



# Thurston County

## Drainage Design and Erosion Control Manual

December 2016 Edition. Adopted October 2016.  
Effective December 31, 2016





# Thurston County

## DRAINAGE DESIGN AND EROSION CONTROL MANUAL

December 2016

ORDINANCE NO. 15355

**AN ORDINANCE RELATING TO LOW IMPACT DEVELOPMENT;  
ADOPTING THE THURSTON COUNTY DRAINAGE DESIGN AND  
EROSION CONTROL MANUAL (2016) AND AMENDING TITLE 14,  
TITLE 15, TITLE 18, AND TITLE 20 OF THE THURSTON COUNTY  
CODE.**

**WHEREAS**, the Federal Clean Water Act sets a national goal to “restore and maintain the chemical, physical, and biological integrity of the nation’s water” and prohibits the discharge of pollutants from any point source; and

**WHEREAS**, the U.S. Environmental Protection Agency delegates administration of the National Pollutant Discharge Elimination System (NPDES) Permit to the state Department of Ecology under the federal Clean Water Act; and

**WHEREAS**, the Washington Department of Ecology issued the Western Washington Phase II Municipal Stormwater Permit for smaller Western Washington municipalities (Phase II Permit) in 2007 with the most recent permit issuance in 2013; and

**WHEREAS**, the Washington Department of Ecology, as authorized by chapter 90.48 RCW (Washington State Water Pollution Control Act), also takes action through the Phase II Permit to control impacts of stormwater discharges to all waters of Washington State, including ground waters, unless the discharges are authorized by another regulatory program; and

**WHEREAS**, the Phase II Permit requires permittees to “review, revise and make effective their local development-related codes, rules, standards, or other enforceable documents to incorporate and require Low Impact Development (LID) principles and LID BMPs” no later than December 31, 2016; and

**WHEREAS**, the intent of that review “shall be to make LID the preferred and commonly-used approach to site development;” and

**WHEREAS**, the Phase II Permit also requires the adoption of a Drainage Manual that is consistent with the Department of Ecology’s *2012 Stormwater Management Manual for Western Washington, as Amended in December 2014*; and

**WHEREAS**, Thurston County staff conducted a multiyear process to revise Thurston County’s development standards to support low impact development approaches and techniques; and

**WHEREAS**, Thurston County is required to plan under chapter 36.70A RCW, the Growth Management Act (GMA), and has performed professional review, public notice and comment with respect to these development code amendments; and

**WHEREAS**, the GMA requires a process of early and continuous citizen participation for amending the development regulations; and

**WHEREAS**, an open house was advertised and held on June 15, 2016, and a technical workshop was held on July 19, 2016; and

**WHEREAS**, the Thurston County Planning Commission held a duly noticed public hearing on June 15, 2016 and recommended the development code amendments to the Board of County Commissioners (Board) following a work session on August 3, 2016, to discuss changes made to the proposal in regards to public comments and input; and

**WHEREAS**, the Board held a duly noticed public hearing on September 27, 2016, to receive comments on the proposed amendments; and

**WHEREAS**, the Board agrees with the findings of the Thurston County Planning Commission and has determined that the amendments contained in this ordinance are consistent with the Thurston County Code (TCC) and other titles, chapters and sections of the TCC; and

**WHEREAS**, pursuant to 36.70A.106, the State of Washington Department of Commerce was notified on August 11, 2016; and

**WHEREAS**, a determination of non-significance was issued by Thurston County under the State Environmental Policy Act (chapter 43.21C RCW) for the changes contained in this ordinance on August 26, 2016 becoming final on September 16, 2016.

**WHEREAS**, this ordinance implements changes to Title 14, 15, 18, and 20 of the Thurston County Code.

**NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF THURSTON COUNTY, AS FOLLOWS:**

**SECTION 1. AMENDMENTS TO THURSTON COUNTY CODE.** The Thurston County Code is hereby amended as shown in Attachment A. Affected titles include Title 14 TCC Buildings and Construction, Title 15 TCC Public Works, Title 18 TCC Platting and Subdivisions, and Title 20 TCC Zoning.

**SECTION 2. SEVERABILITY.** If any section, subsection, sentence, clause, phrase or other portion of this Ordinance or its application to any person is, for any reason, declared invalid, illegal or unconstitutional in whole or in part by any court or agency of competent jurisdiction, said decision shall not affect the validity of the remaining portions hereof.

**SECTION 3. EFFECTIVE DATE.** This Ordinance shall take effect on December 31, 2016.

ADOPTED: October 18, 2016

ATTEST:

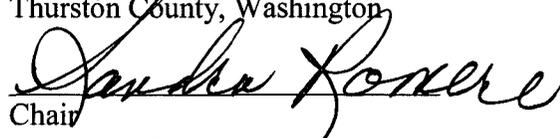
  
Clerk of the Board

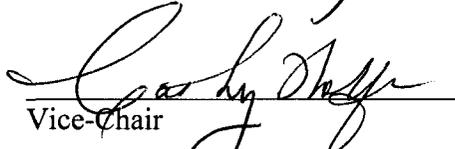
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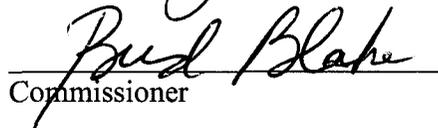
JON TUNHEIM  
PROSECUTING ATTORNEY

  
Rick Peters  
Deputy Prosecuting Attorney

BOARD OF COUNTY COMMISSIONERS  
Thurston County, Washington

  
Chair

  
Vice-Chair

  
Commissioner

# **Thurston County Drainage Design and Erosion Control Manual**

- Volume I – Core Technical Requirements and Site Planning**  
**Volume II – Construction Stormwater Pollution Prevention**  
**Volume III – Hydrologic Analysis and Stormwater Conveyance**  
**Volume IV – Source Control**  
**Volume V – Stormwater BMPs**

Prepared by  
Thurston County Water Resources Division  
Department of Resource Stewardship

December 2016

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# Table of Contents

(Web visitors: double click chapter titles to link to the appropriate PDF)

## Manual Tables of Contents

**Volume I – Minimum Technical Requirements and Site Planning**

**Volume II – Construction Stormwater Pollution Prevention**

**Volume III – Hydrologic Analysis and Stormwater Conveyance**

**Volume IV – Source Control**

**Volume V - Stormwater BMPs**

<b>Acknowledgments</b> .....	<b>iv</b>
<b>I. Introduction</b> .....	<b>v</b>
<b>How This Manual is Organized</b> .....	<b>viii</b>
<b>Related Plans, Permits, and Manuals</b> .....	<b>x</b>
<b>Phase II NPDES and State Waste Discharge Stormwater Permits for Municipalities</b> .....	<b>x</b>
<b>NPDES and State Waste Discharge Baseline General Permit for Stormwater Discharges Associated With Industrial Activities (Industrial Stormwater Permit)</b> .....	<b>xi</b>
<b>WSDOT Highway Runoff Manual (HRM)</b> .....	<b>xii</b>
<b>2012 Low Impact Development Technical Guidance Manual for Puget Sound (LID Manual)</b> .....	<b>xii</b>
<b>Other State and Federal Permits</b> .....	<b>xii</b>
<b>Local Government Permits</b> .....	<b>xiii</b>
<b>Requirements Identified through Watershed and Basin Planning or Total Maximum Daily Loads (TMDLs)</b> .....	<b>xiv</b>
<b>Definitions—Generally</b> .....	<b>xv</b>
<b>II. Glossary</b> .....	<b>xvi</b>

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# Acknowledgments

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### **Additional Sources**

Washington Department of Ecology Stormwater Management Manual for Western Washington, August 2012

Pierce County Stormwater Management and Site Development Manual, 2015

Low Impact Development Technical Guidance Manual for Puget Sound, December 2012

Washington State Department of Transportation, Highway Runoff Manual, March 2014

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# I. Introduction

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## Purpose

*The Thurston County Drainage Design and Erosion Control Manual (DDECM)* establishes requirements and provides guidance on measures necessary to control the quantity and quality of stormwater runoff produced by development and redevelopment such that they comply with water quality standards and contribute to the protection of beneficial uses of receiving waters in Thurston County. This Manual is an update to the 2009 DDECM, which was adopted by Thurston County on November 19, 2009. The 2009 DDECM was a completely revised update to the 1994 Thurston County DDECM. This updated DDECM is intended to comply with the requirement of the National Pollutant Discharge Elimination System (NPDES) Phase II permit issued to Thurston County by the Department of Ecology to adopt a stormwater management manual equivalent to the *Stormwater Management Manual for Western Washington* (Ecology 2012) by December 31, 2016.

The Manual establishes Core Requirements for development and redevelopment projects of all sizes and types and provides guidance on how to prepare and implement drainage plans to demonstrate compliance with the Core Requirements.

## Applicability

*The Thurston County DDECM* applies to all unincorporated areas of Thurston County. Except that, within specific Urban Growth Areas (UGAs) associated with incorporated cities that have adopted a Drainage Manual equivalent to the *201205 Washington State Department of Ecology Stormwater Management Manual for Western Washington*, the associated city may request more stringent standards depending on the project location.

The requirements of the Manual 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 partly within the unincorporated area of the County unless one of the following applies:

- Activity is exempted from the Core Requirements (see Volume I, Section 2.2)
- Development/redevelopment and stormwater activities are conducted in accordance with an approved stormwater management manual consistent with Thurston County's NPDES Phase II permit and the *2012 Washington State Department of Ecology Stormwater Management Manual for Western Washington* and with approval of the Thurston County Drainage Manual Administrator.

## ***Administrator May Impose Additional Controls***

The Drainage Manual Administrator is authorized to request information or to impose controls beyond those specified in this Manual. In doing so, the Administrator shall act reasonably,

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exercising best professional judgment based on available information. Reasons that the Administrator may act include, but are not limited to, one of the following:

- To protect the health, safety, and welfare of the public
- To prevent water quality degradation and stream bank erosion
- To prevent flooding that may present a risk to life, safety, vital services, or property
- Due to known flooding, downstream problems, additional requirements, reports, analysis may be required
- To prevent landslides along unstable slopes that may present a risk to life, safety, property, or critical areas
- To implement regulatory mandates such as Total Maximum Daily Load (TMDL) requirements within a watershed
- Where the Administrator's direction is needed to correct errors and omissions in order to clarify, augment, or update Manual text. Where this is required, the Administrator will, in a timely and appropriate manner, revise the text and provide the revisions to Manual users. Users are advised to check the Thurston County Stormwater website or contact the County for Manual updates, corrections, and/or errata, policies, and administrator memos that have been adopted to update design and implementation guidelines.

## **Stormwater Management Approach**

The use of “on-site measures” (Low Impact Development) will be an integral part of the planning and design of all future development in Thurston County. The ultimate goal of stormwater management for new development and redevelopment will be to mimic the natural pre-development hydrologic conditions of the site as closely as possible with respect to infiltration, evapotranspiration, water quality, and quantity of surface water and groundwater release from the site. To this end, the design for stormwater management systems for development shall be a sequential process described as follows:

- 1st Minimize disturbed areas and maximize open space and native vegetation retention.
- 2nd Limit impervious surface to the minimum necessary and implement source control measures to prevent contact of stormwater with pollutant generating sources.
- 3rd Use “on-site” (LID) measures such as full dispersion, bio-retention (or rain gardens), and small scale infiltration to the maximum extent technically feasible to reduce or eliminate concentrated flows of stormwater.

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- 4th Disconnect impervious surfaces to the maximum extent practicable to slow the runoff of stormwater from a site and increase the time of concentration. Examples include filter strips, porous paving, sheet flow and concentrated flow dispersion of runoff to native vegetation, and bioretention or rain gardens.
  - 5th For any remaining concentrated stormwater flows that exceed specific thresholds, provide treatment and infiltrate to the maximum extent technically feasible.
  - 6th Minimize release of surface water to protect stream channels and downstream properties by meeting design criteria established for peak flow rates, duration, and volume per drainage manual requirements.
  - 7th Implement controls to manage stormwater runoff during construction to eliminate discharge of sediment-laden water offsite and maintain these controls until the site is stabilized.
  - 8th Establish and implement a plan for the operations and maintenance of the stormwater facilities and provide ongoing maintenance, repair, and operations for those facilities to ensure continued protection of water quality and flow control.

The Best Management Practices (BMPs) described in this Manual help meet the following water quality standards and protect beneficial uses of the receiving waters:

- **Chapter 173-200 of the Washington Administrative Code (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
- **Chapter 173-204**, Sediment Management Standards.

### **Presumptive Approach and AKART**

Stormwater management techniques applied in accordance with this Manual are presumed to meet the technology-based treatment requirements of State law to provide all known available and reasonable methods of treatment, prevention, and control (AKART; 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 the State water quality standards listed above.

The BMPs presented in this Manual are approved by Thurston County and the Department of Ecology and are *presumed* to protect water quality and in-stream habitat – and meet the stated environmental objectives of the regulations described in this chapter. Project proponents always have the option of not following the stormwater management practices in this Manual. However, if a project proponent chooses not to follow the practices in the Manual, then the project proponent will be required to individually *demonstrate* that the project will not adversely impact

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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. Projects interested in pursuing the demonstrative approach should contact Thurston County Drainage Manual Administrator<sup>1</sup> early in the process.

Where requirements in this document are also covered in any other law, ordinance, resolution, rule, regulation, or similar requirement, the more restrictive shall govern.

## **Stormwater Retrofits**

This Manual can also help to identify options for retrofitting BMPs in existing developments. Application of BMPs from this Manual is encouraged when retrofitting existing development; however, there can be site constraints that make the strict application of these BMPs difficult, and deviations from the standards of this Manual may be necessary. In these instances, the BMPs presented here can be modified using best professional judgment to provide reasonable improvements in stormwater management. Please contact the Manual Administrator for assistance.

## **Relationship to Thurston County Code**

This Manual has been adopted by the Thurston County Board of Commissioners and is part of Thurston County Code. Title 15.05 of Thurston County Code adopts the 2016 DDECM as if set out in full. Failure to comply may trigger administrative or enforcement action and result in project delays, fines, civil, or criminal penalties.

## **How This Manual is Organized**

### **Overview of Manual Content**

The Manual includes the following:

- *Core Requirements* that cover a range of issues, such as preparation of drainage plans and reports, construction stormwater pollution prevention, treatment of runoff, control of stormwater flow volumes, protection of wetlands, and long-term operation and maintenance requirements. The Core 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 Core Requirements. BMPs are divided into those for short-term control of stormwater from construction sites, and those addressing long-term management of stormwater at developed sites. Long-term BMPs are further subdivided into those that cover management of the volume and timing of stormwater flows, prevention of pollution from potential sources, and treatment of runoff to remove sediment and other pollutants.

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<sup>1</sup> Please call 360-754-4681, Option 5

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- *Guidance on how to prepare required submittals* including Abbreviated and Engineered Abbreviated Drainage Plans and full Drainage and Erosion Control Plans. The full Drainage and Erosion Control Plan is a comprehensive report and plan that describes existing conditions, explains development plans, examines potential off-site effects, identifies applicable Core Requirements, and proposes stormwater controls for both the construction phase and long-term stormwater management. Depending on the project type and size, one of these plans will be submitted to the County to evaluate a proposed project for compliance with stormwater requirements.

The Manual is organized into five volumes, each addressing a specific aspect of stormwater management in Thurston County:

- **Volume I** summarizes Core Requirements, describes submittal requirements, and contains detailed guidance for the selection of Best Management Practices (BMPs) for on-site measures, Low Impact Development (LID), water quality treatment, and flow control.
- **Volume II** describes BMPs and submittal requirements for temporary stormwater management (erosion and sediment control) at construction sites.
- **Volume III** explains hydrologic analysis, modeling, BMP sizing techniques and requirements for conveyance design. Volume III also provides guidance on field and analytical methods to determine infiltration rates and site suitability criteria, to ensure that infiltration facilities are sited in a manner that protects groundwater.
- **Volume IV** describes source control BMPs used to minimize pollution generated by pollution sources on developed sites.
- **Volume V** describes and provides detailed design guidance for BMPs to control stormwater flows and treat runoff that contains sediment or other pollutants from developed sites.

## How to Use this Manual

This Manual has applications for a variety of users. Project proponents should start by:

- Review Chapter 2 of Volume I to determine which of the 11 Core Requirements apply to their project,
- Go on to Chapter 3 of Volume I to determine what submittals will be required, what the submittals shall contain and what site investigations, studies, and mapping will be required.
- Chapter 4 of Volume I will help determine what BMPs should be applied to meet the requirements for on-site measures (LID), flow control and runoff treatment.

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- Use the guidance in Volume II to prepare a Construction Stormwater Pollution Prevention Plan (Temporary Erosion and Sediment Control Plan) for your project.
  - Volume III provides detailed guidance on hydrologic modeling, conveyance system (pipes, outfalls, etc.) design and establishing design infiltration rates for infiltration facilities (ponds, trenches, bioretention, etc.).
  - Once the appropriate BMPs are selected, use Volume V to site and design the selected BMPs. Pay particular attention to Appendix E of Volume V for minimum setbacks from stormwater facilities to drinking water wells, steep slopes, buildings, drainfields, etc.

## **Related Plans, Permits, and Manuals**

### **The Puget Sound Action Agenda**

The Puget Sound Partnership’s 2014/2015 Action Agenda identifies a coordinated, regional approach to reducing the sources of water pollution in Puget Sound that reflects six primary objectives. Urban stormwater is the focus of objective #2:

*Use a comprehensive integrated approach to managing urban stormwater and rural surface water runoff to reduce stormwater volumes and pollutant loadings.*

The Actions that the Action Agenda identifies to achieve this objective that are applicable to Thurston County include:

- Implement the municipal stormwater Phase II permit to achieve overall water quality standards and reduce discharges from municipal stormwater systems.
- Advance the use of LID approaches to stormwater management and provide comprehensive guidance and standards regarding LID practices.
- Prioritize and implement stormwater retrofits in urbanized areas, including roads.

Publication of this *DDECM* contributes to meeting the objectives of the Action Agenda for Thurston County. For more information, see the Puget Sound Partnership website at: <http://www.psp.wa.gov/>.

### **Phase II NPDES and State Waste Discharge Stormwater Permits for Municipalities**

In western Washington, the Washington State Department of Ecology (“Ecology”) has issued joint NPDES and state waste discharge permits to regulate stormwater discharges from municipal separate storm sewer systems (MS4) operated by small cities and counties, including the urban parts of Thurston County. There are over 100 municipalities and counties in Washington that are subject to the Phase II requirements.

Ecology first issued a Western Washington Phase II Municipal Stormwater Permit in 2007. The current Phase II NPDES Municipal Stormwater Permit was issued on August 1, 2012 and is

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effective from August 1, 2013 to July 31, 2018. It is available on Ecology's website: <http://www.ecy.wa.gov/programs/wq/stormwater/municipal/PermitsPermittees.html>.

As a Phase II NPDES permittee, Thurston County must refer to Appendix 1 of the permit rather than relying on Ecology's 2012 Stormwater Management Manual for Western Washington (SWMMWW) to establish Core Requirements, thresholds, and definitions that must be implemented within the urban areas of the County. The permit also directs the County to require site planning processes and BMP selection and design criteria contained within Ecology's 2012 SWMMWW or an Ecology approved equivalent manual.

The current Phase II NPDES Municipal Stormwater Permit also includes language that makes the use of Low Impact Development stormwater management techniques mandatory, where feasible. This Manual has adopted those requirements for all of Thurston County; however, some areas may have different requirements from other areas. For instance, urban areas of Thurston County (inside the Phase II NPDES Permit boundary or inside an Urban Growth area) have different requirements than the rural areas of the County.

The Phase II NPDES Municipal Stormwater Permit is reissued approximately every 5 years. Future permits may require additional stormwater requirements. Within the timeframes required by future permits, Thurston County will update this DDECM to reflect the new permit conditions.

Only those areas of unincorporated Thurston County that have population densities meeting the criteria of the NPDES Phase II program are covered by the permit. This is principally the area surrounding the incorporated cities of Lacey, Olympia, and Tumwater and includes portions of areas designated as urban growth areas as well as areas outside of the urban growth areas. The applicant should check with Thurston County to determine the current NPDES permit boundary if this information is necessary for the project.

### **NPDES and State Waste Discharge Baseline General Permit for Stormwater Discharges Associated With Industrial Activities (Industrial Stormwater Permit)**

Businesses subject to the *Baseline General Permit for Stormwater Discharges Associated with Industrial Activities* must manage stormwater in accordance with specific terms and conditions including the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP), monitoring, reporting, and ongoing adaptive management based on sampling and inspections. See the following website for more information: <http://www.ecy.wa.gov/programs/wq/stormwater/industrial/index.html>.

New development and redevelopment subject to the Industrial Stormwater Permit are also required to comply with the applicable provisions of the Thurston County *DDECM*. Where the Industrial Stormwater Permit and the requirements of this Manual conflict, the more restrictive provisions will govern.

### **NPDES Construction Stormwater General Permit**

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Coverage under Ecology’s Construction Stormwater General Permit is generally required for any clearing, grading, or excavating if the project site:

- Discharges stormwater from the site into surface water(s) of the State, or
- Discharges into storm drainage systems that discharges to surface water(s) of the State, or
- Discharges to or causes trackout that could enter the Thurston County MS4

**And**

- Disturbs one or more acres of land area, or
- Disturbs less than one 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 Thurston County determines to be a significant contributor of pollutants to waters of the State may also require permit coverage, regardless of project size.

### **WSDOT Highway Runoff Manual (HRM)**

The HRM addresses stormwater runoff issues for typical WSDOT roadway construction and maintenance activities. It has been granted equivalent status by Ecology and can, therefore, be adopted by other jurisdictions. Thurston County Public Works Department road projects may use the HRM or the DDECM to meet stormwater requirements for the project. The most recent version of the HRM including any amendments, revisions or addendum, shall be used and can be found at the following website:

<<http://www.wsdot.wa.gov/Environment/WaterQuality/Runoff/HighwayRunoffManual.htm>>.

### **2012 Low Impact Development Technical Guidance Manual for Puget Sound (LID Manual)**

The LID Manual is published by the Puget Sound Partnership and provides current guidance on LID techniques and design procedures in Washington State. The Ecology Manual recognizes the LID Manual and references it in its *Stormwater Management Manual for Western Washington*. The LID Manual was updated in 2012 and can be found at the following website:

<<http://www.psp.wa.gov/documents.php>>.

### **Other State and Federal Permits**

Your project may require additional permits, depending on location and type of development. These permits may include one or more of the following, which are described in detail in the Ecology *Stormwater Management Manual for Western Washington*:

- **Endangered Species Act (ESA):** Potentially restricts construction and development activities that affect ESA-listed species or their habitat.

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Consultation with the National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries), or the U.S. Fish and Wildlife Service (USFWS) may be required and conditions imposed such as preparation of a Habitat Conservation Plan or issuance of a permit for “incidental takes.”

- **Section 401 Water Quality Certifications:** Certification required for projects that require a fill or dredge permit under Section 404 of the Clean Water Act. Ecology must certify to the U.S. Army Corps of Engineers that the proposed project will not violate water quality standards. Ecology may condition its certification to require application of more stringent standards than those included in this Manual.
- **Hydraulic Project Approvals:** Permit issued by Washington State Department of Fish and Wildlife (WDFW), required when project-related stormwater discharges would change the natural flow or bed of state waters or work is required below the ordinary high water level of a lake or stream. WDFW may require application of more stringent requirements than those included in this Manual if determined necessary to protect fish and wildlife.
- **Aquatic Lands Use Authorizations:** 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. WDNR may require application of more stringent requirements than those included in this Manual if deemed necessary to protect the quality of the state’s aquatic lands.
- **Underground injection control program:** An Ecology program (WAC 173-218) which may require registration or restrictions for certain infiltration systems (see Volume V, Section 3.1.3 for more information).

## Local Government Permits

Your project will require some form of permit or land use review/acceptance from Thurston County depending on the location and type of project/development. Many of these permits also require a drainage review in accordance with the Manual. These permits can include the following:

- Building Permit
- Construction Permit (Excavation, Grading, Clearing & Erosion Control)
- Short Plat Subdivision
- Large Lot Subdivision
- Long Subdivision
- Class IV Forest Practices Permit

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- SEPA Approval
  - Critical Areas Review
  - Road Encroachment Permit
  - Site Plan Review
  - Binding Site Plan
  - Design Review
  - Contact Thurston County Permit Assistance Center for help in determining the permits that apply to your project: <[www.co.thurston.wa.us/permitting](http://www.co.thurston.wa.us/permitting)>.

### **Requirements Identified through Watershed and Basin Planning or Total Maximum Daily Loads (TMDLs)**

Some requirements in this Manual may be superseded by adopting ordinances and rules to implement watershed or basin plan recommendations.

Basin plans are thorough investigations of water problems and potential solutions for a specific drainage basin. Basin plans address issues such as flooding, poor water quality, erosion, and the degradation of aquatic habitat. Basin plans are reviewed and approved by the elected officials of each participating agency. Basin plans in Thurston County are usually written jointly by the County and cities. The plan itself does not fund or authorize projects; however, Thurston County refers to these basin plans when deciding which stormwater construction projects to finance.

Information on Thurston County's basin planning process, including links to current County basin plans, can be found at the following website:  
<<http://www.co.thurston.wa.us/waterresources/basin/basin-home.htm>>.

A requirement of this Manual can also be superseded or added to through the adoption of actions and requirements identified in a total Maximum Daily Load (TMDL) that is approved by EPA. Currently TMDLs are either in progress or completed for the following areas:

- Deschutes River
- Henderson Inlet (Including Woodard Creek & Woodland Creek)
- Nisqually River
- Chehalis & Black Rivers

Ecology develops and maintains the TMDLs. They can be found at Ecology's website at <http://www.ecy.wa.gov/programs/wq/tmdl/TMDLsbyWria/TMDLbyWria.html>

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## Definitions—Generally

For the purposes of interpreting this Manual, unless it is plainly evident from the context that a different meaning is intended, certain words and terms are defined in this section as follows:

- The words "shall," "will," and "must" are always mandatory, while the word "should" is situation-specific and not mandatory, and "may" is situation-specific and permissive. For any project, the Administrator or designee is authorized to determine if situation-specific requirements are applicable.
- Words in the present tense include the future, the singular includes the plural and the plural includes the singular.
- The word "and" indicates that all connected items or provisions apply.
- The word "or" indicates that the connected items or provisions may apply singularly or in any combination.
- The term "either or" indicates that the connected items or provisions shall apply singularly but not in combination.
- Where terms are not specifically defined in this Manual (see Glossary at end of this Chapter), the following sources, in order of their use, shall be referred to by the Drainage Manual Administrator to establish a definition of the term:

*Washington State Department of Ecology Stormwater Management Manual for Western Washington (2012)*

Pierce County Stormwater and Site Development Manual. Other Phase I NPDES Permittee Ecology approved equivalent stormwater manuals for jurisdictions located in Western Washington (City of Tacoma, King County, Clark County, City of Seattle, Snohomish County)

Other Phase II NPDES Permittee stormwater management manuals for jurisdictions located in Western Washington.

Low Impact Development Manual for Puget Sound (PSP, 2012).

Thurston County Code

Current industry standard text books, guidance documents, or reports

If not defined in the above sources, then words shall have their ordinary accepted meanings within the context with which they are used. Webster's Third New International Dictionary of the English Language, Unabridged, 1986 Edition, shall be considered in determining ordinarily accepted meanings.

Illustrations found in this Manual are not intended to supersede or replace written definitions, restrictions, or standards.

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## II. Glossary

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<b>303(d) waterbody</b>	A list of lakes, rivers, and streams designated as impaired or threatened by a pollutant for which one or more TMDLs are needed. “Impaired” means the water is not meeting water quality standards.
<b>Aeration</b>	The process of being supplied or impregnated with air. In waste treatment, the process used to foster biological and chemical purification. In soils, the process by which air in the soil is replenished by air from the atmosphere. In a well aerated soil, the soil air is similar in composition to the atmosphere above the soil. Poorly aerated soils usually contain a much higher percentage of carbon dioxide and a correspondingly lower percentage of oxygen.
<b>Adjacent steep slope</b>	A slope with a gradient of 15 percent or steeper within five hundred feet of the site.
<b>Adjustment</b>	A variation in the application of a Core Requirement to a particular project. Adjustments provide substantially equivalent environmental protection.
<b>Administrator</b>	The Drainage Manual Administrator is the Thurston County official authorized to make decisions in regard to Adjustments and Exceptions/Variations, issue clarifications and modifications to the DDECM approve or accept specific actions where such approval or acceptance is required by the DDECM, provide interpretations when requested, and initiate formal policy documents related to the DDECM with Departmental Director and Board of County Commissioner approval, as required. The Drainage Manual Administer is currently the Water Resources Program Manager or his/her designee (TCC Title 15.05).
<b>Antecedent moisture conditions</b>	The degree of wetness of a watershed or within the soil at the beginning of a storm.
<b>Anti-seep collar</b>	A device constructed around a pipe or other conduit and placed through a dam, levee, or dike for the purpose of reducing seepage losses and piping failures.
<b>Applicable BMPs</b>	As used in Volume IV (Source Control), applicable BMPs are those source control BMPs required at new development and redevelopment sites. Applicable BMPs may also be required for existing development when subject to source control planning and pollution prevention in accordance with other provisions of Thurston County code such as the IDDE Ordinance (TCC Title 15.07).
<b>Applicant</b>	The person who has applied for a development permit or approval, typically the owner, but may be a developer or owner’s representative.

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<b>Appurtenances</b>	Machinery, appliances, or auxiliary structures attached to a main structure, but not considered an integral part thereof, for the purpose of enabling it to function.
<b>Aquifer</b>	A geologic strata containing water that can be withdrawn and used for human purposes.
<b>Arterial</b>	Road or street primarily for through traffic. The term generally includes roads or streets considered collectors. It does not include local access roads which are generally limited to providing access to abutting property. See also RCW 35.78.010, RCW 36.86.070, and RCW 47.05.021.
<b>As-built drawings</b>	Engineering plans which have been revised to reflect all changes to the plans which occurred during construction. Also referred to as “record drawings.”
<b>Backwater</b>	Water upstream from an obstruction which is deeper than it would normally be without the obstruction.
<b>Bankfull discharge</b>	A flow condition where streamflow completely fills the stream channel up to the top of the bank. In undisturbed watersheds, the discharge conditions occur on average every 1.5 to 2 years and controls the shape and form of natural channels.
<b>Base flood</b>	A flood having a one percent chance of being equaled or exceeded in any given year. This is also referred to as the 100-year flood.
<b>Base flood elevation</b>	The water surface elevation of the base flood. It shall be referenced to the National Geodetic Vertical Datum of 1929 (NGVD).
<b>Basin</b>	Any area draining to a point of interest.
<b>Basin plan</b>	<p>A plan that assesses, evaluates, and proposes solutions to existing and potential future impacts to the beneficial uses of, and the physical, chemical, and biological properties of waters of the state within a basin. Basins typically range in size from 1 to 50 square miles. A plan should include but not be limited to recommendations for:</p> <ul style="list-style-type: none"> <li>• Stormwater requirements for new development and redevelopment;</li> <li>• Capital improvement projects;</li> <li>• Land Use management through identification and protection of critical areas, comprehensive land use and transportation plans, zoning regulations, site development standards, and conservation areas;</li> <li>• Source control activities including public education and involvement, and business programs;</li> </ul>

- Other targeted stormwater programs and activities, such as maintenance, inspections and enforcement;
- Monitoring; and
- An implementation schedule and funding strategy.

A plan that is “adopted and implemented” must have the following characteristics:

- It must be adopted by legislative or regulatory action of jurisdictions with responsibilities under the plan;
- Ordinances, regulations, programs, and procedures recommended by the plan should be in effect or on schedule to be in effect; and
- An implementation schedule and funding strategy that are in progress.

<b>Bench</b>	A relatively level step excavated into earth material on which fill is to be placed.
<b>Berm</b>	A constructed barrier of compacted earth, rock, or gravel. In a stormwater facility, a berm may serve as a vertical divided typically built up from the bottom.
<b>Best management practice (BMP)</b>	The schedules of activities, prohibitions of practices, maintenance procedures, and structural and/or managerial practices, that when used singly or in combination, prevent or reduce the release of pollutants and other adverse impacts to waters of Washington State.
<b>Bioengineering</b>	The combination of biological, mechanical, and ecological concepts (and methods) to control erosion and stabilize soil through the use of vegetation or in combination with construction materials.
<b>Biofilter</b>	A designed treatment facility using a combined soil and vegetation system for filtration, infiltration, adsorption, and biological uptake of pollutants in stormwater when runoff flows over and through. Vegetation growing in these facilities acts as both a physical filter which causes gravity settling of particulate by regulating velocity of flow, and also as a biological sink when direct uptake of dissolved pollutants occurs. The former mechanism is probably the most important in western Washington where the period of major runoff coincides with the period of lowest biological activity.
<b>Biofiltration</b>	The process of reducing pollutant concentrations in water by filtering the polluted water through biological materials.
<b>Bioretention BMP</b>	Engineered facilities that treat stormwater by passing it through a specified soil profile, and either retain or detain the treated stormwater

	for flow attenuation. Refer to Volume V, Chapter 2 for Bioretention BMP types and design specifications.
<b>Bollard</b>	A post (may or may not be removable) used to prevent vehicular access.
<b>Bond</b>	A surety bond, cash deposit or escrow account, assignment of savings, irrevocable letter of credit or other means acceptable to or required by the Thurston County to guarantee that work is completed in compliance with the project's drainage plan and in compliance with all County requirements.
<b>Buffer</b>	The zone contiguous with a sensitive area that is required for the continued maintenance, function, and structural stability of the sensitive area. The critical functions of a riparian buffer (those associated with an aquatic system) include shading, input of organic debris and coarse sediments, uptake of nutrients, stabilization of banks, interception of fine sediments, overflow during high water events, protection from disturbance by humans and domestic animals, maintenance of wildlife habitat, and room for variation of aquatic system boundaries over time due to hydrologic or climatic effects. The critical functions of terrestrial buffers include protection of slope stability, attenuation of surface water flows from stormwater runoff and precipitation, and erosion control.
<b>Catch basin</b>	A chamber or well, usually built at the curb line of a street, for the admission of surface water to a sewer or subdrain, having at its base a sediment sump designed to retain grit and detritus below the point of overflow.
<b>Cation Exchange Capacity (CEC)</b>	The amount of exchangeable cations that a soil can adsorb. Units are milli-equivalents per 100 g of soil, typically abbreviated simply as meq. Soil found to have a CEC of 5 meq at pH 7.0 will have CEC < 5 meq when pH < 7.
<b>Certified Erosion and Sediment Control Lead (CESCL)</b>	An individual who has current certification through an approved erosion and sediment control training program that meets the minimum training standards established by the Washington State Department of Ecology (Ecology) (see BMP C160 in Volume II). A CESCL is knowledgeable in the principles and practices of erosion and sediment control. The CESCL must have the skills to assess site conditions and construction activities that could impact the quality of stormwater and the effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges. Certification is obtained through an Ecology approved erosion and sediment control course. Course listings are provided online at Ecology's website.

<b>Channel</b>	A feature that conveys surface water and is open to the air.
<b>Channel, constructed</b>	Channels or ditches constructed (or reconstructed natural channels) to convey surface water.
<b>Channel, natural</b>	Streams, creeks, or swales that convey surface/ground water and have existed long enough to establish a stable route and/or biological community.
<b>Check dam</b>	Small dam constructed in a channel, swale, gully or other small watercourse to decrease the streamflow velocity, minimize channel scour, and promote deposition of sediment.
<b>Civil engineer</b>	A professional engineer licensed in the State of Washington in Civil Engineering.
<b>Clay lens</b>	A naturally occurring, localized area of clay which acts as an impermeable layer to runoff infiltration.
<b>Clearing</b>	The destruction, removal, or disposal of vegetation by manual, mechanical, or chemical methods. Clearing includes logging, even when the understory of vegetation is not being removed.
<b>Closed depression</b>	An area which is low-lying and either has no, or such a limited, surface water outlet that during storm events the area acts as a retention basin.
<b>Commercial agriculture</b>	Those activities conducted on lands defined in RCW 84.34.020(2), and activities involved in the production of crops or livestock for commercial trade. An activity ceases to be considered commercial agriculture when the area on which it is conducted is proposed for conversion to a nonagricultural use or has lain idle for more than five (5) years, unless the idle land is registered in a federal or state soils conservation program, or unless the activity is maintenance of irrigation ditches, laterals, canals, or drainage ditches related to an existing and ongoing agricultural activity.
<b>Common plan of development or sale</b>	A site where multiple separate and distinct construction activities may be taking place at different times on different schedules and/or by different contractors, but still under a single plan. Examples include: 1) phase projects and projects with multiple filings or lots, even if the separate phases or filings/lots will be constructed under separate contract or by separate owners (e.g., a development where lots are sold to separate builders); 2) a development plan that may be phased over multiple years, but is still under a consistent plan for long-term development; 3) projects in a contiguous area that may be unrelated but still under the same contract, such as construction of a building extension and a new parking lot at the same facility; and 4) linear projects such as roads, pipelines, or utilities. If the project is part of a

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	common plan of development or sale, the disturbed area of the entire plan must be used to determine permit requirements and thresholds for application of Core Requirements.
<b>Compost</b>	Organic solid waste that has undergone biological degradation and transformation under controlled conditions designed to promote aerobic decomposition at a solid waste facility in compliance with the requirements of Chapter 173-350 WAC. Natural decay of organic solid waste under uncontrolled conditions does not result in composted material.
<b>Composted mulch</b>	Mulch prepared from decomposed organic materials that have undergone a controlled process to minimize weed seeds. Acceptable feedstocks include, but are not limited to, yard debris, wood waste, land clearing debris, brush, and branches.
<b>Constructed wetland</b>	Those wetlands intentionally created on sites that are not wetlands for the primary purpose of wastewater or stormwater treatment and managed as such. Constructed wetlands are normally considered as part of the stormwater collection and treatment system.
<b>Converted vegetation (areas)</b>	The surfaces on a project site where native vegetation, pasture, scrub/shrub, or unmaintained non-native vegetation (e.g. Himalayan blackberry, scotch broom) are converted to lawn or landscaped areas, or where native vegetation is converted to pasture.
<b>Closed Depression</b>	An area which is low-lying and either has no, or such a limited surface water outlet that during storm events, the area acts as a retention basin.
<b>Conveyance</b>	A mechanism for transporting water from one point to another, including pipes, ditches, and channels.
<b>Conveyance system</b>	The drainage facilities, both natural and man-made, which collect, contain, and provide for the flow of surface and stormwater from the highest points on the land down to receiving water. The natural elements of the conveyance system include swales and small drainage courses, streams, rivers, lakes, and wetlands. The human-made elements of the conveyance system include gutters, ditches, pipes, channels, and most retention/detention facilities.
<b>Critical areas</b>	At a minimum, areas which include wetlands, areas with a critical recharging effect on aquifers used for potable water, fish and wildlife habitat conservation areas, frequently flooded areas, geologically hazardous areas, including unstable slopes, and associated areas and ecosystems. Critical areas are those areas as defined by Thurston County Code, Titles 17 and 24, as applicable.
<b>Critical drainage area</b>	An area with such severe flooding, drainage and/or erosion/sedimentation conditions that the area has been formally

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	adopted as a Critical Drainage Area by rule under the procedures specified in an ordinance.
<b>Culvert</b>	Pipe or concrete box structure that drains open channels, swales or ditches under a roadway or embankment. Typically with no catch basins or manholes along its length.
<b>Curb and gutter barrier</b>	An element of a roadway that prevents sheet flow of runoff from the roadway surface at the road edge and concentrates the flow for conveyance through a gutter to either a point of discharge or a catch basin structure and/or piping system. This includes rolled curbs, inverted crown roadway, asphalt wedge curbs and concrete curb and gutters.
<b>Dead storage</b>	The volume available in a depression in the ground below any conveyance system, or surface drainage pathway, or outlet invert elevation that could allow the discharge of surface and stormwater runoff.
<b>Dedication of land</b>	Refers to setting aside a portion of a property for a specific use or function.
<b>Depression storage</b>	The amount of precipitation that is trapped in depressions on the surface of the ground.
<b>Design engineer</b>	The professional civil engineer licensed in the State of Washington who prepares and stamps the analysis, design, and engineering plans for an applicant's permit or approval submittal.
<b>Design storm</b>	A prescribed hyetograph and total precipitation amount (for a specific duration recurrence frequency) used to estimate runoff for a hypothetical storm of interest or concern for the purposes of analyzing existing drainage, designing new drainage facilities or assessing other impacts of a proposed project on the flow of surface water. (A hyetograph is a graph of percentages of total precipitation for a series of time steps representing the total time during which the precipitation occurs.)
<b>Detention</b>	The release of stormwater runoff from the site at a slower rate than it is collected by the stormwater facility system, the difference being held in temporary storage.
<b>Detention facility</b>	An above or below ground facility, such as a pond or tank, that temporarily stores stormwater runoff and subsequently releases it at a slower rate than it is collected by the drainage facility system. There is little or no infiltration of stored stormwater.
<b>Development</b>	New development, redevelopment or both. See definitions for each.

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<b>Discharge point</b>	The location where a discharge leaves the Permittee’s MS4 through the Permittee’s MS4 facilities/BMPs designed to infiltrate.
<b>Dispersion</b>	Release of surface and stormwater runoff from a developed area or drainage facility system such that the flow spreads over a wide area and is located so as not to allow flow to concentrate anywhere upstream of a drainage channel with erodible underlying granular soils.
<b>Ditch</b>	A long narrow excavation dug in the earth for drainage with its top width less than 10 feet at design flow.
<b>Drainage channel</b>	A drainage pathway with a well-defined bed and banks indicating frequent conveyance of surface and stormwater runoff.
<b>Drainage course</b>	A pathway for watershed drainage characterized by wet soil vegetation; often intermittent in flow.
<b>Drainage easement</b>	A legal encumbrance that is placed against a property's title to reserve specified privileges for the users and beneficiaries of the drainage facilities contained within the boundaries of the easement.
<b>Drainage Plan or Drainage and Erosion Control Plan</b>	The comprehensive report containing all the technical information and analysis necessary for Thurston County to evaluate a proposed new development or redevelopment project for compliance with stormwater requirements. Contents of the Drainage Plan will vary with the type and size of the project, and individual site characteristics. It may include a Construction Stormwater Pollution Prevention Plan (Construction SWPPP, Drainage Report, Pollution Source Control Plan, Maintenance Plan, Geotechnical Report and Construction Drawings (Permanent Stormwater Control Plan).
<b>Drainage, soil</b>	<p>A natural condition of the soil, soil drainage refers to the frequency and duration of periods when the soil is free of saturation; for example, in well-drained soils the water is removed readily but not rapidly; in poorly drained soils the root zone is waterlogged for long periods unless artificially drained, and the roots of ordinary crop plants cannot get enough oxygen; in excessively drained soils the water is removed so completely that most cop plants suffer from lack of water. Strictly speaking, excessively drained soils are a result of excessive runoff due to steep slopes or low available water-holding capacity due to small amounts of silt and clay in the soil material. The following classes are used to express soil drainage (Refr. NRCS Soil Survey):</p> <ul style="list-style-type: none"> <li>• Excessively drained – Water moves through the soil very rapidly. Internal free water commonly is very rare or very deep. The soils are commonly course-textured and have very high saturated hydraulic conductivity.</li> </ul>

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- Somewhat excessively drained – Water moves through the soil rapidly. Internal free water commonly is very rare or very deep. The soils are commonly course-textured and have high saturated hydraulic conductivity.
  - Well drained -- Excess water drains away readily, but not rapidly and no mottling occurs within 36 inches of the surface. The soil commonly has a moderate saturated hydraulic conductivity.
  - Moderately well drained – Water moves through the soil slowly during some periods of the year. The soil is wet for only a short time within the rooting depth during the growing season. The soil commonly has a moderately low, or lower saturated hydraulic conductivity.
  - Somewhat poorly drained -- Water is removed from the soil slowly enough to keep it wet for significant periods but not all of the time. Mottling occurs between 8 and 18 inches. The soil commonly has a low or very low saturated hydraulic conductivity, or a high water table, or receives water from lateral flow, or persistent rainfall, or some combination of these factors.
  - Poorly drained -- Water is removed so slowly that the soil is wet for a large part of the time. Mottling occurs between 0 and 8 inches. Typical low or very low saturated hydraulic conductivity.
  - Very poorly drained -- Water is removed so slowly that the water table remains at or near the surface for the greater part of the time. There may also be periods of surface ponding. The soil has a black to gray surface layer with mottles up to the surface.

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**Drawdown** Lower of the water surface (in open channel flow), water table or piezometric surface (in ground water flow) resulting from a withdrawal of water.

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**Dry season** The season in which little rainfall occurs. In Western Washington, from May 1 through September 30.

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**Earth material** Any rock, natural soil or fill and/or any combination thereof. Earth material shall not be considered topsoil used for landscape purposes. Topsoil used for landscaped purposes shall comply with ASTM D 5268 specifications. Engineered soil/landscape systems are also defined independently.

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**Easement** The legal right to use a parcel of land for a particular purpose. It does not include fee ownership, but may restrict the owner’s use of the land.

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**Ecology** Washington Department of Ecology. The agency responsible for implementing the stormwater control required by the Clean Water Act.

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<b>Embankment</b>	A structure of earth, gravel, or similar material raised to form a pond bank or foundation for a road.
<b>Erosion</b>	The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep. Also, detachment and movement of soil or rock fragments by water, wind, ice, or gravity.
<b>ESA</b>	Endangered Species Act
<b>Effective impervious surface</b>	Those impervious surfaces that are connected via sheet flow or discrete conveyance to a drainage system. Impervious surfaces are considered ineffective if: 1) the runoff is dispersed through at least one hundred feet of native vegetation in accordance with BMP LID.11 – “Full Dispersion,” as described in Volume V, Chapter 2; 2) residential roof runoff is infiltrated in accordance with Downspout Full Infiltration Systems in BMP LID.04 in Volume V, Chapter 2; or 3) approved continuous runoff modeling methods indicate that the entire runoff file is infiltrated.
<b>Emergency spillway</b>	A spill lined or vegetated earth channel used to safely convey flood discharges in excess of the capacity of the principal spillway.
<b>Emerging technology</b>	Treatment technologies that have not been evaluated with approved protocols, but for which preliminary data indicate that they may provide a necessary function(s) in a stormwater treatment system. Emerging technologies need additional evaluation to define design criteria to achieve, or to contribute to achieving, state performance goals, and to define the limits of their use.
<b>Energy dissipater</b>	Any means by which the total energy of flowing water is reduced. In stormwater design, they are usually mechanisms that reduce velocity prior to, or at, discharge from an outfall in order to prevent erosion. They include rock splash pads, drop manholes, concrete stilling basins or baffles, and check dams.
<b>Engineered soil/landscape system</b>	<p>This is a self-sustaining soil and plant system that simultaneously supports plant growth, soil microbes, water infiltration, nutrient and pollutant adsorption, sediment and pollutant biofiltration, water interflow, and pollution decomposition. The system shall be protected from compaction and erosion. The system shall be planted and/or mulched as part of the installation.</p> <p>The engineered soil/plant system shall have the following characteristics:</p> <ol style="list-style-type: none"> <li>a. Be protected from compaction and erosion.</li> <li>b. Have a plant system to support a sustained soil quality.</li> </ol>

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	<p>c. Possess permeability characteristics of not less than 6.0, 2.0, and 0.6 inches/hour for hydrologic soil groups A, B, and C, respectively (per ASTM D3385). D is less than 0.6 inches/hour.</p> <p>d. Possess minimum percent organic matter of 12, 14, 16 and 18 percent (dry-weight basis) for hydrologic soil groups A, B, C, and D, respectively (per ASTM D2974).</p>
<b>Erodible or leachable materials</b>	Wastes, chemicals, or other substances that measurably alter the physical or chemical characteristics of runoff when exposed to rainfall. Examples include erodible soils that are stockpiled, uncovered process wastes, manure, fertilizers, oily substances, ashes, kiln dust, and garbage dumpster leakage.
<b>Erodible soils or earth</b>	Any surface where soils grindings, or other materials may be capable of being displaced and transported by rain, wind, or surface water runoff.
<b>Evapotranspiration</b>	The collective term for the processes of evaporation and plant transpiration by which water is returned to the atmosphere.
<b>Excavation</b>	The mechanical removal of earth material.
<b>Exception (Variance)</b>	Relief from the application of a Core Requirement to a project.
<b>Exfiltration</b>	The downward movement of runoff through the bottom of an infiltration BMP into the soil layer or the downward movement of water through soil.
<b>Fertilizer</b>	Any material or mixture used to supply one or more of the essential plant nutrients.
<b>Fill</b>	A deposit of earth material placed by artificial means.
<b>Filter fabric</b>	A woven or nonwoven, water-permeable material generally made of synthetic products such as polypropylene and used in stormwater management and erosion and sediment control applications to trap sediment or prevent the clogging of aggregates by fine soil particles.
<b>Filter fabric fence (silt fence)</b>	A temporary sediment barrier consisting of a filter fabric stretched across and attached to supporting posts and entrenched. The filter fence is constructed of stakes and synthetic filter fabric with a rigid wire fence backing where necessary for support. Also commonly referred to in the Washington Department of Transportation standard specifications as “construction geotextile for temporary silt fences.”
<b>Filter strip</b>	A grassy area with gentle slopes that treats stormwater runoff from adjacent paved areas before it concentrates into a discrete channel.

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<b>Fish bearing stream</b>	A stream is generally considered fish-bearing in Western Washington if it is 2 feet or greater in width and has a gradient of 20 percent or less. Intermittent streams may also be fish-bearing for those times during which the stream is flowing. Includes lakes or ponds connected to a known fish-bearing water by a stream channel of similar dimensions as above.
<b>Flocculation</b>	The process by which suspended colloidal or very fine particles are assembled into larger masses or floccules which eventually settle out of suspension. This process occurs naturally but can also be caused through the use of such chemicals as alum.
<b>Flood hazard areas</b>	Those areas subject to inundation by the base flood. Includes, but is not limited to streams, lakes, wetlands, and closed depressions.
<b>Floodplain</b>	The total area subject to inundation by a flood including the flood fringe and floodway.
<b>Floodway</b>	The channel of the river or stream and those portions of the adjoining floodplains that are reasonably required to carry and discharge the base flood flow. The portions of the adjoining floodplains which are considered to be “reasonably required” is defined by flood hazard regulations.
<b>Flow control BMP (or facility)</b>	A drainage facility designed to mitigate the impacts of increased surface and stormwater runoff flow rates generated by development. Flow control facilities are designed either to hold water for a considerable length of time and then release it by evaporation, plant transpiration, and/or infiltration into the ground, or to hold runoff for a short period of time, releasing it to the conveyance system at a controlled rate.
<b>Flow duration</b>	The aggregate time that peak flows are at or above a particular flow rate of interest. For example, the amount of time that peak flows are at or above 50% of the 2-year peak flow rate for a period of record.
<b>Flow frequency</b>	The inverse of the probability that the flow will be equaled or exceeded in any given year (the exceedance probability). For example, if the exceedance probability is 0.01 or 1 in 100, that flow is referred to as the 100-year flow.
<b>Forebay</b>	An easily maintained, extra storage area provided near an inlet of a BMP to trap incoming sediments before they accumulate in a pond or wetland BMP.
<b>Freeboard</b>	The vertical distance between the design water surface elevation and the elevation of the barrier that contains the water.

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<b>Frequency of storm (design storm frequency)</b>	The anticipated period in years that will elapse, based on average probability of storms in the design region, before a storm of a given intensity and/or total volume will recur; thus a 10-year storm can be expected to occur on the average once every 10 years. Sewers designed to handle flows that occur under such storm conditions would be expected to be surcharged by any storms of greater amount or intensity.
<b>Frequently flooded areas</b>	The 100-year floodplain (base flood) designation is of the Federal Emergency Management Agency and the National Flood Insurance Program or as defined by Thurston County Code.
<b>Gabion</b>	A rectangular or cylindrical wire mesh cage (a chicken wire basket) filled with rock and used as a protecting agent, revetment, etc., against erosion. Soft gabions, often used in Streambank stabilization, are made of geotextiles filled with dirt, in between which cuttings are placed.
<b>Geologically hazardous areas</b>	Also known as “geologic hazard areas”, are areas that because of their susceptibility to erosion, sliding, earthquake, or other geological events, are not suited to the siting of commercial, residential, or industrial development consistent with public health or safety concerns. See also Thurston County Critical Areas Ordinance, TCC Title 24.
<b>Geotechnical professional civil engineer</b>	A practicing, geotechnical/civil engineer licensed as a professional Civil Engineer with the State of Washington who has at least four years of professional employment as a geotechnical engineer in responsible charge, including experience with landslide evaluation.
<b>Ground water</b>	Water in a saturated zone or stratum beneath the land surface or a surface waterbody. Refer to chapter 173-200 WAC.
<b>Groundwater table</b>	The free surface of the ground water, that surface subject to atmospheric pressure under the ground, generally rising and falling with the season, the rate of withdrawal, the rate of restoration, and other conditions. It is seldom static.
<b>Habitat</b>	The specific area or environment in which a particular type of plant or animal lives. An organism's habitat must provide all of the basic requirements for life and should be protected from harmful biological, chemical, and physical alterations.
<b>Hard surface</b>	An impervious surface, a permeable pavement, or a vegetated roof.
<b>Hardpan</b>	A cemented or compacted and often clay-like layer of soil that is impenetrable by roots. Also known as glacial till.

<b>Heavy metals</b>	Metals of high specific gravity, present in municipal and industrial wastes that pose long-term environmental hazards. Such metals include cadmium, chromium, cobalt, lead, mercury, nickel, and zinc.
<b>High-use site</b>	<p>High-use sites are those that typically generate high concentrations of oil due to high traffic turnover or the frequent transfer of oil. High-use sites include:</p> <ul style="list-style-type: none"> <li>• An area of a commercial or industrial site subject to an expected average daily traffic (ADT) count equal to or greater than 100 vehicles per 1,000 square feet of gross building area;</li> <li>• An area of a commercial or industrial site subject to petroleum storage and transfer in excess of 1,500 gallons per year, not including routinely delivered heating oil;</li> <li>• An area of a commercial or industrial site subject to parking, storage or maintenance of 25 or more vehicles that are over 10 tons gross weight (trucks, buses, trains, heavy equipment, etc.);</li> <li>• A road intersection with a measured ADT county of 25,000 vehicles or more on the main roadway and 15,000 vehicles or more on any intersecting roadway, excluding projects proposing primarily pedestrian or bicycle improvements.</li> </ul>
<b>Highway</b>	A main public road connecting towns and cities.
<b>Hog fuel</b>	Wood-based mulch.
<b>Hydraulic conductivity</b>	The quality of a saturated soil that enables water or air to move through it. Also known as permeability coefficient.
<b>Hydrograph</b>	A graph of runoff rate, inflow rate or discharge rate, past a specific point over time.
<b>Hydrologic cycle</b>	The circuit of water movement from the atmosphere to the earth and return to the atmosphere through various stages or processes as precipitation, interception, runoff, infiltration, percolation, storage, evaporation, and transpiration.
<b>Hydrologic soil groups</b>	<p>A soil characteristic classification system defined by the U.S. Natural Resources Conservation Service (formerly Soil Conservation Service) in which a soil may be categorized into one of four soil groups (A, B, C, or D) based upon infiltration rate and other properties.</p> <p>Type A: Low runoff potential. Soils having high infiltration rates, even when thoroughly wetted, and consisting chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.</p> <p>Type B: Moderately low runoff potential. Soils having moderate infiltration rates when thoroughly wetted, and consisting chiefly of</p>

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moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

Type C: Moderately high runoff potential. Soils having slow infiltration rates when thoroughly wetted, and consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine textures. These soils have a slow rate of water transmission.

Type D: High runoff potential. Soils having very slow infiltration rates when thoroughly wetted, and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a hardpan, till, or clay layer at or near the surface, soils with a compacted subgrade at or near the surface, and shallow soils or nearly impervious material. These soils have a very slow rate of water transmission.

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<b>Hydrology</b>	The science of the behavior of water in the atmosphere, on the surface of the earth, and underground.
<b>Hydroperiod</b>	A seasonal occurrence of flooding and/or soil saturation; it encompasses depth, frequency, duration, and seasonal pattern of inundation.
<b>Hyetograph</b>	A graph of percentages of total precipitation for a series of time steps representing the total time in which precipitation occurs.
<b>Illicit connection</b>	Any man-made conveyance that is connected to a municipal storm drainage facility without a permit or other form of written approval by the Director, excluding roof drains and other similar type connections. Examples of illicit connections include but are not limited to sanitary sewer connections, floor drains, channels, pipelines, conduits, inlets, or outlets that are connected directly to a municipal storm drainage facility.
<b>Illicit discharge</b>	All non-stormwater discharges to stormwater drainage systems that cause or contribute to a violation of state water quality, sediment quality or ground water quality standards, including but not limited to sanitary sewer connections, industrial process water, interior floor drains, car washing, and greywater systems. See also Thurston County IDDE ordinance, TCC 15.07.
<b>Impact basin</b>	A device to dissipate the energy of flowing water. Generally constructed of concrete in the form of a partially depressed or partially submerged vessel, it may utilize baffles to dissipate velocities.
<b>Impervious</b>	A surface which cannot be easily penetrated. For instance, rain does not readily penetrate paved surfaces.

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<b>Impervious surface</b>	A non-vegetated surface area which either prevents or retards the entry of water into the soil mantle as under natural conditions prior to development. A non-vegetated surface area which causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions prior to development. Common impervious surfaces include, but are not limited to, roof tops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, and oiled, macadam or other surfaces which similarly impede the natural infiltration of stormwater. Open, uncovered retention/detention facilities shall not be considered as impervious surfaces for the purposes of determining whether the thresholds for application of Core Requirements are exceeded. Open, uncovered retention/detention facilities shall be considered impervious surfaces for purposes of runoff modeling.
<b>Impoundment</b>	A natural or man-made containment for surface water.
<b>Industrial activities</b>	Material handling, transportation, or storage; manufacturing; maintenance; treatment; or disposal. Areas with industrial activities include plant yards, access roads and rail lines used by carriers of raw materials, manufactured products, waste material, or by-products; material handling sites; refuse sites; sites used for the application or disposal of process waste waters; sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to stormwater.
<b>Ineffective Impervious Surfaces</b>	Impervious surfaces are considered ineffective if: 1) the runoff is dispersed through at least one hundred feet of native vegetation in accordance with 65/10 Dispersion as described in Volume V, Chapter 2; 2) residential roof runoff is infiltrated in accordance with Downspout Full Infiltration Systems Volume V, Chapter 2; or 3) approved continuous runoff modeling methods indicate that the entire runoff file is infiltrated.
<b>Infiltration</b>	The downward movement of water from the surface to the subsoil.
<b>Infiltration facility (or system)</b>	A drainage facility designed to use the hydrologic process of surface and stormwater runoff soaking into the ground, commonly referred to as percolation, to dispose of surface and stormwater runoff.
<b>Infiltration rate</b>	The rate, usually expressed in inches/hour, at which water moves downward (percolates) through the soil profile. Short-term infiltration rates may be inferred from soil analysis or texture or derived from

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	field measurements. Long-term infiltration rates are affected by variability in soils and subsurface conditions at the site, the effectiveness of pretreatment or influent control, and the degree of long-term maintenance of the infiltration facility.
<b>Interception (hydraulics)</b>	The process by which precipitation is caught and held by foliage, twigs, and branches of trees, shrubs, and other vegetation. Often used for “interception loss” or the amount of water evaporated from the precipitation intercepted.
<b>Interflow</b>	That portion of rainfall that infiltrates into the soil and moves laterally through the upper soil horizons until intercepted by a stream channel or until it returns to the surface for example, in a roadside ditch, wetland, spring or seep. Interflow is a function of the soil system depth, permeability, and water-holding capacity.
<b>Invert</b>	The lowest point on the inside of a sewer or other conduit.
<b>Invert elevation</b>	The vertical elevation of a pipe or orifice in a pond that defines the water level.
<b>Isopluvial map</b>	A map with lines representing constant depth of total precipitation for a given return frequency.
<b>Land disturbing activity</b>	Any activity that results in a change in the existing soil cover (both vegetative and non-vegetative) and/or the existing soil topography. Land disturbing activities include, but are not limited to clearing, grading, filling, and excavation. Compaction that is associated with stabilization of structures and road construction shall also be considered a land disturbing activity. Vegetation maintenance practices, including landscape maintenance and gardening, are not considered land-disturbing activity. Stormwater facility maintenance is not considered land disturbing activity if conducted according to established standards and procedures.
<b>Level pool routing</b>	The basic technique of storage routing used for sizing and analyzing detention storage and determining water levels for ponding water bodies. The level pool routing technique is based on the continuity equation: $\text{Inflow} - \text{Outflow} = \text{Change in storage}$ .
<b>Level spreader</b>	A temporary ESC or permanent device used to spread out stormwater runoff uniformly over the ground surface as sheet flow (i.e., not through channels). The purpose of level spreaders is to prevent concentrated, erosive flows from occurring, and to enhance infiltration.
<b>Low flow channel</b>	An incised or paved channel from inlet to outlet in a dry basin which is designed to carry low runoff flows and/or baseflow, directly to the outlet without detention.

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<b>Low Impact Development (LID)</b>	A stormwater and land use management strategy that strives to mimic pre-disturbance hydrologic processes of infiltration, filtration, storage, evaporation, and transpiration by emphasizing conservation, use of on-site natural features, site planning, and distributed stormwater management practices that are integrated into project design.
<b>Low Impact Development (LID) Best Management Practices</b>	Distributed stormwater management practices, integrated into a project design, that emphasize pre-disturbance hydrologic processes of infiltration, filtration, storage evaporation and transpiration. LID BMPs include, but are not limited to, bioretention/rain gardens, permeable pavements, roof downspout controls, dispersion, soil quality and depth, minimal excavation foundations, vegetated roofs, and water re-use.
<b>Low Impact Development (LID) Principles</b>	Land use management strategies that emphasize conservation, use of on-site natural features, and site planning to minimize impervious surfaces, native vegetation loss, and stormwater runoff.
<b>Low permeable liner</b>	A layer of compacted till or clay, or a geomembrane.
<b>Maintenance</b>	Repair and maintenance includes activities conducted on currently serviceable structures, facilities, and equipment that involves no expansion or use beyond that previously existing and results in no significant adverse hydrologic impact. It includes those usual activities taken to prevent a decline, lapse, or cessation in the use of structures and systems. Those usual activities may include replacement of dysfunctioning facilities, including cases where environmental permits require replacing an existing structure with a different type structure, as long as the functioning characteristics of the original structure are not changed. One example is the replacement of a collapsed, fish blocking, round culvert with a new box culvert under the same span, or width, of roadway. In regard to stormwater facilities, maintenance includes assessment to ensure ongoing proper operation, removal of built-up pollutants (i.e., sediments), replacement of failed or failing treatment media, and other actions taken to correct defects as identified in the maintenance standards of Volume V, Appendix V-C. See also Pavement Maintenance exemptions in Section 2.2 of Volume I.
<b>Maximum extent practicable</b>	<p>Refers to paragraph 402(p)(3)(B)(iii) of the federal Clean Water Act which reads as follows: Permits for discharges from municipal storm sewers shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques, and system, design, and engineering methods, and other such provisions as the Administrator or the State determines appropriate for the control of such pollutants.</p> <p>The NPDES permit requires permittees to reduce the discharge of pollutants to the maximum extent practicable (MEP). Permittees who</p>

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choose to use the site planning process, and BMP selection and design criteria in the 2012 Stormwater Management Manual for Western Washington, or an equivalent manual approved by Ecology, may cite this choice as their sole documentation to meet this requirement. When used in conjunction with application of BMPs such as LID it means those measures that are feasible taking into consideration all factors such as site conditions, soils, type of project, cost, maintenance, human health and the environment.

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**Mitigation**

Means, in the following order of preference:

- a. Avoiding the impact altogether by not taking a certain action or part of an action;
  - b. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;
  - c. Rectifying the impact by repairing, rehabilitating or restoring the affected environment;
  - d. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
  - e. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments.
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**Modification,  
modified (wetland)**

A wetland whose physical, hydrological, or water quality characteristics have been purposefully altered for a management purpose, such as by dredging, filling, forebay construction, and inlet or outlet control.

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**Municipal Separate  
Storm Sewer  
System (MS4)**

Means a conveyance, or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

- (i) Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) having jurisdiction over disposal of wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of Washington State.
  - (ii) Designed or used for collecting or conveying stormwater.
  - (iii) Which is not a combined sewer; and
  - (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.; and
  - (v) Which is defined as “large” or “medium” or “small” or otherwise designated by Ecology pursuant to 40 CFR 122.26.
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<b>National Pollutant Discharge Elimination System (NPDES)</b>	The part of the federal Clean Water Act, which requires point source dischargers to obtain permits. These permits are referred to as NPDES permits and, in Washington State, are administered by the Washington State Department of Ecology.
<b>Native Growth Protection Easement (NGPE)</b>	An easement granted for the protection of native vegetation within a sensitive area or its associated buffer. The NGPE shall be recorded on the appropriate documents of title and filed with the County Records Division.
<b>Native vegetation</b>	Vegetation comprised of plant species, other than noxious weeds, that are indigenous to the coastal region of the Pacific Northwest and which reasonably could have been expected to naturally occur on the site. Examples include, but are not limited to, trees such as Douglas Fir, western hemlock, western red cedar, alder, big-leaf maple, and vine maple; shrubs such as willow, elderberry, salmonberry, and salal; and herbaceous plants such as sword fern, foam flower, and fireweed.
<b>Natural location</b>	Means the location of those channels, swales, and other non-manmade conveyance systems as defined by the first documented topographic contours existing for the subject property, either from maps or photographs, or such other means as appropriate. In the case of outwash soils with relatively flat terrain, no natural location of surface discharge may exist.
<b>New Development</b>	Land disturbing activities, including Class IV -general forest practices that are conversions from timber land to other uses; structural development, including construction or installation of a building or other structure; creation of hard surfaces; and subdivision, short subdivision and binding site plans, as defined and applied in Chapter 58.17 RCW. Projects meeting the definition of redevelopment shall not be considered new development.
<b>New Hard Surface</b>	Hard surface created on or added to a site or structural development including construction, installation, or expansion of a building or other structure. Includes the addition of a hard or compacted surface like roofs, pavement, gravel, or dirt; or the addition of a more compacted surface, like paving over predevelopment existing dirt or gravel. New hard surface may also include existing hard surface that is removed and replaced. To be considered new, the removal and replacement activity must result in significant changes in hard surface locations, grade, and/or drainage system features, and/or must involve construction, installation, or expansion of a building or structure after complete or substantial intentional demolition thereof by or for the benefit of the applicant.
<b>Non-point source (NPS) pollutants</b>	Pollution that comes from many different, hard-to-trace sources with no obvious point of discharge, unlike wastewater treatment plant

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	discharges, for example. NPS pollutants come from roadways, fertilizers on lawns, rooftops, agricultural and forestry practices, and many other diffuse sources.
<b>NPDES</b>	The National Pollutant Discharge Elimination System as established by the Federal Clean Water Act. Under NPDES regulations, point source dischargers must obtain permits.
<b>NPDES Phase II Boundary</b>	The boundary of those areas of Thurston County which have sufficient population density based on the criteria established for the NPDES program managed by Ecology to be subject to the requirements of the NPDES Phase II permit. The boundary is subject to revision based on census data or regulatory changes. A map of the NPDES Phase II Boundary is available for review at the offices of the Thurston County Water Resources Unit of the Department of Resource Stewardship.
<b>NRCS Method</b>	A single-event hydrologic analysis technique for estimating runoff based on the Curve Number method. The Curve Numbers are published by NRCS in <i>Technical Release No. 55: Urban Hydrology for Small Watersheds, 1986</i> . With the change in name to the Natural Resources Conservation Service, the method may be referred to as the NRCS Method.
<b>Off-line facilities</b>	Water quality treatment facilities to which stormwater runoff is restricted to some maximum flow rate or volume by a flow-splitter.
<b>Off-site</b>	Any area lying upstream of the site that drains onto the site and any area lying downstream of the site to which the site drains.
<b>Oil/water Separator</b>	A vault, usually underground, designed to provide a quiescent environment to separate oil from water.
<b>On-line facilities</b>	Water quality treatment facilities which receive all of the stormwater runoff from a drainage area. Flows above the water quality design flow rate or volume are passed through at a lower percent removal efficiency.
<b>On-site</b>	The entire property that includes the proposed development.
<b>On-site Stormwater Management BMPs</b>	As used in this Manual, a synonym for Low Impact Development BMPs.
<b>Outfall</b>	A point source as defined by 40 CFR 122.2 at the point where a discharge leaves the Permittee's MS4 and enters a surface receiving waterbody or surface receiving waters. Outfall does not include pipes, tunnels, or other conveyances which connect segments of the same stream or other surface waters and are used to convey primarily surface waters (i.e., culverts).

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<b>Outwash soils</b>	Soils formed from highly permeable sands and gravels.
<b>Overflow rate</b>	Detention basin release rate divided by the surface area of the basin. It can be thought of as an average flow rate through the basin.
<b>Pasture</b>	A vegetated area on a project site characterized by a lack of forest cover (mature, or emergent, e.g. replanted under a forest practice permit) and subject to limited or no landscape maintenance. Pasture may include native scrub/shrub, non-native unmaintained vegetation, pasture grasses, recently logged but not replanted areas, and prairies.
<b>Peak flow rate or discharge</b>	The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event, such as a 25-year, 24-hour event.
<b>Permanent Stormwater Control (PSC) Plan</b>	See Drainage Plan.
<b>Permeable pavement</b>	Pervious concrete, porous asphalt, permeable pavers or other forms of pervious or porous paving material intended to allow passage of water through the pavement section. It often includes an aggregate base that provides structural support and acts as a stormwater reservoir.
<b>Permeable soils</b>	Soil materials with a sufficiently rapid infiltration rate so as to greatly reduce or eliminate surface and stormwater runoff. These soils are generally classified as NRCS hydrologic soil types A and B.
<b>Person</b>	Any individual, partnership, corporation, association, organization, cooperative, public or municipal corporation, agency of the state, or local government unit, however designated.
<b>Pervious surface</b>	Any surface material that allows stormwater to infiltrate into the ground. Examples include lawn, landscape, pasture, native vegetation areas, and permeable pavements.
<b>Phase 1 stormwater permit</b>	The part of the NPDES program that deals with large cities, >100,000 population, or heavily urbanized areas.
<b>Phase 2 stormwater permit</b>	The part of the NPDES program that deals with small cities, generally between 10,000 and 100,000 in population.
<b>Point discharge</b>	The release of collected and/or concentrated surface and stormwater runoff from a pipe, culvert, or channel.
<b>Point of compliance</b>	The location at which compliance with a discharge performance standard or a receiving water quality standard is measured.

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<b>Pollution-generating hard surface (PGHS)</b>	Those hard surfaces considered to be a significant source of pollutants in stormwater runoff. See the listing of surfaces under pollution-generating impervious surface.
<b>Pollution-generating impervious surface (PGIS)</b>	<p>Those impervious surfaces considered to be a significant source of pollutants in stormwater runoff. Such surfaces include those which are subject to: vehicular use; industrial activities (as further defined in this glossary); storage of erodible or leachable materials, wastes, or chemicals, and which receive direct rainfall or the run-on or blow-in of rainfall; metal roofs unless they are coated with an inert, non-leachable material (e.g., baked-on enamel coating); or roofs that are subject to venting significant amounts of dusts, mists, or fumes from manufacturing, commercial, or other indoor activities.</p> <p>A surface, whether paved or not, shall be considered subject to vehicular use if it is regularly used by motor vehicles. The following are considered regularly-used surfaces: roads, unvegetated road shoulders, bike lanes within the traveled lane of a roadway, driveways, parking lots, unfenced fire lanes, vehicular equipment storage yards, and airport runways.</p> <p>The following are not considered regularly-used surfaces: paved bicycle pathways separated from and not subject to drainage from roads for motor vehicles, fenced fire lanes, and infrequently used maintenance access roads.</p>
<b>Pollution-generating pervious surface (PGPS)</b>	Any non-impervious surface subject to vehicular use; industrial activities (as further defined in this glossary); storage of erodible or leachable materials, wastes, or chemicals, and that receive direct rainfall or run-on or blow-in of rainfall; use of pesticides and fertilizers or loss of soil. Typical PGPS includes permeable pavement subject to vehicular use, lawns and landscaped areas including: golf courses, parks, cemeteries, and sports fields (natural and artificial turf).
<b>Pre-developed condition</b>	The native vegetation and soils that existed at a site prior to the influence of Euro-American settlement. The predeveloped condition shall be assumed to be a forested land cover unless reasonable, historic information is provided that indicates the site was prairie prior to settlement.
<b>Pretreatment</b>	The removal of material such as solids, grit, grease, and scum from flows prior to physical, biological, or physical treatment processes to improve treatability. Pretreatment may include screening, grit removal, settling, oil/water separation, or application of a Basic Treatment BMP prior to infiltration.

<b>Professional civil engineer</b>	A person registered with the state of Washington as a professional engineer in civil engineering.
<b>Project engineer</b>	See design engineer.
<b>Project proponent</b>	The person with overall responsibility for directing the project as a representative of the owner (may be the owner, architect, developer or project engineer).
<b>Project</b>	Any proposed action to alter or develop a site. The proposed action of a permit application or an approval, which requires drainage review.
<b>Project site</b>	That portion of a property, properties, or right of way subject to land disturbing activities, new hard surfaces, or replaced hard surfaces.
<b>Properly Functioning Soil System (PFSS)</b>	Equivalent to engineered soil/landscape system. This can also be a natural system that has not been disturbed or modified.
<b>Property Owner's Association</b>	A non-profit corporation established for the purposes of enforcing subdivision covenants, conditions and restrictions and for operating, maintaining and repairing private facilities associated with the subdivision such as roads, stormwater facilities, open space, water and sewer systems, as applicable. As used in this Manual, it is synonymous with Home Owner's Association, Lot Owner's Association, Condominium Association, etc.
<b>Rain garden</b>	A non-engineered, shallow, landscaped depression, with compost-amended native soils or imported soils, and adapted plants. The depression is designed to pond and temporarily store stormwater runoff from adjacent areas, and to allow stormwater to pass through the amended soil profile. Refer to the <i>Rain Garden Handbook for Western Washington Homeowners</i> (WSU, 2007 or as revised) for rain garden specifications and construction guidance.
<b>Rational method</b>	A means of computing storm drainage flows (Q) by use of the formula $Q = CIA$ , where C is a coefficient describing the physical drainage area, <u>I is the rainfall intensity and A is the area. This method may be used under limited circumstances for conveyance system design only.</u>
<b>Receiving waters</b>	Bodies of water or surface water systems to which surface runoff is discharged via a point source of stormwater or via sheet flow. Ground water to which surface runoff is directed by infiltration.
<b>Recharge</b>	The addition of water to the zone of saturation (i.e., an aquifer).
<b>Redevelopment</b>	On a site that is already developed (i.e. has 35% or more of existing hard surface coverage), the creation or addition of hard surfaces; the expansion of a building footprint or addition or replacement of a

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	structure; structural development including construction, installation or expansion of a building or other structure; replacement of hard surface that is not part of a routine maintenance activity; and land disturbing activities.
<b>Regional</b>	An action (here, for stormwater management purposes) that involves more than one discrete property.
<b>Regional detention facility</b>	<p>A stormwater quantity control structure designed to correct existing water runoff problems of a basin or subbasin. The area downstream has been previously identified as having existing or predicted significant and regional flooding and/or erosion problems.</p> <p>This term is also used when a detention facility is sited to detain stormwater runoff from a number of new developments or areas within a catchment, subbasin, or basin.</p>
<b>Replaced hard surface</b>	For structures, the removal and replacement of hard surfaces down to the foundation. For other hard surfaces, the removal down to bare soil or base course and replacement.
<b>Replaced impervious surface</b>	<p>For structures, the removal and replacement of impervious surfaces down to or including the foundation. For other impervious surfaces, the removal down to bare soil or base course and replacement.</p> <p>Replaced impervious surface also includes the construction of a new building over existing asphalt or concrete paved impervious surface.</p>
<b>Retention</b>	The process of collecting and holding surface and stormwater runoff with no surface outflow.
<b>Retention/detention facility (R/D)</b>	A type of drainage facility designed either to hold water for a considerable length of time and then release it by evaporation, plant transpiration, and/or infiltration into the ground; or to hold surface and stormwater for a short period of time and then release it to the surface and stormwater management system.
<b>Riprap</b>	A facing layer or protective mound of rocks placed to prevent erosion or sloughing of a structure or embankment due to flow of surface and stormwater runoff.
<b>Runoff</b>	Water originating from rainfall and other precipitation that is found in drainage facilities, rivers, streams, springs, seeps, ponds, lakes and wetlands as well as shallow ground water. As applied in this Manual, it also means the portion of rainfall or other precipitation that becomes surface flow and interflow.
<b>Rural areas</b>	For purposes of the Manual, rural areas are defined as those areas outside of the Phase II NPDES permit boundary and outside of any

	Urban Growth Area, including the Urban Growth Areas of Rochester, Bucoda, Yelm, Rainier, Tenino, and Grand Mound.
<b>Salmonid</b>	A member of the fish family Salmonidae. Chinook, coho, chum, sockeye and pink salmon; cutthroat, brook, brown, rainbow, and steelhead trout; Dolly Varden, kokanee, and char are examples of salmonid species.
<b>Site</b>	The area defined by the legal boundaries of a parcel or parcels of land that is (are) subject to new development or redevelopment. For road projects, the length of the project site and the right-of-way boundaries define the site.
<b>Soil group, hydrologic</b>	A classification of soils by the National Resources Conservation Service into four runoff potential groups. The groups range from A soils, which are very permeable and produce little or no runoff, to D soils, which are not very permeable and produce much more runoff.
<b>Soil horizon</b>	A layer of soil, approximately parallel to the surface, which has distinct characteristics produced by soil-forming factors.
<b>Soil profile</b>	A vertical section of the soil from the surface through all horizon, including C horizons.
<b>Soil Texture Class</b>	The relative proportion, by weight, of particle sizes, based on the USDA system, of individual soil grains less than 2mm equivalent diameter in a mass of soil. The basic texture classes in the approximate order of increasing proportions of fine particles include: sand, loamy sand, sandy loam, silt loam, silt, clay loam, sandy clay, silty clay, and clay.
<b>Source control</b>	Control of pollution by preventing it from entering stormwater such as covering materials, rather than treating it after it enters stormwater.
<b>Source control BMP</b>	A structure or operation that is intended to prevent pollutants from coming into contact with stormwater through physical separation of areas or careful management of activities that are sources of pollutants. This Manual separates source control BMPs into two types. <i>Structural Source Control BMPs</i> are physical, structural, or mechanical devices, or facilities that are intended to prevent pollutants from entering stormwater. <i>Operational BMPs</i> are non-structural practices that prevent or reduce pollutants from entering stormwater. See Volume IV for details.
<b>Spill control device</b>	A Tee section or turn down elbow designed to retain a limited volume of pollutant that floats on water, such as oil or antifreeze. Spill control devices are passive and must be cleaned-out for the spilled pollutant to actually be removed.

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<b>Spillway</b>	A passage such as a paved apron or channel for surplus water over or around a dam or similar obstruction. An open or closed channel, or both, used to convey excess water from a reservoir. It may contain gates, either manually or automatically controlled, to regulate the discharge of excess water.
<b>Steep slope</b>	<p>Slopes of 40 percent gradient or steeper within vertical elevation changes of at least ten feet. A slope is delineated by establishing its toe and top, and is measured by averaging the inclination over at least ten feet of vertical relief. For purpose of this definition:</p> <p>The toe of a slope is a distinct topographic break in slope that separates slopes inclined at less than 40% from slopes 40% and steeper. Where no distinct break exists, the toe of a steep slope is the lower-most limit of the area where the ground surface drops ten feet or more vertically within a horizontal distance of 25 feet; AND</p> <p>The top of slope is a distinct topographic break in slope that separates slopes inclined at less than 40% from slopes 40% or steeper. Where no distinct break exists, the top of a steep slope is the upper-most limit of the area where the ground surface drops ten feet or more vertically within a horizontal distance of 25 feet.</p>
<b>Storm frequency</b>	The time interval between major storms of predetermined intensity and volumes of runoff for which storm sewers and other structures are designed and constructed to handle hydraulically without surcharging and backflooding, e.g., a 2-year, 10-year or 100-year storm.
<b>Stormwater facility</b>	A constructed component of a stormwater drainage system designed or constructed to perform a particular function, or multiple functions. Stormwater facilities include, but are not limited to, pipes, swales, ditches, culverts, street gutters, detention ponds, retention ponds, constructed wetlands, infiltration devices, catch basins, oil/water separators, and biofiltration swales. An engineered or natural dispersion area that is dedicated to stormwater use is also considered a stormwater facility for purposes of this Manual.
<b>Stormwater Management Manual for Western Washington (Ecology Stormwater Manual)</b>	The manual, as prepared by the Washington State Department of Ecology that contains BMPs to prevent, control or treat pollution in stormwater and reduce other stormwater related impacts to waters of the State. The Ecology Stormwater Manual is intended to provide guidance on measures necessary in western Washington to control the quantity and quality of stormwater runoff from new development and redevelopment.
<b>Structural source control BMPs</b>	Physical, structural, or mechanical devices or facilities that are intended to prevent pollutants from entering stormwater. Structural source control BMPs typically include:

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	<ul style="list-style-type: none"> <li>• Enclosing and/or covering the pollutant source (building or other enclosure, a roof over storage and working areas, temporary tarp, etc.).</li> <li>• Segregating the pollutant source to prevent run-on of stormwater, and to direct only contaminated stormwater to appropriate treatment BMPs.</li> </ul>
<b>Subdrain</b>	A pervious backfilled trench containing stone or a pipe for intercepting ground water or seepage.
<b>Surcharge</b>	The flow condition occurring in closed conduits when the hydraulic grade line is above the crown of the sewer.
<b>Surface and stormwater</b>	Water originating from rainfall and other precipitation that is found in drainage facilities, rivers, streams, springs, seeps, ponds, lakes, and wetlands as well as shallow ground water.
<b>SWPPP</b>	Storm Water Pollution Prevention Plan
<b>TESC</b>	Temporary erosion and sediment control.
<b>Threshold Discharge Area</b>	An on-site 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 flowpath). For an example, see Figure 2.3.1. of Volume I of Ecology’s Stormwater Management Manual for Western Washington (2012). The purpose of this definition is to clarify how the thresholds of this Manual are applied to project sites with multiple discharge points.
<b>Tightline</b>	A continuous length of pipe that conveys water from one point to another (typically down a steep slope) with no inlets or collection points in between.
<b>Till</b>	A layer of poorly sorted soil deposited by glacial action that generally has very low infiltration rates.
<b>Time of concentration</b>	The time period necessary for surface runoff to reach the outlet of a subbasin from the hydraulically most remote point in the tributary drainage area.
<b>Topsoil</b>	Topsoil shall be per ASTM D5268 standard specification, and water permeability shall be 0.6 inches per hour or greater. Organic matter shall have not more than 10 percent of nutrients in mineralized water soluble forms. Topsoil shall not have phytotoxic characteristics.
<b>Total Maximum Daily Load (TMDL)</b>	A calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant’s sources. A TMDL (also known as a Water Cleanup Plan) is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The

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	<p>calculation must include a margin of safety to ensure that the waterbody can be used for the purposes the State has designated. The calculation must also account for seasonable variation in water quality. Water quality standards are set by states, territories, and tribes. They identify the uses for each waterbody, for example, drinking water supply, contact recreation (swimming), and aquatic like support (fishing), and the scientific criteria to support that use. The Clean Water Act, section 303, establishes the water quality standards and TMDL programs.</p>
<b>Total Suspended Solids (TSS)</b>	<p>Suspended solids are organic or inorganic particles that are suspended in and carried by the water. The term includes sand, mud, and clay particles (and associated pollutants) as well as solids in stormwater. TSS refers to the solids that can be captured on a standard glass filter.</p>
<b>Tract</b>	<p>A legally created parcel of property designated for special nonresidential and noncommercial uses.</p>
<b>Treatment BMP or Facility</b>	<p>A BMP that is intended to remove pollutants from stormwater. A few examples of treatment BMPs are wetponds, oil/water separators, biofiltration swales, and constructed wetlands.</p>
<b>Treatment liner</b>	<p>A layer of soil that is designed to slow the rate of infiltration and provide sufficient pollutant removal so as to protect ground water quality.</p>
<b>Underdrain</b>	<p>Plastic pipes with holes drilled through the top (or slots), installed on the bottom of an infiltration BMP, which are used to collect and remove excess runoff.</p>
<b>Unstable slopes</b>	<p>Those sloping areas of land which have in the past exhibited, are currently exhibiting, or will likely in the future exhibit, mass movement of earth.</p>
<b>Variance</b>	<p>See <u>Exception</u>.</p>
<b>Vehicular use</b>	<p>Regular use of a hard surface or pervious surface by motor vehicles. The following are subject to regular vehicle use: roads, un-vegetated road shoulders, bike lanes within the traveled land of a roadway, driveways, parking lots, unrestricted access fire lanes, vehicular equipment storage yards, and airport runways.</p> <p>The following are not considered subject to regular vehicular use: paved bicycle pathways separated from and not subject to drainage from roads for motor vehicles, restricted access fire lanes, and infrequently used maintenance access roads.</p>

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<b>Water table</b>	The upper surface or top of the saturated portion of the soil or bedrock layer indicates the uppermost extent of ground water.
<b>Waters of the state</b>	Those waters defined as “waters of the United States” in 40 CFR Subpart 122.2 within the geographic boundaries of Washington State and “waters of the state” as defined in chapter 90.48 RCW which includes lakes, rivers, ponds, streams, inland waters, underground waters, salt waters and all other surface waters and water courses within the jurisdiction of the State of Washington.
<b>Wet season</b>	The season in which most of the rainfall occurs. In Western Washington, from October 1 through April 30.
<b>Wetlands</b>	Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from non-wetland sites, including, but not limited to, constructed wetlands for water quality treatment, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990 that were unintentionally created as a result of the construction of a road, street or highway. Wetlands may include those artificial wetlands intentionally created from non-wetland areas to mitigate for conversion of wetlands.
<b>WSDOT</b>	Washington State Department of Transportation
<b>WSDOT Standard Plans</b>	The most current version of the Washington State Department of Transportation’s Standard Plans.
<b>WSDOT Standard Specifications</b>	The most current version of the Standard Specifications for Road, Bridge and Municipal Construction prepared and promulgated by the Washington State Department of Transportation and any revisions thereof.