



# **CLEARING, GRADING, AND STORMWATER MANAGEMENT TECHNICAL NOTEBOOK**

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## **FOREWORD**

This document may be referred to as the Stormwater Notebook. The Stormwater Notebook contains the goals, specifications, and standards for clearing, grading, and stormwater management authorized and required by Chapter 15.24 of the Redmond Municipal Code (RMC). Note that Chapter 15.24 of the RMC is the primary code basis for clearing, grading, and stormwater management and should, therefore, also be reviewed ([www.codepublishing.com/WA/redmond.html](http://www.codepublishing.com/WA/redmond.html)). In the event that the code contradicts the Stormwater Notebook, RMC 15.24 takes precedence.

### **How to Get Printed Copies of the Stormwater Notebook**

If you would like to receive a copy of the updated manual please stop by the City of Redmond Development Services Center, located on the 2nd floor of City Hall (15670 NE 85th Street). To make other arrangements to receive a copy, contact Development Services Division at 425.556.2760 or [pwgen@redmond.gov](mailto:pwgen@redmond.gov).

### **How to Find the Stormwater Notebook Online**

The Stormwater Notebook is available on the City of Redmond's website at <http://www.redmond.gov/Stormwater>.

### **How to Find Corrections, Updates, and Additional Information**

With a publication of this size and complexity, and with the rapid changes in stormwater management technologies, there may be errors that must be corrected and clarifications that are needed between full document updates. The City publishes corrections, updates, and new technical information on the Stormwater Notebook web page (referenced above).

### **How to Use the Stormwater Notebook**

The Stormwater Notebook is a blend of basic information for everyone from the small single home builder, to the large developer, to the civil engineer supporting them. You can read it from cover to cover or refer to specific sections as needed. For small projects, the Stormwater Notebook should include most of the information you need. For larger projects, or for more detailed information, the project proponent will need a copy of the 2005 Washington State Department of Ecology Stormwater Management Manual for Western Washington. This document is available to download online and through the Washington State Department of Ecology.

Chapter 1 provides some introductory material to get you started. Chapter 2 describes Redmond-specific differences from the Ecology Manual and a lot of detailed design information. Redmond specific differences are identified with bold/italics text. Chapter 3 will help you classify your project as small, medium, or large, so you can move on to the appropriate Chapter 4, 5, or 6. Chapters 7 and 8 provide some design information to help you design your project

to meet all of Redmond's requirements. Finally, Chapters 9 and 10 provide information related to erosion control during construction to help you build your project in accordance with water quality requirements.

## **Overview of Changes from Previous Issue**

The Stormwater Notebook has been updated to be consistent with the Western Washington Phase II Municipal Stormwater Permit, issued January 17, 2007, effective February 16, 2007. The permit required cities to adopt specific requirements of development/redevelopment to reduce stormwater impacts on natural resources. This version of the Stormwater Notebook has significant changes due to the permit. In addition, the City of Redmond has made further changes with the same intent as the permit.

Major changes include:

- Clarified submittal requirements for the Site Plan, drainage report, and documentation of selection of treatment BMPs (Minimum Requirement #1, Section 2.5.1 and Appendix D – Plan Review Checklist).
- Clarified the minimum requirements for on-site stormwater management techniques that are required for all projects (Minimum Requirement #5, Section 2.5.5).
- Clarified the submittal requirements for operation and maintenance manuals (Minimum Requirement #9, Section 2.5.9).
- Regional Facilities Program is updated to reflect current Ecology and NPDES permit requirements (Section 8.8).

Minor changes include:

- Updated to reflect new Zoning Code references.
- Moved definitions into glossary (Section Glossary).
- Clarified vesting of public projects (Section 1.4).
- Clarified the definition of an underground injection control well (Section 2.9.5).
- Clarified the requirement to line non-infiltrating BMPs when located in permeable soils (Section 2.9.5.7).
- Reorganized the project type classification and project submittal requirements chapters (Chapters 3, 4, 5, 6).
- Defined an infiltration system (Section 8.3)
- Moved pipe materials to the Standard Specifications. Removed discussion of a fee for pipe inspection (Section 8.4).
- Maintenance access requirements are clarified (Section 8.6.9).

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# Chapter 1 INTRODUCTION

The Clearing, Grading, and Stormwater Management Technical Notebook (herein referred to as the Stormwater Notebook) supplements the 2005 Washington State Department of Ecology Stormwater Management Manual for Western Washington, defines how the 2005 Ecology Manual is to be applied in the City of Redmond, and provides information and standards specific to stormwater management in Redmond. The Stormwater Notebook adjusts the 2005 Ecology Manual as required by the Western Washington Phase II Municipal Stormwater Permit.

The Stormwater Notebook is intended to assist those who prepare and submit applications and construction documents by providing design requirements and permit processing information. The methods outlined in the Stormwater Notebook are not the only methods acceptable for use in the City, but any deviations from these must still meet or exceed the intended results and be reviewed and approved by the City.

## 1.1 Code Requirements

Code requirements regarding stormwater management are in the Redmond Municipal Code, Chapter 15.24 (included in Appendix A). The Stormwater Notebook is a supplement to the code and the code should also be reviewed to understand the procedures and requirements.

The design, construction, and maintenance of all clearing, grading and stormwater management systems and facilities shall comply with the requirements and design standards contained in all the following documents, and provided in order of precedence:

1. RMC 15.24
2. Any applicable construction specifications, design standards and details approved under the authority of subsection (2) of this section.
3. The Washington State Department of Ecology Stormwater Management Manual for Western Washington, dated February 2005 or its successor when approved by the City's Technical Committee and as applied by the Clearing, Grading and Stormwater Management Technical Notebook.

## 1.2 Permitting Review Process

The permitting review process is a partnership between the applicant and representatives from the City. Throughout the Stormwater Notebook, there are specific stormwater management alternatives that may be approved for a specific project with the approval of the Stormwater Engineer or the Technical Committee. Private Development projects are reviewed by a Stormwater Engineer within the Development Services Division of Public Works. Public Capital Improvement Projects are reviewed by a Stormwater Engineer within the Natural Resources Division of Public Works. In some instances, the City's Technical Committee will review a project. Chapters 3, 4, 5, and 6 go into more detail about the review process for specific project types.

### **1.3 Documents Adopted by Reference**

The following documents are adopted by reference:

- Redmond Municipal Code, Chapter 15.24, Latest Edition.
- Redmond Zoning Code, Latest Edition.
- The 2005 Department of Ecology Stormwater Management Manual for Western Washington, dated February 2005, or its successor when approved by the Public Works Director.
- Low Impact Development Technical Guidance Manual for Puget Sound, May 2005, or its successor when approved by the Public Works Director.
- Standard Specifications and Details for Public Works Construction, prepared by the City of Redmond Public Works Department, Latest Edition.

### **1.4 Vesting**

This document is subject to revision from time to time. The issue dates are shown on the front cover. The issue of this manual that applies to a particular project is the issue that is (or was) in effect when the proposed project was “vested.” If a newer issue of the Stormwater Notebook is published after a project is vested, the project will have the right to use the newer version of the Stormwater Notebook in its entirety, or the older version in its entirety.

- A project subject to a Building Permit is vested when a Building Permit Application is submitted that is deemed complete by the City.
- A Preliminary Plat or a Short Plat is vested when the application for the Preliminary Plat or Short Plat is submitted and is deemed complete by the City.
- A project involving only clearing or grading is vested when an application for the clearing and/or grading work is submitted and determined to be complete by the City.
- Capital project design standards are vested when the City Council approves the project design contract.

Note that this vesting requirement applies only to the requirements of this Stormwater Notebook. For further information, contact the Development Services Center or the Stormwater Engineer.

### **1.5 Additional Permit Requirements**

Additional City of Redmond requirements and special conditions listed on a specific project’s permits apply to clearing, grading, or stormwater work in specific circumstances. While not necessarily a complete list, the following programs often apply to clearing, grading, and/or stormwater work in or near Critical Areas or Shorelines (defined in the Redmond Zoning Code). Contact the City of Redmond Development Services Center for more information about these programs:

- Shorelines – Can apply to projects within 200 feet of Bear Creek, Evans Creek, the Sammamish River, Lake Sammamish, and their associated floodplains and wetlands.

- Critical Areas – Can apply if your project proposes work (as defined in the Redmond Zoning Code 21.64) within:
  - fish and wildlife habitat conservation areas;
  - wetlands;
  - geologically hazardous areas;
  - frequently flooded areas; or
  - critical aquifer recharge areas.

Other agencies may also have requirements and permits related to work in Redmond. While not necessarily a complete list, the following agencies and their permits have been a part of many projects in Redmond:

- State Department of Fish and Wildlife – Hydraulic Project Approval (HPA) for work below the Ordinary High Water Mark (OHWM) of surface waters including intermittent streams (work that uses, diverts, obstructs or changes natural flow or bed of State waters).
- State Department of Ecology – NPDES Permit(s): programs related to water quality management from construction sites of 1 acre or more. Water Quality Certification (401) ensures that limits placed in a permit on the quantity and concentration of pollutants discharged are not exceeded.
- Corps of Engineers – a number of permits (under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act) related to protection of “waters of the United States” including wetlands, streams and other surface waters. As appropriate the Army Corps will coordinate with the NOAA Fisheries (regarding federally listed anadromous species such as salmon) and U.S. Department of Fish and Wildlife (regarding federally listed land or freshwater species – such as eagles or bull trout) to ensure Endangered Species Act consistency.
- Coastal Zone Management Certification (CZM) – issued by the federal permitting agency or state DOE. This is required for USACE authorized projects and other federally licensed or permitted projects. Ensures compliance with a number of federal and state acts relating to environmental protection including the federal Clean Water Act, Clean Air Act, WA State Environmental Policy Act, and Shoreline Management Act & Energy Facility Site Evaluation Criteria.
- U.S. Coast Guard & WA State DNR are also involved in certain projects involving impacts (such as a bridge) over or adjacent to navigable waters (Class 1 Streams)
- Federal Emergency Management Agency – programs related to flood protection near major streams and rivers.

Also note that any work proposed beyond the applicant’s property limits requires written concurrence of the owners of those properties.

# Chapter 2 Modifications to the 2005 Department Of Ecology Stormwater Management Manual for Western Washington

## 2.1 Redmond Requirements

Clearing, grading, and stormwater management issues relating to construction are regulated by Chapter 15.24 of the Redmond Municipal Code and the Redmond Zoning Code (RZC). Issues not addressed in the RZC are regulated by the requirements of the Stormwater Notebook. The 2005 Ecology Manual as modified by the Western Washington Phase II Municipal Stormwater Permit, issued January 17, 2007, effective February 16, 2007, shall regulate issues not addressed in the Redmond Municipal Code, Redmond Zoning Code, or the Stormwater Notebook.

This chapter is divided into two parts to address Department of Ecology requirements as well as issues specific to the City of Redmond. Volume I of the 2005 Ecology Manual is replaced in full by Chapter 2, Sections 2.2 through 2.8. Section numbering of this chapter is intentionally the same as section numbering in the 2005 Ecology Manual (Volume 1, Chapter 2). Modifications and additions specific to the City of Redmond are in *bold italics*. Section 2.9 of Chapter 2 contains local modifications to the remainder of the 2005 Ecology Manual to address work within the City of Redmond.

### Key Modifications for Redmond

In accordance with the Ecology Manual, infiltration is encouraged for recharge or as a method of discharging stormwater as an option in areas with highly permeable soils for clean runoff from sidewalks and roofs. However, due to wellhead protection concerns, all other infiltration proposals shall be evaluated by the Stormwater Engineer on a case-by-case basis.

Infiltration of water draining from pollution generating surfaces in single-family residential developments is allowed in Wellhead Protection Zones 1 and 2 following enhanced treatment in a BMP that is exposed to the surface (such as bioretention in view of sidewalks or roads). Infiltration of stormwater from pollution generating surfaces is prohibited in Wellhead Protection Zones 1 and 2 for all other uses. In Wellhead Protection Zone 3, infiltration for treatment is not permitted, but infiltration for flow control following treatment based on site use (per the requirements of the 2005 Ecology Manual) is allowed.

## 2.2 Exemptions

### Forest Practices

Forest practices regulated under Title 222 WAC, except for Class IV General forest practices that are conversions from timber land to other uses, are exempt from the provisions of the minimum requirements.

## Commercial Agriculture

Commercial agriculture practices involving working the land for production are generally exempt. However, the conversion from timberland to agriculture, and the construction of impervious surfaces are not exempt.

## Oil and Gas Field Activities or Operations

Construction of drilling sites, waste management pits, and access roads, as well as construction of transportation and treatment infrastructure such as pipelines, natural gas treatment plants, natural gas pipeline compressor stations, and crude oil pumping stations are exempt.

Operators are encouraged to implement and maintain Best Management Practices to minimize erosion and control sediment during and after construction activities to help ensure protection of surface water quality during storm events. These activities may be prohibited by RZC 21.64.050(c).

## Road Maintenance

The following road maintenance practices are exempt: pothole and square cut patching, overlaying existing asphalt or concrete pavement with asphalt or concrete without expanding the area of coverage, shoulder grading, reshaping/regrading drainage systems, crack sealing, resurfacing with in-kind material without expanding the road prism, and vegetation maintenance.

The following road maintenance practices are considered redevelopment, and therefore are not categorically exempt. The extent to which this chapter applies is explained for each circumstance.

- Removing and replacing a paved surface to base course or lower, or repairing the roadway base; if impervious surfaces are not expanded, Minimum Requirements #1 - #5 apply. However, in most cases, only Minimum Requirement #2, Construction Stormwater Pollution Prevention, will be germane. Where appropriate, project proponents are encouraged to look for opportunities to use permeable and porous pavements.
- Extending the pavement edge without increasing the size of the road prism, or paving gravel shoulders; these are considered new impervious surfaces and are subject to the minimum requirements that are triggered when the thresholds identified for redevelopment projects are met.
- Resurfacing by upgrading from dirt to gravel, asphalt, or concrete; upgrading from gravel to asphalt, or concrete; or upgrading from a bituminous surface treatment ("chip seal") to asphalt or concrete; these are considered new impervious surfaces and are subject to the minimum requirements that are triggered when the thresholds identified for redevelopment projects are met.

### Underground utility projects

Underground utility projects that replace the ground surface with in-kind material or materials with similar runoff characteristics are only subject to Minimum Requirement #2, Construction Stormwater Pollution Prevention.

All other new development is subject to one or more of the Minimum Requirements (see Section 2.4 of this chapter).

### **2.3 Definitions Related to the Minimum Requirements**

*The following definitions are to help the end user of the Stormwater Notebook understand the application of Minimum Requirements.*

**Arterial** - A road or street primarily for through traffic. A major arterial connects an Interstate Highway to cities and counties. A minor arterial connects major arterials to collectors. A collector connects an arterial to a neighborhood. A local access road connects individual homes to a collector.

**Certified Erosion and Sediment Control Lead (CESCL)** - an individual who has current certification through an approved erosion and sediment control training program that meets the minimum training standards established by the Department of Ecology (see BMP C160 in the 2005 Ecology Manual). 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 source. Course listings are provided online at Ecology's website.

**Effective Impervious Surface** - Those impervious surfaces that are connected via sheet flow or discrete conveyance to a drainage system. Impervious surfaces on residential development sites are considered ineffective if the runoff is dispersed through at least one hundred feet of native vegetation in accordance with BMP T5.30 – "Full Dispersion," as described in Chapter 5 of Volume V of the Ecology Manual.

**Highway** - A main public road connecting towns and cities.

**Impervious surface** - A hard surface area that either prevents or retards the entry of water into the soil mantle as under natural conditions prior to development. A hard surface area which causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions prior to development. Common impervious surfaces include, but are not limited to, roof tops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, and oiled, macadam or other surfaces which similarly impede the natural infiltration of stormwater. Open

uncovered retention/detention facilities shall not be considered as impervious surfaces for purposes of determining whether the thresholds for application of minimum requirements are exceeded. Open, uncovered retention/detention facilities shall be considered impervious surfaces for purposes of runoff modeling.

**Land disturbing activity** - Any activity that results in movement of earth, or a change in the existing soil cover (both vegetative and non-vegetative) and/or the existing soil topography. Land disturbing activities include, but are not limited to clearing, grading, filling, and excavation. Compaction that is associated with stabilization of structures and road construction shall also be considered a land disturbing activity.

**Maintenance** - 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 dysfunctional 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. See also Road Maintenance exemptions in Section 2.2 of this chapter.

**Native vegetation** - 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 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.

**New development** - Land disturbing activities, including Class IV –general forest practices that are conversions from timberland to other uses; structural development, including construction or installation of a building or other structure; creation of impervious surfaces; and subdivision, short subdivision and binding site plans, as defined and applied in Chapter 58.17RCW. Projects meeting the definition of redevelopment shall not be considered new development.

**Pollution-generating impervious surface (PGIS)** - 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 the glossary); or storage of erodible or leachable materials, wastes, or chemicals, and which receive direct rainfall or the run-on or blow-in of rainfall. Erodeable or leachable materials, wastes, or chemicals are those substances which, when exposed to rainfall, measurably alter the physical or chemical characteristics of the rainfall runoff. Examples include erodible soils that are stockpiled,

uncovered process wastes, manure, fertilizers, oily substances, ashes, kiln dust, and garbage dumpster leakage. Metal roofs are also considered to be PGIS unless they are coated with an inert, non-leachable material (e.g., baked-on enamel coating).

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.

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.

**Pollution-generating pervious surfaces (PGPS)** - Any non-impervious surface subject to use of pesticides and fertilizers or loss of soil. Typical PGPS include lawns, landscaped areas, golf courses, parks, cemeteries, and sports fields.

**Pre-developed condition** - The native vegetation and soils that existed at a site prior to the influence of Euro-American settlement. The pre-developed conditions shall be assumed to be a forested land cover unless reasonable, historic information is provided that indicates the site was prairie prior to settlement. *Historically the Sammamish River valley floor was pasture or wooded wetland. The map in Appendix K of the Technical Notebook identifies the historical land cover based on the City's research.*

**Project site** - The portion of a property, properties, or right-of-way subject to land disturbing activities, new impervious surfaces, or replaced impervious surfaces. *Projects that include improvements to an existing City right-of-way may consider the right-of-way as a separate project site, with approval of the City Stormwater Engineer, when determining Minimum Requirements.*

**Receiving waters** - Bodies of water or surface water systems to which surface runoff is discharged via a point source of stormwater or via sheet flow.

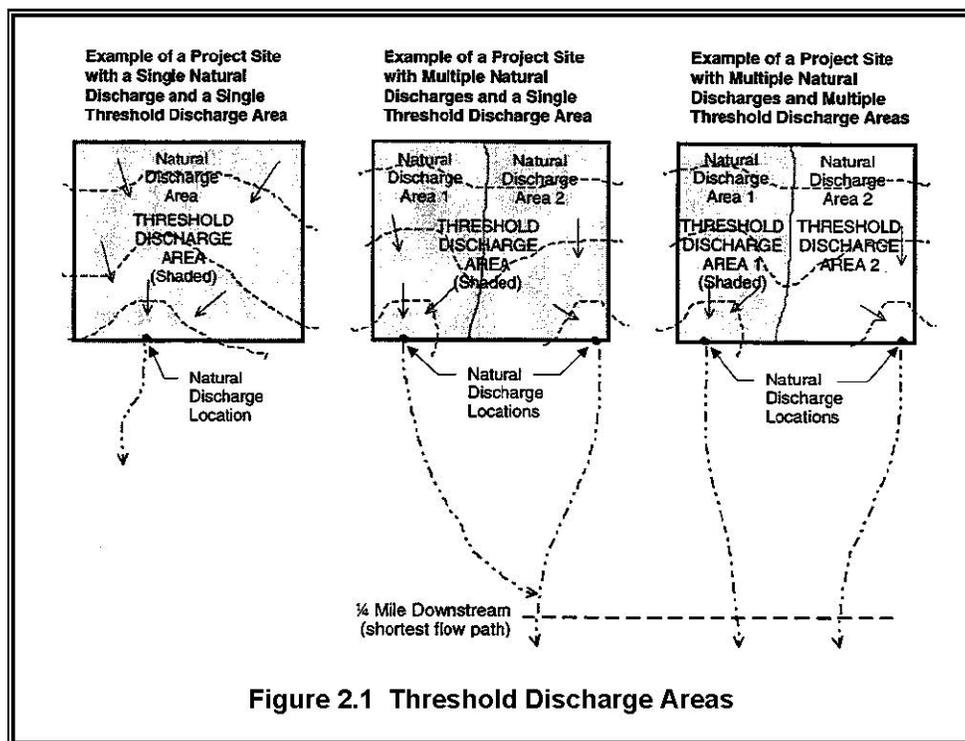
**Redevelopment** - On a site that is already substantially developed (i.e., has 35% or more of existing impervious surface coverage), the creation or addition of impervious surfaces; the expansion of a building footprint or addition or replacement of a structure; structural development including construction,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

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

**Site** - 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.

**Source control BMP** - 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. The Ecology Manual separates source control BMPs into two types. *Structural Source Control BMPs* are physical, structural, or mechanical devices, or facilities that are intended to prevent pollutants from entering stormwater. *Operational BMPs* are non-structural practices that prevent or reduce pollutants from entering stormwater. See Volume IV of the 2005 Ecology Manual for details.

**Threshold Discharge Area** - An onsite area draining to a single natural discharge location or multiple natural discharge locations that combine within one-quarter mile downstream (as determined by the shortest flow path). The examples in Figure 2.1 illustrate this definition. The purpose of this definition is to clarify how the thresholds of this manual are applied to project sites with multiple discharge points.

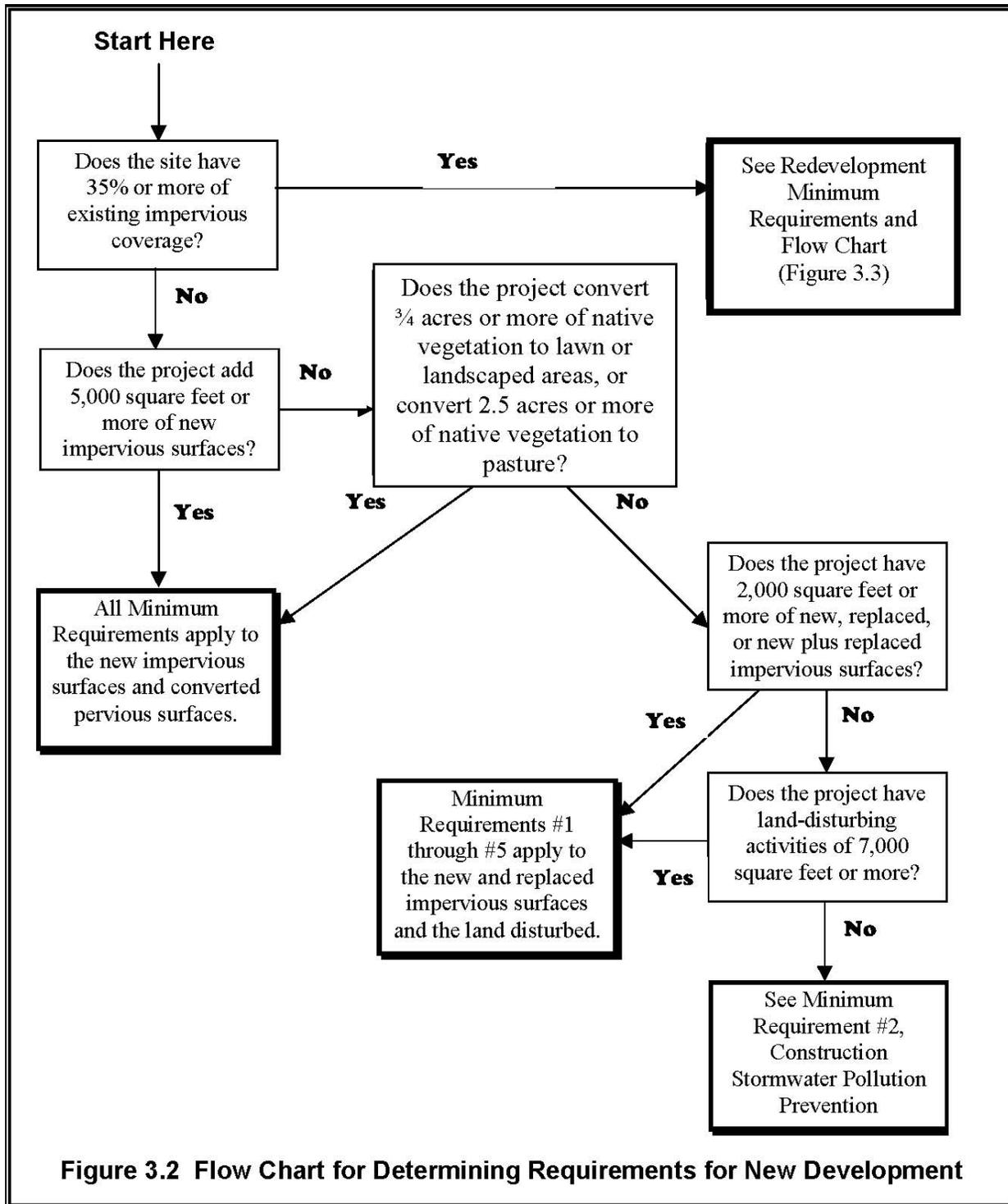


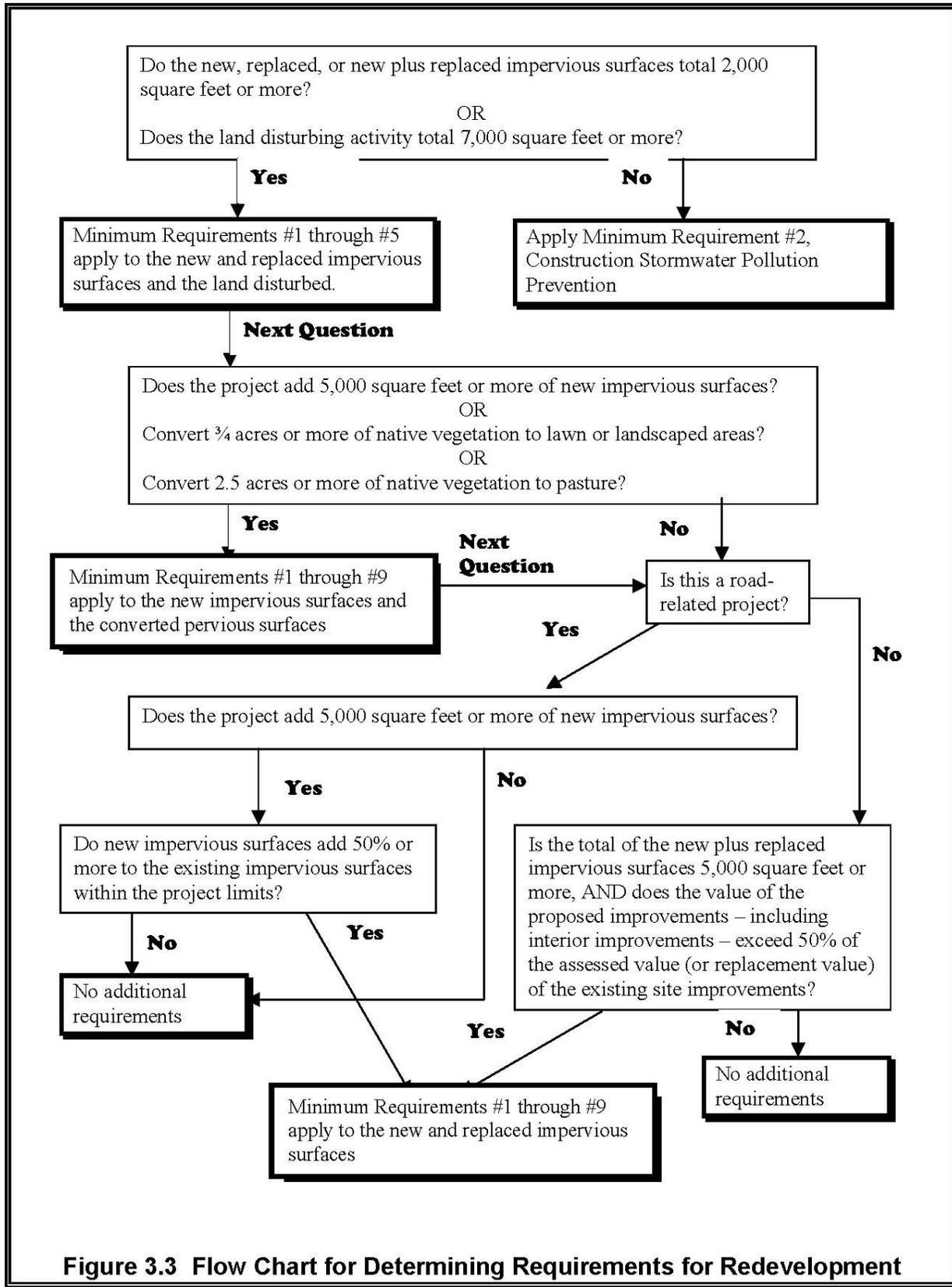
**Wetland** - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from non-wetland sites, including, but not limited to, 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 the conversion of wetlands. *Note: This definition is only applicable to the 2005 Ecology Manual. A separate definition for all other uses is contained in the Redmond Zoning Code.*

## **2.4 Applicability of the Minimum Requirements**

### Thresholds

Not all of the Minimum Requirements apply to every development or redevelopment project. The applicability varies depending on the type and size of the project. This section identifies thresholds that determine the applicability of the Minimum Requirements to different projects. The flow charts in Figures 3.2 and 3.3 (from Appendix 1 of the Western Washington Phase II Municipal Stormwater Permit) can be used to determine which of the Minimum Requirements apply. The Minimum Requirements themselves are presented in Section 2.5. *Project proponents are encouraged to submit a copy of the flow charts indicating how they determined the Minimum Requirements applicable to their project.*





**Figure 3.3 Flow Chart for Determining Requirements for Redevelopment**

### 2.4.1 New Development

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

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

- Creates or adds 2,000 square feet, or greater, of new, replaced, or new plus replaced impervious surface area, or
- Has land disturbing activity of 7,000 square feet or greater.

The following new development shall comply with Minimum Requirements #1 through #9 for the new impervious surfaces and the converted pervious surfaces:

- Create or add 5,000 square feet, or more, of new impervious surface area, or
- Converts  $\frac{3}{4}$  acres, or more, of native vegetation to lawn or landscaped areas, or
- Converts 2.5 acres, or more, of native vegetation to pasture.

### 2.4.2 Redevelopment

All redevelopment shall be required to comply with Minimum Requirement #2. In addition, all redevelopment that exceeds certain thresholds shall be required to comply with additional Minimum Requirements as follows.

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

- The new, replaced, or total of *new plus replaced* impervious surfaces is 2,000 square feet or more, or
- 7,000 square feet or more of land disturbing activities.

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

- Adds 5,000 square feet or more of *new* impervious surfaces or,
- Converts  $\frac{3}{4}$  acres, or more, of native vegetation to lawn or landscaped areas, or
- Converts 2.5 acres, or more, of native vegetation to pasture.

If the runoff from the new impervious surfaces and converted pervious surfaces is not separated from runoff from other surfaces on the project site, the stormwater treatment facilities must be sized for the entire flow that is directed to them.

With approval of the Stormwater Engineer, the Minimum Requirements may be met for an equivalent (flow and pollution characteristics) area within the same site. For public roads' projects, the equivalent area does not have to be within the project limits, but must drain to the same receiving water.

*If flow control/runoff treatment facilities are required of a City right-of-way project, project proponents are encouraged to purchase flow control/runoff treatment in regional facilities, if available.*

#### Additional Requirements for Re-development Project Sites

For road-related projects, runoff from the replaced and new impervious surfaces (including pavement, shoulders, curbs, and sidewalks) shall meet all the Minimum Requirements if the new impervious surfaces total 5,000 square feet or more and total 50% or more of the existing impervious surfaces within the project limits. The project limits shall be defined by the length of the project and the width of the right-of-way.

Other types of redevelopment projects shall comply with all the Minimum Requirements for the new and replaced impervious surfaces if the total of new plus replaced impervious surfaces is 5,000 square feet or more, and the valuation of proposed improvements – including interior improvements – exceeds 50% of the assessed value of the existing site improvements.

*Redmond does not have the “stop-loss” provision described in the 2005 Ecology Manual.*

## **2.5 Minimum Requirements**

This section describes the Minimum Requirements for stormwater management at development and redevelopment sites. Section 2.4 of this Chapter should be consulted to determine which of the minimum requirements below apply to any given project. Figures 3.2 and 3.3 should be consulted to determine whether the minimum requirements apply to new surfaces, replaced surfaces or new and replaced surfaces.

### **2.5.1 Minimum Requirement #1: Preparation of Stormwater Site Plans**

A Stormwater Site Plan is required for all projects meeting the thresholds in Section 2.4 of this Chapter. Stormwater Site Plans shall be prepared in accordance with and follow the outline provided in Chapter 3 of Volume I of the 2005 Ecology Manual. Section 8.3 of this Stormwater Notebook includes additional requirements for documenting BMPs used for storage of hazardous materials and for refueling of construction equipment onsite. Each step in the BMP selection process in Chapter 4 of Volume I will be documented as part of the Site Plan submittal. *Redmond modifications to the BMP selection process, to protect groundwater, are provided in section 2.9.1.4 of this Stormwater Notebook. Site Plans will clearly identify if the proposed project is classified as small, medium, or large. See Chapter 3 of this Stormwater Notebook for site classifications in Redmond.*

## **2.5.2 Minimum Requirement #2: Construction Stormwater Pollution Prevention Plan (SWPPP)**

All new development, redevelopment *and maintenance* projects are responsible for preventing erosion and discharge of sediment and other pollutants into receiving waters. Projects subject to Minimum Requirement #2 are required to provide a Construction Stormwater Pollution Prevention Plan (SWPPP) as part of the Stormwater Site Plan (see Minimum Requirement #1). The SWPPP shall be implemented beginning with initial soil disturbance and until final stabilization.

Sediment and erosion control BMPs shall be consistent with the BMPs contained in Chapters 3 and 4 of Volume II of the 2005 Ecology Manual and/or other equivalent BMPs contained in technical stormwater manuals approved by the Department of Ecology.

The SWPPP shall include a narrative and drawings. All BMPs shall be clearly referenced in the narrative and marked on the drawings. The SWPPP narrative shall include documentation to explain and justify the pollution prevention decisions made for the project. Clearing and grading activities for development shall be permitted only if conducted pursuant to an approved site development plan (e.g., subdivision approval) that establishes permitted areas of clearing, grading, cutting, and filling. When establishing these permitted clearing and grading areas, consideration should be given to minimizing removal of existing trees and minimizing disturbance/compaction of native soils except as needed for building purposes. These permitted clearing and grading areas and any other areas required to preserve critical or sensitive areas, buffers, native growth protection easements, or tree retention areas shall be delineated on the site plans and the development site.

Seasonal Work Limitations – From October 1 through April 30, clearing, grading, and other soil disturbing activities *shall require submittal of Wet Weather Plans for review and approval by Redmond's Wet Weather Committee, as detailed in Chapter 10 of the Stormwater Technical Notebook.*

Based on the information provided and/or local weather conditions, the City of Redmond may expand or restrict the seasonal limitation on site disturbance. *Redmond may take enforcement action – such as a notice of violation, administrative order, penalty, or stop-work order under the following circumstances:*

*If, during the course of any construction activity or soil disturbance during the seasonal limitation period, sediment or contaminants leave the construction site causing a violation of the Washington State surface water quality standard or groundwater quality standard; or*

*If clearing and grading limits or erosion and sediment control measures shown in the approved plan are not maintained.*

The following activities are exempt from the seasonal clearing and grading limitations;

- Routine maintenance and necessary repair of erosion and sediment control BMPs;
- Routine maintenance of public facilities or existing utility structures that do not expose the soil or result in the removal of the vegetative cover to soil, and
- Activities where there is one-hundred percent infiltration of surface water runoff within the site in approved and installed erosion and sediment control facilities.

***Project proponents are required to notify the City of Redmond within 24 hours if a turbidity reading is 250 NTU or higher. Projects discharging water during construction in excess of 25 NTU are required to take immediate action, applying additional temporary sediment and erosion control measures, to lower the NTU in runoff leaving the site below 25 NTU. If a site discharges directly to a surface water body, the NTU limit is based on the standards in WAC 173-201. In general, projects are not allowed to discharge sediment laden water to surface waters unless the background turbidity is not increased by more than 5 NTU. Project sites in seasonal suspension are still required to meet this requirement.***

#### Construction Stormwater Pollution Prevention Plan (SWPPP) Elements

The construction site operator shall include each of the twelve elements below in the SWPPP and ensure that they are implemented unless site conditions render the element unnecessary and the exemption from that element is clearly justified in the SWPPP. All BMPs shall be clearly referenced in the narrative and marked on the drawings. The SWPPP narrative shall include documentation to explain and justify the pollution prevention decisions made for the project.

##### 1. Preserve Vegetation/Mark Clearing Limits

- a. Prior to beginning land disturbing activities, including clearing and grading, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area.
- b. The duff layer, native top soil, and natural vegetation shall be retained in an undisturbed state to the maximum degree practicable.

##### 2. Establish Construction Access

- a. Construction vehicle access and exit shall be limited to one route, if possible.
- b. Access points shall be stabilized with quarry spalls, crushed rock or other equivalent BMP to minimize the tracking of sediment onto public roads.
- c. Wheel wash or tire baths shall be located on site, if the stabilized construction entrance is not effective in preventing sediment from being tracked onto public roads.

- d. If sediment is tracked off site, roads shall be cleaned thoroughly at the end of each day, or more frequently during wet weather. Sediment shall be removed from roads by shoveling or pickup sweeping and shall be transported to a controlled sediment disposal area.
- e. ***Street flushing of sediment into stormwater systems is prohibited in Redmond.***

### 3. Control Flow Rates

- a. Properties and waterways downstream from development sites shall be protected from erosion due to increases in the velocity and peak volumetric flow rate of stormwater runoff from the project site.
- b. Where necessary to comply with Minimum Requirement #7, stormwater retention/detention facilities shall be constructed as one of the first steps in grading. Detention facilities shall be functional prior to construction of site improvements (e.g., impervious surfaces).
- c. ***Permanent infiltration facilities shall not be operational or used to control/treat runoff during construction. Runoff may be infiltrated in locations other than the permanent infiltration facilities.***

### 4. Install Sediment Controls

- a. Stormwater runoff from disturbed areas shall pass through a sediment pond, or other appropriate sediment removal BMP, prior to leaving a construction site or prior to discharge to an infiltration facility. Runoff from fully stabilized areas may be discharged without a sediment removal BMP, but shall meet the flow control performance standard of 3.a, above. ***Full stabilization means concrete or asphalt paving; quarry spalls used as ditch lining; or the use of rolled erosion products, a bonded fiber matrix product, or vegetative cover in a manner that will fully prevent soil erosion. Redmond inspectors shall determine if an area is stabilized by means other than pavement or quarry spalls.***
- b. Sediment control BMPs (sediment ponds, traps, filters, etc.) shall be constructed as one of the first steps in grading. These BMPs shall be functional before other land disturbing activities take place, ***and shall be maintained and removed once the site is stabilized and the inspector approves removal.***
- c. BMPs intended to trap sediment on site shall be located in a manner to avoid interference with the movement of juvenile salmonids attempting to enter off-channel areas or drainages.
- d. ***Earthen structures such as dams, dikes, and diversions shall be seeded and mulched according to the timing indicated in element 5.***

## 5. Stabilize Soils

- a. Exposed and unworked soils shall be stabilized by application of effective BMPs that prevent erosion.
- b. No soils should remain exposed and unworked for more than the time periods set forth below to prevent erosion:
  - During the dry season (May 1 – September 30): 7 days
  - During the wet season (October 1 – April 30): 2 days

*This condition applies to all soils on site, whether at final grade or not. Redmond inspectors may adjust time limits depending on site conditions, forecasted weather, site characteristics, and to protect human safety, habitat, and property downstream.*

- c. Soils shall be stabilized at the end of the shift before a holiday or weekend if needed based on the weather forecast.
- d. Soil stockpiles must be stabilized from erosion, protected with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways and drainage channels.
- e. *Applicable practices include, but are not limited to, temporary and permanent seeding, sodding, mulching, plastic covering, the early application of gravel base on areas to be paved, and dust control.*
- f. *Soil stabilization measures selected should be appropriate for the time of year, site conditions, estimated duration of use, and potential water quality impacts that stabilization materials may have on downstream waters or ground water.*
- g. *Linear construction activities, including right-of-way and easement clearing, roadway development, pipelines, and trenching for utilities, shall be conducted to meet the soil stabilization requirement. Contractors shall install the bedding materials, roadbeds, structures, pipelines, or utilities and re-stabilize the disturbed soils so that:*
  - *From October 1 through April 30 no soils shall remain exposed and unworked for more than 2 days; and*
  - *From May 1 to September 30, no soils shall remain exposed and unworked for more than 7 days.*

## 6. Protect Slopes

- a. Design and construct cut and fill slopes in a manner that will minimize erosion.

- b. Reduce slope runoff velocities by reducing the continuous length of slope with terracing and diversions, reduce slope steepness, and roughen slope surface.*
  - c. Off-site stormwater (run-on) or groundwater shall be diverted away from slopes and undisturbed areas with interceptor dikes, pipes and/or swales. Off-site stormwater should be managed separately from stormwater generated on the site.
  - d. At the top of slopes, collect drainage in pipe slope drains or protected channels to prevent erosion. Temporary pipe slope drains shall handle the expected peak 10-minute flow velocity from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate predicted by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis shall use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis shall use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the Western Washington Hydrology Model to predict flows, bare soil areas should be modeled as "landscaped area."
  - e. Excavated material shall be placed on the uphill side of trenches, consistent with safety and space considerations.
  - f. Check dams shall be placed at regular intervals within constructed channels that are cut down a slope.
  - g. Provide drainage to remove groundwater intersecting the slope surface of exposed soil areas.*
  - h. Stabilize soils on slopes, as specified in Element #5.*
7. Protect Drain Inlets
- a. Storm drain inlets made operable during construction shall be protected so that stormwater runoff does not enter the conveyance system without first being filtered or treated to remove sediment. **Catch basins are considered operational when project proponents create a hole in the side of the drain inlet to allow for drainage when the road is below finished grade. Flows allowed to enter the drain through the created hole are not being treated unless the catch basin insert is installed to provide protection/treatment of runoff entering through the side of the catch basin.***
  - b. All approach roads shall be kept clean. Approach roads shall have inlet protection if they could be impacted by the construction site and at the discretion of the City Inspector.*

- c. Inlet protection devices shall be cleaned or removed and replaced when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).
- d. *When projects are completed, removal of inlet protection devices is required. Removal will be done in a way that does not allow the captured sediment to enter or later be washed into the stormwater inlet.*

#### 8. Stabilize Channels and Outlets

- a. All temporary on-site conveyance channels shall be designed, constructed, and stabilized to prevent erosion from the following expected peak flows. Channels shall handle the expected peak 10-minute flow velocity from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate predicted by an approved continuous runoff model, increased by a factor of 1.6 may be used. The hydrologic analysis shall use the existing land cover condition for predicting flow rates from tributary areas outside the project or permanent project land cover condition, whichever will produce the highest flow rates. If using the Western Washington Hydrology Model to predict flows, bare soil areas should be modeled as "landscaped area."
- b. Stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches shall be provided at the outlets of all conveyance systems.

#### 9. Control Pollutants

- a. All pollutants, including waste materials and demolition debris, that occur onsite shall be handled and disposed of in a manner that does not cause contamination of stormwater, soils or groundwater.
- b. Cover, containment, and protection from vandalism shall be provided for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health or the environment. On-site fueling tanks shall include secondary containment.
- c. Maintenance, fueling and repair of heavy equipment and vehicles shall be conducted using spill prevention and control measures. Contaminated surfaces shall be cleaned immediately following any spill incident.
- d. *Wheel wash or tire bath wastewater shall be discharged to a sanitary sewer with appropriate permits or alternative as approved by the Stormwater Engineer.*
- e. Application of *agricultural chemicals, including* fertilizers and pesticides, shall be conducted in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Manufacturers' label requirements for application rates and procedures shall be followed.

- f. BMPs shall be used to prevent or treat contamination of stormwater runoff by pH modifying sources. These sources include, but are not limited to: bulk cement, cement kiln dust (with Stormwater Engineer pre-approval), new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, dewatering concrete vaults, concrete pumping and mixer washout waters. ***Stormwater discharges shall not cause or contribute to a violation of the water quality standard for pH in the stormwater drainage system or receiving water. Allowable runoff pH concentrations shall be within the range of 6.5 to 8.5 pH.***
- g. Construction site operators are required to obtain written approval from the Department of Ecology prior to using chemical treatment other than CO<sub>2</sub> or dry ice to adjust pH.

#### 10. Control De-watering

- a. Foundation, vault, and trench de-watering water, which have similar characteristics to stormwater runoff at the site, shall be discharged into a controlled conveyance system prior to discharge to a sediment trap or sediment pond.
- b. Clean, non-turbid de-watering water, such as well-point groundwater, can be discharged to systems tributary to, or directly into surface waters of the state as specified in #8, above, provided the de-watering flow does not cause erosion or flooding of receiving waters. Clean de-watering water should not be routed through stormwater sediment ponds.
- c. Other de-watering disposal options may include: (i) infiltration; (ii) transport offsite in vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters; (iii) on-site chemical treatment or other suitable treatment technologies approved by Ecology; (iv) sanitary sewer discharge with ***City of Redmond and King County*** approval, if there is no other option; or (v) use of a sedimentation bag with outfall to a ditch or swale for small volumes of localized de-watering.
- d. Highly turbid or contaminated dewatering water, ***such as from construction equipment operation, clamshell digging, concrete tremie pour, or work inside a cofferdam***, shall be handled separately from stormwater.

#### 11. Maintaining BMPs

- a. All temporary and permanent erosion and sediment control BMPs shall be inspected, maintained and repaired as needed to assure continued performance of their intended function in accordance with BMP specifications.
- b. All temporary erosion and sediment control BMPs shall be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed.

## 12. Manage the Project

- a. Development projects shall be phased to the maximum degree practicable and shall take into account seasonal work limitations.
- b. Construction site operators shall maintain, and repair as needed, all sediment and erosion control BMPs to assure continued performance of their intended function.
- c. Construction site operators shall periodically inspect their sites. For projects that disturb one or more acres, site inspections shall be conducted by a Certified Erosion and Sediment Control Lead who shall be identified in the SWPPP and shall be present on-site or on-call at all times. ***Certification may be obtained through an approved training program that meets the erosion and sediment control training standards established by Ecology. Sites smaller than one acre that require a SWPPP shall also have an on-site/on-call person at all times during construction.***
- d. Construction site operators shall maintain, update and implement their SWPPP. Construction site operators shall modify their SWPPP whenever there is a change in design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the state.

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

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

***Whenever inspection and/or monitoring reveals that the BMPs identified in the Construction SWPPP are inadequate, due to the actual discharge of or potential to discharge a significant amount of any pollutant, appropriate BMPs or design changes shall be implemented as soon as possible. The SWPPP shall be modified as necessary to include additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP shall be completed within seven (7) calendar days following the inspection.***

***The Construction SWPPP shall be retained on-site or within reasonable access to the site.***

*The SWPPP shall be modified whenever there is a significant change in the design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the state.*

### **2.5.3 Minimum Requirement #3: Source Control of Pollution**

*This minimum requirement is also codified in RMC 13.06.* All known, available and reasonable source control BMPs must be required for all projects approved by the City. Source control BMPs must be selected, designed, and maintained in accordance with Volume IV of the Ecology Manual.

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

Natural drainage patterns shall be maintained, and discharges from the project site shall occur at the natural location, to the maximum extent practicable. The manner by which runoff is discharged from the project site must not cause a significant adverse impact to downstream receiving waters and down gradient properties. All outfalls require energy dissipation.

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

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

- a. If the 100-year peak discharge is less than or equal to 0.2 cfs under existing conditions and will remain less than or equal to 0.2 cfs under developed conditions, then the concentrated runoff may be discharged onto a rock pad or to any other system that serves to disperse flows.*
- b. If the 100-year peak discharge is less than or equal to 0.5 cfs under existing conditions and will remain less than or equal to 0.5 cfs under developed conditions, then the concentrated runoff may be discharged through a dispersal trench or other dispersal system, provided the applicant can demonstrate that there will be no significant adverse impact to downhill properties or drainage systems.*
- c. If the 100-year peak discharge is greater than 0.5 cfs for either existing or developed conditions, or if a significant adverse impact to down-gradient properties or drainage systems is likely, then a conveyance system must be*

*provided to convey the concentrated runoff across the downstream properties to an acceptable discharge point (i.e., an enclosed drainage system or open drainage feature where concentrated runoff can be discharged without significant adverse impact).*

*Stormwater control or treatment structures should not be located within the expected 25-year water level elevations for salmonid-bearing waters. Such areas may provide off-channel habitat for juvenile salmonids and salmonid fry. Redmond Stormwater Engineer pre-approval is required for any structure proposed in the 25-year water level elevation of salmonid bearing streams. Designs for outfall systems to protect against adverse impacts from concentrated runoff are included in Volume V, Chapter 4, of the Ecology Manual.*

### **2.5.5 Minimum Requirement #5: On-Site Stormwater Management**

Projects are required to implement on-site stormwater management BMPs to infiltrate, disperse, and retain stormwater runoff on-site to the maximum extent feasible without causing flooding, groundwater contamination, or erosion impacts. See Chapter 5 of Volume V for requirements of on-site stormwater management techniques.

*The following two (2) On-site Stormwater Management Techniques are currently required in Redmond:*

- 1. Roof Downspout Control BMPs, functionally equivalent to those described in Chapter 3 of Volume III of the Ecology Manual. Project proponents are required to follow the flow chart and site suitability criteria in Volume III, Chapter 3, of the 2005 Ecology Manual to determine options to manage roof runoff. Chapter 5 of Volume V also provides requirements of roof runoff dispersion.*
- 2. During completion of construction, all new landscaped areas within the project site are required to have compost amended soils. See City of Redmond Standard Detail 632 for requirements. Reference to and use of City of Redmond Standard Detail 632 is required on landscaping and stormwater civil plans. Additional information and installation procedures/options for compost amending soils is available at [www.buildingsoils.org](http://www.buildingsoils.org).*

*Refer to Section 8.7 of the Stormwater Notebook for additional guidance regarding On-Site Stormwater Management in Redmond.*

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

*Project proponents are encouraged to use runoff reduction/on-site stormwater management techniques to meet flow control requirements, if Minimum Requirement #7 is triggered. Projects that require flow control are required to perform a site assessment to determine applicability and feasibility of runoff reduction techniques.*

### **Groundwater Protection**

*Protection of the City's shallow unconfined drinking water aquifer needs to be considered when managing stormwater runoff from pollution generating impervious surfaces. Except for single-family residential projects, infiltrating runoff from pollution generating impervious surfaces in Wellhead Protection Zones 1 and 2 is prohibited. Single-family residential projects in Wellhead Protection Zones 1 and 2 can infiltrate runoff from pollution generating impervious surfaces after enhanced treatment using a BMP that is exposed to the surface (such as bioretention in view of sidewalks or roads).*

*In Wellhead Protection Zone 3, runoff from pollution generating impervious surfaces can be infiltrated with treatment prior to infiltration based on land use (see Minimum Requirement #6). Native soils cannot be assumed to provide treatment. In Wellhead Protection Zone 4, runoff from pollution generating impervious surfaces can be infiltrated without treatment provided the soil profile provides treatment per Chapter 3.3 of Volume III of the 2005 Ecology Manual. Infiltration of runoff from non-pollution generating impervious areas considered to be clean, including most roofs and sidewalks, is strongly encouraged where feasible.*

## **2.5.6 Minimum Requirement #6: Runoff Treatment**

### **Project Thresholds**

The following require construction of stormwater treatment facilities (see Table 2.1 below):

- Projects in which the total of pollution generating impervious surface (PGIS) is 5,000 square feet or more in a threshold discharge area of the project, or
- Projects in which the total of pollution-generating pervious surfaces (PGPS) is three-quarters (3/4) of an acre or more in a threshold discharge area, and from which there is a surface discharge in a natural or man-made conveyance system from the site.

*Groundwater Protection – please refer to Minimum Requirement #5 for requirements specific to Redmond regarding groundwater protection.*

<b>Table 2.1 Treatment Requirements by Threshold Discharge Area</b>				
	<3/4 acres of PGPS	>3/4 acres PGPS	<5,000 sf PGIS	>5,000 sf PGIS
Treatment Facilities		X		X
On-site Stormwater BMPS	X	X	X	X

PGPS = pollution generating pervious surfaces  
 PGIS = pollution generating impervious surfaces  
 sf = square feet

### Treatment-Type Thresholds

#### 1. Oil Control

Treatment to achieve oil control applies to projects that have “high-use sites.” 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:

- a. An area of 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;
- b. An area of commercial or industrial site subject to petroleum storage and transfer in excess of 1,500 gallons per year, not including routinely delivered heating oil;
- c. 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.);
- d. A road intersection with a measured ADT count 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 use improvements.

#### 2. Phosphorus Treatment

Phosphorus treatment facilities are required for stormwater runoff that discharges directly or indirectly to Lake Sammamish.

#### 3. Enhanced Treatment

Enhanced treatment for reduction in dissolved metals is required for the following project sites that discharge to fish-bearing streams, lakes, or to waters or conveyance systems tributary to fish-bearing streams or lakes.

Industrial project sites, commercial project sites, multi-family project sites, and high AADT roads as follows:

- Fully controlled and partially controlled limited access highways with Annual Average Daily Traffic (AADT) counts of 15,000 or more.
- All other roads with an AADT of 7,500 or greater.

***In Wellhead Protection Zones 1 and 2, enhanced treatment is required prior to infiltrating runoff from pollution generating impervious surfaces in single family residential projects.***

For developments with a mix of land use types, the Enhanced Treatment requirement shall apply when the runoff from the areas subject to the Enhanced Treatment requirement comprise 50% or more of the total runoff within a threshold discharge area.

#### 4. Basic Treatment

Basic Treatment generally applies to:

- Project sites that discharge to the ground, UNLESS:
  - 1) The soil suitability criteria for infiltration treatment are met; (see Chapter 3 of Volume III of the Stormwater Management Manual for Western Washington (2005) for soil suitability criteria); or
  - 2) The project uses infiltration strictly for flow control – not treatment - and the discharge is within ¼-mile of a phosphorus sensitive lake (use a Phosphorus Treatment facility), or within ¼ mile of a fish-bearing stream, or a lake (use an Enhanced Treatment facility). ***See limitations on infiltrating runoff from pollution generating surfaces under Minimum Requirement #5.*** Residential projects not otherwise needing phosphorus control; and
    - Project sites that drain to streams that are not fish-bearing, or to waters not tributary to fish-bearing streams;
    - Landscaped areas of industrial, commercial, and multi-family project sites, and parking lots of industrial and commercial project sites that do not involve pollution-generating sources (e.g., industrial activities, customer parking, storage of erodible or leachable material, wastes or chemicals) other than parking of employees' private vehicles.

For developments with a mix of land use types, the Basic Treatment requirement shall apply when the runoff from the areas subject to the Basic Treatment requirement comprises 50% or more of the total runoff within a threshold discharge area.

#### Treatment Facility Sizing

Water Quality Design Storm Volume: The volume of runoff predicted from a 24-hour storm with a 6-month return frequency (a.k.a., 6-month, 24-hour storm). Wetpool facilities are sized based upon the volume of runoff predicted through use of the Natural Resource Conservation Service curve number equations in Chapter 2 of Volume III of the Stormwater Management

Manual for Western Washington (2005), for the 6-month, 24-hour storm. Alternatively, the 91<sup>st</sup> percentile, 24-hour runoff volume indicated by an approved continuous runoff model may be used.

#### Water Quality Design Flow Rate

- 1) Preceding Detention Facilities or when Detention Facilities are not required: The flow rate at or below which 91% of the runoff volume, as estimated by an approved continuous runoff model, will be treated. Design criteria for treatment facilities are assigned to achieve the applicable performance goal at the water quality design flow rate (e.g., 80% TSS removal).
- 2) Downstream of Detention Facilities: The water quality design flow rate must be the full 2-year release rate from the detention facility. Alternative methods may be used if they identify volumes and flow rates that are at least equivalent. That portion of any development project in which the above PGIS or PGPS thresholds are not exceeded in a threshold discharge area shall apply On-site Stormwater Management BMPs in accordance with Minimum Requirement #5.

#### Treatment Facility Selection, Design, and Maintenance

Stormwater treatment facilities shall be:

- Selected in accordance with the process identified in Chapter 4 of Volume I of the Stormwater Management Manual for Western Washington (2005), ***as modified by the Stormwater Technical Notebook.***
- Designed in accordance with the design criteria in Volume V of the Stormwater Management Manual for Western Washington (2005), ***as modified by the Stormwater Technical Notebook,*** and
- Maintained in accordance with the maintenance schedule in Volume V of the Stormwater Management Manual for Western Washington (2005) ***as modified by the Stormwater Technical Notebook.***

#### Additional Requirements

The discharge of untreated stormwater from pollution-generating impervious surfaces to ground water is prohibited, except for the discharge achieved by infiltration or dispersion of runoff from residential sites through use of On-site Stormwater Management BMPs.

***In some areas of the City, regional runoff treatment facilities have been built, or are planned to be built. One alternative to building runoff treatment facilities within the site is to pay a regional facility surcharge. Participation in regional facilities is mandatory in some locations, and optional in others. See Chapter 8 for additional information on regional facilities and to confirm if participation in the regional facilities program is required or an option.***

***Treatment facilities applied consistent with this Stormwater Notebook and the 2005***

*Ecology Manual are presumed to meet the requirement of state law to provide all known available and reasonable methods of treatment (RCW 90.52.040, RCW 90.48.010). This technology-based treatment requirement does not excuse any discharge from the obligation to apply whatever technology is necessary to comply with state water quality standards, Chapter 173-200 WAC; state sediment management standards, Chapter 173-204 WAC; and the underground injection program, Chapter 173-218 WAC. Additional treatment to meet those standards may be required by the federal government, Washington State or the City of Redmond.*

## **2.5.7 Minimum Requirement #7: Flow Control**

### Applicability

Except as provided below, projects subject to Minimum Requirement #7 must provide flow control to reduce the impacts of stormwater runoff from impervious surfaces and land cover conversions. The requirement below applies to projects that discharge stormwater directly, or indirectly through a conveyance system, into a fresh water.

Flow control is not required for projects that discharge directly to, or indirectly through a conveyance system to Lake Sammamish or the Sammamish River (reference letter from Department of Ecology, Appendix Q) subject to the following restrictions:

- Direct discharge to Lake Sammamish or the Sammamish River does not result in the diversion of drainage from any perennial stream classified as Class 1, 2, 3, or 4 in the City of Redmond Critical Areas Regulations, or from any Category I, II, or III wetland; and
- Flow splitting devices or drainage BMPs are applied to route natural runoff volumes from the project site to any downstream Class 4 intermittent stream or Category IV wetland:
  - Design of flow splitting devices or drainage BMPs will be based on continuous hydrologic modeling analysis. The design will assure that flows delivered to Class 4 intermittent stream reaches will approximate, but in no case exceed, durations ranging from 50% of the 2-year to the 50-year peak flow.
  - Flow splitting devices or drainage BMPs that deliver flow to Category IV wetlands will also be designed using continuous hydrologic modeling to preserve pre-project wetland hydrologic conditions unless specifically waived or exempted by regulatory agencies with permitting jurisdiction; and,
- The project site must be drained by a conveyance system that is comprised entirely of manmade conveyance elements (e.g., pipes, ditches, outfall protection, etc.) and extends to the ordinary high water line of the exempt receiving water; and
- The conveyance system between the project site and the exempt receiving water shall have sufficient hydraulic capacity to convey discharges from future build-

out conditions (under current zoning) of the site, and the existing condition from non-project areas from which runoff is or will be collected; and

- Any erodible elements of the manmade conveyance system must be adequately stabilized to prevent erosion under the conditions noted above.
- *Use of the manmade conveyance system is subject to restrictions that may be placed by the owner of that system.*

*The City of Redmond may require a maximum discharge rate for a site that is flow control exempt. This would typically occur due to existing limits of downstream conveyance capacity.*

If the discharge is to a stream that leads to a wetland, or to a wetland that has an outflow to a stream, both this minimum requirement (Minimum Requirement #7) and Minimum Requirement #8 apply.

### Thresholds

The following require construction of flow control facilities and/or land use management BMPs that will achieve the standard flow control requirement for western Washington (see Table 4.2):

- Projects in which the total effective impervious surfaces is 10,000 square feet or more in a threshold discharge area; or
- Projects that convert  $\frac{3}{4}$  acres or more of native vegetation to lawn or landscape, or convert 2.5 acres or more of native vegetation to pasture in a threshold discharge area, and from which there is a surface discharge in a natural or man-made conveyance system from the site; or
- Projects *that disturb one acre or more*, that through a combination of impervious surfaces and converted pervious surfaces cause a 0.1 cubic feet per second increase in the 100-year flow frequency from a threshold discharge area as estimated using the Western Washington Hydrology Model or other approved model.

That portion of any development project in which the above thresholds are not exceeded in a threshold discharge area shall apply On-site Stormwater Management BMPs in accordance with Minimum Requirement #5.

<b>Table 2.2 Flow Control Requirements by Threshold Discharge Area</b>		
	Flow Control Facilities	On-site Stormwater Management BMPs
<3/4 acres conversion to lawn/landscape, or <2.5 acres to pasture		X
> 3/4 acres conversion to lawn/landscape, or > 2.5 acres to pasture	X	X
<10,000 square feet of effective impervious area per TDA		X
>10,000 square feet of effective impervious area per TDA	X	X
>0.1 cubic feet per second increase in the 100-year flood frequency for sites 1 acre or larger	X	X

Standard Flow Control Requirement

Stormwater discharges shall match developed discharge durations to pre-developed durations for the range of pre-developed discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow. The pre-developed condition to be matched shall be a forested land cover unless:

- Reasonable, historic information is available that indicates the site was not forested prior to settlement. ***A map showing where project proponents can assume pasture for predevelopment conditions (modeled as “pasture” in the Western Washington Hydrology Model) is contained in Appendix K of the Stormwater Notebook;*** or
- The drainage area of the immediate stream and all subsequent downstream basins has had at least 40% total impervious area since 1985. In this case, the pre-developed condition to be matched shall be the existing land cover condition. Where basin-specific studies determine a stream channel to be unstable, even though the above criterion is met, the pre-developed condition assumption shall be the “historic” land cover condition, or a land cover condition commensurate with achieving a target flow regime identified by an approved basin study.

***Alternative Flow Control Design Areas in Redmond***

***Redmond allows alternative flow control design standards in portions of the City. Those areas allowed, or required to meet and alternative flow control requirement, are detailed as follows:***

1. *North Overlake Flow Control Alternative Area. This portion of the City directly discharges to the Sammamish River, a flow control exempt receiving water. The conveyance to the Sammamish River is largely owned by Washington Department of Transportation (WSDOT). As such, the City is required to control flows entering WSDOT conveyance to prevent flooding (see Appendix R).*
2. *Regional Facility Areas (see Appendix L). Proposed project sites in the areas mapped in Appendix L may not be required to construct flow control facilities. This does not waive runoff reduction as required in Minimum Requirement #5. Alternatively, project proponents would be required to participate in the regional flow control facility. See Chapter 8 for information on regional facilities.*
3. *Groundwater Protection. To protect Redmond's shallow, unconfined aquifer/drinking water supply, infiltration of runoff from PGIS in Wellhead Protection Zones (WPZ) 1 and 2 is limited. In WPZ 1 and 2, soils are typically sand and gravel and contain low amounts of organic material. Infiltration rates range from 4 – 20 inches/hour. The groundwater table has been frequently measured at less than 5 feet from the surface. Stormwater detention facilities would need to be extremely large as modeled predevelopment runoff quantities are so small. Based on these conditions, and Redmond's desire to protect its drinking water supply by limiting infiltration of stormwater runoff from PGIS in WPZ 1 and 2, Redmond has adjusted the soil modeling requirements for this area. Project proponents are allowed to model soil type as till (Group C) when determining flow control requirements.*

#### Additional Requirement

Flow Control BMPs shall be selected, designed, and maintained in accordance with Volume III of the Stormwater Management Manual for Western Washington (2005) or an approved equivalent.

### **2.5.8 Minimum Requirement #8 - Wetlands Protection**

#### Applicability

The requirements below apply only to projects whose stormwater discharges into a wetland, either directly or indirectly through a conveyance system. These requirements must be met in addition to meeting Minimum Requirement #6 - Runoff Treatment.

#### Thresholds

The thresholds identified in Minimum Requirement #6 – Runoff Treatment, and Minimum Requirement #7 – Flow Control, shall also be applied for discharges to wetlands. *Additional requirements to protect wetlands are documented in the Redmond Zoning Code.*

### Standard Requirement

Discharges to wetlands shall maintain the hydrologic conditions, hydrophytic vegetation, and substrate characteristics necessary to support existing and designated uses. The hydrologic analysis shall use the existing land cover condition to determine the existing hydrologic conditions unless directed otherwise by a regulatory agency with jurisdiction. A wetland can be considered for hydrologic modification and/or stormwater treatment in accordance with Guide Sheet 1B in Appendix I-D on the Stormwater Management Manual for Western Washington (2005) *if allowed by the Redmond Zoning Code*.

### Additional Requirements

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

- necessary conveyance systems as approved by the Permittee; or
- as allowed in wetlands approved for hydrologic modification and/or treatment in accordance with Guide Sheet 1B in Appendix I-D of the Stormwater Management Manual for Western Washington (2005) *if allowed by the Redmond Zoning Code*.

An adopted and implemented basin plan prepared in accordance with the provisions of Section 2.9 of this chapter may be used to develop requirements for wetlands that are tailored to a specific basin.

### **2.5.9 Minimum Requirement #9: Operation and Maintenance**

An operation and maintenance manual that is consistent with the provisions in Volume V of the Stormwater Management Manual for Western Washington (2005) is required for all proposed public and private stormwater facilities including flow control and treatment facilities, conveyance systems, constructed source controls, and green infrastructure. The Stormwater Engineer may waive this requirement for simple stormwater systems. *The operations and maintenance manual shall be a stand-alone document prepared in accordance with the City of Redmond O&M Manual Template (Appendix N). The development proposal shall include provisions for maintenance of facilities in perpetuity.*

*At a minimum, the operations and maintenance manual shall include:*

- *the purpose of the facility;*
- *the dimensions and other characteristics of the facility (site map);*
- *the party (parties) responsible for maintenance of the facility, with phone numbers and addresses;*
- *list of any proprietary components along with information from the vendor describing maintenance schedule and costs;*

- *what maintenance activities are required, and proposed schedule;*
- *care and maintenance of any powered devices (aeration);*
- *inspection procedures and how the maintenance schedule will be modified if inspections determine the facility is not operating properly; the minimum requirements for this type of facility as described in Chapter 4 of Volume V of the Ecology Manual as modified in this Stormwater Notebook; the minimum requirements for low impact development facilities as described in the following documents:*
  - *Appendix F of Volume III of the Ecology Manual;*
  - *the Low Impact Development Technical Guidance Manual for Puget Sound, published by the Puget Sound Action Team, May, 2005 or current edition,*
  - *Maintenance of Low Impact Development Facilities (Appendix P)*

*The final O&M manual shall incorporate any written comments made during the development review process, and shall incorporate any field changes made to the facilities during construction. A template Operations and Maintenance Manual is provided in Appendix N.*

*The review procedure for O&M manuals shall be as follows:*

*For Public Facilities (that will be maintained by the City): A copy of the draft operations and maintenance manual shall be provided to the Stormwater Maintenance Supervisor for Public Works for review with the Drainage Report as a stand-alone document. Design of public facilities may be subject to revision through the review process to ensure that the facilities make adequate provisions for maintenance, including easements and physical access requirements. The final O&M manual shall be submitted for review and approval prior to acceptance of the completed construction project. The final approved O&M manual shall be submitted with one hard copy and one electronic copy on CD.*

*For Private Facilities (that will be privately maintained): A copy of the draft operations and maintenance manual shall be provided to the Division of Natural Resources for review with the Drainage Report, but as a stand-alone document. The developer shall also submit to the Stormwater Engineer for approval, a proposal indicating the method by which ongoing maintenance will be ensured. For developments that include multiple lots, the party (or parties) responsible for maintenance shall be identified (i.e., homeowners association). Notes shall be added to the property title or plat indicating this maintenance requirement. The final O&M manual shall be submitted for review and approval prior to acceptance of the development. The final approved O&M manual shall be submitted with one hard copy and one electronic copy on CD.*

## **2.6 Adjustments**

*Adjustments to the Minimum Requirements may be granted by the City of Redmond. See RMC 15.24.084 (Appendix A) for details and requirements for adjustments to be granted.*

## **2.7 Variances**

*Variances can be allowed in Redmond. See RMC 15.24.089 (Appendix A) for details and requirements for variances to be granted in Redmond.*

## **2.8 Basin/Watershed Planning**

Basin/watershed planning may be used by the City of Redmond to tailor Minimum Requirement #6 - Runoff Treatment, Minimum Requirement #7 - Flow Control, and/or Minimum Requirement #8 - Wetlands Protection.

Any modifications to minimum requirements based on watershed planning, basin planning, or the use of regional facilities, will be identified in the Stormwater Notebook.

## **2.9 Applicability of the 2005 Ecology Manual in Redmond**

### **2.9.1 Volume I: Minimum Technical Requirements and Site Planning**

No local changes.

#### **2.9.1.1 Chapter 1: Introduction**

No local changes but used for reference only in Redmond.

#### **2.9.1.2 Chapter 2: Minimum Requirements for New Development and Re-development**

Replaced by Chapter 2 of this Stormwater Notebook.

#### **2.9.1.3 Chapter 3: Preparation of Stormwater Site Plans**

##### 3.1 - Stormwater Site Plans: Step-By-Step

Applies. If an Underground Injection Control Well (UIC) is included in the design, proof of registration with the state is required as part of the final drainage report.

##### 3.1.6 - Step 6 – Prepare a Construction Stormwater Pollution Prevention Plan

Applies. Additional requirements are in Chapter 9 and 10 of the Stormwater Notebook.

## 2.9.1.4 Chapter 4: BMP and Facility Selection Process for Permanent Stormwater Control Plans

### 4.2 - BMP and Facility Selection Process

Applies. Note that the City of Redmond has preferences for certain types of stormwater treatment over others. These preferences are based primarily on long-term performance and maintenance cost. Actual selection of facilities must address site-specific constraints. However, these preferences are provided to help the designer in cases where more than one alternative exists. Capital improvement projects shall involve the Stormwater Engineer early in the design process to ensure selection of stormwater treatment facilities that best meet the long-term goals of the City.

The Stormwater Engineer may direct substitution of an alternative treatment method based on these preferences. Table 4.4R, below, describes some of the City's preferences for basic, enhanced, phosphorous, and oil treatment. Treatment methods are designated in the table as follows:

- **Preferred.** These treatment methods are preferred by the City.
- **Accepted.** These treatment methods are acceptable to the City.
- **Conditional.** These treatment methods may be allowed based on site specific information, with approval from the Stormwater Engineer.
- **N/A.** These treatment methods are not accepted by the City.

<b>Facility Option</b>	<b>Basic</b>	<b>Enhanced</b>	<b>Phosphorous</b>	<b>Oil</b>
Biofiltration Swale	Preferred	N/A	N/A	N/A
Wetpond	Preferred	N/A	N/A	N/A
Infiltration Treatment (Wellhead Protection Zone 4)	Preferred	N/A	N/A	N/A
Bio-infiltration Swale (WPZ 4)	Preferred	N/A	N/A	N/A
Stormwater Treatment Wetland	Preferred	Preferred	N/A	N/A
Large Wet Pond	Preferred	N/A	Preferred	N/A
Stormwater Treatment Wetland / Sand Filter	Preferred	Preferred	Preferred	N/A
Stormwater Treatment Wetland / Sand Filter Vault	Preferred	Accepted	Accepted	N/A

**Table 4.4R: Treatment Facility Options in Redmond (continued)**

<b>Facility Option</b>	<b>Basic</b>	<b>Enhanced</b>	<b>Phosphorous</b>	<b>Oil</b>
Bioretention or Rain Garden (WPZ 4)	Preferred	Accepted	N/A	N/A
Phosphorous Control Credit	N/A	N/A	Preferred	N/A
Infiltration Treatment with Basic Treatment (WPZ 4)	Accepted	Accepted	Accepted	N/A
Infiltration Treatment with Enhanced Treatment (WPZ 3,4)	Accepted	Accepted	Accepted	N/A
Infiltration Treatment with Phosphorous Treatment (WPZ 4)	Accepted	Accepted	Accepted	N/A
Media Filter Vault (Iron Media)	Accepted	Conditional	Accepted	N/A
Large Sand Filter	Accepted	Accepted	Accepted	N/A
Amended Sand Filter	Accepted	Accepted	Accepted	N/A
Biofiltration Swale / Sand Filter	Accepted	Accepted	Accepted	N/A
Biofiltration Swale / Sand Filter Vault	Accepted	Accepted	Accepted	N/A
Filter Strip / Linear Sand Filter	Accepted	Accepted	Accepted	N/A
Linear Sand Filter / Filter Strip	Accepted	Accepted	Accepted	N/A
Wet Pond / Sand Filter	Accepted	Accepted	Accepted	N/A
Wet Pond / Sand Filter Vault	Accepted	Accepted	Accepted	N/A
Wet Vault / Sand Filter	Accepted	Accepted	Accepted	N/A
Wet Vault / Sand Filter Vault	Accepted	Accepted	Accepted	N/A
Filtterra	Accepted	Accepted	N/A	N/A
Ecology Embankment	Accepted	Accepted	N/A	N/A
Compost Amended Filter Strip	Accepted	Accepted	N/A	N/A
Biofiltration Swale / Media Filter Vault	Accepted	Accepted	N/A	N/A
Wet Pond / Media Filter Vault	Accepted	Accepted	N/A	N/A
Wet Vault / Media Filter Vault	Accepted	Accepted	N/A	N/A

<b>Table 4.4R: Treatment Facility Options in Redmond (continued)</b>				
<b>Facility Option</b>	<b>Basic</b>	<b>Enhanced</b>	<b>Phosphorous</b>	<b>Oil</b>
Sand Filter / Media Filter Vault	Accepted	Accepted	N/A	N/A
Sand Filter Vault / Media Filter Vault	Accepted	Accepted	N/A	N/A
Media Filter Vault (Zeolite/Perlite/Granular Act. Carbon)	Accepted	N/A	N/A	N/A
Sand Filter	Accepted	N/A	N/A	N/A
Filter Strip	Accepted	N/A	N/A	N/A
Wetvault	Accepted	N/A	N/A	N/A
API OWS	N/A	N/A	N/A	Preferred
CP OWS	N/A	N/A	N/A	Accepted
CB Insert	N/A	N/A	N/A	Accepted
Linear Sand Filter	N/A	N/A	N/A	Accepted
Contribution in lieu of Treatment	Conditional	Conditional	Conditional	N/A
Alternative Technologies	Conditional	Conditional	Conditional	Conditional

Step IV: Step 1: Determine whether you can infiltrate

Infiltration of clean water (water draining from non-pollution generating surfaces) is encouraged throughout Redmond. Infiltration of water draining from pollution generating impervious surfaces in Wellhead Protection Zones 1 or 2 (available at [www.redmond.gov/Maps](http://www.redmond.gov/Maps)) is only permitted for single-family residential projects, and requires enhanced treatment using a BMP that is exposed to the surface. Infiltration of water draining from pollution generating impervious surfaces in Wellhead Protection Zone 3 is permitted following treatment based on land use.

Step V: Step 1: Determine the Receiving Waters and Pollutants of Concern Based on Off-Site Analysis

The City may adopt a basin plan for any watershed in the City that may place additional stormwater requirements. Contact the Stormwater Engineer to determine if any basin plans apply to your project site.

Step V: Step 2: Determine if an Oil Control Facility/Device is Required

Traffic counts in Redmond are available for some roadways at [www.redmond.gov/TrafficCounts.asp](http://www.redmond.gov/TrafficCounts.asp). Follow guidance in the Ecology Manual if traffic counts are not available from Redmond for the project site.

Step V: Step 3: Determine if Infiltration for Pollutant Removal is Practicable

Infiltration for pollutant removal of water draining from pollution generating surfaces in Wellhead Protection Zones 1, 2, or 3 (available at [www.redmond.gov/Maps](http://www.redmond.gov/Maps)) is not permitted. Infiltration for pollutant removal is permitted in Wellhead Protection Zone 4, provided all requirements in the Ecology Manual are met. Note that there are additional requirements regarding infiltration in Wellhead Protection Zones 1, 2 and 3. Please refer to Section 2.5.5. Use of infiltration for water quality treatment is also subject to the requirements of the Washington State Department of Ecology's Underground Injection Control program.

Step V: Step 4: Determine if Control of Phosphorous is Required

Phosphorus control treatment is required for "Large Project" sites that drain to Lake Sammamish. The City's watershed map delineates the boundaries between watersheds, and is available on the City's website at [www.redmond.gov/Maps](http://www.redmond.gov/Maps). See Volume V, Chapter 3, Section 3.3. of the Stormwater Management Manual for Western Washington

Step V: Step 5: Determine if Enhanced Treatment is Required

Traffic counts in Redmond are available for some roadways at [www.redmond.gov/TrafficCounts](http://www.redmond.gov/TrafficCounts). Follow guidance in the Ecology Manual if traffic counts are not available from Redmond for the project site.

Step V: Step 6: Determine if Fee in Lieu is Required

Following review of the step-by-step process for selecting BMPs and review of Table 4.4R, determine if the project will be required or have the option to pay a fee in lieu of construction of the selected onsite BMPs. See Chapter 8, Section 8.8, of the Stormwater Notebook.

**2.9.1.5 Appendix 1-C**

Phosphorus control is required for sites draining to Lake Sammamish. See Step V: Step 4, above.

**2.9.1.6 Appendix I-E Flow Control-Exempt Surface Waters**

Applies with the following revision:

The Sammamish River in Redmond is included on the exempt surface waters list. (Reference letter from Department of Ecology, Appendix Q.)

### **2.9.1.7 Glossary and Notations**

Applies. City Definitions, found in the Glossary of the Stormwater Notebook shall be used where applicable.

## **2.9.2 Volume II: Construction Stormwater Pollution Prevention**

### **2.9.2.1 Chapter 1: Introduction to Constr. Stormwater Pollution Prevention**

Applies.

### **2.9.2.2 Chapter 2: Regulatory Requirements**

Applies with the following additions:

Additional local requirements can be found in:

- Wellhead Protection Zones 1, 2, and 3 make up the critical aquifer recharge area (RZC 21.64 & Map 64.6)
- Critical Areas Regulations (RZC 21.64)
- Construction Stormwater Pollution Prevention (Chapter 9 of the Stormwater Notebook)
- Rainy-Season Construction Guidelines (Chapter 10 of the Stormwater Notebook)
- State regulations provide that turbidity in receiving waters shall not be increased over 5 NTU above existing levels due to runoff from a construction site. In addition to that regulation, Contractor shall take all necessary TESC measures to ensure that runoff from a site does not exceed 50 NTU (during construction). All or parts of a project shall be required by City Inspectors to be shut down until a satisfactory plan is developed and implemented with additional TESC measures as needed to meet these requirements. If the violations occur in the Rainy Season (October 1 through April 30) suspension of work until after April 30 may be required.

### **2.9.2.3 Chapter 3: Planning**

#### 3.1-General Guidelines

Applies.

#### 3.2.3- Step 3 - Construction SWPPP Development and Implementation

Element #4 - BMP C230: Straw bale barrier and BMP C231: Brush barrier are not allowed in Redmond.

Element #12- Refer to Chapter 10 of this Stormwater Notebook for seasonal restrictions/exemptions.

#### 3.3.2-Drawings

Narrative section of Construction SWPPP Checklist applies. Refer to City Standard Notes (Appendix I) and City Plan Review Checklist (Appendix D) for SWPPP drawing requirements.

## **2.9.2.4 Chapter 4: Standards and Specs for Best Management Practices**

### 4.1 - Source Control BMPs

BMP C101 - Preserving Natural Vegetation. No disturbance is allowed within 5 feet of drip lines of trees to be saved unless specifically approved by the Project Planner.

BMP C103 - High visibility plastic or metal fence. Refer to Redmond Standard Specifications and Details.

BMP C104 - Stake and wire fence. Not approved in Redmond.

BMP C105 - Stabilized construction entrance. Refer to Redmond Standard Specifications and Details.

BMP C106 - Wheel wash. Refer to Redmond Standard Specifications and Details.

BMP C121 - Compost mulch may only be used on proposed landscape areas. It is not approved as a general TESC mulch in Redmond.

BMP C140 - Chemical dust suppressants are not approved for use in Redmond.

BMP C202 - Rubble concrete channel lining is not approved in Redmond.

BMP C204 - Pipe slope drain. Note that this is "temporary" only.

BMP C205 - The minimum subsurface drain size shall be 6" diameter.

BMP C220 - Catch basin filters are required in Redmond for storm drain inlet control. Provisions shall be made to remove filters at the end of the project without dropping accumulated sediment into the catch basin.

BMP C230 - Straw Bales. Not approved in Redmond.

BMP C231 - Brush Barrier. Not approved in Redmond.

BMP C233 - Silt fence. Refer to Redmond Standard Specifications and Details.

BMP C234 - Vegetated strips shall have a minimum length of 200 feet.

BMP C240 - Sediment trap shall be sized using the 10-year design storm.

BMP C241 - Temporary sediment pond shall be sized using the 10-year design storm. Side slopes shall be 3:1 or flatter (interior and exterior).

BMP C250 - Construction stormwater chemical treatment and other non-standard treatment systems must be approved by the City.

Appendix II-A - Use Redmond Standard Notes (See Appendix I of the Stormwater Notebook).

## **2.9.3 Volume III: Hydrologic Analysis and Flow Control BMPs**

### **2.9.3.1 Chapter 1: Introduction**

#### 1.2 - Content and Organization of this Volume

The 2005 Ecology Manual notes that conveyance system design is not addressed in that manual. See Chapter 8 of the Stormwater Notebook.

### **2.9.3.2 Chapter 2: Hydrologic Analysis**

#### 2.1 - Minimum Computational Standards

Applies.

#### 2.2 - Western Washington Hydrology Model

For commercial sites use actual proposed impervious area for the developed condition. For single-family developments, use 80% of the maximum impervious area allowed by the zoning code. Detention systems serving projects utilizing green infrastructure design bonuses shall be designed based on the allowed maximum impervious lot area. For single family lots, 4,200 s.f. impervious area per lot may be used with approval from the Stormwater Engineer.

Credits for infiltration of roof runoff or use of porous pavement require demonstration that stormwater is “clean” (draining from non-pollution generating surface) and that it will infiltrate without causing a flooding problem nearby.

### **2.9.3.3 Chapter 3: Flow Control Design**

#### 3.1 - Roof Downspout Controls

Applies only to single family detached homes (with or without an attached or detached Accessory Dwelling Unit).

Section 3.1.3 applies to single family detached homes with modifications as follows:

- The setback from any structure, property line, or steep slope (over 40%) shall be 50 feet minimum.
- The perforated pipe shall not be located where percolating water will encounter and be intercepted by another nearby (within 25 feet) utility trench or foundation drain.

#### Figure 3.2 - Typical Downspout Infiltration Trench

6" minimum diameter pipe required. Flexible single wall pipe is not approved in Redmond.

### Figure 3.4 - Typical Downspout Infiltration Drywell

6" minimum diameter pipe required.

#### 3.2.1 - Detention Ponds

Proposed slopes shall be 3:1 or flatter. Up to 25% of the pond perimeter may have vertical walls. Anything greater will require approval of the Stormwater Engineer.

Modular grid pavement is only allowed if specifically approved by the Stormwater Engineer.

Ponds shall be setback a minimum of 10 feet from structures, property lines or required vegetated buffers, and 50 feet from the limits of steep slope areas. The setback from steep slopes may be reduced per RZC 21.64.060. Conveyance pipes in steep slope areas shall be installed on the surface of the slope, with the minimum disturbance possible, and shall require applicable City approvals.

Minimum setback required for trees is 8 feet in Redmond. Trees shall be setback one (1) vertical foot above the maximum storage elevation to provide maintenance access and liner protection. Trees shall not be planted over any pond liner.

A fire hydrant shall be located within 100 feet of the control structure for maintenance.

Detention ponds in infiltrative soils shall be lined, unless otherwise approved as infiltration facilities. Lining may consist of an impermeable till layer 18 inches or thicker, bentonite or synthetic liners approved by the Stormwater Engineer. When a geomembrane is used, provide an analysis demonstrating that the required cover soil will be stable against sliding when saturated. Impervious bottoms and sides shall extend up to the stage of the 50-year event.

Combination infiltration/detention ponds may be approved by the Stormwater Engineer, subject to the restrictions on infiltration in Wellhead Protection Zones noted in Table 3.11R below.

Pond control structures shall be accessible by a Vector truck. A backhoe must be able to access each pond for maintenance. The detention pond emergency overflow route must be independent from the primary outflow system.

Signs shall be posted at all stormwater ponds using the standard sign format described in Appendix J. There are several alternative sign formats, and they shall be selected based on the following:

- Ponds greater than 5000 square feet in size shall receive the large (24 x 48) sign. Smaller ponds may have either the small (12 x 18) or the large sign.
- Public ponds shall receive the sign with the City of Redmond logo. Private pond signs shall not include the logo, but shall indicate they are privately owned and maintained.

- Ponds with liners shall receive the sign indicating the liner. Ponds that infiltrate shall have the sign indicating the infiltration.

Ponds shall be named by the project proponent. The pond name shall be unique to the City of Redmond. In general, the pond name shall be the same as the name of the subdivision in which the pond is located. Pond names are subject to approval by the Stormwater Engineer.

#### Figure 3.12 - Example of Permanent Surface Water Control Pond Sign

See Appendix J of the Stormwater Notebook for City of Redmond standard sign.

#### 3.2.2 - Detention Tanks

Corrugated metal detention tanks are not approved in Redmond.

Corrugated metal pipe (CMP) risers are not approved in Redmond.

Tanks shall be setback a minimum of 10 feet from structures, property lines, required vegetated buffers, and 25 feet from the limits of steep slopes. The setback from steep slope may be reduced per RZC 21.64.060. For limitations on tree planting, see tree separation information for pipes in Chapter 8.

Add the following note to drawings that include detention tanks: "Pressure tests may be required by the City Inspector. Tanks that do not pass pressure tests shall be repaired or replaced." Avoiding leakage is particularly critical in Wellhead Protection Zones 1, 2, and 3.

Maintenance must be feasible and designs should strive to facilitate maintenance (design adjustments to facilitate maintenance may be required during plan review).

#### 3.2.3 - Detention Vaults

Vaults shall be setback a minimum of 10 feet from structures, property lines, required vegetated buffers, and 25 feet from the limits of steep slopes. The setback from steep slopes may be reduced per RZC 21.64.060.

Vault setbacks from property lines or right-of-way limits must be a minimum of 10 feet, or the distance required to excavate a 1:1 slope from the bottom of the vault to the ground surface at the right-of-way or property line – whichever is greater. Trees may be as close as 2 feet from concrete vaults provided the trees do not interfere with access for maintenance. Specify shallow rooted trees by species on the project landscape plans for locations closer than 8 feet to vaults.

Maintenance must be feasible and designs should strive to facilitate maintenance (design adjustments to facilitate maintenance may be required during plan review).

#### Figure 3.17 - Flow Restrictor (TEE)

Refer to City Standard Detail in "City of Redmond Standard Specifications and Details".

#### Figure 3.18 - Flow Restrictor (Baffle)

Refer to City Standard Detail in "City of Redmond Standard Specifications and Details".

#### Figure 3.19 - Flow Restrictor (Weir)

Refer to City Standard Detail in "City of Redmond Standard Specifications and Details".

#### 3.2.5 - Other Detention Options

Parking lot ponding is only allowed for the 50-year storm event or greater. A maximum ponding depth of 6 inches is allowed. The 50-year event may not impact any buildings or other structures. Provisions to bypass offsite flows shall be included in design of parking lot detention.

Roof detention is not allowed in Redmond at this time.

#### 3.3 - Infiltration Facilities for Flow Control and for Treatment

Protection of the drinking water resource is a very high priority in Redmond. Therefore, infiltration of stormwater, even with treatment, is limited within Wellhead Protection Zones 1 and 2 (map available at [www.redmond.gov/Maps](http://www.redmond.gov/Maps)).

#### 3.3.5 - Site Characterization Criteria

The soil infiltration rate may be determined by a falling head test conducted by a qualified engineer using commonly accepted methods. Infiltration locations will be considered unacceptable if the design infiltration rate is less than 1.0 inches/hour. In no case shall the design infiltration rate be more than 20.0 inches/hour.

Notify the City of Redmond's Wellhead Protection Program staff prior to installing groundwater monitoring wells. The City may consider allowing placement of such wells within a public right-of-way if the City wishes to assume responsibility for the wells in the future. All wells shall either be required to be properly abandoned when they are no longer needed, or may be requested to be turned over to the City for ongoing monitoring by City staff.

#### 3.3.6 - Site Suitability Criteria (SSC)

At least 200 feet shall be provided for separation from public wells. Public wells are located within Wellhead Protection Zone 1. A map of Wellhead Protection Zones is available at [www.redmond.gov/Government/MapsGISservices/StandardMaps/](http://www.redmond.gov/Government/MapsGISservices/StandardMaps/).

### 3.3.9 - General Design, Maintenance, and Construction Criteria for Infiltration Facilities

Construction plans shall include a note to require field verification during construction of the facility, of soil conditions, and infiltration rates by an engineer with experience in stormwater management and licensed in the State of Washington. The engineer shall provide a written statement to the City of Redmond related to the field verification of the design parameters.

### 3.3.10 - Infiltration Basins

Infiltration basins shall meet the same requirements for slopes, fences, signage, etc., as detention ponds.

### 3.3.11 - Infiltration Trenches

Geotextile fabric or sand base is required for infiltration trenches in Redmond. Maximum length shall be 100 feet.

## **2.9.3.4 Appendix IIIB: Western Washington Hydrology Model – Information, Assumptions, and Computation Steps**

### WWHM Information and Assumptions

#### 5. Vegetation data

Pre-developed conditions shall be modeled as forested or pasture land cover. Forested land cover shall be used, except for the valley floors associated with the Sammamish River, Bear Creek, Evans Creek, and Lake Sammamish. For these valley floors, pre-developed condition is “pasture land cover.” 100% of the site shall be assumed pervious.

#### 6. Development land use data

For commercial sites use actual proposed impervious area for the developed condition. For single-family developments, use 80% of the maximum impervious area allowed by the zoning code. For single family lots, 4,200 s.f. impervious area per lot may be used with approval from the Stormwater Engineer.

## **2.9.3.5 Appendix IIIC: Washington State Department of Ecology Low Impact Development Design and Flow Modeling Guidance**

Note: Use of low impact development BMPs requires more thorough site assessment than traditional measures. See Section 8.29 of the Stormwater Notebook.

### 7.1 Permeable Pavements

Use of permeable pavements is subject to approval by the Technical Committee. Use of permeable pavements as pollution generating impervious surface is not allowed. A

maintenance plan is required. Use of modular pavements in fire lanes is discouraged and is subject to approval from the Technical Committee.

## 7.2 Dispersion

### *7.2.5 Dispersion in Urban Areas*

As noted in paragraph 2.5.5 of this Stormwater Notebook, full site dispersion may be limited by site conditions.

## **2.9.4 Volume IV: Source Control BMPs**

### **2.9.4.1 Appendix IVG: Recommendations for Management of Street Wastes**

#### Street Waste Liquids

Decant liquid shall be discharged to sanitary sewer or otherwise disposed. It shall not be discharged to the storm system, even if it passes through a stormwater treatment BMP.

## **2.9.5 Volume V: Runoff Treatment BMPs**

### **2.9.5.1 Chapter 1: Introduction**

Applies. See Table 4.4R in Section 2.9.1.4 of the Stormwater Notebook.

### **2.9.5.2 Chapter 2: Treatment Facility Selection Process**

Applies. Note that the City of Redmond has preferences for certain types of stormwater treatment over others. These preferences are based primarily on long-term performance and maintenance cost. Actual selection of facilities must necessarily address site-specific constraints. However, these preferences are provided to help the designer in cases where more than one alternative exists to meet the same needs. Capital improvement projects shall involve the Stormwater Engineer early in the design process to ensure selection of stormwater treatment facilities that best meet the long-term goals of the City. The Stormwater Engineer may direct substitution of an alternative treatment method based on these preferences. Table 4.4R describes some of the City's preferences.

#### Step 1: Determine the Receiving Waters and Pollutants of Concern Based on Off-Site Analysis

The City may adopt a basin plan for any watershed in the City that may place additional stormwater requirements. Contact the Stormwater Engineer to determine if any basin plans apply to your project site.

Step 2: Determine if an Oil Control Facility/Device is Required

Traffic counts in Redmond are available for some roadways at [www.redmond.gov/Transportation/Resources/Engineering/TrafficCounts](http://www.redmond.gov/Transportation/Resources/Engineering/TrafficCounts). Follow guidance in the Ecology Manual if traffic counts are not available from Redmond for the project site.

Step 3: Determine if Infiltration for Pollutant Removal is Practicable

Infiltration for pollutant removal of water draining from pollution generating impervious surfaces in Wellhead Protection Zones 1, 2, or 3 (map available at [www.redmond.gov/Maps](http://www.redmond.gov/Maps)) is not permitted. Infiltration for pollutant removal is permitted in Wellhead Protection Zone 4, provided all requirements in the Ecology Manual are met. Use of infiltration for water quality treatment is also subject to the requirements of the Washington State Department of Ecology's Underground Injection Control Program. See Table 3.11R in Section 2.3.3.3 of the Stormwater Notebook.

Step 4: Determine if Control of Phosphorous is Required

Phosphorus control treatment is required for "Large Project" sites that drain to Lake Sammamish. The City's watershed map delineates the boundaries between watersheds and is available at [www.redmond.gov/Government/MapsGISservices/StandardMaps/](http://www.redmond.gov/Government/MapsGISservices/StandardMaps/). See Volume V, Chapter 3, Section 3.3. of the Stormwater Management Manual for Western Washington.

Step 5: Determine if Enhanced Treatment is Required

Traffic counts in Redmond are available for some roadways at [www.redmond.gov/TrafficCounts](http://www.redmond.gov/TrafficCounts). Follow guidance in the Ecology Manual if traffic counts are not available from Redmond for the project site.

Step 6: Determine if Fee-in-Lieu is Required

Following review of the step-by-step process for selecting BMPs and review of Table 4.4R, determine if the project will be required or have the option to pay a fee-in-lieu of construction of the selected onsite BMPs. See Chapter 8, Section 8.8, of the Stormwater Notebook.

**2.9.5.3 Chapter 3: Treatment Facility Menus**

3.2 - Oil Control Menu

Applies. However, the Stormwater Engineer may direct substitution of an alternative treatment method based on the preferences noted in Table 4.4R of Section 2.3.1 of the Stormwater Notebook.

### 3.3 - Phosphorous Treatment Menu

Applies. However, the Stormwater Engineer may direct substitution of an alternative treatment method based on the preferences noted in Table 4.4R of Section 2.3.1 of the Stormwater Notebook.

Projects within the Lake Sammamish Basin that are "Large Projects" as defined in Chapter 3 of the Stormwater Notebook (subject to Minimum Requirement #6) are required to provide phosphorus controls.

In addition to the Treatment Methods listed in the 2005 Ecology Manual, phosphorous control may be provided by applying measures listed below such that a score of 10 points or more is achieved. Credit options for phosphorus reduction are as summarized in Table 3.3R and are described as follows:

1. Leaving part of the site undisturbed, including undevelopable land. Full credit, or 10 points, is awarded for leaving 65 percent of a site in undisturbed native vegetation or areas re-established in native vegetation. Critical Areas and their buffers may be counted. All areas for phosphorus credit must be in tracts dedicated to the City protected in accordance with the requirements set forth for general critical area protective measures in RZC 21.64. A descending scale of points applies where lower percentages of the site are left undisturbed. Possible credit = 1 to 10 points.
2. Directing runoff from pollution-generating surfaces to grassy areas with level spreading. Directing runoff from pollution-generating areas to grassy areas that are not fertilized (a notice shall be made on the plat and signage posted to this effect) or to areas of native vegetation (protected by critical area tract) results in pollutant removals similar to those obtained in swales while also providing an increased opportunity for infiltration. To use this option, flows must remain unconcentrated and be spread uniformly over the intended area. The vegetated area receiving dispersed flows should be at least 25 percent as large as the area contributing flow. The receiving area should be increased by one percent for each percent increase in slope over four percent. The area should be configured so that the length of the flow path is no longer than the width over which flows are dispersed.

#### Example:

Assume a parking lot is 100' x 600', or 60,000 s.f. Flows will be dispersed through an adjacent area of native vegetation with a slope of 8 percent.

The area of vegetation must be at least 17,400 s.f. (25% + 4% (for steeper slope) x 60,000 s.f.). Assuming runoff is dispersed continuously along the wider edge of the parking lot, the flow path would need to be at least 29 feet (17,400' ÷ 600'). If the

water were dispersed along the shorter edge, flow path would be 174 feet (17,400' ÷ 100'). However, this flow path would be longer than the width over which flows were dispersed (100'), and would not be a satisfactory option. The parking lot could be graded, however, so that flows would be dispersed at both of the 100 foot ends, making each flow path 87 feet, which would be acceptable.

Credit is proportional to the total volume of runoff diverted; one point is earned for every 25 percent of total volume so directed. Possible credit = 1 to 4 points.

3. Providing covered parking areas isolated from the stormwater conveyance system. This item applies to all land uses for which covered parking for employees, residents, guests, and the general public is provided. This can be achieved for commercial land uses simply by covering the parking required by code. For other land uses, provision of additional covered parking for guests or the general public (total parking) in lieu of on-street parking can be used to provide this assurance. It is intended that covered parking would isolate the area from stormwater run-on as well as direct rainfall. A low curb, berm, or enclosing walls, in addition to a roof, would typically be needed. The water quality credit is proportional to the percentage of the total surface area that is effectively covered. One point is earned for every 25 percent of parking covered and protected from run-on. Possible credit = 1 to 4 points.
4. Providing covered vehicle washing areas connected to the sanitary sewer system. This item applies to commercial, industrial, and multi-family sites. Frequent car-washing can contribute significant amounts of phosphorus to stormwater. Note that sewer districts may have pretreatment requirements before allowing connection to the sanitary sewer. Possible credit = 3 points.
5. Providing covered waste disposal and recycling areas isolated from the stormwater conveyance system. One point is earned if all solid waste management areas are covered and protected from stormwater run-on. Possible credit = 1 point.

Credit shall be applied to the whole site.

If the credit option is used, it should be applied for during initial drainage review by the City. The preliminary stormwater report should include a written request for credit based on either the site plan or the grading plan for the project. The request should outline how the point totals are to be achieved. Credit is not given unless requested. Use of the credit option does not release the project from the need for basic or enhanced treatment (as applicable).

<b>Table 3.3R Water Quality Credit for Phosphorus Control</b>	
<b>Credit Option</b>	<b>Points</b>
Leaving site undisturbed, in native vegetation. Buffers without trails may be counted.	At least 65% = 10 60% = 9 55% = 8 50% = 7 45% = 6 40% = 5 35% = 4 30% = 3 25% = 2 20% = 1
Directing road runoff to pervious, non-pollution-generating vegetated area.	100% of volume = 4 75% of volume = 3 50% of volume = 2 25% of volume = 1
Covered parking protected from run-on	100% of parking = 4 75% of parking = 3 50% of parking = 2 25% of parking = 1
Covered car wash area connected to sanitary sewer (multi-family)	3
Covered solid waste storage area	1

### 3.4 - Enhanced Treatment Menu

Applies. However, the Stormwater Engineer may direct substitution of an alternative treatment method based on the preferences noted in Table 4.4R of Section 2.9.1.4 of the Stormwater Notebook.

### 3.5 - Basic Treatment Menu

Applies. However, the Stormwater Engineer may direct substitution of an alternative treatment method based on the preferences noted in Table 4.4R of Section 2.9.1.4 of the Stormwater Notebook.

## **2.9.5.4 Chapter 4: General Requirements for Stormwater Facilities**

### 4.3.2 - Side Slopes and Embankments

Up to 25% of the pond perimeter may have vertical walls. Anything greater will require approval of the Stormwater Engineer. Provide fence along slopes greater than 3:1.

#### 4.4.1 - General Design Criteria

Liners are required for all water quality ponds and most detention ponds (impermeable till layer, synthetic liner or bentonite).

#### 4.4.3 - Design Criteria for Low Permeability Liner Options

Concrete liners are not approved in Redmond.

#### 4.5.3 - Outfall Systems

Drop structures are not allowed unless specifically approved by the Stormwater Engineer.

#### Table 4.5 - Maintenance Standards

No. 4 – Control Structure / Flow Restrictor

Under “General”, maintenance is required if Trash and Debris (Includes Sediment) material exceeds 20% of sump depth or 1 foot below orifice plate.

#### Figure 4.8 - Flow Dispersal Trench

6" minimum diameter perforated pipe required.

### **2.9.5.5 Chapter 5: On-Site Stormwater Management**

#### BMP T5.10 - Downspout Dispersion

Downspout dispersion may be limited based on site and downstream conditions.

#### BMP T5.13 - Post-Construction Soil Quality and Depth

For landscaped areas and lawns, compost-amended soils are required.

Compost-amended areas shall be marked to prevent vehicle traffic in those areas.

#### BMP T5.20 - Preserving Natural Vegetation

Preserved areas shall be set aside as native growth protection easement and marked accordingly. No vehicle traffic shall be permitted in preserved areas.

#### BMP T5.30 - Full Dispersion

Full dispersion credit may be limited based on site and downstream conditions.

### **2.9.5.6 Chapter 6: Pretreatment**

Applies.

### **2.9.5.7 Chapter 7: Infiltration and Bio-infiltration Facilities**

Applies. Note that infiltration using the native soil for treatment is not allowed in Wellhead Protection Zones 1, 2, or 3. (See Section 2.5.5, Minimum Requirement #5, for limitations on infiltration based upon location.)

Note that underground injection control (UIC) wells are subject to the requirements of the Washington State Department of Ecology's "Guidance for UIC Wells that Manage Stormwater, 2006." UIC wells shall be registered with the state as documented within the Drainage Report.

A UIC well is generally a manmade subsurface fluid distribution system designed to discharge fluids into the ground and consists of an assemblage of perforated pipes, infiltration trenches with perforated pipes, drain tiles, or drywells, other similar mechanisms, or a dug hole that is deeper than the largest surface dimension (WAC 173-218-030).

### **2.9.5.8 Chapter 8: Sand Filtration Treatment Facilities**

Applies.

### **2.9.5.9 Chapter 9: Biofiltration Treatment Facilities**

#### 9.4 - Best Management Practices

Swales shall be at least 200 feet long. Swale length may be reduced to 150 feet for re-development projects if no feasible alternative exists. Maximum swale bottom width shall be 8 feet (parallel swales are acceptable if needed to provide adequate treatment area). Biofiltration swales and similar water quality facilities in infiltrative soils shall be lined, unless otherwise approved as infiltration facilities. Lining may consist of an impermeable till layer 18 inches or thicker, bentonite or synthetic liners approved by the Stormwater Engineer.

If biofilters are not able to be located off-line, the swale shall be designed so the maximum flow possible in the swale up to the 50-year does not produce a velocity over 3 feet per second.

The size and shape of biofilters (and other surface features) shall be compatible with the terrain and not detract from the landscape value (the latter as determined by the Technical Committee).

At least one side of each biofilter shall be accessible for maintenance by a backhoe.

Plant no trees within 8 feet of biofiltration swale banks. Their resulting shade and leaves impact the dense vegetated cover required for biofiltration. In designing the landscaping for the area, and placement of the biofiltration swale, take into account the need for sunlight within the swale.

### Table 9.1 - Sizing Criteria

Underdrains are not required.

### Figure 9.2 - Biofiltration Swale Underdrain Detail

Underdrains are not required.

## **2.9.5.10 Chapter 10: Wet Pool Facility Designs**

### 10.3 - Best Management Practices (BMPs) for Wetpool Facilities

See requirements for Detention Ponds in Volume III.

Provide a 5-foot wide level bench around the perimeter of the pond at or up to 1 foot below the permanent water surface.

All water quality ponds shall be lined to prevent infiltration. Lining may consist of an impermeable till layer 18 inches or thicker, bentonite or synthetic liners approved by the Stormwater Engineer. When a geomembrane is used, provide an analysis demonstrating that the required cover soil will be stable against sliding when saturated.

Gravity drains are not required for wet ponds or vaults. Access roads to the pond bottom are not required but are encouraged for wet ponds.

Wet ponds that are intended solely for water quality treatment shall have a high flow bypass to divert peak flows above the water quality design storm.

Wet ponds shall be setback a minimum of 10 feet from structures, property lines, or required vegetated buffers, and 50 feet from the limits of steep slopes. The setback from steep slopes may be reduced per RZC 21.64.060.

A minimum, average depth of 3 feet is required for water quality treatment in vaults and tanks.

Storm pipes should discharge into wet ponds at/or above the normal control elevation (elevation of outlet pipe invert). Designs that include pipes discharging below the control elevation must include an analysis demonstrating that sediment will not accumulate within the pipe.

To avoid anaerobic conditions, wet ponds should not have permanent pool depths greater than 8 feet, unless aeration is provided. For publicly owned and maintained ponds, aeration requires approval from the Stormwater Engineer.

## **2.9.5.11 Chapter 11: Oil and Water Separators**

### 11.7 - Oil and Water Separator BMPs

API separators rise rate shall be 0.2187 foot/minute.

## **2.9.5.12 Chapter 12: Emerging Technologies**

### 12.7 - Use of Emerging Technologies in Redmond

The use of emerging technologies is not discouraged in Redmond, but will require more careful scrutiny, additional submittals, and may require post-construction monitoring. In general:

- Technologies that have received General Use (GULD) designation are acceptable for use in Redmond, within the guidance and recommendations for use provided by Ecology.
- Technologies that have received Conditional Use (CUD) designation are acceptable for use in Redmond for some projects, on a case-by-case basis. Such projects may require post-construction monitoring.
- Technologies that are going through Ecology's Technology Assessment Protocol may be considered for use in Redmond for some projects, on a case-by-case basis. Such projects will require substantial performance data submittals and post-construction monitoring.

Contact the Stormwater Engineer to discuss use of emerging technologies. Final approval will be by a committee that includes a representative from the Natural Resources Division, the Development Services Division, and the Construction Division of Public Works.

## **Chapter 3 REDMOND PERMIT TYPES AND PROJECT CLASSIFICATIONS**

Projects that involve clearing, grading, installation of new impervious surfaces, or modification of drainage patterns are subject to the requirements described in this Stormwater Notebook and the Redmond Municipal Code, Chapter 15.24.050. Available permits include Rough Grading Permits and Clearing and Grading Permits.

Some very small projects may not require permits. See Redmond Municipal Code, Chapter 15.24

### **3.1 Rough Grading Permits**

Rough grading is the stage at which the grade is modified to conform approximately to the proposed final grade. This permit usually covers only earthwork but may also include stormwater systems especially if they are part of the pollution prevention system. It is a prelude to further work on a development proposal that has received conceptual approval from the City.

### **3.2 Clearing and Grading Permits**

Projects require a permit if they:

- Move over 50 CY of soil; or
- Change the topography by more than four feet; or
- Perform work within a City of Redmond easement or right-of-way; or
- Work with a stormwater pipe 12-inches in diameter or greater; or
- Clear 7,000 SF of land; or
- Remove 10 or more significant trees; or
- Add 2,000 SF or more of impervious surface; or
- Work within a Critical Area or buffer as defined in the RZC 21.64; or
- Modify a private water quality or flow control stormwater facility.

Projects that trigger the above requirements for a Clearing and Grading Permit are classified as Small, Medium or Large.

### **3.3 Small Projects**

Projects are Small Projects if they involve:

- Less than 2000 square feet of new and/or replaced impervious surface; and
- Less than 7000 square feet of land disturbance; and
- Less than 500 CY of grading.

Small projects are projects that do not require a Site Plan, Minimum Requirement #1 in Chapter 2 of this Stormwater Notebook. For these projects, refer to Chapter 4 of the Stormwater Notebook.

### **3.4 Medium Projects**

Projects are Medium Projects if they involve areas that exceed any of the criteria above for Small Projects and involve:

- Less than 5000 square feet of new impervious area; and
- Less than  $\frac{3}{4}$  acre of native vegetation converted to lawn or landscaped areas; and
- Less than 500 CY of grading; and
- Less than 2.5 acres of native vegetation converted to pasture.

Medium projects are subject to Minimum Requirements #1-5 in Chapter 2 of the Stormwater Notebook. For these projects, refer to Chapter 5.

### **3.5 Large Projects**

Large projects are projects that exceed one or more of the criteria for Medium Projects. Large projects trigger Minimum Requirements #1-9 in Chapter 2 of the Stormwater Notebook. Large projects shall comply with the requirements described in Chapter 6.

## CHAPTER 4      **SMALL PROJECT REQUIREMENTS**

### **4.1      Small Project Submittal Requirements**

The detail required for plans submitted for small projects is extremely variable, from very simple, hand-drawn plans, to detailed engineering drawings and reports. Request a meeting with the Stormwater Engineer to discuss your project specifics.

In general, the plans and narratives submitted shall include:

1. Written description outlining proposed activity.
2. Existing contours (information may be available from the City), shown as dashed lines, or spot elevations.
3. Sketch showing proposed activity.
4. Owner information – name, address and contact.
5. Project and Site information – title, tax parcel or address.
6. Existing utilities – identify type and size (information may be available from the City).
7. Identify slopes 40% or greater.
8. Location and drip lines of trees 6 inch caliper or greater (measured 4 feet above existing grade. (Only those trees to be cleared or trees within 50 feet of cleared areas need to be specifically designated).
9. Existing surface waters (streams, lakes, wetlands, etc.). Proposed drainage (flow arrows).
10. Proposed retaining walls/rockeries (indicate approximate heights).
11. Disturbed area – approximate (identify on the plan and label quantity in square feet).
12. Proposed contours – show as solid lines, or finished grade spot elevations at a minimum.
13. Proposed utilities – identify.

Note that if the project triggers State Environmental Policy Act (SEPA) thresholds, the permitting process will be more complex. Examples of SEPA thresholds include:

- Projects include stormwater pipes greater than 12 inches in diameter.
- Projects are located in Critical Areas (See RZC 21.64) such as:
  - Wetlands
  - Wetland buffers
  - Streams
  - Stream buffers
  - Critical wildlife habitat areas
  - Steep slopes
  - FEMA Floodways
  - Wellhead Protection Zones 1, 2, and 3

Contact the Development Services Center at 425.556.2473 or the Development Services Division at 425.556.2760 for further information about critical areas.

## 4.2 Small Project Construction Stormwater Pollution Prevention Requirements

Small Projects are required to meet Minimum Requirement #2 - Construction Stormwater Pollution Prevention, as described in the 2005 Ecology Manual. Small project proponents are also required to review Chapter 10 of this Stormwater Notebook to determine additional requirements for construction monitoring, TESC, and seasonal construction suspension.

In addition to those requirements, the following shall apply:

- It shall be the responsibility of the contractor to obtain street use and other related permits prior to any construction.
- It shall be the responsibility of the contractor to verify the correct locations of utilities to avoid damage or disturbance.
- Keep project impacted off-site streets clean at all times. Use sweepers; flushing streets shall not be allowed.
- Tie impervious surfaces (roof, streets, driveways, etc.) to completed drainage system as soon as possible.
- The City will order stoppage of work and will order sampling and analysis of stormwater discharges if stormwater controls do not meet standards described in this Stormwater Notebook.

## 4.3 Permit Process for Small Projects

The following is an overview of the steps and requirements for projects that require only a Clearing/Grading and Stormwater Management approval (and no other approvals). Projects requiring other permits may have additional steps and requirements. Consult the Development Services Center for additional guidance.

<b>Table 4: Small Project Requirements</b>	
<b>Responsible Party</b>	<b>Activity</b>
<b>Applicant</b>	<b>I. Project Proposal</b>  <u>Prepare project submittal</u> – see requirements above.

<b>Table 4: Small Project Requirements</b>	
<b>Responsible Party</b>	<b>Activity</b>
<b>Applicant</b>	<p><b>II. Complete and Submit Applications</b></p> <p>All the following must be completed and submitted to the Stormwater Engineer for review for the application to be considered complete. Only complete applications will be processed.</p> <ul style="list-style-type: none"> <li>a. One (1) copy of a completed General Application form (found in Appendix B of the Stormwater Notebook and available at the Development Services Center).</li> <li>b. One (1) set of plans and computations including the applicable information on the application requirements checklist.</li> </ul>
<b>City</b>	<p><b>III. City Review Process</b></p> <ul style="list-style-type: none"> <li>a. The project engineer or applicant will be contacted when the review is complete.</li> <li>b. The plans and computations are red-lined and one (1) set of each is returned to the applicant.</li> </ul>
<b>Applicant</b>	<p><b>IV. Revision and Resubmittal, if Required.</b></p> <ul style="list-style-type: none"> <li>a. Revise plans per the City's comments.</li> <li>b. Resubmit the last set of red-lined prints and computations and one (1) set of revised plans and computations as stated above.</li> </ul>
<b>City</b>	<p><b>V. Review of Revised Plans</b></p> <ul style="list-style-type: none"> <li>a. Once all comments have been satisfactorily addressed, the City will proceed with plan approval.</li> <li>b. The project engineer or applicant will be contacted.</li> </ul>
<b>Applicant</b>	<p><b>VI. Submit Original Plans for City Approval.</b></p> <ul style="list-style-type: none"> <li>a. Submit three (3) sets of prints to the Stormwater Engineer for approval.</li> </ul>
<b>City</b>	<p><b>IX. Permit Preparation and Plan Distribution</b></p> <p>The Stormwater Engineer prepares the permit letter, signs it, calculates the remaining fee, and determines performance bonds per the standard list. The project engineer or applicant will be contacted when the permit is ready to be issued.</p>

<b>Table 4: Small Project Requirements</b>	
<b>Responsible Party</b>	<b>Activity</b>
<b>Applicant</b>	<p><b>X. Obtain Permit</b></p> <p>When applicant is notified that the permit is ready to issue, applicant needs to come to the Development Services Center and pay any remaining fees and post required bonds. The Permit Letter is then issued.</p>
<b>Applicant</b>	<p><b>XI. Pre-Construction Meetings</b></p> <p>After plan approval and after submitting permit prints, applicant may be required to contact the Construction Division and schedule a Pre-Construction Meeting. Contact the Construction Division at 425.556.2723 for the date, time, and location (the inspector may have the meeting at the site). In addition to permit issuance, <u>construction may not begin before having a Pre-Construction Meeting (unless waived by the Construction Division)</u>.</p>
<b>Applicant</b>	<p><b>XII. Construction</b></p> <p>The applicant shall complete all activities identified in the approved plans to meet City of Redmond standards. As items are completed, and at appropriate times during construction (i.e., before utilities are buried) the applicant shall notify the City inspector assigned to the project at the Preconstruction Conference that elements are ready for inspection. Failure to notify the City of readiness for inspection in a timely manner may result in the requirement to remove and replace buried or hidden elements.</p>
<b>City</b>	<p><b>XIII. Release of Performance Bonds</b></p> <p>Performance bonds remain in full force and effect until 1) the obligations secured are fully performed to the satisfaction of the City's inspectors; 2) a bond guaranteeing maintenance of all improvements for a guarantee period have been submitted to the City; and 3) the City has released the bonds in writing.</p>
<b>City</b>	<p><b>XIV. Cancellation of Non-Issued Permits</b></p> <p>a. The permit is only valid for a designated time. It may be to the applicant's benefit to wait until construction is ready to begin before picking up the permit.</p> <p>b. The permit will be held for a maximum six (6) months without issuance (unless specifically stated otherwise in the conditions of approval) but will then be nullified after this period if not picked up. The permit application would have to be started again, from the beginning, if the project is still desired. A new application may be required by the Public Works Department.</p>

<b>Table 4: Small Project Requirements</b>	
<b>Responsible Party</b>	<b>Activity</b>
<b>Applicant</b>	<p><b>XV. Permit Extension Request – (Optional)</b></p> <p>a. If the proposed work cannot be completed within the time covered by the permit an extension may be granted. Additional fees for inspection and renewal are required for extension.</p> <p>b. <u>The applicant must submit a written extension request to the Stormwater Engineer at least two (2) working days before the expiration of the permit.</u></p>

**4.4 Fees for Small Projects**

Fees are charged for plan review and City inspection. Current fee information is available from the Development Services Center.

- Small project fees often include but are not limited to:
  - Small & Simple Projects: Review
  - Small & Simple Projects: Inspection

Performance security may be required prior to issuance of a permit. Security requirements are determined after application.

## Chapter 5 Medium Project Requirements

### 5.1 Medium Project Submittal Requirements

Medium projects are required to develop site plans and a drainage report addressing all applicable items listed in the Application Checklist contained in Appendix D. Many items may not apply. Please contact the Development Services Stormwater Engineer for information specific to your project. Additional technical details of engineered plans are in Chapter 7 of this Stormwater Notebook.

### 5.2 Project Requirements for Medium Projects

Medium Projects are required to meet Minimum Requirements #1-5 of the 2005 Ecology Manual. Note that Chapter 2 of the Stormwater Notebook amends some of those requirements. Medium projects also have more strenuous requirements for construction stormwater pollution prevention, as outlined in Chapters 9 and 10.

### 5.3 Permit Process for Medium Projects

The following is an overview of the steps and requirements for projects that require only a Clearing/Grading and Stormwater Management approval (and no other approvals). Projects requiring other permits may have additional steps and requirements. Consult the Development Services Center for additional guidance.

<b>Table 5: Medium Project Requirements</b>	
<b>Responsible Party</b>	<b>Activity</b>
<b>Applicant</b>	<p><b>I. Project Proposal</b></p> <ul style="list-style-type: none"> <li>a. Prepare project submittal – see requirements below.</li> <li>b. Prepare SEPA Checklist (if required – Consult Stormwater Engineer prior to application).               <ul style="list-style-type: none"> <li>1. If any work is proposed in a Critical Area the City will require the completion of the SEPA environmental checklist. The Technical Committee may require any project to complete the SEPA process.</li> <li>2. Checklists are available at the Development Services Center. Redmond has modified the state standard checklist. Therefore, only a City of Redmond SEPA Checklist will be accepted. Complete the checklist to the best of your ability.</li> </ul> </li> </ul>

<b>Table 5: Medium Project Requirements</b>	
<b>Responsible Party</b>	<b>Activity</b>
<b>Applicant</b>	<p><b>II. Complete and Submit Applications</b></p> <p>All the following must be completed and submitted to the Stormwater Engineer for review for the application to be considered complete. Only complete applications will be processed.</p> <ul style="list-style-type: none"> <li>a. One (1) copy of a completed General Application form (found in Appendix B of the Stormwater Notebook and available at the Development Services Center). (If SEPA is required, submit 8 copies of the General Application form.)</li> <li>b. One (1) set of plans and computations addressing Minimum Requirements #1 through #5, including the applicable information on the Application Checklist contained in Appendix D.</li> <li>c. Projects that require SEPA approval will be processed through the Technical Committee. Submit nine (9) copies of the SEPA document(s).</li> <li>d. Application fee.</li> </ul>
<b>City</b>	<p><b>III. City Review Process</b></p> <ul style="list-style-type: none"> <li>a. The project engineer or applicant will be contacted when the review is complete.</li> <li>b. The plans and computations are red-lined and one (1) set of each is returned to the applicant with a Plan Review Checklist completed by the City.</li> </ul>
<b>Applicant</b>	<p><b>IV. Revision and Resubmittal, if Required</b></p> <ul style="list-style-type: none"> <li>a. Revise plans per the City's comments.</li> <li>b. Resubmit the last set of red-lined prints and computations, the Plan Review Checklist and one (1) set of revised plans and computations as stated above.</li> </ul>
<b>City</b>	<p><b>V. Review of Revised Plans</b></p> <ul style="list-style-type: none"> <li>a. Once all comments have been satisfactorily addressed, the City will proceed with plan approval.</li> <li>b. The project engineer or applicant will be contacted.</li> </ul>

<b>Table 5: Medium Project Requirements</b>	
<b>Responsible Party</b>	<b>Activity</b>
<b>Applicant</b>	<b>VI. Submit Original Plans for City Approval</b>
<b>City</b>	<b>VII. Plan Approval</b>  Plans are approved by signature and returned to the applicant or engineer for reproduction as required.
<b>Applicant</b>	<b>VIII. Submittal of Permit Prints</b>  Submit three (3) sets of prints made from the signed plans to the Stormwater Engineer.
<b>City</b>	<b>IX. Permit Preparation and Plan Distribution</b>  The Stormwater Engineer prepares the permit letter, signs it, calculates the remaining fee, and determines performance bonds per the standard list. The completed permit package is sent to the Development Services Center. The project engineer or applicant will be contacted by the Development Services Center when the permit is ready to be issued.
<b>Applicant</b>	<b>X. Obtain Permit</b>  When applicant is notified that the permit is ready to issue, applicant needs to come to the Development Services Center and pay any remaining fees and post required bonds. The Permit Letter is then issued.
<b>Applicant</b>	<b>XI. Pre-Construction Meetings</b>  After plan approval and after submitting permit prints, applicant may be required to contact the Construction Division and schedule a Pre-Construction Meeting. Contact the Construction Division at 425.556.2723 for the date, time, and location (the inspector may have the meeting at the site). In addition to permit issuance, <u>construction may not begin before having a Pre-Construction Meeting (unless waived by the Construction Division).</u>
<b>Applicant</b>	<b>XII. Construction</b>  The applicant shall complete all activities identified in the approved plans to meet City of Redmond standards. As items are completed, and at appropriate times during construction (i.e., before utilities are buried) the applicant shall notify the City inspector assigned to the project at the Preconstruction Conference that elements are ready for inspection. Failure to notify the City of readiness for inspection in a timely manner may result in the requirement to remove and replace buried or hidden elements.

<b>Table 5: Medium Project Requirements</b>	
<b>Responsible Party</b>	<b>Activity</b>
<b>City</b>	<p><b>XIII. Release of Performance Bonds</b></p> <p>Performance bonds remain in full force and effect until 1) the obligations secured are fully performed to the satisfaction of the City's inspectors; 2) a bond guaranteeing maintenance of all improvements for a guarantee period have been submitted to the City; and 3) the City has released the bonds in writing.</p>
<b>City</b>	<p><b>XIV. Cancellation of Non-Issued Permits</b></p> <p>a. The permit is only valid for a designated time. It may be to the applicant's benefit to wait until construction is ready to begin before picking up the permit.</p> <p>b. The permit will be held for a maximum six (6) months without issuance (unless specifically stated otherwise in the conditions of approval) but will then be nullified after this period if not picked up. The permit application would have to be started again, from the beginning, if the project is still desired. A new application may be required by the Public Works Department.</p>
<b>Applicant</b>	<p><b>XV. Permit Extension Request – (Optional)</b></p> <p>a. If the proposed work cannot be completed within the time covered by the permit an extension may be granted. Additional fees for inspection and renewal are required for extension.</p> <p>b. <u>The applicant must submit a written extension request to the Stormwater Engineer at least two (2) working days before the expiration of the permit.</u></p>

**5.4 Fees for Medium Projects**

Fees for Medium Projects are based on the type and number of activities proposed. Fees are charged for plan review and City inspection. Current fee information is available from the Development Services Center.

- Medium project fees often include but are not limited to:
  - Small & Complex Projects: Review
  - Small & Complex Projects: Inspection

Consult the Development Services Center to determine what actual costs you can expect based on the specifics of your project.

Performance security may be required prior to issuance of a permit. Security requirements are determined after application.

## Chapter 6 Large Project Requirements

### 6.1 Project Classification

See Chapter 3 for project classification.

### 6.2 Project Requirements for Large Projects

Large Projects are required to meet Minimum Requirements #1 through #9 as detailed in Chapter 2 of the Stormwater Notebook. There are also more strenuous requirements for construction stormwater pollution prevention outlined in Chapters 9 and 10 of the Stormwater Notebook.

### 6.3 Permit Process for Large Projects

The following is an overview of the steps and requirements for projects that require only a Clearing/Grading and Stormwater Management approval (and no other approvals). Projects requiring other permits may have additional steps and requirements. Consult the Development Services Center for additional guidance.

<b>Table 6 - Large Project Requirements</b>	
<b>Responsible Party</b>	<b>Activity</b>
<b>Applicant</b>	<p><b>I. Project Proposal</b></p> <ul style="list-style-type: none"> <li>a. <u>Prepare Project Plans</u> – an Application Checklist for Project Plan preparation is found in Appendix D. Large projects are subject to Minimum Requirements #1 through #9.</li> <li>b. Prepare SEPA Checklist               <ul style="list-style-type: none"> <li>1. All Large Projects are required to submit a SEPA Checklist. The Technical Committee will determine if the proposed activity requires formal SEPA process review.</li> <li>2. SEPA Checklists are available at the Development Services Center. Redmond has modified the state standard checklist. Therefore, only a City of Redmond SEPA Checklist will be accepted. Complete the checklist to the best of your ability.</li> </ul> </li> </ul>

<b>Table 6 - Large Project Requirements</b>	
<b>Responsible Party</b>	<b>Activity</b>
<b>Applicant</b>	<p><b>II. Complete and Submit Applications</b></p> <p>All the following shall be completed and submitted for review for the application to be considered complete. Only complete applications will be processed.</p> <ul style="list-style-type: none"> <li>a. One (1) copy of a completed General Application Form (found in Appendix B of the Stormwater Notebook, also available at the Development Services Center).</li> <li>b. Eight (8) sets of Project Plans including the applicable information on the application requirements checklist in Chapter 10.</li> <li>c. Submit nine (9) copies of the SEPA document(s).</li> <li>d. Application fee.</li> </ul>
<b>City</b>	<p><b>III. City Review Process</b></p> <p>All Large Projects are processed through the Technical Committee. The Committee reviews the proposed project in concept and makes the SEPA determination. The Committee prepares a letter of conditions to be addressed during preparation of final construction drawings.</p>
<b>Applicant</b>	<p><b>IV. Construction Plan Preparation</b></p> <ul style="list-style-type: none"> <li>a. Prepare construction drawings based on the letter containing the conditions of approval from the Technical Committee and on Redmond's design standards.</li> <li>b. Submit three (3) sets of revised plans and supporting calculations to the Development Services Center (include a copy of the Technical Committee letter of conditions).</li> <li>c. Pay construction drawing review fee at the Development Services Center.</li> </ul>

<b>Table 6 - Large Project Requirements</b>	
<b>Responsible Party</b>	<b>Activity</b>
<b>City</b>	<p><b>V. Construction Plan Review</b></p> <ul style="list-style-type: none"> <li>a. Plans are reviewed in house and with City's contracted consultant.</li> <li>b. The project engineer or applicant will be contacted when the review is complete.</li> <li>c. The plans and computations are red-lined and one (1) set of each is returned to the applicant with a Plan Review Checklist completed by the City.</li> </ul>
<b>Applicant</b>	<p><b>VI. Revision and Resubmittal</b></p> <ul style="list-style-type: none"> <li>a. Revise plans per the City's comments.</li> <li>b. Resubmit the last set of red-lined prints and computations, the Plan Review Checklist and three (3) sets of revised plans and computations.</li> </ul>
<b>City</b>	<p><b>VII. Review of Revised Plans</b></p> <ul style="list-style-type: none"> <li>a. Once all comments have been satisfactorily addressed, the City will proceed with plan approval.</li> <li>b. The project engineer or applicant will be contacted.</li> </ul>
<b>Applicant</b>	<p><b>VIII. Submit Original Plans for City Approval</b></p> <p>Submit original plans to the City for approval along with the final the calculations/report that accurately describes the drainage system and function. Plans shall be reproducible Mylar.</p>
<b>City</b>	<p><b>IX. Plan Approval</b></p> <p>Appropriate City staff sign plans and returns them to applicant or engineer.</p>
<b>Applicant</b>	<p><b>X. Submittal of Permit Prints</b></p> <p>For Clear and Grade Applications only: Submit six (6) sets of prints prepared from the signed plans to the Stormwater Engineer.</p> <p>Otherwise, submit prints to Engineering Division.</p>

<b>Table 6 - Large Project Requirements</b>	
<b>Responsible Party</b>	<b>Activity</b>
<b>City</b>	<p><b>XI. Permit Preparation and Plan Distribution</b></p> <p>The Stormwater Engineer completes the permit, signs it, calculates the remaining fee, and determines bonds. The completed package is sent to the Development Services Center. The project engineer or applicant will be contacted by the Development Services Center when the permit is ready.</p>
<b>Applicant</b>	<p><b>XII. Obtain Permit</b></p> <p>When applicant is notified that the Permit is ready to issue, Applicant needs to come to the Development Services Center and:</p> <ul style="list-style-type: none"> <li>a. Pay any remaining fees and post required bonds, and</li> <li>b. Receive the permit.</li> </ul>
<b>Applicant</b>	<p><b>XIII. Pre-Construction Meetings</b></p> <p>After plan approval and after submitting permit prints, applicant shall contact the Construction Division and schedule a Pre-Construction Meeting. Contact the Construction Division at 425.556.2723 for the date, time, and location (the inspector may have the meeting at the site). <u>In addition to permit issuance, construction may not begin before having a Pre-Construction Meeting.</u></p>
<b>Applicant</b>	<p><b>XIV. Construction</b></p> <p>The applicant shall complete all activities identified in the approved plans to meet City of Redmond standards. As items are completed, and at appropriate times during construction (i.e., before utilities are buried) the applicant shall notify the City inspector assigned to the project at the Preconstruction Conference that elements are ready for inspection. Failure to notify the City of readiness for inspection in a timely manner may result in the requirement to remove and replace buried or hidden elements.</p>
<b>City</b>	<p><b>XV. Release of Performance Bonds</b></p> <p>Performance bonds remain in full force and effect until 1) the obligations secured are fully performed to the satisfaction of the City's inspectors; 2) a bond guaranteeing maintenance of all improvements for a guarantee period have been submitted to the City; and 3) the City has released the bonds in writing.</p>

<b>Table 6 - Large Project Requirements</b>	
<b>Responsible Party</b>	<b>Activity</b>
<b>City</b>	<p><b>XVI. Cancellation of Non-Issued Permits</b></p> <p>a. The permit is only valid for a designated time. It may be to the applicant's benefit to wait until construction is ready to begin before picking up the permit.</p> <p>b. The permit will be held for six (6) months without issuance (unless specifically stated otherwise in the conditions of approval) but will then be nullified after this period if not picked up. The permit application would have to be started again, from the beginning, if the project is still desired.</p>
<b>Applicant</b>	<p><b>XVII. Permit Extension Request – (Optional)</b></p> <p>a. If the proposed work cannot be completed within the time covered by the permit an extension may be granted. Additional fees for inspection and renewal are required for extension.</p> <p>b. <u>The applicant must submit a written extension request to the Development Services Center at least two (2) working days before the expiration of the permit.</u></p>

**6.4 Fees for Large Projects**

Fees are charged for plan review and City inspection. Current fees are available from the Development Services Center.

Large project fees often include but are not limited to:

- Large Projects: Review
- Large Projects: Inspection

There may be additional review fees related to project-specific items. For example, vaults must be designed for appropriate soil, groundwater, and surface loadings. Separate review and permits are required from the Building Department. Consult the Development Services Center to determine what actual costs you can expect based on the specifics of your project.

Performance security may be required prior to issuance of a permit. Security requirements are determined after application.

#### **6.4.1 Provide Accurate As-Built Drawings**

As-built records of the storm drainage system are maintained by the City. Help make sure the records are correct when project information is provided by submitting accurate as-built drawings when a project is completed. Before acceptance of improvements an as-built plan shall be prepared by a Professional Land Surveyor or Civil Engineer, licensed in the State of Washington. The as-built plan shall include accurate locations, elevations, and sizes of all constructed features. As-built documents will bear the signature, stamp, and date of the licensed Land Surveyor preparing them. Visit the Development Services Center for a description of the as-built process.

## Chapter 7 Design Goals

The purpose of the information in Chapters 7 through 10 is to provide engineers, designers, technicians, inspectors, and others with a reference to City of Redmond's goals and standards for the planning and design of clearing and grading activities and stormwater management facilities.

The following design goals are applied to clearing, grading, and stormwater system designs in Redmond. Design goals are broad targets that indicate desirable outcomes, even though they may not be fully met in specific situations. Failure to completely meet a general design goal (e.g., minimize erosion and sedimentation) is not intended to constitute a deficiency subject to legal or procedural challenge. The goal must, however, be reasonably addressed in specific situations. If an alternate approach to a project's stormwater management design would provide a significantly greater achievement of a goal without significant additional cost (monetary, land use, etc.) then the alternative could be considered an alternative that is reasonable and could be required under this chapter. Clearing, Grading, and Stormwater Management goals and design requirements need to be compliant with Redmond Municipal Code 15.24 intent, goals, and requirements. Specific situations can only be evaluated on a case-by-case basis.

### 7.1 Provide a Basic System of Drainage

The drainage system shall:

- serve all lots and site improvements that are part of or affected by the project;
- direct runoff off of and away from buildings, traveled ways, and other developed surfaces; and
- provide water quality management where appropriate.

Basic systems protect walkways, crosswalks, etc., from concentrated runoff flows (for example, by adding catch basins upslope of the walkways).

### 7.2 Prevent Flooding of Inhabited Buildings

Overflow and emergency runoff routes shall be provided. Floodways adjacent to defined channels should accommodate flood flows (to at least the 100-year storm from fully developed upstream conditions). Projects that are located within the floodplain shall submit a Flood Control Zone Application (Appendix E) prior to submittal of final engineering drawings.

### 7.3 Minimize Erosion and Sedimentation

During construction, development activities can have significant and long term impacts on aquatic ecosystems. Reducing these impacts by meeting all 12 elements of the Temporary Erosion and Sediment Control Plan, and responding quickly to unforeseen additional erosion and

sediment control needs greatly reduces the impacts from construction. In addition, permanent stormwater controls need to control runoff volumes for the design frequency storms to reduce adverse hydrologic impacts from runoff volume increases.

#### **7.4 Minimize Water Quality Degradation**

Runoff treatment facilities are necessary and required by State law and Redmond Municipal Code to reduce degradation of surface water bodies and groundwater. Site layouts and stormwater designs that minimize pollution-generating impervious surfaces, inherently reduce pollution. Last, source control measures in the site design are required to reduce the quantity of pollution sources contaminating runoff.

#### **7.5 Don't Mix Clean and Untreated Stormwater**

Stormwater that has been treated for water quality should not be mixed with stormwater that has not been treated for water quality.

#### **7.6 Protect Water-Related Habitat**

Refer to the Critical Areas Code Requirements (contained in the Redmond Zoning Code).

#### **7.7 Maintain Recharge and Subsurface Flow Patterns**

Maintaining groundwater supplies is important, but do not increase recharge over natural conditions without careful hydro-geologic studies to avoid land stability problems. In areas of existing land stability concerns, recharge should be reduced. Water quality is critical for recharge areas. Infiltration of runoff from PGIS is limited by Wellhead Protection Zones; infiltration from clean surfaces is encouraged (see Section 8.7.4.3).

#### **7.8 Address "Real-World" Conditions**

Engineering designs should recognize that field conditions, debris, and poor maintenance/repair practices exist which need to be considered so long-term viability is possible.

#### **7.9 Provide for Operation and Maintenance**

Elements of the system proposed need to be capable of operating in the municipal context, have good access for maintenance and operation, and need to avoid very specialized parts, equipment, and operator qualifications whenever possible.

#### **7.10 Proceed Based on Clear, Professional Thinking**

Engineering documents submitted for approval must have clear concepts (including a narrative description if concepts are non-standard or not obvious) and design explanations, calculations, and other supporting information to show that the construction drawings implement the concepts.

### **7.11 Meet Standards**

Designs need to: (1) comply with City regulations and standards; (2) comply with accepted legal principles; (3) apply sound engineering principles; and (4) include alternatives or adjustments to enhance aesthetics.

## **Chapter 8      Local Design Standards**

This chapter contains information on specific issues for projects in Redmond to help define how to meet Redmond's local codes and regulations and to help define terms in ways that are meaningful to specific engineering design situations in Redmond.

### **8.1      Standard Specifications and Details**

All projects shall be designed and constructed to conform to the City of Redmond Standard Specifications and Details, Current Edition. These are available on the City's website ([www.redmond.gov](http://www.redmond.gov)).

### **8.2      Proper Drainage**

The Stormwater Notebook describes minimum drainage requirements. These requirements must be addressed in all projects (Small, Medium, or Large) whether or not plans and permits are required. Even though plans and permits are not required for most Small Projects, proper drainage facilities are required with all projects.

Proper drainage directs runoff away from structures, meets legally accepted practice, and meets the intent of RMC 15.24. For projects not requiring plans or permits, drainage systems are not required by code to have detention or formally designed runoff treatment facilities.

Nevertheless, if downstream conveyance capacity is not adequate, the project proponent may elect to provide detention or infiltration. Drainage systems shall be provided to prevent flooding of developed areas, connect downspouts, and provide positive drainage for footing drains.

Runoff from upslope properties must be accepted at natural and established locations at property boundaries and be discharged at natural or established downslope locations along property boundaries or to a constructed drainage system if authorized, subject to required on-site quantity and quality controls.

### **8.3      Stormwater Management in Wellhead Protection Zones**

Wellhead Protection Zones (WPZ) were established based on proximity to City drinking water supply wells and groundwater travel times to the various well locations. A map of the WPZ is available at [www.redmond.gov/Map](http://www.redmond.gov/Map). Zones 1 and 2 delineate the 6-month and 1-year time of travel zones for groundwater to reach the wells and are, therefore, the areas of greatest concern regarding infiltrating runoff from pollution generating surfaces. Zone 3 delineates the 5-year to 10-year time of travel zone.

In Zones 1 and 2, certain land uses and activities are prohibited, as noted in Redmond Zoning Code 21.64.050.

If a project area includes portions that are in more than one Wellhead Protection Zone, then the Stormwater Engineer will assess, using criteria found in RZC 21.64.050.d.2, whether any portion of the site may be considered to be in the Wellhead Protection Zone with fewer restrictions.

Otherwise, the whole site shall be considered to be within the Wellhead Protection Zone with more restrictions.

Stormwater systems for new development and redevelopment projects in Zones 1, 2, and 3 shall address the following:

1. During construction, if construction vehicles will be refueled onsite and/or the quantity of hazardous materials that will be stored, dispensed, used, or handled on the construction site is in aggregate quantities equal to or greater than 20 gallons liquid or 200 pounds solid, exclusive of the quantity of hazardous materials contained in fuel or fluid reservoirs of construction vehicles, the City may require any or all of the items listed in the Redmond Zoning Code 21.64.050.D. Generally, the following items will be required in writing as part of the TESC Plan:
  - a. Monitoring plan.
  - b. Designated project contact.
  - c. Secondary containment.
  - d. Provisions to secure hazardous materials.
  - e. Response to leaking vehicles and equipment.
  - f. Practices and procedures regarding transfer of flammable and combustible liquids.
  - g. On-site cleanup materials (materials are to be listed in the TESC Plan) and other containment and cleanup provisions. All hazardous material releases shall be contained, cleaned up, and reported.
2. The Drainage Report required for projects shall include a section describing how each of the items above has been addressed in the plans for the proposed project.
3. Infiltration for flow control or water quality treatment is limited within Wellhead Protection Zones. See Chapter 2 for more information.

The City's Wellhead Protection Program regulates stormwater infiltration systems. A stormwater infiltration system is a stormwater facility that infiltrates stormwater for flow control or treatment. Stormwater facilities that have an incidental amount of infiltration are not considered infiltration facilities, and are therefore not regulated by the Wellhead Protection Program or restricted within Wellhead Protection Zones. Stormwater facilities that are not designed to infiltrate stormwater should be lined or constructed to prevent such infiltration, where appropriate.

## **8.4 Conveyance System Design**

### **8.4.1 Guidance Documents**

For basic conveyance system design in Redmond use the latest edition of the Washington State Department of Transportation (WSDOT) "Hydraulics Manual" (M23-03). The manual is available from WSDOT's website at [www.wsdot.wa.gov/publications/manuals/m23-03.htm](http://www.wsdot.wa.gov/publications/manuals/m23-03.htm).

Note that the 2005 Ecology Manual shall be used for detention sizing and stormwater treatment requirements.

For computation of hydraulic grade lines in Redmond use one of the following models:

1. King County Surface Water Management Backwater Analysis Program
2. PCSWMM by Computational Hydraulics
3. StormCad by Haestad Methods
4. Mouse by DHI Software
5. Equivalent model approved by the Stormwater Engineer

#### **8.4.2 Pipe Sizing**

Pipe sizing analysis shall be for the 10-year fully-developed, peak flow unless otherwise specified.

If a stormwater detention or water quality facility lies downstream of the conveyance system, that conveyance system shall be sized to convey the peak flow to the facility (i.e., a pipe draining to a pond that detains or treats the 50-year developed flow must convey the 50-year developed flow).

If a culvert (pipe section that passes under a road with an open channel at each end) conveys water under and across a City right-of-way, at a minimum the design shall be for the 25-year fully-developed peak flow.

Stormwater shall be managed such that the 50-year frequency event does not flood proposed buildings, any existing on-site buildings, or other existing buildings on contiguous parcels. Required conveyance standards may be adjusted by the Stormwater Engineer based on site and downstream conditions.

For public stormwater pipe, the minimum size shall be 12-inches. For private stormwater pipe, the minimum size shall be 6-inches. To accommodate special installation scenarios, smaller pipe may be used with Stormwater Engineer approval.

#### **8.4.3 Catch Basin and Manhole Freeboard**

Pipe systems shall be designed such that the following freeboard requirements are met at catch basins and manholes:

<b>Table 8.1 - Catch Basin and Manhole Freeboard</b>	
<b>Design Storm</b>	<b>Freeboard</b>
10-year	12 inches
25-year	6 inches
50-year	0 inches (no overtopping)

#### **8.4.4 Horizontal Clearance and Crossing Angle**

The minimum horizontal spacing between closed storm drains and water mains, gas mains, other underground utility facilities, and all structures shall be five feet (5') horizontally. The minimum horizontal distance between any open storm drainage facilities (swales, open channels, biofiltration swales, etc.) and water mains, gas mains, and other underground facilities shall be 10 feet.

For pipe crossings, the preferred angle is 90 degrees, but 20 degrees obtuse or acute of 90 degrees is acceptable.

#### **8.4.5 Vertical Clearance - Utilities**

The minimum vertical clearance spacing between the outside of storm drain pipelines and water mains, gas mains, electrical or communication conduits, and other underground utility facilities, shall be as noted in Table 8.2. It is expected that the "Standard" vertical clearance will be provided. If that is not possible, use of Ethafoam pads or pipe sleeves may be allowed with approval from the Stormwater Engineer.

<b>Table 8.2 - Vertical Clearance – Utilities</b>			
<b>Utility</b>	<b>Location (Above or below Storm Pipe)</b>	<b>Minimum Clearance</b>	<b>Special Requirement</b>
Electrical	Above or below	12 inches	Standard
Communications	Above or below	12 inches	Standard
Water main or gas main	Above or below	12 inches	Standard
Water main or gas main	Above or below	6 inches	Ethafoam pad
Sanitary Sewer	Below storm pipe	12 inches	Standard
Sanitary Sewer	Above storm pipe	18 inches	Standard
Sanitary Sewer	Above or below storm pipe	6 inches	Pipe sleeve and Ethafoam pad
Liquid petroleum	Above or below	See Stormwater Engineer	

An Ethafoam pad is required for some installations to provide additional protection between adjacent utilities. The size of the pad shall be based on the outside diameter (O.D.) of the larger crossing pipe. The pad shall be O.D. by O.D. square by 2.5 inches thick minimum or as required to protect the pipes. The pad shall be a strong, resilient, medium-density, closed-cell, polyethylene foam plank (Dow Ethafoam 220, or accepted equivalent.)

A pipe sleeve is required for some installations to provide additional protection of stormwater from potential leakage from other utilities. A pipe sleeve shall be a single section of PVC pipe (no joints) with a minimum length of 3 feet to each side of pipe crossing. The pipe sleeve shall be placed around the stormwater pipe with the annular space between the pipe sleeve and the stormwater pipe filled with grout.

Additional measures may be necessary to ensure system integrity and may be required as determined by the Stormwater Engineer on a case-by-case basis.

#### **8.4.6 Minimum Cover**

The standard minimum cover over storm drainage lines is dependent on the pipe material. The Redmond Design Standards and Specifications outline cover requirements. The minimum cover over yard drain lines is 18 inches.

#### **8.4.7 Unstable Soils**

Unstable soil conditions, such as peat, shall be removed from under pipes unless special measures are approved by the Stormwater Engineer.

#### **8.4.8 Maximum and Minimum Slopes**

Maximum slope on storm drain lines is 20%, unless approved by the Stormwater Engineer. Minimum slope on storm drain lines is 0.25%, unless approved by the Stormwater Engineer.

#### **8.4.9 Stream Culverts**

Stream culverts shall be designed to have natural bottom conditions, with 1/3 of the pipe diameter buried. Culverts used for stream conveyance shall be a minimum of 24 inches in diameter. Bridges shall be the first choice for stream crossings. More information can be found in the Redmond Zoning Code 21.64.

#### **8.4.10 Conveyance System Emergency Overflow**

Sites shall be designed to prevent flooding of inhabitable buildings in the 100-year, 24-hour storm as determined by the Rational Method. The Stormwater Engineer may require this analysis as part of the design submittal.

#### **8.4.11 Trees**

Trees shall not be located within 8 feet horizontally from storm drain pipe unless root barriers are provided as approved by the Stormwater Engineer. With root barriers, trees may be no closer than 3 feet to pipes unless approved by the stormwater engineer.

#### **8.4.12 Pump System Requirements**

Pumping stormwater is the method of last resort. When no other alternatives are feasible, pump systems may be considered provided they meet the following:

- Pump: 10-year peak flow rate as calculated by the rational method
- Backup Pump
- Alternative Power Source (Emergency Generator)
- Auto-Transfer Switch Disconnecting Generator from Public Grid. Auto-Start Required.
- Audio Alarm for High Water/Pump Failure
- 3-Hour Flow Storage Volume (may be combined with water quality treatment)

In addition to these requirements, a note shall be placed on the plat or title that says, "Property owner is responsible for operation of the stormwater pump, and for any damages to offsite property if the pump fails to transfer stormwater as designed."

### **8.4.13 Underdrains**

Underdrains shall be a minimum of 6" diameter perforated PVC per WSDOT Standard Specification 9-05.2(6). All underdrains shall have cleanouts every 75 feet, or at a minimum at all bends in the underdrain system.

## **8.5 Catch Basin and Manhole Requirements**

### **8.5.1 Structure Materials**

The City of Redmond Standard Specifications and Details describes structure material requirements.

### **8.5.2 Structure Spacing**

Space catch basins in accordance with best engineering practice and the WSDOT Hydraulics Manual. To accommodate maintenance of the pipes, a manhole or catch basin (structure) shall be placed periodically with the following maximum spacing:

- 200 feet for pipes less than 12 inch or with design velocities less than 3 feet per second (fps); otherwise,
- 300 feet for pipes less than 30 inch diameter with design velocities greater than 3 fps; or,
- 400 feet for pipes equal or greater than 30 inch but less than 42 inch diameter with design velocities greater than 3 fps; or,
- 600 feet for pipes of 42 inch diameter or larger with design velocities greater than 3 fps; or,
- 600 feet for tight lines down steep slopes.

Structures shall be installed at the end of all dead end mainlines, at horizontal or vertical pipe bends, at changes in pipe size or material, and at pipe junctions for access.

### **8.5.3 Pipe Connections**

Inlet pipe crowns shall not be lower than outlet pipe crowns unless specifically waived by the Stormwater Engineer. Pipe connections shall be water-tight.

### **8.5.4 Spill Prevention Device**

Multifamily, commercial, and industrial properties shall include at a minimum a spill prevention device at the last structure on the property before connecting to the public stormwater system. The minimum requirement for a spill prevention device is a downturned elbow, removable for maintenance, located on the outlet pipe leaving a type 2 catch basin. Depending on the uses on the site, the Stormwater Engineer may require additional measures of protection.

### **8.5.5 Knockouts**

Knockouts shall be provided in structures where future extensions are anticipated. These shall be shown on the plans.

### **8.5.6 Drop Structures**

Drop structures shall only be allowed where approved by the Stormwater Engineer. Generally, drop structures will not be approved if the drop is less than 5 feet.

### **8.5.7 Lot and Area Drains**

Lot drains or area drains in excess of 2 feet deep and up to 5 feet deep shall be Type 1 catch basins. Area drains exceeding 5 feet deep shall be Type 2 catch basins with bolt-down lids.

### **8.5.8 Through-Curb Inlet Frames**

Through-curb inlet frames shall be specified on plans at sag points, at any inlet where bypassing runoff would escape the intended control system and at every third inlet on a continuous run along a continuous slope. Through-curb inlet frames may be used at all points except at proposed or likely driveway locations.

## **8.6 Site Design**

### **8.6.1 Flood Protection**

All parts of any structure constructed below the 100-year flood elevation of associated waterways shall be protected from flooding using floodproofing.

Floodproof to the 100-year elevation plus 1 foot. Floodproofing shall conform to Federal Emergency Management Agency standards in effect at project vesting.

Projects planning work within Flood Control Zones shall submit a Flood Control Zone Application (Appendix E).

### **8.6.2 Impervious Area for Single Family Residential Plats and Short Plats**

Projects creating lots for single-family houses (residential plat and short plat projects) shall provide drainage systems for all lots. The drainage systems shall address runoff quantity and quality.

### **8.6.3 Drainage Connections for All Lots**

All types of plats and short plats (residential, commercial, industrial, and others) shall provide for drainage connections on each lot, unless otherwise approved by the Stormwater Engineer. (Low impact development measures may make the use of lot connections unnecessary.)

Drainage connection points are to be located at the low elevation point of the allowable building area of each lot. The connections must be below finished grade so as to allow connection of footing drains, roof drain leaders, and other drains.

Providing for drainage connections typically means providing a piped system from the drainage connection points described above to the drainage system in the plat or short plat. A maximum of three (3) lots may be connected to a common private collection pipe. Multiple collection pipes may be used.

In some cases it may be acceptable to include only the plan for the lot drainage connections as part of the City-approved drainage plan for the plat or short plat and defer construction until building construction on the lots.

Infiltration of runoff can reduce hydrologic impacts and water quality impacts and maintain groundwater supplies. Infiltration is generally acceptable where soils and geology are suitable. Infiltration of runoff from pollution generating impervious surfaces is limited based on Wellhead Protection Zones. See Chapter 2 of the Stormwater Notebook. Percolation tests are required at all proposed infiltration locations.

In all cases, appropriate easements must be provided, as part of the plat or short plat, for the specific drainage systems shown on the construction documents. Those documents shall also show anticipated grading, rockeries, retaining walls, etc. Construction of the lot drainage connection systems must be feasible and allow connection to the proposed plat improvements or to the documented infiltration areas. The minimum private easement width is 5 feet.

#### **8.6.4 Single Family Roof and Foundation Drain Requirements**

**Size and Connection:** Roof drain/foundation drain connection from the house, when required based on Figure 3.1 of Volume III of the 2005 Ecology Manual, shall be 6-inch diameter and shall be extended to a storm drain structure (not connected directly to a stormwater pipe). Foundation drains shall be separate from roof drains around the building foundation. Pipes shall be smooth wall, rigid type (sewer grade). Pipes shall not be corrugated polyethylene (such as flexible ADS). Roof and footing drain connection stubs shall be at least one 1 foot below the lowest existing elevation of the building envelope on all newly-created lots, unless a different elevation is approved or required by the Stormwater Engineer. The minimum cover over yard drain lines is 18 inches. For subdivisions, no more than three (3) roof drain stubs are allowed on a single roof drain collection pipe.

**Building Footings:** Building footings shall be designed, or pipe located, such that the footing shall not bear on the pipe.

#### **8.6.5 Separation of Systems Serving Separate Owners**

Stormwater facilities provided to control quantity and quality generally should be provided within the site they are serving although certain exceptions are acceptable.

Facilities for single family plats may be located in common areas (even in public roads that are created by the plat or short plat).

Water quantity and quality controls provided for the private part of a project shall be separate from water quantity and quality controls for public impervious surfaces that are part of the project. Individual lots within single family plats and short plats with public road improvements may drain to the public water quantity and quality control systems constructed to serve the development.

In some circumstances, water quantity and quality control requirements for the proposed impermeable areas may be met by adding such control(s) to equivalent existing developed areas of the site, which do not already have such controls.

### **8.6.6 Grading**

The maximum ground slope on graded surfaces is 3 horizontal to 1 vertical (3:1) except as approved in association with roadway section in City rights-of-way where the maximum ground slope may be up to 2:1.

Proposed contours shall not create undrained, ponding areas where such areas would not be appropriate (onsite or offsite).

### **8.6.7 Rockeries/Retaining Walls**

Rockeries or retaining walls should not cross or be near storm-drain pipes. Any crossing of a wall shall be perpendicular to the wall and special construction techniques including steel casings may be required.

Rockeries under 4 feet are not regulated. Rockeries over 4 feet shall only be used against cut slopes.

Rockeries and retaining walls shall have foundation drains (6 inches in diameter of approved materials) behind the wall connected to a defined conveyance system. Rockeries 48 inches and taller and retaining walls must be designed by a structural or geotechnical engineer. No retaining structure may be higher than 8 feet (unless a relief from general design standards is obtained). Structural retaining walls over 4 feet in height are reviewed and permitted by the Building Department following UBC Section 106.2.

### **8.6.8 Public Easements**

Where public storm drain line easements are necessary, they shall be 20 feet in width. Easement widths of less than 20 feet may be considered by the Stormwater Engineer, in special situations, but shall not be less than 15 feet in width.

Publicly maintained water quality and detention facilities shall be located in tracts dedicated to the City. The size of the tract shall be based on the size of the stormwater facility. At a minimum, the tract shall include the entire facility, site access area, and at least 5 feet around the facility. In limited cases an easement may be permitted. If an easement is permitted, dimensions shall be determined by the Stormwater Engineer.

In cases where pipes and/or other facilities are deeper than 8 feet or have other special conditions, larger tracts or easements may be required.

All easements needed for City stormwater systems shall be provided by the developer in the name of the City. The required easements shall be shown on the construction drawings and the easement legal description or plat markup shall be submitted for review at the same time construction drawings are submitted for review.

Easements shall have language acceptable to the City, similar to the example in Appendix H.

An alternative to separately recording a City of Redmond easement form is to record an easement on the face of a plat. If this is the method used, a standard City of Redmond easement statement shall be included in the plat documents.

Buildings, structures, garages, carports, dumpster enclosures, decks, rockeries over 4 feet, etc., shall not be located in easement areas.

### **8.6.9 Stormwater Facilities**

#### **8.6.9.1 Maintenance Access**

Unless specifically waived by the Stormwater Engineer, all stormwater facilities shall be accessible to maintenance vehicles. The Operations & Maintenance manual for the facility shall identify the equipment and access required for maintenance. Vector access is required to all entries to vaults, flow splitters, and control structures. Vector access to other manholes and catch basins is preferred unless provisions are made for alternative maintenance methods. Large ponds, stormwater treatment wetlands, sand filters, etc., need access for a track hoe that includes a stabilized ramp into the facility to allow for cleaning and equipment access to the entire facility. Smaller facilities may be allowed to eliminate the ramp if provisions for access are spelled out in the Operations & Maintenance manual. Smaller facilities like rain gardens or biofiltration swales need a work area adjacent to the facility to support maintenance activities.

For facilities that require Vector maintenance, the preferred configuration is to have the Vector truck approach a structure opening with the front of the vehicle with limited maneuvering required from the nearby street. Acceptable access includes an improved roadway surface within 10 feet of a manhole with overhead clearance to 20 feet to allow for boom operation. Materials for construction of an improved roadway surface may include asphalt concrete, cement concrete, structurally stabilized vegetated surface, crushed surfacing, or other surfacing as approved by the Stormwater Engineer. Maintenance access roads shall be designed with 40 foot inside radius on curves, with slopes less than 15% and with widths as determined by the Stormwater Engineer (but not less than 10 feet).

The Stormwater Engineer may require maintenance access roads to be located in separate tracts. Facilities that must be located on steep slopes shall be designed to minimize any requirements for maintenance access. A plan for accessing such facilities with Vector flex hose or measures to minimize required maintenance shall be identified in the Operations & Maintenance manual.

Outlet control valves shall be detailed so as to be operable from the surface (not subject to confined space entry requirements) unless approved otherwise by the Stormwater Engineer. The specific detail for these valves depends on the type of valve and shall be subject to approval by the Stormwater Engineer. Gravity-flow draw-down systems (for ponds, vaults, etc.) shall be provided with an outlet control valve.

### **8.6.9.2 Facility Maintenance**

Provision shall be made for long-term maintenance of water quality and detention facilities.

### **8.6.10 Transfer of Assets to the Public**

When projects include construction of improvements that will be turned over to the public, a Public Utility & Stormwater Facilities Bill of Sale Form (Appendix F) and a Developer Extension Asset Summary (Appendix G) shall be completed and submitted to the Development Services Division of Public Works.

## **8.7 Low Impact Development (LID)**

### **8.7.1 LID Overview**

Low impact development (LID) is a stormwater management and land development strategy applied at the parcel and subdivision scale that emphasizes conservation and use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely mimic predevelopment hydrologic functions and provide runoff treatment. Implementation of LID benefits streams, lakes, and Puget Sound by moderating the impacts of stormwater runoff generated by the built environment. These techniques may be accessory or alternative to traditional, structural stormwater management solutions. Information on the scope, benefit, and applicability of LID can be found in the Low Impact Development Technical Guidance Manual prepared by the Puget Sound Action Team and Washington State University, Pierce County Extension.

Use of LID is one way to implement the following Comprehensive Plan policies:

- NE-9: Encourage environmentally friendly construction practices such as the build green program and low impact development.
- NE-10: Encourage projects which utilize alternative technologies, engineering, and plans which emphasize Low Impact Development strategies through incentives and flexibility in application of regulatory requirements.

### **8.7.2 Intent of LID**

The City encourages the use of LID techniques, including techniques for stormwater management.

These goals are to:

- Maintain or restore the pre-developed condition surface water flow volumes, durations and frequencies;
- Retain or restore native forest cover to capture, infiltrate and evaporate all or a portion of the rainfall on the site;
- Cluster development and minimize land disturbance;
- Preserve or restore the health and water-holding capacity of soils;
- Incorporate natural site features that promote infiltration of stormwater;
- Minimize total impervious surfaces and effective impervious surfaces;
- Reduce or eliminate piped stormwater conveyance and conventional detention ponds;

- Manage stormwater through infiltration, bioretention, and dispersion; and
- Manage stormwater runoff as close to its origin as possible.

### **8.7.3 Land Use**

LID is not merely the use of specific stormwater management facilities, but is an approach to land development that integrates with and responds to the natural conditions of a site. A low impact development should strive to minimize the impact of development on the pre-developed hydrologic condition. From a land use perspective, this is accomplished by minimizing the development envelope and minimizing impervious surfaces.

#### **8.7.3.1 Minimize Development Envelope**

Minimizing the development envelope means confining lots and land uses to confine development and activity areas to the smallest impact area. While the City's development standards are generally designed for conventional development that consumes most or all of a development site with buildings, infrastructure and activity areas, the Redmond Zoning Code provides several mechanisms to focus development on a site. Residential clustering can be accomplished through the clustering provisions of RZC 21.08, in particular, the Green Building and Green Infrastructure Incentive Program in RZC 21.08.330.

#### **8.7.3.2 Retain Areas of Native Vegetation**

Minimizing the development envelope allows retention of a portion of the site in its natural or pre-developed state. In addition to offering an aesthetic amenity and opportunities for passive recreation, preservation of natural open spaces provides areas for dispersion of stormwater generated on the developed portion of the site. The extent to which dispersion to a natural area may be allowed depends on the size of the preserved area relative to the tributary area as well as underlying soil types. Where native forest is preserved or restored to disturbed areas, a portion of the rain that falls on the site will be intercepted and evaporated or absorbed. While preservation of significant natural areas is a challenge in urban areas, conservation of existing habitat is a key element of LID. LID projects should preserve or re-establish a minimum of 35 percent of the overall site area in native vegetation. (This 35 percent does not include any critical areas that are already required to be set aside.) Areas retained as native open space are most effective for dispersion when located downslope of proposed development areas.

#### **8.7.3.3 Preserve Native Soils**

In addition to retention of areas of native vegetation, preservation of native soils is an important aspect of low impact development. Native soils have a significantly higher capacity to absorb, retain and transmit water than soils remaining on a site following conventional development. Commonly, native soils are graded and removed from development sites. In the process, the underlying soils are significantly compressed, resulting in a reduction in the ability of the soils to absorb water from the surface.

Prior to any clearing or grading, areas of the site more conducive to infiltration should be identified (see Site Assessment below), and site design should preserve such areas. Ground

disturbance should be limited to road, utility, building pad, landscape areas, and the minimum additional area needed to maneuver equipment. A 10 foot perimeter around the building site can provide adequate work space for most activities. The number and extent of construction access roads should be limited and located where future roads and utility corridors will be placed. Where prior clearing or grading has occurred, soils should be restored according to the requirements in the City of Redmond Standard Specifications, Section 9.14, in all areas except where impervious surfaces are proposed.

#### **8.7.3.4 Compost Amendment of Soils**

Compost amendment of soils shall be in accordance with Redmond Standard Specifications and Details, Section 9.4, for disturbed areas of development that will not be impervious surfaces post construction. Amending soils may be a more viable alternative to preservation of native soils for some sites, and can realize many of the same benefits.

#### **8.7.3.5 Minimize Impervious Surfaces**

Minimizing the development envelope may also limit the extent of new roadways and other impervious surfaces. Limiting impervious surfaces is a primary emphasis of low impact development. Impervious surfaces can be minimized by limiting vehicular and pedestrian infrastructure (e.g., roads, driveways, parking areas, and sidewalks), to the minimum functional needs of the facilities. Redmond Zoning Code provides opportunities for modifying street standards through RZC 21.08.330 (Green Building and Green Infrastructure Incentive Program). The Rustic Street Standards in Appendix 2 of the RZC, while not applicable to all areas or all roadway use conditions, represent a good template for LID road design. LID techniques to minimize impervious surface area also include the use of various pervious paving materials, minimal excavation foundations, and green roofs. These alternatives to conventional development techniques decrease the effective impact of new surfaces and buildings on the pre-developed conditions.

#### **8.7.4 LID BMPs**

To achieve the intent of LID, stormwater should be managed on-site to the greatest extent possible.

##### **8.7.4.1 LID BMPs**

The following onsite BMPs, subject to modifications within this Stormwater Notebook or requirements in the Redmond Municipal Code, should be considered:

- Permeable pavements;
- Dispersion;
- Vegetated rooftops;
- Rainwater harvesting;
- Reverse slope sidewalks;
- Minimal excavation foundations; and
- Bioretention.

Descriptions of these BMPs, along with design criteria, maintenance standards, and modeling guidance, can be found in Appendix F of Volume III of the 2005 Ecology Manual.

Other BMPs may be considered for use by the Technical Committee, provided that the committee finds that there is reasonable scientific justification that such BMPs will provide equal or better flow control and water quality results, and that long-term performance is assured.

#### **8.7.4.2 Treatment BMPs**

The only LID BMPs that may be approved for water quality treatment are:

- Dispersion, when consistent with DOE BMP T5.30; and
- Bioretention, when consistent with the design criteria in the Ecology Manual. Any stormwater that infiltrates through designed bioretention soil mix shall be considered to have received the equivalent of Enhanced Treatment.

#### **8.7.4.3 LID in Wellhead Protection Zones**

Refer to Section 8.3 for limitations or constraints for infiltration from pollution generating impervious surfaces in Wellhead Protection Zones.

Infiltration of runoff from pollution generating surfaces is limited in Wellhead Protection Zones 1 and 2. Infiltration of clean water from roofs and sidewalks is encouraged throughout the City subject to site constraints.

#### **8.7.5 Site Assessment for LID**

All large projects are required to submit a site assessment for LID. If infiltration and/or dispersion are not feasible options, the applicant shall provide justification to demonstrate why.

Unless waived or modified by the City Engineer, all requests to use LID BMPs to achieve conformance with the City's stormwater regulations shall require a site assessment. This initial inventory and assessment process will provide the baseline information necessary to design strategies that preserve natural resources, preserve areas most appropriate to evaporate, transpire, and infiltrate stormwater, and help to achieve the goal of maintaining pre-development natural hydrologic conditions on the site. The assessment should result in a series of maps identifying streams, lakes, wetlands, buffers, steep slopes and other hazard areas and hydrologic features, significant wildlife habitat areas, and permeable soils offering the best available infiltration potential. Maps can be combined as hard copies or in electronic mapping formats to delineate the best areas to direct development.

The site assessment shall be a component of the project submittal. At a minimum, the site assessment shall include the following:

1. A survey prepared by a registered land surveyor showing existing public and private development, including utility infrastructure, on and adjacent to the site, major and minor hydrologic features, including seeps, springs, closed depression areas, drainage swales, and 2 foot contours up to 10 percent slope and 5 foot contours for slopes above 10 percent. Spot elevations shall be at 25 foot intervals.

2. Location of all existing lot lines, lease areas and easements.
3. A soils report prepared by a licensed geotechnical engineer or licensed engineering geologist. The report shall identify:
  - a. Underlying soils on the site utilizing soil pits and soil grain analysis to assess infiltration capability on site. The frequency and distribution of test pits shall be adequate to direct placement of the roads and structures away from soils that can most effectively infiltrate stormwater;
  - b. Percolation tests if appropriate or requested by the Stormwater Engineer;
  - c. Topographic and geologic features that may act as natural stormwater storage or conveyance and underlying soils that provide opportunities for storage and partial infiltration;
  - d. Depth to wet season high groundwater;
  - e. Geologic hazard areas and associated buffer requirements as defined in RZC 21.64.060;
  - f. Distance from site boundaries to any areas within 200 feet of the site identified as landslide hazard areas or having a slope of 40 percent or steeper with a vertical relief of 10 feet or more; [**Note:** the City may require the applicant to expand the 200 feet to encompass a larger area if there are concerns for downstream geological hazards.]
  - g. Identification of Wellhead Protection Zone(s); and
  - h. For previously cleared or graded sites, analysis of topsoil according to the soil requirements in the City of Redmond Standard Specifications, Section 9.14.1.
4. A survey of existing native vegetation cover and wildlife habitat by a qualified biologist identifying any forest areas on the site, species and condition of ground cover and shrub layer, and tree species, seral stage, and canopy cover.
5. A streams, wetland, and water body survey and classification report by a qualified biologist showing wetland and buffer boundaries consistent with the requirements of RZC 21.64.030 and Critical Areas Reporting Requirements (RZC Appendix 1).
6. Flood hazard areas on or adjacent to the site.
7. A preliminary drainage report providing analysis of the existing site hydrologic conditions on the site and recommendations for type, location, and restrictions on LID BMPs.
8. Other studies as deemed necessary by the Stormwater Engineer.

Applicants for LID projects should meet with engineering and planning staff following completion of the site assessment and prior to site design. Staff will provide feedback on additional analysis that may be required, preliminary recommendations on meeting the City's stormwater regulations and options for low impact options for site design. It is recommended that applicants consult the Low Impact Development Technical Guidance Manual for additional information on LID site planning, site preparation, and BMPs.

### **8.7.6 Maintenance**

All BMPs, impervious surface area restrictions, maintenance agreements, preserved native areas and any other requirements or restrictions imposed as conditions of approval under this chapter shall be recorded as covenants, deed restrictions, easements, or other legally binding limitations and commitments in a form approved by the City. Easements or rights of access shall be provided to the City to allow inspection, maintenance and repair, as necessary, to ensure that approved drainage systems are preserved and maintained according to the conditions of approval. BMPs approved on private property under the provisions of this chapter shall remain the responsibility of the person or persons holding title to the property, their heirs and assigns.

Native forest or other natural areas preserved or established as part of a dispersion BMP approved under the provisions of this chapter shall require, as a permit condition, that the native forest area tract or tracts be protected in accordance with the requirements set forth for general critical area protective measures in RZC 21.64.

### **8.7.7 Evaluation and Monitoring**

The Stormwater Engineer may require implementation of a monitoring and evaluation program designed to measure the performance of the drainage system or specific elements that are approved for a project under the provisions of this chapter.

## **8.8 Regional Facilities Program**

As a part of the City's coordinated, regional approach to managing stormwater City-wide, some projects will have the requirement or option of contributing a fee, in lieu of building site-specific facilities for flow control or runoff treatment. The fee shall be used toward construction of regional stormwater facilities. The City has responsibility for ensuring that:

- Potential impacts from all new development or redevelopment within the City are addressed in a manner that meets the City's obligations on a watershed basis to protect water quality and prevent erosion of streams.
- Funds received for construction of regional facilities are used for that purpose.

To meet these responsibilities, the City's program, administered by the Natural Resources Division of the Public Works Department, includes procedures for:

- coordinating with the Development Services Division's review of development and redevelopment projects;
- determining what projects are eligible for "fee in lieu";
- accounting for areas that have been treated by existing regional facilities;
- accounting for funds that have been received for construction of new regional facilities; and,
- locating, designing, and constructing regional facilities.

With the exception of downtown, for new development projects (Section 2.4.2), regional facilities must be operational to be eligible for "fee-in-lieu". Redevelopment projects (Section

2.4.1) are eligible if associated regional facilities are operational or are on the City's Six-year Stormwater Capital Improvement Plan.

To be eligible for "fee-in-lieu", project areas must drain to the applicable regional facility. For public road projects, the project area must drain to the same receiving water as the existing or proposed regional facility.

A project's participation in the Regional Facilities Program is dependent upon where the site is located. Appendix L shows a map of the City's proposed regional facilities and also the City's Regional Facilities Surcharge Areas. Applicants should review the maps to determine if sites fall within regional surcharge areas, and then use the appropriate flow charts below to determine site requirements related to this program.

### **8.8.1 Downtown**

Projects located within the Downtown surcharge area are subject to the Downtown sub-basin stormwater capital facilities charge, per RMC 13.20.045. As described within the RMC, sites located next to the Sammamish River may be eligible to opt out of the regional facilities program with approval of the Technical Committee.

Projects may be required to construct some offsite stormwater improvements such as connecting the pipe into the stormwater system or upsizing existing pipes within the system to prevent downstream flooding. Sites may also be required to construct improvements onsite to meet Minimum Requirement #5.

The City's Downtown Facilities Map, shown in Appendix P, identifies planned offsite improvements that may be required of the applicant, depending on the location and scope of the proposed development. The required offsite improvements should be discussed with the Stormwater Engineer early in the planning process. Downstream analysis using the City's model may be required of the applicant.

### **8.8.2 Overlake**

Projects located within the Overlake surcharge area are subject to the Overlake sub-basin stormwater capital facilities charge, per RMC 13.20.047.

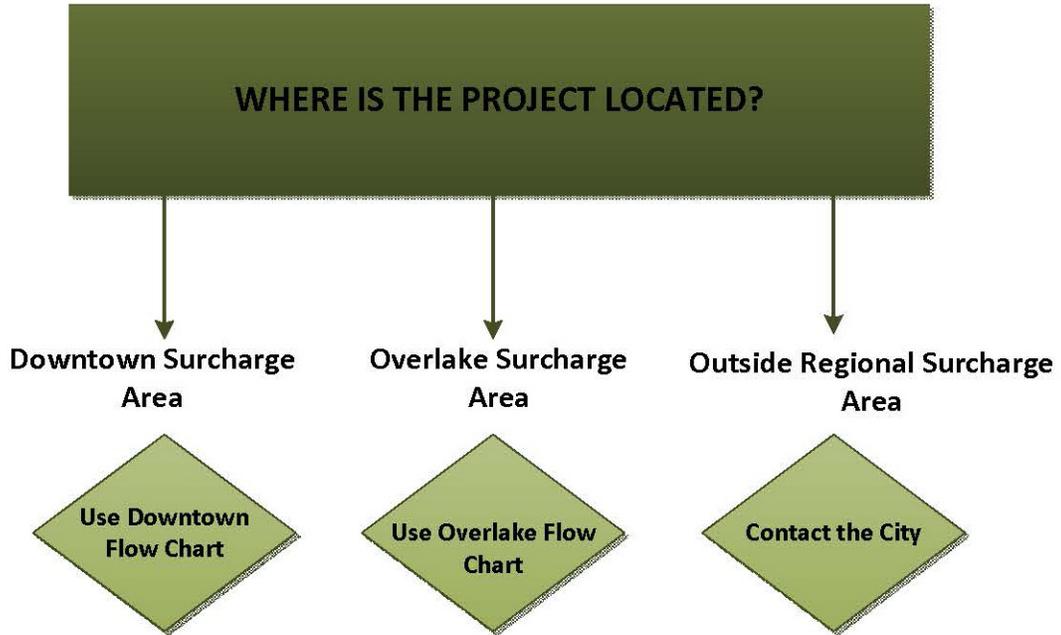
Sites located south of the location of the proposed NE 26<sup>th</sup> Street are required to construct onsite treatment for all pollution generating surfaces.

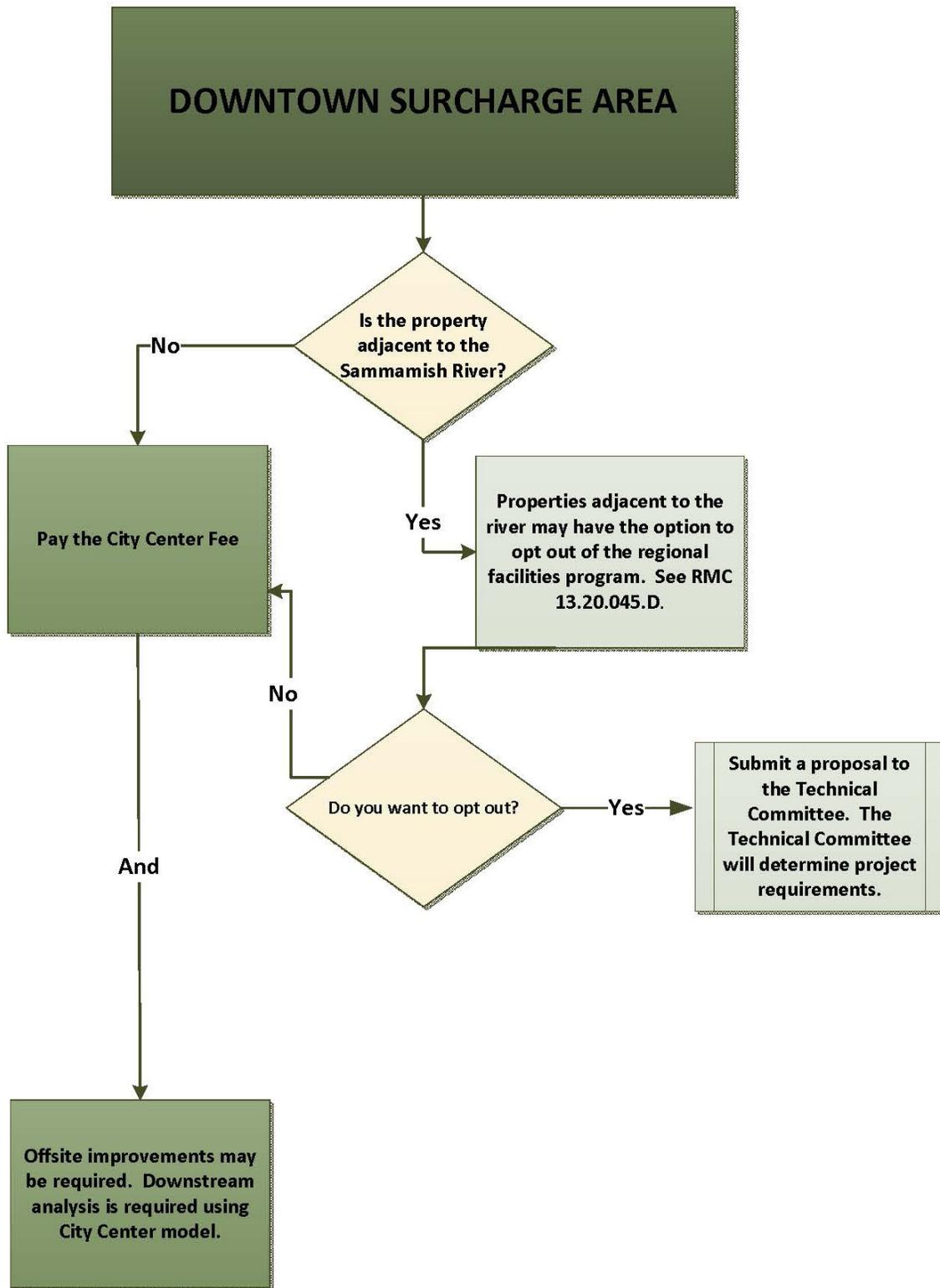
New development (Section 2.4.1) projects are required to construct interim treatment and/or flow control facilities if regional facilities meeting those requirements have not yet been constructed. (The City doesn't believe there are any sites in Overlake that would be classified as "new development").

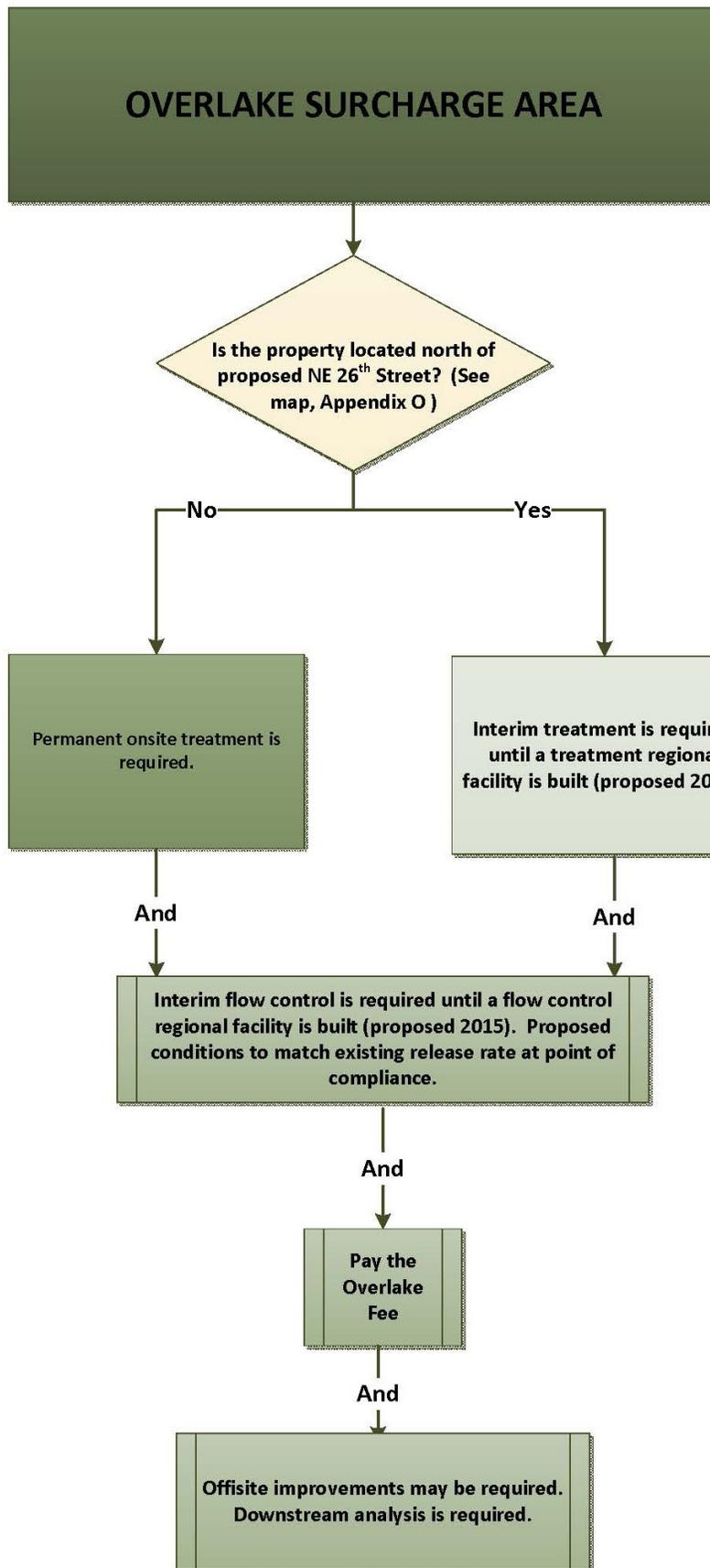
Applicants may also be required to construct improvements onsite to meet Minimum Requirement #5. The City's Overlake Facilities Plan, shown in Appendix O, identifies planned offsite improvements that may be required of the applicant, depending on the location and

scope of the proposed development. The required offsite improvements should be discussed early in the planning process. Downstream analysis using the City's model may be required of the applicant.

## REGIONAL FACILITIES PROGRAM







### **8.8.3 Outside Regional Surcharge Areas**

Projects that are not located within the Downtown or Overlake surcharge areas may have the option of negotiating with the City to participate in construction of a regional facility (or use of an existing regional facility) to meet their stormwater requirements. This is effectively a public/private partnership to facilitate private development and public retrofitting of stormwater management. A proposal describing the project will be reviewed by the City to determine if the project may be eligible.

This proposal must include:

- Full drainage report
- Downstream analysis
- Discussion of cumulative impacts
- Proposed fee
- Summary of offsite improvements
- Identified location for regional facility
- Summary of benefits to the City

Due to the large amount of City resources required to accommodate such a request, most sites that lie outside the designated regional surcharge areas are not eligible to participate in this program. Contact the Natural Resources Division for further information.

## **8.9 Other Development Topics**

### **8.9.1 Internal Building Changes as Redevelopment**

Redevelopment projects that are confined to existing interior spaces shall not require new drainage controls (except those drainage systems described above as may be required by the City for proper drainage).

If redevelopment projects include any work involving the exterior part of the site, the project shall be subject to redevelopment requirements under this Stormwater Notebook. Where exterior work occurs, the value of the interior work shall be included in determining the extent of exterior redevelopment requirements.

### **8.9.2 Site Improvements Involving Hazardous Materials**

Site improvements to existing facilities that would otherwise not be subject to stormwater system improvement but involve hazardous materials shall meet the water quality requirements of this Stormwater Notebook, Redmond Municipal Code (RMC) 15.24, RMC 15.06 and RZC 21.64.050. There are also specific source control BMPs in Volume IV of the Ecology Manual.

### **8.9.3 Dumpster Area Stormwater Drainage**

Dumpster areas are classified into one of three (3) groups. Generally, as an introduction, Group 1 is for small containers (not over 1.5 cubic yards) and single family sites, Group 2 is for all other sites that are not listed in Table 8.3, and Group 3 is for all sites involving uses listed in Table 8.3.

Quite often, the land uses at a site change over time. A development may initially have a Group 1 or Group 2 dumpster area. At a later time, if this site's land use changes and a Group 3 dumpster area becomes appropriate, the City may require an upgrade to the Group 3 specifications. For existing developments which need to add dumpster areas, these guidelines generally apply, but requirements may be adjusted or alternatives accepted by the Stormwater Engineer based on the particular characteristics of the existing situation. If compactors are used, the dumpster area is in Group 2 or Group 3 regardless of dumpster capacity. A dumpster area may contain more than one cart or dumpster. To be considered separate areas two (2) dumpster areas need to be separated by at least 25 feet.

#### **8.9.3.1 Group 1: Single Family Parcels and Dumpster Areas having Total Dumpster Capacity not over 1.5 Cubic Yards**

Group 1 Dumpster Areas include:

1. All dumpster areas where the volume of the container(s) does not exceed 1.5 cubic yards and compactors are not used.
2. All dumpster areas in single family lots except where certain on-site businesses are conducted. For single-family lots where on-site businesses create additional pollutant potentials in the dumpster area, the dumpster areas may be assigned to Group 2 or Group 3 by the Stormwater Engineer.

No special requirements apply to Group 1 dumpster areas.

#### **8.9.3.2 Group 2: Dumpster Areas having Capacities Over 1.5 Cubic Yards and Uses Not Listed in Table 8.3**

Group 2 dumpster areas include areas where the capacity of the dumpster(s) exceed 1.5 cubic yards or dumpsters have compactors and site uses are not included in Table 8.3.

For Group 2 dumpster areas, special requirements apply. Surface drainage from dumpster areas may be connected to the storm drainage system, provided:

1. Dumpster areas are sloped to drain out onto paved, impervious surfaces (such as parking lots).
2. No storm drain inlets are located in the dumpster area.
3. Runoff from the dumpster area flows over the paved surface at least 15 feet prior to entering a catch basin.
4. Catch basins receiving runoff from dumpster areas are Type II, 48 inch diameter minimum, with a "tee" fitting providing floatables separation (and a cleanout port with gasketed cover) but no overflow standpipe.
5. Potential pollutants are not put in the dumpsters on any routine basis.

If pollutants are put in the dumpster on any routine basis, the City may require the dumpster area to meet the requirements for Group 3 dumpster areas.

### **8.9.3.3 Group 3: Dumpster Areas having Capacities Over 1.5 Cubic Yards and Uses Listed in Table 8.3**

Group 3 dumpster locations include areas where the capacity of dumpster(s) exceeds 1.5 cubic yards or dumpsters have compactors and the site uses include any uses described in Table 8.3.

In Group 3 dumpster areas, surface drainage from the dumpster areas may be handled in one of two ways:

#### Preferred Alternative:

Surface drainage from dumpster areas may be connected to the sanitary sewer, provided:

1. The dumpster area is covered.
2. The surface drain from the dumpster area to the sanitary sewer is directed through a City-approved baffle-type oil/water separator.
3. Any issues are resolved with the Fire Department (they may require fire sprinklers) and the Planning Department (regarding aesthetic and site-planning issues).

#### Alternative if the Preferred Alternative is not feasible:

Surface drainage from dumpster areas may be connected to the storm drainage system, provided:

1. No storm drain inlet is located in the dumpster area.
2. Dumpster areas are sloped to drain out onto paved, impervious surfaces (such as parking lots).
3. Runoff from the dumpster area flows over the paved surface at least 15 feet prior to entering a catch basin.
4. Catch basin(s) receiving runoff from dumpster areas are Type I or Type II.
5. Storm drain pipe(s) from catch basins receiving dumpster area runoff convey the runoff through a baffle-type oil/water separator prior to connection to other parts of the storm drainage system. The flow rate for design of the separator shall be the sum of two rates. The first rate is the peak 50-year storm runoff in cubic feet per second that can enter the separator from contributing areas (Rational Method acceptable). The second rate is the capacity of the dumpster(s) in cubic feet, divided by 5 minutes (300 seconds) to yield cubic feet per second.
6. The storm drain pipes that carry flow from the catch basins receiving dumpster area runoff to the separator shall be gasketed pipe that meets the requirements for sanitary sewer pipe as noted in the City of Redmond Standard Details.

### **Table 8.3 -Dumpster Area Group 3 Land Uses**

Dumpster areas are in Group 3 if they serve land uses that are normally associated with the following types of waste materials:

- Accumulated food wastes
- Vegetable or animal grease
- Used oil
- Liquid feedstock
- Cleaning chemicals
- Liquid or solid dangerous waste (as defined by the Department of Ecology under WAC Chapter 173-303). The Development Services Division may require special handling for any items on this list and not allow their discharge to the storm or sanitary sewer systems.

Additional guidance regarding applicable uses is contained in the 2005 Ecology Manual. The determination about a specific use in Redmond will be made by the City's Technical Committee.

Note that multi-family residential uses (including town homes), printing and publishing businesses, restaurants, gas stations, vehicle maintenance facilities, and dry cleaners are examples of common uses in Redmond that are typically included in Group 3.

## Chapter 9 Construction Stormwater Pollution Prevention

The 2005 Ecology Manual provides detailed guidance regarding the plans for stormwater runoff management during construction. That guidance is to be followed in the City of Redmond. Field adjustments, likely to be required as the project construction progresses, must also be consistent with the Stormwater Notebook and the 2005 Ecology Manual.

### 9.1 Key Points to Address

The following are key points to address when formulating a Stormwater Pollution Prevention Plan (SWPPP) and Temporary Erosion and Sedimentation Control (TESC) Plan in Redmond:

1. Consider Stormwater Pollution Prevention in the “Bigger Picture” of the project.
  - A. Review Volume II of the Ecology Manual, particularly the general principles in Section 3.1.4.
  - B. Plan the use of the site or adjust critical parts of the site plan (in Critical Areas, for example) to avoid potential issues and problems. As noted in the Rainy-Season Guidelines (Chapter 10 of this document).
  - C. Avoid Rainy-Season work, especially on large and/or weather-sensitive sites. The Rainy-Season Guidelines (Chapter 10 of this document) may show that work can be done in the rainy season but enhanced (and more costly) TESC Plans are typically required.

2. Include a list of Key Contacts on the TESC Plan.

Key Contacts related to preparation, implementation, and operation of the TESC measures shall be included on a plan sheet. For each person include the name, title, role in preparing the plan, and phone number(s). The types of people involved in preparing the plan will typically vary depending on the complexity of the project. For relatively small, straightforward projects, the Key Contact may be just the project's civil engineer. For complex sites and projects the list could include:

- Project's civil engineer
- Project's lead SWPPP specialist
- Applicant's Project Manager
- General Contractor
- Grading Contractor

3. Include the construction Start-up Sequence on the TESC Plan.
  - a. The construction start-up sequence is a list of actions to be followed, in the order presented, to set up the stormwater pollution prevention measures prior to other construction.

- b. Initial work in the field needs to follow the sequence on the approved plan, with adjustments to fit field conditions that are approved, in advance, by the City Inspector.
4. Delineate Clearing Limits.
  - a. Clearing limits show the area(s) of the site to be left undisturbed. Staging and stockpile areas are considered to be disturbed so they need to be included as cleared area(s). In all cases, disturbed areas shall be the minimum necessary for construction.
  - b. On the TESC Plan, show the Clearing Limits. If there are key dimensions to use in the field for locating the clearing limits, show the dimensions on the plan. Such dimensions involve buffers, setbacks, geotechnical considerations, and other such factors.
5. Include "Disconnection" of Surface Inflows.
  - a. Runoff from areas upslope of the project's disturbed area(s) must be managed so the upslope runoff does not mix with the disturbed area.
  - b. The basic approach is to: cut off the approaching runoff using lined trenches or barriers (that are erosion-proof); collect that runoff at one or more points (depending on topography and other site circumstances); and convey the water around (or across) the work area (in erosion-proof ditches and/or temporary pipes).
6. Apply all available measures to surface runoff leaving the disturbed area to meet water quality standards.

Water quality standards include the State Standards and the City Standards. City Standards include the following:

- a. At the outflow point(s) from the treatment system(s), the turbidity standard is 25 NTU, maximum. NTU = Nephelometric Turbidity Unit.
- b. At downstream points of discharge to surface waters, the standard is as follows: runoff from the site is not to cause the turbidity level in the receiving water(s) to increase more than 5 NTU.
- c. At the outflow point(s) from the site, the standard for pH is 6.5, minimum, and 8.5, maximum.
- d. All available measures can include, but are not necessarily limited to, project phasing, advanced erosion and sediment control measures, and delaying all or part of any project work that has not commenced to avoid working during the rainy season.
- e. Unless a larger design storm is specified for a specific project or pollution control method, the minimum design storm for construction phase measures is the 10-year return frequency storm.

7. Surface runoff leaving the disturbed area shall be controlled using all available measures to meet water quantity limits where sensitive downstream conveyance situations exist. For discharge(s) to streams or channels subject to erosion, the standards for construction phase discharge are the same as those specified for permanent stormwater management for the project.
8. The TESC Plan must include provisions for other pollutants that are likely to be present on site during construction.

The SWPPP must:

- list other potential pollutants that are likely to be present on site and provide basic instructions for their management and control;
- list materials and equipment to be onsite to implement the instructions; and
- list key emergency phone numbers for resource agencies involved in pollution incidents.

The 2005 Ecology Manual provides additional information about potential problem areas (Volume II, Chapter 4).

9. Include provisions to prevent mud and dirt from being tracked onto off-site streets in the TESC Plan.

The minimum basic provision for controlling mud and dirt is the temporary quarry spill entry/exit pad. This approach is successful only in limited circumstances.

A more reliable approach (which may be proposed or required by the City) is a wheel-wash station. At a minimum (unless specifically waived by the City) the TESC Plan must show the standard wheel-wash facility (including site location and related "plumbing") as an optional measure. The City may stipulate that this measure is required. The City Inspector may require immediate implementation of an optional wheel wash if off-site streets become muddy or dirty from the project. Also see 2005 Ecology Manual Volume II, Chapter 4, BMPs C105, C106, and C107.

10. Include provisions to prevent sediment-laden stormwater from draining into areas proposed for infiltration BMPs like infiltration basins or areas designed for low impact development.
11. Include a Minimum Inspection and Maintenance Schedule for all management practices included on the plan.

The Minimum Inspection and Maintenance Schedule is to be a table or matrix listing the management practices on the left and the inspection and maintenance frequencies across the top. Two types of frequencies need to be specified. One type is the minimum time-related frequency (e.g., once per day, once per week, beginning and end of each work day, etc.). The other type is the event-related frequency (e.g., after each rainfall, after each larger storm rainfall, after each windstorm, etc.).

12. Comply with other federal, State, and City laws and regulations that relate to the construction phase.

Of primary importance under this title is safety. Safety of the project workers and other personnel, City staff, the neighbors, and other people who could be affected by the work is of paramount concern. The SWPPP should be reviewed by the plan's designers with safety in mind. Extra features (e.g., fencing, signs, walkways, etc.) should be considered.

Other laws and regulations that typically apply include:

- a. Noise standards (City)
- b. Construction work hours (City)
- c. Dust control (City and the Clean Air Agency)
- d. Rainy-Season Guidelines (City)
- e. A Pre-Construction Meeting with the City prior to starting work (City)

13. Post required Performance Securities prior to starting work.

The performance securities that are required for a specific project are specified either in the approval conditions for the project or in the requirements for permits that are required for the project.

## **9.2 Contents of Construction Stormwater Pollution Prevention Plan (SWPPP)**

The 2005 Ecology Manual requires a Construction Stormwater Pollution Prevention Plan (SWPPP) for Medium and Large Projects. A copy of the SWPPP is to be submitted to the City of Redmond. The SWPPP shall follow the outline and include the elements provided in the "Construction Stormwater Pollution Prevention Plan Checklist" at the end of Volume II, Chapter 3, of the 2005 Ecology Manual.

## **9.3 National Pollutant Discharge Elimination Systems Permit**

A permit is required from the Washington State Department of Ecology for all soil disturbing activities (including clearing, grading, and/or excavation) where one or more acres will be disturbed, and stormwater will be discharged to a receiving water directly (e.g., wetlands, creeks, unnamed creeks, rivers, marine waters, ditches, estuaries), or to storm drains that discharge to a receiving water. If all stormwater is retained on-site and cannot enter surface waters of the state under any condition, you do not need permit coverage.

## Chapter 10 Rainy Season Clearing / Grading

### 10.1 Introduction

These standards are adopted per Redmond Municipal Code 15.24. These general standards identify which development projects in the City of Redmond can undertake site construction work in the rainy season, what level of Temporary Erosion and Sediment Control (TESC) is necessary and what runoff monitoring is required. Since these are general standards, specific projects and sites may warrant exceptions to these standards.

Planning for rainy-season work needs to begin early in a project. The “Permit Processing Implications” section presents important information for those who may be pursuing construction work in the rainy season. It is important to plan ahead if rainy-season work is to occur given that:

- The SWPPP approved for good weather will probably not be adequate for the rainy season.
- A Seasonal Suspension Plan will be required for rainy-season work.
- Higher levels of TESC require City meetings as these plans are formulated (advance scheduling with City staff is important).
- High TESC levels can involve chemical treatment, so the possible use of such measures must be part of SEPA documents. If such measures become necessary for a project and were not included in SEPA reviews, then SEPA processes would need to be amended prior to approval of the special TESC measures.
- State Department of Ecology approval is required for some state-of-the-art TESC.

Clearing/grading work shall comply with provisions in the Stormwater Notebook and other applicable regulations and standards. Project work shall also comply with City regulations and with requirements developed through SEPA (State Environmental Policy Act) processes, through the City’s site plan review processes, and through other project reviews. These project-specific requirements are in addition to and take priority over the general standards in this document where differences occur.

The rest of this chapter contains seven (7) sections:

1. TESC Standards. This section presents the standards that define what constitutes successful Temporary Erosion and Sediment Control for a project.
2. Special Requirements for Rainy-Season Work. This section describes two special requirements that apply to rainy-season project work: the Seasonal Suspension Plan and additional performance security.
3. Rough Grading Permits. This section briefly identifies a permit that allows clearing and grading to get started under certain circumstances, so that such work does not occur in the rainy season.

4. Explanation of the Rainy-Season Clearing/Grading Matrix. This section discusses the elements of the “Matrix” (Table 10.2).
5. How to Use the Rainy-Season Clearing/Grading Matrix. This section describes the steps to follow to use the Matrix.
6. Project Planning Implications. This section outlines the project review and approval implications related to rainy-season work. This section contains information to request an exception to the general standards presented in the Matrix.
7. Appeals: Wet Weather Committee. This section describes the group of City staff that have reviewed these general standards and that considers the Correction Requests and Appeals. This group is called the Wet Weather Committee.

There are four (4) tables in this chapter:

1. Table 10.1-Hydrologic Groups for Area Soils
2. Table 10.2-Rainy-Season Clearing/Grading Matrix (consists of five (5) pages)
3. Table 10.3-TESC Requirements
4. Table 10.4-Monitoring Requirements

## **10.2 TESC Standards**

Successful TESC will meet all the following standards:

- a. Site areas which do not need to be disturbed are not disturbed (clearing limits are defined and maintained).
- b. Flows of runoff from areas not under construction are kept off of disturbed soils in the construction areas.
- c. Disturbed soil in an area that is not being worked receives temporary cover.
- d. The turbidity in runoff from the construction area does not exceed 25 NTU.
- e. Run-off from the construction area that reaches receiving waters does not cause the turbidity in the receiving waters to increase more than 5 NTU as a result of the project runoff.
- f. Disturbed areas receive final, permanent cover in accordance with the approved project plans without unnecessary delay.
- g. Off-site streets are kept free of dirt and mud originating from the construction site. (Using sweeping, not flushing, in the streets and, if appropriate, on-site wheel wash facilities.)
- h. Dust is controlled and is in compliance with the Puget Sound Clean Air Agency.

- i. Contingency plans for controlling spills and other potential pollutants have been developed and are ready to implement at the construction site.
- j. Work in Critical Areas conforms to requirements of the City's Critical Areas Ordinance (CAO). See Redmond Zoning Code 21.64 for additional information and definitions regarding Critical Areas.
- k. 24-hour, 7-day-per-week point(s) of contact is/are designated who can call out and direct crews, obtain materials, and authorize immediate expenditures for on-site temporary erosion and sediment control (TESC) work.
- l. Compliance exists with all project approval conditions and permits (including applicable non-City permits such as, but not necessarily limited to, the Hydraulics Project Approval from Washington State Department of Fish and Game and the Washington Department of Ecology NPDES Permit).

### **10.3 Special Requirements for Rainy-Season Work**

There are two special requirements that apply specifically to rainy-season clearing and grading:

- a. Project must have a City-approved Seasonal Suspension Plan for suspending work until the end of the rainy season if on-site TESC is found to be inadequate.

A Seasonal Suspension Plan is a separate outline on the TESC PLAN that describes how the site is closed for the duration of the rainy season if directed by the City. Sites may be closed if they cannot meet the criteria for successful TESC outlined in Section 2. The Seasonal Suspension Plan must have sufficient detail to clearly define the work to be performed under this plan if it is implemented.

The Seasonal Suspension Plan can include measures in the TESC Plan and /or additional BMPs. No site work is allowed under the Seasonal Suspension Plan in the rainy season except for work that is necessary to implement the measures in the TESC Plan and the Seasonal Suspension Plan.

- b. Performance security must be provided in a manner acceptable to the City. Performance security will need to provide for monitoring (Level M2 minimum; discussed later in these General Standards), operation of TESC measures, implementation of the Seasonal Suspension Plan, and site restoration.

### **10.4 Rough Grading Permits**

- a. Note that a separate permit for clearing and grading may be issued in certain circumstances when such action could allow substantial clearing and grading work to be completed before the rainy season begins. This permit is called a "Rough Grading Permit." See Chapter 3 of the Stormwater Notebook for requirements.

## 10.5 Explanation of the Rain-Season Clearing/Grading Matrix

Four factors are considered to classify sites and set standards for clearing and grading work during the rainy season:

- a. Location of work areas as related to surface waters (streams and lakes) or wetlands and the buffers of these Critical Areas.
- b. The slope of the land surface in the work areas. In some instances the direction of the slope relative to nearby surface waters or wetlands is also a factor.
- c. The actual soils in the work area expressed as Soil Conservation Service (SCS) Soil Hydrologic Groups designations (A, B, C, or D) (Table 10.1).
- d. Amount of land that is disturbed, considering both the cleared area and volume of earth to be moved.

### 10.5.1 Location(s) of Work Area(s)

For purposes of these General Standards, the entire City of Redmond is classified into five (5) types of work areas.

Class 1 Work Areas: areas within the banks of a stream, in a lake, in a regulated wetland or on steep slopes (equal to or over 40 percent).

Class 2 Work Areas: areas that are the buffers of streams, lakes, regulated wetlands, or steep slopes.

Class 3 Work Areas: areas within the current conditions 100-year frequency floodplains of major streams or lakes but outside the buffers of the stream or lake (the Sammamish River, Bear Creek, Evans Creek, and Lake Sammamish).

Class 4 Work Areas: areas that have “potential hydraulic influence” on a stream, lake, or regulated wetland (See glossary section regarding this term).

Class 5 Work Areas: consist of all other areas not included in any of the previous four (4) areas.

Work areas are further defined and sub-divided in Table 10.2.

### 10.5.2 Slope of the Land Surface

This factor refers to the general slope of the land in and immediately adjacent to a work area. The slope used in these General Standards generally refers to the steepest gradient before work or during work, prior to final cover.

Slopes are considered in categories as shown in Table 10.2. The percent of slope is the vertical rise divided by the horizontal run between two points on the ground surface (measured in the steepest direction) multiplied by 100.

### 10.5.3 Soil(s)

This document is based on soil hydrologic groups as defined by the United States Soil Conservation Service (SCS):

- Group A (Low runoff potential). Soils having high infiltration rates even when thoroughly wetted. These consist chiefly of deep, well-to-excessively drained sands or gravels. These soils have a high rate of water transmission in that water readily passes through them.
- Group B Soils having moderate infiltration rates when thoroughly wetted. These consist chiefly of moderately deep-to-deep, moderately well-to-well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.
- Group C Soils having slow infiltration rates when thoroughly wetted. These consist chiefly of soils with a layer that impedes downward movement of water or soils with moderately fine-to-fine texture. These soils have a slow rate of water transmission.
- Group D (High runoff potential) Soils having very slow infiltration rates when thoroughly wetted. These consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very slow rate of water transmission.

Group A soils have high infiltration capacity in their natural locations because they are associated with permeable underlying geology. In these guidelines, a work area is considered to have Group A soils only if the underlying geology is highly permeable (to a depth of at least 6 feet below the elevation of the lowest project excavation) and only Group A material is used in any filling.

A site's soil types must be determined by a qualified professional engineer based on field observations, borings, and test pits at the site. For reference, Table 10.1 shows hydrologic groups for various soils found in the SCS Soil Survey for King County.

### 10.5.4 Amount of Land Disturbed

The area disturbed is measured in acres and includes all land area that will be cleared at any one time. An area is considered cleared or disturbed until it has the final permanent cover as shown in approved project plans.

Permanent cover can include: final landscaping; buildings (at least to pad or first floor stage); and walkways, parking, and roadways (at least to first lift of compacted gravel sub-base or equal).

For some projects, project phasing can be part of the TESC Plan so the amount of land disturbed at any one time is reduced (see Table 10.2 to determine how disturbed area can affect requirements for a site).

The volume of material to be moved on a site is also a factor in setting standards. The volume of material to be moved is measured in cubic yards, independent of site area.

## **10.6 How to Use the Rainy-Season Clearing/Grading Matrix**

Table 10.2 classifies sites, determines if clearing/grading work can occur in the rainy season, determines the level of TESC required, and determines the level of monitoring required. Table 10.3 defines the four (4) levels of TESC shown in Table 10.2. Table 10.4 defines the three (3) levels of monitoring shown in Table 10.2.

To use Table 10.2, it is recommended that this document be reviewed to understand site factors and other issues related to rainy-season work. For specific projects, start with the first page of Table 10.2. If any part of the proposed rainy-season work area is in a Class 1 area, then the entire rainy-season work area must comply with requirements for the Class 1 area.

If none of the proposed rainy-season work area is in a Class 1 area, do the same review using the second page of Table 10.2. Continue through the table until the proposed rainy-season work area is shown in the table. That point in the table defines the class for the proposed work.

Once the work area class is found, Table 10.2 shows whether or not work can be undertaken in the rainy season and if so, what levels of TESC and monitoring are required.

### **10.6.1 Temporary Erosion and Sediment Control (TESC) Levels**

Table 10.2 requires different levels of TESC for different site circumstances. The TESC Levels are defined in Table 10.3. Level TESC-1 is the most basic level and Level TESC-4 is to be used in critical or sensitive situations. The levels of TESC effort shown in Table 10.3 specify the nature of the TESC Plan and:

- The expertise involved in preparation of the TESC Plan.
- The expertise and experience of the TESC implementation team (during project construction).

Moving large volumes of earth is also a factor in determining the TESC Level required. If rainy-season work involves large quantities of earthwork (over 10,000 cubic yards, as a general threshold), then Level TESC-3 is the minimum required.

As experience is obtained by the City concerning TESC-3 and TESC-4 levels, additional guidance will be added to this document.

### **10.6.2 Monitoring Requirements**

Table 10.2 requires different levels of monitoring for different site circumstances. The three (3) levels of monitoring are defined in Table 10.4. The monitoring relates to inspection of the TESC measures and to monitoring of site runoff and receiving waters for turbidity levels. Portable, electronic turbidity meters are required TESC tools for Contractors working in this area.

If monitoring or other inspections lead to a determination that the TESC measures are not adequate to meet the standards outlined in Section 2, the City may stop work on the entire project and issue further direction. The developer must take actions that are necessary (subject to City approval) to meet the TESC criteria listed in Section 2. Such actions may include compliance with the approved TESC Plan, preparation of an improved TESC plan, suspension of work during the rainy season, or other actions depending on the situation.

### **10.7 Project Planning Implications**

These standards are intended to protect surface and ground water quality and fisheries resources during construction and keep streets in the vicinity of construction sites safe, free of dirt and mud.

Almost all construction sites have the potential to adversely affect water quality and the safety of nearby streets. Such potential greatly increases in the rainy season. It is this increased potential that led to formulation of these general standards for rainy-season work.

The best general strategies to avoid the risks associated with rainy-season work are:

Strategy One: Plan projects so that major, if not all, site work is done in the dry season.

Strategy Two: Plan projects so the site work is phased, if rainy-season work is to be pursued. Work phasing can be applied in two ways as related to these general standards.

First, if part of the site is in an area where work would not generally be allowed during the rainy season, a proposed rainy-season work plan might exclude the site work that cannot be constructed in the rainy season.

Second, project phasing may be used as a general strategy to reduce the area of bare earth exposed at any one time during the rainy season. Such project phasing can reduce costs and land area required for the more complex TESC measures. This approach can reduce the scope and costs (including bonding) for implementation of the Seasonal Suspension Plan.

Even with phasing, some work areas pose such a risk to water quality and fisheries resources that they are not suitable for rainy-season work. These standards identify such work areas.

These standards also identify work areas that pose a high risk but one that can be reduced by using exceptional temporary erosion and sediment control (TESC) measures. Further guidance is provided in this document.

Even lower risk sites need to carefully plan and implement TESC measures in the rainy season.

If rainy-season site work is being contemplated, the project applicant should consider the following questions:

### **10.7.1 General Project Planning Stage**

- a. The City has significant limitations and conditions regarding clearing and grading work in the rainy season. Is there any way that this project can be scheduled to conduct all clearing and grading activities in the dry weather? This will expedite permitting and reduce the cost of erosion control measures during construction.
- b. Can work avoid Critical Areas altogether? A project that avoids or at least minimizes work in Critical Areas also avoids or minimizes permitting issues related to Critical Areas.
- c. Can work be phased? This strategy is discussed above.

### **10.7.2 Preliminary Design and Application Stage**

- a. If site work is allowed in the rainy season under these general standards, what levels of TESC and Monitoring will be required? See Tables 10.2, 10.3, and 10.4.
- b. If state-of-the-art TESC-4 is required, what notifications need to be included in the SEPA documents to allow such TESC options to be used?  
Note: If chemical treatment options for TESC may be required, this option must be included in the SEPA Environment Checklist (or EIS) for the project. It is possible to amend a SEPA determination at a later date to add the chemical treatment options but initial disclosure is preferable and saves time for the applicant.
- c. Are appropriate TESC planning and implementation team members and those with monitoring expertise being brought into the design process?  
Note: For sites and projects requiring only TESC-1 or TESC-2 levels, the specialized expertise of the team may be less critical. For TESC-3 and TESC-4 levels, the composition, knowledge, and experience of the team will be a major consideration in allowing rainy-season work. See Table 10.3 for requirements regarding team participants.
- d. Is adequate scheduling, including lead times, being included to involve the City staff in TESC issues?  
Note: The TESC-1 and TESC-2 levels require a minimum of City staff involvement in addition to normal project review activities. However, TESC-3 and TESC-4 require additional review by City staff. Joint meetings will likely be needed. As the rainy

season approaches in each year, demands for City staff time can increase to the point where scheduling involves significant lead time. Please plan ahead if rainy-season work is a possibility.

### **10.7.3 Project Approval Stage**

As part of the City's initial, written preliminary approval for a project, the Rainy-Season Classification will be included.

The City's classification may be appealed based on specific issues of fact or the project's context. Appeals may be submitted only after the written preliminary project approval is issued. Appeals are submitted as described in Paragraph 10.9.

### **10.7.4 Construction Documents Stage**

As construction documents are being developed, it is imperative to apply the expertise of appropriate team members. For most sites, rainy-season TESC will involve significant costs. The TESC measures and their costs are an inherent part of rainy-season work. The design team needs to produce high-quality TESC plans for projects to proceed in the rainy season.

### **10.7.5 Pre-Construction Stage**

The main interaction with the City in this stage is the Pre-Construction Meeting. This meeting needs to include members of the TESC and monitoring, planning and implementation team including contractors and sub-contractors. The contractor doing the clearing and grading work must attend.

If appropriate parties are not represented at the Pre-Construction Meeting, the City may cancel that meeting and require it to be rescheduled.

### **10.7.6 Construction Stage**

The construction stage is the critical stage. It is the responsibility of the developer to meet the standards outlined in Paragraph 10.3 of this chapter. (If the approved plan is not sufficient, the developer must take actions to propose and, after approval by the City, implement additional measures.)

**It is the TESC standards—not just the measures on the approved plan—that must be achieved.**

If TESC (including monitoring) is not being successfully addressed, the City may take action ranging from "Notices of Correction" to "Stop Work Orders" that apply to the whole project including all trades and activities. The 'Stop Work Order' can apply for the entire rainy-season duration and can require implementation of the Seasonal Suspension Plan.

The construction stage does not end under these general guidelines until all disturbed earth surfaces are covered with the final, permanent cover as shown on approved project plans.

## **10.8 Appeals: Wet Weather Committee**

After the City has issued the initial written approval or disapproval for a project (which will include the classification of the site and project under these general standards) an appeal may be made based on issues of fact and/or the project's context.

Appeals are to be submitted to the Development Services Division and will be considered by the Wet Weather Committee. The Wet Weather Committee is composed of one representative from each of the following divisions of the Public Works Department:

- Construction Division
- Development Services Division
- Natural Resources Division

Appeals must be in writing (five copies) and must include clearly organized supporting data developed by well-qualified professionals for all key points.

Upon reviewing written appeals, the Wet Weather Committee may take one of six (6) actions:

- Determine that inadequate or insufficient information has been provided or that information was not developed by appropriate, well-qualified professionals. (The appeal will be returned without action and additional details may or may not be included.)
- Approve the appeal.
- Approve the appeal with conditions.
- Deny the appeal.
- Deny the appeal but include information that could be addressed so as to warrant reconsideration.
- Request additional information.

For sites that require an NPDES permit from the State Department of Ecology, initial review(s) of appeals may be made by the Wet Weather Committee but final approval for rainy-season work will require submittal of the NPDES Permit.

For sites that require an HPA from the Washington State Department of Fish and Wildlife, a copy of the state-approved HPA must be submitted with an appeal to the Wet Weather Committee.

<b>Table 10.1 Hydrologic Groups for Area Soils*</b>		
<b>SCS Symbol</b>	<b>SCS Soil Name</b>	<b>SCS Hydrologic Group</b>
Ag	Alderwood gravelly sandy loam	C
Be	Beausite gravelly sandy loam	B
Bh	Bellingham silt loam	C
Br	Briscot silt loam	B
Bu	Buckley silt loam	B/C
Ea	Earlmont silt loam	B/C
Ed	Edgewick fine sandy loam	B
Ev	Everett gravelly sandy loam	B
In	Indianola loamy fine sand	A
Kp	Kitsap silt loam	C
Ks	Klaus gravelly loamy sand	A
Ne	Neilton very gravelly loamy sand	A
Ng	Newberg silt loam	B
Nk	Nooksack silt loam	B
No	Norma sandy loam	B
Or	Orcas Peat	D
Os	Oridia silt loam	C
Ov	Ovall gravelly loam	C
Pc	Pilchuck loamy fine sand	A
Pu	Puget silty clay loam	C
Py	Puyallup fine sandy loam	B
Ra	Ragnar fine sandy loam	B

\*Compiled from Soil Conservation Service information that applies to King County.

**Table 10.2  
Rainy-Season Clearing / Grading Matrix<sup>1</sup>  
Work Located in Critical Areas**

<b>Area Class<sup>2</sup></b>	<b>Description<sup>3</sup></b>	<b>Surface Slope</b>	<b>Soil Group</b>	<b>Work in Rainy Season, General Guidance</b> (Guidance may be modified or waived during City-designated emergencies)
1a	<ul style="list-style-type: none"> <li>• Within the Ordinary High Water mark of a stream (all stream classes)</li> <li>• Within a lake</li> <li>• Within a regulated wetland (all wetland classes)</li> <li>• On steep slopes (equal to or greater than 40 percent)</li> </ul>	All	All	No work in rainy season

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<sup>1</sup> Decisions for a specific project regarding work in the rainy season may be appealed to the Public Works Department’s “Wet Weather Committee.” Contact the Engineering Division for details. For TESC Levels and Monitoring Levels see Tables 3 and 4, respectively.

<sup>2</sup> “Area Classes” are labels used to identify sub-parts of a project site that meet the descriptions presented in this table.

<sup>3</sup> See Redmond’s Critical Areas Ordinance (RZC 21.64) for additional definitions and information regarding streams, lakes, wetlands, and buffers. “Artificially Created Wetlands” as mitigation to maintain wetland resources are to be treated as closest wetland type.

**Table 10.2 - Continued**  
**Rainy-Season Clearing / Grading Matrix<sup>1</sup>**  
**Work Located in Critical Area Buffers**

<b>Area Class<sup>2</sup></b>	<b>Description<sup>3</sup></b>	<b>Surface Slope</b>	<b>Soil Group</b>	<b>Work in Rainy Season, General Guidance</b> (Guidance may be modified or waived during City-designated emergencies)
2a	Buffers associated with: <ul style="list-style-type: none"> <li>• Class I Streams</li> <li>• Class II Streams where native fish are present or could be present during the construction time</li> <li>• All classes of regulated wetlands</li> <li>• The area within 25 feet of Lake Sammamish Ordinary High Water (elevation 27, City Datum)</li> <li>• The area within 15 feet of steep slopes (those equal to or greater than 40 percent)</li> </ul>	All slopes less than 40 percent	All	No work in rainy season
2b	Buffers associated with: <ul style="list-style-type: none"> <li>• Class II Streams not included in 2a above</li> <li>• Class III Streams</li> <li>• The area within 5 feet of Class IV Streams</li> </ul>	Ground slopes away from stream (at slope of at least 5 percent at all times before, during, and after project construction) or work area is isolated from stream by dike or equal; slopes less than 40 percent	All	Work Possible if: <ul style="list-style-type: none"> <li>• TESC-3 or TESC-4 Plan (as directed by City); M3 monitoring</li> <li>• Separation of work from 100-year stream flows</li> <li>• Restoration/mitigation and performance assurances are approved by City</li> </ul>
2c		All other ground slopes less than 40 percent	All	No work in rainy season

**Table 10.2 - Continued**  
**Rainy-Season Clearing / Grading Matrix<sup>1</sup>**  
**Work Located in Major Floodplain (Outside Buffers)**

<b>Area Class<sup>2</sup></b>	<b>Description<sup>3</sup></b>	<b>Surface Slope</b>	<b>Soil Group</b>	<b>Work in Rainy Season, General Guidance</b> <b>(Guidance may be modified or waived during City-designated emergencies)</b>
3a	Within the current 100-year FEMA Floodplain but outside of stream buffers and wetland buffers (all stream classes, and wetland types)	Ground slopes away from stream (at slope of at least 5 percent at all times before, during and after project construction) or work area is isolated from stream by dike or equal; slopes less than 40 percent	All	Work Possible if: <ul style="list-style-type: none"> <li>• TESC-3 Plan minimum; M3 monitoring</li> <li>• Separation of work from 100-year stream flows</li> <li>• Restoration/mitigation and performance assurance are approved by City</li> </ul>
3b		All other ground slopes less than 40 percent	All	No work in rainy season (unless the work area has been isolated from current 100-year frequency flood flows)

**Table 10.2 - Continued**  
**Rainy-Season Clearing / Grading Matrix<sup>1</sup>**  
**Work Located in "Hydraulic Influencing" Areas**

<b>Area Class<sup>2</sup></b>	<b>Description<sup>3</sup></b>	<b>Surface Slope</b>	<b>Soil Group</b>	<b>Work in Rainy Season, General Guidance (Guidance may be modified or waived during City-designated emergencies)</b>
4a	Potential hydraulic influence; <sup>4</sup> disturbed area for entire project is less than ¼ acre	All slopes less than 40 percent	A	Work possible with: <ul style="list-style-type: none"> <li>• TESC-1</li> <li>• M1 monitoring</li> </ul>
4b			All other soils (B, C, and D)	<ul style="list-style-type: none"> <li>• TESC-2</li> <li>• M1 monitoring</li> </ul>
4c	Potential hydraulic influence; <sup>4</sup> two or more phases used so maximum disturbed area does not exceed ¼ acre at any one time	All slopes less than 40 percent	A	Work possible with: <ul style="list-style-type: none"> <li>• TESC-3</li> <li>• M1 monitoring</li> </ul>
4d			All other soils (B, C, and D)	<ul style="list-style-type: none"> <li>• TESC-3</li> <li>• M2 monitoring</li> </ul>
4e	Potential hydraulic influence; <sup>4</sup> disturbed area(s) over ¼ acre	All slopes less than 40 percent	A	Work possible with: <ul style="list-style-type: none"> <li>• TESC-3</li> <li>• M2 monitoring</li> </ul>
4f			All other soils (B, C, and D)	<ul style="list-style-type: none"> <li>• TESC-3 minimum; TESC-4 approved and ready to implement at site</li> <li>• M3 monitoring</li> </ul>

<sup>4</sup> Potential Hydraulic Influence means surface runoff from the site would follow an identifiable conveyance route to a surface water or regulated wetland and would not be infiltrated enroute.

Disturbed areas less than ¼ acre typically include:

- Trenching/backfill operations
  - Berm construction/cover work
  - Small sites, including single family homes
  - Large sites where work can be phased so as to create only a small disturbed area at any one time.
- TESC Plans for disturbed areas in Area Classification 4a, 4b, 4c, and 4d must provide methods to cover all disturbed areas and temporarily cease work during rainfall.

**Table 10.2 - Continued**  
**Rainy-Season Clearing / Grading Matrix<sup>1</sup>**  
**Work Located in Other Areas**

<b>Area Class<sup>2</sup></b>	<b>Description<sup>3</sup></b>	<b>Surface Slope</b>	<b>Soil Group</b>	<b>Work in Rainy Season, General Guidance (Guidance may be modified or waived during City-designated emergencies)</b>
5a	Areas not included in previous types with disturbed area of 1 acre or less	0-10% slope	All	Work possible if: <ul style="list-style-type: none"> <li>• TESC-2 plan minimum; M1 monitoring</li> </ul>
5b		Slopes over 10%, but less than 40%	All	Work possible if: <ul style="list-style-type: none"> <li>• TESC-2 plan minimum; M2 monitoring</li> </ul>
5c	Areas not included in previous types with disturbed area over 1 acre	0-10% slope	Group A Soils	Work possible if: <ul style="list-style-type: none"> <li>• TESC-2 plan minimum; M1 monitoring</li> </ul>
5d			Group B, C, or D Soils	Work possible if: <ul style="list-style-type: none"> <li>• TESC-3 plan minimum; M2 monitoring</li> </ul>
5e		Slopes over 10%, but less than 40%	All	Work possible if: <ul style="list-style-type: none"> <li>• TESC-3 minimum; TESC-4 approved and ready to implement at site; M2 monitoring</li> </ul>

**Table 10.3  
TESC Requirements<sup>5</sup>**

<b>TESC Level Number</b>	<b>Recommended Participants in TESC Plan</b>	<b>TESC Plan General Formulation and Features (Note: Seasonal Suspension Plan required for all TESC Levels)</b>	<b>TESC Implementation Team (during construction)</b>
TESC-1	<ul style="list-style-type: none"> <li>• Applicant's Engineer</li> </ul>	Focus is on standard, common BMPs for site and project type. General sequencing list required.	Designated contractor or sub-contractor <sup>6</sup>
TESC-2	<ul style="list-style-type: none"> <li>• Applicant's Engineer</li> <li>• Applicant's Project Manager</li> <li>• Designated Contractor or Sub-Contractor for TESC<sup>6</sup></li> </ul>	Focus is still on standard BMPs. Written summary required outlining how TESC is to be addressed through main construction phases. More detailed sequencing info on plan.	Designated contractor or sub-contractor with documented experience <sup>7</sup>
TESC-3	<ul style="list-style-type: none"> <li>• Applicant's TESC Engineer(s)</li> <li>• Applicant's Project Manager</li> <li>• General Contractor</li> <li>• Designated Contractor or Sub Contractor<sup>6</sup> for TESC</li> <li>• Grading Contractor</li> <li>• City's Stormwater Engineer</li> <li>• City's Construction Inspector</li> </ul>	Plan content similar to Level TESC-2, above. More attention to all aspects of plan from conceptual to practical considerations included by team during plan formulation so as assure successful TESC.	Designated contractor or sub-contractor(s) <sup>6</sup> with Level TESC-3 experience <sup>7</sup>
TESC-4	<p>Same as Level TESC-3 plus:</p> <ul style="list-style-type: none"> <li>• Representative from City's Natural Resources Division</li> </ul>	Same as Level TESC-3 but will include state-of-art stormwater treatment systems, currently including chemical/filtration systems and such systems as "electrofloc".	Designated contractor(s) or sub-contractor(s) with Level TESC-4 experience <sup>7</sup>

<sup>5</sup> Projects moving over 10,000 cubic yards of earth require TESC-3 or TESC-4.

<sup>6</sup> Designated 24-hour, 7-day-per-week contact list is required.

<sup>7</sup> TESC Contractor must document prior experience in TESC at level designated. For Level 4, TESC Contractor must document experience in chemical treatment and latest mechanical TESC methods (even if they are not initially included in TESC Plan).

**Table 10.4  
Monitoring Requirements<sup>8</sup>**

Monitoring Level	Turbidity Monitoring <sup>9</sup>		
	Monitoring to be by	Monitoring What and When	Frequency <sup>10</sup>
M1	<ul style="list-style-type: none"> <li>Contractor or sub-contractor acceptable to City</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring of surface runoff whenever it is leaving the work area</li> </ul>	<ul style="list-style-type: none"> <li>Frequency and details as directed by City; adjusted as project proceeds</li> </ul>
M2	<ul style="list-style-type: none"> <li>City-approved contractor</li> <li>Supplemental verification, if directed by City, by third party to be approved by City and hired by Developer</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring of surface runoff whenever it is leaving the work area</li> <li>Monitoring of receiving waters (if applicable) if and when directed by City</li> </ul>	<ul style="list-style-type: none"> <li>Surface runoff to be monitored at least twice per day</li> <li>Receiving waters to be monitored immediately after surface runoff monitoring</li> </ul>
M3	<ul style="list-style-type: none"> <li>Monitoring to be done by City-approved "third party" hired by Developer</li> <li>If so specified, monitoring shall be done by "third party" hired by City and paid for by Developer's advance deposit of funds</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring of surface runoff whenever it is leaving the work area</li> <li>Monitoring of receiving waters whenever surface runoff is leaving site and is reaching the receiving waters</li> </ul>	

<sup>8</sup> For all three (3) Monitoring Levels, the minimum inspection frequency of all of the TESC measures shall be:

- After each day of site work (but not less than 3 times per week even if no site work has occurred)
- After each storm
- Twice per day during storms; more frequently if directed by City

<sup>9</sup> TESC Contractor must have portable, electronic turbidity meter. At all monitoring levels, a log is to be kept on-site by the TESC Contractor showing monitoring dates, times, locations, weather conditions, estimated discharge rates, monitoring readings, name(s) of those doing the monitoring and equipment used.

<sup>10</sup> Frequencies listed are minimum frequencies. More frequent monitoring including continuous monitoring during heavy storms may be required.

## GLOSSARY

**Clearing** - The removal of timber, brush, grass, ground cover or other vegetative matter from a site which exposes the earth's surface or any actions which disturb the existing ground surface.

**Engineer** - A professional engineer licensed by the State of Washington, who is qualified to practice those aspects of engineering reviewed in Chapter 15.24 RMC, Clearing, Grading and Storm Water Management. (Ord. 1877 (75))

**Existing grade** - The land surface elevation prior to grading. (Ord. 1877 (95))

**French drains** - Perforated storm drain pipes used to collect water underground. (Ord. 1877 (97))

**Grading** - Any action which changes the elevation of the ground surface. Grading includes, but is not limited to, dredging, landfills, excavations, filling, earthwork, embankments, etc.

**NTU** - The letters "NTU" stand for Nephelometric Turbidity Units. These units are a quantitative measure of water clarity based on the scattering of a standard beam of light directed into a standard sample of the water. A higher reading means the sample is less clear (more cloudy/muddy). See also the definition for turbidity.

**Potential hydraulic influence** - Surface runoff from the project would follow an identifiable conveyance route to surface water (including wetlands) and would not be infiltrated en-route.

**Quality Control Systems** - Stormwater facilities that are intended to reduce the pollutants in runoff. (Ord. 1877 (157))

**Quantity Control Systems** - Stormwater management facilities that are intended to reduce the rate of runoff. (Ord. 1877 (159))

**Rainy season** - The period of time starting on October 1 of each year and ending April 30 of the following year. These dates may be adjusted by the Public Works Director based on climatic conditions for a particular year.

**Restoration** - The re-establishment of the land characteristics and ecological values to pre-development conditions that were lost by alteration, development or catastrophic events. (Ord. 1954; Ord. 1877 (165))

**Rough Grading** - The stage at which the grade is modified to approximately conform to the proposed final grade. It is a prelude to and shall be based on a known development proposal. (Ord. 1877 (190))

**Speculative Clearing and Grading** - Clearing or grading without an approved viable site development concept, consisting of a site layout and other appropriate documents, as determined by the City's Technical Committee.

**Stormwater Capital Improvement Plan** - The Stormwater Capital Improvement Plan is a six-year plan of capital improvements, including facilities, programs, projects necessary to serve the current and future stormwater needs of those who live and work in Redmond. The CIP is a six-year financial planning document of City revenues and expenditures for those improvements.

**Stormwater Engineer** -The Stormwater Engineer is the reviewing authority who reports to the Public Works Director and represents the City for projects that involve stormwater management. City of Redmond Capital Improvement Projects are reviewed by a Stormwater Engineer within the Natural Resources Division of the Public Works Department. All other public or private projects are reviewed by a Stormwater Engineer in the Development Services Division of the Public Works Department.

**Turbidity** - The visual cloudiness of runoff, especially as caused by suspended solids and settle-able solids in runoff. Turbidity shall be measured as specified in Method 2130-B of the following reference:

Standard Methods for the Examination of Water and Wastewater. Current Edition. Franson, Mary Ann H., Managing Editor. Clesceri, Lenore S; Greenberg, Arnold E; and Eaton, Andrew D editorial board. Published jointly by the American Public Health Association, the American Water Works Association, and the Water Environment Federation.

**Turbidity Meter** - A portable, electric, hand-held measuring device designed to give a numerical value of the turbidity (cloudiness) of a sample of water. The numerical values are expressed in units known as Nephelometric Turbidity Units (NTUs).

**Appendix A**  
**Redmond Municipal Code, Chapter 15.24**

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## Redmond Municipal Code

### [Chapter 15.24](#)

<http://www.codepublishing.com/WA/redmond.html>

#### **CLEARING, GRADING, AND STORMWATER MANAGEMENT\***

##### Sections:

- [15.24.010](#) Purpose and intent.
- [15.24.020](#) Design, construction and maintenance – General requirements.
- [15.24.030](#) Director.
- [15.24.040](#) Issuance of permits.
- [15.24.050](#) Activities requiring permits.
- [15.24.055](#) Activities that do not require a clearing, grading, and stormwater permit.
- [15.24.060](#) Classification of clearing, grading and stormwater management construction activities.
- [15.24.070](#) Rough grading projects.
- [15.24.080](#) Requirements for design and construction.
- [15.24.084](#) Adjustments.
- [15.24.089](#) Variances.
- [15.24.090](#) *Repealed.*
- [15.24.095](#) Wellhead Protection Zones 1 and 2 performance standards.
- [15.24.100](#) Enforcement – Authorization.
- [15.24.110](#) Inspection.
- [15.24.120](#) Stop work orders.
- [15.24.130](#) Suspension or revocation of permit.
- [15.24.140](#) Penalty for violation.
- [15.24.150](#) Restoration.
- [15.24.160](#) Notification of noncompliance.
- [15.24.170](#) Penalties.
- [15.24.180](#) Processing fees.
- [15.24.190](#) Permit fees.
- [15.24.200](#) Inspection fees.

\*Prior legislation: Ords. 1877, 2180 and 2215. Formerly Chapter 20E.90 RCDG.

##### **15.24.010 Purpose and intent.**

The purpose of the Clearing, Grading, and Stormwater Management Code is to: safeguard life, property, public health, and general welfare; minimize water quality degradation; prevent excessive sedimentation of or erosion by surface waters; and prevent the creation of public nuisances such as fouling of surface or groundwater. Furthermore, this section is intended to reduce impacts from land development; preserve and enhance wildlife habitat in and along surface waters; enhance the aesthetic quality of the area waters; minimize

erosion; preserve trees; and preserve natural topographic features. These regulations focus on prevention of adverse impacts associated with clearing, grading and stormwater activities rather than remediation of adverse impacts after they have occurred. (Ord. 2532 § 2 (part), 2010: Ord. 2218 § 1, 2004)

**15.24.020 Design, construction and maintenance – General requirements.**

(1) The design, construction, and maintenance of all clearing, grading and stormwater management systems and facilities shall comply with the requirements and design standards contained in all the following documents:

(a) This chapter.

(b) The Washington State Department of Ecology Stormwater Management Manual for Western Washington, dated February 2005 or its successor when approved by the City's Technical Committee and as applied by the Clearing, Grading and Stormwater Management Technical Notebook ("Stormwater Technical Notebook" for the remainder of this chapter).

(c) Any applicable construction specifications, design standards and details approved under the authority of subsection (2) of this section.

(2) The Public Works Director shall prepare and shall adopt construction specifications and design standards and details for clearing, grading, and stormwater management. The specifications, design standards and details shall be based on the Washington State Department of Ecology Stormwater Management Manual for Western Washington, dated February 2005 or its successor when approved by the City's Technical Committee. The Public Works Director has the authority to make changes as local conditions warrant. The specifications, design details, and any changes shall be made available to the public. A fee set by the Public Works Director may be charged for these documents.

(3) In the case of conflicts between the documents listed in subsection (1) of this section, conflicts shall be resolved by applying the following order of precedence:

(a) This chapter;

(b) The Stormwater Technical Notebook;

(c) City of Redmond Standard Specifications and Details;

(d) The Washington State Department of Ecology Stormwater Management Manual for Western Washington. (Ord. 2532 § 2 (part), 2010: Ord. 2218 § 1, 2004)

**15.24.030 Director.**

For the purposes of this chapter only, "Director" shall mean the Director of the Public Works Department or his/her designee. (Ord. 2532 § 2 (part), 2010: Ord. 2218 § 1, 2004)

#### **15.24.040 Issuance of permits.**

(1) Regulated clearing, grading and/or stormwater activity as defined in RMC [15.24.050](#) requires City approval and the issuance of the appropriate permit(s) before initiating any of the regulated activities.

(2) Speculative clearing and grading shall be prohibited.

(3) For regulated activities, "City approval" means approval of appropriate plans, prepared by the applicant's engineer(s), indicating compliance with the requirements and design standards specified in this chapter under RMC [15.24.020](#). Approval shall be evidenced by the signature of the Public Works Director or designee. Once plans are approved, a permit may be issued by the City. Fees for plan review and permit processing may be charged as established by separate ordinance. Issued permits shall be posted on the construction site at all times when work is underway. To ensure that the actual work in the field conforms with the approved plans, permitted activities shall be inspected by the City during construction. (Ord. 2532 § 2 (part), 2010; Ord. 2218 § 1, 2004)

#### **15.24.050 Activities requiring permits.**

All clearing, grading or stormwater management construction activities listed below require approved plans and a permit(s). The thresholds are cumulative during a one-year period for any given site.

(1) Clearing of 7,000 square feet of land area or more.

(2) Earthwork of 50 cubic yards or more. This means any activity which moves 50 cubic yards of earth, whether the material is excavated or filled and whether the material is brought into the site, removed from the site, or moved around on the site.

(3) Removal of 11 or more trees that are six-inch diameter or larger. The tree diameter is measured four feet from the ground. The removal of 10 or fewer trees is regulated in Redmond Zoning Code Chapter 21.72.

(4) Any clearing or grading within a critical area or buffer of a critical area. Critical areas are defined in Redmond Zoning Code Chapter 21.64, Critical Areas. Any disturbance to vegetation within critical areas and their corresponding buffers is also regulated by Redmond Zoning Code Chapter 21.64, Critical Areas. Note that under this chapter, a clearing/grading permit for work on steep slopes must first comply with RZC 21.76.070(E), Alteration of Geologic Hazard Areas.

(5) Any change of the existing grade by four feet or more. This criterion applies to all permanent changes in grade and grade changes for extended periods of time (60 days or longer) located outside structure footprints.

(6) Any work within a public easement, City-owned tract or City right-of-way. Any clearing, grading or landscaping must be approved by the Department of Public Works prior to construction.

(7) The creation or addition of new, replaced or new plus replaced impervious surface in the amount of 2,000 square feet or more.

(8) Any construction of public drainage facilities to be owned or operated by the City.

(9) Any construction of private storm drainage pipes 12 inches in diameter or larger.

(10) Any modification of, or construction which affects, a privately owned/operated flow control facility or runoff treatment facility. (Does not include maintenance or repair to the condition defined by previously approved plans.) (Ord. 2596 § 2 (part), 2011; Ord. 2532 § 2 (part), 2010; Ord. 2218 § 1, 2004)

**15.24.055 Activities that do not require a clearing, grading, and stormwater permit.**

(1) All clearing, grading and stormwater management construction activities that do not involve any of the thresholds listed above do not require City-approved clearing, grading and stormwater management plans or a permit, but still must meet the requirements specified in RMC [15.24.020](#).

(2) Activities that do not require approved plans or permits must still provide BMPs as necessary to protect water quality. Any surface intended for vehicular traffic shall provide a floatables separator. Minimum requirements for other activities may be obtained by written request to the Development Services Division, accompanied by an adequate description of proposed work.

(3) The following activities are unregulated by this chapter even if the criteria in RMC [15.24.050](#) are exceeded:

(a) Agricultural crop management of existing farmed areas.

(b) Cemetery graves involving less than 50 cubic yards of excavation, and related filling per each cemetery plot. (Ord. 2532 § 2 (part), 2010; Ord. 2218 § 1, 2004)

**15.24.060 Classification of clearing, grading and stormwater management construction activities.**

(1) A clearing, grading and stormwater management permit may be considered as a component of a building permit or other permit, rather than as a separate permit, if City-approved drawings for such activities are included under the other permit.

(2) The Director shall specify what submittal and application materials are required for a complete application, including the type of submittals, the required level of detail, the minimum qualifications of preparers of technical documents, and the number of copies that must be submitted.

(3) Clearing, grading and stormwater management activities are classified based on type, location and timing of development activity proposed. Table 1 outlines the classifications for clearing, grading and stormwater management activities and briefly reviews processing.

Other City processes, approvals and permits may also be required for projects. The Director may adjust classifications and permit processing steps for proposed projects which are shown to be in multiple classifications or are otherwise not appropriately classified under the criteria shown in Table 1 and may adjust processing steps and fees as appropriate.

(4) Project Classification and Processing Table.

**Table 1**

<b>Project Classification</b>	<b>Typical Type of Development Activity</b>	<b>City Permit Which Allows Clearing, Grading and Stormwater Management Construction*</b>	<b>Summary of Permit Process for Clearing, Grading and Stormwater Management Construction</b>
Building Projects	Single-family, duplex construction, commercial, industrial and multifamily construction, additions	Building Permit	Clearing, grading and stormwater management activities are reviewed in conjunction with the Building Permit plans. Single-family and duplexes are reviewed by the Construction and Building Divisions, all other projects are reviewed by the Development Services Division
Development Projects	Subdivision, utility construction outside City right-of-way, clearing and grading only projects including landscaping projects	Approved Civil Drawings	Clearing, grading and stormwater management activities are reviewed by the Development Services Division as all or part of the site improvement plans
Right-of-Way Projects	Construction activities all or partly within the City right-of-way	Street Use Permit	Clearing, grading and stormwater management activities are reviewed by the Development Services Division as part of the project
Rough Grading Projects	Clearing and/or grading of a site before all final approvals of the entire project	Rough Grading Permit	Clearing and grading activities are reviewed by the Development Services Division prior to other site improvements plans. Special conditions shall be met for issuance of Rough Grading plans (see RMC <a href="#">15.24.070</a> ).

\* Construction is allowed only when approved plans for clearing, grading and stormwater management construction are issued with the appropriate permit listed in the table.

(Ord. 2532 § 2 (part), 2010: Ord. 2218 § 1, 2004)

#### **15.24.070 Rough grading projects.**

(1) Rough Grading Prerequisites. The Technical Committee shall determine whether rough grading will be permitted for a project. At a minimum, to obtain a Rough Grading Permit approval for a project all the following shall have been processed and have received approval:

- (a) Site plan approval including conceptual utility layout.
- (b) SEPA review for the entire project completed (if required).
- (c) Clearing, grading and temporary erosion control construction plans.
- (d) Resolution of all project feasibility issues (i.e., required off-site easements, significant utility design issues, etc.).

(2) Rough Grading Application. Upon completion of the prerequisites listed above, the following information shall be submitted, if applicable, for a rough grading application to be considered complete:

- (a) Seven sets of rough grading drawings and supporting information stamped and signed by a professional civil engineer.
- (b) Clear identification of all work proposed under the rough grading application.
- (c) Clear identification of existing and proposed grades.
- (d) Clear identification of all areas that will be disturbed.
- (e) Identification of proposed quantity of earthwork.
- (f) Identification of proposed erosion control measures.
- (g) An erosion control plan designed in accordance with the City Design Specifications.
- (h) Payment of the appropriate plan review fees.
- (i) Prior to issuance of Rough Grading Permits, acceptable site restoration assurance (bonding, cash deposits, etc., as specified by the Technical Committee) shall be posted with the City. (Ord. 2532 § 2 (part), 2010; Ord. 2218 § 1, 2004)

#### **15.24.080 Requirements for design and construction.**

The City hereby adopts the thresholds, definitions, and minimum requirements, found in Appendix 1 of the Western Washington Phase II Municipal Stormwater Permit, including the mandatory provisions of the 2005 Washington State Department of Ecology Stormwater Management Manual for Western Washington. Refer to the Stormwater Technical Notebook

for local modifications and application of the definitions, thresholds, and minimum requirements in Redmond.

(1) Design and Construction Standard Requirements. The design and construction standards found in this section are required. The Director may require additional or modified standards for specific projects or areas based on approved interlocal agreements, identified capacity limitations, significant erosion potential, seasonal factors, or other applicable factors.

(2) Checklist. The Director of Public Works shall maintain a checklist of Project Requirements that will be available at the Development Services Center. For those activities that require preparation of plans (see regulated activities, RMC [15.24.050](#)), the applicant shall prepare plans that, at a minimum, include the following:

(a) Erosion and Sediment Control. All clearing, grading and stormwater management activities shall be designed and constructed to minimize erosion and the transport of sediment.

(b) Drainage Facilities. Drainage facilities shall be provided with site improvements as needed to meet the intent of this section. As a minimum, conveyance systems shall be designed to convey the 10-year storm. Culvert crossings of public rights-of-way shall be designed for at least the 25-year storm. Additional analysis may be required and if excessive flooding, erosion and other damage would occur, the design storm may be increased by the Director.

(c) Water Quality Control. Post construction stormwater water quality control requirements depend on project and site characteristics. Runoff treatment and pollution source control measures are required of development/redevelopment projects based on the following:

- If a project creates 2,000 square feet (sf) or more new, replaced, or new plus replaced impervious surfaces, OR the project will disturb 7,000 sf or more land, post construction source control of pollutants is required as specified in the Stormwater Technical Notebook.
- If a project adds 5,000 sf or more new impervious surfaces OR the project converts 3/4 acre native vegetation to lawn/landscaping OR converts 2.5 acres of native vegetation to pasture, runoff treatment facilities AND the selection of post construction source controls are required as specified in the Stormwater Technical Notebook.

Selection and documentation of post construction operational and structural source controls, and treatment facilities, shall conform with requirements detailed in the Stormwater Technical Notebook. All runoff treatment facilities are required to have an operations and maintenance manual that clearly indicates who is responsible for cleaning, maintenance, and operation of the facility. The Director may exempt trails

and other linear types of construction projects if not used by motor vehicles and no significant impacts are identified.

(d) Water Quantity Control.

(i) Post construction runoff quantity control requirements depend on project and site characteristics. Runoff reduction/on-site stormwater management and flow control facilities are required of development/redevelopment projects based on the following:

- If a project creates 2,000 square feet (sf) or more new, replaced, or new plus replaced impervious surfaces, OR the project will disturb 7,000 sf or more land: runoff reduction/on-site stormwater management, to reduce the quantity of runoff created by the proposed project, is required as detailed in the Stormwater Technical Notebook.
- If a project adds 5,000 sf or more new impervious surfaces OR the project converts 3/4 acre native vegetation to lawn/landscaping OR the project converts 2.5 acres of native vegetation to pasture OR a project one acre or larger will result in a 0.1 cubic feet per second increase in flow during a 100-year frequency storm: runoff flow control facilities AND runoff reduction/on-site stormwater management are required as detailed in the Stormwater Technical Notebook.

(ii) When modeling to determine quantity control design requirements, the predeveloped condition to simulate is forested land cover except on the Sammamish Valley floor, where pasture may be taken as the predeveloped condition. If downstream analyses show flooding, erosion, and other damage would still occur, the allowable discharge rates may be decreased by the Director. In some cases direct discharge without detention may be permitted as determined by the Director. Trails and other linear types of construction activities may be exempt if not used by motor vehicles and no significant impacts are identified with approval by the Director.

(iii) Project proponents are required to document the application of permanent runoff reduction/on-site stormwater management techniques, to reduce the quantity of runoff produced by the project, as required by the Stormwater Technical Notebook. All facilities are required to have an operations and maintenance manual that clearly indicates who is responsible for cleaning, maintenance, and operation of flow control and on-site/runoff reduction facilities.

(e) Stabilization of Disturbed Areas. All exposed soil shall be stabilized by suitable application of erosion control BMPs. All BMPs shall be selected, designed and maintained according to sediment and erosion control standards established by the Stormwater Technical Notebook. From October 1st through April 30th, no unworked

soil shall remain exposed for more than two days. From May 1st through September 30th, no unworked soil shall remain exposed for more than seven days. The director or his/her designee may permit extension of these times or require reduction of these times.

(f) Protection of Adjacent Properties. Adjacent properties shall be protected from sediment deposition by appropriate use of vegetative buffer strips, sediment barriers or filters, dikes or mulching, or by a combination of these measures and other appropriate BMPs.

(g) Maintenance. All erosion and sediment control BMPs shall be regularly inspected (minimum once a week and after each storm) and maintained to ensure continued performance of their intended function.

(h) Identification of Critical Areas and Associated Buffers. No clearing or grading activity shall take place without first delineating critical areas and buffers. All critical areas shall be delineated and clearly marked on the plans for permits. On-site and off-site critical areas that may be affected by the proposed activity shall be identified. All such on-site areas shall be fenced before any clearing or grading whether a permit is required or not required. These areas shall not be cleared and the vegetation shall not be disturbed per Redmond Zoning Code Chapter 21.64, Critical Areas.

(i) Identification of Easements. Native growth protection easements (NGPE), utility easements, etc., and corresponding setbacks shall be delineated and clearly marked on the plans. These areas shall not be cleared and the vegetation shall not be disturbed without proper approval.

(j) Accurately Describe Work Area. Provide a plan showing location of the property where the activity is proposed. Show areas to be cleared and graded, stockpile areas, staging areas, etc.

(k) Control of Pollutants Other Than Sediment on Construction Sites. All potential pollutants in addition to sediment that occur on-site during construction shall be handled and disposed of in a manner that does not cause contamination of stormwater, surface waters, soil, or groundwater.

(l) Source Control of Pollution. Source control BMPs shall be applied to all projects to the maximum extent practicable. Source control BMPs shall be selected, designed, and maintained according to the Stormwater Technical Notebook.

(m) Controlling Off-Site Erosion. Properties and waterways downstream from development sites shall be protected from erosion due to increases in the volume, velocity, and peak flow rate of stormwater runoff from the site.

(n) Other BMPs. Shall be applied as appropriate to mitigate the effects of potential increased runoff and/or decreased runoff water quality to the maximum extent practicable.

(o) Separate public and private drainage stormwater facilities for public land and City rights-of-way shall be separate from private stormwater facilities to the maximum extent practicable.

(p) Limit Topographic Change.

- Within structure footprints, this chapter does not limit cuts or fills (even with the presence of significant trees).
- Within the structural footprint, plus a 10-foot horizontal buffer, temporary cuts or fills are not limited by this chapter (even with the presence of significant trees).
- Outside the structure's footprint, and where significant trees are not present, the maximum permitted vertical depth or height of a cut or fill is a total of eight vertical feet.
- Outside building work areas, and where significant trees are present, grades shall not be changed.
- Cut or fill slopes may not exceed 33 percent (3H:1V). Cut and fill slopes for roadways may, however, be designed at (2H:1V) upon review and approval by the Director.

(q) Tree preservation plan information in accordance with the City's Tree Preservation Regulations shall be incorporated into the clearing and grading drawings and shall become part of all construction documentation. This information shall define spatial limits for tree protection and include detailed drawings of tree protection measures and all required mitigation plantings. The tree preservation information must be prepared by a certified arborist or a certified landscape architect in conjunction with a registered civil engineer. (Note: In most instances, the tree survey will serve as the basis for the tree preservation information.)

(r) Placement of imported contaminated fill material is prohibited, citywide. Additional requirements for fill material in Wellhead Protection Zones 1 and 2, and language to determine fill material as contaminated, is detailed in RMC [15.24.095](#). (Ord. 2596 § 2 (part), 2011; Ord. 2532 § 2 (part), 2010; Ord. 2218 § 1, 2004)

#### **15.24.084 Adjustments.**

(1) Adjustments are permissions granted by the Technical Committee to deviate from the stormwater requirements for design and construction specified in RMC [15.24.080](#) or in the Stormwater Technical Notebook. Adjustments must provide the equivalent (or improved)

level of environmental protection. Adjustments are requested through application of a General Development Permit and decision by the Technical Committee. Application for adjustments must include clear written documentation to explain how the proposed adjustments address the following criteria:

- (a) Provide substantially equivalent (or improved) environmental protection as would be provided if the standard stormwater requirements were met.
- (b) Reflect sound engineering practices.
- (c) Meet the objectives of public health, safety, function and maintenance.
- (d) Avoid damage to other properties in the vicinity of and downstream of the proposal.

(2) The Technical Committee may deny any or all of the requested adjustments, may request additional information including written documentation from qualified specialists, may approve any or all of the requested adjustments, or may approve specific parts of adjustments, either to the extent requested or to a reduced extent. All documentation is to be obtained and paid for by the applicant(s). The Technical Committee may also require peer review which, if required, is to be paid for by the applicant.

(3) The Technical Committee may determine the adjustment(s) requested are to be processed in accordance with Redmond Zoning Code Section 21.76.070(BB), Variances, and the criteria in RMC [15.24.089](#). (Ord. 2596 § 2 (part), 2011; Ord. 2532 § 2 (part), 2010)

#### **15.24.089 Variances.**

(1) Variances are permissions granted through the City's variance process in accordance with Redmond Zoning Code Section 21.76.070(BB), Variances. Variances under this title apply only to RMC [15.24.080](#)(1) and (2)(a), (c), (d), (e), (g), (h), (j), (k), (l), and (n). The criteria for approving a variance requested under this title shall include the decision criteria contained in Redmond Zoning Code Section 21.76.070(BB)(3), Decision Criteria, together with the following criteria:

- (a) The variance may be granted by the City only when meeting the applicable standards would impose a severe and unexpected economic hardship.
- (b) The variance will not increase the risk to the public health and welfare, nor be injurious to other properties in the vicinity of and/or downstream or to the quality of waters of the state.
- (c) The variance is the least possible deviation that could be granted to comply with the intent of the Minimum Requirements detailed in the Stormwater Technical Notebook.

(2) The application for a variance shall include written documentation addressing the decision criteria above and written documentation addressing the following topics:

- (a) The current (pre-project) use of the site, and
- (b) How the application of Minimum Requirements restricts the proposed use of the site compared to restrictions that existed prior to adoption of the Minimum Requirements (October 1, 2004), and
- (c) The possible remaining uses of the site if the variance were not granted by the City, and
- (d) The uses of the site that would have been allowed prior to the City's adoption of Minimum Requirements, and
- (e) A comparison of the estimated amount and percentage of value loss resulting from meeting the Minimum Requirements, and
- (f) The feasibility to alter the project so that it meets the Minimum Requirements.

(3) The City shall prepare written findings of fact that address each of the six items above and that address the variance criteria. The City shall publish legal public notice of an application that requests a variance under this title and shall publish legal notice of the City's decision on the application. (Ord. 2596 § 2 (part), 2011; Ord. 2532 § 2 (part), 2010)

**15.24.090 Relief from general design standards.**

*Repealed by Ord. 2532. (Ord. 2218 § 1, 2004)*

**15.24.095 Wellhead Protection Zones 1 and 2 performance standards.**

In Wellhead Protection Zones 1 and 2, performance standards for the following uses or activities shall be implemented:

(1) Well Construction and Operation. The record and construction details of any well regulated under Chapter 173-160 WAC, Construction and Maintenance of Wells, and any well excluded per WAC 173-160-010(2) that is constructed or decommissioned in Zones 1 and 2 shall be provided to the Department of Public Works within 60 days of well completion or decommissioning.

(2) Fill Material. Fill material shall not contain concentrations of contaminants that exceed cleanup standards for soil specified in WAC 173-340-740, Model Toxics Control Act, regardless of whether all or part of the contamination is due to natural background levels at the fill source site. Where the detection limit (lower limit at which a chemical can be detected by a specified laboratory procedure) for a particular soil contaminant exceeds the cleanup standard for soil specified in WAC 173-340-740, the detection limit shall be the standard for fill material quality.

(a) Fill materials in quantities greater than 10 cubic yards placed directly on or in the ground in excess of six months shall meet the following requirements:

(i) A fill material source statement shall be provided to the Department of Public Works and shall be reviewed and accepted by the Department prior to stockpiling or grading imported fill materials at the site. The source statement shall be issued by a professional engineer, geologist, engineering geologist or hydrogeologist licensed in the State of Washington demonstrating the source's compliance with standards of the Model Toxics Control Act. The source statement shall be required for each different source location from which fill will be obtained.

(ii) Analytical results demonstrating that fill materials do not exceed cleanup standards specified in WAC 173-340-740 may be used in lieu of a fill material source statement, provided the regulated facility submits a sampling plan to, and which is approved by, the Director of Public Works. The regulated facility must then adhere to the approved sampling plan, and maintain analytical data on-site and available for inspection for a minimum of five years from the date that the fill was accepted.

(b) The Department of Public Works may accept a fill material source statement that does not include results of sampling and analysis of imported fill if it determines that adequate information is provided indicating that the source location is free of contamination. Such information may include, but is not limited to:

(i) Results of field testing of earth materials to be imported to the site with instruments capable of detecting the presence of contaminants; or

(ii) Results of previous sampling and analysis of earth materials to be imported to the site.

(c) A fill material source statement is not required if documents confirm that imported fill will be obtained from a Washington State Department of Transportation approved source.

(d) The Director of Public Works shall have the authority to require corrective measures regarding noncompliant fill materials, including independent sampling and analysis, if the property owner or operator fails to accomplish such measures in a timely manner. The property owner or operator shall be responsible for any costs incurred by the City in the conduct of such activities.

(3) Cathodic Protection Wells. Designs for cathodic protection wells shall be submitted to the City for review and approval prior to initiation of drilling. Cathodic protection wells shall be constructed such that the following do not occur:

(a) Vertical cross-connection of aquifers normally separated by confining units;

- (b) Migration of contaminated surface water along improperly sealed well borings or casings;
- (c) Introduction of electrolytes or related solutions into the subsurface; and
- (d) Any of the above conditions caused by improperly abandoned cathodic protection wells that are no longer in use.

(4) Underground Hydraulic Elevator Cylinders. All underground hydraulic elevator pressure cylinders shall be encased in an outer plastic casing constructed of Schedule 40 or thicker-wall polyethylene or polyvinyl chloride (PVC) pipe, or equivalent. The plastic casing shall be capped at the bottom, and all joints shall be solvent- or heat-welded to ensure water tightness. The neck of the plastic casing shall provide a means of inspection to monitor the annulus between the pressurized hydraulic elevator cylinder and the protective plastic casing. (Ord. 2532 § 2 (part), 2010; Ord. 2257 § 1, 2005)

#### **15.24.100 Enforcement – Authorization.**

The Director is authorized and directed to enforce all the provisions of this section. For such purpose, the Director may appoint officers, inspectors, assistants and other employees as needed from time to time. The Director may authorize such employees, as may be necessary, to carry out the duties and functions of that office. (Ord. 2532 § 2 (part), 2010; Ord. 2218 § 1, 2004)

#### **15.24.110 Inspection.**

The Director is authorized to make such inspections and take such actions as may be required to enforce the provisions of this chapter or whenever the Director has reasonable cause to believe that any land is being used in violation of this section. Inspections shall be made as follows:

(1) As a condition of any permit issued for activity covered by this chapter, the property owner shall be required to consent to entry upon the land by the Director at all reasonable times to inspect the same or to perform any duty imposed upon the Director by this section. If the land is occupied, the Director shall first present proper credentials and request entry. If the land is unoccupied, a reasonable effort shall be made to locate the owner or other persons at the site who are in apparent charge or control of the land and demand entry. If no person is located, the Director may enter said property and shall, with due diligence, make attempts to notify the owner, occupant, or other person having charge within a reasonable amount of time.

(2) Where the Director has reasonable grounds to believe that activities for which a permit is required by this chapter are being conducted without a permit on land within the City, the Director may seek to inspect the land and such activity. If the land is occupied, the Director shall first present proper credentials and request entry for inspection. If the land is unoccupied, a reasonable effort shall be made to locate the owner or other persons at the site in apparent charge or control of the land and request entry for inspection. If no person is located, or if entry is refused, the Director may request the assistance of the City Attorney,

City Prosecutor or Police Department regarding access. (Ord. 2532 § 2 (part), 2010: Ord. 2218 § 1, 2004)

**15.24.120 Stop work orders.**

(1) Whenever any activity is being done contrary to the provisions of this section, the Director may order the work stopped by notice verbally or in writing served on any persons engaged in the doing or causing such work to be done, and any such person shall forthwith stop such work until authorized by the Director to proceed with the work.

(2) The Director may suspend work on any project during periods of inclement weather to reduce actual or potential erosion and/or sedimentation. Such a period may involve days or weeks during storm events or may, at the discretion of the Director, involve the entire rainy season.

(3) The Director may order work stopped because of inadequate on-site erosion/sedimentation controls. In such cases, a revised and improved erosion/sediment control plan (including but not limited to addition of or additional phasing) shall be submitted to the City for review. Once approved, the Director shall lift the stop work order and work can continue. If the revised and improved erosion/sediment control plan is found to be inadequate and work is again ordered stopped, then the following shall be required:

(a) If it is the rainy season, work will be suspended until the end of the season (until April 30th, or later if weather conditions warrant, and work shall not continue beyond October 1st or earlier if weather conditions warrant).

(b) A revised plan shall be required to be submitted to the City Public Works Department. Once approved, work can continue between April 30th and October 1st.

(c) An on-site, full-time erosion control inspector (provided by developer) shall be required to monitor all work involving land disturbance. All costs for this inspector shall be paid by the contractor. The inspector shall provide weekly reports to the City regarding all clearing and grading work; monitor all erosion control features; and be a direct contact for the City inspectors. (Ord. 2532 § 2 (part), 2010: Ord. 2218 § 1, 2004)

**15.24.130 Suspension or revocation of permit.**

The Director may suspend or revoke a permit whenever the permit is issued on the basis of incorrect information supplied, approved plans are not accurately reflective of actual field conditions, or the work is being done contrary to, or in violation of, any pertinent ordinance, regulation, procedure or permit. Upon receipt of a timely appeal under Redmond Zoning Code Chapter 21.76, suspension or revocation shall be stayed pending decision on the appeal; provided, that such a stay shall not affect any stop work order issued by the Director. (Ord. 2596 § 2 (part), 2011: Ord. 2532 § 2 (part), 2010: Ord. 2218 § 1, 2004)

#### **15.24.140 Penalty for violation.**

All violations of this chapter, including hazards and failure to comply with terms of the clearing/grading permit and conditions, are determined to be detrimental to the public health, safety, and welfare and declared to be public nuisances. All such violations are also criminal gross misdemeanors and punishable as provided in RMC [1.01.110](#). All conditions that, after inspection, have been determined by the Director to render any site or portion thereof to be used or maintained in violation of the section, shall be abated. (Ord. 2532 § 2 (part), 2010; Ord. 2218 § 1, 2004)

#### **15.24.150 Restoration.**

Any work not done in compliance with this chapter or any permit issued pursuant thereto or with any other section of the Redmond Zoning Code may be required by the Director to be removed or restored to as near pre-project original condition as possible in the sole opinion of the Director. Such restoration may include, but shall not be limited to, the following:

- (1) Filling, stabilizing and landscaping with vegetation similar to that which was removed, cuts or fills;
- (2) Planting and maintenance of trees of a size that will reasonably assure survival and that replace functions and values of removed trees; and
- (3) Reseeding and landscaping with vegetation similar to that which was removed, in areas without significant trees where bare ground exists. (Ord. 2596 § 2 (part), 2011; Ord. 2532 § 2 (part), 2010; Ord. 2218 § 1, 2004)

#### **15.24.160 Notification of noncompliance.**

(1) If, while fulfilling their responsibility under this chapter, the inspector, the engineer, the soil engineer, the engineering geologist or the testing agency finds that the work is not being done in conformance with this chapter or the approved grading plans, the discrepancies shall be reported immediately in writing to the person in charge of the grading work and to the Director. Recommendations for corrective measures, if necessary, shall be submitted.

(2) The appropriate clearing, grading or stormwater management permit (see RMC [15.24.060](#)) shall be required regardless of any permit issued by any other department or agency that may be interested in certain aspects of the proposed work. Where work for which a permit is obtained by this chapter is started or proceeding before obtaining such a permit, the work shall be stopped, and the violator shall be subject to such penalties as provided in this chapter. However, the payment of such penalties shall not relieve any person from fully complying with the requirements of this chapter in the execution of the work nor any other penalties prescribed thereon.

(3) The Director may require that the approved activity, operations and project designs be modified if delays occur which incur weather-generated problems not apparent at the time the permit was issued. (Ord. 2532 § 2 (part), 2010; Ord. 2218 § 1, 2004)

#### **15.24.170 Penalties.**

Whenever any work for which a permit is required by this code has been commenced without first obtaining said permit, the work shall be stopped, and special investigation shall be made before a permit may be issued for such work. Work shall not commence during the investigation other than restoration, work on pollution control measures or stabilization approved by the Public Works Director. An investigation fee, in addition to the permit fee, shall be collected whether or not a permit is then or subsequently issued. The investigation fee shall be equal to the amount of the permit fee required by the code. The minimum investigation fee shall be the same as the minimum fee set forth in the standard clearing and grading fee for permit application. The payment of such investigation fee shall not exempt any person from compliance with all other provisions of this code nor from any penalty prescribed by law. (Ord. 2532 § 2 (part), 2010: Ord. 2218 § 1, 2004)

#### **15.24.180 Processing fees.**

Clearing and grading and stormwater management fees shall be determined by the Director, and upon approval by the City Council shall be made available to the public.

Before accepting a set of plans and specifications for checking, the Director shall collect a plan-checking fee. Separate permits and fees shall apply to retaining walls or major drainage structures as required by the Uniform Building Code. There shall be no separate charge for standard terrace drains and similar facilities. The amount of the plan-checking fee for clearing/grading plans shall be as set forth in the schedule of fees adopted pursuant to Redmond Zoning Code Chapter 21.76, Review Procedures. (Ord. 2596 § 2 (part), 2011: Ord. 2532 § 2 (part), 2010: Ord. 2218 § 1, 2004)

#### **15.24.190 Permit fees.**

A fee for each clearing, grading or stormwater management permit shall be paid to the Director as set forth in the fee schedule adopted pursuant to Redmond Zoning Code Chapter 21.76, Review Procedures.

Permits may be extended, before their expiration, for up to a total of one year. Inspection fees shall be paid before the start or extension of work and are required for the duration of the project. An additional fee may be charged for processing of a permit extension. (Ord. 2596 § 2 (part), 2011: Ord. 2532 § 2 (part), 2010: Ord. 2218 § 1, 2004)

#### **15.24.200 Inspection fees.**

A fee for each clearing, grading or stormwater management construction inspection shall be paid to the Director as set forth in the fee schedule adopted pursuant to Redmond Zoning Code Chapter 21.76, Review Procedures. (Ord. 2596 § 2 (part), 2011: Ord. 2532 § 2 (part), 2010: Ord. 2218 § 1, 2004)

**Appendix B**  
**General Application Form**

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**CITY OF REDMOND**

**GENERAL**

**APPLICATION FORM**

Clearing, Grading, and Stormwater Management

File No.

Type of Application

Date Received

Fee Paid

**GENERAL INFORMATION**

Name of Development

Area of Property (Acres/Sq. Ft.)

Name of Applicant

Address

City

State

Zip Code

Telephone

Description of Proposed Action

**FOLLOWING INFORMATION REQUIRED IF APPLICABLE**

Location of Subject Property

Legal Description (Attach additional pages if required)

Properties contiguous to hazardous liquid pipelines must provide Ticket Number from One Call Center:

**AUTHORIZATION TO FILE SIGNATURE OF ALL PERSONS WITH AN INTEREST IN THE PROPERTY**

Name

Name

Signature

Signature

Tax Lot and STR/Lot Subdivision

Tax Lot and STR/Lot Subdivision

City

State

City

State

\_\_\_ Owner \_\_\_ Contract Purchaser

\_\_\_ Owner \_\_\_ Contract Purchaser

\_\_\_ Option Purchaser\* \_\_\_\_\_ Option Expiration Date

\_\_\_ Option Purchaser\* \_\_\_\_\_ Option Expiration Date

\*Owners Signature also required

\*Owners Signature also required

**CERTIFICATION**

I certify that the information and exhibits herewith submitted are true and correct to the best of my knowledge and that I am to file this application and act on the behalf of the signatories of the above authorization.

Signature

Date

## **Appendix C Permit Review Fee Schedule**

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## APPENDIX C



### **Permit Review Fee Schedule**

The fee schedule is updated annually. Obtain a current copy from the Development Services Center or on the City website:

[www.redmond.gov/BusinessDevelopment/DeveloperServicesCenter/FeeSchedules/](http://www.redmond.gov/BusinessDevelopment/DeveloperServicesCenter/FeeSchedules/)

## **Appendix D Plan Review Checklist**

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**CITY OF REDMOND**  
**CLEARING, GRADING AND STORMWATER MANAGEMENT**  
**PLAN REVIEW CHECKLIST**

Project Name: \_\_\_\_\_ Submittal Dates: \_\_\_\_\_ Review Dates/Initials: \_\_\_\_\_

Tax Parcel / Plat # / CIP #: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

Engineer: \_\_\_\_\_ / \_\_\_\_\_

Contact: \_\_\_\_\_ / \_\_\_\_\_

Phone: \_\_\_\_\_ / \_\_\_\_\_

Review Notes: I = Incomplete / Incorrect / Must be Addressed  
 C = Complete/Correct  
 N = Non-Applicable  
 [ ] = Reference  
 \_\_/\_\_/\_\_ = 1<sup>st</sup>/2<sup>nd</sup>/3<sup>rd</sup> Review

**REDMOND MUNICIPAL CODE**

Plans shall conform to Redmond Municipal Code Chapter 15.24, and the Stormwater Technical Notebook. The general headings listed below must be addressed.

- \_\_\_/\_\_\_/\_\_\_ Erosion and Sediment Control
- \_\_\_/\_\_\_/\_\_\_ Conveyance Facilities
- \_\_\_/\_\_\_/\_\_\_ Water Quality Control
- \_\_\_/\_\_\_/\_\_\_ Onsite Stormwater Management
- \_\_\_/\_\_\_/\_\_\_ Water Quantity Control
- \_\_\_/\_\_\_/\_\_\_ Stabilization of Disturbed Areas
- \_\_\_/\_\_\_/\_\_\_ Protection of Adjacent Properties
- \_\_\_/\_\_\_/\_\_\_ Adequate Maintenance Provisions
- \_\_\_/\_\_\_/\_\_\_ Identification of Critical Areas and Associated Buffers
- \_\_\_/\_\_\_/\_\_\_ Identification of Easements
- \_\_\_/\_\_\_/\_\_\_ Accurate Description of Work Area
- \_\_\_/\_\_\_/\_\_\_ Control of Pollutants other than Sediment on Construction Sites
- \_\_\_/\_\_\_/\_\_\_ Source Control of Pollution
- \_\_\_/\_\_\_/\_\_\_ Controlling Off-Site Erosion
- \_\_\_/\_\_\_/\_\_\_ Other BMPs
- \_\_\_/\_\_\_/\_\_\_ Separate Public and Private Drainage
- \_\_\_/\_\_\_/\_\_\_ Limited Topographic Change
- \_\_\_/\_\_\_/\_\_\_ Tree Preservation Plan
- \_\_\_/\_\_\_/\_\_\_ Downstream Analysis

## **OTHER PERMITS / SPECIAL TOPICS**

- / /  Projects disturbing 1 acre or more obtain NPDES Construction Stormwater General Permit from Washington State Department of Ecology.
- / /  Projects seeking fee-in-lieu have submitted a proposal and obtained a letter of approval from Natural Resources.

## **DRAINAGE REPORT REQUIREMENTS**

- / /  Project Description [brief narrative description of the project activity and site]
- / /  Existing Site Information
  - / /  Detailed Topographic Map of site, including
    - / /  North Arrow
    - / /  Scale (larger engineering scale may be used as appropriate)
    - / /  Title Block
    - / /  Property Lines
    - / /  Existing contours
    - / /  Area (square feet or acres)
    - / /  Structures
    - / /  Roads
    - / /  Wells and Wellhead Protection Zone (1, 2, 3, 4)
    - / /  Septic Tanks
    - / /  Other underground facilities and utilities
    - / /  Perennial streams and other permanent watercourses
    - / /  Wetlands and buffers
    - / /  Easements
    - / /  Test pit sites
  - / /  Describe any wetlands on site
  - / /  Describe any threatened or endangered species habitats or related concerns
  - / /  Identify any existing TMDL Implementation Plan, Watershed Management Plan, or Wellhead Protection requirements that affects the project or site and how it does so.
  - / /  Larger scale drawing showing all basins that cause runoff to flow to or across site
  - / /  Larger scale drawing showing the downstream/down gradient drainage to the point of discharge to the receiving water body

## **DRAINAGE REPORT REQUIREMENTS (continued)**

- \_\_\_/\_\_\_/\_\_\_ Soils information – include geotechnical report
- \_\_\_/\_\_\_/\_\_\_ Site Layout Narrative and Map
  - \_\_\_/\_\_\_/\_\_\_ Provide a narrative and map that describes the preliminary development layout designed to minimize hydrology impacts. Based upon the analysis of existing site conditions, locate the buildings, roads, parking lots, and landscaping features for the proposed development. Consider the following points when laying out the site:
    - \_\_\_/\_\_\_/\_\_\_ Fit development to the terrain to minimize land disturbance; Confine construction activities to the least area necessary, and away from critical areas;
    - \_\_\_/\_\_\_/\_\_\_ Preserve areas with natural vegetation (especially forested areas) as much as possible;
    - \_\_\_/\_\_\_/\_\_\_ On sites with a mix of soil types, locate impervious areas over less permeable soil (e.g., till), and try to restrict development over more porous soils (e.g., outwash);
    - \_\_\_/\_\_\_/\_\_\_ Cluster buildings together;
    - \_\_\_/\_\_\_/\_\_\_ Minimize impervious areas; and
    - \_\_\_/\_\_\_/\_\_\_ Maintain and utilize the natural drainage patterns.

The development layout designed here will be used for determining threshold discharge areas, for calculating whether size thresholds under Minimum Requirements #6, #7, and #8 are exceeded (see Chapter 2), and for the drawings and maps required for the Stormwater Drainage Report.

### \_\_\_/\_\_\_/\_\_\_ Downstream Analysis (Qualitative and Quantitative, as applicable)

Redmond requires an offsite analysis, unless waived by the Stormwater Engineer for projects that add 5,000 square feet or more of new impervious surface, or that convert  $\frac{3}{4}$  acres of pervious surfaces to lawn or landscaped areas, or convert 2.5 acres of forested area to pasture.

### \_\_\_/\_\_\_/\_\_\_ Mapping

### \_\_\_/\_\_\_/\_\_\_ Calculations

### \_\_\_/\_\_\_/\_\_\_ Assumptions

For more information, see Section 2.6.2 of Volume I of the 2005 Ecology Manual.

## **DRAINAGE REPORT REQUIREMENTS (continued)**

   /    /    Permanent Stormwater Facilities

   /    /    *Highlighted* and annotate copy of flow charts used to determine applicable Minimum Requirements

   /    /    *Describe how each minimum requirement is being met.*

   /    /    *Source Control BMPs selected and documented (not applicable for single family residential).* Provide list of source controls selected.

Refer to Volume IV. If the project involves construction of areas or facilities to conduct any of the activities described in Section 2.2 of Volume IV, the “applicable” structural source control BMPs described in that section must be constructed as part of the project. In addition, if the specific business enterprise that will occupy the site is known, the “applicable” operational source control BMPs must also be described.

The project may have additional source control responsibilities as a result of areas specific pollution control plans established by Redmond Watershed Management Plan, when adopted.

   /    /    *Determine Threshold Discharge Areas for applicable minimum requirements for treatment, flow control, and wetland protection.* Take into account on-site stormwater management (minimum requirement 5) when determining applicable minimum requirements. Include in submittal the 4 step process described in Volume I, section 4.2, Step III of the 2005 Ecology Manual.

   /    /    *Identify Flow Control BMPs and facilities.* Document the 2 step process identified in Volume I, section 4.2, step IV, of the 2005 Ecology Manual. Flow control standard modifications specific to Redmond may be found in Section 2.5.7 of the Stormwater Technical Notebook.

   /    /    *Select Treatment Facilities.* Document the 6 step process identified in section 2.9.1.4 of the Stormwater Technical Notebook, which adds local requirements to Volume I, section 4.2, step V, of the 2005 Ecology Manual.

   /    /    Map showing developed site stormwater facilities layout

   /    /    Locations and sizes of on-site management, treatment, and detention BMPs and facilities

   /    /    Locations and sizes of conveyance systems

   /    /    Calculations for sizing of facilities

   /    /    Area Draining to SWM System, Bypass and Compensation Areas

## **DRAINAGE REPORT REQUIREMENTS (continued)**

- /  /   Offsite Areas Draining on Site - generally do not need to be controlled but, must be safely conveyed
  
- /  /   Detention Volume Computation - show volume required and volume provided - stage/storage curve must match proposed facility
- /  /   Output from WWHM (or equivalent model)
  - /  /   Report
  - /  /   Additional data not provided in report (for example, screen print of flow control facility sizing or an excel file containing stage/area/volume/ discharge/infiltration data for pond)
  - /  /   Digital copy of WWHM input
- /  /   Infiltration Sizing
  - /  /   Soil Permeability Tests or Gradation per DOE - two (2) tests minimum or one (1) for every 5000 s.f. of infiltration system bottom area. Test must end up being not more than 20' from the final location of the infiltration system.  
Note on plans - to be verified by field observation.
  - /  /   Soil Test - must be taken at the proposed bottom of infiltration system.
  - /  /   Excavation or Boring - is required in the trench area to a minimum depth of 4' below the proposed bottom of the trench. Infiltration not feasible if evidence of ground water or bedrock/hard pan.
  - /  /   Maximum Drainage Area
    - /  /   Down Spout Infiltration Systems - 5000 s.f.
    - /  /   Infiltration Basin - 50 acres
    - /  /   Infiltration Trench - 15 acres
- /  /   Conveyance Calculations
  - /  /   Storm Drain Computations - rational method may be used for pipe sizing.  
Include: "C" factor determination, time of concentration determination and flow calculations
  - /  /   Storm Drainage Table (include: inlet number, drainage area, rational method "C" factor and  $t_c$ .)
  
  - /  /   Hydraulic Grade Line Computations – hgl for 10 year must be 12-inches below overflow condition (allowances may be made near detention system or large bodies of water surcharge). 25 year = 6 inches below. 50 year = no overtopping.
  - /  /   Downstream Analysis - provide storm drain computations and hydraulic grade line computations for existing storm drainage systems which are being revised by changes to the drainage area or system expansion.
  - /  /   Safe 100-Year Flow Conveyance - the 100-year storm flow shall not impact any buildings (this is beyond traditional conveyance system).

## **DRAINAGE REPORT REQUIREMENTS (continued)**

\_\_\_/\_\_\_/\_\_\_ Information presented in the calculations is consistent with plan.

\_\_\_/\_\_\_/\_\_\_ Construction Stormwater Pollution Prevention Plan (SWPPP) [12 elements]

## **DRAWING FORMAT AND CONTENT**

\_\_\_/\_\_\_/\_\_\_ Construction Drawing Size - 22" x 34"

\_\_\_/\_\_\_/\_\_\_ Drawing Content - shall contain all information necessary to review the design and to construct the improvements.

\_\_\_/\_\_\_/\_\_\_ Title Block/Drawing Title

\_\_\_/\_\_\_/\_\_\_ Issue or Revision Date

\_\_\_/\_\_\_/\_\_\_ Section, Township, and Range

\_\_\_/\_\_\_/\_\_\_ Project Name & Phase

\_\_\_/\_\_\_/\_\_\_ Tax Parcel/Plat Number

\_\_\_/\_\_\_/\_\_\_ Legal Description

\_\_\_/\_\_\_/\_\_\_ Engineer Information - name, address, phone and contact

\_\_\_/\_\_\_/\_\_\_ Owner Information - name, address, phone and contact

\_\_\_/\_\_\_/\_\_\_ Vicinity Map - showing the general location of the project

\_\_\_/\_\_\_/\_\_\_ City Approval Block – (Private projects: must be on every sheet at lower right hand corner, Public projects: City Engineer signs cover sheet.)

\_\_\_/\_\_\_/\_\_\_ Horizontal Scale - 1"=20'

\_\_\_/\_\_\_/\_\_\_ Vertical Scale - 1"=5'

\_\_\_/\_\_\_/\_\_\_ Vertical Datum - minimum of two (2) C.O.R. datum must be shown

\_\_\_/\_\_\_/\_\_\_ Horizontal Datum - minimum of two (2) C.O.R. datum and NAD 83-91 coordinates on two (2) minimum points at exterior lot/boundary corners must be shown

\_\_\_/\_\_\_/\_\_\_ North Arrow & Scale Bar - shown in the upper left hand corner of the drawings

\_\_\_/\_\_\_/\_\_\_ Drawing Layout - shall be laid out to afford the maximum understanding possible

\_\_\_/\_\_\_/\_\_\_ Profiles of Storm Drainage Systems - required for public drainage systems and may be required for private systems where conflicts with other utilities are possible

\_\_\_/\_\_\_/\_\_\_ Profile Information - include existing and proposed grade, all utility crossings and crossings clearances, pipe slope, pipe size, pipe length, pipe material, manhole depths, inverts, etc.

\_\_\_/\_\_\_/\_\_\_ Plan View Information - shall indicate and identify all existing and proposed features, utilities, street improvements and paving, and other features that will affect the design and construction of the site grading and the drainage system.

\_\_\_/\_\_\_/\_\_\_ Engineer Stamp and Signed and Dated Consistently with Issued or Revised Date - drawings shall be stamped before submittal and review by the City.

\_\_\_/\_\_\_/\_\_\_ Legend - identify line types and symbols used

\_\_\_/\_\_\_/\_\_\_ Property Data - shall include property lines with bearings and distances, right-of-way lines, parcel numbers, lot numbers, plat names, and street names.

## **DRAWING FORMAT AND CONTENT (continued)**

- /  /   Phased Project Drawings - depict all construction necessary to complete the phase (each phase shall be independently approved).
- /  /   Standard Notes found in Appendix of the Stormwater Notebook
- /  /   Identify source and dates of survey information used in design.

## **SITE PLAN (All Proposed Information must be Distinguishable from Existing Information)**

- /  /   Property Lines - including bearings and distances
- /  /   Right of Way - including bearings and distances
- /  /   Lot Numbers
- /  /   Site Area - shown in s.f. and acres
- /  /   Streets - edge of pavement or curb and sidewalk, centerline, and name shown
- /  /   Contours - (dashed lines for existing and solid lines for proposed) 1' or 2' interval (slopes 40% or greater may be shown with 5 foot contours)
- /  /   Onsite Features - easements, buffers, +40% slopes, etc.
- /  /   Offsite Information - all features within offsite areas that drain onsite, and all information within 20' of all property lines
- /  /   Utilities (water, sewer, telephone, cable television, gas, power, wells, etc.)
- /  /   All Utilities Easements Shown with Dimensions Labeled
- /  /   Setbacks
  - /  /   Building
  - /  /   Steep Slope (in accordance with geotechnical recommendations)
  - /  /   Other
- /  /   Parcel Information – Area (s.f.), existing, new, and proposed impervious area, and water quality and quantity design storms

## **CLEARING AND GRADING**

- /  /   Fully Identify Work - clearing and grading limits shown, with stockpile/staging areas and sequence of construction
- /  /   Disturbed Area - in acres must be shown on the clearing and grading plans
- /  /   Limits of Clearing - fenced with 42" orange safety fence or approved filter fence
- /  /   Trees to Remain - shall be shown with the dripline designated (must have protective fencing at five feet (5') beyond the dripline if adjacent to cleared areas) - no grading or filling permitted within the dripline. Show pertinent information within 50' of clearing.
- /  /   Buffers of Critical Areas
- /  /   Steep Slope Setback
- /  /   Grades - show existing and proposed contours

## **CLEARING AND GRADING (continued)**

- /  /   Cut/Fill - shall not exceed 8'
- /  /   Stabilization of Disturbed Areas
- /  /   Stockpile location and ground slopes
- /  /   Estimate of Earthwork Quantities

## **TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- /  /   Timing and Stabilization of Sediment Trapping Measures
- /  /   Silt Fence [COR Std 502] (no straw bale permitted - must use silt fence)
- /  /   Construction Entrance [COR Std 503]
- /  /   Clean Water Diversion - areas onsite and offsite that are not disturbed must be diverted away from disturbed areas.
- /  /   Dewatering Construction Sites – show sediment traps
- /  /   Stabilization of Temporary Conveyance Channels and Outlets – no erosion for 10-year/24-hour storm
- /  /   Storm Drain Inlet Protection – inlet protection must be provided for all storm drain inlets within the construction vicinity
- /  /   Temporary Swales and/or Trenches - show shape, dimensions, spot elevations every 50', drainage area, channel stabilization treatment type and computations of flow and velocity (cannot exceed 4 fps without rip-rap lining) [COR Std 504].
- /  /   Check Dams - show detail, dimensions and quantity of rock protection. No straw bales allowed.
- /  /   Temporary Culverts - show drainage area, 1' minimum cover, type of pipe, length and diameter, and slope.
- /  /   Temporary Sediment Pond(s) - show size, bottom elevation, top elevation, cleanout elevation, outlet protection, drainage area, volume required, volume provided, cross-section through the dam, profile through the pond, spillway and consistent with calculations. Not allowed near future infiltration sites.
- /  /   Rip-rap Outlet Protection - show size of stone, quantity and stabilization fabric under stone [COR Std 620].
- /  /   Maximum open trench length = 300'
- /  /   TESC performance bond posted (Rough Grade Permit only)
- /  /   Construction Access Routes
- /  /   Note concerning Removal of Temporary BMPs upon completion of project
- /  /   Preservation of Natural Drainage Systems
- /  /   Sequence of Construction - describe how construction will proceed in order to limit erosion, include phasing if appropriate.
- /  /   Remove all TESC measures following final site stabilization.

## **STORMWATER PLAN**

- /  /   Minimum Pipe Size - 12” minimum for public storm drain systems and 6” minimum for private systems.
- /  /   Pipe Data - pipe size, length, slope, and material labeled
- /  /   Horizontal Clearance - 5’ from all other utilities and structures, and 8’ from trees (street trees may be 3’ minimum with root barrier).
- /  /   Vertical Clearance - 1’ from other utilities - 18” for sewer with storm above sewer
- /  /   Design Slope - 0.25% minimum and 20% maximum
- /  /   Rockeries/Retaining Walls - shall not cross or be near storm drain pipes. Exceptions shall only be approved where no alternatives exist. Any crossing of a wall shall be perpendicular to the wall and special construction techniques including steel casings may be required. No rockeries allowed over roof or footing drains
- /  /   Structure Data - structure number, structure type and/or size, type of cover, rim elevation, and all pipe inverts labeled
- /  /   Structure Spacing – 300’ typical, varies by size of pipe.
- /  /   Easements – shown with dimensions labeled - 20’ minimum width - no obstructions allowed in easements
- /  /   Drains Behind Sidewalk - required in all cut situations and at the base of slopes
- /  /   Cleanouts Spacing - to be at bends, end of lines and at 100’ o.c. (required in all cut situations and at the base of slopes)
- /  /   Cleanouts Specifications - shall be specified with Carson boxes or equal with ungasketed caps in soft area and traffic bearing in paved areas [COR Std 621].
- /  /   Footing/Foundation Drains - including pipe size, material, and cleanouts shall be connected to the storm drain system (shown as stubbed to lots only for plats).
- /  /   Roof Drains - including pipe size, material, and cleanouts shall be connected to the stormdrain system (shown as stubbed to lots only for plats) 6” minimum. Maximum of three roof drain stubs are allowed to be connected per collection pipe.
- /  /   Footing/Foundation Drains and Roof Drains - shall be connected at a structure only (private onsite structure or at the street).
- /  /   3’ Paved Area - around roof drain cleanout or catch basin Type 1A required
- /  /   Outfall Protection - sized for 10-year storm (unless otherwise specified by Development Services Division); provide: type, size dimensions and quantity of stone. Stone must be laid on approved filter fabric. Maximum allowable discharge velocity to rock outlet is 10 fps without special design [COR Std 620].
- /  /   In control structures, hoods for risers over 15” in diameter shall have an annular space equal to the riser pipe flow area.   /  /

## **STORMWATER PROFILES (Required for Public System)**

- /  /   Profile - pipes and structures
- /  /   Other Utilities - labeled and designate size and type
- /  /   Profile grades - show and label existing and proposed grades
- /  /   Pipe Cover - 18" minimum
- /  /   Pipe Profile Information - show invert and top of pipe, pipe size, pipe material, and design slope.
- /  /   Drop structures only allowed per approval of Stormwater Engineer
- /  /   Grates: through-curb inlets at sag curves, possible bypass points and every third inlet; Vaned Grates for public system and private, unless otherwise specified by the Stormwater Engineer.
- /  /   Lids: solid round lids for all travel lanes (existing rectangular grates being retrofitted with solid lids in traffic lanes can be retrofitted with round lids). – Solid rectangular lids may be used in non-traffic lanes or landscaped areas where inlets are not required.
- /  /   Utility Crossings - all crossings must be shown, label utility type, line size, invert of utility and storm lines and clearance between pipes (1' minimum vertical clearance and 30 degrees minimum crossing angle).
- /  /   Structure Profile Information - label type of structure, structure number, size, and pipe inverts
- /  /   Berm Section - in accordance with geotechnical recommendation for open ponds
- /  /   Public Storm Structure – with 4' or greater from the top to the invert must be Type II catch basin - 5' for private structure - see Standard detail 608
- /  /   Type III catch basin required for structures with bottoms between 12' and 25'. See Standard Detail 615.

## **STORMWATER QUALITY TREATMENT AND FLOW CONTROL FACILITIES**

### **Wetpond / Detention Pond**

- /  /   Setbacks - 10' minimum away from structure and ROW, and 50' minimum away from steep slope (15% or greater)
- /  /   Length/Width Ratio - minimum of 3.0 (preferred)
- /  /   Interior Slope - maximum of 3H:1V. A 2:1 slope below water surface OK where no geotechnical liner is used and pool depth is under 4'.
- /  /   Pond fencing is required where walls or slopes steeper than 3:1 are designed.
- /  /   Permanent Pool - minimum of 6-month/24-hour basin runoff volume.
- /  /   Live Storage - maximum of 50-year/24-hour release.
- /  /   Berm Embankment - maximum of 6' high (preferred)
- /  /   Toe of Embankment - minimum of 55' from ROW.
- /  /   Pond permanent pool depth under 8'
- /  /   Multi-Celled - minimum of 2 cell (preferred)
- /  /   Emergency Overflow - for open pond, shall be completely separated from pond outlet.
- /  /   5' wide safety bench set at or 1' below the permanent water surface elevation around perimeter of pond. Plant bench with wetland planting.

**STORMWATER QUALITY TREATMENT AND FLOW CONTROL FACILITIES (continued)**

- Trees must be setback from the 50-year storm stage. Maintenance access to the pond must be unhindered by trees.
- Natural shape preferred
- Maintenance access - a Vactor truck shall be able to access the control structure, a backhoe shall be able to access the pond bank.
- Inflow pipes to the pond discharge at or above the control elevation. (Stormwater Engineer may approve submerged inflow).
- Ponds lined or over impermeable soil in WPZ 1, 2, 3

**Underground Detention**

- Controlling Orifice Computation - plans and computation must match
- Control Structure - designed and detailed (plan view and cross section required) shall conform to COR Std 610 or equivalent.
- Profile of Detention Pipe or Vault
- Structural Details and Vault Calculations (separate building division review and permit required)
- Inverts - show for all pipes entering and leaving control structure or vault
- Vent - minimum 2" diameter for pipe detention systems, 12" diameter for vaults
- Maintenance Vehicle Access - required to both ends of detention pipes and two (2) accesses to vaults (one near control structure)
- Maintenance access road provided with drivable surface to control structure
- Maximum Distance between Detention System Access Points - 100' and ladder access must be provided at all ends.
- Easement - 5' minimum around all public detention systems (20' min. width)
- Minimum 10-foot setback from structures, property lines, and right-of-way, or minimum distance to allow construction of a 1:1 slope to the bottom of the facility, whichever is greater.
- Fire Hydrant - within 100 feet of detention pipe systems 4' in diameter or larger, and for all vault systems over 1000 cubic feet of total volume may be required.
- Tank Note- "Detention tanks may be air tested before final acceptance".

**Infiltration**

- Wellhead Protection Zone noted and accommodated.
- If UIC is part of design, then UIC is registered with Ecology.
- Soil Permeability Tests or Gradation per DOE - two (2) tests minimum or one (1) for every 5000 s.f. of infiltration system bottom area. Test must end up being not more than 20' from the final location of the infiltration system. Note on plans - to be verified by field observation.
- Soil Test - must be taken at the proposed bottom of infiltration system.
- Excavation or Boring - is required in the trench area to a minimum depth of 4' below the proposed bottom of the trench. Infiltration not feasible if evidence of ground water or bedrock/hard pan.

**STORMWATER QUALITY TREATMENT AND FLOW CONTROL FACILITIES (continued)**

- /  /   Infiltration Bed - all infiltration system should be a minimum of 5' above the seasonal high water mark, bedrock, hardpan and impermeable layer. May be reduced to 3' with mounding analysis.
- /  /   Setbacks
  - /    /     Minimum 200' from drinking water wells and springs, septic tanks and drain fields
  - /    /     Minimum 20' down slope and 100' up slope of building foundations
  - /    /     Minimum 10' from NGPE and property line
- /  /   Down Spout Infiltration System - shall be designed with overall project for typical lot with individual homes.
- /  /   Maximum Drainage Area
  - /    /     Down Spout Infiltration Systems - 5000 s.f.
  - /    /     Infiltration Basin - 50 acres
  - /    /     Infiltration Trench - 15 acres
- /  /   Infiltration System Location - may not be located in an area previously used as a sediment trap.
- /  /   Inflow to an Infiltration System - must first pass through a pre-settling BMP or a biofilter. Disturbed areas shall not drain to the infiltration system.
- /  /   Add the following note to the plan: "The contractor shall construct infiltration systems only after the entire area draining to it has been stabilized".
- /  /   Filter fabric is required on all sides, top and bottom of infiltration trenches.
- /  /   Maximum Trench Length - 100'
- /  /   Observation Well - one is required per trench
- /  /   Provisions for the 100-year overflow path required.
- /  /   Maximum Ponding - in an open infiltration basins is 3' for the maximum storm entering the basin (not to exceed the 100 year - this includes headwater to pass storm flow out any overflow) 1' of freeboard is required to the top of the structure.
- /  /   Basins Side Slopes - shall not exceed 3:1
- /  /   Infiltration Basin Berm - must use impervious material for berm and the berm must be 2' wide at the top for each foot in height as measured from the ponding area bottom.

**Biofiltration**

- /  /   Required Length - 200' minimum (may be reduced to 150' for redevelopment projects only).
- /  /   High flow bypass required unless otherwise designated.
- /  /   Maximum Velocity - 1 fps for the design storm. 3 fps for stability
- /  /   Swale Slope - For slope greater than 2.5%, check dams must be provided.
- /  /   Swale bottom width – Maximum 8 feet
- /  /   Setbacks - no buildings or trees within 8' of the normal high water.

**STORMWATER QUALITY TREATMENT AND FLOW CONTROL FACILITIES (continued)**

- /    /    Maintenance Access – A backhoe must be able to access at least one side of each biofiltration swale.
- /    /    Easement - public systems shall be in tracts, or easements, unless approved during site review.
- /    /    Cross Section - show dimensions, design flow depth and 1' minimum freeboard
- /    /    Vegetation Specifications - shall provide for water tolerant plants and shall address shading of vegetation. Biofilter planting shall be shown on the civil drawings and subject to approval from the Construction Division.
- /    /    Swales/Trenches - including, grading, slope, spot elevations (a minimum of every 50' and at both ends), bottom width, side slopes, and lining.
- /    /    Biofiltration swales lined or over impermeable soil in WPZ 1,2,3
- /    /    Setback from biofiltration swale top of bank to property line shall be a minimum of 5'.

**LOW IMPACT DEVELOPMENT SITE ASSESSMENT**

- /    /    Survey
- /    /    Soils report
- /    /    Land cover assessment
- /    /    Streams, wetlands, buffers
- /    /    Flood hazard areas
- /    /    Drainage Report
- /    /    Compost Amended Soil or Protection of Undisturbed soils
- /    /    LID BMPs to be used \_\_\_\_\_
- /    /    Credits used in modeling \_\_\_\_\_

**OPERATIONS AND MAINTENANCE**

- /    /    O&M Manual per Section 2.5.9 of the Technical Notebook
- /    /    Provisions for long term maintenance noted on plat
- /    /    Concrete inlets or channelized catch basins may be installed only where downstream catch basins are available to collect sediment. They should be used where sump maintenance would be difficult.
- /    /    Maintenance access to all catch basins and drainage structures has been provided. Extreme cases may be waived by the Stormwater Engineer.
- /    /    Roof drain stubs should cross sidewalk at close to a 90 degree angle.
- /    /    A maximum of three (3) single family houses may share a common roof drain stub.

**ADDITIONAL COMMENTS**

1. \_\_\_\_\_
2. \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Appendix E**  
**Flood Control Zone Application Form**

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**FLOOD CONTROL ZONE**  
**APPLICATION**

**APPLICANT:**

Name: \_\_\_\_\_  
Company: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_

**OWNER (if different from applicant):**

Name: \_\_\_\_\_  
Company: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_

**PROJECT IDENTIFICATION AND SCHEDULE:**

Type of Work: \_\_\_\_\_ Construct \_\_\_\_\_ Reconstruct \_\_\_\_\_ Modify  
Project Description \_\_\_\_\_  
Project Name \_\_\_\_\_  
Construction to commence on \_\_\_\_\_  
and to be completed by \_\_\_\_\_  
Permit if sought for period \_\_\_\_\_

**PROJECT LOCATION:**

Tax parcel number \_\_\_\_\_  
Project address \_\_\_\_\_  
Located in \_\_\_\_\_ ¼ Section \_\_\_ T \_\_\_ R \_\_\_ E (WM)  
Within the flood plain of \_\_\_\_\_  
(Body of water)

**APPLICANT'S SIGNATURE**

Applicant, by signature following, hereby applies for a Flood Control Zone Permit and stipulates that information provided is correct to the best of applicant's knowledge:

\_\_\_\_\_ Date \_\_\_\_\_

\_\_\_\_\_ Print \_\_\_\_\_

**PERMIT:** This document grants permission under provision of Chapter 86.16 RCW when and only when signed below and is subject to all conditions noted:

**Minimum Finished Elevation shall be \_\_\_\_\_ NGVD, 1929**

Permit Granted

\_\_\_\_\_ Date \_\_\_\_\_  
City of Redmond Flood Control  
Zone Administration

**Permit and Conditions:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Acknowledged \_\_\_\_\_ Date \_\_\_\_\_

Print \_\_\_\_\_

**Appendix F**  
**Bill of Sale and Instructions Form**

---



**PUBLIC UTILITY & STORMWATER FACILITIES**  
**BILL OF SALE FORM**  
**INSTRUCTIONS**

**PURPOSE:**

To transfer ownership of a newly constructed public utility and/or stormwater system and appurtenances that have been newly constructed as part of the following project to the City of Redmond.

The project name, as shown on official City approvals is:

---

**PROPERTY DESCRIPTION:**

All constructed stormwater conveyance systems and appurtenances constructed as part of the subject project that: (1) are located in City Rights-of-Way; and (2) any stormwater conveyance systems and appurtenances not in City Rights-of-Way that: (a) have been specifically approved for acceptance by the City in writing and (b) are contained within approved easements granted to the City.

**SIGNATURE**

*The Bill of Sale shall be signed by the party who paid for the system improvements. Signature shall be notarized. The notary space for individuals or corporations as appropriate.*

**QUESTIONS:**

*If you have any questions about how to complete the form, please contact the Public Works Development Services Division at (425)556-2760.*



## BILL OF SALE

FOR VALUABLE CONSIDERATION, receipt of which is hereby acknowledged, the undersigned hereby conveys, bargains and sells and transfers to the City of Redmond, hereinafter referred to as the "City", all its present and future right, title and any interest in and to all of the following property:

to have and hold the same for itself, its successors and assigned forever, free of all liens and encumbrances, or interest of third parties.

The undersigned, on behalf of itself and its successors, and assigns covenants and agrees that the undersigned is the owner of said property and has good right and authority to sell the same and that it will, and does, hereby warrant title to said property and agrees to defend and hold harmless the City, its successors and assigns, against all and every person or persons whomsoever lawfully claiming any right, title, or interest in or to the same.

The undersigned warrants that the above-described property is in good operating condition and repair; that the undersigned has not received any citation or warning to the effect that these assets do not comply with all governmental laws or regulations; and further covenants and agrees with the City to replace, repair and correct any defect in work or materials in respect to the personal property subject to this Bill of Sale arising during a period of one (1) year from the date of Acceptance by Public Works Development Services Division, without cost to the City.



**Appendix G**  
**Developer Extension Asset Summary Form**

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**DEVELOPMENT SERVICES DIVISION  
DEVELOPER EXTENSION ASSET SUMMARY**

**Project Name:** \_\_\_\_\_

**Developer:** \_\_\_\_\_

**Contractor:** \_\_\_\_\_

\*\*\*\*\*

**WATER SYSTEM CONSTRUCTION COSTS**

Land \$ \_\_\_\_\_  
 Storage \$ \_\_\_\_\_  
 Pump Station \$ \_\_\_\_\_  
 Pressure Reducing Valve \$ \_\_\_\_\_

Water Mains and Appurtenances:

Main Size:	4"	6"	8"	12"	16"	Other ( )
Length:						
Type:						
Lineal Ft \$:						
Main Cost:						

Water Mains and Appurtenances Total \$ \_\_\_\_\_  
 Service Lines (Line, Meter Box / Vault, Meter Setter) \$ \_\_\_\_\_  
 Meter Size \_\_\_\_\_ Qty \_\_\_\_\_ \$ \_\_\_\_\_  
 Hydrant Q \_\_\_\_\_ ty \_\_\_\_\_ \$ \_\_\_\_\_

**Water Total** \$ \_\_\_\_\_

\*\*\*\*\*

**SEWER SYSTEM CONSTRUCTION COSTS**

Pump Station \$ \_\_\_\_\_  
 Side Sewer (Within Right of Way) Qty \_\_\_\_\_ \$ \_\_\_\_\_  
 Manholes Q \_\_\_\_\_ ty \_\_\_\_\_ \$ \_\_\_\_\_

Sewer Mains and Appurtenances:

Main Size:	8"	8"	10"	10"	12"	Other ( )
Length:						
Type:	PVC	DI	PVC DI			
Lineal Ft \$:						
Main Cost:						

Sewer Mains and Appurtenances Total \$ \_\_\_\_\_

**Sewer Total** \$ \_\_\_\_\_

**(Combined Water/Sewer) Project Total** \$ \_\_\_\_\_

\*\*\*\*\*

**PUBLIC STORMWATER SYSTEM CONSTRUCTION COSTS**

Land \$ \_\_\_\_\_  
Pond / Vault / Tank Construction \$ \_\_\_\_\_  
Pipe Storage Size \_\_\_\_\_ & Length \_\_\_\_\_ \$ \_\_\_\_\_  
Water Quality Type \_\_\_\_\_ \$ \_\_\_\_\_

Stormwater Mains and Appurtenances:

Main Size:	8"	12"	18"	24"	36"	Other ( )
Length:						
Type:						
Lineal Ft \$:						
Main Cost:						

Stormwater Mains and Appurtenances Total \$ \_\_\_\_\_

**Stormwater Total \$ \_\_\_\_\_**

\*\*\*\*\*

**NOTES:**

1. Include total cost of improvements including sales tax, engineering and administration.
2. As a separate instrument, a Bill of Sale has been provided for the above improvements.

\*\*\*\*\*



**Appendix H**  
**Typical Drainage Easement**

---

Please Return To:  
**City of Redmond**  
**Public Works Adm. MS: 4NPW**  
**Attn: D. Wilson**  
**P.O. Box 97010**  
**Redmond, WA 98073-9710**

**WASHINGTON STATE COUNTY AUDITOR/RECORDER INDEXING FORM**

<b>Document Title(s) (or transactions contained therein):</b>  <b>EASEMENT</b>	
<b>Reference Number(s) of Documents assigned or released:</b> Additional reference numbers on page ____ of document	
<b>Grantor(s): (Last name first, then first name and initials)</b> 1.  <input type="checkbox"/> Additional names on page __ of document	
<b>Grantee(s): (Last name first, then first name and initials)</b> 1. <b>REDMOND, CITY OF</b>  <input type="checkbox"/> Additional names on page __ of document	
<b>Legal Description: (abbreviated form i.e. lot, block, plat name, section-township-range)</b>  <b>Ptn</b>  <input type="checkbox"/> Additional legal on <b>Exhibit "A"</b> of document	
<b>Assessor's Property Tax Parcel Account Number(s):</b>	
<b>City of Redmond Reference:</b>  Project Number: _____ Permit Number: _____	
<i>The Auditor/Recorder will rely on the information provided on the form. The staff will not read the document to verify the accuracy or completeness of the indexing information provided herein.</i>	

**EASEMENT**

**THE GRANTOR(S)**, \_\_\_\_\_, a \_\_\_\_\_, for Ten and no/100 Dollars (\$10.00) or other valuable consideration, in hand paid, receipt of which is hereby acknowledged, conveys and grants to **CITY OF REDMOND** (Grantee), its successors and assigns, a permanent non-exclusive easement, over, under, in, along, across and upon, that certain land legally described as:

Exhibit "A", attached hereto and incorporated herein by reference,

and graphically depicted on Exhibit "B", for the purpose of constructing, reconstruction, installing, repairing, replacing, operating and maintaining a public storm drain system, with ordinary and necessary appurtenances, together with the right of ingress and egress thereto without prior institution of any suit or proceedings of law and without incurring any legal obligation or liability therefore. This easement is granted subject to the following terms and conditions:

1. The Grantee shall, upon completion of any work within the property covered by the easement, restore the surface of the easement, and any private improvements disturbed or destroyed during execution of the work, as nearly as practicable to the condition they were in immediately before commencement of the work or entry by the Grantee.
  
2. Grantor shall retain the right to use the surface of the easement as long as such use does not interfere with the easement rights granted to the Grantee. Grantor shall not, however, have the right to:
  - (a) Erect or maintain any building or structures within the easement; or
  - (b) Plant trees, shrubs or vegetation having deep root patterns which may cause damage to or interfere with the utilities to be placed within the easement by the Grantee; or
  - (c) Develop, landscape, or beautify the easement area in any way which would unreasonably increase the cost to the Grantee of restoring the easement area and any private improvements therein.

This easement shall be recorded with the King County Recorder, shall run with the land described herein, and shall be binding upon the parties, their heirs, successors in interest and assigns.

Grantor covenants that he is the lawful owner of the above-described property and has authority to convey such easement.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_

Grantor:



**EXHIBIT "A"**

EASEMENT  
KING COUNTY TAX ID #

**EXHIBIT "B"**

Map

## **Appendix I Standard Notes**

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## **STANDARD NOTES**

### **CLEARING, GRADING AND TEMPORARY EROSION CONTROL PLANS**

1. All work and materials to be per City of Redmond Standards.
2. Keep off-site streets clean at all times. Flushing streets shall not be allowed. All streets should be swept.
3. Additional erosion/sediment control measures may be required by City Inspector.
4. When work is stopped/completed in an area, the City Inspector may require post-construction erosion control including seeding or other measures.
5. Locations shown of existing utilities are approximate. It shall be the responsibility of the contractor to verify the correct locations to avoid damage or disturbance.
6. It shall be the responsibility of the contractor to obtain street use and other related permits prior to any construction.
7. All ground cover is to remain undisturbed outside of clearing areas.
8. The temporary erosion/sediment controls shall be installed, inspected, and operating before any grading or extensive land clearing. These controls must be satisfactorily maintained until construction and landscaping are complete.
9. Tie impervious surfaces (roof, streets, driveways, etc.) to completed drainage system as soon as possible.
10. A Pre-Construction Meeting with the Construction Division and all permits must be completed before start of construction.
11. Clearing limits shall be located by a licensed Civil Engineer or Land Surveyor.
12. Approval of this temporary erosion/sedimentation control (TESC) plan does not constitute an approval of permanent road or drainage design.
13. This approval for TESC is valid for construction between May 1 and September 30. This approval for TESC is not valid for the rainy season (October 1 through April 30).
14. Remove all TESC measures once all work is completed and site is permanently stabilized.

**Appendix J**  
**Standard Sign for Stormwater Pond**

---

# Stormwater Pond

## This pond is in our care.

Runoff is held here after storms. It is released slowly or stored until the next storm when it is replaced by incoming flows. This helps prevent downstream flooding and erosion and helps clean the water. This facility is lined to protect groundwater.



For more information or to report littering, vandalism, or other problems, call the Natural Resources Division at 425-556-2825.

**Welcome Pond**



**Large Lined Public Pond**

# Stormwater Pond

## This pond is in our care.

Runoff is held here after storms. It is released slowly or stored until the next storm when it is replaced by incoming flows. This helps prevent downstream flooding and erosion and helps clean the water. This facility is lined to protect groundwater.

**PRIVATE  
POND**

This pond is privately  
owned and maintained.

For more information or to report littering, vandalism, or other problems, call the Natural Resources Division at 425-556-2825.

**Welcome Pond**



**Large Lined Private Pond**

# Stormwater Pond

## This pond is in our care.

Runoff is held here after storms. It is released slowly or stored until the next storm when it is replaced by incoming flows. This helps prevent downstream flooding and erosion and helps clean the water. Stormwater from this facility infiltrates into the ground.



For more information or to report littering, vandalism, or other problems, call the Natural Resources Division at 425-556-2825.

**Welcome Pond**



**Large Unlined Public Pond**

# Stormwater Pond

## This pond is in our care.

Runoff is held here after storms. It is released slowly or stored until the next storm when it is replaced by incoming flows. This helps prevent downstream flooding and erosion and helps clean the water. Stormwater from this facility infiltrates into the ground.

**PRIVATE  
POND**

This pond is privately  
owned and maintained.

For more information or to report littering, vandalism, or other problems, call the Natural Resources Division at 425-556-2825.

**Welcome Pond**



**Large Unlined Private Pond**

# Stormwater Pond

## This pond is in our care.

Runoff is held here after storms. It is released slowly or stored until the next storm when it is replaced by incoming flows. This helps prevent downstream flooding and erosion and helps clean the water. This facility is lined to protect groundwater.

For more information or to report littering, vandalism, or other problems, call the Natural Resources Division at 425-556-2825.

### Welcome Pond



## Small Lined Public Pond

# Stormwater Pond

## This pond is in our care.

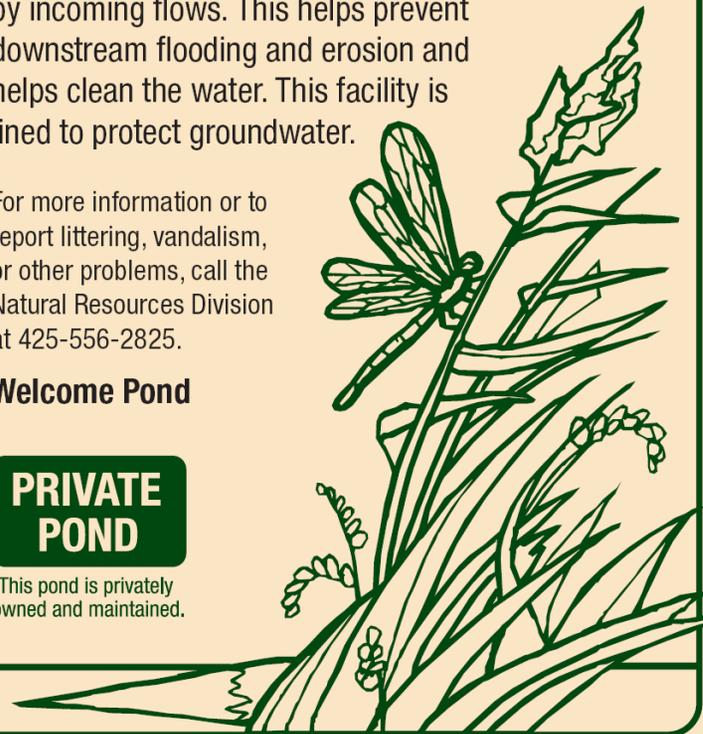
Runoff is held here after storms. It is released slowly or stored until the next storm when it is replaced by incoming flows. This helps prevent downstream flooding and erosion and helps clean the water. This facility is lined to protect groundwater.

For more information or to report littering, vandalism, or other problems, call the Natural Resources Division at 425-556-2825.

### Welcome Pond

**PRIVATE  
POND**

This pond is privately owned and maintained.



**Small Lined Private Pond**

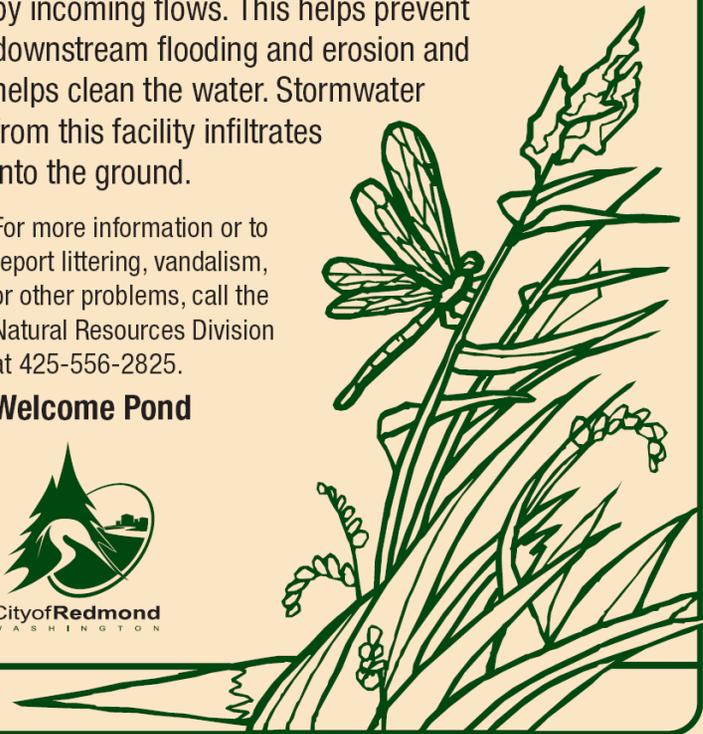
# Stormwater Pond

## This pond is in our care.

Runoff is held here after storms. It is released slowly or stored until the next storm when it is replaced by incoming flows. This helps prevent downstream flooding and erosion and helps clean the water. Stormwater from this facility infiltrates into the ground.

For more information or to report littering, vandalism, or other problems, call the Natural Resources Division at 425-556-2825.

### Welcome Pond



## Small Unlined Public Pond

# Stormwater Pond

## This pond is in our care.

Runoff is held here after storms. It is released slowly or stored until the next storm when it is replaced by incoming flows. This helps prevent downstream flooding and erosion and helps clean the water. Stormwater from this facility infiltrates into the ground.

For more information or to report littering, vandalism, or other problems, call the Natural Resources Division at 425-556-2825.

### Welcome Pond

**PRIVATE  
POND**

This pond is privately owned and maintained.



**Small Unlined Private Pond**

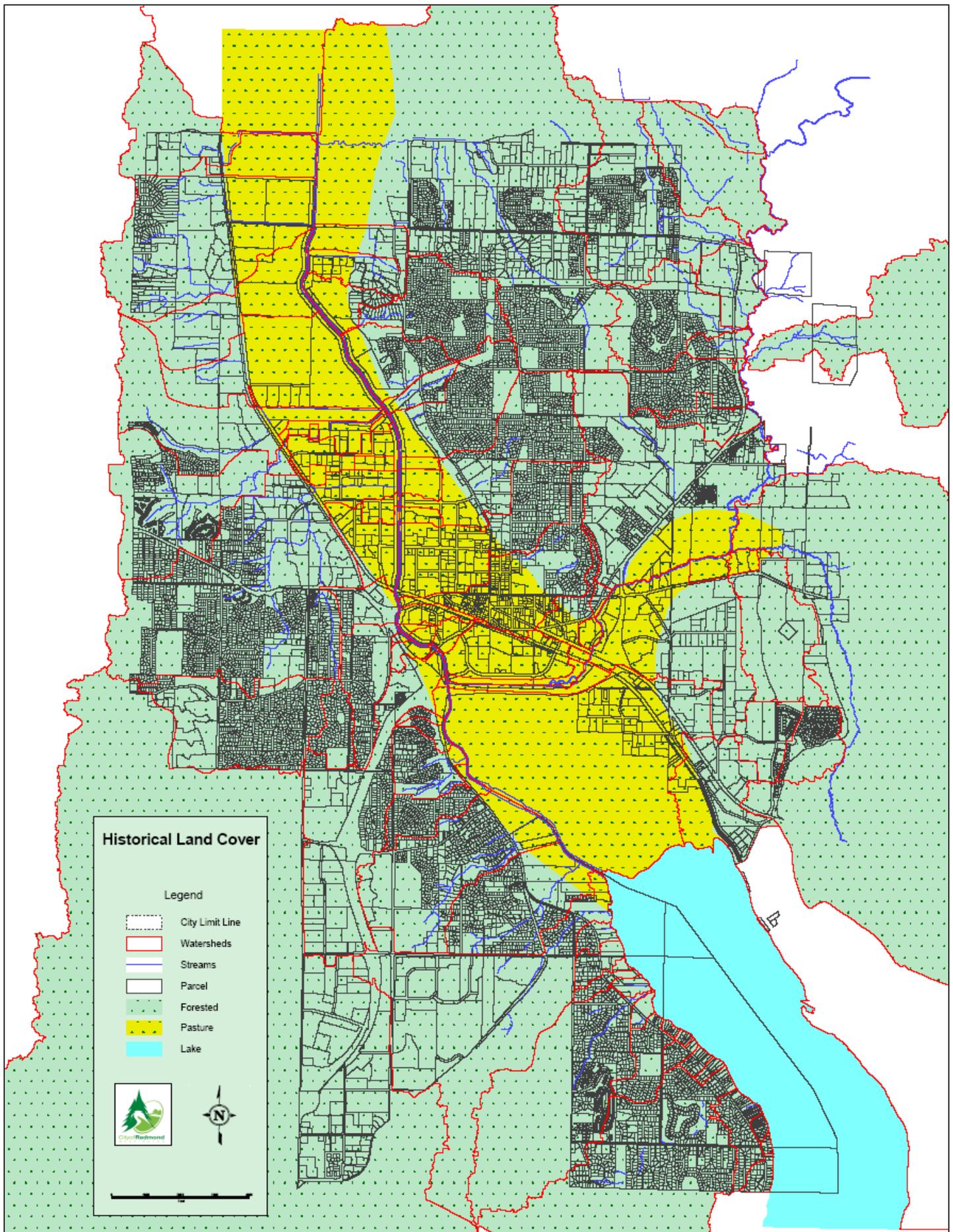
## Sign Specifications

- The sign colors are PMS 350 (dark green) for the lettering and PMS 726 (light tan) for the background.
- The font used is Helvetica Neue Condensed (bold and regular).
- Size: 48 inches by 24 inches (large sign) or 18 inches by 12 inches (small sign)
- Material: 0.125-gauge aluminum
- Face: Non-reflective vinyl or 3 coats outdoor enamel (sprayed)
- Lettering: Silk screen enamel or vinyl letters
- Installation: Mount on fence, or with pressure treated posts with beveled tops, 1-1/2 inch higher than sign. If posts are used, set in 30-inch deep by 8-inch diameter, concrete filled post holes. Top of sign should be 3'-6" above ground. For large sign, use two posts. For small sign, use one post.
- Placement: Face sign in direction of primary visual or physical access. Do not block access road. Do not place within six feet of structures. Location is subject to approval by the Stormwater Engineer.
- The pond name is optional and subject to approval by the Stormwater Engineer.
- An electronic file of the sign is available from the Stormwater Engineer, and is available on the City's website under Stormwater Notebook.
- Sign format varies depending on whether the pond is lined or unlined, public or private, and if it is a large pond or a small pond. Use the correct sign format for the site.
- For Stormwater Treatment Wetlands, replace the large text "Stormwater Pond" with "Stormwater Treatment Wetland"

# **Appendix K**

## **Map of Historical Land Cover**

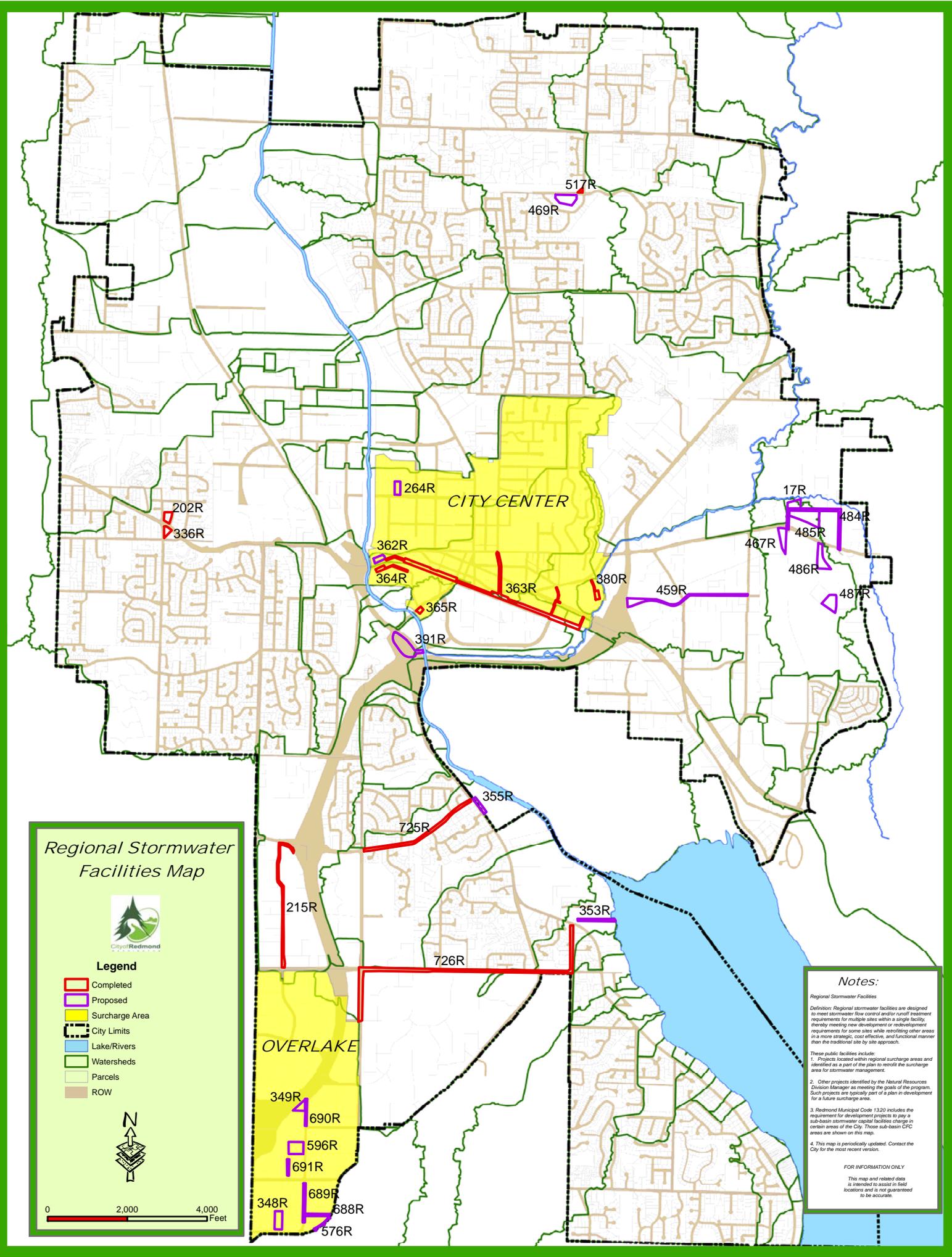
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# **Appendix L**

## **Regional Facilities Plan Map**

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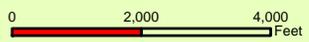


*Regional Stormwater Facilities Map*



**Legend**

- Completed
- Proposed
- Surcharge Area
- City Limits
- Lake/Rivers
- Watersheds
- Parcels
- ROW



**Notes:**

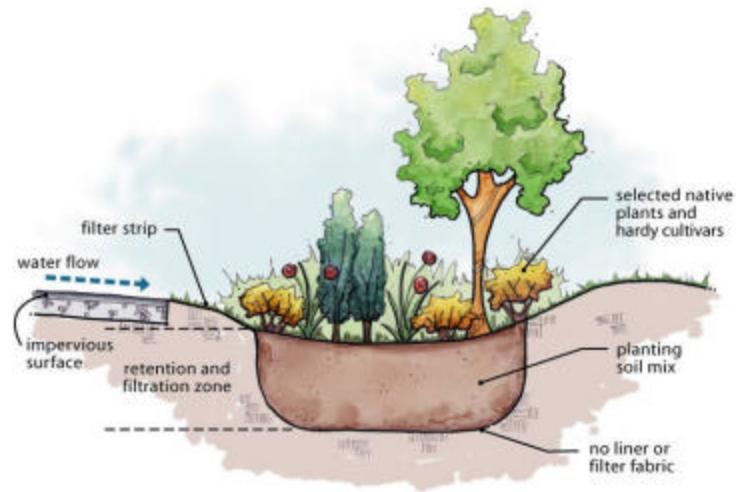
- Regional Stormwater Facilities*
- Definition: Regional stormwater facilities are designed to meet stormwater flow control and/or runoff treatment requirements for multiple sites within a single facility, thereby meeting new development or redevelopment requirements for some sites while retrofitting other areas in a more strategic, cost effective, and functional manner than the traditional site by site approach.*
- These public facilities include:*
1. Projects located within regional surcharge areas and identified as a part of the plan to retrofit the surcharge areas for stormwater management.
  2. Other projects identified by the Natural Resources Division Manager as meeting the goals of the program. Such projects are typically part of a plan in development for a future surcharge area.
  3. Redmond Municipal Code 13.20 includes the requirement for development projects to pay a sub-basin stormwater capital facilities charge in certain areas of the City. Those sub-basin CFC areas are shown on this map.
  4. This map is periodically updated. Contact the City for the most recent version.

**FOR INFORMATION ONLY**  
 This map and related data is intended to assist in field locations and is not guaranteed to be accurate.

**Appendix M**  
**Maintenance of Low Impact Development Facilities**

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# Maintenance of Low Impact Development Facilities



Prepared by:



For:



# Maintenance of Low Impact Development Facilities

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## Maintenance of Low Impact Development Facilities

### A. Introduction

The maintenance of LID facilities is essential to ensure that designed stormwater management performance and other benefits continue over the full life cycle of the installation. Some of the maintenance agreements and activities associated with LID practices are similar to those performed for conventional stormwater systems; however, the scale, location, and the nature of a LID approach will also require new maintenance strategies.

The following outlines typical maintenance goals and objectives, types of maintenance agreements and training, and provides matrices with maintenance activities and schedules for bioretention areas, amended construction site soils, permeable paving, vegetated roofs, and roof rainwater collection systems.

#### 1. *Goals and Objectives*

Many maintenance goals of LID facilities will be similar throughout the Puget Sound region. The following provides a standard set of goals that can be added to or modified according to the specific physical settings and needs of a local jurisdiction.

##### A) Flow Control and Drainage

- Maintain pre-development infiltration capacity (reduce total volume of surface flows) and flow attenuation of facility.
- Maintain pre-development detention capability to reduce peak flows.
- Safely convey design storm flows.

##### B) Water Quality Treatment

- Maintain pre-development infiltration and detention capability.
- Preserve soil and plant health and contact of storm flows with those plant soil systems.

##### C) Safety and Emergency Vehicle Access

- Maintain adequate sight distances.
- Create signage for emergency vehicle access and facilities.
- Ensure the sufficient carrying capacity for emergency vehicles of any permeable load-bearing surfaces.

##### D) Cost Effectiveness

- Maintain facilities for long-term, high quality performance at a cost that is equal to, or less than, conventional systems.
- Prevent expensive repair of large scale or catastrophic problems through continued routine procedures.

##### E) Aesthetics

- Develop LID facilities as a landscape amenity as well as a stormwater management system.

##### F) Public Health

- Minimize potential for disease transmission and mosquito breeding by maintaining designed infiltration capacity, storm flow conveyance, ponding depths, and dewatering rates.

##### G) Community Participation

- Provide educational materials to homeowners and commercial property owners explaining the benefits, function, and importance of community participation for the long-term performance of LID facilities.

## 2. *Support Strategies*

Effective measures to support and ensure quality maintenance of LID facilities include education, incentives, and regulations. In order to provide the most effective maintenance programs, a variety of strategies should be selected from the list below.

### A) Education

- Simple, concise messages delivered throughout the project life cycle.
- Brochures explaining the functions, benefits, and responsibilities of facilities at transfer of deed.
- Information bulletins over public access channels.
- Community volunteers providing informal workshops.
- Ongoing involvement of developer with community groups.
- Training programs for those maintaining the systems.

### B) Incentives

- Reduce stormwater utility fees for individual homeowners or commercial properties.
- Provide support for property owners with technical advice and materials, such as mulch and plants.
- Provide awards and recognition to innovative developers and communities that build and properly maintain LID facilities.

### C) Regulations

- Require maintenance plans and agreements prior to project approvals. (These would include a list of all proposed facilities, facility locations, a schedule of maintenance procedures, monitoring requirements, if any, and an agreement that all subject properties are collectively liable for the ongoing maintenance of the facilities.)
- Mandate jurisdictional maintenance and additional taxes for funding.
- Require fines for corrective actions.
- State that maintenance responsibilities and liabilities are shared by all property owners for projects with facilities designed to serve multiple properties or owned and/or maintained collectively.
- Require deed restrictions or covenants conveyed with deed for the full life cycle of all project types.

## 3. *Maintenance Responsibilities*

Low Impact Development facilities range in size and complexity. Accordingly, entities responsible for maintenance should be appropriately matched to the tasks required to ensure long-term performance. An individual homeowner may be able to reasonably maintain a rain garden, permeable driveway, or other small facility; however, larger facilities are often maintained through private parties, shared maintenance agreements or the presiding jurisdiction. In addition, the use and ownership of properties can often help dictate the most appropriate means of facility maintenance. Below are some general guidelines for the three primary categories of Maintenance Responsibilities.

#### A) Property Owners

- Are usually responsible for small facilities located on an individual property.
- Require basic knowledge and understanding of how the system functions.
- Jurisdiction(s) can improve system function over time by offering basic training to property owners.
- Should know when to seek and where to find technical assistance and any additional information.
- Requirements for maintenance should be conveyed with deed.
- Failure to properly maintain LID facilities may result in jurisdictional liens.

#### B) Private Parties

- Handle the widest range of LID projects in size and scope.
- Handle most commercial or multi-family properties. Copies of agreement may be required prior to project approval.
- Unique maintenance agreements should be developed based on the scale, use, and characteristics of the site and conservation areas, as well as level of expertise of the property owner and the responsible jurisdiction.
- Maintenance agreements can be between a variety of parties, such as individual homeowners, property owner associations, or even jurisdictions.
- Outside groups responsible for maintenance should be trained in the design, function, benefits, and maintenance of LID facilities.
- Recognize that integrated LID management practices require more frequent inspection than conventional facilities.
- Third-party maintainers should provide documentation to the property owners of the type of maintenance performed, a certificate of function, and any non-routine maintenance needs requiring specialized corrective actions.
- Jurisdictions may choose to provide an educational course for prospective maintenance parties and a list of approved or recommended parties.

#### C) Jurisdictions

- Will handle most public LID infrastructure.
- Should be prepared to handle non-routine maintenance issues for a variety of facilities.
- Maintain primarily large facilities, except for those requiring corrective action.
- Private LID facilities requiring corrective action may require a jurisdiction to hire a private party or use their own staff to complete the work. Property owners should be billed for these expenses.

#### *4. Inspections*

Regular and appropriately timed inspections are necessary for the proper operation of LID facilities over the full life cycle of the installation. Inspectors should be trained in the design and proper function and appearance of LID practices. Inspections should be seasonally timed in order to have early detection, repair and efficiency. These inspections should include the following: During Fall to clear debris and organic material from structures and prepare for impending storms; early winter storm events to confirm proper flow control operation and to identify any erosion problems; before major horticultural cycles (i.e., prior to weed varieties dispersing seeds); and any other regularly scheduled maintenance activities. To ensure continuity and to better identify trends in the function of facilities, the same individual(s) should inspect the same drainage area. Finally, LID facilities are integrated into the development landscape and willing homeowners can provide frequent inspection and identification of basic problems with minimal training.

## B. Bioretention Maintenance Schedule

Bioretention areas require annual plant, soil, and mulch layer maintenance to ensure optimum infiltration, storage and pollutant removal capabilities. The majority of routine maintenance procedures are typical landscape care activities and can be performed by various entities including individual homeowners.

### *Routine*

Activity	Objective	Schedule	Notes
<b>Watering:</b> Maintain drip irrigation system without breaks or blockages. Hand water as needed for specific plants.	Establish vegetation with a minimum 80% survival rate.	Twice annually (May and July) or as indicated by plant health.	Plants should be selected to be drought tolerant and not require watering after establishment (2-3 years). Watering may be required during prolonged dry periods after plants are established.
<b>Clean curb cuts:</b> Remove any accumulation of debris from gutter and entrance to bioretention area.	Maintain proper flow of stormwater from paved/impervious areas to bioretention facility.	Twice annually (October and January)	
<b>Remove and/or prune vegetation</b>	Maintain adequate plant coverage and plant health. Reduce shading of under-story if species require sun. Maintain soil health and infiltration capability. Maintain clearances from utilities and sight distances.	Once or twice annually.	Depending on aesthetic requirements, occasional pruning and removing dead plant material may be necessary.
<b>Weeding:</b> Remove undesired vegetation by hand.	Reduce competition for desired vegetation. Improve aesthetics.	Prior to major weed species disbursing seeds (usually twice annually)	Periodic weeding is necessary until plants are established. The weeding schedule should become less frequent if the appropriate plant species and planting density have been used and, as a result, undesirable plants excluded.
<b>Mulching:</b> Replace or add mulch with hand tools to a depth of 2-3 inches.	Replenish organic material in soil, reduce erosion, prolong good soil moisture level, and filter pollutants.	Once annually or every two years.	Consider replacing mulch annually in bioretention facilities where high pollutant loading is likely (e.g. contributing areas that include quick marts). Use compost in the bottom of the facility and wood chips on side slopes and rim (above typical water levels).
<b>Trash removal</b>	Maintain aesthetics and prevent clogging of infrastructure.	Twice annually.	
<b>Maintain access to infrastructure:</b> Clear vegetation within 1 foot of inlets and out falls, maintain access pathways.	Prevent clogging of infrastructure and maintain sight lines and access for inspections.	Once annually.	

## Bioretention Maintenance Schedule (cont.)

### Non routine

Activity	Objective	Schedule	Notes
<b>Erosion control:</b> Replace soil, plant material, and/or mulch layer in areas if erosion has occurred.	Reduce sediment transport and clogging of infrastructure. Maintain desired plant survival and appearance of facilities.	Determined by inspection.	Properly designed facilities with appropriate flow velocities should not have erosion problems except perhaps in extreme events. If erosion problems persist, the following should be reassessed: (1) flow volumes from contributing areas and bioretention cell sizing; (2) flow velocities and gradients within the cell; and (3) flow dissipation and erosion protection strategies in the pretreatment area and flow entrance.
<b>Sediment removal:</b> Shovel or rake out sediment within vegetated areas. Vactor catch basins or other sediment structures.	Reduce sediment transport and clogging of infrastructure. Maintain desired plant survival and appearance of facilities. Maintain proper elevations and ponding depths.	Determined by inspection.	If sediment is deposited in the bioretention area, immediately determine the source within the contributing area and stabilize.
<b>Clean under-drains:</b> Jet clean or rotary cut debris/roots from under-drains.	Maintain proper subsurface drainage, ponding depths, and dewatering rates.	Determined by inspection of clean-outs.	
<b>Clean intersection of pavement and vegetation:</b> Remove excess vegetation with a line trimmer, vacuum sweeper, rake or shovel.	Prevent accumulation of vegetation at pavement edge and maintain proper sheet flow of stormwater from paved/impervious areas to bioretention facility.	Determined by inspection.	Bioretention facilities should be designed with a proper elevation drop from pavement to vegetated area to prevent blockage of storm flows by vegetation into infiltration area.
<b>Replace vegetation:</b> Reseed or replant bare spots or poor performing plants.	Maintain dense vegetation cover to prevent erosion, encourage infiltration and exclude unwanted weed species.	Determined by inspection.	If specific plants have a high mortality rate, assess the cause and replace with appropriate species.
<b>Replace soil:</b> Remove vegetation (save as much plant material as possible for replanting) and excavated soil with backhoe, excavator or, if small facility, by hand.	Maintain infiltration, soil fertility, and pollutant removal capability.	Determined by inspection (visual, infiltration, pollutant, and soil fertility tests).	Soil mixes for bioretention facilities are designed to maintain long-term fertility and pollutant processing capability. Estimates from metal attenuation research suggest that metal accumulation should not present an environmental concern for at least 20 years in bioretention systems. Replacing mulch in bioretention facilities where heavy metal and hydrocarbon deposition is likely provides an additional level of protection for prolonged performance.
<b>Rebuild or reinforce structures:</b> Various activities to maintain walls, intake and outfall pads, weirs, and other hardscape elements.	Maintain proper drainage, and aesthetics and prevent erosion.	Determined by inspection.	
<b>Re-grade or re-contour side slopes:</b> Maintain proper slope with hand tools, back hoe or excavator, replant exposed areas.	Prevent erosion where side slopes have been disturbed by foot or auto traffic intrusion.	Determined by inspection.	

### C. Compost Amended Construction Site Soil Maintenance Schedule

Compost amendments enhance the water storage and pollutant filtering capability of disturbed soils and improve plant performance on construction sites.

*Routine*

Activity	Objective	Schedule	Notes
<b>Add compost of mulch:</b> Spread material by hand to minimize damage to plant material.	Maintain organic matter content of soil, optimize soil moisture retention, prevent erosion, and enhance plant growth and survivability.	Once every one or two years.	Compost amended landscapes are stormwater management facilities and pesticide inputs should be eliminated or used only in unusual circumstances. Landscape management personnel should be trained to adjust chemical applications accordingly.

## D. Permeable Paving Maintenance Schedule

The following matrices provide general maintenance recommendations applicable to all permeable paving and specific procedures for asphalt, concrete, Eco-Stone pavers, and Gravelpave2.

### *Routine*

Activity	Objective	Schedule	Notes
All permeable paving surfaces			
<b>Erosion and sediment control:</b> Mulch and/or plant all exposed soils that may erode to paving installation.	Minimize sediment inputs to pavement, reduce clogging and maintain infiltration of pavement.	Once annually.	Erosion control is critical for long-term performance of permeable paving.
Permeable asphalt or concrete			
<b>Clean permeable paving installation:</b> Use street cleaning equipment with suction, sweeping and suction or high-pressure wash and suction.	Maintain infiltration capability.	Once or twice every year.	Street cleaning equipment using high-pressure wash with suction provides the best results for improving infiltration rates. Sweeping with suction provides adequate results and sweeping alone is minimally effective. Hand held pressure washers are effective for cleaning void spaces and appropriate for smaller areas such as sidewalks.
<b>Remove snow:</b> Use conventional snow removal techniques.	Maintain access.	Determined by inspection/snow depth.	
Eco-Stone pavers			
<b>Clean permeable paving installation:</b> Use street cleaning equipment with sweeping and suction when surface <b>and</b> debris are dry.	Maintain infiltration capability.	Once annually.	Washing should not be used to remove debris and sediment in the openings between the pavers. Vacuum settings may have to be adjusted to prevent excess uptake of aggregate from paver openings or joints.
<b>Remove snow:</b> Use snow plow with skids or rollers to slightly raise blade above pavers.	Maintain access.	Determined by inspection/snow depth.	The structure of the top edge of the paver blocks reduces chipping from snowplows. For additional protection, skids or rollers on the corner of plow blades are recommended.
Gravelpave2			
<b>Remove snow:</b> Use snow plow with skids or rollers to slightly raise blade above gravel surface.			Elevating blades slightly above the aggregate surface prevents loss of top course aggregate and damage to plastic grid.

## Permeable Paving Maintenance Schedule (cont.)

### Non-routine

Activity	Objective	Schedule	Notes
All permeable paving surfaces			
<b>Backfill utility cuts:</b> Use same aggregate base as under permeable paving.	Maintain conveyance of stormwater through base and prevent migration of fines from standard base aggregate to the more open graded permeable paving base material.	Determined by inspection.	Small utility cuts can be repaired with permeable top course or with conventional asphalt or concrete if small batches of permeable material are not available or are too expensive.
<b>Replace permeable paving material</b>	Maintain infiltration and stormwater storage capability.	Determined by inspection.	If facility is designed, installed and maintained properly permeable paving should last as long as conventional paving.
Eco-Stone pavers			
<b>Replace aggregate in paver cells:</b> Remove aggregate with suction equipment.	Maintain infiltration capacity.	Determined by inspection.	Clogging is usually an issue in the upper most few centimeters of aggregate. Check infiltration at various depths in the aggregate profile to determine excavation depth.
<b>Utility maintenance:</b> Remove pavers individually by hand and replaced when utility work is complete.	Repair utilities, maintain structural integrity of pavement.	When maintaining utilities.	Pavers can be removed individually and replaced when utility work is complete.
<b>Replace broken pavers:</b> Remove individual pavers by hand and replace.	Maintain structural integrity of pavement.	Determined by inspection.	
Gravelpave2			
<b>Clean permeable paving installation:</b> Use vacuum trucks for stormwater collection basins to remove and replace top course aggregate if clogged with sediment or contaminated.	Restore infiltration capability.	Determined by inspection.	Permeable gravel paving systems have a very high void to surface coverage ratio. System failure due to clogging is unlikely except in unusual circumstances.
<b>Replenish aggregate material:</b> Spread gravel with rake	Maintain structural integrity.	Determined by inspection.	Gravel level should be maintained at the same level as the plastic rings or above the top of rings.
<b>Remove and replace grid segments:</b> Remove pins, pry up grid segments, replace gravel.	Maintain structural integrity.	Determined by inspection.	Replace grid segments where three or more adjacent rings are broken or damaged.

## E. Vegetated Roof Maintenance Schedule

Proper maintenance and operation are essential to ensure that designed performance and benefits continue over the full life cycle of the installation. Each roof garden installation will have specific design, operation and maintenance guidelines provided by the manufacturer and installer. The following guidelines are for extensive roof systems and provide a general set of standards for prolonged roof garden performance.

### *General maintenance guidelines*

- All facility components, including structural components, waterproofing, drainage layers, soil substrate, vegetation, and drains should be inspected for proper operation throughout the life of the roof garden.
- Drain inlets should provide unrestricted stormwater flow from the drainage layer to the roof drain system unless the assembly is specifically designed to impound water as part of an irrigation or stormwater management program.
- The property owner should provide the maintenance and operation plan and inspection schedule.
- Written guidance and/or training for operating and maintaining roof gardens should be provided along with the operation and maintenance agreement to all property owners and tenants.
- All elements of an extensive roof installation should be inspected twice annually.
- The facility owner should keep a maintenance log recording inspection dates, observations, and activities.
- Inspections should be scheduled to coincide with maintenance operations and with important horticultural cycles (e.g., prior to major weed varieties dispersing seeds).

### *Routine*

Activity	Objective	Schedule	Notes
Structural & drainage components			
<b>Clear inlet pipes:</b> Remove soil substrate, vegetation or other debris.	Maintain free drainage of inlet pipes.	Twice annually.	
<b>Inspect drain pipe:</b> Check for cracks settling and proper alignment, and correct and re-compact soils or fill material surrounding pipe, if necessary	Maintain free drainage of inlet pipes.	Twice annually.	
<b>Inspect fire ventilation points for proper operation</b>	Fire and safety.	Twice annually.	
<b>Maintain egress and ingress:</b> Clear routes of obstructions and maintained to design standards	Fire and safety.	Twice annually.	
<b>Insects</b> (see note)			Roof garden design should provide drainage rates that do not allow pooling of water for periods that promote insect larvae development. If standing water is present for extended periods correct drainage problem. Chemical sprays should not be used.

### Vegetated Roof Maintenance Schedule (cont.)

<b>Prevent release of contaminants:</b> Identify activities (mechanical systems maintenance, pet access, etc.) that can potentially release pollutants to the roof garden and establish agreements to prevent release.	Water quality protection.	During construction of roof and then as determined by inspection.	Any cause of pollutant release should be corrected as soon as identified and the pollutant removed.
Vegetation and growth medium			
<b>Invasive or nuisance plants:</b> Remove manually and without herbicide applications.	Promote selected plant growth and survival, maintain aesthetics.	Twice annually.	At a minimum, schedule weeding with inspections to coincide with important horticultural cycles (e.g., prior to major weed varieties dispersing seeds).
<b>Removing and replacing dead material:</b> See note.	See note.	Once annually.	Normally, dead plant material will be recycled on the roof; however specific plants or aesthetic considerations may warrant removing and replacing dead material (see manufacturer's recommendations).
<b>Fertilization:</b> If necessary apply by hand (see note).	Plant growth and survival.	Determined by inspection.	Extensive roof gardens should be designed to not require fertilization after plant establishment. If fertilization is necessary during plant establishment or for plant health and survivability after establishment, use an encapsulated, slow release fertilizer (excessive fertilization can contribute to increased nutrient loads in the stormwater system and receiving waters).
<b>Mulching:</b> (see note)			Avoid application of mulch on extensive roof gardens. Mulch should be used only in unusual situations and according to the roof garden provider guidelines. In conventional landscaping mulch enhances moisture retention; however, moisture control on a vegetated roof should be through proper soil/growth media design. Mulch will also increase establishment of weeds.
<b>Irrigate:</b> Use subsurface or drip irrigation.		Determined by inspection and only when absolutely necessary for plant survival.	Surface irrigation systems on extensive roof gardens can promote weed establishment, root development near the drier surface layer of the soil substrate, and increase plant dependence on irrigation. Accordingly, subsurface irrigation methods are preferred. If surface irrigation is the only method available, use drip irrigation to deliver water to the base of the plant.

## F. Roof Rainwater Collection System Maintenance Schedule

Maintenance requirements for rainwater collection systems include typical household and system specific procedures. All controls, overflows and cleanouts should be readily accessible and alerts for system problems should be easily visible and audible. The following procedures are operation and maintenance requirements recorded with the deed of homes using roof water harvesting systems in San Juan County, Washington.

### *Routine*

Activity	Objective	Schedule	Notes
<b>Remove debris from roof:</b> Sweep, rake or use leaf blower.	Prevent debris from entering collection and filter system.	Determined by inspection.	
<b>Clean gutters:</b> By hand or use leaf blower.	Prevent debris from entering collection and filter system.	Determined by inspection (generally September, November, January and April). The most critical cleaning is in mid- to late-Spring to flush the pollen deposits from surrounding trees.	Covers for gutters may be appropriate for specific locations, but can make regular cleaning more difficult and will not prevent pollen from entering filter system.
<b>Clean downspout basket screens:</b> Remove debris from screens at top of downspout.	Prevent debris from entering collection and filter system, and clogging of system.	Same as gutters.	
<b>Clean pre-filters</b>	Prevent debris from entering collection and filter system, and clogging of system.	Monthly	
<b>Clean storage tanks of debris:</b> Drain tank and remove debris from bottom of tank.	Prevent contamination.	Determined by inspection.	
<b>Clean particle filters</b>	Prevent contamination.	6 months or determined by pressure drop in system.	
<b>Clean and replace UV filters</b>	Prevent contamination.	Clean every 6 months and replace bulb every 12 months or according to manufacturer's recommendation.	
<b>Chlorinate storage tank:</b> Chlorinate to 0.2ppm-0.5ppm (1/4 cup of household bleach (5.25%) at the rate of 1 cup of bleach to 1000 gallons of stored water)	Prevent contamination.	Quarterly	
<b>Flush household taps:</b> Remove carbon filter and flush until chlorine odor is noticed at taps. Chlorinated water should be left standing in the piping for 30 minutes. Replace the carbon filter.	Prevent contamination.	When storage tanks are cleaned.	

# **Appendix N**

## **Operations and Maintenance Manual Template**

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**Stormwater Management Facility  
*Operation and Maintenance (O&M) Manual***

**for**

**Insert Development Name**

**Located at:**

**Insert Site Location/Address/contact information**

**Prepared for:**

**Insert Developer Name, Address and Phone #**

**Prepared by:**

**Insert Name, Company Name, Address and Phone #**

# **Stormwater Management Facility Operation and Maintenance (O&M) Manual**

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- I Contact Information
- II Compliance with Redmond Municipal Code
- III. Maintenance
- IV. Preventative Measures to Reduce Maintenance Costs
- V. Safety
- VI. General Location and Description of Stormwater Management Facilities
- VII. Inspecting Stormwater Management Facilities
- VIII. Maintaining Stormwater Management Facilities
- IX. Maintenance Documentation

## Appendices

- Appendix A – Maintenance Agreements
- Appendix B – Maintenance Activity Log
- Appendix C – Site Plan
- Appendix D – As-Built Drawings
- Appendix E – Maintenance Standards

# Stormwater Management Facility Operation and Maintenance (O&M) Manual

## I Contact Information

Owner \_\_\_\_\_

Phone \_\_\_\_\_

Email \_\_\_\_\_

Maintenance Responsible Party: \_\_\_\_\_

Phone \_\_\_\_\_

Email \_\_\_\_\_

Emergency Contact \_\_\_\_\_

Phone \_\_\_\_\_

Email \_\_\_\_\_

City of Redmond, Stormwater Inspection: 425.556.2825

The above contact information shall be updated any time that the information changes. Notify the City of Redmond Division of Natural Resources Stormwater Inspector, with this information within 30 days of changes.

## II Compliance with Redmond Municipal Code

In accordance with Redmond Municipal Code 13.06, all property owners are responsible for ensuring that stormwater facilities installed on their property are properly maintained and that they function as designed. The maintenance responsibility for a stormwater facility may be designated on the subdivision plat, the site development plan, and/or within a maintenance agreement for the property. Property owners should be aware of their responsibilities regarding stormwater facility maintenance. Maintenance agreement(s) associated with this property are provided in Appendix A.

## III. Maintenance

Maintenance Manuals shall be transferred with the ownership of the property, including from the developer to the first property owner. Maintenance logs shall be provided to the City of Redmond's Public Works Director or his/her designee upon request. A sample Maintenance Log is provided in Appendix B.

#### IV. Preventative Measures to Reduce Maintenance Costs

The most effective way to maintain your water quality facility is to prevent the pollutants from entering the facility in the first place. Common pollutants include sediment, trash & debris, chemicals, dog wastes, runoff from stored materials, illicit discharges into the storm drainage system (like car wash or pressure washing runoff) and many others. A thoughtful maintenance program will include measures to address these potential contaminants, and will save money and time in the long run. Key points to consider in your maintenance program include:

- Educate property owners/residents/tenants to be aware of how their actions affect water quality, and how they can help reduce maintenance costs.
- Keep properties, streets and gutters, and parking lots free of trash, debris, and lawn clippings.
- Ensure the proper disposal of hazardous wastes and chemicals.
- Plan lawn care to minimize the use of chemicals and pesticides.
- Sweep paved surfaces and put the sweepings back on the lawn.
- Be aware of automobiles leaking fluids. Use absorbents such as cat litter to soak up drippings – dispose of properly.
- Re-vegetate disturbed and bare areas to maintain vegetative stabilization.
- Clean out the upstream components of the storm drainage system, including inlets, storm sewers and outfalls.
- Do not store materials outdoors (including landscaping materials) unless properly protected from runoff.
- Close the covers on dumpsters to prevent liquids from leaking into the storm system.

#### V. Safety

Never enter a confined space (outlet structure, manhole, etc.) without proper training and equipment. A confined space should never be entered without at least one additional person present.

If a toxic or flammable substance is discovered, leave the immediate area and call 911. Potentially dangerous (e.g., fuel, chemicals, hazardous materials) substances found in the areas must be referred to the local Fire Department immediately for response by the Hazardous Materials Unit. The emergency contact number is 911.

Vertical drops may be encountered in areas located within and around the facility. Avoid walking on top of retaining walls or other structures that have a significant vertical drop.

If any hazard is found within the facility area that poses an immediate threat to public safety, call 911 immediately.

Identify site specific hazards here.

## **VI. General Location and Description of Stormwater Management Facilities**

Insert a description of the stormwater management facilities specific to the site including treatment and flow control facilities, conveyance systems, valves, constructed source controls, green infrastructure, proprietary components, and powered devices (aerators or pumps).

Identify the equipment and access required for maintenance including provisions for access in the absence of a ramp and access for a vector truck and might require flex hose.

Maintenance personnel may use the site plan located in Appendix C containing the locations of the Stormwater Management facilities.

## **VII. Inspecting Stormwater Management Facilities**

The City of Redmond, Department of Public Works, inspects private stormwater systems.

## **VIII. Maintaining Stormwater Management Facilities**

Stormwater management facilities must be properly maintained to ensure that they operate correctly and provide the water quality treatment for which they were designed. Routine maintenance performed on a frequently scheduled basis, can help avoid more costly rehabilitative maintenance that results when facilities are not adequately maintained. The Maintenance requirements are contained in Appendix E. These requirements should be updated to reflect changes and updates to these facilities.

### Routine Work

The majority of this work consists of inspection, scheduled mowing, weed control, and trash and debris pickups for stormwater management facilities during the growing season. This includes items such as the removal of debris/material that may be clogging the outlet structure well screens and trash rack, and weed control. These activities normally will be performed numerous times during the year. These items can be completed without any prior correspondence with City of Redmond.

### Minor Work

This work consists of a variety of isolated or small-scale maintenance and work needed to address operational problems. Most of this work can be completed by a small crew, with minor tools, and small equipment. These items can be completed without any prior correspondence with City of Redmond.

### Major Work

This work consists of large-scale maintenance and major improvements needed to address failures within the stormwater management facilities. This work may require an engineering design with construction plans to be prepared for review and approval by the City. This work may also require more specialized maintenance equipment, surveying, construction permits or assistance through private contractors and consultants. These items require prior correspondence with City of Redmond and may be subject to permits.

## **IX. Maintenance Documentation**

The Stormwater Management Facility Maintenance Activity Form provides a record of maintenance activities. Maintenance Forms for each facility type are provided in Appendix B. Maintenance shall be completed by the contractor completing the required maintenance items. The form shall then be reviewed by the property owner or an authorized agent of the property owner and kept on site and submitted to the City of Redmond upon request.

## **Appendix A**

### **Maintenance Agreements**

## **Appendix B**

### **Stormwater Facility Maintenance Activity Log**

## **Appendix C**

### **Site Plan**

This is a simplified map of the site that shows the location of the stormwater system.

## **Appendix D**

### **Stormwater As-Built Drawings**

## **Appendix E**

### **Maintenance Standards**

Insert only the Maintenance Standards that pertain to this development

# **Appendix O**

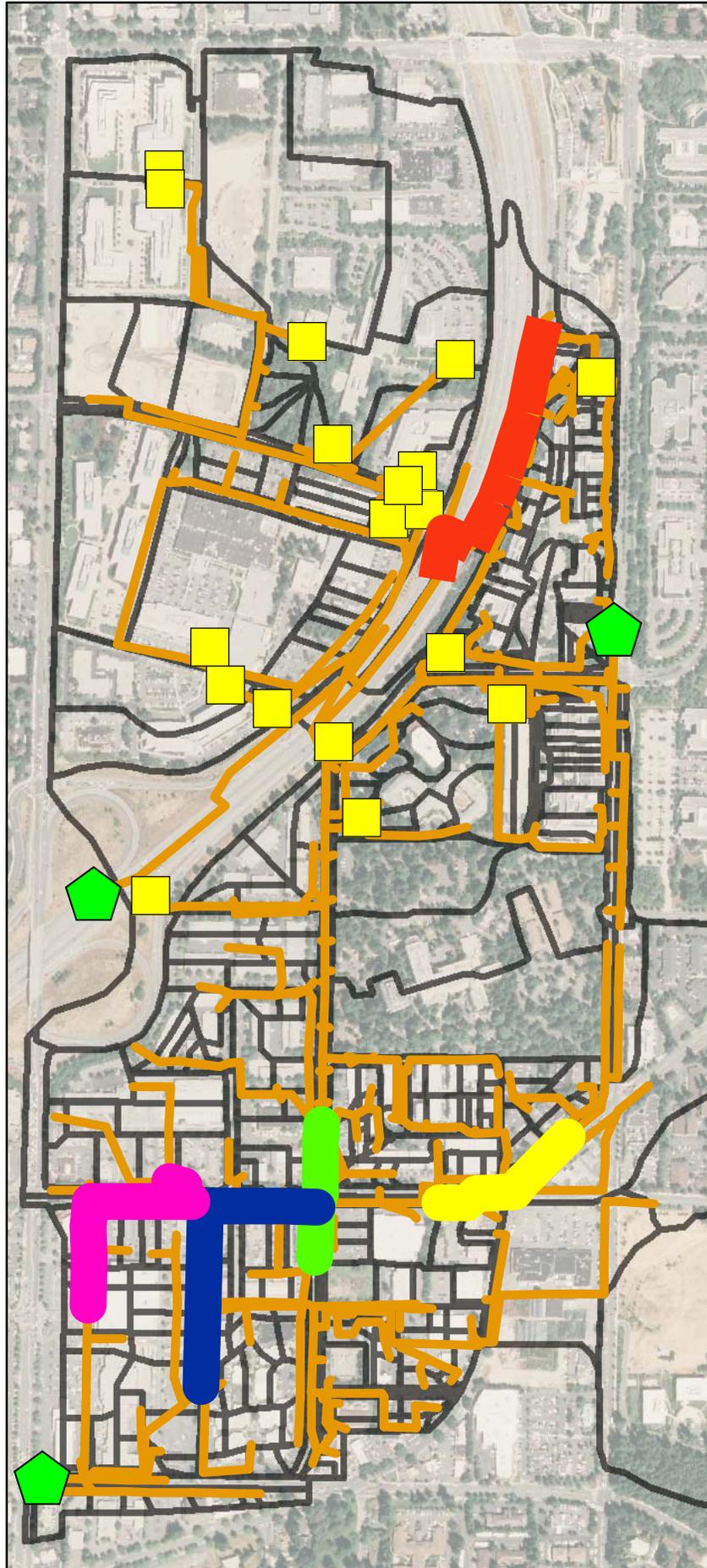
## **Overlake Facilities Plan Map**

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## Overlake Facilities Plan Map

The City has a PCSWMM model of all pipes 12-inches or larger within the Overlake basin, represented in orange on the above map. The other colored areas represent potential trouble areas where flooding might occur under a 50-year flood event. The City has a consultant currently working on the design of three large regional stormwater facilities that are expected to resolve all of these issues. That design is expected to be completed in 2012.

Until the City finalizes this Overlake Facilities Plan Map, project proponents should contact the City to discuss their development application and determine how the proposed project may be impacted by the identified trouble spots. City staff believe that the trouble areas will be resolved by the proposed regional facilities.



# **Appendix P**

## **Downtown Facilities Plan**

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**Appendix Q**  
**Flow Exemption on Sammamish River**  
**Letter from Department of Ecology**

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STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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August 17, 2005

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✓ Robert Franklin  
Redmond Stormwater Manager  
P.O. Box 97010  
Redmond, WA 98073-9710

Jon Morrow  
Storm/Surface Water Coordinator  
9654 NE 182<sup>nd</sup>  
Bothell, WA 98011

Yosh Monzaki  
Woodinville Stormwater Manager  
17301 133<sup>rd</sup> Ave NE  
Woodinville, WA 98072

Matt Witecki  
WSDOT  
MS 47329

**Stormwater Managers:**

The Washington State Department of Transportation and King County have requested that the Department of Ecology add the Sammamish River to the list of surface waters exempt from flow control requirements. For the reasons listed below, Ecology will add the Sammamish River to the list.

This decision is based upon the results of a relatively simplistic but conservative hydrologic and hydraulic study of the Sammamish basin performed by Northwest Hydraulic Consultants. The study showed and recommended that detention facilities for flow control were not necessary to prevent scour of the Sammamish River below its confluence with Little Bear Creek. The study also predicted small increases (2% to 8%) in what are normally considered channel forming flow rates, and an increase of 0.26 feet in the elevation of Lake Sammamish if a flow control exemption applied to the entire river. Because more accurate analyses are likely to predict



lower increases in flow rates, and because these increases are not seen as substantial, extension of the exemption to the entire river seems reasonable.

Also considered in this decision are the following observations:

Due to the significant time delays in flows from the upper watershed, direct discharges to the river may actually help reduce high flows in some common rainfall situations.

The increase in flow velocities as a result of a river exemption are likely insufficient to cause scour and marginally more effective at transporting fine sediment from the river to Lake Washington.

At a meeting on this topic in April, the participants (King County, WSDOT, Bothell, and Ecology) also discussed the related issue of water quality standards exceedances for temperature in the Sammamish River. The participants agreed that a viable strategy to reduce river temperatures is to require infiltration of stormwater runoff wherever feasible in the valley. Infiltrating stormwater will also have the result of reducing discharge flow rates and significantly delaying stormwater discharge to the river. All municipalities in the basin, including WSDOT, should require infiltration of stormwater wherever feasible as determined by techniques advocated in the Stormwater Management Manual for Western Washington. King County and WSDOT have indicated their intentions to do so, but have not yet incorporated the requirement into their stormwater codes/manuals. The Department of Ecology will consider incorporating infiltration of stormwater as part of a Total Maximum Daily Load strategy for the Sammamish River temperature problem.

The addition of the Sammamish River to the list of waters exempt from flow control is effective immediately. Appendix I-E of Volume I of the 2005 Stormwater Management Manual for Western Washington will be amended to add the Sammamish River, and will eventually be posted at the Ecology stormwater web page. Please remember that projects requesting a flow control exemption for discharge to the Sammamish River must still meet the criteria listed in Appendix I-E.

If you have any questions concerning this decision, please contact me at [eobr461@ecy.wa.gov](mailto:eobr461@ecy.wa.gov), or 360/407-6438.

Sincerely,



Ed O'Brien, P.E.  
Municipal Services Unit  
Program Development Services  
Water Quality Program

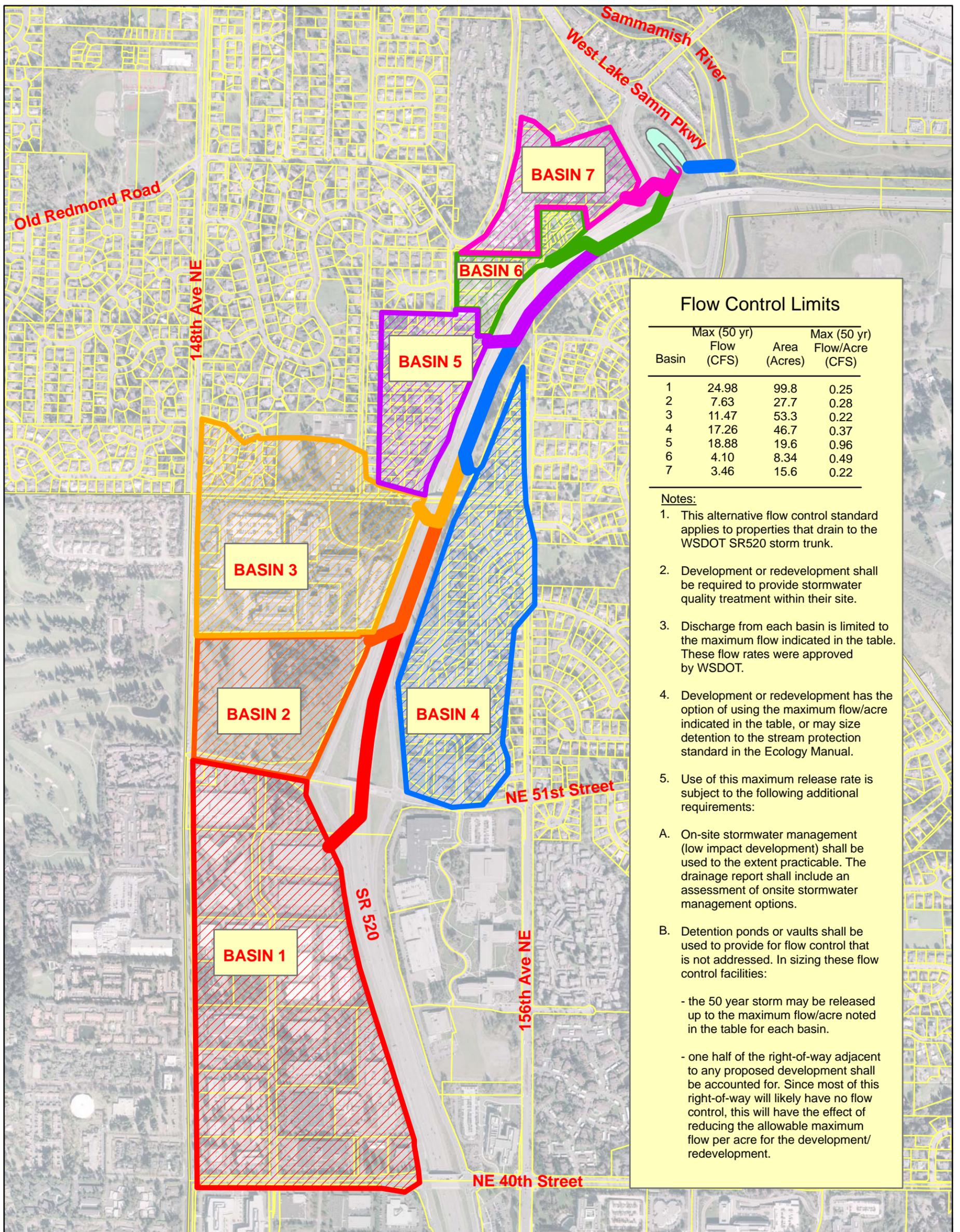
EO:mw

cc: Dave Garland, Ecology, NWRO, WQ - TMDL/Watershed Unit

**Appendix R**  
**North Overlake Flow Control Standard**

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# CITY OF REDMOND PUBLIC WORKS NORTH OVERLAKE DRAINAGE AREA ALTERNATIVE FLOW CONTROL STANDARD



October 28, 2009

