

# CHAPTER 3 – DRAINAGE SUBMITTALS



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### 3.1 INTRODUCTION

The goal of this chapter is to provide a framework for uniformity in Drainage Submittal preparation. Such uniformity will promote predictability throughout Central Oregon and facilitate prompt and consistent jurisdictional review and acceptance. Properly drafted construction plans and supporting documents should also facilitate the operation and maintenance of the proposed drainage system long after design and construction.

The local jurisdiction reviews the drainage submittal for compliance with this Manual and other applicable standards. The drainage submittal includes the Construction Plans, Full Drainage Report, and, other documentation to support the proposed stormwater management methods for the project. The specific submittal requirements are discussed in Section 3.4 through 3.6 and a Drainage Submittal Checklist is included in Appendix 3A.

Depending on the complexity of the project, the local jurisdiction may request that a Concept Drainage Report (CDR) be submitted for review with the planning application or during the preliminary design process. CDR requirements are discussed in Section 3.3. Submittal and/or approval of the CDR does not replace the drainage submittal requirements in Sections 3.4 through 3.6.

State law requires that all engineering work be performed by, or under the direction, of a qualified Engineer.

### 3.2 APPLICABILITY

The discussion of applicability and submittal requirements assumes that the local government reviewing a development proposal has adopted this Manual to guide stormwater management within their jurisdiction.

The following land-actions, permits, or activities require a Drainage Submittal:

- Projects adding 5,000 square feet or more of impervious area or disturbing one or more acres;
- Projects that propose an UIC facility;
- Manufactured and mobile home parks; and
- Other projects designated by the local jurisdiction as part of their review and permitting process.

The following permits and other activities generally require a Drainage Submittal:

- Commercial building permits and site plans (including institutional and multi-family residential projects) prior to the issuance of the building or grading permits;
- Change of use permits to more intense uses;
- Grading permits (not in conjunction with building permits);

- Public or private road projects (not in conjunction with land-actions or permits); and,
- Projects proposing the installation, removal, or modification of drainage systems.

The following activities are generally exempt from a Drainage Submittal:

- Single-family residential/duplex building permits without special plat conditions; and,
- Temporary use permits, unless the use could cause adverse water quality or other drainage related impacts.

The following activities are exempt from a Drainage Submittal:

- Projects adding less than 5,000 square feet of impervious area and disturbing less than one acre (staged or phased projects shall be evaluated based upon the total area of the project), unless otherwise determined by the local government;
- Commercial agriculture practices involving working the land for production are generally exempt, except the construction of impervious surfaces as related to commercial agriculture;
- Forest practices regulated under the Oregon Forest Practices Act (ORS 527.610-527.770, 527.990(1) and 527.992), except conversions from forest lands to other land uses;
- Actions by a public utility or any other governmental agency to remove or alleviate an emergency condition, restore utility service, or reopen a public thoroughfare to traffic;
- Remodeling permits or tenant improvements;
- Change of use permits to less intense or similar uses;
- Records of survey, boundary line adjustments, and property aggregations;
- Minor land-disturbing activities that do not require a permit;
- Permits or applications not physically disturbing the land;
- Municipal road and parking area preservation/maintenance projects such as:
  - Pothole and square cut patching;
  - Crack sealing;
  - Resurfacing with in-kind material without expanding the road prism;
  - Overlaying existing asphalt or concrete pavement with BST, chip seal, asphalt or concrete without expanding the area of coverage;
  - Shoulder grading;
  - Reshaping or re-grading drainage systems; and,
  - Landscaping;
- Operation and maintenance, repair, or minor modification of existing facilities.

## 3.3 CONCEPT DRAINAGE REPORT

### 3.3.1 INTRODUCTION

The CDR is used by staff to preliminarily assess the drainage requirements on certain land-actions and land development permits. The primary purpose of the CDR is to demonstrate that the proposed drainage facilities can meet the intent of this Manual and are feasible with respect to design, construction, and maintenance.

A CDR is needed for sites in which limiting layers, shallow groundwater, and/or critical areas (wetlands, streams, rivers, lakes, ponds, aquatic habitat) are present. The need for a CDR is determined by the local jurisdiction during the pre-application process.

Acceptance of a CDR does not imply that the proposed concept is inherently accepted as the final design. Acceptance only implies that the project proponent has demonstrated that stormwater disposal is feasible. It does not relieve the project proponent from a Geotechnical Site Characterization (GSC) (see Basic Requirement #2 in Chapter 2), a Downstream/Down-Gradient Analysis, or changes to the design that may be necessary in order to meet the criteria and standards found within this Manual and the local jurisdiction's guidelines.

### 3.3.2 CONCEPT DRAINAGE REPORT APPLICABILITY

The need for a CDR derives from the nature, scope and complexity of the land-action in conjunction with the drainage conditions encountered at the site. Due to all of the variables involved, an exhaustive listing of all possible situations that may require a CDR is not possible. However, a CDR will be requested when one or more of the following situations are present:

- The project lies within or drains to sensitive areas important for aquatic habitat (wetlands, streams, rivers, lakes, etc.), as determined by the local jurisdiction;
- The project lies within a wellhead protection area;
- The project lies within or drains to a *Special Drainage Area (SDA)* or study area as recognized by the local jurisdiction (See Section 7.7);
- The project lies within or drains to an official *FEMA 100-Year Flood Zone* (See Section 7.7);
- The project lies within or drains to an area recently identified by the local jurisdiction as having drainage problems;
- The project is especially large, phased, or master-planned with interim facilities involved;
- The project involves significant offsite drainage and relies on a predominant drainage way as designated by the local jurisdiction;

- The project includes a stormwater conveyance system that proposes pumps or inverted siphons;
- The project has the potential to impact existing or future regional stormwater facilities;
- The project proposes water quality treatment by means other than those described in Chapter 6 of this Manual;
- The project proposes conventional subsurface disposal systems in areas that are typically not conducive to subsurface disposal.

The local jurisdiction also has the authority to require a CDR for projects when any unspecified drainage conditions or extenuating circumstances are present.

### **3.3.3 EXEMPTIONS**

Standard drainage systems operating in deep free-draining soils that do not involve significant offsite drainage issues are generally exempt from the CDR requirement.

### **3.3.4 SCOPE**

The CDR shall demonstrate that the existing or proposed drainage infrastructure is adequate to handle the increase in runoff and water quality pollutants due to the proposed land-action, by meeting the minimum requirements of this Manual.

A detailed design is not required at this stage because the exact nature of the proposal is not certain; however, the CDR must provide sufficient information and analysis to demonstrate that adequate infrastructure can be provided. Due to the varying design parameters, design challenges, and potential solutions, the level of requirements can change from site to site. For example, if an infiltration facility were proposed in an area known to have shallow groundwater or bedrock, site characterization would be required at the CDR stage to support the use of infiltration. But a CDR proposing an evaporation facility in the same area would not require geotechnical work at this stage.

If a project proponent chooses to propose a concept that meets the criteria of this Manual, but intends to explore other ideas once conditions of approval have been drafted, then the CDR needs to address any and all other alternatives that may be explored. The main concept must follow all of the criteria in this Section, while any other alternatives need only be listed and discussed. If the concept does not mention any other alternatives, it will be assumed that the accepted concept is the final design concept that will be evaluated and submitted for review.

The requirements for a CDR are:

- A narrative that generally follows Section 3.4.2. The narrative shall describe the proposed method of stormwater treatment and disposal and include a schematic of the proposed system showing the approximate size and location of all the drainage components. The report shall include all relevant information, supporting technical data, infiltration rate assumptions, and

preliminary drainage calculations. Detailed design is not being sought at this stage, but a sufficient amount of work must be done to demonstrate that adequate infrastructure can be provided that meets the requirements of this Manual;

- Provide discussion for any other stormwater management concepts that the project proponent intends to explore prior to, or during, final design;
- Provide drainage basin maps per Section 3.4.3;
- If a non-standard disposal system or infiltration is proposed, then a site characterization shall be done in accordance with Chapter 4;
- If the local jurisdiction requires a Critical Areas evaluation for the project proposal, any required mitigating measures shall be incorporated into the preliminary site layout and the CDR;
- If phasing is anticipated, an explanation of how the drainage system will be phased and built shall be included;
- Provisions for perpetual maintenance of the drainage facilities shall be addressed in the CDR. A written description of the maintenance plan shall be provided with the submittal. Section 11.1 discusses the maintenance requirements; and,
- Offsite easements will need to be obtained for areas where constructed stormwater facilities are proposed outside of the project boundaries. The anticipated locations of these easements need to be provided in an exhibit or on the basin map. These easements shall be obtained prior to the final acceptance of the plan. See Section 11.2 for additional information.

### **3.3.5 PROCEDURAL**

If a CDR is required, it will normally be requested by the local jurisdiction during pre-application or preliminary design process. The accepted CDR shall be implemented in the final construction plans. New or significantly altered conceptual elements on the final plans are subject to re-consideration and/or denial.

## **3.4 FULL DRAINAGE REPORT**

### **3.4.1 INTRODUCTION**

A Full Drainage Report is necessary to assess potential adverse drainage impacts resulting from site alterations due to land development. The results of the drainage calculations are used to determine the drainage improvements necessary to mitigate any increase in runoff due to land development and to mitigate adverse impacts to water quality.

The Full Drainage Report shall be inclusive, clear, legible, and reproducible. It shall provide enough information about the project for a third party to read the report and understand the project scope, site characteristics, methodology, calculation results, and recommendations.

The basic elements of a Full Drainage Report are the narrative, figures, computations/calculations, and downstream/down-gradient analysis as summarized below. The Full Drainage Report is included in the drainage submittal along with the Construction Plans and other required elements outlined in Section 3.5.

### 3.4.2 NARRATIVE

The Full Drainage Report narrative shall include the following elements:

- Section 1: Project Description – Provides information about the size of the project, number of lots proposed (residential), project location (including Section, Township and Range), and background information relevant for drainage design (topography, surface soils, surface and vegetative conditions, etc). Wetlands, streams, natural drainage channels, floodplains, natural depressions, existing onsite and/or offsite drainage facilities well sites and 2-year time of travel areas, and any other special features on or near the project, at a minimum, need to be identified and discussed;
- Section 2: Basic Requirements – Reviews which of the basic requirements are applicable to the project and any other conditions or permits that affect the stormwater design. Addresses treatment and flow control requirements based upon the aquifer susceptibility of the area, proximity to surface water bodies, and land-uses;
- Section 3: Geotechnical Information – Summarizes the site characterization report for the project (i.e. recommended outflow rates for infiltration trenches, infiltration ponds, drywells, and drill holes, description of the soils present onsite based upon site specific fieldwork, etc). If wells are to be abandoned as part of the project, the abandonment procedures and sequence shall be described. The GSC Report (described in Chapter 4) may be included as an integral part of the Full Drainage Report or it can be submitted as a separate document accompanying the Full Drainage Report. The GSC Report must be prepared and stamped by a qualified Engineer;
- Section 4: Downstream/Down-Gradient Analysis – Identifies and discusses probable impacts downstream/down-gradient of project site. Offsite drainage facilities, natural or constructed, need to be identified and evaluated as to their condition and capacity (i.e. collapsed culverts, substandard conveyance channels, etc.). See Section 3.4.5 for further requirements;
- Section 5: Hydrology – Identifies the hydrologic methods and storm events used to calculate runoff rates and size drainage facilities. Summarizes the pre- and post-development drainage basins and includes a basin map as described in Section 3.4.3. Discusses the assumptions (existing vegetation, size of roofs and driveways, etc) used to determine curve numbers and/or runoff

coefficients utilized in the analysis. Includes a table that breaks down the impervious and permeable areas in each subbasin for both pre- and post-development conditions;

- Section 6: Stormwater Facility Analysis and Design – Describes facilities selected to provide water quality treatment and flow control. Summarizes the results of the calculations and the type of facilities that are proposed. Include facility dimensions, and tables summarizing the maximum water elevation of the facilities for the storms analyzed, outflow structure information, size of facilities “required” by the calculations, and size of facilities “provided” by the design. When applicable, include a table comparing the pre-developed and post-developed outflow conditions;
- Section 7: Conveyance – Presents a detailed analysis of any existing conveyance systems and the analysis and design of the proposed stormwater collection and conveyance system. Verification of capacity must be provided for each element of the conveyance system including natural and constructed channels, culverts, storm drain systems, gutters, and drainage inlets;
- Section 8: ESC Analysis and Design – Discuss proposed erosion and sediment control measures, addressing the 16 elements outlined in Section 9.4.3. Not all elements listed in Section 9.4.3 will apply to every site, but each should be discussed and indication made as to which are not applicable to the project. Include calculations, as needed, to justify the size and design of proposed facilities; and,
- Section 9: Long Term Maintenance – Discusses the provisions set forth to adequately operate and maintain the drainage facilities. Identifies the mechanism proposed by the project proponent, for funding said operation and maintenance for stormwater facilities, including Sinking Fund Calculations (see Chapter 12 for requirements).

### 3.4.3 FIGURES

#### *Basin Map*

The Full Drainage Report shall include a basin map. Under most conditions both a pre-developed basin map and post-developed basin map shall be provided. The minimum elements required for the basin map are:

- Vicinity map, project boundaries, and Section, Township and Range;
- Basin limits showing onsite, offsite, and bypass areas contributing runoff onto or from the project. The Engineer shall field verify the basin limits, including any contributing offsite areas, and shall describe how the basin limits were determined;
- Drainage basins clearly labeled and correlated with the calculations;

- Labeled topographic contours which extend beyond the project or drainage basin boundaries to the extent necessary to confirm basin limits used in the calculations. Spot elevations on flat commercial projects may be acceptable on post-developed basin maps in lieu of contours (i.e. when site grading is too flat to be accurately depicted using a 2 foot contour interval). Projects within an urban area shall utilize a maximum contour interval of 2 feet. At the discretion of the local jurisdiction, projects outside an urban area, such as a large lot subdivision, may utilize the best available topographic information; this may involve contours on a scale larger than the 2 feet minimum required;
- Natural or constructed drainage features, such as: creeks, seasonal drainage ways, closed depressions, ditches, culverts, storm drain systems, drywells, etc;
- Time of concentration routes with each segment clearly labeled and correlated with the calculations;
- Footprint of proposed drainage facilities such as, ponds, infiltration facilities, pipes routes, ditches, etc;
- Well sites and designated 2-year time of travel areas;
- Delineation of floodplain limits, as defined by FEMA or other studies;
- North arrow and scale; and,
- Wetlands, streams, and buffers.

#### ***Other Figures***

- Soils map;
- Site photos; and,
- Any graphs, charts, nomographs, maps, or figures used in the analysis and design, when applicable.

### **3.4.4 COMPUTATIONS/CALCULATIONS**

The computations shall be presented in a readable format and provide sufficient information for an unbiased third party to be able to reproduce the same results. All assumptions, input and output data, and variables listed in the computer printouts and hand calculations, shall be clearly identified. All calculations shall clearly show which basin(s) they are applicable to, and the design storm event identified thereon if multiple-storm events are addressed in the design.

The drainage report shall incorporate all calculations used to determine the required size of the applicable systems. Calculations may be included in an appendix, but should be clearly labeled and referenced in the narrative (section 3.4.2). Typical calculations include, but are not limited to:

- Hydrologic/hydraulic computations – Includes pre- and post-developed peak rates and volume calculations (i.e. basin areas, runoff coefficients, times of concentration, etc.), routing calculations design information for drywells, outflow structures, pond volume rating table/pond volume calculations, etc.;

- Water budget calculations;
- Water quality treatment calculations;
- Inlet capacity and gutter flow calculations;
- Detention/retention storage capacities;
- Calculations for ditches and natural channels;
- Culvert and pipe calculations; and,
- Energy dissipation calculations.

Chapters 5, 6, 7, and 8 provide specific information for the above calculations.

### **3.4.5 DOWNSTREAM/DOWN-GRADIENT ANALYSIS**

A downstream/down-gradient analysis is performed to identify and evaluate the drainage impacts that could result from a proposed land action. Some of the common negative impacts of land development can be erosion, flooding, slope failures, changed runoff patterns and reduced groundwater recharge (to springs, streams, wetlands and wells, etc.). The proposed facilities shall be designed to mitigate the adverse impacts identified in the downstream/down-gradient analysis.

The downstream analysis should generally extend from the project site to the receiving water, but need not exceed one mile unless requested by the local jurisdiction. If the receiving water is within one-quarter mile of the project site, the analysis should extend within the receiving water one-quarter mile from the project site. For projects with subsurface discharge, the down-gradient analysis shall extend at least one-quarter mile from the project site.

A downstream/down-gradient analysis is required for all projects that require a drainage submittal. The level of detail required will vary depending upon the location of the project. In project areas where soils are well-draining, drainage problems have not been identified and land features that rely on groundwater recharge are not within the vicinity of the project site, the level of effort required to meet this requirement may be quite brief. Conversely, if the project is located in a Special Drainage Area (SDA) or known problem drainage area, as determined by the local jurisdiction, or non-standard disposal systems are proposed, or land features of concern have been identified downstream/down-gradient of the project site, the level of analysis should match the complexity of the site.

The purpose of the downstream/down-gradient analysis is to inventory and map the downstream/down-gradient drainage features of concern and evaluate potential adverse impacts due to the proposal. Note that a Geotechnical Engineer may be required to participate in the down-gradient portion of the study, if it requires expert knowledge with regard to subsurface hydrology.

For any existing or potential offsite drainage problems which are downstream or down-gradient of the project, it shall be demonstrated that the proposed stormwater disposal system has been designed such that:

- The stormwater runoff leaves the site in the same manner and at the same location as in the pre-developed condition;
- It takes into account the necessity for groundwater recharge (reduced or increased), that may have the potential to adversely impact downstream/down-gradient land features;
- The proposed design does not aggravate an existing drainage problem nor create a new drainage problem; and,
- Underground injection facilities are not located in the following areas:
  - Within 500 feet of drinking water wells;
  - Within the 2-year time of travel zone as delineated by the Oregon Health Division or closer than 500 feet to a public water supply well, whichever is more protective;
  - Within an abandoned septic tank or drain field; or
  - Where the injection may impact contaminated soil or a clean-up site.

At a minimum, this analysis shall include:

- A visual inspection of the site by the Engineer that extends to where adverse impacts are anticipated to be negligible;
- A schematic which adequately identifies those areas that have been investigated (drawing/map/figure must include enough information for the reader/reviewer to recognize the areas analyzed, and the areas identified as being problematic);
- A written summary addressing the following items:
  - Existing or potential offsite drainage problems that may be aggravated by the project;
  - Undeveloped downstream/down-gradient property, that if developed, could be adversely impacted;
  - Information on the condition and capacity of the conveyance route, new or existing, that includes potential backwater conditions on open channels, constrictions or low capacity zones, surcharging of enclosed systems, or localized flooding;
  - Presence of existing natural or constructed land features that are dependent upon pre-developed surface and/or subsurface drainage patterns;
  - Potential adverse impacts to groundwater including, but not limited to, changes to the groundwater characteristics in the area whereby sub-level structures, foundations, or surface areas have increased amount or increased frequency or duration of groundwater intrusion;

- Potential adverse impacts to natural or constructed drainage channels due to an increase in stormwater runoff;
- Erosive conditions (existing or potential scour, landslide hazards, etc.) onsite or downstream/down-gradient of project;
- Slope stability or landslide areas, whether existing or where there is potential for failure; and,
- Flood hazard areas identified on FEMA maps.

The downstream/down-gradient analysis should be included as a section of the Drainage Report. However, if the study is extensive, it may be submitted as a separate document with the Geotechnical Site Characterization Report as part of the overall Drainage Submittal.

## **3.5 OTHER SUBMITTAL ELEMENTS**

As determined by the local jurisdiction, the following items shall be submitted as part of the drainage submittal:

- An inspection agreement (see Appendix 3B);
- A GSC, which can also include a sub-level structure feasibility analysis, pavement analysis, pavement subgrade sampling, and/or downstream/down-gradient analysis, etc. if required for the project (See Chapter 4);
- An Erosion and Sediment Control (ESC) Plan (See Chapter 9);
- A spill prevention and control plan as required by DEQ;
- A draft copy of the Conditions, Covenants and Restrictions (CC&R's) for the Homeowner's Association (HOA) in charge of operating and maintaining the drainage facilities (See Chapter 12);
- An Operations and Maintenance (O&M) Manual (See Chapter 12);
- A Financial Plan (See Chapter 12); and/or,
- Onsite and/or offsite easement documentation (See Chapter 12);

## **3.6 ROAD AND DRAINAGE PLANS**

### **3.6.1 INTRODUCTION**

Construction drawings shall be submitted for review by the local jurisdiction. The submittal and acceptance process shall be in accordance with the current local jurisdiction standards and specifications. Road and drainage plans shall include the local jurisdiction's standard notes for construction.

### 3.6.2 MINIMUM PLAN ELEMENTS

The road and drainage plans shall provide enough detail for a third party to be able to construct the proposed facilities per the Engineer's design. At a minimum, the plans shall meet the local jurisdiction's design standards, and also provide the following information, per this Manual:

- Flow line and/or spot elevations, slopes, lengths, and cross sections of ditches;
- Rim elevations of inlet grates, drywells, and any other structure;
- A profile of the main line stormwater system (and connections, where applicable), showing size, material type, lengths of pipes (or culverts), and invert elevations. For lateral pipe connections to storm drain lines in existing rights-of-way, fixed invert elevations are preferred but not required; only a minimum depth from finish grade (i.e. grate elevation) to pipe invert and the minimum pipe slope must be provided. This allowance is made to account for potential conflicts with existing utilities in the ROW;
- Record drawing information, including invert elevations of the existing drainage system to which the drainage plan proposes to connect. Record drawing information should be field verified whenever possible;
- Construction details or a referenced standard drawing for all structures;
- Drainage easements with all survey information shown;
- Latitude and longitude, in Oregon State NAD 83 coordinate system, of a site reference point and of each underground injection system;
- Grading plan for drainage ponds/swales. The grading plan shall include existing contours, proposed contours and catch points. A cross-section of each pond or swale shall be provided in the plans, showing pond/swale bottom elevation, maximum water surface elevation for the design storm(s), inlet and outlet elevations, berm elevation and slopes, and keyway location and dimensions;
- Each drainage pond/swale corner, pipe inlets and outlets, pipe system angle points, ditches, and drainage structures, shall be horizontally defined with respect to property corners, street stationing, or a coordinate system; and,
- Material gradation, thickness, and dimensions of riprap pads.

### 3.6.3 REVISIONS AFTER PLAN ACCEPTANCE

When changes to the design are necessary, acceptance of any proposed plan changes shall be obtained. The proposed revisions shall be submitted to the local jurisdiction for review prior to construction.

## 3.7 PROCEDURAL

A drainage submittal package is required after the land use decision has been made and the conditions of approval have been accepted; it must be submitted, reviewed and accepted in accordance with local jurisdiction requirements.

# APPENDIX 3A – DRAINAGE SUBMITTAL CHECKLIST

This checklist is intended to assist project proponents in developing a complete drainage submittal for review by the local jurisdiction. This checklist is for guidance purposes only. Project proponents should carefully review Chapter 3 to understand the specific requirements for each submittal element. The local jurisdiction may request additional information be submitted to complete their review of a proposed project.

In addition to the elements listed below, projects in or near sensitive areas or those proposing complex or non-standard stormwater management techniques are required to submit a Concept Drainage Report during the planning process. See section 3.3 for specific conditions and requirements of the Concept Drainage Report.

	Included?		
	Yes	No	N/A
<b>FULL DRAINAGE REPORT</b>			
Narrative (Section 3.4.2)			
Project Description			
Summary of Basic Requirements and other conditions/permits			
Summary of Geotechnical Site Characterization			
Downstream/Down-gradient Analysis (Section 3.4.5)			
Hydrology Assumptions			
Stormwater Facility Description			
Conveyance System Description			
ESC Control Measures Description			
Long Term Maintenance			
Basin Map (Section 3.4.3)			
Soils Map			
Phasing Map (if applicable)			
Site Photos			
Table of Land Use Areas			
Hydrology Calculations			
Facility Sizing Calculations			
Conveyance Calculations			
ESC Calculations (if applicable)			
<b>OTHER ELEMENTS (may be included in drainage report or submitted separately)</b>			
Inspection Agreement (Appendix 3A)			
Geotechnical Site Characterization (Chapter 4)			
ESC Plan (Chapter 9)			
Spill Prevention and Control Plan (as required by DEQ)			
Draft CC&Rs			
O&M Manual (Chapter 12)			
Financial Plan (Chapter 12)			
Easement Documentation (Chapter 12)			

<b>CONSTRUCTION PLANS</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Standard Plan Notes for local jurisdiction			
Flow Line/Control Elevations for Ditches			
Structure Rim Elevations			
Pipe inverts, sizes, slopes, and material type			
Stormwater main line profiles			
Record Drawing information for offsite connections			
Construction details			
Easements with Survey Information			
Coordinates or Lat/Long for each UIC			
Grading Plan			
Pond/Swale Cross sections			
ESC Plan View			
ESC Details			
ESC Standard Notes			
Seed Mix for Vegetative Cover (if applicable)			

# APPENDIX 3B – EXAMPLE – INSPECTION AGREEMENT

## INSPECTION AGREEMENT

**Project Title** \_\_\_\_\_  
**Project Address** \_\_\_\_\_ **S** \_\_\_ **T** \_\_\_ **R** \_\_\_  
**Project Proponent** \_\_\_\_\_  
**Project Number** \_\_\_\_\_

*{If a Variance has been submitted, reviewed and approved for the project, insert the following language.}*  
Pursuant to the conditions of the approved Variance, the above-referenced project requires special inspection of the following:

*{Insert a brief description of infrastructure referenced in the approved Variance that requires special inspection.}*

The stormwater system designed for this site is intended to control stormwater runoff resulting from the development of this property or parcel. The purpose of this inspection is to ensure that the stormwater disposal facilities are constructed in substantial conformance with the accepted plans on file with *{insert name of local jurisdiction and engineering department}*, and that the facilities will function as intended.

## PART 1. GENERAL CONDITIONS

### DEFINITIONS

Inspector: A Professional Engineer or authorized agent, hired by the Owner or local jurisdiction, to provide quality control testing and inspection services.

Project Proponent: The person (owner, applicant, or company) sponsoring the project.

Contractor: The person or company hired by the Project Proponent to construct the facilities.

Engineer: A Professional Engineer currently licensed in the State of Oregon

Design Engineer: The Engineer who designed, prepared, stamped and signed the Accepted Plans.

Accepted Plans: Civil plans for the above referenced project that have been designed, prepared, stamped, and approved by a Professional Engineer currently licensed in the State of Oregon, which have been reviewed by the *{insert name of local jurisdiction and engineering department}*, and accepted for construction.

**Variance:** A Variance is an administrative approval of design elements that do not conform to or are not explicitly addressed by the Central Oregon Regional Stormwater Manual or other standards of the local government.

## **GENERAL CONDITIONS**

The Project Proponent, Contractor, and Inspector are to perform their respective duties in a cooperative manner, to ensure that the stormwater system is constructed in accordance with the Accepted Plans and that the system will function appropriately.

This Agreement shall be signed by the responsible parties noted above, prior to the issuance of a building permit.

## **PART 2. SPECIFIC REQUIREMENTS**

### **FOR THE CONTRACTOR**

The Contractor shall provide the Inspector two working days notice prior to performing any construction activity that will require inspection by the Inspector.

1. Activities that will require inspection include, but will not be limited to:
  - a) Excavation of drainage pond areas, conveyance ditches, berms, and any other earthwork;
  - b) Placement of fill for drainage areas;
  - c) Placement of manholes, catch basins, gravity or pressure-line storm drainage piping, poured-in-place drainage structures, gravel drain-fields, pumping systems, stormwater ponds and disposal facilities, etc.;
  - d) Finish grading; installation of sod, seeding, landscaping, and irrigation systems; final cleanup; and,
  - e) Other items, as listed in "Exhibit A."
2. The Contractor is responsible for reviewing the approved plans for additional activities that require inspection by the Inspector.
3. The Contractor shall correct any deficiencies in the work, as noted by the Inspector, in a timely fashion.
4. The Contractor shall notify the Project Proponent, the Inspector, the Design Engineer and *{insert name of local jurisdiction and engineering department}*, immediately of any unexpected site conditions. Unexpected site conditions are those that would prevent the construction of the improvements as designed, which would adversely affect the performance of the stormwater facilities either in functionality or by causing damage to adjacent or

downstream/down-gradient properties. The Contractor shall read and understand the Project Proponent's and Inspector's portions of this Agreement.

**CONTRACTOR:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

**PHONE NUMBER:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**BY:** \_\_\_\_\_  
(Print Name) (Authorized Signature)

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**FOR THE PROJECT PROPONENT**

1. The Project Proponent agrees to employ an Engineer, prior to construction, for the purpose of being an Inspector of the construction activities for the accepted stormwater system.
2. For coordination purposes, the Project Proponent shall provide the Contractor the name and phone number of the Inspector, and the Project Proponent shall provide the Inspector with the name of the Contractor.
3. The Project Proponent shall aid the Inspector in being present on the site when required. The Project Proponent shall also aid the Inspector in submitting final reports, testing data, and Record Drawings to *{insert name of local jurisdiction and engineering department}*.
4. The Project Proponent shall help to facilitate the correction of any deficient aspects of the stormwater system.
5. The Project Proponent shall read and understand both the Contractor's and Inspector's portions of this Agreement.
6. The Project Proponent acknowledges that he/she will not receive a Certificate of Occupancy or final building permit inspection until deficient aspects of the construction are corrected, and the Record Drawings are accepted by the *{insert name of local jurisdiction and department to whom the documents shall be submitted}*.

**PROJECT PROPONENT:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

**PHONE NUMBER:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**BY:** \_\_\_\_\_  
(Print Name) (Authorized Signature)

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**FOR THE INSPECTOR**

- 1) The Inspector shall perform job site inspection, materials testing and quality control services to an extent that the stormwater system associated with the project will function: a) in accordance with the applicable local jurisdictional codes and regulations; b) as intended per the design; c) in conformance with any Variance conditions associated with this project, if applicable, and d) as shown on the Accepted Plans.
- 2) The Inspector must be an Engineer or an authorized agent of an Engineer.
- 3) The Inspector has the responsibility of being present on the site when he/she is notified by the Contractor that work will be performed that requires inspection.
- 4) The Inspector shall keep a log of each time that he/she performs inspection work on the site.
- 5) The Inspector shall use the Accepted Plans for overseeing the construction of the stormwater system.
- 6) Examples of inspection duties include, but are not limited to,
  - a) During excavation and construction of pond/swale areas, ditches or berms, etc.
    - i) Note any signification changes in the soil or if groundwater is present.
    - ii) Confirm the following:
      - o Elevations of swale(s)/pond(s) bottom (floor), berms, conveyance ditches;
      - o Side slopes, grades and embankment stability;
      - o Dimensions of swale(s)/pond(s), etc.;
      - o Horizontal location of facilities;
      - o Pond liner materials and installation procedures, if used;
      - o Soil compaction; and,
      - o Elevations and dimensions of stormwater structures.
    - iii) Perform testing of fill material for gradation and compaction.

- b) Perform testing of cement for compressive strength, slump and air entrainment.
  - c) Inspect the placement of reinforcing steel in cement concrete structures.
  - d) Inspect the placement of gravity or pressure-pipe stormwater lines. Inspect pipe material, size, length, grade and construction methods.
  - e) Observe the placement of sod, seed, landscaping, and irrigation. Ensure that these items meet the specifications and that they do not interfere with or harm the stormwater system.
  - f) See Exhibit “A” which is attached.
- 7) Often, the Inspector will need to perform inspection duties beyond the minimum requirements set forth on the plans or listed herein. It is recommended that ODOT Specifications be used where specifications are not expressly given.
- 8) The Inspector shall notify the Contractor, Project Proponent, the Design Engineer, *{insert name of local jurisdiction and applicable department associated with plan review}*, immediately, if unexpected conditions are encountered that would prevent proper construction of the improvements, that would negatively affect the intended operation of the stormwater system, or have the potential to cause damage to adjacent or downstream/down-gradient properties.
- 9) Any modifications to the Accepted Plans must be submitted to the Design Engineer for approval, and subsequently, also to the *{insert name of local jurisdiction and applicable department associated with plan review}* for acceptance prior to construction of the proposed modifications.
- 10) Copies of all routine reports shall be submitted by the Inspector to both the *{insert name of local jurisdiction and applicable departments that require receipt of the weekly reports}*.
- 11) Prior to the issuance of a Certificate of Occupancy or final building permit inspection for this project:
- a) The Inspector shall submit inspection reports, lab reports, and the Record Drawings. Record Drawings shall be signed and stamped by the Inspector, with a statement placed on the plans that the construction improvements are in substantial conformance with the Accepted Plans.
  - b) The Project Proponent, Contractor and Inspector shall acquire written acceptance of the Record Drawings and inspection reports from the *{insert City or County, as applicable}* Engineer.
- 12) The Inspector shall read and understand both the Contractor’s and Project Proponent’s portions of this Agreement.

**INSPECTOR:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

**PHONE NUMBER:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

BY: \_\_\_\_\_  
(Print Name) (Authorized Signature)

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**EXHIBIT "A"**

Additional items which require inspection for this project are listed below.

*{Local jurisdiction to complete this portion of the inspection agreement.}*