-year rates. This level of control did not adequately address the increased duration at which those high flows occur because of the increased volume of water from the developed condition as compared to the predeveloped conditions. To protect stream channels from increased erosion, it is necessary to control the durations over which a stream channel experiences geomorphically significant flows such that the energy imparted to the stream channel does not increase significantly. Geomorphically significant flows are those that are capable of moving sediments. This target will translate into lower release rates and significantly larger detention ponds than earlier city standards. The size of such a facility can be reduced by changing the extent to which a site is disturbed. In addition, projects are encouraged to also look for means to improve or restore natural conditions to compliment, or in lieu of, traditional flow control measures. The onsite stormwater management BMPs presented in Volume III as well as Volume VI will help accomplish this goal. See also Section 1.6.6 below.

1.6.4 Source Control BMPs (Volume IV)

Source control BMPs typically prevent pollution, or other adverse effects of stormwater, from occurring. Source control BMPs are classified as operational or structural. Examples of source control BMPs include methods as various as using mulches and covers on disturbed soil, putting roofs over outside storage areas, and berming areas to prevent stormwater runon and pollutant runoff.

It is generally more cost effective to use source controls to prevent pollutants from entering runoff, than to treat runoff to remove pollutants. However, since source controls cannot prevent all impacts, some combination of measures will always be needed.

1.6.5 Treatment BMPs (Volume V)

Treatment BMPs include facilities that remove pollutants by simple gravity settling of particulate pollutants, centrifugal separation, filtration, biological uptake, and/or media or soil adsorption. Treatment BMPs can accomplish significant levels of pollutant load reductions if properly designed and maintained.

1.6.6 Low Impact Development – LID (Volume III & VI)

Low impact development is a land use development strategy that emphasizes protection and use of onsite natural features integrated with engineered, small-scale hydrologic controls at the parcel and subdivision scale to infiltrate and/or, disperse stormwater runoff onsite as a means to more closely mimic predevelopment watershed hydrologic functions. Certain onsite stormwater management BMPs and LID techniques are required as part of Minimum Requirement #5 (see Chapter 2), with additional techniques available to supplement or replace traditional stormwater approaches. Volume III presents design guidelines for several of the most common onsite stormwater management (i.e., LID) BMPs, while Volume VI outlines the City's specific requirements for Comprehensive LID Site Designs (per Title 17 GHMC).

1.7 Relationship of this Manual to Federal, State, and Local Regulatory Requirements

This section describes some of the local, state, and federal regulations and permits that may apply to your project depending on the nature of the project and site characteristics. City of Gig Harbor staff is available to help in determining which permits apply and helping project applicants through the permitting process.

The City of Gig Harbor website has information on the City's permitting process, including online permit information .

Permit information can also be obtained by calling the general information line at (253) 851-6170, or visiting the Public Works Department at 3510 Grandview Street in Gig Harbor.

The Joint Aquatic Resources Permit Application (JARPA) is another resource that can help to streamline the environmental permitting process. As noted in the following sections, several of the permits described in this section are included in the JARPA, so they can be covered under a single permit application. Refer to the Access Washington, one-stop e-permitting website for more information .

1.7.1 The Manual's Role as Technical Guidance and Requirements

The Gig Harbor Stormwater Management and Site Development Manual is to be used for identifying, selecting, and designing BMPs and completing submittal requirements to comply with City permits.

The requirements of this manual apply to all incorporated areas of Gig Harbor. These requirements also apply to cross-jurisdictional projects (e.g., utility, port, irrigation, drainage or flood control district, city, town, county, or other local, state, or federal government entity) located totally, or in part of, the City unless one of the following applies:

- Activity is exempted from submittal requirements (see Section 2.2).
- Development/redevelopment and stormwater activities are conducted in accordance with an approved stormwater management manual consistent with the Washington State Department of Ecology's Stormwater Management Manual for Western Washington (Ecology manual).

The manual provides technical guidance on measures to control the quantity and quality of stormwater runoff from new development and redevelopment projects. These measures are considered to be necessary to achieve compliance with state water quality standards and to contribute to the protection of the beneficial uses of the receiving waters (both surface and groundwaters). Stormwater management techniques applied in accordance with this manual are presumed to meet the technology-based treatment requirement of state law to provide all known available and reasonable methods of

treatment, prevention, and control (AKART; Revised Code of Washington [RCW] 90.52.040 and RCW 90.48.010).

This technology-based treatment requirement does not excuse any discharge from the obligation to apply additional stormwater management practices as necessary to comply with state water quality standards. The state water quality standards include: Chapter 173-200 WAC, Water Quality Standards for Ground Waters of the State of Washington; Chapter 173-201A, Water Quality Standards for Surface Waters of the State of Washington; and Chapter 173-204 WAC, Sediment Management Standards.

Severability

If any provisions of the manual or their application to any person or property are amended or held to be invalid, the remainder of the provisions in this manual in their application to other persons or circumstances shall not be affected.

Penalties and Enforcement

Penalties and enforcement shall be in accordance with Chapter 12.17 GHMC..

Appeals

Appeals shall be handled in accordance with the Building Code Advisory Board (Chapter 15.02 GHMC).

1.7.2 More Stringent Measures

Total maximum daily loads (TMDL) – which are also known as Water Cleanup Plans – may identify more stringent measures needed to restore water quality in an impaired water body. For more information, refer to the Washington State Department of Ecology (Ecology) website .

In addition, approved community plans may include additional stormwater management requirements applicable to new development. See Title 17 GHMC.

1.7.3 Presumptive Versus Demonstrative Approaches to Protecting Water Quality

Wherever a discharge permit or other water-quality-based project approval is required, project applicants may be required to document the technical basis for the design criteria used to design their stormwater management BMPs. This includes: how stormwater BMPs were selected; the pollutant removal performance expected from the selected BMPs; the scientific basis, technical studies, and/or modeling which supports the performance claims for the selected BMPs; and an assessment of how the selected BMP will comply with Federal technology-based treatment requirements, state water quality standards, and satisfy “all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the State of Washington.” This statutory requirement is generally known by the acronym AKART.

The BMPs presented in this manual are approved by the City of Gig Harbor, Pierce County and Ecology and are *presumed* to protect water quality and instream habitat – and meet the stated environmental objectives of the regulations described in this chapter. Project applicants always have the option of not following the stormwater management practices in this manual. However, if a project applicant chooses not to follow the practices in the manual then the project applicant will be required to individually *demonstrate* that the project will not adversely impact water quality by collecting and providing appropriate supporting data to show that the alternative approach is protective of water quality and satisfies state and federal water quality laws. Project applicants interested in pursuing the demonstrative approach should contact the City of Gig Harbor's Public Works Department early in the process.

If a project applicant wants to follow the demonstrative approach for a water quality treatment BMP, the Ecology manual and website have more information on setting up an approved water quality monitoring plan to demonstrate that a project will protect water quality and satisfy state and federal laws. Additional City of Gig Harbor requirements will also apply. Contact the City of Gig Harbor Public Works Department for additional information (253) 851-6170.

1.7.4 Phase II – NPDES and State Waste Discharge Stormwater Permits for Municipalities

Certain municipalities and other entities are subject to permitting under the U.S. Environmental Protection Agency (U.S. EPA) Phase II Stormwater Regulations (40 CFR Part 122). In western Washington, Ecology has issued joint NPDES and state waste discharge permits to regulate the discharges of stormwater from the municipal separate storm sewer systems operated by urbanized areas, including Gig Harbor.

The Phase II NPDES Municipal Stormwater Permit was reissued on August 1, 2019 and is available on the Ecology website.

1.7.5 Industrial Stormwater General Permit

Facilities covered under Ecology's Industrial Stormwater General Permit (i.e., NPDES and State Waste Discharge General Permit for Stormwater Discharges Associated With Industrial Activities) must manage stormwater in accordance with specific terms and conditions including: the development and implementation of an Industrial Stormwater Pollution Prevention Plan (Industrial SWPPP), monitoring, reporting, and ongoing adaptive management based on sampling and inspections.

The Industrial Stormwater General Permit (ISGP) requires Industrial SWPPPs to include certain mandatory BMPs, including those BMPs identified as "required" to specific industrial activities in Volume IV and V of this manual. Facilities with new development or redevelopment must evaluate whether flow control BMPs are necessary. BMPs must be consistent with this manual, or other stormwater management guidance documents that are approved by Ecology and incorporated into the ISGP. Facilities may also use alternative BMPs if their Industrial SWPPP includes documentation that the BMPs

selected are demonstrably equivalent to practices contained in stormwater technical manuals approved by Ecology, including the proper selection, implementation, and maintenance of all applicable and appropriate best management practices for onsite pollution control.

Ecology's Industrial Stormwater Webpage has a fill-in-the-blank Industrial SWPPP template for use by industrial facilities.

1.7.6 Construction Stormwater General Permit

Coverage under the Construction Stormwater General Permit is generally required for any clearing, grading, and/or excavating if the project site discharges:

- Stormwater from the site into surface water(s) of the State, or
- Into storm drainage systems that discharge to a surface water(s) of the State. "Surface waters of the State" are broadly defined by state law and includes storm drains, ditches, wetlands, creeks, rivers, lakes, and marine waters.

And:

- Disturbs one or more acres of land area, or
- Disturb less than 1 acre of land area, if the project or activity is part of a larger common plan of development or sale.

Any construction activity discharging stormwater that Ecology and/or the City determines to be a significant contributor of pollutants to waters of the State may also require permit coverage, regardless of project size, at the discretion of the agencies.

The Construction Stormwater General Permit requires application of stabilization and structural practices to reduce the potential for erosion and the discharge of sediments from the site. The stabilization and structural practices cited in the permit are similar to the minimum requirements for sedimentation and erosion control (Minimum Requirement #2) in Chapter 2 of this volume. Developers must file a Notice of Intent with Ecology and develop a Construction SWPPP prior to beginning construction. It is the responsibility of the project applicant to contact Ecology to determine if these or other requirements apply to their project. However, to minimize review time and effort by both the project applicant and the City, the Construction SWPPP required by the City has been structured to be consistent with Ecology's Construction SWPPP requirements.

The permit also requires construction sites within western Washington to implement stormwater BMPs contained in stormwater management manuals published or approved by Ecology, or BMPs that are demonstrably equivalent. Volume II of this manual further describes the requirements and BMPs appropriate for managing construction site stormwater.

1.7.7 Endangered Species Act

With the listing of multiple species of salmon as threatened or endangered across much of Washington State, and the probability of more listings in the future, implementation of the requirements of the Endangered Species Act impacts many aspects of stormwater management. Provisions of the Endangered Species Act (ESA) that can apply to stormwater management include the Section 4(d) rules, Section 7 consultations, and Section 10 Habitat Conservation Plans (HCP).

The ESA can be of particular concern for construction sites because of potential adverse impacts from discharges of sediment, turbidity, or abnormal pH. Specific adverse impacts include:

- Suffocation of eggs or fry
- Displacement and elimination of aquatic invertebrates used for food
- Reduction in the biodiversity of aquatic invertebrates
- Reduction of foraging abilities in turbid water
- Irritation of gill tissue that can lead to disease or death
- Filling of resting or feeding areas, or spawning gravels with sediment.

These impacts could be determined to be a "take" under ESA.

The stranding of listed species behind erosion and sediment control features or the impairment of their access into certain areas due to the presence of erosion and sediment control features could also be determined to be a take under ESA.

For more information on ESA and how it affects your project, please contact the National Oceanic and Atmospheric Administration Fisheries Service or the U.S. Fish and Wildlife Service .

1.7.8 Section 401 Water Quality Certifications (included in JARPA)

For projects that require a fill or dredge permit under Section 404 of the Clean Water Act, Ecology must certify to the permitting agency, the U.S. Army Corps of Engineers that the proposed project will not violate water quality standards. In order to make such a determination, Ecology may do a more specific review of the potential impacts of a stormwater discharge from the construction phase of the project and from the completed project. As a result of that review, Ecology may condition its certification to require application of the minimum requirements in this volume, or more stringent requirements.

1.7.9 Hydraulic Project Approvals (included in JARPA)

Under Chapter 77.55 RCW, the Hydraulics Act, the Washington State Department of Fish and Wildlife (WDFW) has the authority to require actions when stormwater

discharges related to a project would change the natural flow or bed of state waters. The implementing mechanism is the issuance of a Hydraulics Project Approval (HPA) permit. In exercising this authority, WDFW may require application of the minimum requirements in this volume, or more stringent requirements.

1.7.10 Aquatic Lands Use Authorizations (included in JARPA)

The Washington State Department of Natural Resources (WDNR), as the steward of public aquatic lands, may require a stormwater outfall to have a valid use authorization, and to avoid or mitigate resource impacts. Through its use authorizations, which are issued under authority of Chapter 79.90 through 96, Chapter 79.105-79.140 RCW, and in accordance with Chapter 332-30 WAC, WDNR may require application of the minimum requirements in this volume, or more stringent requirements.

1.7.11 Requirements Identified through Watershed/Basin Planning or Total Maximum Daily Loads

A number of the requirements of this manual can be superseded by the adoption of ordinances and rules to implement the recommendations of watershed plans or basin plans. In accordance with the Watershed Management Act (Chapter 90.82 RCW) or the basin planning option per Chapter 400-12 WAC, the state allows the City of Gig Harbor to initiate their own watershed/ basin planning processes to identify more stringent or alternative requirements. As long as the actions or requirements identified in those plans and implemented through local or state ordinances or rules comply with applicable state and federal statutes, they can supersede the requirements in this manual. The decisions concerning whether such locally derived requirements comply with federal and state statutes rest with the regulatory agencies responsible for implementing those statutes.

A requirement of this manual can also be superseded or added to through the adoption of actions and requirements identified in a TMDL that is approved by the U.S. EPA. However, it is likely that at least some TMDLs will require use of the BMPs in this manual.

1.7.12 Underground Injection Control – UIC Program

One of the provisions of the Safe Drinking Water Act is to protect underground sources of drinking water (USDW). In 1984, Ecology received authority from the U.S. EPA to administer the Underground Injection Control (UIC) Program to protect USDW by regulating the discharges of fluids into the subsurface by UIC wells.

Ecology has adopted Chapter 173-218 WAC to implement the program; however, the UIC program rule protects all groundwater, not just USDW. The U.S. EPA organizes UIC wells into six classes. The Washington UIC program regulates Class I through Class V UIC wells, except for wells located on tribal land. UIC wells used to manage stormwater are considered Class V wells. For more information visit Ecology's web page for the UIC program and "Guidance for UIC Wells that Manage Stormwater" .

The UIC program has two requirements:

1. A non-endangerment performance standard must be met, prohibiting discharges that allow movement of fluids containing contaminants to reach groundwater.
2. All UIC facility owners/operators must complete online UIC well registration with Ecology.

The UIC program defines a UIC well as a well that is used to discharge fluids from the ground surface into the subsurface and is one of the following:

- A bored, drilled, or driven shaft, or dug hole whose depth is greater than the largest surface dimension; or
- A dug hole whose depth is greater than the largest surface dimension, or
- An improved sinkhole; which is a natural crevice that has been modified, or
- A subsurface fluid distribution system which includes perforated pipes, drain tiles or other similar mechanisms intended to distribute fluids below the surface of the ground.

Examples of UIC wells or subsurface infiltration systems are the following:

- Drywells
- Drainfields
- Infiltration trenches with perforated pipe
- Storm chamber systems with the intent to infiltrate
- French Drains
- Bioretention systems intending to infiltrate water from a perforated pipe below the treatment soil
- Other similar devices that discharge into the ground

The following are not UIC wells:

- Buried pipe and/or tile networks that serve to collect water and discharge that water to a drainage system or to a receiving water
- Surface infiltration basins and flow dispersion stormwater facilities
- Infiltration trenches designed without perforated pipe or a similar mechanism
- Bioretention systems transporting water via a perforated pipe to a drainage system or to a receiving water

Depending upon the manner in which it is accomplished, the discharge of stormwater into the ground can be classified as a Class V injection well. **UICs are required to be registered with Ecology** with the exception of UIC wells at single-family homes (or duplexes) that only receive residential roof runoff or for basement flooding control (WAC 173-218-070 (1)(e)).

The UIC rule (Chapter 173-218 WAC) applies to all Class V UIC wells that receive stormwater discharges. These wells must be sited, designed, constructed, managed, operated, and maintained according to the requirements throughout Appendix I-C - Underground Injection Control (UIC) Program Guidelines.

If all stormwater runoff from the project site discharges to a Class V UIC well, the Municipal Stormwater Permits do not pertain to the project, and the Minimum Requirements do not apply. The UIC rule (Chapter 173-218 WAC) applies in such cases. See Appendix I-C - Underground Injection Control (UIC) Program Guidelines for details on the rules, registration requirements, regulations, non-endangerment standard, treatment requirements and operation guidelines.

This manual represents several BMPs to infiltrate stormwater. Additional information on underground injection control and how it applies to infiltration and stormwater management is included in Volume III, Section 2.6 and Appendix I-C. For more information and for a listing on potential stormwater facilities that may have Class V classification refer to the UIC Program available on Ecology's Website >.

Chapter 2 - Minimum Requirements for New Development and Redevelopment

2.1 Overview

This chapter identifies the 10 minimum requirements for stormwater management applicable to new development and redevelopment sites. The minimum requirements are:

1. Preparation of stormwater site plans
2. Construction stormwater pollution prevention
3. Source control of pollution
4. Preservation of natural drainage systems and outfalls
5. Onsite stormwater management
6. Runoff treatment
7. Flow control
8. Wetlands protection
9. Operation and maintenance
10. Financial liability.

Depending on the type and size of the proposed project, different combinations of these minimum requirements or UIC Program regulations apply. See Appendix I-C for information on the UIC Program regulations. In general, small sites are required to control erosion and sedimentation from construction activities and to apply simpler approaches for treatment and flow control of stormwater runoff from the developed site. Controlling flows from small sites is important because the cumulative effect of uncontrolled flows from many small sites can be as damaging as those from a single large site. For small sites, including single family and small commercial developments, Section 3.2 provides separate applicable submittal, design, and stormwater management requirements.

Larger sites must provide erosion and sedimentation control during construction, permanent control of stormwater runoff from the developed site through selection of appropriate BMPs and facilities, and other measures to reduce and control the onsite and offsite impacts of the project. Sites being redeveloped must generally meet the same minimum requirements as new development for the new hard surfaces and pervious surfaces converted to lawn or landscaped areas. Redevelopment sites must also provide erosion control, source control, and onsite stormwater management for the portion of the site being redeveloped. In addition, if the redevelopment meets certain cost or space (as applied to roads) thresholds, updated stormwater management for the redeveloped pervious and hard surfaces must be provided. There may also be situations in which additional controls are required for sites, regardless of type or size, as a result of basin plans or special water quality concerns.

Development sites are to demonstrate compliance with these requirements through the preparation of stormwater site plans. The plans are described in detail in Chapter 3.

Section 2.3 and 2.4 provide additional information on applicability of the minimum requirements to different types of sites, and Chapter 3 provides details on required stormwater-related plan submittals.

Finally, it is important to note that other city requirements beyond those outlined in this chapter, but still related to stormwater management, may apply to a given project. For example, GHMC Title 17 identifies situations where the City's requirements for Comprehensive LID Site Designs apply (see also Volume VI). Project proponents are responsible for identifying and addressing all requirements applicable to their proposed project.

2.2 Exemptions

See exemptions listed in Section 14.20.070 GHMC. All other projects are subject to one or more of the minimum requirements (see Section 2.4).

2.3 Applicability of the Minimum Requirements

Not all of the minimum requirements apply to every development or redevelopment project. The applicability varies depending on the project type and size. This section identifies thresholds that determine the applicability of the minimum requirements to different projects. First, determine if all runoff is infiltrating into a UIC well (i.e. approved continuous runoff modeling methods indicate that the entire runoff file is infiltrated). If it is, refer to Appendix I-C – Underground Injection Control (UIC) Program Guidelines. If not, use the flow charts in Figures 2.1 and 2.2 to determine which of the minimum requirements apply. The minimum requirements themselves are presented in Section 2.4.

Note: For definitions related to the minimum requirements (impervious surface, redevelopment, converted pervious surface, pollutant generating surface, etc.) refer to the glossary in Volume I. A common question when using this section and figures 2.1. and 2.2. is whether gravel is considered an impervious surface. The answer to this question is yes. Gravel that is typically used in lieu of asphalt or concrete for parking areas, driveways or roads is considered an impervious surface. An existing gravel surface upgraded to concrete or asphalt is considered new impervious surface.

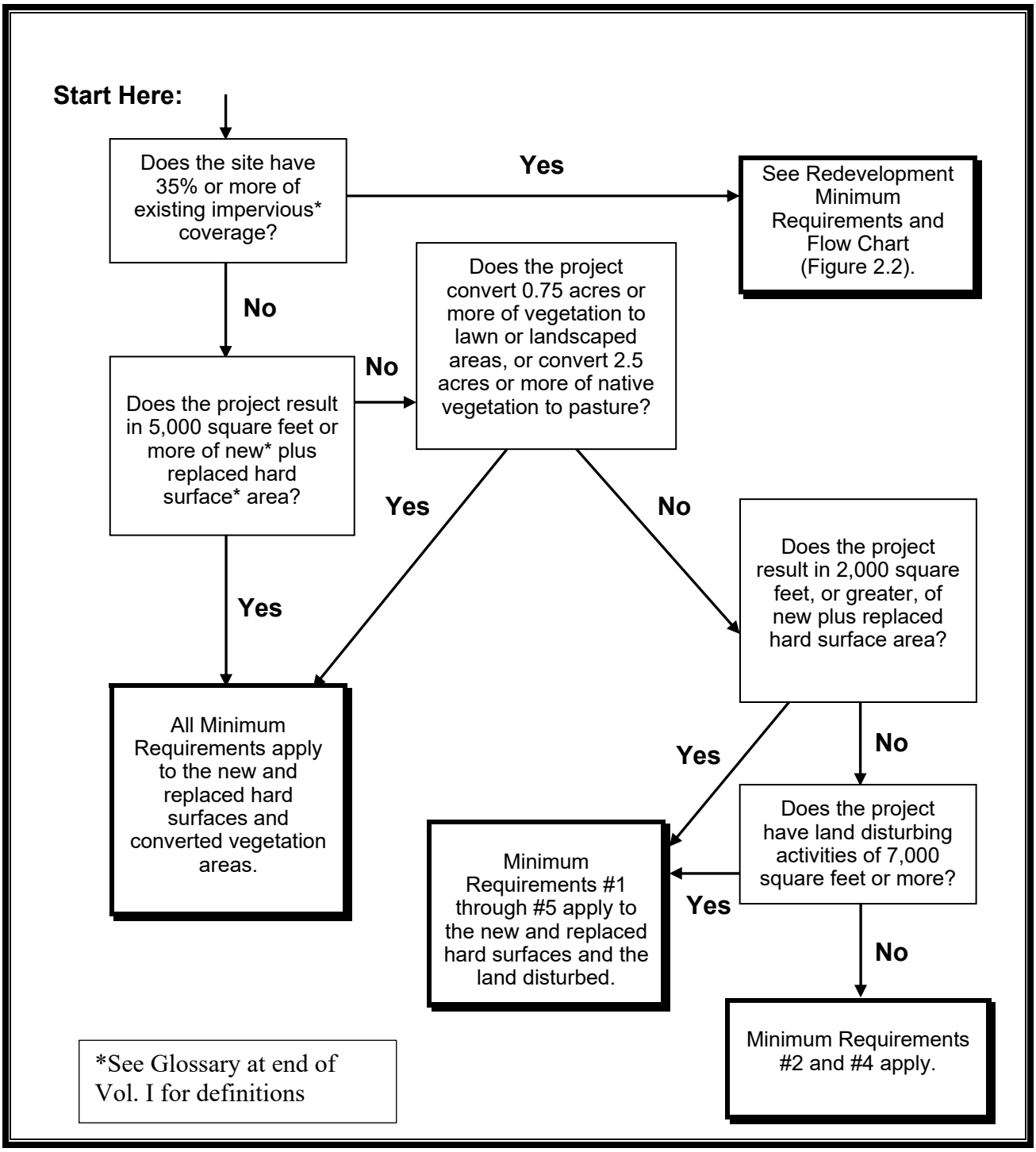

Figure 2.1. Flow Chart for Determining Requirements for New Development.

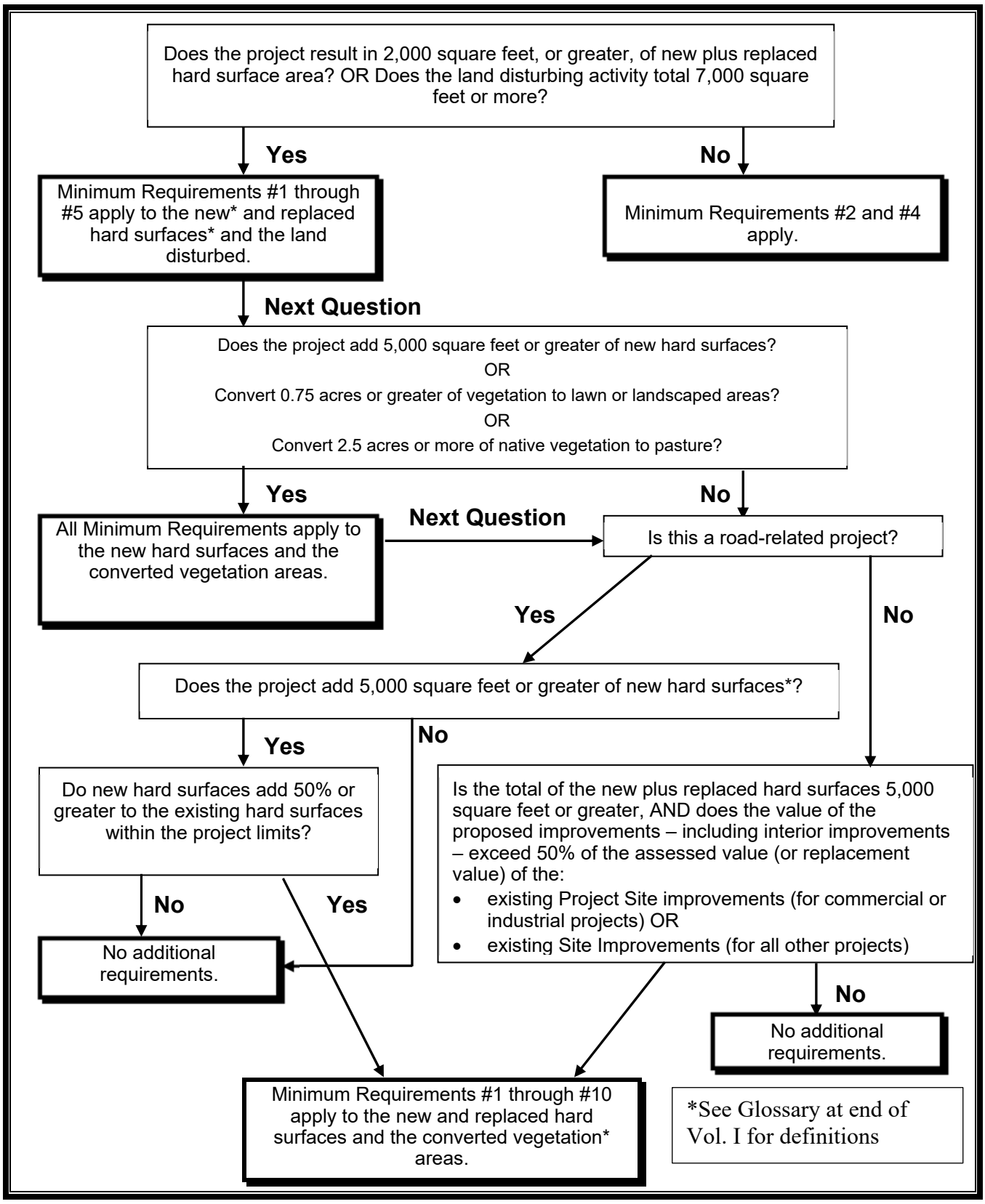

Figure 2.2. Flow Chart for Determining Requirements for Redevelopment.

Use the thresholds in Figures 2.1 and 2.2 at the time of application for a subdivision, plat, short plat, building permit, or other construction permit. The plat or short plat approval shall identify permanent stormwater BMPs that are required for each lot.

2.3.1 New Development

All new development shall be required to comply with Minimum Requirement #2 and #4.

The following new development shall comply with Minimum Requirements #1 through #5 for the new and replaced hard surfaces and the land disturbed:

- Results in 2,000 square feet, or greater, of new, replaced, or new plus replaced hard surface area, or
- Has land disturbing activity of 7,000 square feet or greater.

The following new development shall comply with Minimum Requirements #1 through #10 for the new and replaced hard surfaces and the converted vegetation areas:

- Results in 5,000 square feet, or greater, of new plus replaced hard surface area, or
- Converts three-fourths acres, or more, of vegetation to lawn or landscaped areas, or
- Converts 2.5 acres, or more, of native vegetation to pasture.

Supplemental Guidelines

Approved community plans may include additional stormwater management requirements applicable to new development. See GHMC Title 17.

Regional stormwater facilities (new, or city-approved existing facilities) may be used as an alternative method of meeting Minimum Requirements #6, #7, and #8. Such facilities must be operational prior to development, and must have the capacity and capability to meet the performance criteria applicable to the new development, as documented through engineering reports detailing how the proposed facilities meet these requirements for the sites that drain to them.

Subdivisions

For the purposes of applying the thresholds in Chapter 3, Table 3.1, to a proposed subdivision (i.e., a plat or short plat project), the hard surface coverage, as well as the converted vegetation areas, must be specified for each lot and recorded with the City on the face of the final plat (or an alternative acceptable to the City).

Compensatory Flow Control or Treatment

Where new development projects require improvements (e.g., frontage improvements) that are not within the same threshold discharge area, the City of Gig Harbor may allow

the minimum requirements to be met for an equivalent (flow and pollution characteristics) area that drains to the same receiving water.

2.3.2 Redevelopment

All redevelopment shall be required to comply with Minimum Requirement #2 and #4.

The following redevelopment shall comply with Minimum Requirements #1 through #5 for the new and replaced hard surfaces and the land disturbed:

- Results in 2,000 square feet or greater, of *new plus replaced* hard surface area, or
- Has land disturbing activity of 7,000 square feet or greater.

The following redevelopment shall comply with Minimum Requirements #1 through #10 for the new hard surfaces and converted pervious areas:

- Adds 5,000 square feet or more of new hard surfaces
- Converts three-fourths acres, or more, of vegetation to lawn or landscaped areas
- Converts 2.5 acres, or greater, of native vegetation to pasture.

The City of Gig Harbor may allow the minimum requirements to be met for an equivalent (flow and pollution characteristics) area within the same threshold discharge area (TDA).

Underground utility projects that replace the ground surface with in-kind material or materials with similar runoff characteristics should not be subject to redevelopment requirements except construction site erosion control (Minimum Requirement #2) and preservation of natural drainage systems and outfalls (Minimum Requirement #4).

Additional Requirements for Redevelopment

For road-related projects, runoff from the replaced and new hard surfaces (including pavement, shoulders, curbs, and sidewalks) and the converted vegetated areas shall meet all the minimum requirements if the new hard surfaces total 5,000 square feet or greater and total 50 percent or more of the existing hard surfaces within the project limits. The project limits shall be defined by the length of the project and the width of the right-of-way.

Other types of redevelopment projects shall comply with Minimum Requirements #1 through #10 for the new and replaced hard surfaces and the converted vegetated areas if:

- The total of new plus replaced hard surfaces is 5,000 square feet or greater, and
- For commercial or industrial projects: the valuation of proposed improvements, including interior improvements, exceeds 50 percent of the assessed value of the existing Project Site improvements as determined by the City's Building Official.

- For all other projects: the valuation of the proposed improvements, including interior improvements, exceeds 50 percent of the assessed value of the existing Site improvements as determined by the City's Building Official.

Finally, if the City determines that the project site contributes to an existing water quality, flooding, or erosion problem, the City may require that the project site comply with additional stormwater management requirements. The City shall base the determination on the results of basin planning for the basin in which the project is located; historic water quality data; or historic information on flooding, erosion, or habitat degradation in receiving waters.

Objective

Redevelopment projects have the same requirements as new development projects in order to minimize the impacts from new surfaces. To not discourage redevelopment projects, replaced surfaces are not required to be brought up to new stormwater standards unless the noted cost or space thresholds are exceeded. As long as the replaced surfaces have similar pollution-generating potential, the amount of pollutants discharged shouldn't be significantly different. However, if the redevelopment project scope is sufficiently large that the cost or space criteria noted above are exceeded, it is reasonable to require the replaced surfaces to be brought up to current stormwater standards. This is consistent with other utility standards.

2.4 Minimum Requirements

This section describes the minimum requirements for stormwater management at development and redevelopment sites. Section 2.3 should be consulted to determine which requirements apply to any given project. Figures 2.1 and 2.2 should be consulted to determine whether the minimum requirements apply to new surfaces, replaced surfaces, or new and replaced surfaces. Volumes II through VI of this manual present BMPs for use in meeting the minimum requirements.

2.4.1 Minimum Requirement #1: Preparation of Stormwater Site Plans

All projects meeting the thresholds in Section 2.3 are required to prepare one or more stormwater site planning documents for city review. **In addition, the City of Gig Harbor requires Abbreviated Plan submittals for some projects that fall below the Minimum Requirement #1 threshold identified in Section 2.3.** The information required in the various stormwater site plans varies depending on the nature of the project and its location. Stormwater Site Plans shall use site-appropriate development principles, as required by Title 17 GHMC, to retain native vegetation and minimize impervious surfaces to the extent feasible. Each of the plan submittals listed below are described in detail in Chapter 3. See Chapter 3 and Table 3.1 for the specific information on required plans and plan content.

- Abbreviated Plan
- Drainage Control Plan

- Construction Stormwater Pollution Prevention Plan.

Completing the applicable plan in accordance with the requirements in Chapter 3 will meet Minimum Requirement #1.

Objective

The 2,000 square foot threshold for hard surfaces and 7,000 square foot threshold for land disturbance are specified by Ecology to capture most single family home construction and their equivalent. The city-specific thresholds identified in Chapter 3, Table 3.1, were developed to meet more specific City of Gig Harbor needs and interests, without negating Ecology's requirements.

2.4.2 Minimum Requirement #2: Construction Stormwater Pollution Prevention

Thresholds

All new development and redevelopment projects are responsible for preventing erosion and discharge of sediment and other pollutants into receiving waters, and shall comply with Construction SWPPP Elements #1 through #13 as detailed in Volume II, Section 2.3.3. The thirteen elements are summarized below, but project applicants must refer to Volume II, Section 2.3.3 for the full description of applicable requirements.

Projects which result in 2,000 square feet or more of new plus replaced hard surface area, or which disturb 7,000 square feet or more of land must prepare a Construction SWPPP as part of the Stormwater Site Plan (see Section 2.4.1). Each of the thirteen elements must be considered and included in the Construction SWPPP unless site conditions render the element unnecessary and the exemption from that element is clearly justified in the narrative of the Construction SWPPP.

Projects that result in less than 2,000 square feet of new plus replaced hard surface area, or disturb less than 7,000 square feet of land are not required to prepare a Construction SWPPP, but must consider all of the thirteen elements of Construction Stormwater Pollution Prevention and develop controls for all elements that pertain to the project site.

These elements cover the general water quality protection strategies of limiting site impacts, preventing erosion and sedimentation, and managing activities and sources during the construction phase of a project.

The 13 elements are:

1. Preserve vegetation / Mark clearing limits
2. Establish construction access
3. Control flow rates
4. Install sediment controls

5. Stabilize soils
6. Protect slopes
7. Protect drain inlets
8. Stabilize channels and outlets
9. Control pollutants
10. Control dewatering
11. Maintain BMPs
12. Manage the project
13. Protect Low Impact Development BMPs.

If a Construction SWPPP is found to be inadequate (with respect to Erosion and Sediment Control requirements), the City of Gig Harbor may require that other BMPs be implemented as needed.

A complete description of each element and the associated BMPs are given in Volume II, Chapter 2.

2.4.3 Minimum Requirement #3: Source Control of Pollution

All known, available and reasonable source control BMPs must be applied to all projects. Source control BMPs must be selected, designed, and maintained according to this manual.

Objective

The intent of source control BMPs is to prevent stormwater from coming in contact with pollutants. They are a cost-effective means of reducing pollutants in stormwater, and, therefore, should be a first consideration in all projects.

Supplemental Guidelines

An adopted and implemented basin plan or a TMDL (also known as a Water Cleanup Plan) may be used to develop more stringent source control requirements that are tailored to a specific basin.

Source control BMPs include operational BMPs and structural source control BMPs. See Volume IV for design details of these BMPs. For construction sites, see Volume II.

Structural source control BMPs should be identified in the stormwater site plan and should be shown on all applicable plans submitted for city review and approval.

2.4.4 Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls

All new development and redevelopment projects are responsible for maintaining natural drainage patterns, and discharges from the project site shall occur at the natural location, to the maximum extent practicable. The manner by which runoff is discharged from the project site must not cause a significant adverse impact to downstream receiving waters and downgradient properties. When downstream drainage courses are inadequate or systems are undersized, or when in the opinion of the City, property or properties may be adversely affected by the existing and/or proposed stormwater release rates, additional stormwater flow control measures may be required. Such determination by the City may be based upon existing information indicating problem areas or based upon current or past litigation over drainage problems within the vicinity of the project. If additional stormwater flow control measures are required by the City, the applicant may have the option to correct and/or improve downstream drainage conditions so that the proposed stormwater release rate does not have to be further restricted. Any offsite improvements will require the applicant to obtain easements from the owners of any property where work is to take place.

All outfalls require energy dissipation**.**

Objective

To preserve and utilize natural drainage systems to the fullest extent because of the multiple stormwater benefits these systems provide; and to prevent erosion at and downstream of the discharge location.

Supplemental Guidelines

Creating new drainage patterns results in more site disturbance and more potential for erosion and sedimentation during and after construction. Creating new discharge points can create significant stream channel erosion problems as the receiving water body typically must adjust to the new flows. Diversion can cause greater impacts than would otherwise occur by discharging runoff at the natural location.

Where no conveyance system exists at the adjacent downgradient property line and the discharge was previously unconcentrated flow or significantly lower concentrated flow, then measures must be taken to prevent downgradient impacts. Drainage easements from downstream property owners may be needed and shall be obtained prior to approval of the engineering plans.

The following discharge requirements apply:

Where no conveyance system exists at the abutting downstream property line and the natural (existing) discharge is unconcentrated, any runoff concentrated by the proposed project must be discharged as follows:

- If the 100-year peak discharge, as estimated by using an approved continuous runoff model using 15-minute time steps, is less than or equal to 0.3 cfs under existing conditions and will remain less than or equal to 0.3 cfs under developed conditions, then the concentrated runoff may be discharged onto a rock pad or to any other system that serves to disperse flows.

- If the 100-year peak discharge, as estimated by using an approved continuous runoff model using 15-minute time steps, is less than or equal to 0.5 cfs under existing conditions and will remain less than or equal to 0.5 cfs under developed conditions, then the concentrated runoff may be discharged through a dispersal trench or other dispersal system, provided the applicant can demonstrate that there will be no significant adverse impact to downgradient properties or drainage systems.

- If the 100-year peak discharge, as estimated by using an approved continuous runoff model using 15-minute time steps, is greater than 0.5 cfs for either existing or developed conditions, or if a significant adverse impact to downgradient properties or drainage systems is likely, then a conveyance system must be provided to convey the concentrated runoff across the downstream properties to an acceptable discharge point (i.e., an enclosed drainage system or open drainage feature where concentrated runoff can be discharged without significant adverse impact).

2.4.5 Minimum Requirement #5: Onsite Stormwater Management

Projects shall employ onsite stormwater management BMPs in accordance with the following projects thresholds, standards, and lists to infiltrate, disperse, and retain stormwater runoff onsite to the extent feasible without causing flooding or erosion impacts. A flow chart (Figure 2.3) is provided at the end of this section to help summarize the core components of this minimum requirement.

In addition, projects subject to the City's Comprehensive LID Site Design requirements (per GHMC Title 17) should review Volume VI in conjunction with Minimum Requirements #5, #6, and #7. Some of the requirements of GHMC Title 17 will partially or fully achieve the requirements of Minimum Requirements #5, #6, and #7.

Project Thresholds

Projects triggering only Minimum Requirements #1 through #5 shall either:

a. Use onsite stormwater management BMPs from List #1 for all surfaces within each type of surface in List #1; or

b. Demonstrate compliance with the LID Performance Standard. Projects selecting this option cannot use rain gardens. They may choose to use bioretention areas as described in Volume III, Section 3.4 to achieve the LID Performance Standard. Projects selecting this option must implement the soil preservation and amendment BMP described in Volume III, Section 3.1 if feasible.

Projects triggering Minimum Requirements #1 through #10, must meet the requirements in Table 2.1.

Table 2.1. Onsite Stormwater Management Requirements for Projects Triggering Minimum Requirements #1 – #10.

Project Location and Parcel Size	Requirement
Projects inside the UGA, on any size parcel	• Use the LID BMPs from List #2 for all surfaces within each type of surface in List #2; **or** • Use any Flow Control BMP(s)[1] desired to achieve the LID Performance Standard, and apply Soil Preservation and Amendment BMP.
Projects outside the UGA, on a parcel smaller than 5 acres	
Projects outside the UGA, on a parcel 5 acres or larger	Use any Flow Control BMP(s)[1] desired to achieve the LID Performance Standard, and apply Soil Preservation and Amendment BMP.
Note: This text refers to the Urban Growth Area (UGA) as designated under the Growth Management Act (GMA) (Chapter 36.70.A RCW) of the State of Washington.	

Flow Control Exempt Projects:

Projects qualifying as Flow Control exempt in accordance with the TDA Exemption in Vol. I, Sec. 2.4.7 Minimum Requirement #7: Flow Control shall either:

- Use the LID BMPs from List #3 for all surfaces within each type of surface in List #3;

  or

- Use any Flow Control BMP(s)[1] desired to achieve the LID Performance Standard, and apply Soil Preservation and Amendment BMP.

If the project has multiple TDAs, all TDAs must be Flow Control exempt per the TDA Exemption in Vol. I, Sec. 2.4.7 Minimum Requirement #7: Flow Control for the project to use the options listed here.

1. A Rain Garden BMP cannot be used to achieve the LID Performance Standard.

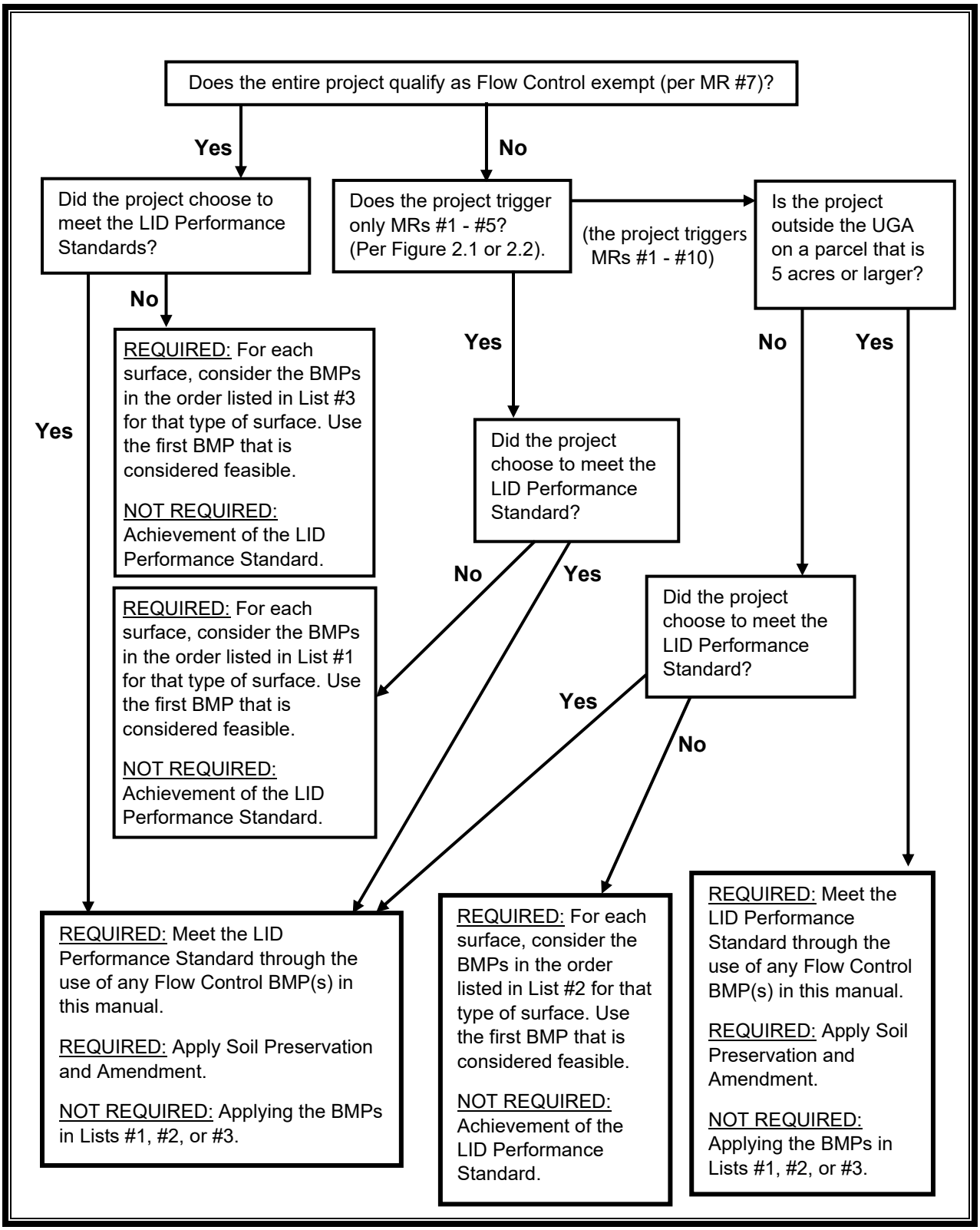

Figure 2.3. Flow Chart for Determining Minimum Requirement #5 Requirements

Low Impact Development Performance Standard

The LID Performance Standard compliance method for Minimum Requirement #5 requires modeling the proposed Flow Control BMPs to demonstrate the flow reduction as described below. Note that in order to meet the LID Performance Standard, the chosen Flow Control BMPs will most likely need to include infiltration.

Stormwater discharges shall match developed discharge durations to pre-developed durations for the range of pre-developed discharge rates from 8 percent of the 2-year peak flow to 50 percent of the 2-year peak flow. Refer to the Standard Flow Control Requirement section in Minimum Requirement #7 for information about the assignment of the pre-developed condition. Project sites that must also meet Minimum Requirement #7 – flow control – must match flow durations between 8 percent of the 2-year flow through the full 50-year flow.

A Rain Garden BMP cannot be used to achieve the LID Performance Standard. Use a Bioretention BMP to achieve the LID Performance.

The List Approach

The List Approach compliance method for Minimum Requirement #5 requires evaluating the BMPs in Table 2.2. The List Approach for Minimum Requirement #5 Compliance.

For each surface, evaluate the feasibility of the BMPs in the order listed, and use the first BMP that is considered feasible. The designer must document the site conditions and infeasibility criteria used to deem each BMP infeasible. Once a BMP is deemed feasible and used for a surface, no other BMP from the list is necessary for that surface.

If all BMPs in the list are infeasible, then the designer must document the site conditions and infeasibility criteria used to deem each BMP infeasible. This documentation will demonstrate compliance with Minimum Requirement #5.

Feasibility shall be determined by evaluation against:

- Design criteria, limitations, and infeasibility criteria identified for each BMP in this manual; and
- Competing Needs Criteria listed below.
- (See also Volume III, Appendix III-D for a summary of infeasibility criteria for all BMPs.)

Table 2.2. The List Approach for Minimum Requirement #5 Compliance

List #1 (For MR #1- #5 Projects That Are Not Flow Control Exempt)	List #2 (For MR #1- #10 Projects That Are Not Flow Control Exempt)	List #3 (For Flow Control Exempt Projects)
Surface Type: Lawn and Landscaped Areas		
Soil Preservation and Amendment BMP in Volume III, Section 3.1	Soil Preservation and Amendment BMP in Volume III, Section 3.1	Soil Preservation and Amendment BMP in Volume III, Section 3.1
Surface Type: Roofs		
1. Full Dispersion BMP in Volume VI, Section 2.3 or Downspout Infiltration Systems in Volume III, Section 3.9.3	1. Full Dispersion BMP in Volume VI, Section 2.3 or Downspout Infiltration Systems in Volume III, Section 3.9.3	1. Downspout Infiltration Systems in Volume III, Section 3.9.3
2. Rain Gardens BMP in Volume III, Section 3.8 or Bioretention BMP in Volume III, Section 3.4 or ONLY for sites that are underlain by Spanaway soils[1], Downspout Dispersion Systems in Volume III, Section 3.9.4	2. Bioretention BMP in Volume III, Section 3.4 or ONLY for sites that are underlain by Spanaway soils[1], Downspout Dispersion Systems in Volume III, Section 3.9.4	2. Downspout Dispersion Systems in Volume III, Section 3.9.4
3. Downspout Dispersion Systems in Volume III, Section 3.9.4	3. Downspout Dispersion Systems in Volume III, Section 3.9.4	3. Perforated Stub-out Connections in Volume III, Section 3.9.5
4. Perforated Stub-out Connections in Volume III, Section 3.9.5	4. Perforated Stub-out Connections in Volume III, Section 3.9.5	
Surface Type: Other Hard Surfaces		
1. Full Dispersion BMP in Volume VI, Section 2.3	1. Full Dispersion BMP in Volume VI, Section 2.3	Sheet Flow Dispersion BMP in Volume III, Section 3.2.3 or
2. Permeable Pavement BMP in Volume III, Section 3.5 or Rain Garden BMP in Volume III, Section 3.8 or Bioretention BMP in Volume III, Section 3.4	2. Permeable Pavement BMP in Volume III, Section 3.5	

Table 2.2. The List Approach for Minimum Requirement #5 Compliance (continued)

3. Sheet Flow Dispersion BMP in Volume III, Section 3.2.3 or Concentrated Flow Dispersion BMP in Volume III, Section 3.2.4	3. Bioretention BMP in Volume III, Section 3.4	Concentrated Flow Dispersion BMP in Volume III, Section 3.2.4
	4. Sheet Flow Dispersion BMP in Volume III, Section 3.2.3 or Concentrated Flow Dispersion BMP in Volume III, Section 3.2.4	
General Notes for using the List Approach: • Size Rain Gardens and Bioretention used in the List Approach to have a minimum horizontal projected surface area below the overflow which is at least 5% of the area draining to it. • Downspout Dispersion Systems must have a slope of 10 percent or less. • When the designer encounters Permeable Pavements in the List Approach, it is not a requirement to pave these surfaces. Where pavement is proposed, it must be permeable to the extent feasible unless Full Dispersion is employed. • Sidewalk infiltration galleries are equivalent to pervious concrete sidewalk. See Ballasted Cement Concrete Sidewalk Std. Detail 2-47 current PW Standards.		

1. As defined by the Soils Survey of Pierce County Area (USDA 1979), and field verified by a professional soil scientist certified by the Soil Science Society of America (or an equivalent national program); a locally licensed onsite sewage designer; or by other suitably trained persons working under the supervision of a professional engineer, geologist, hydrogeologist, or engineering geologist registered in the State of Washington.

Objective

To use practices as feasible, distributed across a development, which reduce the amount of disruption of the natural hydrologic characteristics of the site.

Competing Needs

The onsite stormwater management BMPs can be superseded or restricted where they are in conflict with:

- Requirements of the following federal or state laws, rules, and standards: Historic Preservation Laws and Archaeology Laws as listed at < https://dahp.wa.gov/project-review/preservation-laws>, Federal Superfund or Washington State Model Toxics Control Act, Federal Aviation Administration requirements for airports, Americans with Disabilities Act.

- Where a LID requirement has been found to be in conflict with special zoning design criteria and community plans found in Title 17 GHMC the existing local codes may supersede or reduce the LID requirement.

- Critical Area Ordinance – Chapter 18.08 GHMC that provides protection of tree species.

- Public health and safety standards.
- Transportation regulations to maintain the option for future expansion or multi-modal use of public rights-of-way.
- A local code or rule adopted as part of a Wellhead Protection Program established under the Federal Safe Drinking Water Act; or adopted to protect a Critical Aquifer Recharge Area established under the State Growth Management Act.

Supplemental Guidelines

In order to meet the LID Performance Standard, designers may use any Flow Control BMP in this manual. There are no specific Flow Control BMPs that must be used to meet the LID Performance Standard.

"Flooding or erosion impacts" include flooding of septic systems, crawl spaces, living areas, outbuildings, etc.; increased ice or algal growth on sidewalks/roadways; earth movement/settlement; erosion and other potential damage.

Note also that rain gardens cannot be used to meet the requirements of the Low Impact Development Performance Standard outlined above. This is because the LID Performance Standard requires the submittal of an engineered design and analysis. For projects proposing to meet the LID Performance Standard, a bioretention area must be used in lieu of a rain garden, even though they may look and perform similarly in practice.

2.4.6 Minimum Requirement #6: Runoff Treatment

Projects must provide runoff treatment to reduce the water quality impacts of stormwater runoff from pollution generating surfaces. This will include treatment for oil products, phosphorus control, and basic or enhanced treatment for dissolved metals and suspended solids for projects that meet specified thresholds.

Treatment Facility Selection, Design, and Maintenance

Stormwater treatment facilities shall be:

- Selected in accordance with the process identified in Chapter 4 of this volume and detailed in Volume V
- Designed in accordance with the design criteria in Volume V
- Maintained in accordance with the maintenance checklists in Appendix I-A.

Thresholds

When assessing a project against the following thresholds, only consider those hard and pervious surfaces that are subject to this minimum requirement as determined in Section 2.3 of this chapter.

The following require construction of stormwater treatment facilities:

- Projects in which the total of pollution-generating hard surface (PGHS) is 5,000 square feet or more in a threshold discharge area of the project, or
- Projects in which the total of pollution-generating pervious surfaces (PGPS) – not including permeable pavements – is three-fourths of an acre or more in a threshold discharge area, and from which there will be a surface discharge in a natural or man-made conveyance system from the site.

Treatment Facility Sizing

Size stormwater treatment facilities for the entire area that drains to them, even if some of those areas are not pollution-generating, or were not included in the project site threshold decisions (Section 2.3 of this chapter) or the treatment threshold decisions of this minimum requirement.

- Water Quality Design Storm Volume:
  - Using the latest version of an Ecology approved continuous runoff model (e.g., the Western Washington Hydrology Model [WWHM]), the water quality design storm volume shall be equal to the simulated daily volume that represents the upper limit of the range of daily volumes that accounts for 91 percent of the entire runoff volume over a multi-decade period of record.
- Water Quality Design Flow Rate:
  - *Preceding Detention Facilities or when Detention Facilities are not required*: The flow rate at or below which 91 percent of the runoff volume, as estimated by an approved continuous runoff model, will be treated. At a minimum, 91 percent of the total runoff volume, as estimated by an approved continuous runoff model, must pass through the treatment facility(ies) at or below the approved hydraulic loading rate for the facility(ies).
  - *Downstream of Detention Facilities*: The water quality design flow rate must be the full 2-year recurrence interval release rate from the detention facility.

Additional Requirements

Direct discharge of untreated stormwater from pollution-generating hard surfaces to groundwater is prohibited. Volume V, Section 6.3 details the soil requirements to achieve water quality treatment through infiltration.

Objective

The purpose of runoff treatment is to reduce pollutant loads and concentrations in stormwater runoff using physical, biological, and chemical removal mechanisms so that beneficial uses of receiving waters are maintained and, where applicable, restored. When site conditions are appropriate, infiltration can potentially be the most effective BMP for runoff treatment.

Supplemental Guidelines

See Volume V for more detailed guidance on selection, design, and maintenance of treatment facilities. Volume V includes performance goals for basic, enhanced, phosphorus, and oil control treatment, and a menu of facility options for each treatment type. Treatment facilities that are selected from the appropriate menu and designed in accordance with their design criteria are presumed to meet the applicable performance goals.

An adopted and implemented basin plan or a TMDL may be used to develop runoff treatment requirements that are tailored to a specific basin. However, treatment requirements shall not be less than that achieved by facilities in the basic treatment menu (see Volume V, Section 3.5).

Treatment facilities applied consistent with this manual are presumed to meet the requirement of state law to provide all known available and reasonable methods of treatment (RCW 90.52.040, RCW 90.48.010). This technology-based treatment requirement does not excuse any discharge from the obligation to apply whatever technology is necessary to comply with state water quality standards, Chapter 173-201A WAC; state groundwater quality standards, Chapter 173-200 WAC; state sediment management standards, Chapter 173-204 WAC; and the underground injection control program, Chapter 173-218 WAC. Additional treatment to meet those standards may be required by federal, state, or local governments.

Infiltration through use of onsite stormwater management BMPs can provide both treatment of stormwater, through the ability of certain soils to remove pollutants, and volume control of stormwater, by decreasing the amount of water that runs off to surface water. Infiltration through engineered treatment facilities that utilize the natural soil profile can also be very effective at treating stormwater runoff. However, note that pretreatment is required for most infiltration facilities, and soil conditions must also be appropriate to achieve effective treatment while not impacting groundwater resources. See Volume V, Chapter 6 for further details.

Discharge of pollution-generating surfaces into a drywell, after pretreatment for solids reduction, can be acceptable if the soil conditions provide sufficient water quality treatment capacity. Drywells into gravelly soils are not likely to have sufficient treatment capability and must be preceded by at least a basic treatment BMP. See Volume V, Chapters 2 and 6 for details.

2.4.7 Minimum Requirement #7: Flow Control

Projects must provide flow control to reduce the impacts of stormwater runoff from hard surfaces and land cover conversions. The requirements below apply to projects that discharge stormwater directly, or indirectly through a conveyance system, into a fresh waterbody or a saltwater body. Projects on parcels that immediately abut a saltwater body or tidally influenced waters which do not discharge stormwater runoff through a municipal stormwater system, are exempt from the flow control requirements below.

Discharges to flow control-exempt receiving waters are only allowed in accordance with the following restrictions:

- Direct discharge to the exempt receiving water does not result in the diversion of drainage from any perennial stream classified as Types 1, 2, 3, or 4 in the State of Washington Interim Water Typing System, or Types "S", "F", or "Np" in the Permanent Water Typing System, or from any Category I, II, or III wetland.

- If flow splitters or conveyance elements are applied to route natural runoff volumes from the project site to any downstream Type 5 stream or Category IV wetland, then:

    - Design of flow splitters or conveyance elements must be based on approved continuous simulation modeling analysis. The design must assure that flows delivered to Type 5 stream reaches will approximate, but in no case exceed, durations ranging from 50 percent of the 2-year to the 50-year recurrence interval peak flow.

    - Flow splitters or conveyance elements that deliver flow to Category IV wetlands must also be designed using approved continuous simulation modeling to preserve preproject wetland hydrologic conditions unless specifically waived or exempted by regulatory agencies with permitting jurisdiction.

- The project site must be drained by a conveyance system that is comprised entirely of manmade conveyance elements (e.g., pipes, ditches, outfall protection) and extends to the ordinary high-water line of the exempt receiving water.

- The conveyance system between the project site and the exempt receiving water shall have sufficient hydraulic capacity to convey discharges from future build-out conditions (under current zoning) from contributing areas of the site, and the existing condition from contributing offsite areas.

- Any erodible elements of the manmade conveyance system must be adequately stabilized to prevent erosion under the conditions noted above.

If the discharge is to a stream that leads to a wetland, or to a wetland that has an outflow to a stream, both this requirement and Minimum Requirement #8 apply.

Thresholds

When assessing a project against the following thresholds, consider only those impervious, hard, and pervious surfaces that are subject to this minimum requirement as determined in Section 2.3 of this chapter.

The following circumstances require achievement of the standard flow control requirement for western Washington:

- Projects in which the total of effective impervious surfaces is 10,000 square feet or more in a threshold discharge area.
- Projects that convert three-fourths of an acre or more of native vegetation, pasture, scrub/shrub, or unmaintained non-native vegetation to lawn or landscape, or convert 2.5 acres or more of native vegetation to pasture in a threshold discharge area, and from which there is a surface discharge in a natural or man-made conveyance system from the site.
- Projects that through a combination of effective hard surfaces and converted vegetation areas cause a 0.15 cubic feet per second (cfs) or greater increase in the 100-year flow frequency from a threshold discharge area as estimated using WWHM, or other approved continuous simulation model and using 15-minute time steps. See the supplemental guidelines below for example scenarios that could trigger this requirement.

Discharge Requirements

The allowable release rates from a project are dependent upon the ultimate destination for the stormwater. All projects not directly attributable to one of the four categories defined below, and not exempted per the flow-control exempt receiving waters outlined above, shall use Category A for determining the allowable discharge rates.

Category A: Discharge to a minor water body as defined below:

Any water body not defined as a flow control-exempt receiving waters (presented above), closed depression, a publicly owned regional retention and/or detention facility, or privately constructed regional retention and/or detention facility.

In regard to implementation of the revised flow control requirement for highly urbanized basins, Ecology has published maps listing total impervious area for basins in western Washington.

Requirements:

Stormwater discharges shall match developed discharge durations to predeveloped durations for the range of predeveloped discharge rates from 50 percent of the 2-year

recurrence interval peak flow up to the full 50-year peak flow. The predeveloped condition to be matched shall be a forested land cover unless:

- Reasonable, historic information is provided that indicates the site was prairie prior to settlement (modeled as "pasture" in the WWHM).
- The drainage area of the immediate stream and all subsequent downstream basins have had at least 40 percent total impervious area since 1985. In this case, the predeveloped condition to be matched shall be the existing land cover condition. Where basin-specific studies determine a stream channel to be unstable, even though the above criterion is met, the predeveloped condition assumption shall be the "historic" land cover condition, or a land cover condition commensurate with achieving a target flow regime identified by an Ecology Gig Harborapproved basin study.

This standard requirement is waived for sites that will reliably infiltrate all the runoff from hard surfaces and converted vegetation areas.

Alternative Requirement

An alternative requirement may be established through application of watershed-scale hydrological modeling and supporting field observations. Possible reasons for an alternative flow control requirement include:

- Establishment of a stream-specific threshold of significant bedload movement other than the assumed 50 percent of the 2-year recurrence interval peak flow
- Zoning and Land Clearing Ordinance restrictions that, in combination with an alternative flow control standard, maintain or reduce the naturally occurring erosive forces on the stream channel
- A duration control standard is not necessary for protection, maintenance, or restoration of designated and existing beneficial uses or Clean Water Act compliance.

Objective

To prevent increases in the stream channel erosion rates that are characteristic of natural conditions (i.e., prior to disturbance by European settlement). The standard intends to maintain the total amount of time that a receiving stream exceeds an erosion-causing threshold based upon historic rainfall and natural land cover conditions. That threshold is assumed to be 50 percent of the 2-year recurrence interval peak flow. Maintaining the naturally occurring erosion rates within streams is vital, though by itself insufficient, to protect fish habitat and production.

Category B: Discharge to a Closed Depression

Applies to discharges to any low-lying area(s) which has/have no outlet, or such a limited surface outlet that in most storm events the area acts as a retention basin holding water for infiltration or evaporation shall be considered a pothole area. Appropriate water quality treatment BMPs will be applied to all discharges.

Requirements:

- Due to the significant adverse impacts which can result from increasing the rate, volume, and duration of stormwater runoff to closed depressions, the contributing area to each depression must be analyzed using a continuous runoff model for the 100-year recurrence interval developed runoff condition. When a proposed development is contributory to a pothole area, discharge to the pothole may be allowed when the discharge matches durations to predeveloped (existing) durations for the range of discharges from 50 percent of the 2-year recurrence interval flow up to the full 50-year flow. In addition, discharge rates must match the predeveloped (existing) rates for the 2-, 10-, and 100-year recurrence interval flows. In addition, a mandatory additional 20 percent safety factor must also be added to the final design storage volume. Appropriate water quality treatment BMPs must also be applied to all discharges. When selecting appropriate treatment BMPs, the engineer shall assume the soil is fully saturated all year within the closed depression unless the engineer provides supporting documentation for an alternative condition.

- Potential overflow routes from the closed depression shall be analyzed, using a fully developed contributing basin, and the engineer will identify and address potential adverse impacts. Any overflow must still meet all applicable minimum requirements outlined in this chapter. The closed depression will be analyzed, at a minimum, for uncontrolled discharge from the site to the pothole.

- If the project site discharges excess volumes to a privately owned closed depression, the applicant must obtain written permission/easements from the owner(s) of record for drainage course to the closed depression, the closed depression, and potential overflow. The applicant shall record the information with the Pierce County Auditor. This information shall be recorded with all affected property titles including those for the depression, overflow route, and the applicant's property. If easements cannot be obtained, discharge to the pothole may be allowed on a case by case basis in accordance with the first bullet of this requirement.

Category C: Discharge to a publicly owned regional retention facility. Applies to discharges to existing and any future publicly owned regional retention facilities.

Requirements:

- If the public retention facility is determined by the City to have capacity the developer shall have the option of paying the city a one-time buy in fee, as determined by the City, for the right to discharge excess stormwater flow,

rates, and volumes from the developed site. On a case by case basis the City may determine that it is reasonable and feasible for the developer to infiltrate the excess volumes on site, and thereby reject the request to discharge to the public facility.

- The project site must be located within the existing natural drainage basin tributary to the publicly owned regional retention facility.
- Water quality treatment is always required prior to discharge from the project site. Discharge to regional retention facilities that also provide water quality treatment will not be justification to remove this requirement.
- The allowable discharge rates from the project site shall be limited as follows based on the type of conveyance system from the project site to the regional retention facility:
    - Direct discharge (after water quality treatment) may be allowed when the conveyance system to the retention facility is public and has capacity to convey stormwater runoff from its entire contributing basin in a fully developed condition. The retention facility must be designed or retrofitted to accept the increased flows without sustaining any damage. The City may limit the number of connection points into the retention facility to facilitate maintenance.
    - Discharges (after water quality treatment) to existing public conveyance systems that are undersized or have unresolved capacity issues may be required to apply runoff duration and/or peak flow controls on site or install a new conveyance system with increased capacity.
    - Discharge to or through a natural drainage system may be required to have flow controls that protect the channel and maintain flow capacity.
- The publicly owned regional retention facility must be available by the time of the construction of the new development or redevelopment with adequate capacity as determined by the City.

Category D: Privately constructed regional detention and/or retention facilities.

Requirements:

- In lieu of individual systems, applicants can design and build regional facilities in accordance with the design requirements of Category A or B, as applicable and with excess capacity which, when completed, may be dedicated to the City. Such a facility can be onsite or offsite. Privately constructed regional facilities shall meet all the requirements outlined above for Category C facilities. In addition, upon City approval of the facility, the City may:

- Accept the dedicated facility; and
- If funds are available as determined by the City of Gig Harbor Public Works Director *and* the facility is constructed in a location within a basin studied by the City of Gig Harbor Public Works Department *and* is currently budgeted for in the approved 6-year capital facilities plan, reimburse the developer for the excess capacity provided by the facility at a rate mutually agreed upon, or
- Enter into a latecomer's agreement with the developer for reimbursement as other properties are developed which opt to discharge to the regional facility.

Additional Requirements

Under any of the above categories, when downstream drainage courses are inadequate or systems are undersized, or when in the opinion of the City, property or properties may be adversely affected by the existing and/or proposed stormwater release rate, a restricted release rate may be required. Such determination by the City may be based upon existing information indicating problem areas or based upon current or past litigation over drainage problems within the vicinity of the project.

The release rate will be approved by the City and must be compatible with downstream drainage conditions. If a restricted release rate is required, the applicant may correct and/or improve downstream drainage conditions so that the proposed release rate does not have to be further restricted. When a restricted release rate is used, a corresponding increase in storage must be provided.

In addition, flow control BMPs shall be selected, designed, and maintained according to this manual.

Supplemental Guidelines

Calculations to determine whether a TDA exceeds the 0.15 cubic feet per second (cfs), using a 15-minute time step, increase in the 100-year recurrence interval flow must be done individually for each TDA using an approved continuous simulation runoff model. The calculation will compare runoff in the post development site to the predevelopment land cover. Pre-development, for this activity, is the lower runoff of the preproject condition or the site in 1997[1]. The unique site, soil, precipitation, and other project-specific factors will ultimately determine whether this threshold is exceeded. Nonetheless, the following general guidelines (based on hypothetical site designs) may be used to help identify the likelihood of this threshold being exceeded. The following land uses changes are likely to exceed this threshold under certain conditions:

- Converting approximately 5,000 square feet of forest to impervious surface
- Converting approximately 5,000 square feet of pasture to impervious surface
- Converting approximately 0.25 acres of forest to landscape surface

- Converting approximately 1.25 acres of forest to pasture surfaces (in till soil conditions).

Reduction of flows through infiltration decreases surface water runoff and helps to maintain base flow throughout the summer months. However, infiltration shall follow the guidance in this manual to reduce the chance that groundwater quality is threatened by such discharges.

Application of sufficient types of LID and onsite stormwater management BMPs can result in reducing the effective impervious area and the converted vegetation areas, thereby reducing, or eliminating the need for a flow control facility. Impervious surfaces that are fully dispersed in accordance with Full Dispersion in Volume VI, Section 2.3, are not considered effective impervious surfaces. Impervious surfaces that are dispersed in accordance with downspout dispersion in Volume III, Section 3.9.4; concentrated flow dispersion in Volume III, Section 3.2.4; and sheet flow dispersion in Volume III, Section 3.2.3 are still considered effective surfaces though they may be modeled as pervious surfaces if flow path lengths meet the specified minimums. Permeable pavers and modular grid pavements are assigned lower surface runoff calibrations and may also reduce stormwater flow control facility sizes. See Volume III and Volume VI for more complete descriptions of hydrologic credits for LID and onsite stormwater management BMPs.

Diversions of flow from perennial streams and from wetlands can be considered if significant existing (i.e., preproject) flooding, stream stability, water quality, or aquatic habitat problems would be solved or significantly mitigated by bypassing stormwater runoff rather than providing stormwater detention and discharge to natural drainage features. Bypassing should not be considered as an alternative to applicable flow control or treatment if the flooding, stream stability, water quality or habitat problem to be solved would be caused by the project.

2.4.8 Minimum Requirement #8: Wetlands Protection

Applicability

The requirements below apply only to projects whose stormwater discharges into a wetland, either directly or indirectly through a conveyance system.

Thresholds

Refer to Figure 2.4. Flow Chart for Determining Wetland Protection Level Requirements to determine what Level(s) of Wetland Protection must be applied to comply with Minimum Requirement #8.

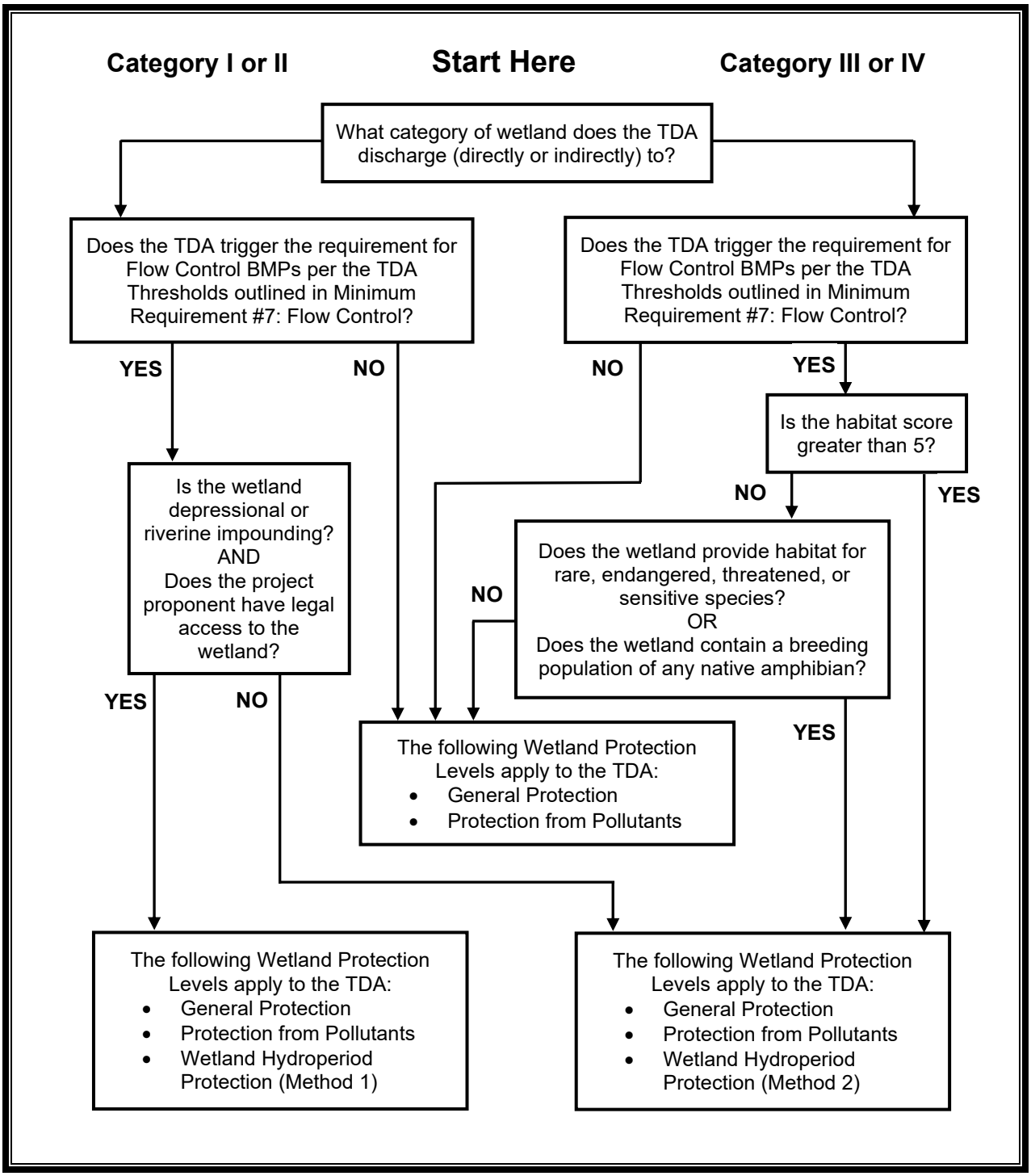

Figure 2.4. Flow Chart for Determining Wetland Protection Level Requirements

Standard Requirement

Projects shall comply with Appendix I-B – Wetland Protection Guidelines. For general protection see I-B.2, for protection from pollutants see I-B.3 and for wetland hydroperiod protection see I-B.4 for details. A wetland can be considered for hydrologic modification and/or stormwater treatment in accordance with Chapter 18.08 GHMC and Appendix I-B of this volume.

Additional Requirements

Stormwater treatment and flow control facilities shall not be built within a natural vegetated buffer, except for:

- Necessary conveyance systems as approved by the City of Gig Harbor
- As allowed in Appendix I-B.6 Compensatory Mitigation of Wetlands.

An adopted and implemented basin plan, or a TMDL may be used to develop requirements for wetlands that are tailored to a specific basin.

Objective

To ensure that wetlands receive the same level of protection as any other waters of the State. Wetlands are extremely important natural resources that provide multiple functions and values, including groundwater recharge, flood control, and stream channel erosion protection. They are easily impacted by development unless careful planning and management are conducted. Wetlands can be severely degraded by untreated stormwater discharges from urban development due to pollutants in the runoff and also due to disruption of the natural hydrologic pattern of the wetland.

Supplemental Guidelines

Appendix I-B - Wetland Protection Guidelines shall be used for discharges to natural wetlands and mitigated wetlands. While it is always necessary to pre-treat stormwater prior to discharge to a wetland, there are limited circumstances where wetlands may be used for additional treatment and detention of stormwater. These situations must comply with the City of Gig Harbor Critical Areas Ordinance Chapter 18.08 GHMC and Appendix I-B.

In most cases, if Wetland Hydroperiod Protection is required per Minimum Requirement #8: Wetlands Protection, then the Flow Control Performance Standard is also required per Minimum Requirement #7: Flow Control. In these cases, the designer must attempt to meet the requirements for both Minimum Requirements. This may prove to be feasible in many situations because Minimum Requirement #7: Flow Control will seek to adjust the flow in small time intervals and Minimum Requirement #8: Wetlands Protection looks to maintain daily flow volumes.

If the designer is unable to meet both requirements, then the requirement to maintain the hydroperiod of the wetland becomes the overriding concern and the designer must show

compliance with Minimum Requirement #8: Wetlands Protection. If this is the case, the designer must also provide documentation detailing why they are unable to meet both requirements.

2.4.9 Minimum Requirement #9: Operation and Maintenance

A Maintenance and Source Control Manual that is consistent with the provisions in this manual shall be provided for all proposed stormwater facilities and BMPs, and the party (or parties) responsible for maintenance and operation shall be identified. At private facilities, a copy of the manual shall be retained onsite or within reasonable access to the site, and shall be transferred with the property to the new owner. For public facilities, a copy of the manual shall be retained in the appropriate department. A log of maintenance activity that indicates what actions were taken shall be kept and be available for inspection by the City.

Objective

To ensure that stormwater control facilities are adequately maintained and operated properly.

Supplemental Guidelines

Inadequate maintenance is a common cause of failure for stormwater control facilities. The Maintenance and Source Control Manual should be viewed as the owner's manual, written for the person who was not the designer, builder, or inspector but who, in the future, is charged with the responsibility to maintain the facilities built for them. While the Maintenance and Source Control Manual may be submitted during permitting at the same time as the complete set of construction plans, the two are often separated after final construction. The manual should be written with sufficient information to describe the number, location, and type of facilities as well as specific details and inspection intervals to ensure proper maintenance long into the future. The description of each BMP in Volumes II, III, and V includes a section on maintenance to assist in writing the Maintenance and Source Control Manual. Appendix I-A of this volume includes maintenance checklists for many drainage facilities.

2.4.10 Minimum Requirement #10: Financial Liability

Performance bonding or other appropriate financial instruments shall be required for all projects to ensure compliance with these standards.

Chapter 3 - Drainage Control Plan and Abbreviated Plan Submittal Requirements

This chapter outlines the various requirements for submittal of stormwater plans, reports, and other documents for review by the City. The amount of document preparation and review are tiered in an effort to match the impact potential of a particular project to the appropriate amount of regulatory oversight and control. All projects are subject to the minimum requirements outlined in Chapter 2, and the plans described in this chapter meet the requirements of the stormwater site plan required by Minimum Requirement #1. Based on the project size and proposed conditions, an applicant will have to prepare either an Abbreviated Plan or a Drainage Control Plan (outlined further below).

This chapter is divided into 3 major sections:

- Section 3.1 describes which submittals are required, depending on project thresholds
- Section 3.2 describes Abbreviated Plans
- Section 3.3 describes Drainage Control Plans.

3.1 Projects and Activities Requiring Plan Submittal

Project thresholds are summarized in Table 3.1 based on the scope of the project and site conditions. Project applicants should identify their type of project in the Table 3.1 rows, and then identify the appropriate requirements by each column, as well as any applicable table notes.

In addition, any activity that alters the approved plans for a given project (e.g., stormwater facility maintenance or repair, drainage facility resizing, other project design changes to impervious surfaces or land cover) will require reapproval by the City, regardless of whether the thresholds listed in Table 3.1 have been exceeded. This may include updates to the original Abbreviated Plan or Drainage Control Plan, and associated Construction SWPPP. The City may waive the requirement to update plans depending on the specific activity and associated impacts.

Table 3.1. Thresholds for Abbreviated Plans, Construction Stormwater Pollution Prevention Plans, and Drainage Control Plans.

Category [1, 2]		≥500 sf New or Replaced Impervious/Hard Surface	≥2,000 sf New or Replaced Impervious/Hard Surface or ≥7,000 sf Land Disturbed	≥5,000 sf New or Replaced Impervious/Hard Surface, or ≥0.75 ac of Vegetation Converted to Lawn, or ≥2.5 ac Native Vegetation Converted to Pasture, or ≥250 cy Materials Moved
1	Subdivisions, Short Plats, and Large Lots	AP	AP, SWPPP	SWPPP, DCP
2	Creation of New Impervious/Hard Surface [5]	AP	AP, SWPPP	SWPPP, DCP
3	Construction of Roads, Shared Accesses, and Alleyways	AP	AP, SWPPP	SWPPP, DCP
4	Maintenance and Repair of Roads, Shared Accesses, and Alleyways		AP, SWPPP	SWPPP, DCP
5	Utility Line Work (construction or maintenance – inside R/W) [3]		AP, SWPPP	SWPPP, DCP
6	Utility Line Work (construction or maintenance – outside R/W) [4, 5]		AP, SWPPP	SWPPP, DCP
7	Building Permit	AP	AP, SWPPP	SWPPP, DCP
8	Clearing	AP	AP, SWPPP	SWPPP, DCP
9	Grading	AP	AP, SWPPP	SWPPP, DCP
10	Driveway culvert installation in Roadside Swales/Ditches [6]			

AP = Abbreviated Plan
DCP = Drainage Control Plan
SWPPP = Construction Stormwater Pollution Prevention Plan

Table 3.1 notes:

1. For sites that contain critical areas, critical area buffers, or require an offsite analysis, a submittal stamped by a licensed professional engineer is required, unless waived by the City.

2. All development must consider the thirteen elements of Minimum Requirement #2 (see Section 2.4.2). Depending on the scope of the project, components of the Construction SWPPP shall be required with the plan submittal. All development must also consider the requirements of Minimum Requirement #4 (see Section 2.4.4).

3. All work shall be performed in accordance with the Chapter 12.18 GHMC and shall include the implementation of the applicable Abbreviated Plan measures, and shall be in compliance with Title 14 GHMC for the life of the installation.

4. An individual site development permit is not required if utility line improvements are performed within a larger project (i.e., subdivision construction) that has a site development permit and the utility line improvements have been addressed under the larger project's site development permit.

5. Routine, repetitive maintenance or repair activities that do not meet the threshold for an Abbreviated Plan, Drainage Control Plan, or Construction Stormwater Pollution Prevention Plan shall be performed in accordance with standard BMPs as published by the City.

6. Driveway culvert size and location to be per City inspector's direction. The City may require that the applicant retain an engineer to size and design the culvert in situations where a larger than standard diameter appears necessary. Note that a driveway and/or right-of-way permit may also be required.

Note: For the purposes of applying the thresholds in Chapter 3, Table 3.1 to a proposed subdivision (i.e., a plat or short plat project), the hard surface coverage, as well as the converted vegetation areas, must be specified for each lot and recorded with the City on the face of the final plat (or an alternative acceptable to the City).

3.2 Abbreviated Plan

Projects that are identified in Table 3.1 as needing an Abbreviated Plan require a Site Development Permit submittal, document preparation, city review, and city inspection. Abbreviated Plans can be simple or complex (referred to as “Basic” Abbreviated Plans and “Advanced” Abbreviated Plans, respectively). The simplest plan may only need to address Minimum Requirement #2 – Construction Stormwater Pollution Prevention, and Minimum Requirement #4 – Preservation of Natural Drainage Systems and Outfalls. The most complex might have to address Minimum Requirements #1 through #5. Detailed descriptions of Basic and Advanced Abbreviated Plan thresholds and requirements are

outlined in the following subsections. A schematic showing the components of a typical Abbreviated Plan is presented in Figure 3.1 below.

The purpose of an Abbreviated Plan is:

1. To assure that a project complies with the applicable minimum requirements.

2. To incorporate requirements that achieve the intent and purpose of the Critical Area Regulations. Flood, Landslide, Shoreline Erosion, Wetland, and other critical areas sometimes require measures that must be depicted on Abbreviated Plan drawings to achieve compliance with these regulations.

3. To prevent development related stormwater runoff from impacting neighboring properties.

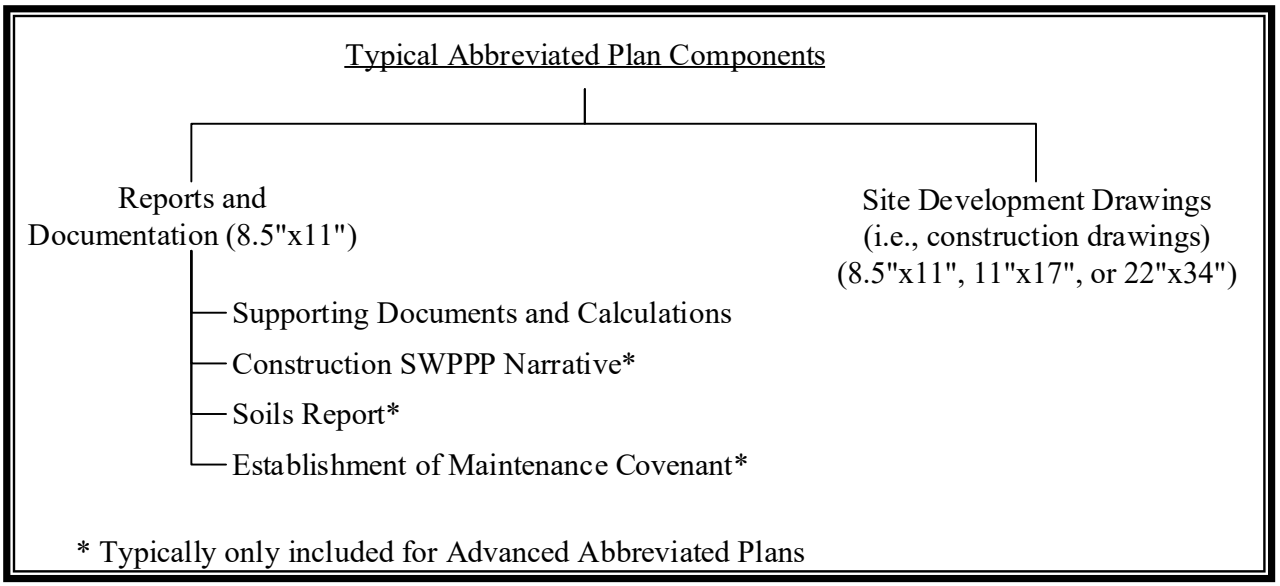

Figure 3.1. Typical Abbreviated Plan Components.

3.2.1 Abbreviated Plans – Basic and Advanced Plan Requirements

Basic Abbreviated Plans

Regardless of project size and type, all Abbreviated Plans have several basic requirements that must be met and reflected in the plan drawings and documentation. If new, replaced, or new plus replaced hard surfaces are greater than or equal to 500 square feet but less than 2,000 square feet, or land-disturbing activity is less than 7,000 square feet, a Basic Abbreviated Plan can be submitted. The Basic Abbreviated Plan must demonstrate that Minimum Requirements #2 and #4 are being met. For Minimum Requirement #2, the project must demonstrate and document that the 13 Construction Stormwater Pollution Prevention elements are being considered and addressed as applicable. For Minimum Requirement #4, projects must document how they are preventing downstream impacts to the extent necessary. Application of Minimum Requirement #4 will be project-specific, and will be based on an assessment by City staff

of the proposed project's potential to cause stormwater runoff impacts to downstream properties.

Advanced Abbreviated Plans

If new, replaced, or new plus replaced hard surfaces are greater than or equal to 2,000 square feet, or if land-disturbing activity is greater than or equal to 7,000 square feet, an Advanced Abbreviated Plan must be submitted. The Advanced Abbreviated Plan must demonstrate how Minimum Requirements #1 through #5 are being met. Note that Minimum Requirement #5 includes detailed requirements and decision points that can affect the project significantly, which must be reflected in the Abbreviated Plan documentation. Likewise, compliance with Minimum Requirement #2 will require preparation of a full Construction SWPPP.

In many situations, it will be necessary for a licensed professional to prepare components of the Advanced Abbreviated Plan. In some cases, the additional required information pertinent to the Abbreviated Plan may be available within the plat or other approved documents related to the project.

The following subsections provide further detail on the requirements for Basic and Advanced Abbreviated Plans. The following topics are discussed:

- Critical Areas requirements
- Supporting documents and calculations
- Drawing size and quality requirements
- Drawing requirements for Basic and Advanced Abbreviated Plans, including topographic survey requirements
- Construction SWPPP requirements (Advanced plans only)
- Soils Report requirements (Advanced plans only)
- Establishment of maintenance obligation (Advanced plans only).

Phased Project Submittals

Phased projects shall be completed in accordance with approved Abbreviated Plans. Phasing of projects shall not result in a reduction of drainage control requirements. Drawings showing the overall project, clearly delineating phase boundaries, and estimating dates of construction (if known), shall be part of any initial submittal. A typical phasing example is single-family residence construction where a garage or accessory dwelling unit is built, and the main house is built later.

3.2.2 Abbreviated Plan – Critical Areas Requirements

In addition to the core requirements for Basic or Advanced Abbreviated Plans, projects that involve work in or near critical areas must demonstrate compliance with Chapter

18.08 GHMC. The Abbreviated Plan must indicate any specific site design and construction requirements that implement the applicable critical area standards and requirements.

3.2.3 Abbreviated Plan – Supporting Documents and Calculations

Abbreviated Plans must include all calculations and/or analyses necessary to demonstrate compliance with applicable minimum requirements. This may include calculations related to sizing stormwater BMPs or conveyance systems, analyses of site or downstream conditions, documentation of infeasibility issues, etc.

3.2.4 Abbreviated Plan – Licensed Engineer Required for Roads

Abbreviated Plans that propose work on public roads, private roads, and unopened City right-of-way must be prepared by a professional engineer licensed in Washington State.

3.2.5 Abbreviated Plan – Drawing Size and Quality

Lines shall be drawn with a straight edge (with the exception of curved lines) and features shall be to scale. Drawings shall be sufficiently clear to see footprints of structures and other features described above, and shall be on 8.5 x 11-inch paper, 11 x 17-inch paper, or plan-size sheets (22 x 34-inch).

3.2.6 Abbreviated Plan – Site Development Drawings

Basic Plan Requirements

The Abbreviated Plan site development drawings generally contain all the pertinent information necessary for construction of a project. This may include applicable drainage, grading, sediment control, and topographic survey information, as well as any applicable notes or details. At a minimum, Basic Abbreviated Plan drawings must contain:

- The location and type of any onsite stormwater management BMPs (e.g., soil amendment, infiltration trenches, dispersion, rain gardens, permeable pavement, etc.)
- The location and type of construction stormwater pollution prevention BMPs used for erosion and sediment control
- The location and type of other construction stormwater pollution prevention BMPs (such as refueling areas)
- Location of stormwater conveyance systems for runoff from structures
- Notes, specifications, and details related to selected BMPs
- Name, address, telephone number, and email address of the applicant

- Name, address, telephone number, and email address of the person preparing the plan
- Name, address, telephone number, and email address of the contractor, if known
- Parcel number(s)
- Scale and north arrow
- Legend if symbols are used
- Property boundaries, dimensions, and area
- Contour lines from the best available source (specify datum used)
- Adjoining street names
- Existing and proposed structures and other hard surfaces such as driveways, patios, etc.
- Location of onsite sewage disposal systems and reserve areas
- Existing and proposed easements
- Established buffers, significant trees (per Title 17 GHMC), and natural vegetation easements
- Natural drainage channels, wetlands, canyons, gullies, water bodies, etc.
- Clearing limits
- Areas to be graded, filled, excavated, or otherwise disturbed
- Location of known wells, and underground storage tanks
- Proposed location(s) determined for stockpiled materials, i.e., excavation wastes
- Location and details of construction entrance
- Earthwork requirements of Title 17 GHMC.

It is useful when these drawings also include:

- Applicable standard driveway approach detail (driveway approaches shall be constructed or reconstructed to meet the requirements of the City of Gig Harbor Public Works Design Standards)
- Building setbacks from property lines.

Advanced Plan Requirements

The following additional information must be provided on the site development drawings for projects required to submit an Advanced Abbreviated Plan (i.e., projects subject to Minimum Requirements #1 through #5).

All Advanced Abbreviated Plans must include survey information prepared by a registered land surveyor or other qualified professional that includes:

- Existing public and private development, including utility infrastructure on and adjacent to the site if publicly available
- Minor hydrologic features, including seeps, springs, closed depression areas, and drainage
- Major hydrologic features including streams, wetlands, and water bodies, as well as wetland and buffer boundaries and classifications
- Flood hazard areas on or adjacent to the site
- Geologic hazard areas and associated buffer requirements on or adjacent to the site
- Aquifer and wellhead protection areas on or adjacent to the site
- Topographic features that may act as natural stormwater storage, infiltration, or conveyance
- Locations of soil surveys, soil test pits, and soil borings conducted as part of the required soils report.

In addition, if a geotechnical assessment is required, any recommendations contained in the report must be incorporated into the site development drawings.

3.2.7 Abbreviated Plan – Construction SWPPP Requirements (Advanced Plans Only)

Advanced Abbreviated Plans must include a complete Construction SWPPP. See Volume II, Section 2.2 of this manual for information on the items that shall be included as part of the Construction SWPPP narrative (i.e., report) and drawings.

3.2.8 Abbreviated Plan – Soils Report Requirements (Advanced Plans Only)

In support of the requirements of Minimum Requirement #5, Advanced Abbreviated Plans must include a soils report prepared by: a professional soil scientist certified by the Soil Science Society of America (or an equivalent national program); a locally licensed onsite sewage designer; or by other suitably trained persons working under the supervision of a professional engineer, geologist, hydrogeologist, or engineering

geologist registered in the State of Washington. The report shall include the following information:

- Soil surveys, soil test pits, soil borings, or soil grain analyses sufficient to identify underlying soils on the site.
- The results of saturated hydraulic conductivity (Ksat) testing to assess infiltration capability and the feasibility of rain gardens, bioretention, and permeable pavement. Use one of the infiltration testing methods outlined in Volume III, Appendix III-A.
- The results of testing for a hydraulic restriction layer (groundwater, soil layer with less than 0.3 in/hr Ksat, bedrock, etc.) under possible sites for a rain garden, bioretention area, or permeable pavement. Testing with a monitoring well or an excavated pit must extend to a depth at least 1 foot below the estimated bottom elevation of a rain garden/bioretention excavation and at least 1 foot below the subgrade surface of a permeable pavement. This analysis should be performed in the winter season (December 21 through March 21). Site historic information and evidence of high groundwater in the soils can also be used.
- If onsite infiltration may result in shallow lateral flow (interflow), the conveyance and possible locations where that interflow may re-emerge shall be assessed by a professional engineer, geologist, hydrogeologist, or engineering geologist registered in the State of Washington.

3.2.9 Abbreviated Plan – Establishment of Maintenance Covenant (Advanced Plans Only)

To ensure future maintenance of onsite stormwater management BMPs used to meet the requirements of Minimum Requirement #5, a maintenance covenant must be recorded for each parcel that contains onsite stormwater management BMPs. The proposed covenant must be reviewed and approved by the City prior to recording. All required covenants must be recorded prior to final construction approval for the proposed project.

The recorded maintenance covenant must be created on a city-approved form (included in Attachment G). The covenant shall include an 8.5″ x 11″ plan view showing the location of onsite stormwater management BMPs relative to structures and property lines, and maintenance instructions for each onsite stormwater management BMP. A map showing the location of newly planted and retained trees claimed as flow reduction credits shall also be attached. All documents and attachments shall meet the recording requirements of the Pierce County Auditor. After approval by the City, the declaration of covenant must be signed and recorded at the Pierce County Auditor's office.

3.3 Drainage Control Plan

The Drainage Control Plan is the full submittal package meeting all minimum requirements per Chapter 2, Figures 2.1 and 2.2. The Drainage Control Plan submittal

package includes the following components: Drainage Report, Construction SWPPP, Maintenance and Source Control Manual, Maintenance Covenant, and Site Development Drawings. A schematic showing the components of a typical Drainage Control Plan is presented in Figure 3.2 below. The Construction SWPPP consists of two parts: a narrative report, and drawings which are included with the other Site Development Drawings. Additional details on each component of the Drainage Control Plan are provided in the following sections.

The City requires that Drainage Control Plans that propose work on public roads private roads, and unopened City right-of-way must be prepared by a professional engineer licensed in Washington State.

While the preparation of a Drainage Control Plan in almost all cases involves the practice of engineering and thus must be prepared by a licensed engineer there are sites and projects that can meet the requirements of this Manual that may not require the practice of engineering. In these situations, the City may allow others to prepare the necessary plans, reports, and documents necessary to fulfill the requirements of this Manual. Please note that determinations regarding the practice of engineering are the purview of the Washington State Board of Registration for Professional Engineers and Land Surveyors.

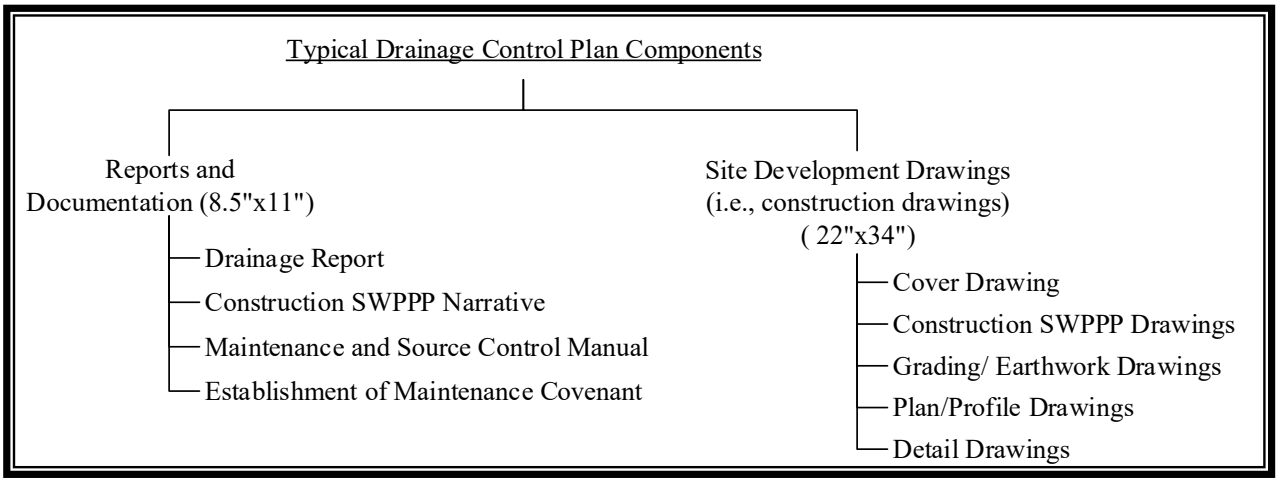

Figure 3.2. Typical Drainage Control Plan Components.

3.3.1 Phased Project Submittals

Phased projects shall be completed in accordance with approved Drainage Control Plans and in accordance with phased development requirements placed upon the development by the City. Phasing of projects shall not result in a reduction of drainage control requirements. Drawings showing the overall project, clearly delineating phase boundaries, and estimating dates of construction (if known), shall be part of any initial submittal.

3.3.2 Drainage Control Plan – General Site Development Drawing Requirements

The drawings for construction purposes submitted to the City shall conform to the following protocols.

- City approval block
- Required sheet size is 22 x 34 inches.
- Scale: 1 inch = 20 feet or 1 inch = 50 feet (1 inch = 100 feet may be used with prior City approval) for public facilities and roads to be dedicated to the City.
- Scale: 1 inch = 20 feet, 30 feet, or 40 feet for all others. Plats are generally 1 inch = 50 feet which may be reduced to 1 inch = 100 feet with prior City approval.
- All sheets shall have a north arrow, scale, a benchmark reference, datum, the section, township, and range. Each set of drawings shall have a legend to define map symbols. North arrow should point to the top or to the right of the sheet.
- All lettering shall be one-tenth of an inch or greater. Existing spot elevations will be no smaller than one-twentieth of an inch or greater than one-tenth of an inch.
- Prior to City approval, drawings that are required to be prepared by a licensed professional engineer must be stamped, signed and dated.
- Road alignments with 100-foot stationing, preferably increasing to the north or east and reading from left to right, and stationing at points of curve, tangent, and intersection, with ties to section or quarter corners or other established and monumented survey control points to include at the intersection of any proposed road or roads and the existing city road or state highway as applicable. All lettering shall be right reading.
- Bearing on all centerlines.
- Curve data including radius, delta, and arc length on all horizontal lines.
- Right-of-way, easement, tract lines, and dimensions for all existing and proposed facilities including proposed roads and intersecting roads, properly dimensioned lot lines, lot numbers, location, and dimension of all tract and easement areas.
- Show parcel numbers and lot lines for adjacent properties.
- Label all adjacent roads and shared access

and identified whether they are public or private.All topographic features within project limits and sufficient area beyond to resolve questions of setback, slope, drainage, access onto abutting property, and road continuations.

- All ditch flow lines, all drainage structures with invert elevations, utility locations, fences, structures, existing curbing and approaches, pertinent trees and shrubbery, and other appurtenances which would affect the construction of the project.
- Identification of all adjoining subdivisions when it is pertinent to the scope of the project.
- Existing features shall be ghosted or shaded.

3.3.3 Drainage Control Plan – Site Development Drawings

It is the responsibility of the project engineer to ensure that engineering drawings submitted for review are sufficiently clear to construct the project in proper sequence, using specified methods and materials, and with sufficient dimensions to fulfill the intent of drainage laws and ordinances and these design guidelines.

The most recently adopted editions of standard specifications and standard plans (see Glossary) shall be the standards for all design and construction of drainage facilities not explicitly described herein. In the event of a conflict between the standard specifications, standard plans, and the manual, this manual shall prevail. When required by the City, standard specifications and general provisions for construction must be submitted with any road construction plans.

Projects that involve work in or near critical areas must demonstrate compliance with Chapter 18.08 GHMC. The Drainage Control Plan must indicate any site design and construction requirements that implement the applicable critical area standards and requirements.

Drainage Control Plan – Cover Drawing

- Any drawing sets submitted for review and approval containing three or more sheets shall have a cover sheet.
- The cover sheet shall be sheet one of the drawing set and contain the following information:
    - A simple vicinity map, with north arrow oriented to the top of the sheet, showing project site, existing public road system and any other pertinent information.

- An overall site plan or location map showing the project site(s). Road and stormwater drainage system network including its connection to an existing public road or state highway. This does not have to be to scale.
- The applicant's and project engineering firm's names, address, telephone number, email address, current owner, and parcel numbers.
- Project name
- An index table of drawings.
- Title block descriptive of project.

Drainage Control Plan – Construction SWPPP Drawings

- Volume II, Section 2.2.2 of this manual describes the items that shall be shown on the Construction SWPPP drawings.

Drainage Control Plan – Grading/Earthwork Drawings

In addition to the general drawing requirements, the site and/or grading plan sheets shall show the following:

- The project's existing and proposed storm drainage along with easements, tracts, drainage facilities, all buffer and screening areas, offsite and onsite existing drainage courses, delineated wetlands, and associated buffers. Indicate direction of flow, size, and kind of each drainage channel, pipe, and structure. The status of existing drainage structures must be clarified as either "existing-abandon" or "existing-remove." For onsite stormwater management BMPs, provide a scale drawing of the lot or lots, and any public-right-of-way that displays the location of the BMPs and the areas served by them.
- Areas of possible significant environmental concern (gullies, ravines, swales, wetlands, steep slopes, estuaries, springs, creeks, lakes, etc.). For natural drainage features show direction of flow.
- 100-year floodplain boundary (if applicable).
- Soil logs, soil log locations, and soils within the project site as verified by field testing (and documented in Drainage Control Plan Section 3).
- Wells and wellhead protection areas – existing and proposed, onsite and on adjacent properties (both of record and not of record) within specified setbacks.
- Utilities.
- Existing paved surfaces, including roads.

- Lot dimensions and areas.
- Topographic information including contour lines of the property in its existing condition. City, County or U.S. Geological Survey (USGS) topographic mapping must be field verified and supplemented with additional field topographic information when necessary to provide an accurate depiction of the property.
- Topographic features that may act as natural stormwater storage, infiltration, or conveyance.
- Proposed grades.
- Property lines, parcel numbers, and ownership.
- Contour intervals shall be as follows:
  - 0 percent – 15 percent 2-foot contour interval
  - >15 percent – 40 percent slope 5-foot contour interval
  - >40 percent slope 10-foot contour interval.
- Grading/clearing setbacks from property lines per Title 14 GHMC.
- Earthwork/geotechnical requirements per Title 14 GHMC.

Drainage Control Plan – Plan/Profile Drawings

Show the following:

- Plan over profile drawings for new roads, shared accesses, and improvements on existing roads.
- Original ground line at 100-foot stations and at significant ground breaks and topographic features, with accuracy to within 0.1 feet on unpaved surface and 0.01 feet on paved surfaces.
- Typical roadway/storm drainage cross-sections when applicable.
- Final surface and storm drain profile with stationing the same as the site/grading plan sheets. Preferably reading from left to right, to show stationing of points of curve, tangent, and intersection of vertical curves, with elevations to 0.01 feet.
- Surface grade and vertical curve data. Roads to be measured at centerline.
- Vertical datum shall be based on NAVD88. All bench mark information shall use established U.S.C. and G.S. control or city bench marks when there is an existing bench mark within one-half mile of the project.

- Vertical scale 1 inch = 5 feet. Clarifying details may be drawn to a convenient scale. Use 1 inch = 10 feet for vertical scale when horizontal scale is at 1 inch = 100 feet.
- When roads end at a property line, the existing ground profile shall be continued a minimum of 200 feet to show the proposed vertical alignment is reasonable.
- When intersecting road profile grades have a difference of 1 percent or less, a vertical curve is not required. All other vertical grade intersections shall follow City of Gig Harbor Public Works Design Standards and applicable AASHTO requirements.
- Storm drainage text shall be shown in profile only, to avoid duplication of text. Number of structures shall be shown in the plan and profile views. The following information shall be shown in the profile view:
    - Type of structure
    - Structure number
    - Stationing/offsets (coordinates to be shown in the plan view)
    - Rim elevation
    - Invert elevations (in)
    - Invert elevations (out)
    - Pipe length, pipe size, material, and slope (percent).

Drainage Control Plan – Detail Drawings

- All applicable standard notes.
- All applicable standard drawings and details.
- A minimum of two cross-sections of each retention/detention pond and bioretention area showing original property lines, slope catch points, and all other pertinent information to adequately construct the pond or bioretention area.
- Details of all onsite stormwater management BMPs that are used to help achieve compliance with Minimum Requirement #5. If distributed bioretention areas and/or storage below permeable pavement are used, provide details to confirm accurate facility representation in the runoff models (submitted as part of Drainage Control Plan Section 9).

- Identify locations and approximate size of all permeable pavement surfaces and bioretention areas to be installed, including those that will be installed on individual lots.
- Identify locations and species types for newly planted or retained trees for which impervious surface reduction credits are claimed. Supporting areas such as the flow paths for dispersion BMPs shall also be shown.
- If distributed bioretention areas and/or infiltration below pollution-generating hard surfaces are used to help meet treatment requirements, provide details to confirm accurate representation in the runoff model (submitted as part of Drainage Control Plan Section 9).
- Standard open conveyance system cross-sections if applicable.
- Right-of-way cross-sections as required by the City.
- Construction recommendations from a soils report if applicable.

3.3.4 Drainage Control Plan – Drainage Report

The Drainage Report is a major component of the Drainage Control Plan. The Drainage Report shall include data that facilitate plan review such as (but not limited to): water surface elevations for the design storm(s), invert elevations at breaks in grade, design discharge, design velocity, design depths of reservoir course for permeable pavement, bioretention media thickness, etc. Specific components of the Drainage Report are described in detail below. The Drainage Report shall be 8.5 x 11 inch size.

Cover Sheet: The Drainage Report will have a cover sheet with the project name; applicant's name, address, telephone number, and email address; project engineer's name, address telephone number, and email address; date of submittal; contact's name, address, telephone number, and email address; and the name, address, telephone number, and email address of the contractor, if known.

Project Engineer's Certification: The project engineer responsible for completion of a Drainage Control Plan submittal as described herein shall be a professional engineer with a current State of Washington license. All plans and specifications, calculations, certifications, as-built drawings, and all other submittals which will become part of the permanent record of the project must be dated and bear the project engineer's official seal and signature.

The Drainage Report shall contain a page with the project engineer's seal with the following statement:

> *"I hereby state that this Drainage Control Plan for _____ (name of project) has been prepared by me or under my supervision and meets the standard of care and expertise which is usual and customary in this community for professional engineers. I understand that the City of Gig Harbor does not and will not assume liability*

for the sufficiency, suitability, or performance of drainage facilities prepared by me."

Table of Contents: Show the page number for each section of the report. Show page numbers of appendices. All pages of the Drainage Report shall be numbered.

Maps: The Drainage Report shall include the following maps:

- **Basin Map**. Show project boundaries, subbasin boundaries, and offsite area tributary to the project. Show major drainage features (such as channels and detention facilities and floodways), and flow path to receiving waters. Use an appropriate scale for the project site.

- **Work Map (or maps)**. On a topographic map at an appropriate scale for the project site, show:

  - Unit areas greater than 1 acre as contributing to a reach of swale or to a catch basin including offsite area. Identify areas contributing to retention/detention facilities. Identify threshold discharge areas (TDAs) where applicable. Show the following on the work map (or on a schedule) for unit areas: total project area; total hard surfaces, pollution generating hard/impervious surface, pollution generating pervious surface, and total disturbed area; average slope; and estimated ultimate infiltration rate and Soil Conservation Service (SCS) Soil Group.

  - Conveyance data, identifier (for reference to model output), length, slope, inverts up and down.

  - Overland flow paths and distances.

  - Soil types.

  - Locations of soil pits and infiltration tests.

  - Spot water surface elevations, discharges, and velocities for the design event.

- **Schedule of Structures.** The Drainage Report shall include a table or "schedule" for the storm drainage structures used on the project, including the following information:

  - Catch basin/manhole number

  - Stationing

  - Washington State Plane Coordinate System (i.e., Northings and Eastings) if used

  - Street name and side located on, if applicable

- Catch basin/manhole diameter or size
- Invert elevation in/out
- Pipe diameter in/out
- Type of each structure and pipe, i.e., Type II, concrete.

All Drainage Reports shall have each of the following section titles (if some sections do not apply, list and mark NA):

Drainage Report Section 1 – Proposed Project Description

Describe type of permit for which the applicant is applying, address and legal description of property, parcel number, property zoning, etc. Describe other permits required (hydraulic permits, USACE Section 404 Permit, wetlands, etc.) and present status.

Provide a brief description of the development project (type, size, location, and for additions/remodels only, current assessed value and cost of improvements excluding land value) and the stormwater features to be installed for storage, treatment, conveyance, and disposal/discharge (types, sizes, and locations). Identify which of the minimum requirements apply to the project, and how they are being addressed. Also include justification for those minimum requirements that do not apply. For Minimum Requirement #5, indicate whether the project used the mandatory list option, or the LID performance standard option, and complete documentation demonstrating compliance with either approach (additional guidance provided below).

Summarize calculations for all facilities. Include a tabulation of the current and proposed hard surfaces; new and replaced pollution generating pervious, impervious, and hard surfaces; effective impervious surfaces; disturbed pervious (such as landscaped areas); converted vegetation areas; and undisturbed areas. In this table, indicate any additions of hard surfaces, and the value of any additions or remodels completed, during the last 5 years. Complete engineering calculations, including hydrologic modeling analyses and documentation, must be included with the report. It is recommended that these be placed in appendices and be referenced where appropriate.

Describe the stormwater BMPs and conveyance systems incorporated into the design. Describe the detention system, outlet works, and spillways. Discuss vegetation establishment and management plan for conveyance and detention systems. For LID features and Minimum Requirement #5 specifically, describe the following:

- Project narrative showing how the project will fulfill the requirement for onsite management of stormwater to the extent feasible.
- Total area of vegetation retained.
- For projects using the list option for Minimum Requirement #5, an explanation and documentation, including citation of site conditions

identified in a soils report, for any determination that an onsite stormwater management BMP was considered infeasible for the site. Information obtained and documented in the Existing Conditions Description (Section 2, see below) shall be used to substantiate any BMP infeasibility determinations. (See also Volume III, Appendix III-D for a summary of infeasibility criteria for all BMPs.)

- Areas of disturbed soils to be amended. (Note: All lawn and landscaped areas are to meet requirements of soil preservation and amendment [see Volume III, Section 3.1]. Use of compost is one way to meet the requirement).
- Retained trees and newly planted trees for which impervious reduction credits are claimed.

Drainage Report Section 2 – Existing Conditions Description

Existing conditions analysis results shall be submitted as part of the Drainage Control Plan submittal. Information in this section should also be used to help prepare the Construction Stormwater Pollution Prevention Plan.

Low impact development site design in particular is intended to complement the existing conditions on the site. However, not all sites are appropriate for all LID and onsite stormwater management BMPs, as site conditions often determine the feasibility of using these techniques. The existing conditions site analysis, consistent with the requirements of this section, shall determine the feasibility of using these BMPs.

Describe existing conditions and relevant hydrologic conditions including, but not limited to, the items listed below. Where subsequent report sections call for more details on these issues (e.g., soils, wells, septic systems), a brief description and reference to the specific report section is sufficient.

- Existing ground cover, including pervious (trees, shrubs, lawn, etc.), hard surface, and pollution generating areas.
- Offsite drainage to the property.
- Creeks, lakes, ponds, wetlands, ravines, gullies, steep slopes, springs, erosion hazards, freshwater designations, and other environmentally sensitive areas on or down gradient of the property.
- Is the project located in an aquifer recharge area or wellhead protection area as defined by the Tacoma-Pierce County Health Department, the U.S. EPA or by the City? Cite reports.
- Any specific requirements included in a basin plan for the area.
- Drains, channels, and swales, within the project site and immediately adjacent.
- Points of exit for existing drainage from the property.

- Any known historical drainage problems such as flooding, erosion, etc.
- Proximity to structures, property lines, onsite structures, sewers, septic tanks, septic fields and reserve areas, basements, bulkheads, closed or active landfills, and underground storage tanks.
- Summary of existing soil type, groundwater levels, and soil hydraulic conductivity (details to be covered in Section 3).
- Include references to relevant reports such as basin plans, flood studies, groundwater studies, wetland designations, sensitive area designations, environmental impact statements, environmental checklists, lake restoration plans, water quality reports, soils reports, etc. Where such reports impose additional conditions on the applicant, state these conditions and describe any proposed mitigation measures.

Drainage Report Section 3 – Infiltration Rates/Soils Reports

Specific infiltration testing and documentation requirements are outlined in Volume III, Section 2.5 and Appendix III-A. For all sites utilizing infiltration for stormwater management, a soils report must be prepared that is stamped by a professional engineer with geotechnical expertise, a licensed geologist, an engineering geologist, or a hydrogeologist, and that summarizes site characteristics and demonstrates that sufficient permeable soil for infiltration exists at the proposed facility location. The reporting requirements depend on the type of facility and analysis being performed. See Volume III, Section 2.5 and Appendix III-A for the detailed requirements.

If an infiltration and/or detention facility is near the top of a slope that is regulated through local ordinance, then a geotechnical assessment addressing effects of seepage and the potential for slope failure during any precipitation event through the design event is required as part of this section of the Drainage Report.

Drainage Report Section 4 – Wells and Septic Systems

The project engineer shall report the existence of wells and septic systems both of record and others on the site and on adjacent property within the setback distance for stormwater retention/detention facilities identified in Volume III. The project engineer shall inquire with the Tacoma-Pierce County Health Department and neighboring property owners as necessary to obtain location of wells and septic systems that are not of record. Wells and septic systems thus found, both active and abandoned, shall also be shown on the plans or as-builts (if found during construction).

The proper abandonment of wells is a matter regulated by state law (WAC 173-160). The Tacoma-Pierce County Health Department regulates drinking water and irrigation wells while Ecology regulates resource protection wells. The respective phone numbers are (253) 798-6500 and (360) 407-6872. If a well on the site has not been properly sealed, the applicant shall be responsible for contacting the Tacoma-Pierce County Health Department. The appropriate procedure shall be followed for sealing any well. Proof of

proper abandonment (e.g., copies of the well log and invoice from a firm qualified to perform such work) shall be supplied to the Tacoma-Pierce County Health Department or Ecology per its requirements. If no wells or septic systems were found, indicate so.

Drainage Report Section 5 – Fuel Tanks

The project engineer shall report, the existence of fuel tanks, in-use or abandoned. Fuel tanks shall be shown on the plans or as-builts (if found during construction). If fuel tanks will be abandoned, contact the Tacoma-Pierce County Health Department for specific instructions. If no fuel tanks are found, indicate so.

Drainage Report Section 6 – Subbasin Description

Describe offsite drainage tributary to the project. Describe any bypass drainage from the project which will not be controlled.

Describe the drainage system between the site and the receiving surface waters (or pothole, regional detention facility, etc.). Describe emergency services located along the flow path (e.g., fire/police stations, hospitals). Describe environmentally sensitive areas, such as wetlands, etc.

Drainage Report Section 7 – Floodplain Analysis

If the project is within the potential flood hazard area as defined in Chapter 18.08 GHMC, show the 100-year flood hazard area on the plans. If the flood hazard area has not been established (or the City determines that it is in error), the City may require per Chapter 18.08 GHMC the applicant to establish and map the 100-year flood hazard area for the proposed project to be submitted with the Drainage Report. Analysis will be for the 100-year flood for build out at maximum density allowed by zoning. If the project is determined to be in the flood hazard area additional studies per Chapter 18.08 GHMC may be required. The project engineer shall contact the City regarding the appropriate computer program(s) for backwater analysis.

Drainage Report Section 8 – Aesthetic Considerations for Facilities

Describe the effort made to make the facilities aesthetically pleasing, how facilities will provide useable open space, and how the facilities will fit into the landscaping plan for the property and be in accordance with any approved community plan. Drainage facilities should be made attractive features of the urban environment. Engineers are encouraged to be creative in shaping and landscaping facilities.

Drainage Report Section 9 – Facility Sizing and Offsite Analysis

The project engineer shall provide calculations for the project's stormwater storage, treatment, and conveyance system components. All relevant work/calculations shall be submitted for City review. Documentation outlining whether and how each of the minimum requirements have been addressed in the Drainage Report shall be submitted for city review. All calculations shall be keyed to features shown on the work map as described above. Also note that, per Volume III, all detention facilities (including

detention vaults), and all infiltration facilities designed for greater than 1 foot of ponding depth, are required to include a crest gauge that will record maximum pond water surface elevation after a storm event. In addition, project submittals must include a table that identifies the design facility stage expected for the 2-, 5-, 10-, 25-, 50-, and 100-year recurrence interval flows.

An offsite analysis comprising of a downstream and an upstream analysis is required. The offsite analysis shall assess existing and potential problems related to offsite water quality, stream channel erosion, slope stability, conveyance system capacity, and drainage impacts associated with the project. The analysis shall be qualitative and quantitative.

The engineer shall physically inspect all the existing onsite and offsite stormwater drainage systems of the study area for each discharge location for existing or potential problems and drainage features. The inspection and investigation shall include:

- Prepare a scaled map labeling all drainage components and depicting the downstream study area. The study area shall extend downstream of the proposed project discharge location to a point on the drainage system where the proposed project site constitutes 15 percent or less of the total tributary area, but in no event less than one-fourth (1/4) of a mile.

- Review all available resource information regarding existing and potential water quality, runoff volumes and rates, flooding and streambank erosion problems within the study area.

- Physically inspect the existing onsite and offsite drainage system problems reported in the resources.

- City or Pierce County GIS drainage data may be used to assist the engineer in determining the capacity of existing systems. Historic comprehensive storm drainage maps, last updated in the early 1990s, can be useful to find drainage features not within the right-of-way, and in understanding development patterns and changed conditions. A copy of the City comprehensive storm drainage map or a map generated from City or County GIS coverage, updated with current drainage features, delineating the study area, together with the drainage system onto and from the proposed site, and showing the flow route of the onsite water for the minimum of one-fourth of a mile downstream distance must be included in the storm drainage calculations. USGS maps (minimum scale of 1:2400) may be utilized when City or County maps are not available.

- Describe in a narrative form, observations regarding the makeup and general condition of the drainage system.

- Include information such as pipe sizes, channel characteristics, amount of freeboard in pipes, channels and stormwater facilities.

- Field results of the downstream offsite drainage areas shall be provided in a table format and include the following information:
    - Project site.
    - Distance to downstream drainage components.
    - Description of drainage component.
    - Existing problems.
    - Potential problems.
    - Distance to next component.
    - Etc., to the limit of the downstream analysis.
    - Photographs to supplement the table information.

A secondary component of the offsite analysis report is to identify all upstream tributary areas to the site and quantify the expected flows so they can be accommodated in the design of the project.

If hydrologic modeling (see Chapter 2, and Volumes III and V) is required, the project engineer shall use an approved continuous simulation runoff model and document modeling methods, assumptions, parameters, data sources, and all other relevant information to the analysis. If model parameters are used that are outside the standards of practice, or if parameters are different than those standards, justify the parameters. The applicant must also include digital copies of the model with files sufficient to re-run the model and include input parameters, as well as model output files to the City. Projects taking an impervious surface reduction credit for newly planted or retained trees (see tree planting and tree retention in Volume III, Section 3.3) must provide those calculations and documentation on site plans for the locations of the trees. Projects using Full Dispersion or full downspout infiltration BMPs must provide information to confirm conformance with design requirements that allow removal of the associated drainage areas from computer model input.

For design of water quality treatment systems specifically, if bioretention and/or infiltration below pollution-generating hard surfaces through adequate soils (see Volume V, Section 6.3 and Appendix I-C) will be used to help meet treatment requirements, the runoff model output files must include the volume of water that has been treated through those BMPs. The summation of those volumes and the volume treated through a centralized, conventional treatment system must meet or exceed 91 percent of the total stormwater runoff file. This sum of volumes must include:

- Stormwater that has infiltrated through a bioretention area, and stormwater that has infiltrated below pollution-generating hard surfaces (e.g., permeable pavement) through adequate soils.

- Stormwater that passes through a properly sized treatment facility. Note that stormwater that is re-collected below a bioretention area and routed to a centralized treatment facility should not be counted twice.
- Subtraction of any stormwater that does not receive treatment due to bypass of, or overflow from a treatment facility or a bioretention area (if the overflow is not subsequently routed to a treatment facility).

Include copies of all calculations for capacity of channels, culverts, drains, gutters, etc. If used, include nomographs and tables indicating how they were used. Show headwater and tailwater analysis for culverts when necessary. Provide details on references and sources of information used.

Describe capacities, design flows, and velocities in each reach. Describe required materials or specifications for the design (e.g., rock lining for channels when velocity is exceeded, high density polyethylene pipe needed for steep slope).

For a subdivision project, provide a detailed breakdown on a lot-by-lot basis of the assumptions related to roof, driveway, and other hard surfaces that have been used in the design and sizing of facilities. This breakdown will be used to determine the allowed square footage of hard surfaces for each lot

Drainage Report Section 10 – Utilities

Describe how utilities will be installed to ensure no conflicts with proposed stormwater quantity and quality control measures.

Drainage Report Section 11 – Covenants, Dedications, Easements

Describe legal instruments needed to guarantee preservation of drainage systems and access for maintenance purposes (attach copies if not included as part of other Drainage Control Plan submittals). Describe the organization or person which will be responsible for O&M of storm drainage facilities. For projects subject to Minimum Requirement #5, a declaration of covenant must be recorded for each parcel that contains onsite stormwater management BMPs. This is to ensure future maintenance of onsite stormwater management BMPs. See Section 3.3.7 and Appendix I-A for additional details.

Drainage Report Section 12 – Property Owners' Association Articles of Incorporation

Attach a copy of the Articles of Incorporation, if applicable and available.

Drainage Report Section 13 – Other Permits or Conditions Placed on the Project

Construction of road and drainage facilities may require additional permits from other agencies. These additional permits may contain more restrictive drainage control requirements. This section should provide the title of any other necessary permits, the

agencies requiring the other permits, and identify the permit requirements that affect the project.

Other agencies including, but not limited to, those listed below may require drainage review for a proposed project's impact on surface and stormwater and conveyance systems. The applicant should take care to note that these other agency drainage requirements are separate from, and in addition to, Pierce County and City of Gig Harbor's drainage requirements. The applicant will be responsible to coordinate joint agency drainage review, including resolution of any conflicting requirements between agencies.

The additional agencies that may require permits for some projects are listed in Table 3.2. However, this is not a complete list of permits that may be required.

3.3.5 Drainage Control Plan – Construction SWPPP Report

Volume II, Section 2.2 of this manual describes the items that shall be included in the Construction SWPPP report.

Note: The Construction SWPPP consists of two parts: a narrative report and drawings. A complete Construction SWPPP (both report and drawings) is required as part of the Drainage Control Plan submittal. Depending on the scope of the project, components of the Construction SWPPP may be required with an Abbreviated Plan. At a minimum, all 13 Construction Stormwater Pollution Prevention elements in accordance with Minimum Requirement #2 (Section 2.4.2) must be addressed.

Table 3.2. Other Potential Permits.

Agency	Permit/Approval
Tacoma-Pierce County Health Department	Onsite Sewage Disposal and Well Permits
Washington State Department of Transportation (WSDOT)	Developer/Local Agency Agreement
Ecology	Short Term Water Quality Modification Approval
Washington State Department of Fish and Wildlife	Hydraulic Project Approval
Washington State Department of Ecology	Dam Safety Permit
United States Army Corps of Engineers	Section 10 Permit
United States Army Corps of Engineers	Section 401 Certification
United States Army Corps of Engineers	Section 404 Permit
City of Gig Harbor	Shoreline Permit
City of Gig Harbor	ROW Permit
City of Gig Harbor	Wetlands Permit or Fish and Wildlife Permit

* This is not a complete list of possible permits that may be required.

3.3.6 Drainage Control Plan – Maintenance and Source Control Manual

In accordance with Minimum Requirement # 9 and Table 3.1, a Maintenance and Source Control Manual must be developed for projects that require a Drainage Control Plan. For privately maintained facilities, a copy of the manual shall be retained onsite or within reasonable access to the site. For example, the Maintenance and Source Control Manual for a subdivision should be kept by a member of the Homeowner's Association. In the case of a commercial property the Maintenance and Source Control Manual should be kept in the office by those employees with maintenance responsibilities. When a property is sold or key members of a Homeowner's Association change, the Maintenance and Source Control Manual shall be transferred to the new owner/Homeowner's Association Member. A log of maintenance activity that indicates what actions were taken shall also be kept and be available for inspection by the City. For public facilities, a copy of the manual shall be retained in the appropriate department.

The manual must be prepared in an 8.5 x 11 inch format and must comply with the recording standards of the Pierce County Auditor. The manual must be prepared by a professional engineer and must be written to be understandable by the typical property owner and/or person responsible for maintenance.

For both private and public facilities, it is important to work with maintenance personnel early and throughout the design process. During discussions with maintenance personnel, describe the maintenance procedures that will be performed on the site BMPs. This will help ensure that future maintenance work and potential access needs are clearly understood.

The Maintenance and Source Control Manual must include the following components:

Cover Page

The Maintenance and Source Control Manual must have a cover page. The cover page must include the project name; engineer's name, address, telephone number, and email address; date of preparation of the manual (and any updates); project parcel numbers; and applicable City permit numbers.

Map

A map of the project area must be included in the manual. The extent of the map should be inclusive of all the drainage facilities that are a part of the Drainage Control Plan for the project. The intent of the map is to show the boundaries of the maintenance responsibilities that the Maintenance and Source Control Manual addresses. The map is not intended to provide a high level of detail nor is it intended to call out each structure or BMP. The map shall provide road names of the existing roads that the project connects to as well as any proposed roads. The map can be one or multiple pages.

Maintenance and Source Control Manual Section 1 – Project Description

Provide a brief description of the development project, including project type (plat, short plat, commercial center, industrial, etc.) and size (acres, number of lots, lineal feet of road, square feet of building, etc.). Describe the stormwater BMPs and conveyance systems, and how these systems are designed to manage the volume, rate, and quality of stormwater runoff from the project.

Maintenance and Source Control Manual Section 2 – Maintenance Importance and Intent

Include the following statement in this section:

"The importance of maintenance for the proper functioning of stormwater control facilities cannot be over-emphasized. A substantial portion of failures (clogging of filters, resuspension of sediments, loss of storage capacity, etc.) are due to inadequate maintenance. Stormwater BMP maintenance is essential to ensure that BMPs function as intended throughout their full life cycle.

The fundamental goals of maintenance activities are to insure the entire flow regime and treatment train designed for this site continue to fully function. For this site these include: (engineer can delete non applicable BMPs listed below):

- Maintain designed stormwater infiltration capacity
- Maintain designed stormwater detention/retention volume
- Maintain ability of storm facility to attenuate flow rates
- Maintain ability to safely convey design stormwater flows
- Maintain ability to treat stormwater runoff quality
- Preserve soil and plant health, as well as stormwater flow contact with plant and soil systems
- Clearly identify systems so they can be protected
- Keep maintenance costs low
- Prevent large-scale or expensive stormwater system failures
- Prevent water quality violations or damage to downstream properties.

The intent of this section and manual is to pass on to the responsible party(s) all the information critical to understand the design of the system, risks and considerations for proper use, suggestions for maintenance frequencies, and cost so that realistic budgets can be established."

Maintenance and Source Control Manual Section 3 – Responsible Parties

Stormwater facilities range in size and complexity. Entities responsible for maintenance should be appropriately matched to the tasks required to ensure long-term performance. For example, an individual homeowner may be able to reasonably maintain a rain garden, permeable driveway, infiltration trench, or other small facility. However, larger facilities are often maintained through private parties, shared maintenance covenants with the City, or by City ownership.

This section of the Maintenance and Source Control Manual must identify the party (or parties) responsible for maintenance and operation of all stormwater structures and BMPs requiring maintenance.

Maintenance and Source Control Manual Section 4 – Facilities Requiring Maintenance

Provide a detailed list of all stormwater structures and BMPs requiring maintenance. For situations where there are split maintenance responsibilities (e.g., private/public), provide a breakdown of the entity responsible for each structure and BMP.

Maintenance and Source Control Manual Section 5 – Maintenance Instructions

This section shall begin with the following statement, unless otherwise approved by the City:

"The parties responsible for maintenance must review and apply the maintenance requirements contained herein. These maintenance instructions outline conditions for determining if maintenance actions are required, as identified through inspection. However, they are not intended to be measures of the facility's required condition at all times between inspections. Exceedance of these conditions at any time between inspections or maintenance activity does not automatically constitute a violation of these standards. However, based upon inspection observations, the inspection and maintenance presented in the checklists shall be adjusted to minimize the length of time that a facility is in a condition that requires a maintenance action. For facilities not owned and maintained by the City, a log of maintenance activity that indicates what actions were taken must be kept on site and be available for inspection by the City."

In addition, include a narrative description of the purpose, function, and maintenance requirements for all stormwater structures and BMPs requiring maintenance. Following the narrative description(s), include detailed maintenance checklists for all stormwater structures and BMPs requiring maintenance. Appendix I-A includes maintenance checklists for all stormwater facilities and BMPs included in this Stormwater Management and Site Development Manual. The Maintenance and Source Control Manual shall include only those checklist items that are pertinent to the structures and BMPs proposed for your project. Do not include all of the checklists provided in Appendix I-A. Note that the maintenance checklists (and narrative descriptions) can be included as an attachment to the Maintenance and Source Control Manual, so long as they are clearly referenced in this section.

If the project is a surface mine, this section shall identify the measures (temporary swales, temporary berms, etc.) that will be implemented over the life of the mining activity to control stormwater runoff in accordance with the approved Drainage Control Plan.

Maintenance and Source Control Manual Section 6 – Vegetation Maintenance

The effectiveness of many stormwater facilities will depend on the plants included in the facility design, and their proper maintenance. A listing and location of plant species and their requirements for maintenance shall be included in this section. This includes bioretention and rain garden planting, newly planted and retained trees claimed as flow reduction credits, as well as vegetation retention and restoration areas. Maintenance requirements must address issues including but not limited to pest and disease management practices, pruning requirements, irrigation requirements, fertilization requirements, etc.

Maintenance and Source Control Manual Section 7 – Pollution Source Control Measures

Pollution source control is the application of pollution prevention practices on a developed site to reduce contamination of stormwater runoff at its source. BMPs and resource management systems are designed to reduce the amount of contaminants used and potentially discharged to the environment. This section of the Maintenance and Source Control Manual shall contain language regarding pollution source controls that are specifically applicable to the site. Additional information on required and suggested source control measures is provided in Volume IV.

Maintenance and Source Control Manual Section 8 – Annual Cost of Maintenance

Provide an estimate of the expected annual cost of maintenance, including identification of the number of catch basins, control structures, linear feet of pipe, etc. Contact the City for additional guidance if needed.

3.3.7 Drainage Control Plan – Establishment of Maintenance Covenant

A maintenance covenant is required for each site/lot that contains stormwater management BMPs that will be maintained by a private entity such as an individual, corporation, or homeowner's association. The maintenance covenant must be created on a city-approved form (included in Attachment G), and any attachments shall meet the recording requirements of the Pierce County Auditor. The covenant shall be recorded at the Pierce County Auditor's office at the expense of the applicant, and shall be tied to the parcel numbers that the project is built on. All covenants must be recorded prior to final construction approval for the proposed project.

The covenant shall include the following:

1. A legal description of the property
2. Assessor parcel numbers

3. Project name

4. Project application/permit #

5. Parties responsible (including contact information) for maintenance and implementation of pollution source control measures

6. Language stating that the covenant shall run with the land and be binding on all successors and assigns

7. A requirement that the responsible parties maintain the stormwater facilities in accordance with the attached project Maintenance and Source Control Manual

8. A requirement that the responsible parties implement pollution source control measures in the attached Maintenance and Source Control Manual

9. A requirement that the responsible parties keep and maintain a log of maintenance activity that indicates what actions were taken, and that the log be made available for inspection by the City

10. Language that prohibits unauthorized modifications, unless approved by the City

11. Language that provides for a city approval process and allows modification to the covenant, or to the Maintenance and Source Control Manual

12. Language that provides for a city process (remedies) for situations where the responsible party fails to perform the required maintenance or fails to implement the pollution source control measures

13. Language that provides access authority to the City for purposes of inspection, maintenance, and repair

14. Language that provides for reimbursement to the City by the responsible party in the event that the City incurs costs related to maintenance or repair

15. The location of the approved Drainage Control Plan

16. The Maintenance and Source Control Manual as an attachment.

Chapter 4 - BMP and Facility Selection Process for Permanent Stormwater Control Plans

4.1 Purpose

The purpose of this chapter is to provide guidance for selecting permanent BMPs and facilities for new development and redevelopment sites (including retrofitting of redevelopment sites).

Gig Harbor's pollution control strategy is to emphasize pollution prevention first, through the application of source control BMPs. Then the application of appropriate onsite, treatment, and flow control facilities fulfills the statutory obligation to provide AKART, or "all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the State of Washington." (RCW 90.48.010)

The remainder of this chapter presents seven steps in selecting BMPs, treatment facilities, and flow control facilities.

4.2 BMP and Facility Selection Process

Step I: Determine and Read the Applicable Minimum Requirements

Section 2.3 establishes project size thresholds for the application of minimum requirements to new development and redevelopment projects. Figures 2.1 and 2.2 provide the same thresholds in a flow chart format. Calculate total new hard surfaces, replaced hard surfaces, and converted vegetation areas to determine which minimum requirements apply to the project.

Step II: Select Source Control BMPs

Refer to Volume IV. If the project involves construction of areas or facilities to conduct any of the activities described in Volume IV, Chapter 2, the required structural source control BMPs described in that volume must be constructed as part of the project. In addition, residential (Volume IV, Chapter 3) or the planned business enterprise (Volume IV, Chapter 4) that will occupy the site need to review the required operational source control BMPs described. Structural source control BMPs should be identified on all applicable plans submitted for city review and approval.

The project may have additional source control responsibilities as a result of area-specific pollution control plans (e.g., watershed or basin plans, water cleanup plans, groundwater management plans, lakes management plans), ordinances, and regulations.

Step III: Determine Threshold Discharge Areas and Applicable Requirements for Treatment, Flow Control, and Wetlands Protection

Minimum Requirement #6: Runoff Treatment and Minimum Requirement #7: Flow Control have specific thresholds that determine their applicability (see Sections 2.4.6

and 2.4.7). Minimum Requirement #8: Wetlands Protection uses the same size thresholds as those used in #6 and #7. Those thresholds determine whether certain areas (called "threshold discharge areas") of a project must use treatment and flow control facilities, designed by a professional engineer, or whether just Minimum Requirement #5: Onsite Stormwater Management BMPs can be applied instead (see Section 2.4.5).

Step 1: Review the definitions in the Glossary to become acquainted with the following terms: effective impervious surface, impervious surface, hard surface, pollution-generating impervious surface (PGIS), pollution-generating hard surface, pollution-generating pervious surface (PGPS), and converted vegetation areas.

Step 2: Outline the threshold discharge areas for your project site.

Threshold Discharge Area – An onsite area draining to a single natural discharge location or multiple natural discharge locations that combine within one-quarter mile downstream (as determined by the shortest flow path). The examples in Figure 4.1 below illustrate this definition. The purpose of this definition is to clarify how the thresholds of this manual are applied to project sites with multiple discharge points.

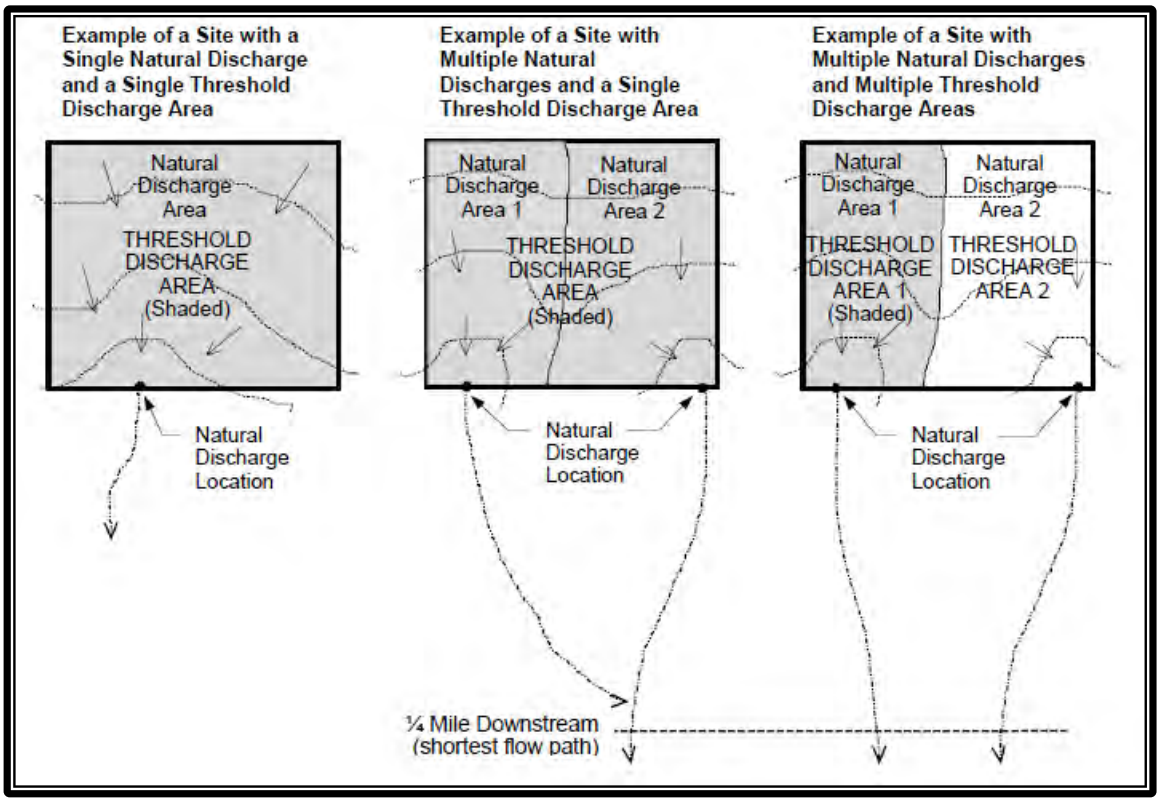

Figure 4.1. Threshold Discharge Areas.

Step 3: Determine the amount of pollution-generating hard surfaces (including pollution-generating permeable pavements) and pollution-generating pervious surfaces (not including permeable pavements) in each threshold discharge area. Compare those totals to the project thresholds in Section 2.4.6 (Table 2.1) to determine where treatment

facilities are necessary. Note that onsite stormwater management BMPs (Minimum Requirement #5) are always applicable.

Step 4: ***Compute the totals for effective impervious surface and converted vegetation areas in each threshold discharge area.*** Compare those totals to the project thresholds in Section 2.4.7 to determine if flow control facilities (Minimum Requirement #7 and #8) are needed. If neither threshold for flow control facilities is exceeded, proceed to Step 5. If one of the thresholds is exceeded, proceed to Step IV below.

Step 5: For each threshold discharge area, use an Ecology approved continuous runoff model to determine whether there is an increase of 0.15 cfs in the 100-year return frequency flow using 15-minute time steps. This requires a comparison to the 100-year return frequency flow predicted for the existing (pre-project; not the historic) land cover condition of the same area. If the above threshold is exceeded, flow control – Minimum Requirements #7 and #8 – is potentially required. See the "Applicability" sections of those minimum requirements. Note that onsite stormwater management BMPs (Minimum Requirement #5) are always applicable.

This task requires properly representing the hard surfaces and the converted vegetation areas in the runoff model. Hard surfaces include impervious surfaces, permeable pavements, and vegetated roofs. Impervious surface area totals are entered directly. Additional modeling guidance is found in the BMP design criteria in Volumes III and VI.

Step IV: Select Flow Control BMPs and Facilities

A determination should have already been made whether Minimum Requirement #7, and/or Minimum Requirement #8 apply to the project site. Onsite stormwater management BMPs must be applied in accordance with Minimum Requirement #5. In addition, flow control facilities must be provided for discharges from those threshold discharge areas that exceed the thresholds outlined in Section 2.4.7. Use an approved continuous simulation runoff model and the details in Volume III, Chapter 3 to size and design the facilities.

The following describes a selection process for those facilities.

Step 1: Determine whether you can infiltrate.

Review Appendix I-C – Underground Injection Control (UIC) Program Guidelines to determine if the proposed infiltration BMP is considered a UIC well. If so, Appendix I-C requirements apply to the selected BMP.

There are two possible options for infiltration.

The first option is to infiltrate through rapidly draining soils that do not meet the site characterization and site suitability criteria for providing water quality treatment (see Volume V, Section 6.3). In this case, any runoff from pollutant generating surfaces must first be treated in accordance with Minimum Requirement #6 prior to discharge to the flow control infiltration facility (and ultimately to the ground via infiltration). The

treatment facility could be located off-line with a capacity to treat the water quality design flow rate or volume (see Volume V, Chapter 4) to the applicable performance goal (see Volume V, Chapter 3). Volumes or flow rates in excess of the water quality design volume or flow rate would bypass untreated into the infiltration basin. The infiltration facility must provide adequate volume such that the flow duration standard of Minimum Requirement #7, or the wetland protection requirements of Minimum Requirement #8, will be achieved. See Volume III, Chapter 3 for design criteria for infiltration facilities intended to provide flow control without treatment.

The second option is to infiltrate through soils that meet the site characterization and site suitability criteria for water quality treatment outlined in Volume V, Section 6.3. The facility would be designed to meet the requirements for both treatment and flow control. Because such a facility would have to be located on-line it would be quite large in order to achieve the flow duration standard of Minimum Requirement #7. Therefore this option will, in most cases, be cost and space prohibitive.

If infiltration facilities for flow control are planned, the flow control requirement has been met. Proceed to Step V. If infiltration facilities are not planned, proceed to Step 2.

Step 2: Use an approved continuous simulation runoff model to size a detention facility.

Refer to Volume III, Chapter 2 for an overview of the use of continuous simulation models for flow control facility sizing. Additional information may be available from the model developers, depending on the specific model being used.

Note that the more the site is left undisturbed, and the less impervious surfaces are created, the smaller the detention/flow control facility. Greater the use of onsite stormwater management BMPs can lead to a smaller detention facility when supported by engineering.

Step V: Select Treatment Facilities

Please refer to Chapter 2 of Volume V of this manual for step-by-step guidance to selection of treatment facilities.

- Step 1: Determine the receiving waters and pollutants of concern based on offsite analysis
- Step 2: Determine whether the facility will be city owned or privately owned
- Step 3: Determine if an oil control facility/device is required
- Step 4: Determine if infiltration for pollutant removal is practicable
- Step 5: Determine if control of phosphorous is required

- Step 6: Determine if enhanced treatment is required
- Step 7: Select a basic treatment facility unless previously selected treatments also meet basic treatment standards.

Step VI: Review Selection of BMPs and Facilities

The list of onsite, treatment, flow control, and source control BMPs should be reviewed. The site designer may want to re-evaluate site layout and design to reduce the need for stormwater facilities or the size of the facilities by reducing the amount of impervious surfaces created and increasing the areas to be left undisturbed. This step presents another opportunity to maximize the use of onsite stormwater management BMPs and LID approaches to reduce stormwater facility needs.

Step VII: Complete Development of Permanent Stormwater Control Plans and Submittals

The design and location of the BMPs and facilities on the site must be determined using the detailed guidance in Volumes III through VI. Maintenance requirements for each treatment and flow control facility are also required as part of the Maintenance and Source Control Manual submittal. Please refer to Chapter 3 for guidance on the contents of required stormwater site plans and submittals, which may include: Construction SWPPP, Abbreviated Plans, or Drainage Control Plans.

Volume I References

Azous, A.L. and Horner R.R., "Wetlands and Urbanization, Implications for the Future," Final Report of the Puget Sound Wetlands and Stormwater Management Research Program, 1997.

Low Impact Development Manual for Puget Sound, WSU Puyallup Research and Extension Center, and the Puget Sound Partnership, 2012.

Low Impact Development Operation and Maintenance Manual, Washington State Department of Ecology, Prepared by Herrera Environmental Consultants, Inc. and the Washington Stormwater Center, 2013.

Puget Sound Water Quality Management Plan, Puget Sound Water Quality Authority, 1987, 1989, 1991, 1994.

Soil Survey of Pierce County Area, Washington, 1979, Soil Conservation Service, United States Department of Agriculture (USDA), 1979.