Annual Report

Number	Permit Section	Question
1	S5.A.2	Attach updated annual Stormwater Management Program Plan (SWMP Plan). (S5.A.2) **Saved Document Name: Kelso_SWMP_2018_1_03292018022857**
2	S9.D.5	Attach a copy of any annexations, incorporations or boundary changes resulting in an increase or decrease in the Permittee's geographic area of permit coverage during the reporting period per S9.D.5. **Not Applicable**
3	S5.A.3	Implemented an ongoing program to gather, track, and maintain information per S5.A.3, including costs or estimated costs of implementing the SWMP. **Yes**
4	S5.A.5.b	Coordinated among departments within the jurisdiction to eliminate barriers to permit compliance. (S5.A.5.b) **Yes**
5	S5.C.1.a.i and ii	Attach description of public education and outreach efforts conducted per S5.C.1.a.i and ii. **Saved Document Name: Educational Outreach Efforts-2_5_03212018024720**
6	S5.C.1.b	Created stewardship opportunities (or partnered with others) to encourage resident participation in activities such as those described in S5.C.1.b. **Yes**

8	S5.C.2.a	Describe the opportunities created for the public to participate in the decision making processes involving the development, implementation and updates of the Permittee's SWMP. (S5.C.2.a) **The City held four meetings of the Kelso Stormwater Advisory Committee whose purpose is to guide the development, implementation and updates to the City's SWMP. These meetings are advertised on the City's website and the public is invited to attend. The City also created opportunities for the public to participate in revisions to the Kelso Engineering Design Manual and Kelso Municipal Code for LID. A copy of the LID Code and Manual Update - Public Involvement Summary is attached.**
9	S5.C.2.b	Posted the updated SWMP Plan and latest annual report on your website no later than May 31. (S5.C.2.b) **Yes**
9b	S5.C.2.b	List the website address. **http://stormwater.kelso.gov**
10	S5.C.3.a.i - vi	Maintained a map of the MS4 including the requirements listed in S5.C.3.a.i.-vi. **Yes**
11	S5.C.3.b.v	Implemented a compliance strategy, including informal compliance actions as well as enforcement provisions of the regulatory mechanism described in S5.C.3.b. (S5.C.3.b.v) **Yes**
12	S5.C.3.b.vi	Updated, if necessary, the regulatory mechanism to effectively prohibit illicit discharges into the MS4 per S5.C.3.b.vi. (Required no later than February 2, 2018) **Yes**
12b		Cite the Prohibited Discharges code reference **KMC 17.50 Building and Construction. KMC 13.09 Stormwater Management.**
13	S5.C.3.c.i	Implemented procedures for conducting illicit discharge investigations in accordance with S5.C.3.c.i.

		Yes
13b	S5.C.3.c.i	Cite methodology **Methodology is found in the City's document "Municipal Stormwater Illicit Discharge Detection and Elimination (IDDE) Program which is found at http://stormwater.kelso.gov.**
14	S5.C.3.c.i	Percentage of MS4 coverage area screened in reporting year per S5.C.3.c.i. (Required to screen 40% of MS4 no later than December 31, 2017 (except no later than June 30, 2018 for the City of Aberdeen) and 12% on average each year thereafter. (S5.C.3) **43**
15	S5.C.3.c.ii	List the hotline telephone number for public reporting of spills and other illicit discharges. (S5.C.3.c.ii) **360-423-6590**
15b	S5.C.3.c.ii	Number of hotline calls received. **5**
16	S5.C.3.c.iii	Implemented an ongoing illicit discharge training program for all municipal field staff per S5.C.3.c.iii. **Yes**
17	S5.C.3.c.iv	Informed public employees, businesses, and the general public of hazards associated with illicit discharges and improper disposal of waste. (S5.C.3.c.iv) **Yes**
17b	S5.C.3.c.iv	Describe the information sharing actions. (S5.C.3.c.iv) **Provided illicit discharge and illicit connection training to five operations staff. Provided the brochure Solutions to Stormwater Pollution to the general public.**
18	S5.C.3.d	Implemented an ongoing program to characterize, trace, and eliminate illicit discharges into the MS4 per S5.C.3.d. **Yes**

19	S5.C.3.d.iv	Number of illicit discharges, including illicit connections, eliminated during the reporting year. (S5.C.3.d.iv) **3**
20	S5.C.3.d.iv	Attach a summary of actions taken to characterize, trace and eliminate each illicit discharge found by or reported to the permittee. For each illicit discharge, include a description of actions according to required timeline per S5.C.3.d.iv **Saved Document Name: Kelso IDDE Log-2017_20_03212018040209**
21	S5.C.3.e	Municipal illicit discharge detection staff are trained to conduct illicit discharge detection and elimination activities as described in S5.C.3.e. **Yes**
22	S5.C.4.a	Implemented an ordinance or other enforceable mechanism to address runoff from new development, redevelopment and construction sites per the requirements of S5.C.4.a. **Yes**
23	S5.C.4.a.i-iii	Revised ordinance or other enforceable mechanism to effectively address runoff from new development, redevelopment and construction sites per the requirements of S5.C.4.a.i-iii. (Required no later than December 31, 2016, except no later than June 30, 2017 for Permittees in Lewis and Cowlitz counties, and no later than June 30, 2018 for the City of Aberdeen) **Yes**
23b	S5.C.4.a.i-iii	Cite code reference for revised ordinance or other enforceable mechanism to address runoff from new development, redevelopment and construction sites. **KMC 17.50 Building and Construction. KMC 13.09 Stormwater Management.**
24	S5.C.4.a.i	Number of exceptions granted to the minimum requirements in Appendix 1. (S5.C.4.a.i., and Section 6 of Appendix 1) **0**
25	S5.C.4.a.i	Number of variances granted to the minimum requirements in

		Appendix 1. (S5.C.4.a.i., and Section 6 of Appendix 1)
		0
26	S5.C.4.b.i	Reviewed Stormwater Site Plans for all proposed development activities that meet the thresholds adopted pursuant to S5.C.4.a.i. (S5.C.4.b.i)
		Yes
26b	S5.C.4.b.i	Number of site plans reviewed during the reporting period.
		2
27	S5.C.4.b.ii	Inspected, prior to clearing and construction, permitted development sites that have a high potential for sediment transport as determined through plan review based on definitions and requirements in Appendix 7 Determining Construction Site Sediment Damage Potential, or alternatively, inspected all construction sites meeting the minimum thresholds adopted pursuant to S5.C.4.a.i. (S5.C.4.b.ii)
		Yes
27b	S5.C.4.b.ii	Number of construction sites inspected per S5.C.4.b.ii.
		1
28	S5.C.4.b.iii	Inspected permitted development sites during construction to verify proper installation and maintenance of required erosion and sediment controls. (S5.C.4.b.iii)
		Yes
28b	S5.C.4.b.iii	Number of construction sites inspected per S5.C.4.b.iii.
		1
29	S5.C.4.b.ii, iii and	Number of enforcement actions taken during the reporting period (based on construction phase inspections at new development and redevelopment projects). (S5.C.4.b.ii, iii and v)
		0
30	S5.C.4.b.iv	Inspected all permitted development sites that meet the thresholds in S5.C.4.a.i upon completion of construction and prior to final approval or occupancy to ensure proper installation of permanent stormwater facilities. (S5.C.4.b.iv)
		Yes

31	S5.C.4.b.ii-iv	Achieved at least 80% of scheduled construction-related inspections. (S5.C.4.b.ii-iv) **Yes**
32	S5.C.4.b.iv	Verified a maintenance plan is completed and responsibility for maintenance is assigned for projects. (S5.C.4.b.iv) **Yes**
33	S5.C.4.c	Implemented provisions to verify adequate long-term operation and maintenance (O&M) of stormwater treatment and flow control BMPs/facilities that are permitted and constructed pursuant to S5.C.4. a and b. (S5.C.4.c) **Yes**
34	S5.C.4.c.i and ii	Updated provisions to verify long-term operation and maintenance of stormwater treatment and flow control BMPs/facilities that are permitted pursuant to S5.C.4.a and b. (Required no later than December 31, 2016, except no later than June 30, 2017 for Permittees in Lewis and Cowlitz counties, and no later than June 30 2018 for the City of Aberdeen, S5.C.4.c.i and ii **Yes**
35	S5.C.4.c.iii	Annually inspected stormwater treatment and flow control BMPs/facilities per S5.C.4.c.iii. **Yes**
35b	S5.C.4.c.iii	If using reduced inspection frequency for the first time during this permit cycle, attach documentation per S5.C.4.c.iii **Not Applicable**
36	S5.C.4.c.iv	Inspected new residential stormwater treatment and flow control BMPs/facilities and catch basins every 6 months per S5.C.4.c.iv to identify maintenance needs and enforce compliance with maintenance standards. **Not Applicable**
37	S5.C.4.c.v	Achieved at least 80% of scheduled inspections to verify adequate long-term O&M. (S5.C4.c.v) **Yes**
38	S4.C.4.c.vi	Verified that maintenance was performed per the schedule in

		S5.C.4.c.vi when an inspection identified an exceedance of the maintenance standard. **Not Applicable**
38b	S5.C.4.c.vi	Attach documentation of any maintenance delays. (S5.C.4.c.vi) **Not Applicable**
39	S5.C.4.d	Provided copies of the Notice of Intent for Construction Activity and Notice of Intent for Industrial Activity to representatives of proposed new development and redevelopment. (S5.C.4.d) **Yes**
40	S5.C.4.e	All staff responsible for implementing the program to control stormwater runoff from new development, redevelopment, and construction sites, including permitting, plan review, construction site inspections, and enforcement are trained to conduct these activities. (S5.C.4.e) **Yes**
41	S5.C.4.f.i	Reviewed, revised and made effective the low impact development-related enforceable documents per S5.C.4.f.i. (Required by December 31, 2016, except by June 30, 2017 for Permittees in Lewis and Cowlitz counties, and by June 30, 2018 for the City of Aberdeen) **Yes**
41b	S5.C.4.f.ii	Attach a summary of the LID review and revision process that includes the requirements listed in S5.C.4.f.ii. (Required with annual report due no later than March 31, 2017, except no later than March 31, 2018 for Permittees in Lewis and Cowlitz counties, and with the Fifth Year annual report for the City of Aberdeen) **Saved Document Name: LID Code Update Final Summary _41b_03222018084114**
42	S5.C.4.g	Participated and cooperated with the watershed-scale stormwater planning process led by a Phase I county. (S5.C.4.g) **Not Applicable**
43	S5.C.5.a	Updated and implemented maintenance standards as protective, or more protective, of facility function as those specified in Chapter 4 of Volume V of the 2012 Stormwater Management Manual for

		Western Washington. (Required no later than December 31, 2016, except no later than June 30, 2017 for Permittees in Lewis and Cowlitz counties, and no later than June 30, 2018 for the City of Aberdeen, S5.C.5.a)
		Yes
44	S5.C.5.a	Applied a maintenance standard that is not specified in the Stormwater Management Manual for Western Washington.
		Not Applicable
45	S5.C.5.a.ii	Performed timely maintenance per S5.C.5.a.ii.
		Yes
46	S5.C.5.b	Annually inspected all municipally owned or operated permanent stormwater treatment and flow control BMPs/facilities. (S5.C.5.b)
		Yes
46b	S5.C.5.b	Number of known municipally owned or operated stormwater treatment and flow control BMPs/facilities. (S5.C.5.b)
		9
46c	S5.C.5.b	Number of facilities inspected during the reporting period. (S5.C.5.b)
		8
46d	S5.C.5.b	Number of facilities for which maintenance was performed during the reporting period. (S5.C.5.b)
		4
47	S5.C.5.b	If using reduced inspection frequency for the first time during this permit cycle, attach documentation per S5.C.5.b.
		Not Applicable
48	S5.C.5.c	Conducted spot checks and inspections (if necessary) of potentially damaged stormwater facilities after major storms as per S5.C.5.c.
		Yes
49	S5.C.5.d	Inspected all municipally owned or operated catch basins and inlets as per S5.C.5.d, or used an alternative approach. (Required once no later than August 1, 2017 and every two years thereafter, except

		once no later than June 30, 2018 and every two years thereafter for the City of Aberdeen) **Yes**
49b	S5.C.5.d	Number of known catch basins. **1484**
49c	S5.C.5.d	Number of catch basins inspected during the reporting period. **0**
49d	S5.C.5.d	Number of catch basins cleaned during the reporting period. **0**
50	S5.C.5.d.i-ii	Attach documentation of alternative catch basin cleaning approach, if used. (S5.C.5.d.i or ii) **Not Applicable**
51	S5.C.5.f	Implemented practices, policies and procedures to reduce stormwater impacts associated with runoff from all lands owned or maintained by the Permittee, and road maintenance activities under the functional control of the Permittee. (S5.C.5.f) **Yes**
52	S5.C.5.g	Implemented an ongoing training program for Permittee employees whose primary construction, operations or maintenance job functions may impact stormwater quality. (S5.C.5.g.) **Yes**
53	S5.C.5.h	Implemented a Stormwater Pollution Prevention Plan for all heavy equipment maintenance or storage yards, and material storage facilities owned or operated by the Permittee in areas subject to this Permit that are not required to have coverage under an NPDES permit that covers stormwater discharges associated with the activity. (S5.C.5.h) **Yes**
54	S7.A	Complied with the Total Maximum Daily Load (TMDL)-specific requirements identified in Appendix 2. (S7.A) **Not Applicable**

55	S7.A	For TMDLs listed in Appendix 2: Attach a summary of relevant SWMP and Appendix 2 activities to address the applicable TMDL parameter(s). (S7.A) **Not Applicable**
56	S8.A	Attach a description of any stormwater monitoring or stormwater-related studies as described in S8.A. **Not Applicable**
57	S8.B.1	Participated in cost-sharing for the regional stormwater monitoring program (RSMP) for status and trends monitoring. (S8.B.1) **Not Applicable**
58	S8.C.1	Participated in cost-sharing for the regional stormwater monitoring program (RSMP) for effectiveness studies. (S8.C.1) (Required to begin no later than August 15, 2014) **Yes**
59	S8.D.1	Contributed to the RSMP for source identification and diagnostic monitoring information repository in accordance with S8.D.1. (Required to begin no later than August 15, 2014) **Yes**
60	G3	Notified Ecology in accordance with G3 of any discharge into or from the Permittees MS4 which could constitute a threat to human health, welfare or the environment. (G3) **Not Applicable**
61	G3	Number of G3 notifications provided to Ecology. **0**
62	G3.A	Took appropriate action to correct or minimize the threat to human health, welfare, and/or the environment per G3.A. **Not Applicable**
63	S4.F.1	Notified Ecology within 30 days of becoming aware that a discharge from the Permittee's MS4 caused or contributed to a known or likely violation of water quality standards in the receiving water. (S4.F.1) **Not Applicable**

64	S4.F.3.a	If requested, submitted an Adaptive Management Response report in accordance with S4.F.3.a. **Not Applicable**
65	S4.F.3.d	Attach a summary of the status of implementation of any actions taken pursuant to S4.F.3 and the status of any monitoring, assessment, or evaluation efforts conducted during the reporting period. (S4.F.3.d) **Not Applicable**
66	G20	Notified Ecology of the failure to comply with the permit terms and conditions within 30 days of becoming aware of the non-compliance. (G20) **Not Applicable**
67	G20	Number of non-compliance notifications (G20) provided in reporting year. **0**
67b	G20	List the permit conditions described in non-compliance notification(s). **Not Applicable**

Attachments:

View Files Attached to Submission

DocDescr	DocName	DocExt	DocID	SubID	AppName
Submitted Copy of Record for City of Kelso	Copy of Record CityofKelso Thursday March 29 2018	.pdf	670673	1618363	wqwebportal
Submitted Cover Letter for City of Kelso	Cover Letter CityofKelso Thursday March 29 2018	.pdf	670674	1618363	wqwebportal
WAR045010_5_03212018024720	Educational Outreach Efforts-2_5_03212018024720	.pdf	669453	1618363	wqwebportal
WAR045010_20_03212018040209	Kelso IDDE Log-2017_20_03212018040209	.pdf	669471	1618363	wqwebportal
WAR045010_03292018082951	Kelso_SWMP_2018_03292018082951.pdf	.pdf	670498	1618363	wqwebportal
WAR045010_1_03292018022857	Kelso_SWMP_2018_1_03292018022857	.pdf	670671	1618363	wqwebportal
WAR045010_41b_03222018084114	LID Code Update Final Summary _41b_03222018084114	.pdf	669507	1618363	wqwebportal
WAR045010_03212018025103	Public Involvement Summary_03212018025103.pdf	.pdf	669456	1618363	wqwebportal

Close

This SWMP is an attachment to the City's 2017 Annual Report to the Department of Ecology for its Phase II NPDES Permit

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In compliance with the provisions of
The State of Washington Water Pollution Control Law Chapter 90.48 Revised Code of Washington
and
The Federal Water Pollution Control Act (The Clean Water Act)
Title 33 United States Code, Section 1251 et seq.

Stormwater Management Program Plan 2018 for

City of Kelso

Prepared for:
City of Kelso, Washington

Prepared by:
Otak, Inc.
700 Washington Street, Suite 401
Vancouver, WA 98660
Otak Project No. 17258

January 2015

Updated February 2018 by Van McKay, P.E., City of Kelso

TABLE OF CONTENTS

Abbreviation and Acronyms

AKART	All Known, Available, and Reasonable Methods of Prevention, Control, and Treatment
BMP	Best Management Practice
CESCL	Certified Erosion and Sediment Control Lead
City / Kelso	City of Kelso
Ecology	Washington State Department of Ecology
IDDE	Illicit Discharge Detection and Elimination
KEDM	Kelso Engineering Design Manual
KMC	Kelso Municipal Code
KSAC	Kelso Stormwater Advisory Committee
LID	Low Impact Development
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
Permit	Phase II Western Washington NPDES Municipal Stormwater Permit
SIDIR	Source Identification Information Repository
SWMMWW	Stormwater Management Manual for Western Washington
SWMP	Stormwater Management Program Plan
SWPPP	Stormwater Pollution Prevention Plan

CITY OF KELSO
STORMWATER MANAGEMENT
PROGRAM
2018

1. INTRODUCTION

1.1 Overview and Background

The City of Kelso (City) operates a municipal separate storm sewer system (MS4) which collects and conveys stormwater runoff from developed areas of the City to surface waters. Discharge of runoff from the MS4 is regulated by the Washington State Department of Ecology (Ecology), and the City is required to obtain a permit to operate the system.

The Western Washington Phase II Municipal Stormwater Permit (Permit) outlines stormwater program activities and implementation milestones that the City must follow to comply with federal Clean Water Act. As a general Permit, it applies to more than 80 MS4s in western Washington. Each Phase II community is required to develop a Stormwater Management Program Plan (SWMP) that includes a description of the required activities, implement those activities within the required timeframes of the Permit term, and submit annual reports to Ecology by March 31st each year to document progress toward Permit compliance.

Kelso was first issued a Permit in 2007 and has been implementing a SWMP since that time.

Ecology issued the current Permit in 2012, and it became effective on August 1, 2013. Ecology subsequently issued a Permit modification on December 17, 2014, which became effective January 16, 2015. The Permit modification includes minor changes to correct inconsistencies and scriveners' errors, changes to definitions to clarify the intent of some Permit language, and substantial changes to the watershed-scale stormwater planning requirement, which is not applicable to the City. The Permit covers a five-year period from August 2013 to July 2018 and Ecology subsequently extended that period to July 2019.

Stormwater runoff from the City eventually enter the Cowlitz and Coweeman Rivers through a combination of gravity outfalls and pump stations operated by the Diking Improvement District No. 1 and the Consolidated Diking Improvement District No. 3. The City's MS4 also connects to and discharges stormwater to the City of Longview's MS4.

In accordance with Permit requirements, the City has developed a SWMP designed to reduce the discharge of pollutants to the maximum extent practicable (MEP), to meet all known, available, and reasonable methods of prevention, control and treatment (AKART)

requirements, and to protect water quality. A main goal of the SWMP is to inform the public of the stormwater activities the City plans to achieve during the year. The following sections describe the actions that Kelso has and will take to comply with the requirements of the Permit.

1.2 Departmental Responsibilities

The Community Development Department employs a full-time Senior Stormwater Engineer, who acts as the City's National Pollutant Discharge Elimination System (NPDES) Coordinator.

The Community Development Department is responsible for general Permit compliance, stormwater public education and outreach, public involvement in stormwater concerns, regulating the entrance of stormwater pollutants into the MS4, regulating runoff on construction sites and developments, developing procedures for compliance with the Permit, planning stormwater capital projects, training staff from other departments, and reporting.

The Public Works Department is responsible for spill response, maintaining components of the MS4, and operating City properties such as roads, rights-of-way, parks, and municipal buildings in a manner that prevents and reduces stormwater impacts.

Employees in the Police Department are responsible for maintaining awareness of the stormwater system and reporting potential illicit discharges that may be observed during the normal course of their duties in the community.

The City's stormwater utility funds the SWMP based on impervious area for commercial properties and on a base rate for residential properties.

1.3 Document Organization

This report comprises the required written documentation of the City's SWMP.

To aid in tracking Permit requirements, this document has been organized into sections that correspond with the Permit Special Conditions and are outlined in the Permit as follows:

- Chapter 2 – Stormwater Management Program
  - 2.1 - Public Education and Outreach, Special Condition S5.C.1
  - 2.2 - Public Involvement and Participation, Special Condition S5.C.2
  - 2.3 - Illicit Discharge Detection and Elimination (IDDE), Special Condition S5.C.3
  - 2.4 - Controlling Runoff from New Development, Redevelopment, and Construction Sites, Special Condition S5.C.4
  - 2.5 - Operation and Maintenance (O&M) for Municipal Operations, Special Condition S5.C.5

- 2.6 - NPDES Program Administration
- Chapter 3 – Stormwater Monitoring

2. STORMWATER MANAGEMENT PROGRAM

This chapter describes five required components of the Permit SWMP and the City's plan to meet each requirement and administer the program.

2.1 Public Education and Outreach

The City's public education and outreach program focuses on building general awareness among the public of problems created by stormwater runoff. The program is carried out by the NPDES Coordinator.

2.1.1 Permit Requirements

Section S5.C.1 requires the following:

- Develop and administer an education program to reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts and encourage the public to participate in stewardship activities. The program must target residents, businesses, industry, and city employees at all levels.
- Provide an education and outreach program designed to educate target audiences about the stormwater problem and provide specific actions they can follow to minimize the problem.
- Measure adoption of targeted behaviors for at least one target audience in at least one subject area. Use the resulting measurements to direct outreach resources most effectively and to evaluate changes in adoption of the targeted behaviors and evaluation of the education program's effectiveness at changing targeted behaviors.
- Create stewardship opportunities to encourage residents to participate in activities such as stream teams, storm drain marking, volunteer monitoring, and riparian plantings.

2.1.2 Existing Programs and Activities

Kelso's activities in this area are ongoing:

- Continue to maintain the City's stormwater educational website at http://www.kelso.gov/departments-services/community-development/engineering-department/stormwater.
- Make available to the public the *Solution to Stormwater Pollution* brochure.
- Coordinate a storm drain marker volunteer program.
- Hold educational workshops.
- Track and document all public education and outreach efforts.

2.1.3 Planned Activities

Planned activities for 2018 include:

- Send remaining general stormwater brochures to residence through regular mail or utility inserts.
- Update the general stormwater brochure
- Implement a program to educate a target audience.
- Update the City's outreach plan based on results of measurement.
- Continue to develop stewardship opportunities with Kelso High School.
- Collaborate activities with the Cowlitz Clean Water Partners to produce educational materials, including posters and student public service announcement videos.

2.2 Public Involvement and Participation

The City's public involvement and participation program is designed to seek regular input from stakeholders through the Kelso Stormwater Advisory Committee (KSAC). The NPDES Coordinator carries out this requirement.

2.2.1 Permit Requirements

Section S5.C.2 requires the following:

- Provide ongoing opportunities for public involvement through advisory councils, public hearings, watershed committees, participation in developing rate structures or other similar activities.
- Create opportunities for the public to participate in the decision-making processes involving the development, implementation and update of the SWMP.
- Make the SWMP document and Annual Report available to the public on the City's website. Any other submittals required by Ecology also must be available on the website.

2.2.2 Existing Programs and Activities

Kelso's activities in this area are ongoing:

- Holds quarterly public meetings of KSAC.
- Seeks public input through the City Council.
- Posts annual reports, the SWMP, and other stormwater-related documents to the City's website.
- Track and document all public involvement and participation efforts.

2.2.3 Planned Activities

Planned activities for 2018 include:

- Continue to hold quarterly meetings of KSAC.
- Update the SWMP by December 31, 2018.
- Post the 2018 SWMP to the website by January 2018
- Post the 2017 Annual Report to website by May 2018.

2.3 Illicit Discharge Detection and Elimination (IDDE)

The City's IDDE ordinance prohibits the discharge of non-stormwater, with a few exceptions, into the MS4. The IDDE program guides City responses to spills and to reports of potential discharges to the storm sewer. Staff monitored the system through inspection of priority outfalls. During the Permit term, the City plans to update its MS4 maps and increase system monitoring through a greater number of outfall inspections. The program is carried out primarily by Community Development, although primary responsibility for spill response is with Public Works.

2.3.1 Permit Requirements

Section S5.C.3 requires the following:

- Implement an ongoing program to prevent, detect, characterize, trace, and eliminate illicit discharges, connections and improper disposal into the MS4.
- Develop a storm sewer system map and update it on an ongoing basis.
- Implement an ordinance to prohibit non-stormwater, illicit discharges into the MS4 that includes allowable discharges, conditionally allowable discharges, and escalating enforcement procedures and actions.
- Implement a compliance strategy that includes informal compliance actions such as public education and technical assistance as well as escalating enforcement penalties and an enforcement strategy. Include the following tools:
    - Apply operational and structural source control Best Management Practices (BMPs) for pollutant generating sources to prevent illicit discharges.
    - Maintain stormwater facilities to standards to prevent illicit discharges.
- Implement an ongoing program to detect and identify non-stormwater discharges and illicit connections to the MS4, including the following components:
    - Procedures for conducting investigations of the MS4, including field screening and methods for identifying potential sources of illicit discharges and connections.
    - Publicize a hotline or other local telephone number for reporting of spills or other illicit discharges.
    - Provide appropriate training to City field staff on identification and reporting of illicit discharges.
    - Inform public employees, businesses, and the general public of the hazards associated with illicit discharges and improper disposal of waste.
- Implement an ongoing program to address illicit discharges and illicit connections, including the following components:
    - Procedures for characterizing the nature of, and threat posed by, any illicit discharges found by or reported to the City, including evaluating if the discharge must be immediately contained.
    - Procedures for tracing the source of an illicit discharge, including visual inspection and other methods and procedures.

    - Procedures for eliminating the discharge through notification, technical assistance, inspections and the compliance strategy required above.
- Comply with requirements to address illicit discharges found or reported within Permit-established timelines (see S5.C.3.d.iv.).
- Train technical staff that is responsible to conduct these activities.
- Track and maintain records of the activities conducted to meet the requirements of S5.C.3.

2.3.2 Existing Programs and Activities

Kelso's activities in this area are ongoing:

- Follows procedures for detection, reporting, characterization, response, investigation, removal, clean-up, and enforcement in the *Municipal Stormwater Illicit Discharge Detection and Elimination (IDDE) Program 2015*.
- Contacts the public to provide education and enforcement when illicit discharges are reported or discovered.
- Provides training on IDDE awareness one time, per Permit term, to Public Works field staff and Police.
- Operates the Kelso stormwater hotline.
- Encourages the public to report illicit discharges, spills, or other stormwater-related issues using the online Stormwater Incident Report at http://www.kelso.gov/stormwater-incident-report.
- Tracks illicit discharge reports and responses.
- Tracks and documents required recordkeeping.

2.3.3 Planned Activities

Planned activities for 2018 include:

- Ensure all new field employees are trained in IDDE.
- Continue ongoing activities listed above, including enforcing KMC 13.11, responding to illicit discharges and spills, educating the public about the hazards of IDDE through educational enforcement, and providing the public ways to report illicit discharges and spills, including the hotline and an online incident report.
- Map any new public (City-operated) stormwater treatment and flow control facilities constructed in 2018.
- Map discharge points.
- Follow indicator sampling procedures, when required, in response to illicit discharges discovered during field screening.
- Contact concrete suppliers to educate and give technical guidance on proper on-site washout procedures.
- Field screen the MS4 by December 31 for non-stormwater discharges and illicit connections.

2.4 Controlling Runoff from Development, Redevelopment, and Construction Sites

The City's stormwater regulatory program currently implements local standards for temporary erosion control and permanent stormwater control on most development, redevelopment, and construction projects, while applying state standards to those projects greater than one acre in size.

Note: the Permit includes Section S5.C.4.g for watershed-scale stormwater planning. None of these requirements apply to the City, so they are not listed below.

2.4.1 Permit Requirements

Section S5.C.4 requires the following:

- Implement and enforce a program to reduce pollutants in stormwater runoff that enters the MS4 from new development, redevelopment and construction site activities.
- Implement an ordinance with necessary legal authority to require development, redevelopment, and construction applications submitted after June 30, 2017 to control runoff according to the minimum technical requirements in either the 2014 Ecology Stormwater Management Manual for Western Washington, or an equivalent Manual approved by Ecology.
- Include a permitting process with site plan review, inspection, and enforcement capability to all sites that meet the minimum thresholds in Appendix 1 of the City's Permit, including the following components:
  - Review all stormwater site plans.
  - Inspect, prior to clearing and construction, all permitted development sites that have high potential for sediment transport.
  - Inspect all permitted development sites during construction to verify proper installation of erosion and sediment controls.
  - Inspect all permitted development sites upon completion of construction, and prior to final approval or occupancy, to ensure proper installation of permanent stormwater facilities. Verify that a maintenance plan is complete and responsibility for maintenance is assigned.
  - An enforcement strategy to respond to issues of non-compliance with above-noted components.
- Notify representatives of proposed new development and redevelopment of the Notice of Intent (NOI) for Construction Activity and the NOI for Industrial Activity..
- Train staff on the new codes, standards, processes and procedures.
- Summarize the results of the LID integration and revision process by March 31, 2018.

2.4.2 Existing Programs and Activities

Kelso's activities in this area are ongoing:

- Enforce existing local stormwater and erosion control codes for development, redevelopment, and construction sites that meet stormwater thresholds.
- Enforce stormwater and erosion control regulations using Ecology's 2014 SWMMWW for sites over 2000 square feet that meet thresholds established in Appendix 1.
- Review site plans and grading permit applications that meet the SWMMWW Minimum Requirements.
- Perform site inspections before, during, and after construction on regulated sites.
- Make known the NOIs for Construction Activity and Industrial Activity to developers.
- Continue review of development, redevelopment, and construction sites using thresholds established in Appendix 1 of the 2013.
- Continue inspecting regulated sites before, during, and after construction.
- Document all required recordkeeping.

2.4.3 Planned Activities

Planned activities for 2018 include:

- Ensure all Community Development staff are trained on the updated stormwater requirements, provisions and procedures.
- Create new public guidance materials and checklists for development-related activity.

2.5 Municipal Operations and Maintenance (O&M)

The Public Works Department operates the MS4 and City properties, including streets, rights-of-way, parks, and municipal buildings. Employees follow procedures to reduce stormwater impacts from City operations. During the Permit term, the City plans to update its maintenance standards, increase frequency of catch basin inspection, and implement a catch basin repair and replacement program.

2.5.1 Permit Requirements

Section S5.C.5 requires the following:

- Develop and implement an operations and maintenance (O&M) program with the ultimate goal of preventing or reducing pollutant runoff from municipal operations.
- By June 30, 2017, establish and adopt maintenance standards for components of the municipal separate stormwater system that are at least as protective as those specified in Volume V of the SWMMWW.
- Conduct annual inspections of City-operated stormwater treatment and flow control and treatment BMPs/facilities, and conduct required maintenance within Permit-established deadlines.
- Spot checks of potentially damaged permanent stormwater treatment and flow control BMPs/facilities after major storm events and system-wide inspection if spot checks indicate widespread damage. Then conduct required maintenance within Permit-established deadlines.

- Inspect all City-operated catch basins and inlets at least once by August 1, 2017 and then every two years thereafter.
- Implement practices, policies, and procedures to reduce stormwater impacts associated with runoff from municipal operation and maintenance activities including but not limited to streets, parking lots, roads, highways, buildings, parks, open space and maintenance yards owned or maintained by the City.
- Implement an ongoing training program for staff whose job functions may impact stormwater quality. Document the training program.
- Implement a Stormwater Pollution Prevention Plan (SWPPP) for all heavy equipment maintenance or storage yards and material storage facilities owned or operated by the City that are not covered by an Industrial Stormwater General Permit.
- Maintain records of inspections and maintenance or repair activities.

2.5.2 Existing Programs and Activities

Kelso's activities in this area are ongoing:

- Annual inspection of six City-operated permanent stormwater treatment and flow control facilities.
- Annual cleaning of two stormwater facilities.
- Spot check stormwater facilities and flood-prone areas of the conveyance system after rain storms larger than the 24-hour, 10-year storm event.
- Routine street sweeping.
- Clean ditches and culverts as needed.
- Follow City of Kelso *Municipal Stormwater O&M Program 2015* for operation of stormwater facilities, streets, parks and buildings owned or operated by the City.
- Follow City of Kelso *Nutrient, Integrated Pest Management and Herbicide Plan 2015* to guide the use of nutrients and chemicals on City-operated properties and rights-of-way.
- Follow protocols for spills response on City streets and properties in the City of Kelso *Illicit Discharge Detection and Elimination (IDDE) Program 2015*.
- Train new Operations staff on operational source control BMPs for the maintenance yard, City street and property operations, and City parks operations or when the program is modified.
- Maintain the SWPPP for the Public Works maintenance yard; conduct quarterly inspections.
- Document all required recordkeeping.

2.5.3 Planned Activities

Planned activities for 2018 include:

- Review maintenance standards and revise as necessary to ensure they are as effective as the current edition of the SWMMWW.

- Review the street sweeping program and consider strategies to document where, when and how much street sweeping has been performed. Investigate the possibility to increase the frequency of street sweeping.
- Implement a catch basin structural repair and replacement program to repair or replace approximately six catch basins in 2018.
- Inspect the Operations maintenance yard for proper application of BMPs to document conformity with the SWPPP; revise SWPPP as needed based on conditions.
- Inspect approximately half of City-operated catch basins and maintain those that need it.

2.6 NPDES Program Administration

The City's NPDES compliance program requires administration to develop plans and schedules, administer contracts, maintain tracking systems, process payments, and prepare reports.

2.6.1 Planned Activities

Planned activities for 2018 include:

- Manage contract with consultant for assistance with LID code and manual update implementation.
- Implement new NPDES time tracking procedures for Community Development and Public Works.
- Submit the 2017 Annual Report and attachments, including the 2018 SWMP.
- Submit the annual Permit fee.
- Submit required payments for regional monitoring activities (see Chapter 3).
- Update the SWMP for 2019 activities in late 2018.
- Maintain records of NPDES activities for each Permit component.

3. MONITORING AND ASSESSMENT

3.1 Stormwater Monitoring

Stormwater monitoring requirements are given in Section S8 of the Permit. The basic requirements for stormwater monitoring include the following:

- Provide Ecology with any stormwater-related monitoring or studies conducted by or on behalf of the City.
- Study the effectiveness of the SWMP, either through contributing to Ecology's established regional effort or by conducting stormwater discharge monitoring.
- Pay into a collective fund to conduct source identification and diagnostic monitoring, which will implement the Source Identification Information Repository (SIDIR).

3.1.1 Ongoing Activities

- The City has chosen to pay into the regional effort for monitoring. The City will remit payments to Ecology annually through 2018 for effectiveness monitoring and the SIDIR.

Engineering Department

203 S. Pacific Avenue, PO Box 819 Kelso, WA 98626

MEMO

To: Department of Ecology

From: Van McKay, P.E.

Date: March 21, 2018

Subject: Description of the City's public education and outreach efforts conducted in 2017 to comply with Phase II Permit sections S5.C.1.a.i and ii

To build general awareness, the City made available to the public the Solution to Pollution brochure that describes the hazards of stormwater pollution and specific habits to reduce stormwater pollution.

As much information is now communicated through the Internet, the City maintained and regularly updated its stormwater website with many documents to educate the public on stormwater pollution and the City's stormwater management program (SWMP). The documents include annual reports, educational documents, stormwater management plans, and stormwater ordinances. It also includes supporting documents for the SWMP such as the IDDE program, the O&M program and the Operations SWPPP. The City's stormwater website is located at: http://stormwater.kelso.gov.

The City provided financial support for Earth Day. The funds were earmarked to help with the Earth Day bag contest. This contest uses art as a vehicle to educate school children on stormwater and water quality issues.

Clean Water Partners (CWP), that includes permittees and secondary permittees in the area, had meetings to further its combined educational efforts. The purpose of the CWP is to develop media materials necessary to undertake a regional social marketing strategy and to disseminate these media within the area. CWP held its first annual "Solutions to Stormwater Pollution" calendar contest where middle school students submitted artwork and haikus and won prizes. The City spearheaded the contest.

S5.C.3.e (IDDE Log)

Date In	Inspection, Caller, or Hotline	Spill, Illicit Dumpn/Dischrg or Connection, or PR Feedback	Caller Information	Location	Problem	Response Date	Discussion of Actions and Resolution (Van McKay unless otherwise noted)	Date Completed	Days to Respond	Days to Conclude	Illicit Discharge or Connection eliminated?
3/13/2017	C	D	REDACTED	1013 N. 3rd Ave at Donation St.	Cream colored paint was discharging from a trash can in the street, mixing with stormwater and discharging to the SW corner catch basin.	3/13/2017	Received a call from on stormwater as white as milk discharging to the catch basin. When I arrived at 10:20 Brian Hogue/Tom Powers were on the scene. One of the four trash cans was discharging paint and there were paint cans in the trash can, labeled 2. Photos were taken of the discharge to the catch basin. B. Hogue left for Watkins Tractor to get a catch basin filter. I contacted residents in this 4 apartment building until one person knew about the paint. He claimed paint cans and other trash were left next to the trash cans so he put it all in the trash cans. I found out the names of the owner (Ron Lucas 503-369-1553) and maintenance person (Mike Hawn 360-442-8145). Left a message on R. Lucas' voice mail and talked with M. Hawn. I moved the trash can underneath the carport for souce control. M. Hawn said a Jack would respond to the incident. Jack called my office about 11:00 am and said he would be there shortly to clean up the spill. I educated apartment dwellers and M. Hawn on illicit discharges that flow directly to Cowlitz River. R. Lucas called at 11:40 to discuss; I educated him and he said his maintenance staff was working on source control. He also was going to tell all his residents about it and that paint cans with paint need to go to the transfer station. I saw the site was cleaned up in a drive-by inspection at 5:00 pm the same day. 3/17: Follow-up call to say the paint was cleaned up and to consider getting trash cans that don't have holes in them.	3/13/2017	0	0	Y
3/17/2017	C	D	REDACTED	210 S. 9th Ave	Girl dumping wastewater into a catch basin.	4/21/2017	, a neighbor, called to say she witnessed a girl dumping some kind of wastewater into the catch basin adjacent to 210 S. 9th Ave. where the girl lived. I madE a visit to the property and discussed the issue with her father. The visit was educational enforcement and included illicit discharges, polluted discharges to the Cowtliz River and I gave him an illicit discharge ordinance. He said he would discuss this with his daughter.	4/21/2017	35	35	Y
4/4/2017	C	D	REDACTED	301 Allen Str.	Lead paint discharges		On March 31 Van McKay discussed with Rian Salee of Ecology the lead paint discharge issue at the Americal Legion building. She asked me to call the Ecology ERTS line to report the issue so she can begin helping with it. I called the Ecology's ERTS line at 360-407-6300 to report the discharges on April 4 and spoke with a Ruth and a Brian. On or after March 29, I contacted Rian Sallee of Ecology. She is Ecology's liaison for stormwater permittees in southwest Washington. She requested that I report the discharge to the state's spill line which I did on 04/04/2017 and then she would respond. A copy of the ERTS report is attached. 04/20/2017: Rian Sallee responded by saying that Ecology does not regulate lead paint (used to) but the Department of Commerce does. She gave me the contact there: Cynthia Sanderson, 360-725-4000. Rian also said that the US EPA should also regulate lead. Cynthia Sanderson said that the Department of Commerce only regulates lead paint on residential properties and not commercial properties. Her best suggestion would be to contact L&I construction on lead paint at 1-800-423-7233 main line. The contact there was Cheryl Christian (sp?) and I left a message with her at 360-902-5732. 04/21/2017: I spoke with Cheryl Christian from L&I who said they regulate when there are workers onsite. We agreed that as the building is unoccupied, the L&I would not be involved. She encouraged me to contact Ecology again in their toxics reduction section. 05/01/2017: Met Kirsten Alvarez of Ecology's toxics cleanup program onsite. She said she would send a letter to the American Legion cc'ing me on the lead paint chips discharging to neighboring properties/soil and for the owner to clean it up. At most Ecology could list the property as contaminated. The owner wouldn't really have to do anything until the property's sale.				

S5.C.3.e (IDDE Log)

Date In	Inspection, Caller, or Hotline	Spill, Illicit Dumpn/Dischrg or Connection, or PR Feedback	Caller Information	Location	Problem	Response Date	Discussion of Actions and Resolution (Van McKay unless otherwise noted)	Date Completed	Days to Respond	Days to Conclude	Illicit Discharge or Connection eliminated?
							Kirsten sent a letter to the A. Legion on May 9. As of June 2, no response. They have until June 9 to respond. If not, Kirsten will push forward to list the property as suspected contamination. After the review process, I will be cc'd on the letter to A. Legion. Once a property is listed as suspected contaminated, banks are wary to make loans on the property to potential buyers. Find these sites at https://fortress.wa.gov/ecy/neighborhood/ and https://fortress.wa.gov/ecy/gsp/SiteSearchPage.aspx.				
10/18/2017	C	D	REDACTED	Talley Way	Dump site with permeable containment and mud/silt	10/18/2017	Received an email from Brian Andrews of Ecology on 10-18-2017. Attached was an ERTS report with incident number 676577 and a few photographs. The incident was reported by Ecology's industrial permit inspector Kevin Hancock. The site is City property and has been a permitted fill site. I contacted Randy Johnson, Operations Superintendent to verify that the slurry was only from hydroexcavation activities, such as potholing. He verified that the slurry was from this source.	10/18/2017	0	0	N/A
10/27/2017	C	D	REDACTED	305 S. Pacific Ave	Painting contractor spraying tap water with concrete etching fluid with discharge to onsite storm drain	10/27/2017	Skylar Masters initiated response by contacting the employee of Olymplia-based Hoeks Painting who was using tap water with a concrete etching fluiid to etch concrete at the building entrance. Skylar had him stop spraying the mixture and explained that the discharge was an illicit discharge. Skylar subsequently asked me to explain in more detail to the contractor our illicit discharge ordinance. I spoke with Alex Dumar and he didn't know about the ordinance of Kelso's and of any other town. I gave him a copy of the City's ordinance and described stormwater pollution and permitting issues in detail. As the employee had not heard about these issues, he was going to bring it up the the company's management.	10/27/2017	0	0	Y

Low Impact Development Code Update
Final Summary Report

Submitted to:

City of Kelso
203 S. Pacific
P.O. Box 819
Kelso, WA 98626

Prepared by:

Otak, Inc.
700 Washington Street, Suite 300
Vancouver, WA 98660
Otak Project No. 17854

March 8, 2018

Otak

Acknowledgements

Low Impact Development Code Update
Final Summary Report

Submitted to:
City of Kelso
Van McKay

Prepared by:
Otak, Inc.

Jesse Reynolds
Environmental Planner

Trista Kobluskie
Stormwater Planner

Table of Contents

Section 1—Introduction

The City of Kelso is covered under the National Pollutant Discharge Elimination Systems (NPDES) Western Washington Phase II Municipal Stormwater Permit (Permit).

Permit condition S5.C.4.f.i requires Kelso to incorporate and require Low Impact Development (LID) principles and Best Management Practices (BMP) in local development-related codes, rules, and standards by June 30, 2017. The Permit states:

> The intent of the revisions shall be to make LID the preferred and commonly-used approach to site development. The revisions shall be designed to minimize impervious surfaces, native vegetation loss and stormwater runoff in all types of development situations.

Review and Revision Process

The Permit requires Kelso to engage in a process of review and revision of local codes similar to the process outlined in *Integrating LID into Local Codes: A Guidebook for Local Governments* (Puget Sound Partnership, 2012) (Guidebook).

The City hired Otak, Inc. to assist the review and revision process. The project was managed by the City's Senior Stormwater Engineer, Van McKay under the supervision of the Community Development Director, Mike Kardas.

Following the Guidebook closely, the City together with Otak performed the following tasks.

1. Assemble a project team

The project team consisting of city staff members and the Kelso Stormwater Advisory Committee (KSAC) is described in Section 2.

2. Understand general topics to address

Otak provided introductory training presentations to the project team. The regulatory framework, LID concepts, benefits of LID, and the review and update process were introduced.

3. Review existing codes and standards (identify gaps)

Otak produced an initial gap analysis by reviewing all of the City's development-related codes, stormwater codes, and engineering standards. The full list of standards reviewed is discussed in Section 3.

Concurrent with the LID code review process, the City was undertaking an effort to reorganize various development titles into a Unified Development Code (UDC). LID-related gaps in the draft UDC were identified as part of this process. The City's planning consultant participated on the LID project team, attended meetings and incorporated selected LID concepts into proposed drafts of the UDC.

The gap analysis was thoroughly reviewed and discussed with the project team during a series of meetings and was updated to reflect team comments.

Based on the gap analysis, Otak proposed amendments to stormwater codes and engineering standards to meet the goals of making LID the preferred and commonly used approach to site development. As described above, proposed amendments to the UDC were incorporated into drafts by the City's planning consultant.

The complete gap analysis resulting from these reviews is attached as Appendix A.

4. Amend Codes

Proposed code amendments to fill identified gaps were presented to the project team in writing or orally by the City's project manager. Proposed amendments to the UDC were presented in writing by the City's planning consultant to selected team members. Drafts were revised based on comments.

5. Review & Adopt Codes

Through the project, the City undertook a robust public involvement campaign. The campaign is described in the *Low Impact Development Code and Manual Update Public Involvement Summary*, which is Appendix B to this report.

Ultimately, LID-related amendments pertaining to subdivision, land use and planning were incorporated into the UDC and adopted on March 21, 2017 in Ordinance 17-3889.

Amendments pertaining to the Kelso Engineering Design Manual (KEDM) and stormwater regulations in KMC 13.09 were considered separately by City Council. Ordinance 17-3894 was adopted June 20, 2017 to revise the KEDM to both incorporate LID strategies and BMPs and to adopt the current *Stormwater Management Manual for Western Washington*. Ordinance 17-3895 was also adopted June 20, 2017 to amend Chapter 13.09, Stormwater Management, to support requirements of the KEDM and of the *Stormwater Management Manual for Western Washington* and to ensure long-term maintenance of stormwater facilities.

6. Implement

New codes and standards went into effect prior to the Permit deadline of June 30, 2017.

To implement stormwater codes and engineering standards, the City and Otak developed numerous handouts and application forms tailored primarily to applicants for construction on small sites. The City elected to focus on small site applicants because the changes to stormwater requirements were most impactful to those sites.

The list of handouts and applications is provided below.

Title	Audience	Purpose
Stormwater Requirement Thresholds Handout	City Community Development Department counter and review staff, developers, engineers, property owners	• Guide applicants and City staff to categorize a development application as a small site, allowed to use an Abbreviated Stormwater Site Plan, or an engineered site, requiring a Full Stormwater Site Plan
Abbreviated Stormwater Site Plan (ASSP)	Property owners and contractors – small site construction project	• Efficiently and simply guide property owner to meet stormwater requirements and to prepare the permit application without hiring an engineer (in most cases)
Custom Soil Resource Report Instructions (addendum to ASSP)	Property owners and contractors – small site construction project	• Guide property owner to assess soils on the construction site using an online resource
Final Feasibility Checklist (addendum to ASSP)	Property owners and contractors – small site construction project	• Guide property owner to assess feasibility of LID BMPs
Residential Permeable Pavement Design & Construction Guide (addendum to ASSP)	Property owners and contractors – residential small site construction project	• Guide property owner to plan, design, and hire contractor to construct permeable pavement driveway, patio, etc.
Rain Garden Design & Construction Guide for Small Projects (addendum to ASSP)	Property owners and contractors – small site construction project	• Guide property owner to plan, design, and construct a rain garden on a small construction site
Post-Construction Soil Quality and Depth Guide (addendum to ASSP)	Property owners and contractors – small site construction project	• Guide property owner to plan and place required soil amendments on a small construction site
Small Construction Erosion Control Plan	Property owners and contractors – small site construction project	• Efficiently and simply guide property owner to select and use appropriate erosion and sediment control BMPs on a small construction site and to prepare the required Construction Stormwater Pollution Prevention Plan

Title	Audience	Purpose
Maintenance Instructions for Permeable Pavement	Property owners, developers, and engineers	• Standardized instructions for permeable pavement maintenance on private property • May be used to meet a portion of the requirement to provide a maintenance plan in the Full Stormwater Site Plan for engineered projects
Maintenance Instructions for Rain Garden	Property owners, developers, engineers, and landscape maintenance contractors	• Standardized instructions for rain garden maintenance on private property • May be used to meet a portion of the requirement to provide a maintenance plan in the Full Stormwater Site Plan for engineered projects
Full Stormwater Site Plan (FSSP) Counter Checklist	City Community Development Department counter staff, developers, and engineers	• A checklist of all submittal requirements pertaining to a Full Stormwater Site Plan for engineered projects

Timeline

The project began in the spring of 2016 with reviews of existing City codes and standards. A presentation to City Council in June 2016 introduced the project. The project team met through the summer and fall of 2016.

LID-related amendments were included in drafts of the UDC in the winter of 2016-2017. These were presented to Planning Commission in January 2017 and ultimately adopted in March 2017.

Draft amendments to the KEDM and KMC 13.09 were developed through the winter and spring of 2016-2017. They were presented to KSAC in May 2017 and adopted by City Council in June 2017.

Implementation tools and training materials were developed over the summer and fall of 2017. Forms were available to the community beginning in December 2017. A training session for the community was held in December 2017, and a training session for City Community Development staff was held in January 2018.

Summary Report Requirements

Permit condition S5.C.4.f.ii requires Kelso to submit a summary of the results of the review and revision process for S5.C.4.f.i no later than March 31, 2018. This report fulfills these requirements.

The content of this report is consistent with the elements specified in S5.C.4.f.ii:

- A list of the participants (job title, brief job description, and department represented).
- Codes, rules, standards, and other enforceable documents reviewed.
- A summary of revisions made to those documents which incorporate and require LID principals and BMPs. The summary includes existing requirements for LID principals and BMPs and is organized as follows:
  (a) Measures to minimize impervious surfaces;
  (b) Measures to minimize loss of native vegetation and soils; and
  (c) Other measures to minimize stormwater runoff.

Section 2—Participants

Several Kelso employees, citizen advisory committee members and consultants working on behalf of the city took part in meetings, discussions and document reviews.

City Project Team

Name	Job Title	Department	Role
Van McKay	Senior Stormwater Engineer	Community Development	• Manage project • Coordinate internal reviewers • Review and comment on gap analysis • Review proposed amendments to code • Review proposed edits to Kelso Engineering Design Manual • Review proposed new and updated standard details • Coordinate staff reports and presentations to City Council • Coordinate and host public outreach written and online communications, events, and committee meetings • Coordinate and host trainings
Mike Kardas	Community Development Director and City Engineer	Community Development	• Policy decisions • Review gap analysis • Review selected/escalated amendments and edits to code and Kelso Engineering Design Manual • Sign new and updated standard details
Tammy Baraconi	Planning Manager	Community Development	• Review and comment on gap analysis • Review and comment on proposed amendments to code
Gregg Dohrn, G.R. Dohrn and Associates	Planning Consultant	Consultant for Community Development	• Review and comment on gap analysis • Write proposed amendments to development code
Mike Murray	Building Inspector	Community Development, via cooperative agreement with City of Longview	• Review and comment on gap analysis
Randy Johnson	Public Works Director	Public Works	• Review and comment on gap analysis
Jeremy Huff	Deputy Fire Marshal	Cowlitz 2 Fire & Rescue	• Review and comment on gap analysis
Janean Parker	City Attorney	City Attorney's office	• Review and comment on gap analysis • Review and comment on proposed amendments to code

KSAC

KSAC is a citizen advisory committee to the City Council. The KSAC helps guide the implementation of the City's Stormwater Management Program, and the committee reviews all major changes proposed for the program.

The KSAC was an integral part of the project team to review and discuss the gap analysis, review and comment on proposed amendments, and provide a recommendation to City Council on adopting proposed amendments. KSAC's role is also discussed as part of the public involvement campaign. KSAC members are listed below.

Name	Role
Gary Fredricks	Technical Advisor member
Gloria Nichols	Environmental Advocate member
Dan Howell	Recreation Advocate member
Tim Wines	Large Land Owner / Developer member
Erik Olson	Stormwater Permittee / Affected Business Owner member
Madison Forsberg	Youth member
Steffanie Taylor	Citizen member

Consultant Team

A team of consultants from Otak, Inc. assisted Kelso in the code update processes by reviewing municipal code; leading discussions about the gap analysis; and developing code, engineering drawings, and plant lists. Below is a list of these participants and their roles.

Name	Specialization	Role
Cody Kent	Assistant Stormwater Planner	Newsletters, drafting, KEDM edits, develop small projects forms
Enrique Diaz	Engineering Designer, Water Resources	Drafting
Finis Ray	Landscape Designer	Planting templates
Jesse Reynolds	Environmental Planner	Code review, gap analysis, reporting
Maggie Daly	Landscape Designer	Plant lists, planting templates
Marissa Chargualaf	Graphic Design	Graphic design for outreach materials
Shannon Gray	Engineering Designer, Water Resources	Drafting
Tim Kraft, P.E.	Sr. Project Manager	Project oversight, engineering drawings QC, KEDM edits, KEDM QC
Trista Kobluskie	NPDES Lead	Project management, code review, gap analysis, review and comment on proposed code amendments, KEDM edits, internal stakeholder and public engagement, develop small project forms, City Council presentations, trainings

Section 3—Standards Reviewed

The following codes, rules, and standards were reviewed for the gap analysis:

- City of Kelso Chapter 13.09 Stormwater Management
- City of Kelso Title 12 Streets
- City of Kelso Title 17 Unified Development Code (formerly Titles 15 Building and Construction; 16, Subdivisions; and 18, Environment)[1]
- City of Kelso Engineering Design Manual[2]
- City of Kelso Standard Plans and Specifications

The complete gap analyses resulting from these reviews are attached as Appendix A.[3]

[1] The municipal LID code update process, in compliance with municipal Permit condition S5.C.4.f.i, was integrated into a larger City effort to unify all city development codes into a single title. This involved updating and rearranging of the Zoning, Building, Subdivision, Environment, and Project Permitting Codes. Title 17 was amended and became the Unified Development Code in the City's Ordinance 17-3889. The LID code updates were integrated into this overall process.

[2] During the municipal LID code update process, in compliance with municipal Permit condition S5.C.4.f.i, the City also undertook an update to the Kelso Engineering Design Manual to adopt the 2012 Stormwater Management Manual for Western Washington, as amended December 2014. This update was approved in the City's Ordinance 17-3894. The LID code updates were integrated into this overall process.

[3]See Note 1. The Gap Analysis was initiated before Ordinance 17-3889 was enacted, thus references reflect former titles and sections.

Section 4—Revisions

To incorporate LID principles and BMPs, the following were amended or created:

- Title 13 Section 09, Stormwater Management
- Title 17[4], Unified Development Code
- KEDM[5]

Ordinance 17-3889, adopted March 21, 2017, reorganized the City's development codes and adopted LID-related development standards. Ordinance 17-3894, adopted June 20, 2017, revised the KEDM to both incorporate LID strategies and BMPs and to adopt the current *Stormwater Management Manual for Western Washington*. Ordinance 17-3895, adopted June 20, 2017, amended Chapter 13.09, Stormwater Management, to support requirements of the KEDM and SWMMWW and to ensure long-term maintenance of stormwater facilities.

Amendments and existing language that supports LID are summarized below. Items are organized by the following LID principles: measures to minimize impervious surface, measures to minimize loss of native vegetation and soils, and other measures to minimize stormwater runoff.

(a) Measures to minimize impervious surfaces

- Table 17.22.020 Density, Dimension, Height, and Setback Requirements now applies maximum lot coverages with impervious surfaces to the following zones: RSF-5, RSF-10, RMD, and NC.
- Title 17 Section 22.020(B)(2) states that impervious or hardened surfaces are prohibited in all required setbacks, except for approved driveways and sidewalks.
- Title 17 Section 17.22.100(E)(1) now requires a landscaped area of 30% in RMF zones, where it was previously 20%. Section 17.22.100(E)(2) now requires a landscape area of 20%, where it was previously 10%.
- Title 17 Section 22.110 now allows street parking to be used to satisfy on-site parking requirements in various zones, and it eliminates minimum and maximum parking for all non-residential uses and instead requires applicant to demonstrate parking demand.
- KEDM 3.02 now promotes ribbon (two-track) driveways when driveways are less than 100 feet in length.
- KEDM 3.02 now encourages permeable pavement where feasible in accordance with the 2014 Stormwater Manual for Western Washington (SWMMWW) for commercial driveways and commercial parking lots.
- KEDM 3.03 now allows alternate lane widths and allows sidewalks on only one side of the road in new subdivisions with approval.

[4] See Note 1.
[5] See Note 2.

- KEDM Figure 3-6 & Figure 3-6a are updated to allow alternate pavement widths with approval in traffic calming access roads and single-family roads.
- KEDM Figure 3-6 & Figure 3-6a are updated to allow sidewalks on one side of the street with approval on traffic calming access roads and single-family roads.
- KEDM 3.09 allows modification to right-of-way widths with approval when pavement width is modified.
- KEDM 3.26 encourages the use of permeable pavement in commercial driveways where feasible.
- In a planned future update of the City's standard plans, the city plans to update ST-160, Driveway Approach, to show residential driveway widths down to 9 ft width and to reduce maximum commercial/industrial two-way driveway width from 30 ft to 28 ft.

(b) Measures to minimize loss of native vegetation and soils

- Title 17 Section 10.130(B)(3) now states site plan review applications submitted to the city should include areas to be preserved or protected for the implementation of LID stormwater features.
- Title 17 Section 22.100(C)(3)(a) now allows the retention of significant trees to contribute to meeting the LID development requirements in the Kelso Engineering Design Manual (KEDM).
- Title 17 Section 34.030 now requires plats to be designed to preserve and enhance natural features.
- Title 17 Section 50.30 adopts local amendments to the grading code from the International Building Code Appendix J, which now states: "all sites should be designed to the extent feasible to limit disturbance, preserve vegetation, preserve topsoils, and preserve areas of existing infiltration" (see Section J 104.2 Additions to Site Plan Requirements).
- KEDM 1.14 has added language covering soil preservation and amendment, in particular areas that have been designated for LID BMPs.
- KEDM 3.26 is updated to encourage preservation of existing trees within proposed parking lot landscape areas.

(c) Other measure to minimize stormwater runoff

- Title 13 Section 09.020(2)(d) elaborates on the definition of Best Management Practices to include LID with an emphasis on pre-development conditions.
- Title 13 Section 09.020(20) adds the definition of "Hard Surface" which includes impervious surface, permeable pavement, and vegetated roofs.

- Title 13 Section 09.020(25) now elaborates on the definition of "Impervious Surface" to include non-vegetated surfaces and rooftops.
- Title 13 Section 09.020(28) elaborates on the definition of LID and emphasizes pre-development conditions.
- Title 13 Section 09.050 now states the adopted KEDM includes LID competing needs criteria.
- Title 13 Section 09.140(A) is added to require easements for maintenance in stormwater facilities.
- Title 17 Section 22.020(A)(4) now allows maximum building height to be increased with a Type 2 variance.
- Title 17 Sections 22.020(B)(1) & (3) encourage all required setbacks to contain LID features.
- Title 17 Section 22.030(C) permits zero lot line development for single-family dwellings in the R-5 and RMD zones in order to promote LID, among other reasons.
- Title 17 Section 22.100(A)(5) is amended to encourage LID stormwater features in landscaping, in addition to native vegetation and drought-resistant plant material.
- Title 17 Sections 22.100(C)(2)(e) & (g)(7) now require LID features and facilities in landscaping plans submitted to the City.
- Title 17 Section 22.100(C)(11) now allows LID stormwater features to be located in required setbacks and landscaping areas, and allows LID to contribute to meeting landscaping requirements.
- Title 17 Section 38.020(A)(5)(l) now requires master plan development site plans to include site descriptions of the natural hydrology of a site.
- Title 17 Section 38.020(A)(5)(l) now requires master plan development site plans to include the location and nature of all required stormwater improvements including LID.
- KEDM 2.04 was added as guidance for stormwater facility plantings, and includes optional schematic planting plans, and cites the LID Technical Manual plant lists.
- KEDM 2.06 now establishes setbacks from structures, sensitive areas, property lines, and other items suggested or required in the SWMMWW.
- KEDM 2.13 now allows curb drains and perforated connections only after on-site stormwater management requirements have been satisfied.
- KEDM 3.03 now allows bioretention in planters and landscaping strips. Street parking lanes may have bioretention with approval.
- KEDM 3.03 now allows utilities to be placed under the sidewalk in new subdivisions with approval if on-site bioretention is used to manage stormwater on residential lots.
- KEDM Figure 3-6 & Figure 3-6a are updated to allow placement of utilities under the sidewalk in new subdivisions if bioretention is used in traffic calming access areas and single-family areas.
- KEDM 3.16 is updated to allow sidewalks to slope either direction to direct runoff to an adjacent bioretention or sheet flow dispersion BMP.

- KEDM 3.19 now includes planting specifications for bioretention in the right-of-way, and requires adjacent property owners to maintain the bioretention plants. Plants within bioretention curb extensions are to be maintained by the City.
- KEDM Table 3.10 is now included, a bioretention plant list suitable for use in the right-of-way.
- KEDM Figure 3.12 allows a street tree to be planted within a bioretention BMP when bioretention is placed in the right-of-way to manage stormwater runoff.
- KEDM 3.26 now allows curb cuts and bioretention in parking facility landscaping. Plant spacing requirements are relaxed to accommodate bioretention, where necessary.
- KEDM 3.26 now states LID stormwater facilities may be located in required landscaping where feasible.
- KEDM 4.18 is updated with the addition of LID facilities to the list of BMPs that may require tracts and easements.

Appendix A – Gap Analyses

Site Planning and Assessment — Gap Analysis Worksheet & Summary

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap*	*Steps Taken*	*Category for Permit*
Site Assessment and Design	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 16 - Subdivisions** **16.28.010 – 090 – Sketch Plan through Final Plat**	Standards for showing geographic and administrative features and boundaries on various plans ranging from the sketch plan presented at the preapplication conference to the final plat are given.	In order to bring low impact development into consideration at the earliest stages of site design, consider increasing the requirement for depicting existing features to include wetlands, potential wetlands, and areas of permeable soils. In addition, consider requiring greater detail about proposed stormwater best management practices early in the process. Require this inventory either at the sketch plan or preliminary plat. To ensure adequate assessment for all types of land divisions, consider requiring a similar assessment for short subdivisions and binding site plans (Title 16, Divisions II and III, respectively).	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **17.34.030 UDC Plat Design Standards reads:** Plats shall be designed to preserve and enhance natural features and resources, including natural contours, natural hydrology, watercourses, marshes, permeable soils, native vegetation, scenic points, large trees, natural groves and native vegetation, rock formations and sensitive areas; to be compatible with aesthetic values of the area; and to reflect natural limitations inherent in the property.	☐ **Minimize impervious** ☒ **Retain vegetation and soils** ☐ **Manage stormwater close to source**
		16.20.050 – Natural features preservation **17.34.030(B) – Plat Design Standards**	Plats shall be designed to preserve and enhance natural features and resources, including contours, watercourses, marshes, scenic points, large trees, natural groves, rock formations, and sensitive areas.	This language is supportive to an extent, but could be strengthened for LID by including areas of permeable soils and native vegetation in the inventory of features to be preserved.		
		16.20.070 – Effect on plat design	Requires plat design to reflect natural limitations and hazards inherent in the property and placement of roads, buildings, utilities, and open space to reflect such limitations.	This language is supportive to an extent but could be strengthened greatly for LID by requiring plat design to reflect opportunities inherent in the site for on-site stormwater management by preserving areas of permeable soils and native vegetation. **Discussion 6/14/16:** Site analysis at the earliest stages shifts the burden of cost forward. Does the city want to specifically require geotechnical analysis for pre-application in land division? There is reluctance to require this without some incentive or		

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap*	*Steps Taken*	*Category for Permit*
				compensation such as a density credit. Large parcel subdivision is <u>not</u> much expected in Kelso, so site planning standards that focus on raw land conversion are not very pertinent; however making a small change to 16.20.050 (or current proposed equivalent) could bring the issue to light earlier in the development process. Note that the only large parcels are east of I-5 in an area with geologic challenges. Any development in that area must be careful and investigate the subsurface conditions well. In practice, 16.20.050 probably acts like a "should" more than a "shall". 17.34.030 in the new UDC should add "native soils and permeable soils" to the list of preserved resources. Alternately, the sentence reading "Plats shall be designed…to reflect natural limitations inherent…" could be updated to read "…to reflect natural limitations <u>and opportunities for stormwater infiltration and dispersion</u>…" This language should also be added to the new Master Plan section. Between the two, all new residential land divisions are covered without needed to add significant new requirements for site assessment. What about other land divisions or other development that does not involve land division? Can we ensure measures to preserve and enhance natural features and resources are required there, too? If additional site analysis is required at the preapplication stage, can the City offer a density credit to offset the costs?		

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap*	*Steps Taken*	*Category for Permit*
				KSAC Discussion 6/28/16: If Kelso annexes to the North, more large lots that could be subdivided may become open for development under Kelso's codes. The current stock of subdividable parcels is in the east hills, where people are unlikely to develop because of landslide hazard. Kelso is hilly in many spots. Water runs downhill, so stormwater facilities will be located at the downhill spot on a site, regardless of any additional site planning language added to the code. A change to site planning language doesn't seem to be needed to accomplish the goals. This goes for the following sub-topic, "Stormwater treatment/flow control BMP/facility locations", below.		
Stormwater treatment/flow control BMP/facility locations	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 13 – Public Services 13.09.020(2) & (25) – Definitions**	Best management practice definitions including flow control and LID.	Keep this language, it is supportive.	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Technical requirements in the SWMMWW should adequately prompt designers to site stormwater facilities over areas of most permeable soil. Note that 17.22.020 UDC allows LID features in setbacks.	☐ **Minimize impervious** ☐ **Retain vegetation and soils** ☒ **Manage stormwater close to source**
		13.09.050(2) – General requirements	LID BMPs shall be preferentially used as practicable in all activities subject to regulation in this chapter.	Keep this language, it is supportive.		
		Title 16 - Subdivisions 16.20.130(F) – Lot design	Lots shall be laid to provide drainage away from buildings and coordinated with the drainage of the area. Drainage shall not be designed to concentrate stormwater on an adjacent lot.	Consider adding text encouraging on-site stormwater infiltration facilities and other LID techniques such as native soil preservation.		
		16.24.010(A)	Required improvements include a drainage system connected to drainage ways or storm sewers.	Consider adding text encouraging a soils analysis and placement of infiltration facilities, when proposed, over areas with the most permeable soils.		
		Title 16, Divisions I, II, and III	Various standards for subdivision layout are given.	In order to make use of the most appropriate soils for LID facilities and infiltration facilities, consider encouraging or requiring stormwater facilities to be located over the most permeable soils. Note: implementing this requirement		

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap*	*Steps Taken*	*Category for Permit*
				effectively would necessitate encouraging or requiring site assessment, as noted above. **Discussion 6/14/16:** A smart site designer will choose to use infiltration when it's possible and will locate infiltrating facilities where the soils are most capable of handling the expected runoff. Otherwise, facility sizes increase and more land is consumed for stormwater management. The technical requirements alone should adequately drive these decisions, so it may not be necessary to explicitly state a requirement in development code. From City's perspective, this discussion does not belong in development code and should be left to KEDM. **KSAC Discussion 6/28/16:** See discussion of previous sub-topic. **Additional Findings:** UDC: 17.22.080.G lists projections allowed into required yards. Add bioretention and rain gardens specifically to this list, where feasible.		
Building locations	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 16 - Subdivisions** **16.20.130(D) – Lot design** **16.20.160 – Lot and block design, commercial and industrial uses.**	Where applicable lots should be designed to promote solar access. To ensure commercial and industrial areas are designed for their intended purpose the hearing examiner or council may require a plan including: structure placement, circulation system, off-street parking, pedestrian circulation, open spaces	Consider adding an element to preserve native soils in site design as well as solar access. In order to make use of the most appropriate soils for LID facilities and infiltration facilities, consider encouraging or requiring placement of structures away from soils with greatest permeability. Note: implementing this requirement effectively would necessitate encouraging or requiring site assessment, as noted above.	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** With infill and redevelopment on already impacted lots, specific regulation of building location within the UDC is not practical. Little greenfield development is expected.	☐ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap*	*Steps Taken*	*Category for Permit*
		Title 18 - Environment 18.20.090(B)(3) – Fish and wildlife habitat conservation areas	Locate buildings and structures to preserve habitat and minimize impacts.	Keep this language, it is supportive. **Discussion 6/14/16:** With infill and redevelopment on already impacted lots, specific regulation of building location within the UDC is not practical. Little greenfield development is expected. **KSAC Discussion 6/28/16:** See discussion above.		
Parking area locations	☐ **Yes** ☒ **No** ☐ **Does not apply**	**Title 18 - Environment 18.20.110(B)(1)(b)(iii) – Geologic hazard areas**	Parking should be designed to parallel the natural contours of the site in a geologic hazard area.	Keep this language, it is supportive. However, location of parking is not regulated anywhere else that we found. In order to make use of the most appropriate soils for LID facilities and infiltration facilities, consider encouraging or requiring placement of structures away from soils with greatest permeability within either Title 16 or 17. **Discussion 6/14/16:** Parking area locations have been fully revised in the proposed UDC. This sub-topic requires re-review. **Additional Review:** UDC 17.26.080 Geologic Hazard Areas still contains the language recommending parking be parallel to natural contours in a geologic hazard area. UDC 17.22.190 West Kelso Overlay Zone at sections (A)(4)(d) and (B)(1)(b) require parking to be located behind or to the side of buildings. We found no other guidance or restriction on the placement of parking on sites.	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Location of parking is flexible throughout most districts and should allow placement over the most appropriate soils.	☐ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap*	*Steps Taken*	*Category for Permit*
				Flexibility in locating parking is supportive of LID as it could allow placement of the parking surfaces where the soils are most suitable. More supportive would be guidance to place impervious parking over the least permeable areas of the site and pervious parking over better-draining soils. No change recommended.		

Healthy Soils — Gap Analysis Worksheet & Summary

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
Protecting and restoring healthy soil	☐ **Yes** ☒ **No** ☐ **Does not apply**	**Title 17 – Zoning 17.40.050(F)(7) – Landscaping**	At least 2in of composted organic mulch shall cover ground at finish grade to minimize evaporation.	Keep this language, it is supportive. Note that landscaping installed to meet Minimum Requirement #5 of the stormwater manual will need to meet amendment and mulch requirements specified in the manual.	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **KEDM Section 1.14 updated to include a new list item:** The Contractor shall preserve areas of the site that have been designated for LID BMPs, including those areas to be preserved for dispersion, native vegetation retention, bioretention, rain garden, and permeable pavements. **Title 17 Section 50.30 amended**. Section 50.30 adopts local amendments to the grading code from the International Building Code (Appendix J). The local amendments contain elements that encourage minimizing disturbance to native vegetation, soils, and areas of existing infiltration (Section J 104.2 Additions to Site Plan Requirements).	☐ **Minimize impervious** ☒ **Retain vegetation and soils** ☐ **Manage stormwater close to source**
		KEDM Chapter 1, Section 1.14 Preservation, Restoration, and Cleanup, A. Site Restoration and Cleanup (page 1-45)	Section discusses stockpiling of excavated material, and leaving the surfaces in a condition equivalent to their original condition. Section does not discuss protecting soils during construction to preserve their ability to absorb and infiltrate stormwater runoff.	Consider incorporating language to encourage excavated duff/native soils to remain on-site in a stockpile and be incorporated back into the landscaped area. Consider deferring to the SWMMWW 2014 BMP T5.13: Post-Construction Soil Quality and Depth BMP for re-incorporation of topsoil/duff back into the landscaped areas. Consider identifying soil protection zones. Consider adding language about protecting the soil moisture holding capacity of new pervious surfaces.		
		KEDM Chapter 2 – Erosion Control, Clearing, and Grading	Chapter on clearing and grading focuses almost exclusively on erosion and sedimentation control measures, but does not regulate or encourage protection of healthy soil by requiring a soil management plan or requiring site assessment to identify areas of healthy native soil (e.g. intact duff layer, no previous compaction). However, Element #1 – Preserve Vegetation/Mark Clearing Limits – on page 2-6 does state that existing vegetation and native top soil shall be retained in an undisturbed state to the maximum degree practicable (i.e. minimize and/or phase cut and fill and clearing).	Can language to encourage or require identification and protection of areas of healthy soil during the clearing and grading process be strengthened? **Discussion 6/14/16:** Language regarding mulch has been removed from the proposed UDC. That is fine as the KEDM and SWMMWW should control soil amendments. New UDC 17.50 adopts and amends the International Building Code. An amendment needs to be added to ensure standalone grading and building permit projects (no site plan review, no engineering review) appropriately trigger KEDM for stormwater at established thresholds. <u>Proposed adjustment made in</u>		

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
				draft UDC. **KSAC Discussion 6/28/16:** The group wondered if Kelso is thus far planning to *require* a minimum limitation on site disturbance and compaction. No, the idea is more to prompt users to think about limiting site disturbance and compaction by mentioning the idea in either the UDC or the KEDM. Adding suggestions clutters up the code, making it more difficult to use in the end. There is a concern about "encouraged" language being enforced as "required" by City officials. Land is constrained in Kelso, and it already requires thought and phasing to get equipment and materials in and out of constrained construction sites. Avoiding site disturbance and compaction can have an incremental benefit. If just a small corner of the site does not get disturbed, and that is repeated on site after site, the amount of undisturbed land adds up. There was support in the group for suggesting and prompting to think about avoiding disturbance. There was not support to require a minimum area of undisturbed land on a grading site.		
Compost amendments	☐ **Yes** ☒ **No** ☐ **Does not apply**	**Title 17 – Zoning 17.40.050(F)(8) – Landscaping**	Existing soils may need to be augmented with fully composted organics.	Keep this language, it is supportive. Note that landscaping installed to meet Minimum Requirement #5 of the stormwater manual will need to meet amendment and mulch requirements specified in the manual. **Discussion:** Language regarding augmenting soils has been removed from proposed UDC.	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **KEDM Section 1.14 updated to include a new list item:** All soils disturbed by the Contractor's operations shall be amended to meet the standards of BMP T5.13, Post-Construction Soil Quality and Depth, in accordance with	☐ **Minimize impervious** ☒ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
				Instead, leave standards for soil amendments in the KEDM. We may need to add language regarding inspection and verification of BMP T5.13, Post-Construction Soil Quality and Depth, to KEDM in either Ch 1 or Ch 2.	Chapter 4 of these standards and the SMMWW. **KEDM Chapters 1 and 4** adopt the SMMWW, which requires soil amendments on all development and redevelopment sites that disturb more than 7,000 sf or creates/replaces more than 5,000 sf hard surface.	
Compaction	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 17 – Zoning 17.40.050(D)(2)(c) – Landscaping** **KEDM**	No compaction or removal of native soil shall occur in the defined area of significant trees and tree stands. No standards requiring a general avoidance of soil compaction were found. We note that we are specifically not discussing compaction under buildings, roads, other infrastructure, or infiltration best management practices.	Keep this language, it is supportive. Consider limiting type of equipment used in clearing and grading to minimize compaction of soils. Consider regulating clearing, grading, and soil disturbance outside the building and infrastructure footprint to limit compaction of soils. **Discussion 6/14/16:** When / where should the city require avoidance of compaction? Should the KEDM and/or Appendix J, Grading, of the IBC recommend or require that infiltration testing for LID and traditional infiltration BMPs (e.g. infiltration basin) be performed before any grading is done and that the grading plan then avoid disturbing or compacting any areas that are planned for infiltration? The group discussed order of operations for infiltration testing and grading. An infiltration rate test done before site grading could be invalidated by the grading activities unless the areas designated for infiltration are protected. An option is to allow mass grading followed by infiltration tests. Keep in mind, however, that the SWMMWW will require restoration of all disturbed soils on	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** The same update pertinent to "Protecting and Restoring Healthy Soil" above, serves to help limit compaction. **KEDM Section 1.14 updated to include a new list item:** The Contractor shall preserve areas of the site that have been designated for LID BMPs, including those areas to be preserved for dispersion, native vegetation retention, bioretention, rain garden, and permeable pavements.	☐ **Minimize impervious** ☒ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
				the site that will not eventually be covered by buildings or hard surfaces. The easiest way to do that is to avoid disturbance/compaction in the first place. Note that the City already plans to combine KEDM Ch 2 (Erosion Control, Clearing, and Grading) with KEDM Ch 4 (Storm Drainage). Also note that the SEPA threshold for grading is 500 cu. yd. over the life of the project. The group discussed if the new Site Plan Review process in 17.10.130 of the proposed UDC is an appropriate place to require limitation on compaction. **Additional Research:** An option would be to insert language in KEDM 4.04 – Overview of Development Requirements – that states "Stormwater Site Plans shall use site-appropriate development principles to retain native vegetation and minimize impervious surfaces to the extent feasible." Stormwater Site Plan language is taken from MR #1: Preparation of Stormwater Site Plans in the 2014 SWMMWW. This should encourage protection of soils, too.		

Landscaping and Native Vegetation — Gap Analysis Worksheet & Summary

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
Tree preservation	☐ **Yes** ☐ **No** ☐ **Does not apply**	**Title 15 – Buildings and Constructions** **15.05.030 – Preconstruction Land Clearing – Intent**	The purpose is to preserve and protect natural vegetation…minimize erosion and sedimentation…and minimize adverse effects on ground and surface water.	This language is supportive of LID.	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :**	☐ **Minimize impervious** ☒ **Retain vegetation and soils** ☐ **Manage stormwater close to source**
		15.05.060(C) & (D) Permit application.	A map of the site is required showing critical areas and trees over four inches diameter, groups of trees, and a description of vegetation proposed to be removed with what equipment.	Consider requiring the list of species of tree/vegetation in order to identify and preserve native vegetation.	**17.22.100 Landscaping UDC amended** to encourage tree preservation and incorporation of trees into site design. Proposed standard is less supportive of tree retention than existing language, but is more practical for Kelso. **KEDM Chapters 1 and 4 adopt the SMMWW**, which has credits for tree retention, which should also serve to encourage retention.	
		15.05.050 – Exemptions	Exempts from need to acquire a permit for removal of trees from developed platted lots	This exemption is not applicable to development, but could result in unregulated removal of native vegetation.		
		Title 16 – Subdivisions **16.08.210 - "S" definitions**	"Significant tree" includes 1) evergreen tree 10in diameter or greater, 2) deciduous tree 12in diameter or greater, 3) all trees in a critical area buffer.	Keep this language, it is supportive. Consider adding text to greater encourage native evergreens.		
		16.20.050 – Natural features preservation	Plats shall be designed to preserve natural features and resources, including large/significant trees.	Keep this language, it is supportive. Consider revising code to place greater emphasis on preserving conifers.		
		Title 17 – Zoning **17.08.020 – Definitions "S"**	"Significant tree" means the following: an evergreen tree with 10in diameter or greater, a deciduous tree with 12in diameter or greater, all trees in critical area buffers.	Keep this language, it is supportive.		
		17.40.050(A)(1) – Landscaping	Retain existing vegetation and significant trees by incorporating them into site design.	Keep this language, it is supportive.		
		17.40.050(C)(3) – Landscaping	Existing vegetation may be used in lieu of new plant material for screening if not used to meet another requirement.	Keep this language, it is supportive.		
		17.40.050(D) Landscaping	To preserve the forested character in	Keep this language, it is supportive. It		

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
			areas of Kelso significant trees and tree stands shall be preserved. Requires significant trees and stands within areas for perimeter landscaping to be retained, and allows width averaging to save significant trees. Within site interior, requires retention or replacement of 30% of significant tree canopy including those retained in perimeter landscaping and critical areas or retention or replacement of 15% of the total number of significant trees not including those in perimeter landscaping and critical areas.	could be improved in support of LID by allowing or encouraging removed deciduous trees to be replaced by evergreen trees, which manage stormwater more efficiently.		
		17.40.050(K)(4) – Landscaping	Also requires protection of significant trees and tree stands during construction.	Keep this language, it is supportive.		
		Title 18 – Environment 18.20.090(B)(8) – Fish and wildlife habitat conservation areas	Development applicant shall submit a tree retention plan concurrent with application, including a tree survey, and a plan identifying significant trees and tree stands. Mitigation plans should preserve trees to the extent possible.	Keep this language, it is supportive.		
		Chapter 1, Section 1.04 Submittal Requirements – Preliminary Stormwater Plan. Section E – Onsite Stormwater Management BMPs (page 1-18)	Plans must show the areas of retained native vegetation.	Keep this language, it is supportive.		
		Chapter 3, Section 3.11 Street Frontage Improvements	Does not require that existing vegetation is retained, or replanted, if disturbed during development when there are frontage improvements.	Consider incorporating language that requires existing native vegetation to be retained, or replanted, during frontage improvements. **Discussion 6/14/16:** The following changes are in the proposed		

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				UDC: - No requirement for street trees. - The definition of “significant tree” remains. - 17.22.110 Landscaping: - retains language “encouraging retention of existing vegetation, tree stands and significant trees by incorporating them into the site design” and “incorporating native vegetation and drought-resistant plant material into new landscape developments, as appropriate” - removes a lot of language requiring and giving standards for retention or replacement of significant trees and tree stands on sites. Replaces this with a small amount of language encouraging retention or replacement of significant trees and mature landscaping. With proposed UDC not requiring street trees, KEDM should be re-evaluated. Figure 3-12 shows the minimum street improvement that appears to include a planting strip with street trees; however none of the supporting text seems to require a planting strip or street trees. Standards are given for <u>when</u> landscaping is provided in the ROW in sections 3.11 – Street Frontage Improvements and 3.19 – Landscaping in the ROW, Easements, and Access Tracts. There is a tree list but nowhere is it required to install trees from the list. Observations about trees in Title 18 Critical Areas are fine, but the City does not want to make any changes to Shorelines due to extensive review requirements. Shoreline language is already supportive of tree retention.		

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				Additional Research / Recommendation: Proposed language in 17.22.110 is less supportive of tree retention than existing language, but is more practical for Kelso. Note that credits are available in the 2014 SWMMWW for sites that retain trees and native vegetation, which should provide some additional incentive to retain or restore vegetation. Consider promoting and highlighting the available credits so that applicants are aware of them. **KSAC Discussion 8/2/2016:** At least one member is not supportive of requiring any tree retention. There is a concern the city could be sued if a tree that the city required to be retained falls and injures somebody. It also is difficult to do a site plan around existing vegetation. It appears the proposed language in the UDC "encourages" tree retention rather than requires it.		
Screening	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 16 - Subdivisions** **16.24.070 – Landscaping-Screening** **Title 17 – Zoning** **17.40.050(C) – Landscaping**	Fences/hedges/landscaped buffers must be installed to separate any clashing land uses such as residential bordering commercial/industrial and arterials, and critical areas. Table 17.40.050(B) indicates perimeter landscaping required when a property abuts specific zoning and land uses.	Consider revising code to encourage the use of native vegetation and vegetation within LID facilities to count as screening. To facilitate the use of bioretention, consider counting vegetation planted within LID facilities as landscaping if it provides adequate screening. Allow some flexibility in plant type and spacing when bioretention is used. Also, consider encouraging native vegetation in addition to the existing requirements for evergreen plantings (apart from provisions in 17.40.050(F)).	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **17.22.100 Landscaping UDC amended** to explicitly allow LID stormwater features to be located in required setbacks and contribute to meeting landscaping requirements.	☐ **Minimize impervious** ☐ **Retain vegetation and soils** ☒ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
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		17.40.050(C)(6) – Landscaping	Earth berms in combination with vegetation may be used to achieve initial plant requirements.	Consider adding flexibility on initial plant heights to avoid the use of berms, as they reduce the ability to use bioretention in the landscaped area. **Discussion 6/14/16:** Requirements for screening and buffers have been clarified and strengthened in the proposed UDC in sections 110 and 111. Group tended to agree that language requiring screens, buffers and landscaping should be clear that bioretention is allowed to meet the requirements. Some standards may need to be more flexible in order to accommodate both purposes. For example, requirements for a continuous hedge may be incompatible with bioretention, while a bioretention facility planted only with grasses and emergent may not provide adequate screening. **Additional Research and Recommendation:** New findings in review of proposed UDC: - “screen” appears to have been replaced by “buffer” and “landscaping buffer”, and requirements are given in 17.22.100(E)-(G). Recommend explicitly allowing bioretention to meet onsite landscaping (F) and perimeter landscaping (G). Discussion with a landscape designer regarding the proposed (F): For each 25 feet of property line needing a buffer, a 500 sf buffer is required (25’ x 20’). At 100 sf/tree and 7.8 sf/shrub (at 3’ oc), 178 sf is needed for the plantings. This leaves 322 sf available for bioretention		

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				within each 500 sf buffer "cell". This is adequate for a bioretention facility. A 100' property line would require a 2000 sf landscaped buffer – 4 cells. If plantings were grouped, a bioretention facility could be placed between groups. To achieve adequate height/screening, consider the following: 1) a 10' bioretention swale could run the length of the 20' wide strip, leaving 10' along the whole property line for trees and shrubs, or 2) non-bioretention plants could be clumped, and a bioretention cell between clumps could provide softened screening that includes less densely-planted shrubs, tall ornamentals that bloom primarily in summer, and native grasses, emergents, and groundcovers. **KSAC Discussion 8/2/2016** Members seemed strongly supportive of integrating bioretention into screening requirements. The group supported the ideas of prioritizing plant selection and spacing for facility function where bioretention is used in a screen over plant selection and spacing to achieve the screening objectives. One member mentioned that allowing sheet flow entrances to bioretention also can help in site design. Requiring a catch basin, on the other hand, brings facility bottom elevations down and complicates drainage design.		
Landscaping requirements for street frontages	☒ **Yes** ☐ **No** ☐ **Does not apply**	**KEDM** **Section 3.11 – Streets, Frontage Improvements**	Figure 3-12 shows minimum street improvement. Illustration shows a tree planting strip, but gives no standards for it.	Frontage improvement requirements are of interest to LID design because frontages can be used to manage stormwater. Are there opportunities to better support the use of bioretention or dispersion in	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :**	☐ **Minimize impervious** ☐ **Retain vegetation and soils** ☒ **Manage stormwater close to source**

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		Chapter 3, Section 3.19 Landscaping in the Right-of-Way, Easement, and Access Tracts (page 3-34)	Criteria for planting strips are given. A tree list is given. No language on native vegetation or LID-friendly vegetation in the ROW.	frontages by altering these standards? Consider incorporating language to promote native vegetation and trees in the landscape strip in lieu of grass/sod or the current list of trees that is not necessarily focused on native trees. Consider developing a plant list, including trees, for bioretention used in the ROW to facilitate its use. **Discussion 6/14/16:** As discussed above, minimum street improvement illustration 3-12 in the KEDM does not enforce any provision for landscaping on street frontages. There essentially is no requirement for this. The City cannot maintain landscaping or stormwater facilities in frontages. On further consideration, the City could maintain bioretention facilities in the ROW taking runoff from public roads. Curb extensions are good for retrofits, but might not be used for new streets. There are minor proposed changes to KEDM Ch 3, mostly about sight triangles. The idea is to move all technical standards into KEDM and keep them out of the UDC. Modifications to Ch 3 or Ch 4 showing bioretention in the ROW would be acceptable. Limit these facilities to handling runoff from the public road. **KSAC Discussion 8/2/2016:** KSAC discussed responsibility for maintenance of facilities in the right of way. If a bioretention facility is located in the planter strip, who is responsible to maintain it? The group expressed concern	**Standard Plans** updated to include an option for using bioretention in the planting strip in street frontage. **KEDM Chapter 3 updated** to specify maintenance responsibility for plants within bioretention in the ROW. Plants in bioretention planters in the landscape strip are to be maintained by adjacent property owner. Plants within bioretention curb extension to be maintained by the City.	

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				about the city's ability to afford the maintenance. Some options for bioretention maintenance in the ROW could include seasonal staff, hiring a landscaping contractor, hiring additional permanent city staff. The group was also concerned about enforcement if private property owners are responsible for maintenance. How would the city enforce maintenance in that case? There is a possibility of the city notifying the property owner of a violation, giving a warning, doing the maintenance, billing the property owner, and filing a lien on the property. This is the same as any other code enforcement action. Otak: some cities are dividing the maintenance responsibility of vegetated facilities in the ROW. The adjacent owner is responsible for the vegetation and mulch, while the city is responsible for the maintenance of inlets, catch basins, outlets, pipes, etc. Some cities allow vegetated facilities in the ROW but allow only runoff from the public road to enter it. This could create the need to build two systems, if the private runoff from the lot can't enter the same drainage system the road runoff is entering. Kelso staff has said previously that few new roads are likely to be built in Kelso. Based on that assertion, it seems unlikely that this adverse scenario would happen very much.		
Landscaping requirements for parking lots	☒ **Yes** ☐ **No** ☐ **Does not apply**	**17.40.050(A)(4) – Landscaping** **17.40.050(E)(1 & 2)**	Trees provide visual relief in parking areas. Trees within landscaped areas shall be at	Keep this language, it is supportive. Keep this language, it is supportive.	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain**	☐ **Minimize impervious** ☐ **Retain vegetation and soils** ☒ **Manage stormwater close to source**

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			a rate of trees per parking spaces and have a minimum percentage of evergreen trees, relative to zoning. Requires shrubs at minimum of 18" height at time of planting spaced no more than 3' of center to provide a continuous hedge of 3' in height at maturity adjacent to rights of way.	Consider counting vegetation planted within LID facilities as landscaping. The spacing and height requirement could limit the use of bioretention as parking lot landscaping along the ROW. **Discussion 6/14/16:** Parking area landscaping is already drafted and is available in a draft of revised KEDM Ch. 3. Staff is supportive of allowing bioretention to be located within parking lot landscaping. **Additional Research and Recommendation:** The draft KEDM Ch 3 has been renamed to "Streets and Parking" and contains several criteria for onsite parking, including landscaping requirements. Concerns with the proposed landscaping requirements are: - The required 6' landscape island between rows may not be adequately wide to fit in a bioretention swale. The language does not say "minimum" 6' landscape island. - With exception of trees that provide needed shade, plant selection and spacing for *interior* parking lot landscaping should be waived when bioretention is proposed in favor of species and spacing designated for bioretention in the stormwater manual, since screening is not really a concern within interior parking lot landscaping. - Allow an adjustment with approval of director for different species and spacing when bioretention is proposed in parking	**why :** **KEDM Chapter 3 updated** to explicitly allow bioretention to serve as interior and perimeter parking lot landscaping. Plant spacing requirements are relaxed to accommodate bioretention, where necessary. Also updated to encourage preservation of existing trees within proposed parking lot landscape areas.	

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				lot perimeter landscape border (KEDM 3.26.C(6). **KSAC Discussion 8/2/2016:** The group voiced support for the idea of allowing bioretention in parking lot landscaping. One member of the group would prioritize ability to put bioretention in the perimeter landscaping over the interior landscaping. The perimeter landscaped areas are usually bigger and geometrically more flexible, and thus are easier to fit bioretention within. Often the interior islands are too small to cost-effectively incorporate stormwater management. Does not support the idea of requiring an adjustment to use bioretention in the parking lot perimeter landscaping. The group also supported changing the minimum landscaped island between rows to "minimum 4-foot width" in contrast to the current proposed "6' landscape island". Again the idea of sheet flow entrances to bioretention was raised. Ensure that parking standards allow for sheet flow to adjacent landscape areas by refraining from requiring continuous raised curb. An option is a "flat curb" cement edging around asphalt. This would be similar to the "street edge alternatives" pilot program in Seattle.		
Native Vegetation	☐ **Yes** ☒ **No** ☐ **Does not apply**	**Title 17 – Zoning 17.40.050(F)**	Encourages use of native species in landscaping designs by encouraging areas in excess of required landscaping to be planted or remain in existing vegetation, including native or adapted species in new plant material selection,	Keep this language; it is supportive of LID principles to retain vegetation and emphasize native vegetation. **KSAC Discussion 8/2/2016:** Do not support use of evergreen trees for	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Existing references to vegetation often refer to "native or adapted species."	☐ **Minimize impervious** ☒ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
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			allowing existing vegetation to augment new plantings to meet standards, requiring 2” of composted organic mulch on ground cover areas.	street trees, so be cautious when emphasizing native trees for street trees.		

Hard and Impervious Surfaces — Gap Analysis Worksheet & Summary

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
Maximum impervious surface allowances	☒ **Yes** ☐ **No** ☐ **Does not apply**	**None Found**	Impervious surface coverage appears to be unregulated in Kelso.	A limitation on impervious surface coverage can help limit stormwater volume and leave room for stormwater management practices. Are there other provisions that, in effect, limit impervious coverage on lots? Can a maximum impervious coverage be inserted for residential areas? **Discussion 6/21/16:** There were no objections to the idea of limiting coverage of a site or lot; however there is a preference to come at the concept from the other direction by requiring a minimum amount of area not covered by structures or hardscape. For both commercial and residential, require a minimum percentage of the setback to be landscaped or open. Allow driveways to cross setbacks. Ensure that the concept does not include permeable pavement surfaces as “landscaped or open”. **Additional Findings:** In a review of the proposed UDC, we found the following language in 17.22.080: “Please refer to the City’s Stormwater Design Standards to determine the maximum lot coverage with impervious surfaces”. This assumes that the KEDM or SWMMWW limit impervious surface coverage outright, but currently they do not. **Discussion 7/12/16:** Another discussion of lot coverage limitation was initiated by the discussion	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **17.22.100 Landscaping UDC updated** to require minimum landscaped area for all development activities: - residential multifamily 30% - commercial zones 20% - industrial zones 15% This provision serves to effectively limit impervious or hard coverage of a lot. **17.22.020 UDC Density, Dimension, Height, and Setback**: includes maximum lot coverage with impervious surfaces.	☒ **Minimize impervious** ☒ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

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				of maximum building footprint (see "Bulk and Dimension" topic), which is not regulated in Kelso. Staff supports limiting impervious surface coverage of lots by a) requiring a minimum percentage of site area to be landscaped or pervious and b) requiring all setbacks to be landscaped (driveways, sidewalks, and approved walkways can cross or be in setbacks). For the purposes of this standard, the minimum landscaped/pervious percentage can be met with landscaped setbacks, critical area set-asides, parking lot landscaping, voluntary landscaping, and permeable pavements. This standard should be articulated in 17.22.080 UDC. A cross reference should be included in the landscaping chapter. Alternately, switch the location and the citation. As a starting point for further research, staff supports a standard of: - Residential: 50% min. landscaped/pervious - Commercial: 20% - Industrial 10% - The downtown overlay will not have a minimum. Gregg proposes to do more research of standards in comparable cities: Longview, Battle Ground, and Spokane Valley. Note: later we found that proposed UDC 17.22.110(C) already has a minimum lot landscaping. These standards are: SFR: none Multifamily: 20%		

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				Commercial: 10% Industrial: 15% These do not match the proposed percentages from today's discussion. A decision about which route to go and the correct percentages is pending further review. **KSAC Discussion 8/2/2016:** Members supported the idea of controlling impervious coverage, in effect, by regulating minimum landscaping.		
Shared driveways	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 16 – Subdivisions** **16.24.080 – Streets, curbs and sidewalks**	The subdivider shall determine the location of all driveway entrances.	Consider adding text that encourages shared driveways in appropriate areas such as multiple single-family dwellings, multi-family structures, and commercial development. Shared driveways reduce total impervious surface. **Discussion 6/21/16:** The concept of shared driveways is supported where it makes sense. In commercial infill and redevelopment, it would be difficult to require shared driveways, since the neighboring property owner could not be compelled to share the driveway. The concept could be promoted, however. Residential flag lots also can easily share driveways. The group agreed that promotion of this concept belongs in the UDC, not in the KEDM. When a shared driveway is proposed, an easement and shared maintenance agreement must be covenanted to run with the land. In the proposed UDC, parking standards are given in 17.22.120 – Development	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** City and stakeholders do not support requiring shared driveways, although new curb cuts are prohibited in industrial zones where access can be shared (see below).	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

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				Standards – Parking. Recommend to add language encouraging shared driveways within this section. **Fire Department Comments 6/30/16:** Use caution with language for shared driveways as apparatus access must be kept in mind. I don't see this happening much within the city but still could be a potential issue. **KSAC Discussion 8/2/2016:** Members supported encouraging shared driveways. Members did not support requiring shared driveways.		
Shared driveways	☐ **Yes** ☒ **No** ☐ **Does not apply**	**Title 17 – Zoning 17.40.060(I)(3) - Parking**	No new curb cuts shall be allowed onto public streets if it is possible to share an access drive.	Keep this language, it is supportive. **Additional Research 6/22/16:** This language has been removed from the proposed UDC and relocated to proposed KEDM Ch 3. It pertains only to the light industrial (LI) and general industrial (GI) zones. This language is supportive of LID and should be retained.	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Language already exists to limit curb cuts (driveways). Moved language prohibiting new curb cuts when shared driveways are possible in proposed KEDM Chapter 3.	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**
Shared driveways	☒ **Yes** ☐ **No** ☐ **Does not apply**	**KEDM Chapter 3, Section 3.02 Intersections, Driveways, and Approaches (page 3-4)** **Appendix B, Section .060 Access Standards** **Appendix B, Appendix A: Needs for an Effective Access Management Program**	No language to encourage shared driveways. No direct language to encourage shared driveways. Shared driveways make it more convenient for pedestrians and motorists to access multiple facilities without having to utilize major roads.	Opportunity to add language promoting shared driveways for multiple single-family dwellings, multi-family structures, and/or commercial development. Consider allowing shared driveways for up 4 to 6 houses. Opportunity to add language promoting shared driveways for multi-family and/or commercial development. Keep this language, it is supportive. **Discussion:** See discussion above.	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Staff and stakeholders do not support shared driveways situations for residential, including multifamily. Other language already exists to limit new curb cuts in industrial zones.	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**
Minimum driveway width	☒ **Yes** ☐ **No**	**KEDM Chapter 3, Section 3.02**	Minimum driveway widths are specified: two-way commercial 24-feet minimum,	Department of Ecology's code integration toolkit contemplates minimizing driveway	☒ **Amended existing code** ☐ **Developed new code**	☒ **Minimize impervious** ☐ **Retain vegetation and**

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<tr><th>Topics Reviewed</th><th colspan="4">Gaps and Opportunities Identified</th><th>Proposed Action / Resolution</th><th>Permit Summary</th></tr>
<tr><td>Topic/Sub Topics</td><td>Conflict/Gap Identified</td><td>Section/Page Reference</td><td>Summary of Existing Text</td><td>Summary of Conflict/Gap/Discussion</td><td>Steps Taken</td><td>Category for Permit</td></tr>
<tr><td></td><td>☐ Does not apply</td><td>Intersections, Driveways, and Approaches, H. Driveway Design Criteria (page 3-8)</td><td>maximum 30-feet; two-way multi-family 16-feet min, 22’ max; one-way multi-family 10-feet min, 12-feet max; single family 10-feet min, 16-feet max.</td><td>widths and proposes the following minimum dimensions: two-way commercial driveway 18-feet; one-way multi-family driveway 9-feet, single family driveway 9-feet.

Discussion 6/21/16:
Driveway widths are specified both in KEDM Ch 3, as noted above, and in Standard Plan ST-160. The required dimensions in the two sources do not match. Kelso has been enforcing the dimensions found in ST-160.

<table><tr><th>Driveway</th><th>Ch 3 (ft)</th><th>ST-160 (ft)</th></tr><tr><td>Commercial 2 Way</td><td>24 - 30</td><td>n/a</td></tr><tr><td>Commercial</td><td>n/a</td><td>12 - 28</td></tr><tr><td>Multi-Fam 1 Way</td><td>10 - 12</td><td>n/a</td></tr><tr><td>Multi-Fam 2 Way</td><td>16 - 22</td><td>n/a</td></tr><tr><td>Single Family</td><td>10 – 16</td><td>10 - 16</td></tr></table>
Narrower driveway widths can result in concerns with sight distances, or it is more difficult to meet sight distance requirements. Some find narrower driveways to be uncomfortable from a safety perspective.

It appears that Kelso is already enforcing the narrower range of driveways widths by enforcing ST-160.

Better Site Design recommends residential driveway widths down to 9’. The group is amenable to allowing, but not requiring, residential driveways widths of 9’. Perhaps there should be a limitation on the road classification where the narrower driveway width is allowed</td><td>☐ Decided not to incorporate any changes
If you decided not to incorporate any changes, explain why :

Update KEDM Chapter 3 to allow residential driveways from 9 – 16 feet width and to reduce maximum commercial/industrial two-way driveway from 30 feet to 28 feet.

Revisions to street standard drawings will be done in a couple of years. Kelso plans to consider an update to ST-160 to show residential driveways from 9 – 16 feet width at that time.</td><td>soils
☐ Manage stormwater close to source</td></tr>
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				Language in 3.02 should be harmonized with ST-160, and both should be amended to allow residential driveway widths of 9'. **Fire Department Comments 6/30/16:** We would want to follow appendix D of the International Fire Code. With regards to private driveways the fire department cannot regulate those unless they have a gate which has a min. width of 20ft. If the driveways are short in length we would not be pulling in the driveway typically, but if they have an extended driveway this is where the width would be a concern. **KSAC Discussion 8/2/2016:** A driveway in an industrial or commercial area could need 30-36'. Group appeared OK with leaving commercial driveway width at 12 – 28' in ST-160. If a business needs a wider driveway and provides justification, the city could grant an adjustment. The group supported allowing residential driveways to go down to 9' width as long as it doesn't interfere with fire response. Did not support requiring 9' width. In thinking about market demand, one member does not think 9' residential driveways would be used.		
Use of permeable pavement for driveways	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 17 - Zoning** **17.40.060(A)(3) – Parking** **KEDM**	All driveways/parking areas shall be hard surfaced with materials such as asphalt, concrete/unit pavers, and shall be designed to dispose of surface waters. KEDM omits any design criteria for	This text does not disallow use of permeable pavements, but does not explicitly encourage it, either. Consider adding text encouraging the use of permeable pavement to retain and infiltrate surface waters. **Discussion 6/21/16:**	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **Update KEDM Chapter 3**: encourage use of permeable pavement for commercial driveways and commercial	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

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			permeable pavements.	Initially decided that the City would like to explicitly encourage use of permeable pavement on driveways and parking lots. Since driveway aprons are in the ROW, this topic led to a lengthy discussion of permeable pavements in the ROW that is also applicable to streets and roads, which we are scheduled to discuss more thoroughly later. There are concerns with maintenance of permeable pavements, and staff thinks the City does not have the resources to maintain it. By preference, the City would elect to prohibit use of permeable pavement in the ROW; however, there are concerns that an outright prohibition could violate the City NPDES municipal stormwater permit. For example, if a project applicant were to be required by the BMP selection process of the Stormwater Management Manual for Western Washington to use permeable pavement on a road, sidewalk, or driveway apron the ROW, it may violate the City's permit to prohibit such use. Other cities and counties have proposed a number of solutions to this concern. • Establish road classifications and elements of the typical road (e.g. parking lane, sidewalk) that may use permeable pavement while prohibiting its use on other road classifications. [Note: this solution avoids conflict with the NPDES permit by ensuring that road classifications that are likely to fall below the 400 ADT infeasibility criterion allow permeable pavements.] • Remain silent on use of permeable	parking lots where feasible in accordance with the SMMWW.	

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
				pavement in the ROW –neither encourage nor prohibit. • Outright prohibit use of permeable pavement in the ROW and/or on any public road. In some cases, specify that private roads may be permeable pavement. [This could have the effect of forcing some residential access roads that otherwise would have been proposed as public roads to be private roads.] • Require developments seeking to construct a public road to meet the LID Performance Standard using a list of BMPs that does not include permeable pavement. A concern about asking private parties to take on a maintenance burden that the City is not prepared to handle was raised. Is it fair to ask a resident to maintain a permeable driveway? Bioretention to handle driveway runoff seems a better option. [Post-discussion note: selecting bioretention as an alternative may not always be allowed under the SWMMWW.] However, commercial parking lots seem to be a more reasonable place to expect permeable pavements for two reasons: 1) often the party benefitting from use of permeable pavement by reduction in size of detention pond or infiltration pond is the same party that will maintain the permeable pavement and 2) a commercial facility is more likely to have the resources to properly maintain a permeable pavement. **KSAC Discussion 8/2/2016:** A member questioned why the city would want to avoid the use of permeable		

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				pavements - isn't the use of permeable pavement a benefit? The city is cautious about the maintenance requirements of permeable pavements. A vacuum sweeper is required, and the city does not have one. The city does not think that owners of private residences or HOAs will have easy access to this type of equipment.		
Two-track driveway design	☒ **Yes** ☐ **No** ☐ **Does not apply**	**None Found.**	Kelso's design standards do not mention two-track driveway design, which can be used to reduce impervious surface footprint.	**Discussion 6/28/16:** Staff is OK allowing 2-track design for residential driveways and commercial low-volume driveways. The correct place to allow this will be in KEDM. Do not provide a standard plan or detail. **KSAC Discussion 8/2/2016:** Members support allowing 2-track driveway design, but do not support requiring this design.	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **Update KEDM Chapter 3**: allow two-track driveways for residential and low-volume commercial driveways less than 100' in length.	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Parking — Gap Analysis Worksheet & Summary

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
Minimum/maximum parking ratios	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 17 – Zoning** **17.040.060(B) – Vehicular Parking Requirements**	Table 17.40.060(B) describes the parking minimums and maximums for several land uses.	Reducing required parking ratios is one way to reduce impervious surface coverage. The Better Site Design Manual gives recommendations for Office and Retail uses: Office: Better Site Design recommends 3 or less per 1,000 sf gross floor area. Parking for this use is not specified in KMC.. Shopping Center: Better Site Design recommends 4.5 or less per 1,000 sf of GFA. For retail greater than 1,000 sf structure, KMC requires 4 per 1,000 sf (min) and 6 per 1,000 sf (max). For two other uses, we compared other cities' requirements:	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **17.22.110 UDC Parking**: 1) Allows street parking to be used to satisfy on-site parking requirements in Neighborhood Commercial, General Commercial, and Residential Commercial zones. 2) Removes required minimum parking for all non-residential uses and instead requires the applicant to demonstrate the parking demand. 3) Eliminate maximum parking requirements.	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Use	Kelso	Woodin-ville	Longview
Restaurant	16 – 22 per 1,000 GFA	1 per 75 sf of dining / lounge (= 13 per 1,000 sf)	20 – 30 per 1,000 sf dining / seating area
Industrial	1 per employee; 1 per 250 sf office; and 2 per 1,000 sf GFA	(Manufacturing) 0.9 per 1,000 sf manufacturing + 1 per 300 sf office	(Uses not listed) 1 per 1,000 sf floor area OR 1 per 3 full-time employees on shift

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
				Would Kelso consider reviewing and reducing its required parking ratios?		
		17.040.060 – Parking	Parking lots may provide up to 10% of the established amount of parking to avoid design issues. Additional spaces require administrative approval.	For some uses, minimums and maximums are already established. Consider not allowing this additional maximum for uses where a maximum is already established unless a parking study supports the need.		
		17.40.060(D)(7) – Parking	Joint use of parking is allowed for two or more adjacent and complementary uses. This reduction may be up to 50%.	Keep this language, it is supportive. Can joint parking be further incentivized or facilitated? **Discussion 6/28/16 and e-mail from Gregg Dohrn 6/14/16:** Gregg writes that the proposed UDC has substantially rewritten parking requirements, moving away from minimum required parking for every conceivable use. The new approach is case-by-case. Shared parking language is strengthened. There is no limit on the amount of parking. These measures are appropriate for infill and for Kelso in particular, which does not have a development pattern that is conducive to restricting the use of the auto. Otak will re-review parking requirements in proposed UDC 17.22.120. **Additional Review:** A minimum number of spaces is required for various residential development types, and these appear to be moderate. No maximum is established. Non-residential uses require parking as determined by the City and supported by a study, demand study, or requirements from comparable cities. In light of thoughts on Kelso's		

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				development pattern and use of automobile, it may not be reasonable to limit parking. However, encouraging commercial project proponents to provide the least amount of parking need could be added to (B)(3) and encouraging project proponents in the NC, GC, and RC zones to consider shared parking as the first option could be added to (A)(5). **Discussion with KSAC 8/2/16:** Parking has changed enough that we skipped this topic. KSAC can review when a draft of the KEDM is available.		
Use of permeable paving	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 17 – Zoning** **17.40.060(A)(3) – Parking** **KEDM**	All driveways/parking areas shall be hard surfaced with materials such as asphalt, concrete/unit pavers, and shall be designed to dispose of surface waters	This language does not prohibit use of permeable pavements, which are considered "hard surfaces", but also does not specifically encourage or prefer it. Consider adding text encouraging the use of permeable pavement to retain and infiltrate runoff. KEDM is silent of the use of permeable pavement for parking lots. **Discussion 6/28/16:** Language previously in 17.40.060 regarding parking is proposed to be moved to the KEDM 3.26 – Parking Facilities. The group agreed to add text specifically allowing parking facilities to be of permeable materials by adding "such as permeable pavements, asphalt, concrete or unit pavers…". Refer to KEDM and SWMMWW for design of permeable pavements.	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **KEDM Chapter 3 updated**: encourages use of permeable pavement for commercial parking lots.	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☒ **Manage stormwater close to source**
Parking stall and driving aisle dimensions	☐ **Yes** ☒ **No** ☐ **Does not apply**	**Title 17 – Zoning** **17.40.060(D)(1) – Parking stall dimensions**	Table 17.40.060(D) contains the parking stall dimension requirements for several types of parking areas.	Kelso parking dimension requirements were compared to several municipalities (Auburn, Bothell, Issaquah, and Olympia), and are either comparable or smaller dimensions.	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Current dimensions work for users and are not	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☒ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
				Discussion 6/28/16: Staff requests comparisons to jurisdictions with more similar size, urban/rural proximity, and demographics, such as Woodland, Castle Rock, and small cities in the Yakima Valley. Staff are already considering increasing the size of parking stall dimensions to accommodate agricultural users of lots. Suggestion to provide different stall sizes by use or intended customer base – only increasing stall sizes when the intended users will be driving agricultural vehicles. Suggestion to allow larger stalls near the entrance to commercial buildings and require a percentage of compact stalls for larger lots, located away from the entrance where use will be less frequent. No decision was reached. Otak will compare a few similar jurisdictions. **Discussion with KSAC 8/2/16:** KSAC stated that it is not necessary to limit the size of parking stalls because developers self-regulate. They do no build bigger stalls than are needed by the customer. Flexibility in sizing would be helpful.	excessive. Requirements were moved from Title 17 to KEDM Table 3.11.	
Off-street parking regulations	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 17 - Zoning 17.40.060(C)(1 & 2) - Parking**	Parking shall be located behind, to the side, or under buildings.	Underground parking is supportive of impervious surface reduction by creating vertical, rather than horizontal, development. Consider structured parking be incentivized to more greatly encourage it? **Discussion 6/28/16:**	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Most development in Kelso is infill or redevelopment, and configurations for parking are limited based on existing adjacent development.	☐ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
				Development patterns and economic challenges in Kelso, with projected negative population growth, do not support the need to create greater incentive for structured parking. It is allowed; that is sufficient.		

Clearing and Grading — Gap Analysis Worksheet & Summary

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
Protecting existing infiltration	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 15 - Building 15.03.020 - Section J 104.6 Engineering Grading Requirements** **Title 16 - Subdivision 16.24.020 – Clearing, grubbing and grading** **KEDM Ch 2 – Erosion Control, Clearing, and Grading – 2.04 12 Elements of Construction Erosion and Sediment Control**	Grading plans shall include property limits, current and proposed contours, surface and subsurface drainage plans, structure locations, recommendations from soils report, dates of soils and engineering reports. The construction area shall be cleared and grubbed according to the KEDM. Element #4 requires permanent infiltration systems to be isolated and protected from sedimentation and compaction. Kelso currently has no standard in either KEDM or Appendix J of the IBC requiring a general avoidance of site disturbance, which would lead to protection of existing infiltration even where infiltration and LID BMPs are <u>not</u> proposed.	Consider adding requirement of documentation and steps taken to conserve soils with good infiltration. As grading standards will now be given in KEDM, then this reference could be supportive of protecting existing infiltration if KEDM provides for it. Keep this language, it is supportive. Note that under the updated Stormwater Management Manual for Western Washington, there will also be Element #13 requiring the protection of LID BMPs from sedimentation and compaction to protect the infiltration. **Discussion 6/28/16:** Technical standards within the SWMMWW Minimum Requirement #2, Elements #4 and Elements #13 will require areas designated for infiltration systems, bioretention, permeable pavement, and other LID BMPs to be protected from compaction and sedimentation. Thus, it may be redundant to require these protections in the grading code. A general encouragement to avoid disturbance where possible would be supportive of LID and protect infiltration, conserve soils, and conserve vegetation. Language in Title 15 adopting Appendix J of the IBC could be updated to read in J104.2, “Site plans should be designed to the extent feasible to limit disturbance,	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **15.03.020 International Building Code adopted, amendments to IBC Section J 104.2, Additions To Site Plan Requirements**: amended to include the statement: All sites should be designed to the extent feasible to limit disturbance, preserve vegetation, preserve topsoils, and preserve areas of existing infiltration.	☐ **Minimize impervious** ☒ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
				preserve vegetation, preserve topsoils, and preserve areas of existing infiltration." Given that Title 15 is currently being updated, Otak will provide recommended language for J104.2 immediately. Otak supplied the recommendation to the City on 6/29/16. Additional discussion of Element #13 of construction stormwater pollution prevention revealed that the prohibition to keep heavy equipment off existing soils under LID facilities that have been excavated *to final grade* is insufficient. If soils are saturated, equipment can compact soils up to 4 feet, thus heavy equipment should be excluded from soils under planned LID facilities regardless of whether the facility has been graded. **KSAC Discussion:** No further comments.		
Conserving native vegetation/soils	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 13 – Public Services 13.09.020(30) – Definitions** **Title 15 - Building 15.03.020 - Section J 104.7 Soils Engineering Report** **15.05.040 – Permit required.** **Title 16 - Subdivisions 16.24.020 – Clearing,**	Native vegetation is defined as plants indigenous to the coastal Pacific Northwest. Examples are mentioned. The required soils report shall include the nature of the soils, recommendations for grading design and procedures. A permit is required for preconstruction cutting or removal of vegetation when a tree has a greater diameter than 4in, slopes are greater than 15 degrees, or the area is 6,000sf or greater. The construction area shall be cleared and grubbed according to the KEDM.	Keep this language, it is supportive. Consider adding a sentence stating native vegetation provides natural stormwater management and pollutant removal, as a way to encourage conservation. Consider adding requirement of documentation and steps taken to conserve native soils. Keep this language, it is supportive. Consider adding language that discouraging the removal of native vegetation. As grading standards will now be given in KEDM, then this reference could be	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **13.09.020 Stormwater Management Definitions amended**: added "Native vegetation provides natural stormwater management" to definition of native vegetation. Incentives for tree preservation and tree planting are part of the SMMWW, so conserving or replanting trees is encouraged by adopting the manual for all sites.	☐ **Minimize impervious** ☒ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
		grubbing and grading		supportive of conserving soils and vegetation if KEDM provides for it. **Discussion 6/28/16:** Group agreed that adding a sentence to 13.09.020 stating native vegetation provides natural stormwater management and pollutant removal, as a way to encourage conservation, is a good idea. The discussion veered to tree preservation. If the idea is to have a landscape with trees, staff thinks a better place to discuss this issue is in the landscaping code in the proposed UDC. Increasing requirements to plant trees could be supported. Otak noted the SWMMWW contains incentives to preserve or plant trees by providing flow control credits. Staff supports the idea of relying on those incentives to promote tree preservation and planting and advertising the incentives in the City's materials, including training materials as part of this process and the Master Land Use Application. **KSAC Discussion:** No additional comments.		
Construction sequencing	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 12 - Streets 12.09.090(A) Construction – Inspections**	No construction shall begin until plans are approved and all erosion control measures are in place.	Consider adding element regarding proper construction sequencing to reduce the potential for soil and erosion compaction. **Discussion 6/28/16:** Construction sequencing is also a BMP in the SWMMWW Minimum Requirement #2 (BMP C162: Scheduling). The BMPs is applicable to Element #12: Manage the Project. The purpose is to reduce the amount and duration of exposed soil.	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Element #12 in Minimum Requirement #2 already encourages sequencing of construction to avoid impacts.	☐ **Minimize impervious** ☒ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
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				All projects triggering stormwater thresholds will be required to comply with Minimum Requirement #2. Staff also noted that most development and construction sites in Kelso are small, and sequencing for grading is seldom needed. **KSAC Discussion:** No additional comments.		

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
Travel lane widths	☒ **Yes** ☐ **No** ☐ **Does not apply**	**KEDM** **Chapter 3, Section 3.03** **Street Widths (page 3-10)**	Public street dimensions described based on functional classification of the road.	Consider whether minimum travel lane widths can be reduced to the minimum required by emergency responders, particularly for local access streets or those with no housing/buildings or anticipated on-street parking. We compared travel lane widths to Clark County and found that the Collector classification is wider than Clark County. Consider reducing collector street from the current 12' to 11' drive lane. Costs: Considering that the cost of paving a road averages $15 per square yard, shaving even four feet from existing street widths can yield cost savings of more than $35,000 per mile of residential street. In addition, since narrower streets produce less impervious cover and runoff, additional savings can be realized in the reduced size and cost of downstream stormwater management facilities. (Better Site Design Fact Sheet: Narrower Residential Streets, SMRC) **Discussion 6/28/16:** Very few, if any, new residential roads are going to be built in Kelso. No subdivisions are planned. No new Collectors are needed. Where the City may retrofit a road, usually an arterial, the City would submit a unique design fitting the circumstances rather than limiting itself to KEDM standards. Thus, it would have no impact on creation of impervious surfaces to change Kelso's existing street standards.	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **KEDM Chapter 3 updated:** Figure 3-6 Single-family Local access road and Figure 3-6a traffic calming local access updated to allow alternate pavement widths with approval of the Director in new subdivisions.	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
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				KSAC Discussion 8/30/16: KSAC did not agree with the staff group that no new residential roads will be constructed. There are areas in South Kelso near the golf course that will have new roads. KSAC thought a narrower road section would be desirable. Adding flexibility for a narrower standard, rather than mandating a narrower street, was an agreeable solution. A low-volume road that is sheeting instead of crowned could have bioretention on one side. Engineering said it could be proposed. (This is not pertinent to road width.) *Note: this configuration is already available as a private road.*		
Right-of-way (ROW) widths	☐ **Yes** ☐ **No** ☒ **Does not apply**	**KEDM** **Chapter 1, Section 1.04 Submittal Requirements – J. Transportation Impact Study (page 1-28)** **KEDM** **Chapter 3, Section 3.03 Street Widths (page 3-10)** **Chapter 3, Section 3.11 Street Frontage Improvements (page 3-25)**	Geometrics and Traffic Control section discusses studying the roadway widths but not the right-of-way widths. Sidewalks currently on both sides of street. Minimum frontage requirements for non-arterial streets include a minimum of a 60 foot ROW, 26 foot minimum pavement area, or 20 foot minimum travel lane area.	Consider having the study include right-of-way widths as part of the geometrics study. Opportunity to adjust requirements for sidewalk to be on one side of the street in low-density residential areas. Clark County has a ROW width of 54’ for local access streets. Consider reducing the ROW width for local access streets to 54 feet. **Discussion 6/28/16:** Very few, if any, new residential roads are going to be built in Kelso. No subdivisions are planned. Changing ROW width would have no appreciable impact on creation of impervious surfaces in Kelso. **Fire Department Comments 6/30/16:** The fire department wants to take a	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **KEDM Chapter 3 updated:** Section 3.09 allows modification to ROW width with approval of Director when pavement width is modified (with approval of Director).	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
				careful approach with considering narrower streets with the LID review. We would want to follow appendix D of the International Fire Code.		
Use of permeable pavement for sidewalks	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 17 (Proposed UDC) 17.34.030 Plat Design Standards, Section F Required Improvements**	In Section 4, requires any sidewalks in a plat to be constructed by the subdivider in accordance with the KEDM.	Defers to KEDM for sidewalk design standards.	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Kelso is concerned about maintenance of permeable pavements and the cost associated with it. The SMMWW may require permeable pavement on some project sites.	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☒ **Manage stormwater close to source**
		KEDM Chapter 3, Section 3.04 Surfacing Requirements	Pavement structure thickness provided for HMA based on soil type and functional classification of the road.	Consider including pavement structure thickness for permeable HMA surfaces.		
		Chapter 3, 3.17 Multi-Use Trails (page 3-32)	Requires surfaces to be HMA. crushed rock, concrete pavers, or porous concrete may be used at the discretion of the City Engineer.	Consider including language that encourages or incentivizes permeable pavements in lieu of HMA. Or suggest circumstances where using permeable pavements would be ideal. Remove requirement for City Engineer to provide special approval.		
		Standard Plan ST-080	Detail includes option for HMA or CL-4000 Cement Concrete.	Consider including a permeable pavement surface detail OR deferring to the examples in SWMMWW 2014 BMP T5.15: Permeable Pavement. Consider, at a minimum, allowing permeable pavement for nonseparated bike lanes of all urban access roads.		
		Standard Plan ST-150	Detail specifies a concrete commercial mix for sidewalks. No details on permeable pavement.	Consider including a permeable pavement surface detail OR deferring to the examples in SWMMWW 2014 BMP T5.15: Permeable Pavement.		
		Standard Plan ST-170	Detail specifies cement concrete.	Consider including a permeable pavement surface detail OR deferring to the examples in SWMMWW 2014 BMP T5.15: Permeable Pavement. Consider allowing permeable pavement for concrete alley approaches. **Discussion 6/28/16:**		

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
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				Drawing from staff discussion on 6/21/16, recorded within the "Hard and Impervious Surface" topic, no changes are anticipated. **KSAC Discussion 8/30/16:** No further comment.		
Placement of utilities under paved areas in the ROW	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 16 - Subdivision 16.24.090(A) – Utility installation** **KEDM** **Chapter 3, Section 3.20 Street Illumination (page 3-36)** **Chapter 3, Section 3.23 Franchise Utilities (page 3-39)**	All utility lines serving subdivisions shall be placed underground. All new or relocated lighting systems to be installed underground. Requires all utilities to be installed or reinstalled underground.	Consider adding text that encourages utilities to be placed under paved sections of ROW. Utilities located in these areas result in fewer conflicts with installation of roadside LID BMPs. Opportunity to add language about preference for buried utilities to be located under the paved section of the ROW (less conflict for future roadside LID installations). Opportunity to add language about preference for buried utilities to be located under the paved section of the ROW. **Discussion 6/28/16:** Although KEDM Ch 3 regulates franchise utilities, these provisions may not be being referenced during franchise negotiations. Also, some utilities are not franchised, so technically the requirements in KEDM 3.23 would not apply to them. However, the City negotiates the franchise agreements and can include criteria such as locating utilities underground with a preference for being placed under the sidewalk. Again, the City is built out and most needed infrastructure has been provided. Above-ground utilities may occasionally move underground when a road project goes through. The group agreed that the least disruptive	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **KEDM Chapter 3 updated:** Figure 3-6 local single –family access road and Figure 3-6a local traffic calming have been updated to allow placement of utilities under the sidewalk in new subdivisions if bioretention is used to manage stormwater on the residential lots.	☐ **Minimize impervious** ☐ **Retain vegetation and soils** ☒ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
				place for underground utility placement, given the possibility of including bioretention in the ROW and the expense of tearing up the road to install or repair buried utilities, is under the sidewalk. Allowing the sidewalk to meander to accommodate obstructions (see existing language in KEDM Ch 3) could be enhanced by allowing the sidewalk to meander to avoid bioretention and to favor placing a new sidewalk over existing buried utilities, thus reducing conflicts with using bioretention in the ROW. This would include allowing sidewalks to be next to the curb (rather than separated) on lower volume roads. This language would be added to KEDM 3.23. **KSAC Discussion 11/2/16:** Expressed concern that utilities will not like being placed under the sidewalk because it is more difficult to work on them. **Additional Research:** Note that KEDM 3.03 states that "public utility easements beyond the ROW are typically required" and public utility easements (PUE) are shown outside the ROW under non-paved areas in most street sections (see Figures 3-2 through 3-8.) The concern with this placement of utility easement on the lot is that it reduces the amount of space on the lot for LID BMPs. It likely makes the most sense to allow flexibility for utilities to be under the sidewalk rather than in a PUE outside the ROW in new subdivisions, which will be rare. In infill and redevelopment,		

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
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				patterns of utility placement will be already established.		
Required turn around area (e.g., Fire, USPS)	☐ **Yes** ☐ **No** ☒ **Does not apply**	**KEDM** **Chapter 1, Section 1.04 Submittal Requirements – J. Transportation Impact Study (page 1-28)**	Geometrics and Traffic Control section discusses studying the roadway widths but not the turnaround area.	Consider having the study include turnaround area as part of the geometrics study. **Discussion:** No discussion.	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Turnarounds are not common in Kelso.	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**
Sidewalk widths	☐ **Yes** ☒ **No** ☐ **Does not apply**	**Title 17 (Proposed UDC) 17.34 Plat Design Standards, Section F Required Improvements** **KEDM** **Chapter 3, Section 3.02 Intersection, Driveways, and Approaches, C. Intersection/Driveway Spacing (page 3-6)** **Chapter 3, Section 3.03 Street Widths (page 3-10)** **Chapter 3, 3.17 Multi-Use Trails (page 3-32)**	In Section 4, requires any sidewalks in a plat to be constructed by the subdivider in accordance with the KEDM. In the case of long or oddly shaped blocks, to facilitate pedestrian access, pedestrian paths shall not be less than ten feet in width. Sidewalk widths are 5-6 feet depending on functional classification of road. Multi-use trails are required to be a minimum of ten feet wide.	Defers to KEDM for sidewalk design standards. Consider allowing reduced sidewalk widths. . Consider reducing all sidewalk widths to 5 feet. This width is not excessive for a multi-use trail. **Discussion 6/28/16:** As discussed above, few new roads are being constructed in Kelso. In road reconstruction projects, the City may add or change sidewalks, but again provides a unique design based on the circumstances rather than relying on standards in KEDM. Furthermore, the stated widths are not excessive. **KSAC Discussion 11/2/16:** KSAC supportive of allowing sidewalk only	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **KEDM Chapter 3 updated**: Figure 3-6 local single –family access road and Figure 3-6a local traffic calming have been updated to allow sidewalk on one side of the street in new residential subdivisions with approval of the Director. KEDM already allows no sidewalks for infill when the predominant characteristic does not include sidewalk.	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
				on one side in residential areas. Engineering agreed it could be proposed.		
Sidewalk slope	☒ **Yes** ☐ **No** ☐ **Does not apply**	**KEDM** **Chapter 3, Section 3.03** **Street Widths (page 3-10)**	Sidewalk slope required to be 2 percent.	Consider adding language or flow arrows in the figures that encourage sidewalk cross slope directed toward rain garden in Figure 3-6b: Roadway with Rain Gardens. In the SWMMWW, the Reverse Slope Sidewalk BMP T5.18 has sidewalks sloping away from the road and into an adjacent vegetated area. The vegetated area must be greater than 10 feet that is not directly connected to the storm drainage system and must be either native soil or have been amended with compost per guidelines. Using this BMP can reduce the size of a flow control facility. **Discussion 6/28/16:** As long as designs are compliant with the Americans with Disability Act, the group is fine with showing a reverse slope sidewalk. Recommend to update Figure 3-6B showing sidewalk slope toward rain garden. Recommend updating KEDM 3.03 so that 2% sidewalk slope may slope either toward the gutter, toward an adjacent bioretention facility, or toward an adjacent minimum 10’ landscape strip meeting the requirements of BMP T5.18 of the SWMMWW.	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **KEDM Chapter 3 updated:** Section 3.16 updated to allow sidewalks to slope either direction to direct runoff to an adjacent bioretention or sheet flow dispersion BMP.	☐ **Minimize impervious** ☐ **Retain vegetation and soils** ☒ **Manage stormwater close to source**
Minimum cul-de-sac radius	☒ **Yes** ☐ **No** ☐ **Does not apply**	**KEDM** **Chapter 1, Section 1.04** **Submittal Requirements – J. Transportation Impact Study (page 1-28)** **Chapter 3, Section 3.12**	Geometrics and Traffic Control section discusses studying the roadway widths but not the cul-de-sac radius. The cul-de-sac may include a planting	Consider having the study include cul-de-sac radii as part of the geometrics study. Consider revising the language to allow	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Few cul-de-sacs are expected to be constructed in Kelso.	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
		Street Ends, A. Cul-de-sacs (page 3-28)	circle in the center. The minimum curb radius is 40 feet for residential areas and 60 feet for commercial/industrial areas.	stormwater flow control and treatment within the landscaped island, unless infeasible. Consider revisiting and revising some of these dimensions/standards to be more LID-friendly. Typical LID supportive design for a cul-de-sac with landscape island (edge of pavement / face of curb) is a minimum of 35 foot radius, and for a cul-de-sac without a landscaped island (edge of pavement / face of curb) is a minimum of 30 foot radius.		
		Chapter 3, Section 3.10 Private Streets, D. Turnarounds (page 3-22)	Turnarounds shall have a minimum radius of 40 feet.	Consider revisiting and revising the dimensions/standards to be more LID-friendly. Typical LID supportive design for a cul-de-sac with landscape island (edge of pavement / face of curb) is a minimum of 35 foot radius, and for a cul-de-sac without a landscaped island (edge of pavement / face of curb) is a minimum of 30 foot radius. **Discussion 6/28/16:** As discussed above, few if any new roads are planned in Kelso, including residential roads serving few lots, which can result in cul-de-sacs. Revising cul-de-sac standards would have little to no impact on impervious surface cover in Kelso.		
Alternatives to cul-de-sacs	☒ **Yes** ☐ **No** ☐ **Does not apply**	**Title 16 - Subdivisions 16.08.050 - "C" definitions** **KEDM Chapter 3, Section 3.12 Street Ends, B.**	Cul-de-sacs are required to terminate in a turning circle for the safe and convenient reversal of traffic. Hammerheads may be used on private streets in lieu of a cul-de-sac.	Consider changing this definition to encourage "hammerheads" as a feasible alternative to cul-de-sacs for turnaround areas. They require less impervious surface. Hammerhead is a good alternative to a cul-de-sac because its paved area is smaller. Consider encouraging cul-de-sac	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Few cul-de-sacs are expected to be constructed in Kelso.	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
		Hammerheads (page 3-29) **Chapter 3, Section 3.12 Street Ends, E. (page 3-30)**	Eyebrow corners are allowed under certain circumstances. Minimum curb radius on the outside of the eyebrow corner is 41-feet.	alternatives to reduce overall impervious area by allowing hammerheads in more circumstances. Allowing eyebrows can help reduce impervious cover. **Discussion 6/28/16:** Given the anticipated lack of new roads, Kelso's standards in this area are already sufficient. Hammerheads are allowed on private streets.		
Compaction	☒ **Yes** ☐ **No** ☐ **Does not apply**	**KEDM** **Chapter 1, Section 1.12 Contractor's Requirements for Testing (page 1-43)**	Compaction testing is required for asphalt, subgrade and crushed surfacing, bedding and backfill for utility trenches, and embankment for subgrade. The testing method is specified as the WSDOT Standard Specs.	Consider adding language about compaction testing under permeable pavement surfaces. Consider requiring an acceptance test for permeable pavement and bioretention facilities. For permeable pavement, consider deferring to the acceptance test in SWMMWW 2014 BMP T5.15: Permeable Pavement. For bioretention facilities, consider deferring to the post-construction verification test in the SWMMWW 2014 BMP T7.30: Bioretention Cells, Swales, and Planter Boxes.	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Kelso will require a unique section design, including subgrade compaction, where permeable pavement is proposed.	☐ **Minimize impervious** ☐ **Retain vegetation and soils** ☒ **Manage stormwater close to source**
		Standard Details Other Standards	Compaction addressed in Local Access Street Section, but not in the Sidewalk, Driveway Approach, or Cement Concrete Alley Approach standard detail.	Compaction under permeable pavement surfaces is generally required to be less than compaction under the analogous impermeable pavement surface. The Regional Porous Pavement Working Group has developed guideline specifications that have been adopted by WSDOT as Local Agency General Special Provisions for subgrade preparation under permeable pavements. These recommend subgrade compaction of 90-92% standard proctor using ASTM D698 or to firm and unyielding. Include compaction instructions in a standard detail for permeable pavement, if included.		

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
			No standard details for LID BMPs.	If standard details for BMPs are included, show notes to avoid compaction under LID BMPs. **Discussion 6/28/16:** All permeable pavements should be selected and designed in accordance with the SWMMWW. The SWMMWW requires a geotechnical engineer to do the subsurface investigations when large areas of permeable pavements are proposed. Additionally, Kelso wants to ensure that a geotechnical engineer provides and stamps the permeable pavement section (to include subgrade compaction required to support expected loads and to allow for infiltration) and inspects the pavement during construction to see if it is constructed correctly. WSDOT's Local Agency GSPs are here: http://www.wsdot.wa.gov/Partners/APWA/Division_5_Page.htm , and they include a number of specifications for permeable pavements, such as subgrade, permeable ballast, shaping and compaction, mix design, measurement, and payment.		

Bulk and Dimensional Considerations — Gap Analysis Worksheet & Summary

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
Building setbacks	☒ **Yes** ☐ **No** ☐ **Does not apply**	**17.40.020 – Lot area, density and yard requirements *(Setbacks moved to Table 17.22.080 in UDC)***	On Table 17.40.020 front setbacks for RSF, LI, and GI zone classes is 20ft. *UDC: Residential front setbacks are 20 ft., sides are 5' and rear is 10'. Commercial and industrial setbacks are higher, generally 20' in all dimension.*	Consider minimizing setbacks to allow for greater flexibility in building location. Residential setbacks are flexible enough already.	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **17.22.030 UDC Single Family Residential Standards:** allows zero lot line development to promote LID. **17.38 UDC Master Planned Developments**: Master Planned Development allows flexibility in development standards.	☐ **Minimize impervious** ☐ **Retain vegetation and soils** ☒ **Manage stormwater close to source**
		17.40.080 – Zero lot line development *(moved to 17.22.030.D in UDC)*	Zero lot line development for single-family dwellings may be permitted with review for several purposes, including preservation of environmentally sensitive areas.	Keep this language, it is supportive. Could include an additional list item allowing zero lot lines for purposes of "preserving native soils and areas of good infiltration". **Discussion 7/12/16:** Group is supportive, with Community Development Director and City Manager approval, of the concept of reducing the side and rear setbacks for commercial and industrial to 0' in Table 17.22.080 UDC when the site is <u>not</u> adjacent to a residential use. For residential setbacks, the improved and more broadly applicable Master Planned Development chapter of the UDC, 17.38, allows flexibility in setbacks. As discussed in a previous meeting, group is supportive of adding language allowing 17.38 to apply and to protect natural hydrology. **KSAC Discussion 11/2/16:** KSAC is supportive of residential 10' front setback to home paired with an 18'-20' front setback to garage. KSAC suggests increasing density to reduce urban sprawl.		

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
Height limits	☒ **Yes** ☐ **No** ☐ **Does not apply**	**17.30.030(D)(2)(a) – Downtown design overlay *(moved to 17.22.150 in UDC)*** **17.40.030 – Height limitations *(moved to Table 17.22.080 in UDC)***	New construction shall preserve the traditional pattern of development by following the scale and proportion of existing buildings. Table17.22.080 shows maximum building heights in residential, commercial and multi-family areas between 35 and 60ft. Except in single-family zones, maximum building height may be increased through a variance.	Limiting building height can increase impervious surface. Consider allowing new buildings to be taller than original patterns, as long as architectural character is consistent. Consider increasing maximum building heights in order to decrease impervious surface from building footprints. **Discussion 7/12/16:** Staff notes that there is a limit for industrial, too – 35'. Staff thinks that the current height limitations: - are consistent with existing development patterns in Kelso, - some are required in the Shoreline Master Plan, which emphasizes lower buildings to preserve views - there is no demand for taller buildings Therefore, changing building height limitations likely would have no effect on impervious surface coverage or retention of native vegetation. No change proposed.	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **17.22.020 UDC updated:** allows maximum building height to be increased with a Type 2 variance.	☐ **Minimize impervious** ☐ **Retain vegetation and soils** ☒ **Manage stormwater close to source**
Maximum square footage	☒ **Yes** ☐ **No** ☐ **Does not apply**	**None Found**	No regulation of maximum building square footage found in the UDC.	**Discussion 7/12/16:** Yes. There is no explicit regulation of building footprint in the development code. There was no support for limiting building footprint because it can be confusing when paired with lot coverage limitations. There are some indirect limitations on lot coverage, achieved through other standards. The discussion on lot coverage maximum is contained in the "Hard and	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** There was no support for limiting building footprint because it can be confusing when paired with lot coverage limitations.	☐ **Minimize impervious** ☐ **Retain vegetation and soils** ☐ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
				Impervious Surfaces" topic sheet in the gap analysis. **KSAC Discussion:** No further comment.		
Clustering	☒ **Yes** ☐ **No** ☐ **Does not apply**	**16.20.070(C) – Effect on plat design** ***(Moved to UDC 17.34.030 Plat Design Standards***	As slopes increase and as soils exhibit moderate to severe limitations for urban development, as documented by qualified geologists, soils scientists or engineers, the density of development should decrease. Thus plats should provide for larger lot sizes, fewer roads and clustering of development on more appropriate building sites.	Language is supportive in intent but also could be considered confusing. Clustering often involves smaller lot sizes clustered closer together with the remaining (large proportion) of the site preserved in a separate tract.	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **Update proposed UDCA 17.34.030 Plat Design Standards** regarding development on steep slopes. Replace sentence beginning, "Thus plats should…" with "Thus plats could provide for larger lots, fewer roads, or clustering of development."	☒ **Minimize impervious** ☐ **Retain vegetation and soils** ☒ **Manage stormwater close to source**
		17.08.020 – Definitions "C"	"Cluster development" means arranging/grouping lots to preserve open space and other amenities.	Keep this language, it is supportive. Consider adding text that mentions clustering to maintain natural hydrologic characteristics of the site.		
		UDC 17.26.080 – Geologically Hazardous Areas	Structures should be clustered where possible to reduce disturbance and removal of vegetation;	Keep this language, it is supportive. Promotes only clustering of structures, however, and not clustering of lots. Consider adding text that promotes the use of clustering for residential areas.		
		18.20.090(B)(3) – Fish and wildlife habitat conservation areas ***(Moved to UDC 17.26.060)***	Locate buildings in a manner that preserves habitat and minimizes impact	**Discussion 7/12/16:** Agreed that 17.34.030 language is supportive but worded in a confusing way that conflates less density with large lots and clustering. Sentence should read "Thus plats could provide for larger lots, fewer roads, or clustering of development. There is a current detailed discussion about moving the geo hazard provisions from a separate section, 17.26.080, into the Critical Areas chapter. In any case, the existing language regarding clustering in 17.26.080 is supportive, and there is no plan to change it.		

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Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
				Clustering is also supported in the improved and more broadly applicable Master Planned Development chapter of the UDC, 17.38. As discussed in a previous meeting, group is supportive of adding language allowing 17.38 to apply and to protect natural hydrology. There is a new zone, too, the residential mixed density zone to encourage different types of housing, including cottage housing. This is supportive of LID. **KSAC Discussion:** No additional comment.		

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
Trees and bioretention	☒ **Yes** ☐ **No** ☐ **Does not apply**	**13.09.020(3) – Definitions** **Chapter 3, Section 3.19 Landscaping in the ROW, Easements, and Access Tracts (page 3-35)**	Bioretention is defined as an integrated stormwater management practice that uses plants to remove and retain pollutants. Street trees must comply with the Street Tree List.	Keep this language, it is supportive. Opportunity to update list based on the Street Tree List in the LID Technical Guidance Manual for Puget Sound. Plant lists were not found. Opportunity to develop a list of plants appropriate for use in bioretention and bioretention in the ROW to support use of these technologies. Consider deferring to the Bioretention Plant List in the LID Technical Guidance Manual for Puget Sound. **Discussion 6/12/16:** It is correct that there is no street tree list currently. Otak to develop a street tree list with a focus on natives and near-natives. There is no plant list for bioretention either. Otak to develop a list that is suitable for bioretention in the ROW and anywhere on private property. These lists will be appendices in KEDM. Language in the planting plan requirements in the UDC should cite that street trees and bioretention plants must be selected from lists in KEDM. **KSAC Discussion:** No additional comment.	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **KEDM Chapter 3 updated:** now includes a bioretention plant list, including one tree species, that is suitable for use in the ROW.	☐ **Minimize impervious** ☐ **Retain vegetation** ☒ **Manage stormwater close to source**

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
Continuous curb requirements	☒ **Yes** ☐ **No** ☐ **Does not apply**	**None Found**	None Found	We did not find requirements for all roads or parking lots to be enclosed by continuous curbs. This is supportive of LID by allowing options other than curbs for street and parking lot edges, such as sheet flow entrances to bioretention or dispersion areas. **Discussion 7/12/16:** Staff agrees this is probably not regulated.	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Continuous curbs are not currently required.	☐ **Minimize impervious** ☐ **Retain vegetation** ☒ **Manage stormwater close to source**
Curb radii	☐ **Yes** ☒ **No** ☐ **Does not apply**	**Chapter 3, Intersection, Driveways, and Approaches, J. Curb Returns (page 3-9)**	Minimum curb radii at intersections are provided for various street classifications ranging from 25’ for arterials, to 20’ for collectors, to 15’ for local streets.	These curb radii appear consistent with other cities and do not seem excessive. 15’ is the minimum radii suggested by Better Site Design principles. **Discussion 7/12/16:** These curb radii are not excessive and do not need to be changed to be supportive of LID. **KSAC Discussion:** KSAC indicated that the requirements for centerline radius or horizontal curvature also can control curb radius and limit flexibility in site design. KSAC suggested that these be updated to ensure that a local low-volume road would be allowed to make a 90 degree turn without an intersection (similar to rural roads).	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Curb radii are not excessive and do not need to be changed to be supportive of LID. W	☒ **Minimize impervious** ☐ **Retain vegetation** ☐ **Manage stormwater close to source**

Additional Notes:

Stormwater Management and Maintenance — Gap Analysis Worksheet & Summary

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
Maintenance Provisions	☐ **Yes** ☒ **No** ☐ **Does not apply**	**13.09.090 – Maintenance agreement and plan**	The owner is responsible for operation and maintenance of facilities. The owner shall execute a stormwater maintenance agreement that designates a responsible party, passes responsibility to successors, grants Kelso right of entry for inspection, ensures continued performance through a maintenance plan (attached to agreement).	Keep this language, it is supportive. However, for full compliance, the maintenance plan must be at least as protective as the maintenance standards within the SWMMWW, so these should be referenced.	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **Minor updates to 13.09:** to clarify maintenance issues. Developed two handouts covering maintenance instructions for small projects for bioretention/rain garden and permeable pavement.	☐ **Minimize impervious** ☐ **Retain vegetation** ☒ **Manage stormwater close to source**
		13.09.130 – Ongoing maintenance for stormwater BMPs	Requires maintenance of structural and non-structural BMPs and access routes in accordance with approved stormwater plan, stormwater maintenance agreement, and stormwater maintenance plan.	Keep this language, it is supportive. This section should also reference the maintenance standards adopted in the SWMMWW. Maintenance standards within the stormwater maintenance plan must be at least as protective as those in the SWMMWW.		
		13.09.150(A)(1) – Maintenance and inspection **KEDM** **Chapter 4, Section 4.22 Long-Term Operation and Maintenance**	All stormwater facilities shall be maintained in accordance with this chapter and the KEDM. All erosion controls, watercourses, and stormwater facilities (including, but not limited to, structural and non-structural BMPs, catch basins and other protective devices, necessary access routes, and appurtenances) shall be operated and maintained in accordance with the manufacturer's specifications, the SMMWW, this Manual, the approved stormwater management design plan, and the stormwater maintenance agreement and plan, as discussed below.	Supportive. May supplant need to reference maintenance requirements of SWMMWW in 13.09.090 (noted above). Supportive. **Discussion 7/12/16:** Yes, 13.09.090 should reference minimum maintenance standards of SWMMWW since the section currently lacks a process for City approval. How would the City know if the maintenance plan is "good enough" under current language? Also, for		

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
				13.09.090, add some of the language from KEDM section 4.22 re: long term operation and maintenance for consistency's stake. Insert the parenthetical phrase "(including, but not limited to, structural and non-structural BMPs, catch basins and other protective devices, necessary access routes, and appurtenances)" after the word "facilities" in 090. 13.09.130 does not need to adopt SWMMWW maintenance criteria since 13.09.090 will adopt them. 13.09.150(A) should add that facilities must be inspected in accordance with the chapter, the KEDM, <u>and the maintenance agreement and plan</u> from 090. <u>Moving 13.09 to UDC or Public Works code</u> There was a discussion about the appropriate placement of 13.09. The standards are not really public service standards, but development standards. This makes an argument for moving 13.09 into the UDC. However, the variance and exception process of the UDC would not work for the stormwater engineering standards, thus UDC may be an inappropriate location unless a different permit type were created. There is also an argument for moving 13.09 into a "Public Works" code, although one does not currently exist. The closest is Title 12. Agreement is to make the required changes to 13.09 in situ and then to address the proper location of 13.09 at a later time and not as a part of this process.		

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
Inspection Access (covenants, easements)	☐ **Yes** ☒ **No** ☐ **Does not apply**	**13.09.080(A)(3) – Easements, deeds, education**	With the exception of managed properties, all residential stormwater facilities not in the public ROW, or a full easement, shall be granted to the city.	Keep this language, it is supportive.	☒ **Amended existing code** ☐ **Developed new code** ☐ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** **KEDM Section 4.18 updated**: Add LID facilities to the list of BMPs that may require tracts and easements.	☐ **Minimize impervious** ☐ **Retain vegetation** ☒ **Manage stormwater close to source**
		13.11.070 – Inspection and sampling	The director is authorized to develop inspection procedures and requirements for all drainage systems in the city. This includes access.	Keep this language, it is supportive.		
		16.12.130	Improvements shall be inspected at start, during, and a completion of construction and installation.	Keep this language, it is supportive.		
		KEDM Chapter 1, Section 1.11 Contractor's Responsibility for Scheduling (page 1-42)	The City will inspect subgrade for street/sidewalk, crushed surfacing, paving, curb and sidewalk.	Consider including inspection of all stormwater facilities (in the ROW or on private property).		
		Chapter 4, Section 4.18 Tracts and Easements	Requires dedication of tract or easement for conveyance, storage, or treatment BMPs if access is needed by the City.	It may be more supportive of LID to specifically call out LID BMPs in the list of items that may require an easement or tract. **Discussion 7/12/16:** Agreed to add LID facilities to the list of BMPs that may require tracts and easements in KEDM section 4.18.		
Enforcement	☐ **Yes** ☒ **No** ☐ **Does not apply**	**Title 13 – Public Services 13.09.070(B) – Construction inspection for permanent stormwater BMPs**	Public works shall conduct inspections of the stormwater BMPs shown on design plans.	Keep this language, it is supportive.	☐ **Amended existing code** ☐ **Developed new code** ☒ **Decided not to incorporate any changes** **If you decided not to incorporate any changes, explain why :** Enforcement provisions seem adequate.	☐ **Minimize impervious** ☐ **Retain vegetation** ☐ **Manage stormwater close to source**
		13.09.100 – Stormwater performance bond	At public works discretion an applicant may be required to furnish a stormwater facility performance bond.	Keep this language, it is supportive.		
		13.09.150(C) – Maintenance and inspection	The inspector is authorized to inspect stormwater systems in Kelso to determine compliance. Failure to provide adequate stormwater controls	Keep this language, it is supportive.		

Topics Reviewed	Gaps and Opportunities Identified				Proposed Action / Resolution	Permit Summary
Topic/Sub Topics	*Conflict/Gap Identified*	*Section/Page Reference*	*Summary of Existing Text*	*Summary of Conflict/Gap/Discussion*	*Steps Taken*	*Category for Permit*
		KEDM **Chapter 1, Section 1.10** **Inspection (page 1-40)**	shall result in an order to stop work. Work performed in the ROW shall be in accordance with WSDOT Standard Specifications and approved plans. The City has the authority to enforce these standards.	Keep this language, it is supportive. **Discussion 7/12/16:** Enforcement provisions seem adequate.		

Additional Notes:

Appendix B – Low Impact Development Code and Manual Update Public Involvement Summary

Otak

Low Impact Development Code and Manual Update
Public Involvement Summary

Submitted to:

City of Kelso
203 S. Pacific
P.O. Box 819
Kelso, WA 98626

Prepared by:

Otak, Inc.
700 Washington Street, Suite 300
Vancouver, WA 98660
Otak Project No. 17854

March 8, 2018

Otak

Acknowledgements

Low Impact Development Code and Manual Update
Public Outreach Summary Report

Submitted to:
City of Kelso
Van McKay

Prepared by:
Otak, Inc.

Trista Kobluskie
Stormwater Planner

Table of Contents

Section 1—Introduction

The City of Kelso (City) is covered under the National Pollutant Discharge Elimination Systems (NPDES) Western Washington Phase II Municipal Stormwater Permit (Permit).

The Permit required Kelso to achieve two key objectives by June 30, 2017: 1) incorporate and require Low Impact Development (LID) principles and Best Management Practices (BMPs) in local development-related codes, rules, and standards; and 2) adopt a stormwater planning and engineering manual equivalent to the *2012 Stormwater Management Manual for Western Washington, as amended December 2014* (2014 SWMMWW).

Between February 2016 and January 2018, the City and consultant Otak, Inc. carried out a plan to achieve the objectives and to involve and inform the public.

LID-related amendments pertaining to subdivision, land use, and planning were incorporated into the City's concurrent effort to reorganize various development titles into a Unified Development Code (UDC). Pursuant to this effort, Ordinance 17-3889 was adopted March 21, 2017 to adopt Kelso Municipal Code (KMC) Title 17, UDC, and to adopt LID-related development standards incorporated into it.

Amendments pertaining to the Kelso Engineering Design Manual (KEDM) and stormwater regulations in KMC Chapter 13.09 were considered separately by City Council. Ordinance 17-3894 was adopted June 20, 2017 to revise the KEDM to both incorporate LID strategies and BMPs and to adopt the 2014 SWMMWW. Ordinance 17-3895 was also adopted June 20, 2017 to amend Chapter 13.09, Stormwater Management, to support requirements of the KEDM and 2014 SWMMWW and to ensure long-term maintenance of stormwater facilities.

This report summarizes the public involvement effort, which began in June 2016 and concluded in December 2017.

Section 2—Stakeholders

Several sets of public stakeholders in the LID code and KEDM update were identified. These included:

- Members of the Kelso Stormwater Advisory Committee (KSAC)
- The engineering, construction contracting, and development community
- Property owners within the City limits
- Environmental advocates
- Suppliers of certain landscaping products commonly used in LID facilities
- Neighboring jurisdictions and allied districts: City of Longview, Cowlitz County, Cowlitz 2 Fire & Rescue District, and Port of Longview

During the spring of 2017, the City's Senior Stormwater Engineer, Van McKay, provided initial invitations to stakeholders via phone calls, emails and attendance at industry meetings such as the Lower Columbia Contractor's Association.

Stakeholders were invited to join an email list to receive newsletters and meeting announcements. KSAC members were automatically included on the stakeholder list. The stakeholder email list was managed by the City, and it included approximately 15 individuals.

Section 3—Online Communications

Online communications included a web page devoted to the LID code and KEDM update and email newsletters to stakeholders.

Web

The web page at www.kelso.gov/stormwater/low-impact-development-lid went live in January 2017. The page was updated throughout the review and adoption process. The web page introduced LID concepts, informed readers about upcoming meetings or hearings and summarized proposed amendments. Informational content about LID concepts and the regulatory requirements remains as a resource for the community.

Figure 1. Screenshot of web page, February 2018

Newsletters

Between February 17, 2017 and November 14, 2017, four brief newsletters were emailed to stakeholders. Newsletter topics were intended to introduce LID concepts, address the regulatory framework of the project, describe the expected timeline, show draft example drawings and notify readers about upcoming meetings and opportunities to provide input.

The four newsletters are still available on the website and are presented in Attachment A.

Section 4—Events & Meetings

The City hosted several in-person events and meetings in 2016 and 2017, including those Hearings of City Council necessary to adopt the three ordinances described in Section 1. A brief timeline of events and meetings is presented in Figure 2, below.

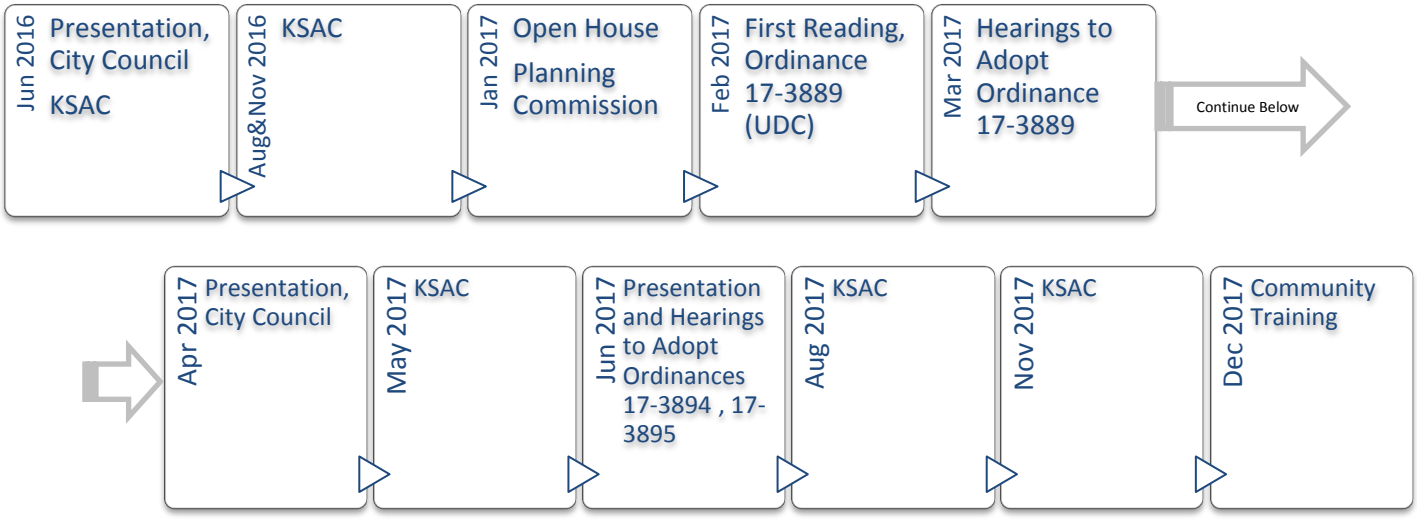


Figure 2. Timeline of Events & Meetings

Kelso Stormwater Advisory Committee (KSAC)

The KSAC is a citizen advisory committee to the City Council. Its members represent the citizens at large, development community, environmental advocates, recreation advocates, other stormwater permittees (local business) and youth.

KSAC meetings are open to the public. The City's Senior Stormwater Engineer, Van McKay, is the liaison to the KSAC.

The KSAC was consistently involved in reviewing identified gaps, discussing proposed amendments to codes and the KEDM and recommending proposed amendments to City Council. The KSAC was presented with the entire detailed gap analysis, and they discussed the findings with staff and consultants thoroughly over the course of several meetings in 2016 and 2017.

Gap analysis findings reviewed by the KSAC included the following:

- Code and engineering standards where LID planning principals could be encouraged;
- Code and engineering standards that could restrict the use of LID;

- Code and engineering standards that could be amended or added to encourage and support the use of LID BMPs; and
- Elements of code and KEDM that would require amendments to adopt the 2014 SWMMWW.

The KSAC's comments in meetings were recorded by Otak on the gap analysis spreadsheets. The gap analysis spreadsheets, including summaries of KSAC discussions, are presented in Attachment A to the *Low Impact Development Final Summary Report*, dated February 29, 2018.

In May 2017, the KSAC was presented with the proposed amendments to the KEDM and KMC 13.09. At the May 25, 2017 meeting, KSAC carried a motion to recommend to City Council that the drafts of the KEDM and Chapter 13.09 be adopted.

In November 2017, Otak also attended a KSAC meeting to present drafts of forms, handouts and applications, such as the Kelso Stormwater Requirements Thresholds handout and the Abbreviated Stormwater Site Plan that is tailored to small sites.

KSAC members were invited to the other events, meetings, and hearings hosted by the City as part of this process.

Open House

In January 2017, the City hosted an open house at the City Council chambers for the community at large. The open house was included on the City's general calendar of events and members of the development and contracting community specifically were invited.

Figure 3. Example Poster

Otak staff and the City's Senior Stormwater Engineer were on hand to introduce LID topics and practices, discuss the 2014 SWMMWW, and answer questions.

A set of eight posters illustrated LID topics and proposed standard drawings for streets that incorporate LID. The posters are presented in Attachment B.

Five stakeholders attended the open house, including two employees from the City of Longview, one member of the private development community, one employee from the Kelso School District (who is also a Planning Commission member), and one employee of the Port of Longview.

Comment cards were on hand, but no written comments were received.

City Council – Presentations and Hearings

Kelso's City Council meetings are open to the public and noticed in advance. Agendas are posted online prior to meetings. The public is invited to present "Citizen Business" prior to the Consent Agenda and to comment after presentations to the Council.

Otak presented at City Council three times. A presentation in June 2016 introduced the project and LID concepts to Council. In April 2017, Otak gave a progress report to Council and outlined the nature of proposed code and manual amendments. Otak summarized the final proposed code and manual amendments to City Council in June 2017.

City staff presented proposed updates to the UDC several times during 2016 and 2017 prior to adoption of Ordinance 17-3889 (UDC). The dates of those presentations are not recorded in this summary.

City Council held four Hearings to adopt proposed code and manual amendments. The first reading of Ordinance 17-3889 to adopt the UDC was February 21, 2017, and the second reading was March 21, 2107. The ordinance was adopted. The first readings of Ordinances 17-3894 and 17-3895 to update the KEDM and amend KMC 13.09 were June 6, 2017, and the second readings were June 21, 2017. The ordinances were adopted.

Community Training

On December 13, 2017, the City and the City of Longview teamed to host a stormwater training session for individual property owners and the development and contracting community. The presenters were Van McKay, City of Kelso Senior Stormwater Engineer; Steve Haubner, City of Longview Stormwater Manager, and Trista Kobluskie, Stormwater Planner from Otak.

The training agenda included the following topics:

- Stormwater Regulations Background
- Project Classification by Size and Complexity
- Stormwater Minimum Requirements

- Focus on LID and Stormwater Concepts for Small Sites
- Detailed Review of Kelso Abbreviated Site Plan for Small Sites
- Detailed Review of Longview Abbreviated Site Plan for Small Sites
- Summary Review of Requirements Engineered Projects / Major Projects for Larger Sites
- Q&A

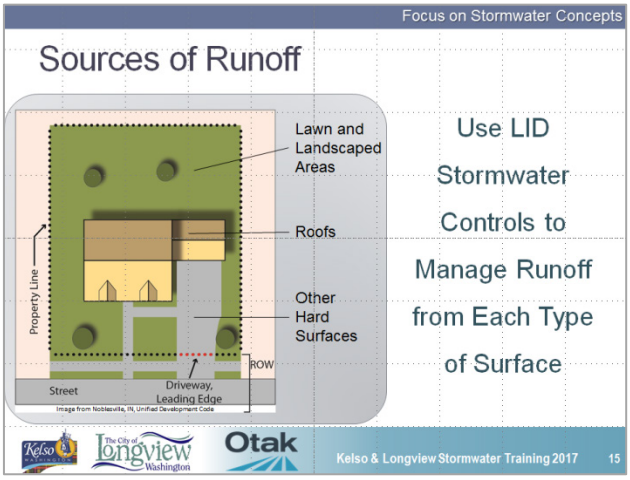


Figure 4. Example Slide from Community Training Presentation

A handful of representatives from the private development community attended.

The training presentation was televised live on KLTV Kelso Longview Television. The video is available online in the Education and Outreach section of the City's Stormwater Documents collection at www.kelso.gov/engineering/stormwater/stormwater-documents.

Section 5—Public Comments

No written public comments were received throughout the public involvement campaign.

Attendees at the open houses and training sessions asked general questions about LID, questions about the process (e.g. dates of next public meetings), and clarifying questions about specific proposals or requirements. No specific comments or suggestions were recorded by staff or consultants at the events.

Several specific requests by the KSAC were incorporated into final amendments of the KEDM and KMC 13.09 or may be incorporated into future updates.

These specific requests from KSAC were recorded in a log of public comments. The Public Comments Log is included as Attachment C.

Attachment A

Newsletters

Kelso
Low Impact Development

Issue #1
February 17, 2017

Find Out More

Kelso LID Web Page:
http://www.kelso.gov/stormwater/low-impact-development-lid

An example of a bioretention area built to capture street runoff. (Photo by Otak, Inc.)

Upcoming Events

City Council Hearing on February 21, 2017

City Council Hearing on March 21, 2017

What Is Low Impact Development?

The Problem

Stormwater runoff is the main cause of water pollution in urban areas, and it contributes to flooding and erosion.

Rain can soak into the soil, stay on the surface and evaporate, or run off to streams and other water bodies. Prior to urbanization, when rain falls on undeveloped prairies and forests, most of the water is absorbed by the soil and plants. In natural systems in the Pacific Northwest, only a small fraction of precipitation typically runs off over the surface.

After we build cities and suburbs, rain that falls onto impervious surfaces such as roofs, streets, and parking lots cannot soak into the ground. Instead, stormwater quickly drains through storm sewers and into nearby water bodies and picks up pollutants along the way. The increased proportion of runoff means that even small storms can harm water quality, cause flooding, and erode stream banks, causing property damage and harming habitat.

The Solution

Low Impact Development (LID) is an approach to land development that mimics a site's natural pattern of runoff. LID emphasizes conserving natural areas and vegetation on site and minimizing impervious surfaces. Extra runoff that is produced by development is captured and treated on site. Small, distributed stormwater facilities slow runoff down, spread the runoff out, and soak it into the soil.

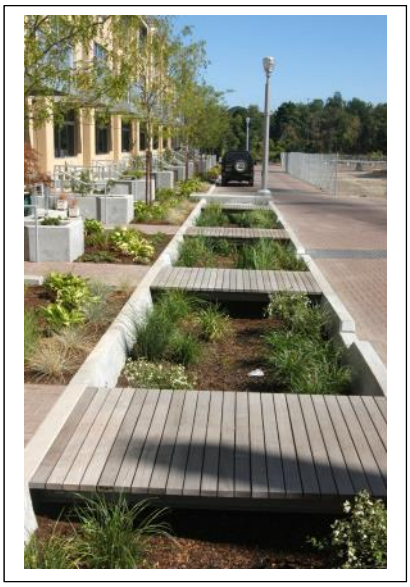
You have probably seen some types of LID around Kelso and other cities in Washington and Oregon. Bioretention and permeable pavement are just two examples of LID. (Continued on page 2.)

Regulatory Background

Most stormwater runoff in Kelso is conveyed through a network of pipes, ditches, catch basins and some water quality treatment facilities to the City's drainage channels and rivers – the Columbia, Cowlitz, and Coweeman. This network is called a municipal separate storm sewer system (MS4).

The Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) to protect the water quality of streams, rivers, and lakes by limiting how much pollution can be discharged to them. Kelso operates the MS4 under a municipal stormwater NPDES Permit.

Under the Permit, Kelso is required to incorporate LID into its development codes, update the Kelso Engineering Design Manual (KEDM), and adopt the 2014 Stormwater Management Manual for Western Washington (SWMMWW) to meet state standards for stormwater control on development sites.



Example of bioretention as landscaping in a mixed use development. (Photo by Otak, Inc.)

LID Update Process

To meet its Permit requirements, Kelso is incorporating LID principles into its existing codes and standards and adopting the 2014 SWMMWW.

In 2016, Kelso began reviewing its municipal code and engineering standards for subdivisions, planning and zoning, streets and sidewalks, stormwater design, and buildings and construction. We looked for opportunities to reduce impervious surfaces and keep native trees during the development process, which helps reduce and slow runoff. We looked for ways to add bioretention and permeable pavement to the Kelso Engineering Design Manual (KEDM).

We will use this review to recommend changes to the City code and the KEDM. City Council and Planning Commission will consider proposed updates this spring and summer. Opportunities for public involvement began in late January. Kelso must incorporate LID and adopt the 2014 SWMMWW by June 30, 2017. See the timeline below.

An example of grassed permeable pavers. (Public Domain)

What is Low Impact Development (cont.)

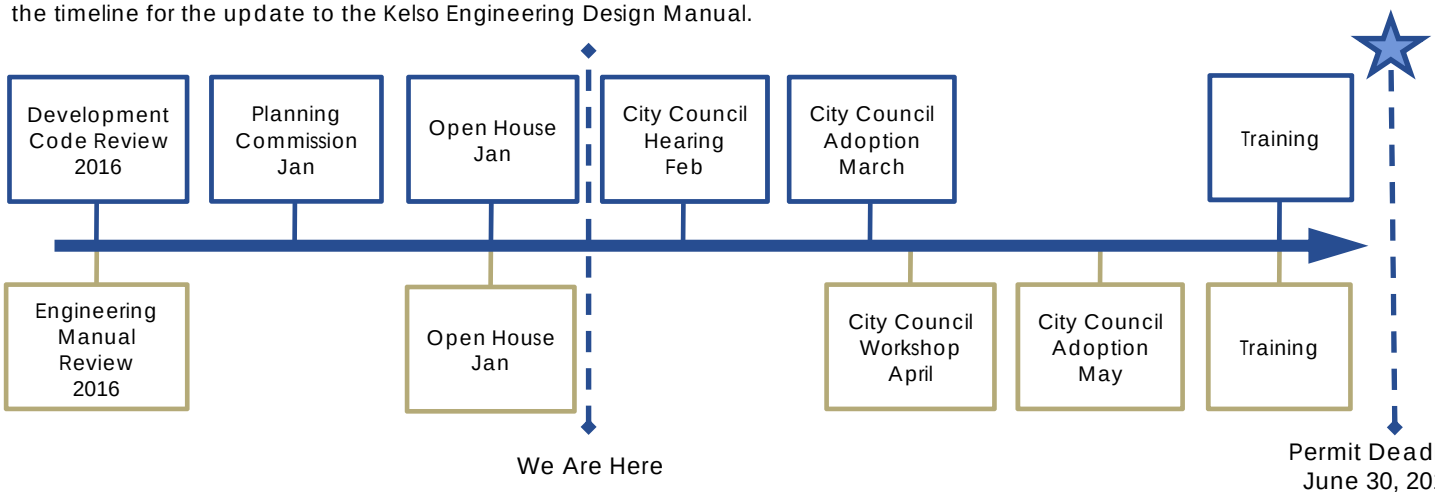
LID techniques mostly fall into two categories: minimizing impervious surfaces and treating and infiltrating stormwater on site.

Permeable pavement replaces impervious asphalt and concrete surfaces with porous asphalt and concrete surfaces. These materials contain small voids that provide a path for water to flow through. Water that falls on the surface infiltrates into the soil below. Pollutants that collect on these surfaces are filtered out. Parking lots, driveways, sidewalks, and other paved surfaces can all be built using permeable pavement.

Bioretention areas are simple structures that mimic natural processes to treat and infiltrate stormwater. Runoff from impervious areas is directed to small, shallow, plant-filled depressions where the water can pool and soak into porous soil. The water is then taken up and transpired by the plants or trickles down to recharge aquifers. The soil and plants in the bioretention area also absorb and break down pollutants and prevent them from reaching streams and lakes.

Timeline

Blue boxes on the top row show the timeline for the update to the development code. Tan boxes on the bottom row show the timeline for the update to the Kelso Engineering Design Manual.



Kelso
Low Impact Development

Issue #2
March 15, 2017

Find Out More

Kelso LID Web Page:
http://www.kelso.gov/stormwater/low-impact-development-lid

Upcoming Events

City Council Workshop on March 21, 2017

City Council Hearing on March 21, 2017

An illustration of a residential ribbon driveway, which reduces impervious surface (Otak, Inc.)

Focus on Kelso Engineering Design Manual - Streets and Paved Areas

As part of Kelso's effort to include Low Impact Development (LID) principles and best management practices in its development codes, the Kelso Engineering Design Manual (KEDM) will be updated.

In this issue, we focus on proposed updates to KEDM standards governing streets, driveways, frontages, and parking in the City.

Streets

Several changes are proposed to standards for streets.

- Allow narrower street width and narrower right-of-way (ROW) width in a new residential subdivision with approval of Community Development Director and Fire Marshal
- Allow sidewalk on only one side of the street in a new residential subdivision with approval
- In new subdivisions, allow utilities such as telephone and cable to be placed under the sidewalk instead of in a public utility easement on a residential lot when space is needed for a rain garden
- Allow bioretention in the ROW with planters and curb extensions

Why? *These measures reduce impervious surfaces and allow flexibility to manage stormwater runoff on private residential lots and in the ROW.*

Driveways

Several changes are proposed for driveway standards.

- Reduce maximum width of commercial driveway from 30 ft to 28 ft
- Allow residential driveway width as narrow as to 9 ft
- Allow ribbon driveway (two-track) design for residential and some commercial driveways
- Encourage use of permeable pavement for commercial driveways

Why? *These measures reduce impervious surfaces.*

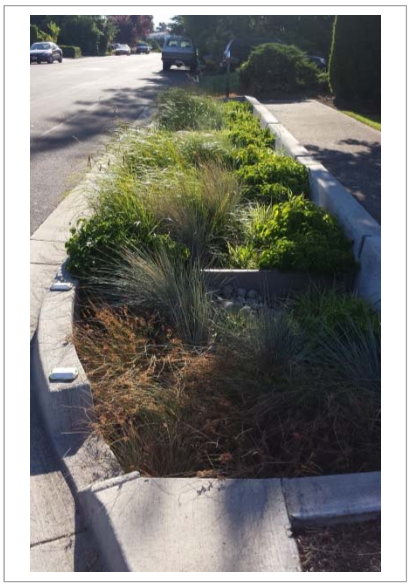
Parking

The following changes are proposed to parking standards:

- Encourage permeable pavement for commercial parking lots
- Allow parking lot landscaping to be used to manage runoff with bioretention facilities

Why? *These measures reduce impervious surfaces and allow flexibility to manage stormwater runoff on private commercial/industrial property.*

Continued on page 2.



Bioretention curb extension manages runoff in ROW (Otak, Inc.)

Bioretention planter in the landscape strip manages stormwater runoff in the ROW. See below for standard engineering plan for a similar facility. (Photo courtesy Muralmouth.Wordpress)

Focus on KEDM - Streets, Frontage, and Parking (con't.)

Frontage – Bioretention, Plants, and Trees

The following changes are proposed to standards for frontage landscaping:

- Allow two species of street tree to be planted within a bioretention facility in the ROW
- Specify plants for use in bioretention facilities in the ROW
- Require maintenance of plants in bioretention planter in landscape strip by adjacent property owner
- Assign responsibility for maintaining plants in bioretention curb extension to City

Why? *Plants are an integral part of managing runoff using bioretention.*

New Standard Plans and Details

- Standard plans for bioretention planter and curb extension
- Standard details for inlets and outlets to bioretention
- Curb extension planting template

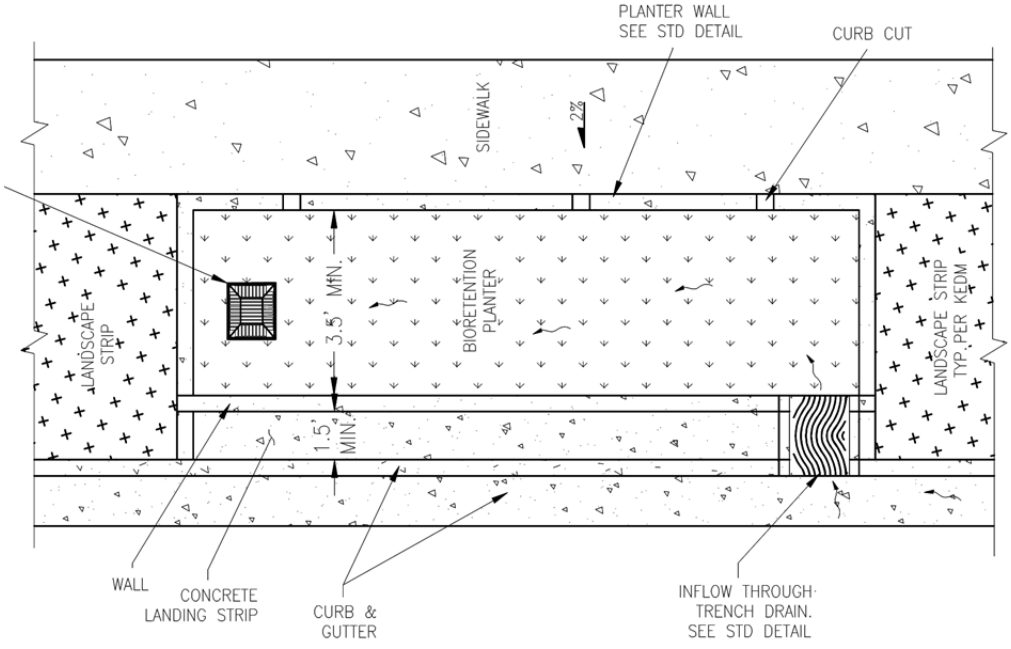
Why? *Standard Plans and Details make it easier to design, construct, and plant LID facilities.*

LID Update Process

To meet state stormwater requirements, Kelso is incorporating LID principles into its existing development standards and is adopting a new stormwater design manual – the 2014 Stormwater Management Manual for Western Washington.

LID is a way of managing stormwater by slowing it down, spreading it out, and soaking it in. It uses site planning to reduce impervious surfaces and retain native vegetation and focuses on installing small, vegetated stormwater practices distributed throughout a site to manage runoff.

Proposed Standard Plan for Bioretention Planter in the Landscape Strip



Kelso
Low Impact Development

Issue #3
June 5, 2017

Find Out More

Kelso LID Web Page:
http://www.kelso.gov/stormwater/low-impact-development-lid

Upcoming Events

City Council Hearing on June 6, 2017

City Council Hearing on June 20, 2017

Illustrations of ongoing stormwater facility maintenance (photos are courtesy of Department of Ecology and AHBL, Inc.)

Focus on the Stormwater Management Manual for Western Washington

As part of Kelso's effort to include Low Impact Development (LID) principles and best management practices in its development codes, the Kelso Engineering Design Manual (KEDM) will be updated.

In this issue, we focus on adopting the 2014 Stormwater Management Manual for Western Washington (SWMMWW) and on proposed changes to the KEDM: update the overall stormwater requirements, update and simplify submittals, and ensure long-term operations and maintenance of stormwater facilities.

General Design and Submittal Requirements

Several changes are proposed to the general requirements:

- Change the Site Grading Plan requirement and added a Permit requirement for projects with cut/fill of 50 cy of material or 7,000 sf of land disturbance. This is an increase from the previous threshold of 5,000 sf of disturbance.
- Add a Stormwater Submittals Guide.
- Exempt small sites from the KEDM for stormwater. Small sites use an Abbreviated Stormwater Site Plan worksheet.
- Reduce the Drainage Design Report requirement to a single submittal instead of a preliminary and final report submittal.
- Add a Long-Term Stormwater Site Management Plan requirement that ensures ongoing maintenance by facilities' owners.
- Add soil preservation and amendment language.

Why? *These measures adopt the SWMMWW, simplify the submittal process and ensure facilities are maintained by their owners.*

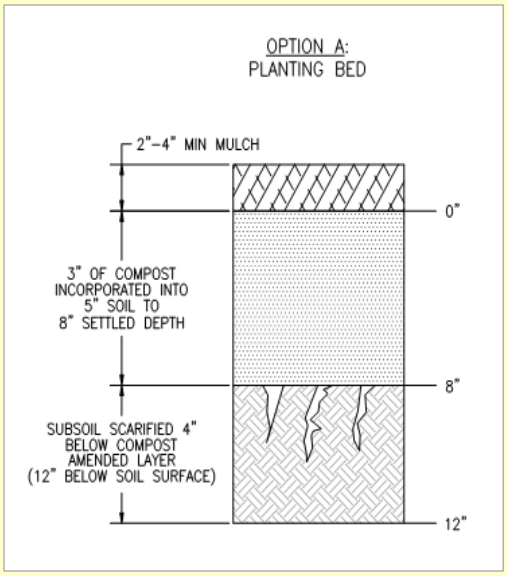
Storm Drainage, Grading, and Erosion Control

Several changes are proposed:

- Combine Chapter 4 "Storm Drainage" with Chapter 2 "Grading and Erosion Control."
- Adopt the storm drainage, grading and erosion control thresholds from the SWMMWW. (See illustration on page 2.)
- Eliminate the local stormwater management requirements, and replaced them with the SWMMWW requirements. This removes the local amenity and education requirements.
- Add a Stormwater Maintenance Bond requirement for the construction of public treatment and flow control facilities.

Why? *These changes adopt the SWMMW, simplify the KEDM, and ensure new facilities function as designed.*

Continued on page 2



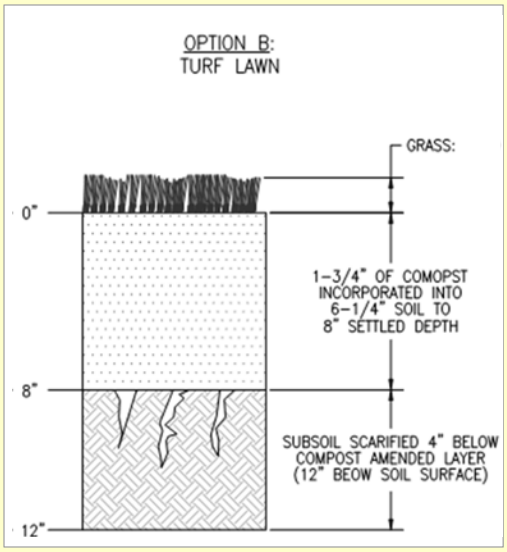


Illustration of Soil Amendments – Required on Most Construction Sites

Focus on SWMMWW (con't.)

Streets

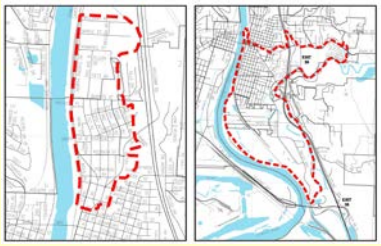
Several changes are proposed to the street requirements that apply to driveways and commercial parking lots.

- Encourage LID techniques such as ribbon driveways and permeable pavement for driveways and commercial parking lots.
- Allow LID techniques in the right-of-way and parking lot landscaping.

Why? *These measures reduce impervious surfaces and allow flexibility to manage stormwater runoff on private commercial/industrial property.*

Flow Control Exemption

Many construction and development sites in Kelso are exempt from the requirement to use flow control facilities such as detention ponds. Sites in Drainage Improvement District No 1 (left) and Consolidated Diking Improvement District No. 3 (right) do not have to use detention ponds, bioretention, or permeable pavement to control runoff.



LID Update Process

To meet state stormwater requirements, Kelso is incorporating LID principles into its existing development standards and is adopting the 2014 Stormwater Management Manual for Western Washington. LID is a way of managing stormwater by slowing it down, spreading it out, and soaking it in.

Thresholds for Stormwater Requirements

<2,000 sf hard surface and <7,000 sf land disturbance
- No submittals
- 1. Control erosion during construction

>50 cy cut/fill or >7,000 sf land disturbance
- Site grading plan and permit required
- 1. Control erosion during construction.
- 2. Amend soils

2,000-5,000 sf hard surface
- Submit Abbreviated Stormwater Site Plan
- 1. Control erosion during construction
- 2. Use rain garden, permeable pavement, and downspout drywells on site to manage runoff
- 3. Amend soils

>5,000 sf hard surface
- Submit engineered Stormwater Site Plan following KEDM
- 1. Control erosion during construction
- 2. Use bioretention, permeable pavement, and downspout drywells on site to manage runoff
- 3. Use swales and detention ponds for treatment and soil erosion
- 4. Amend soils

Kelso
Low Impact Development

Issue #4
Nov. 14, 2017

Find Out More

Kelso LID Web Page:
http://www.kelso.gov/stormwater/low-impact-development-lid

Upcoming Event

Stormwater Requirements Training

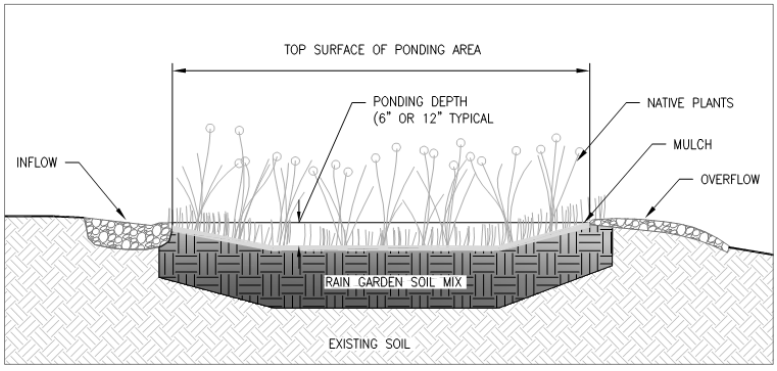
Dec. 13, 2017
1:00-3:30 pm
Kelso City Council Chambers
203 S. Pacific Avenue

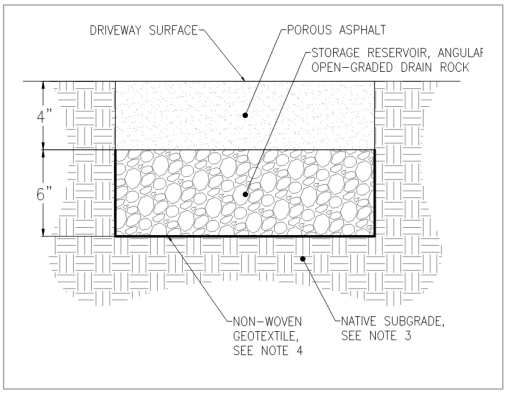
LID Update Process Complete

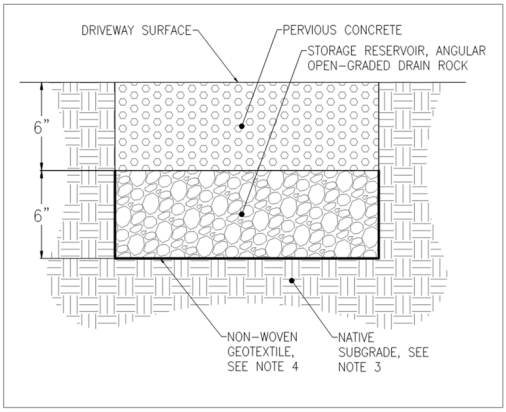
Kelso has updated its development codes to include Low Impact Development (LID) principles and best management practices. Changes can be found in the unified development code and the Kelso Engineering Design Manual (KEDM). As part of that effort, Kelso adopted the 2014 Stormwater Management Manual for Western Washington (SWMMWW). In addition to these changes, the LID update simplified the submittal process and resulted in new applications and informational handouts for small construction projects (described on page 2). A training to describe these changes to stormwater requirements is announced below.

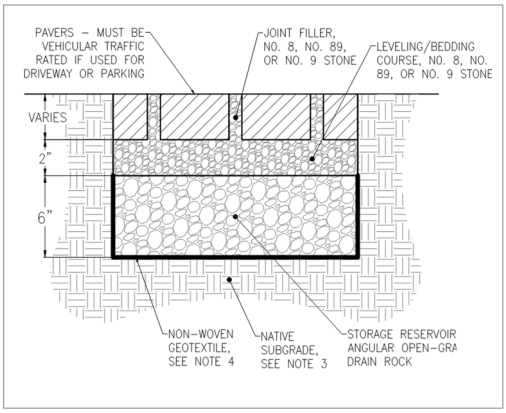
Free Stormwater Requirements Training for Developers and Property Owners

The City of Kelso and the City of Longview are partnering to provide training for the development community on the new LID standards and requirements for the respective cities. The free training will take place 1:00 - 3:30 pm Wednesday December 13th, 2017 at Kelso City Council Chambers.









*Illustrations of permeable pavement sections from the **Residential Permeable Pavement Design & Construction Guide**. Top – Porous Asphalt, Middle – Pervious Concrete, Bottom – Permeable Interlocking Concrete Pavers*

Announcing New Application Forms and Handouts for Small Projects

Kelso is introducing new applications and instruction handouts for small projects. The new applications incorporate LID best management practices (BMPs) for stormwater management and simplify the submittal process for small projects. Small projects use an **Abbreviated Stormwater Site Plan** worksheet with simplified requirements and step-by-step guidance. To assist with filling out the Abbreviated Stormwater Site Plan, the City also has the **Custom Soil Resource Report Instructions** and **Final Stormwater Management Feasibility Checklist** available.

For sites that construct Rain Gardens or Permeable Pavement, several other handouts are available. These include the **Residential Permeable Pavement Design & Construction Guide** and the **Rain Garden Design & Construction Guide for Small Projects**. These guides provide detailed instructions for small projects.

Rain gardens and permeable pavement are permanent on-site stormwater BMPs, and they must be maintained by future homeowners. A **Small Project Example Covenant** and **Maintenance Instructions** are available to include as part of the Abbreviated Stormwater Site Plan application.

Finally, the **Small Construction Erosion Control Plan** provides owners of small sites a simplified erosion control format and instructions to comply with City requirements to prevent eroded soils from leaving the site during construction. The plan includes a template to assist site owners with planning and placing erosion control BMPs.

The new forms can be found on the Kelso website at: http://www.kelso.gov/engineering/engineering-permits

Thresholds for Stormwater Requirements

<2,000 sf hard surface and <7,000 sf land disturbance

- No submittals
- 1. Control erosion during construction

>50 cy cut/fill or >7,000 sf land disturbance

- Site grading plan and permit required
- 1. Control erosion during construction.
- 2. Amend soils

2,000-5,000 sf hard surface

- Submit Abbreviated Stormwater Site Plan
- 1. Control erosion during construction
- 2. Use rain garden, permeable pavement, and downspout drywells on site to manage runoff
- 3. Amend soils

>5,000 sf hard surface

- Submit engineered Stormwater Site Plan following KEDM
- 1. Control erosion during construction
- 2. Use bioretention, permeable pavement, and downspout drywells on site to manage runoff
- 3. Use swales and detention ponds for treatment and detention
- 4. Amend soils

Attachment B

Posters

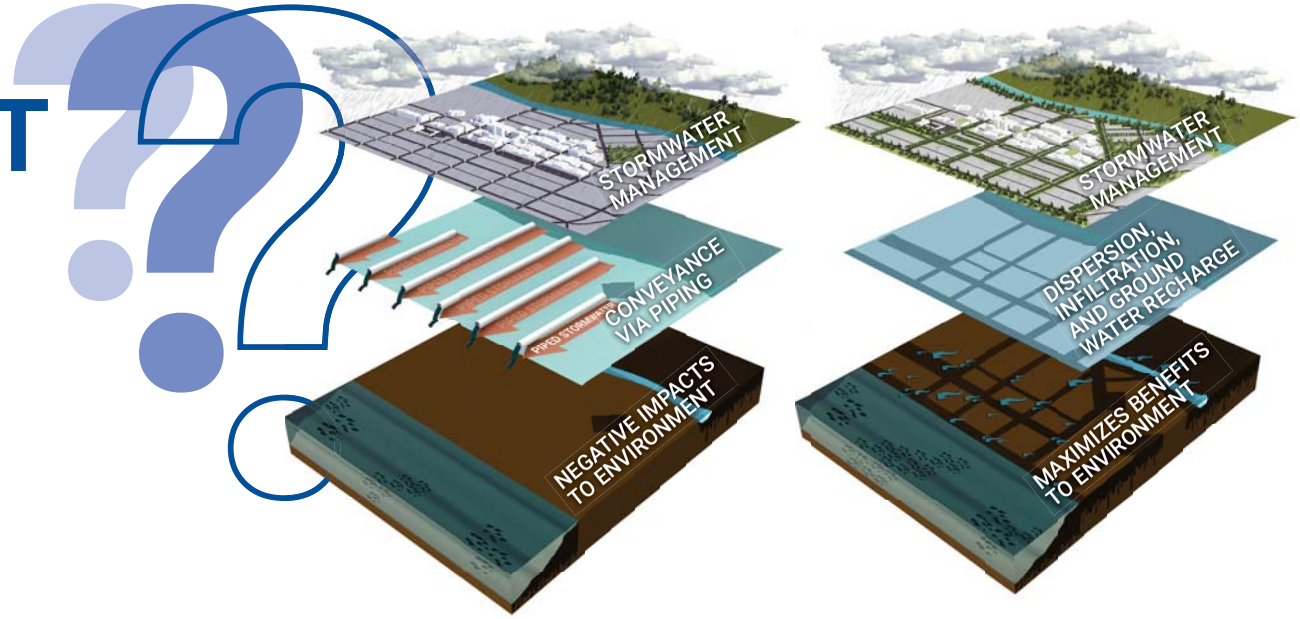
By mimicking natural water cycles, LID reduces the negative impacts of stormwater runoff and pollution on streams and rivers. Small-scale best management practices (BMPs) such as rain gardens and swales allow for collection, retention, storage, infiltration, and filtering near where the rain falls. As much runoff as possible is infiltrated into the ground.

what is LOW IMPACT DEVELOPMENT

Low Impact Development (LID) manages rainfall in ways similar to nature. Rather than using big stormwater ponds, vaults, and pipes, LID introduces more dispersion, infiltration, transpiration, and evaporation into the design and development of sites and streets. Stormwater management functions are provided in ways that mimic the natural hydrologic processes prior to disturbance and development.

LID is implemented through land use, design, and stormwater management strategies and techniques, including:

- Conserving natural on-site features such as existing streams, ponds, trees, and native soils and landscape areas
- Site planning to minimize the "footprint" of impervious surfaces and the amount of clearing and grading
- Features that slow stormwater runoff and allow it soak into the ground such as rain gardens and bioretention planters
- Distributing small-scale BMPs across the landscape and adjacent to areas of flow, rather than centralizing stormwater storage
- Integrating site planning and stormwater management considerations at the initial design phases of a project to create a more hydrologically functional landscape



What's the Difference?

CONVENTIONAL

- Sends stormwater to the storm sewer or storm drainage system, taking pollutants with it
- Expensive infrastructure: piping, vaults, ponds, etc.
- Techniques haven't been updated in over 50 years
- Minimizes opportunities for groundwater infiltration and aquifer recharge
- Does not succeed in eliminating stream erosion or impacts to water quality

LOW IMPACT DEVELOPMENT

- Manages stormwater on-site, cleaning and reducing the amount of water that flows into drainage systems and streams
- Mimics natural hydrologic processes
- Best management practices are based on significant amounts of current research
- Less expensive bioretention systems naturally treat runoff and replenish aquifers
- Improves water quality, stream flows, and wetland hydrology; enhances the natural environment

why is LID BENEFICIAL?

environment: LID protects our natural ecosystems and provides improved water quality, increased groundwater recharge, improved air quality, enhanced aesthetics, and more open space.

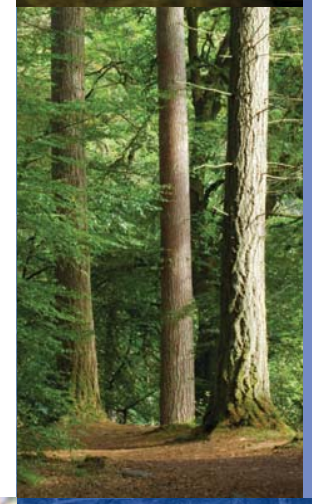
LID also brings **community** and **economic** benefits.

- » Clean water and reduced flooding enhance the communities we live in and our quality of life.
- » Protecting streams and rivers from pollutants is usually less expensive than cleaning contaminated water.
- » Lower infrastructure and maintenance costs reduce capital burdens.
- » Landscapes enhance property values and are easier to maintain.
- » Reducing the need for large stormwater detention ponds can increase the amount of buildable area within a development.

LID *is good for* PEOPLE

Did you know that Kelso is home to the following salmon and trout species?

- » Chinook
- » Coho
- » Sockeye
- » Pink
- » Chum
- » Steelhead
- » Bull Trout



LID *is good for* FISH

Several species of salmon, trout, and other aquatic wildlife are endangered, threatened, or otherwise at risk in the Columbia River and its tributaries. Studies have shown that untreated runoff and poor water quality can be lethal to juvenile salmon. Poor water quality and high velocity flows in streams can harm all aquatic species and the upland wildlife that are part of the food chain.

Uncontrolled runoff from expansive impervious surfaces and massive site grading worsens these problems. LID is a good solution for addressing these issues. This is the reason that the Washington State Department of Ecology is now requiring that LID best management practices be integrated into development projects in many cities and counties.

TREES PROTECT STREAMS

Research in King County shows that preserving and restoring trees and other native vegetation along streams helps maintain healthy habitat conditions for salmon and other fish and the bugs they eat.

Washington State Department of Ecology and many cities and counties in Western Washington already require LID techniques. The City of Kelso intends to adopt LID requirements by June 30, 2017.

For more information, refer to:

» *Stormwater Management Manual for Western Washington*

» *LID Technical Guidance Manual for Puget Sound*

best MANAGEMENT PRACTICES

LID Best Management Practices (BMPs)

include a variety of treatments and techniques for managing surface water runoff as part of site development and street improvements. These solutions help to slow runoff down, spread it out and soak it into the ground:

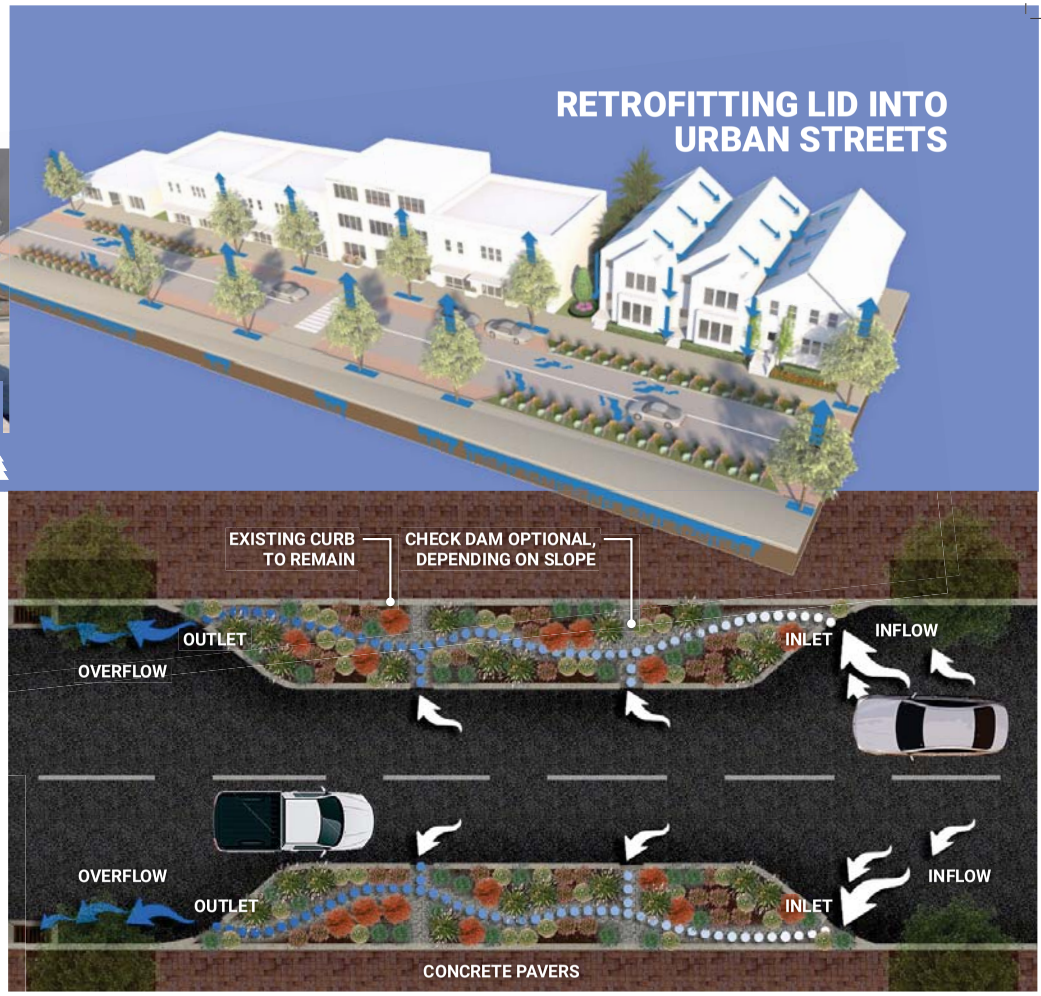
» **Bioretention areas** such as swales, cells, planters, or rain gardens can hold water and allow it to soak into the ground and evaporate.

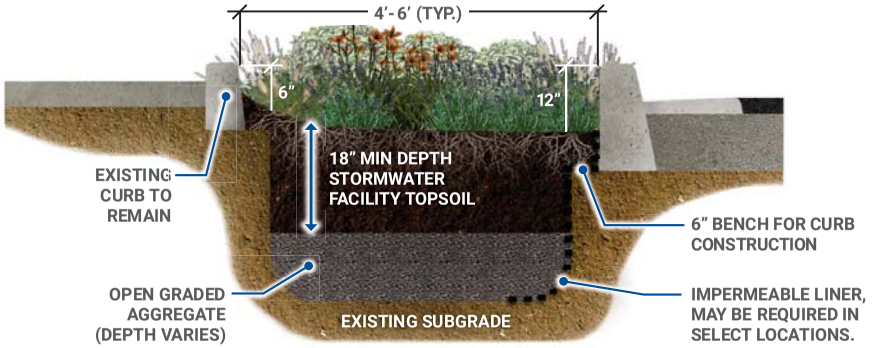
» **Permeable pavements** such as pavers with joints or pervious concrete surfaces that allow water to flow through can be used on driveways, sidewalks, parking areas, and streets.

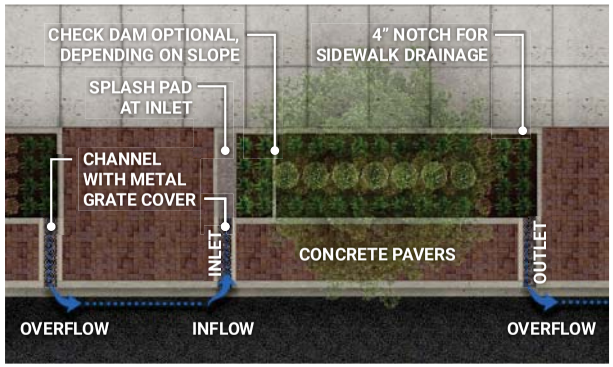
» **Reducing the "footprint"** of paved areas and impermeable surfaces also helps by reducing how much runoff is generated and by creating more space for trees, landscaping, and natural areas where water can soak into the ground.

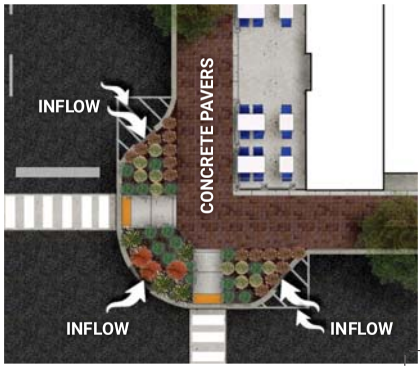
SLOW IT DOWN **SPREAD IT OUT** **SOAK IT IN**

strategies for STREETS & RIGHTS-OF-WAY



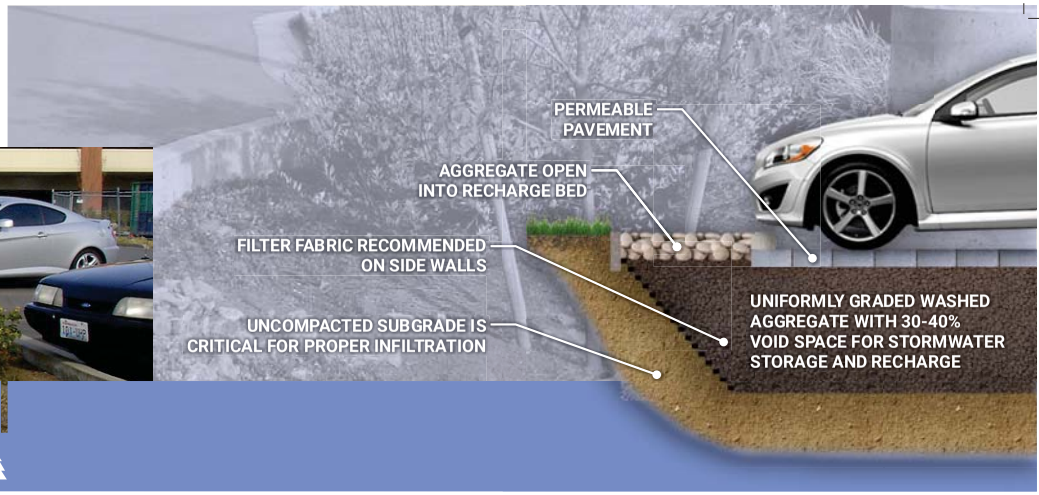




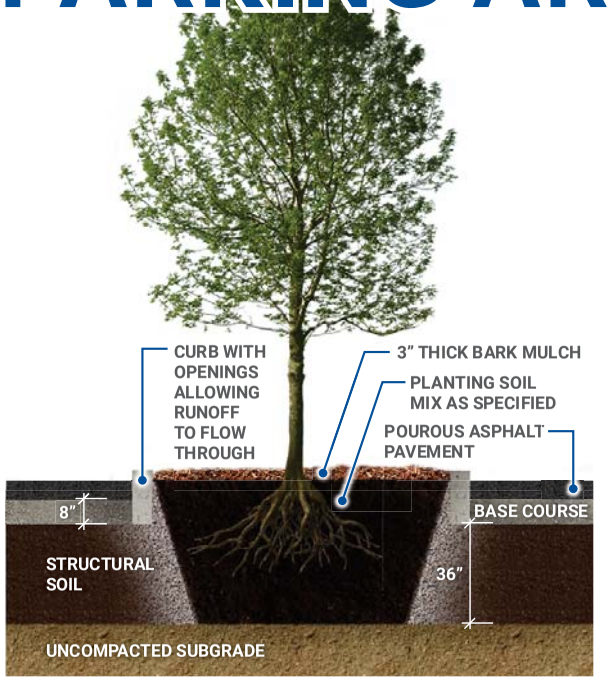


City Capital Improvement Projects will use LID:

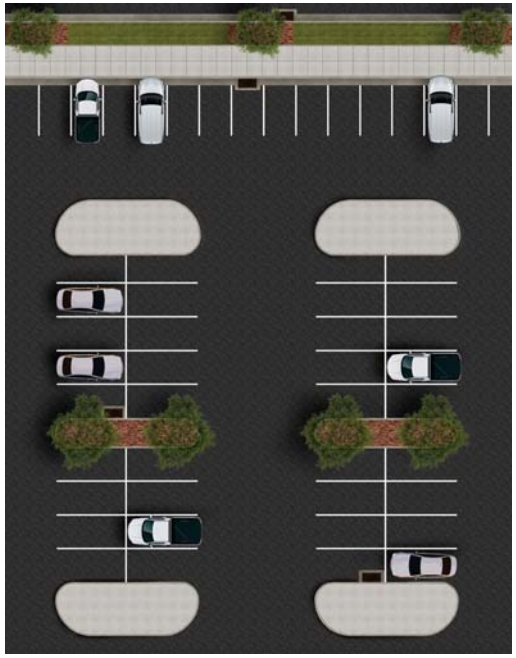
- Use minimum widths allowable for travel lanes, shoulders, paths, and sidewalks.
- Infiltrate and slowly convey storm flows in roadside bioretention cells and swales.
- Make use of median islands, traffic circle islands, space at intersection bulb-outs, and planting strips along roadways for bioretention facilities and rain gardens.
- Design the roadway network to minimize site disturbance and reduce fragmentation of the landscape.
- Retrofit LID features into existing city streets to reduce impervious surface area, better manage stormwater runoff, and enhance the environment.

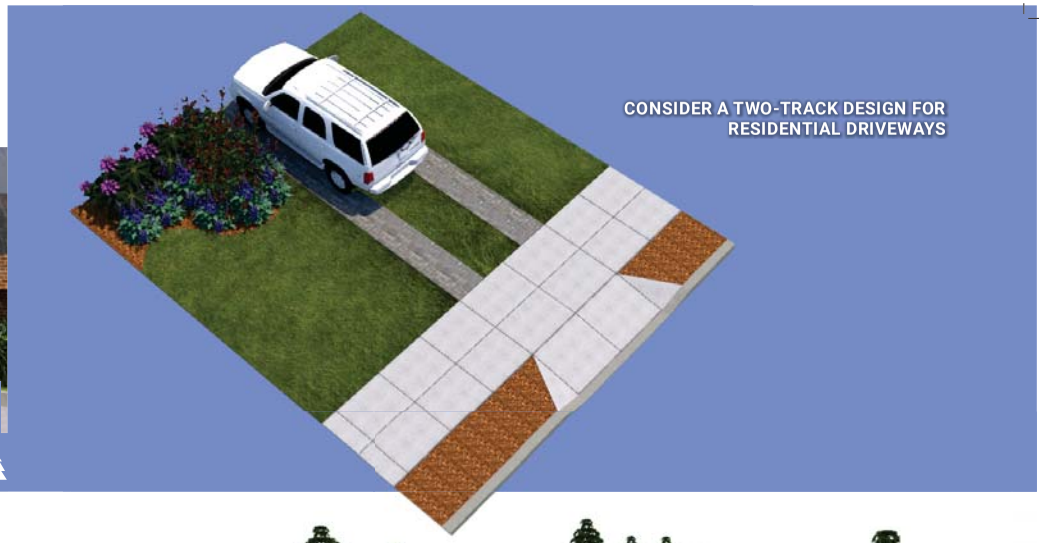


strategies for PARKING AREAS



- Use minimum needed dimensions for parking spaces, access aisles, and driveways to reduce the overall footprint of the paved area.
- Use permeable paving as much as possible in parking areas, adjacent sidewalks, and paths.
- Build some compact spaces.
- Make use of median islands and planting strips along parking areas for bioretention facilities and rain gardens.
- Retrofit LID features into existing parking areas to reduce impervious surface area, better manage stormwater runoff, and enhance the environment.



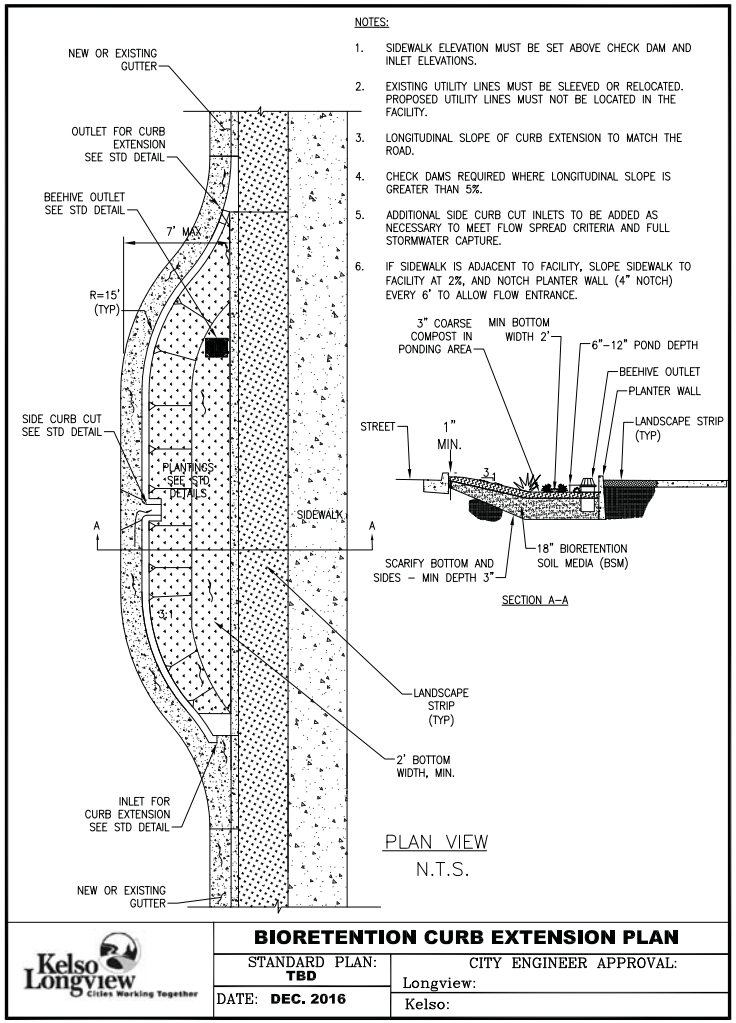


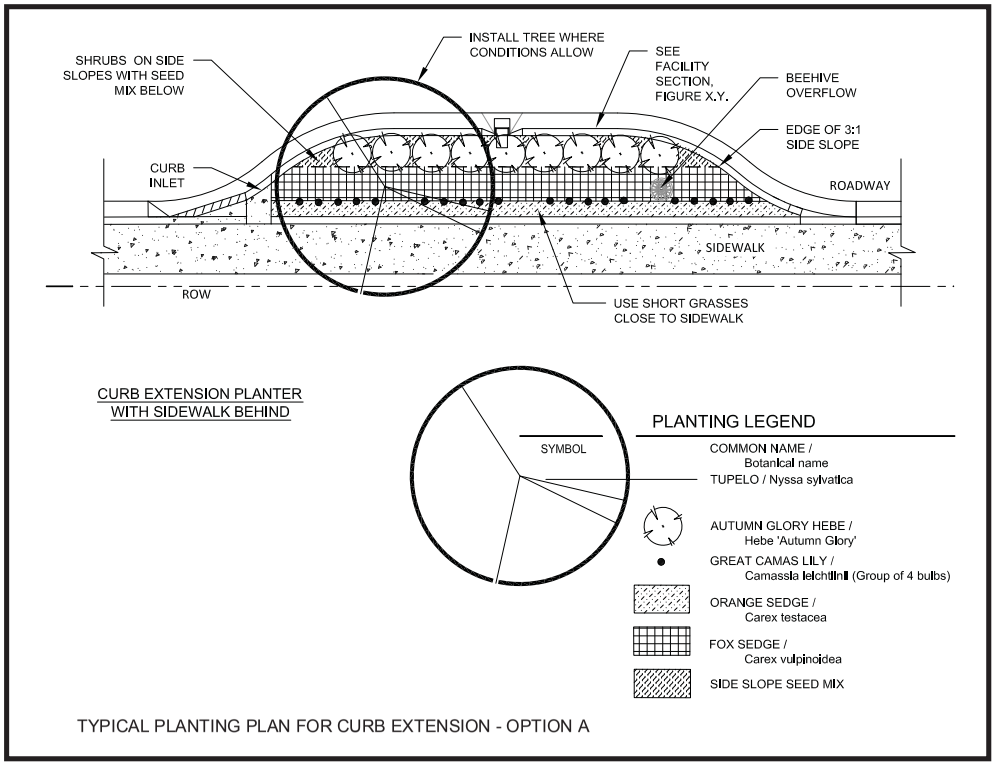
strategies for

SHORT PLATS, SUBDIVISIONS, & OTHER RESIDENTIAL DEVELOPMENT

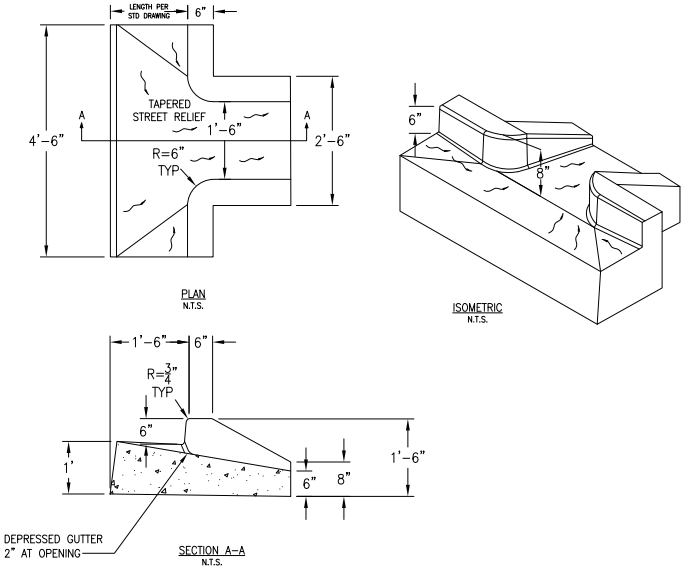
- Address stormwater management early in your site planning process—this will be more efficient and cost effective than waiting until the engineering stage of work.
- Work with a geotechnical engineer to check your soil conditions and infiltration rates to determine if and where infiltration facilities might be most feasible.
- As part of site planning, avoid compacting or paving over soils with high infiltration rates—plan ahead to make use of these areas in your development.
- Be efficient with land and get multiple uses by integrating open space and stormwater facilities. Rain gardens with paths and interpretive elements can serve as recreation space for residents. Stormwater can disperse over lawn areas. Retention and infiltration vaults can be covered with lawn and picnic areas.
- Use bioretention, rain gardens, permeable pavements, and other features to reduce the amount of stormwater infrastructure and piping needed—this will reduce your development costs.
- Minimize the footprint of impervious surfaces—use permeable pavements and minimum allowable roadway and sidewalk cross sections, driveway lengths, and parking stall sizes. Use two-track/ribbon driveways or shared driveways.
- Cluster homes and development to minimize the amount of land disturbance, preserve natural areas for stormwater absorption, and maximize vegetated area.
- Maximize preservation of trees and natural areas and planting/ restoration of native landscaping.
- Include landscape islands in streets, bulb-outs at intersections, and cul-de-sacs.
- Work with a good landscape architect to choose the best Pacific Northwest native plants for your landscaping, rain gardens, and bioretention facilities.

PROPOSED STANDARD DETAILS



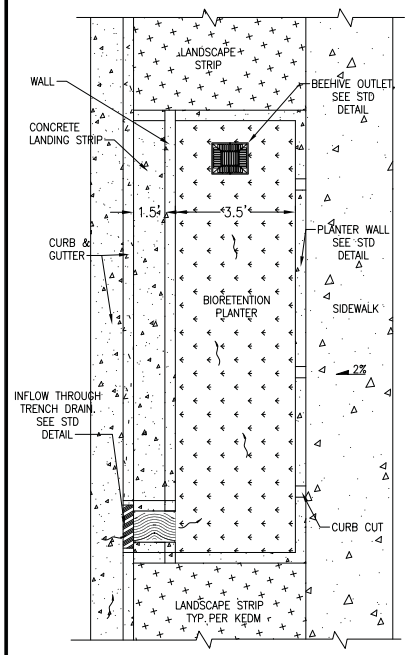


PROPOSED STANDARD DETAILS



NOTES:
1. FOR USE WITH STORMWATER FACILITIES WITH SIDE SLOPES.
2. REFER TO STANDARD DRAWING ST-090 & ST-110. MATCH GUTTER PAN OF ADJACENT CURB AND GUTTER.

Kelso Longview Cities Working Together	SIDE CURB CUT	
	STANDARD PLAN: **TBD**	CITY ENGINEER APPROVAL: Longview:
	DATE: **DEC. 2016**	Kelso:



PLAN VIEW
N.T.S.

NOTES:
1. SIDEWALK ELEVATION MUST BE SET ABOVE CHECK DAM AND INLET ELEVATIONS.
2. EXISTING UTILITY LINES MUST BE SLEEVED OR RELOCATED. PROPOSED UTILITY LINES MUST NOT BE LOCATED IN THE FACILITY.
3. LONGITUDINAL SLOPE OF PLANTER TO MATCH THE ROAD.
4. CHECK DAMS REQUIRED WHERE LONGITUDINAL SLOPE IS GREATER THAN 5%.
5. ADDITIONAL TRENCH DRAIN INLETS TO BE ADDED AS NECESSARY TO MEET FLOW SPREAD CRITERIA AND FULL STORMWATER CAPTURE.

Kelso Longview Cities Working Together	BIORETENTION PLANTER	
	STANDARD PLAN: **TBD**	CITY ENGINEER APPROVAL: Longview:
	DATE: **DEC. 2016**	Kelso:

Attachment C

Public Comment Log

Public Comment Log

Date	Commenter	Comment	Status
2/24/17	Tim Wines / KSAC	To reduce cost of submittals for LID facilities, the City could provide a standard planting plan for a bioretention cell.	A standard planting plan was created and is available as a handout
2/24/17	Tim Wines / KSAC	Advocates for changing the land-disturbance area threshold for requiring a grading permit from 5,000 sf (as proposed and as is currently required) to 7,000 sf, to match with the minimum land-disturbance threshold that will trigger Minimum Requirement #2 (construction site erosion control) in the stormwater manual.	One thresholds of the grading permit was changed from 5,000 sf of land disturbance to 7,000 sf of land disturbance
2/24/17	Tim Wines / KSAC	KEDM currently limits single-family residential driveway throat from 10 ft to 16 ft width. The proposed update presented to KSAC would change the range from 9 ft to 16 ft width. The comment is to allow single-family residential driveways to have up to 20 ft width throat to match the standard width of a 2-car garage door.	Driveway widths will be reconsidered when the City updates its standard details
2/24/17	KSAC	Discussion of a proposed update to KEDM, which would require the adjacent landowner to maintain the plants within a bioretention planter facility within the typical public street landscaping strip, if present. This would present a new responsibility for landowners that they may not be aware of. At the same time, it is similar in nature to the requirement for the adjacent landowner to maintain the sidewalk, landscape strip, and street tree(s), if present.	An exception was added for owner maintenance of plants in a curb extension-style bioretention facility that extends into the parking lane. Due to safety concerns, property owners will not be required to maintain plants in these facilities – responsibility will rest with City.

Date	Commenter	Comment	Status
2/24/17	Tim Wines / KSAC	The stormwater manual will require use of soil amendments on almost all development sites. Is there a way to avoid using soil amendments on sites where soil amendments may pose a landslide risk, in the opinion of a geotechnical engineer?	The City's reviewers will consider stamped reports from licensed geotechnical engineers on a case-by-case basis to assist in determining feasibility of LID BMPs.

Low Impact Development Code and Manual Update
Public Involvement Summary

Submitted to:

City of Kelso
203 S. Pacific
P.O. Box 819
Kelso, WA 98626

Prepared by:

Otak, Inc.
700 Washington Street, Suite 300
Vancouver, WA 98660
Otak Project No. 17854

February 28, 2018

Otak

Acknowledgements

Low Impact Development Code and Manual Update
Public Outreach Summary Report

Submitted to:
City of Kelso
Van McKay

Prepared by:
Otak, Inc.

Trista Kobluskie
Stormwater Planner

Table of Contents

Section 1—Introduction

The City of Kelso is covered under the National Pollutant Discharge Elimination Systems (NPDES) Western Washington Phase II Municipal Stormwater Permit (Permit).

The Permit required Kelso to achieve two key objectives by June 30, 2017: 1) incorporate and require Low Impact Development (LID) principles and Best Management Practices (BMPs) in local development-related codes, rules, and standards; and 2) adopt a stormwater planning and engineering manual equivalent to the *2012 Stormwater Management Manual for Western Washington, as amended December 2014* (2014 SWMMWW).

Between February 2016 and January 2018, the City and consultant Otak, Inc. carried out a plan to achieve the objectives and to involve and inform the public.

LID-related amendments pertaining to subdivision, land use, and planning were incorporated into the City's concurrent effort to reorganize various development titles into a Unified Development Code (UDC). Pursuant to this effort, Ordinance 17-3889 was adopted March 21, 2017 to adopt Kelso Municipal Code (KMC) Title 17, UDC, and to adopt LID-related development standards incorporated into it.

Amendments pertaining to the Kelso Engineering Design Manual (KEDM) and stormwater regulations in KMC Chapter 13.09 were considered separately by City Council. Ordinance 17-3894 was adopted June 20, 2017 to revise the KEDM to both incorporate LID strategies and BMPs and to adopt the 2014 SWMMWW. Ordinance 17-3895 was also adopted June 20, 2017 to amend Chapter 13.09, Stormwater Management, to support requirements of the KEDM and 2014 SWMMWW and to ensure long-term maintenance of stormwater facilities.

This report summarizes the public involvement effort, which began in June 2016 and concluded in December 2017.

Section 2—Stakeholders

Several sets of public stakeholders in the LID code and manual update were identified. These included:

- Members of the Kelso Stormwater Advisory Committee (KSAC)
- The engineering, construction contracting, and development community
- Property owners in the City
- Environmental advocates
- Suppliers of certain landscaping products commonly used in LID facilities
- Neighboring jurisdictions and allied districts: City of Longview, Cowlitz County, Cowlitz 2 Fire & Rescue District, and Port of Longview

During the spring of 2017, the City's Senior Stormwater Engineer, Van McKay, provided initial invitations to stakeholders via phone calls, emails and attendance at industry meetings such as the Lower Columbia Contractor's Association.

Stakeholders were invited to join an email list to receive newsletters and meeting announcements. KSAC members were automatically included on the stakeholder list. The stakeholder email list was managed by the City and included approximately 15 individuals.

Section 3—Online Communications

Online communications included a web page devoted to the LID code and manual update and email newsletters to stakeholders.

Web

The web page at www.kelso.gov/stormwater/low-impact-development-lid went live in January 2017. The page was updated throughout the review and adoption process. The web page introduced LID concepts, informed readers about upcoming meetings or hearings and summarized proposed amendments. Informational content about LID concepts and the regulatory requirements remains as a resource for the community.

Figure 1. Screenshot of web page, February 2018

Newsletters

Between February 17, 2017 and November 14, 2017, four brief newsletters were emailed to stakeholders. Newsletter topics were intended to introduce LID concepts, address the regulatory framework of the project, describe the expected timeline, show draft example drawings and notify readers about upcoming meetings and opportunities to provide input.

The four newsletters are still available on the website and are presented in Attachment A.

Section 4—Events & Meetings

The City hosted several in-person events and meetings in 2016 and 2017, including those Hearings of City Council necessary to adopt the three ordinances described in Section 1. A brief timeline of events and meetings is presented in Figure 2, below.

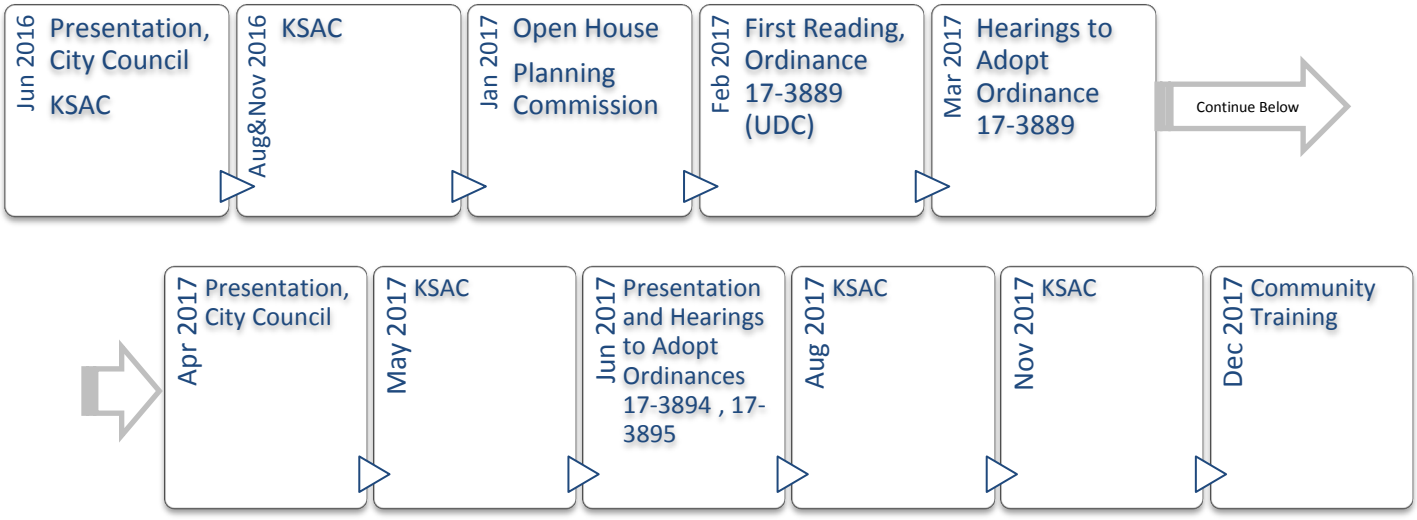


Figure 2. Timeline of Events & Meetings

Kelso Stormwater Advisory Committee (KSAC)

KSAC is a citizen advisory committee to the City Council. Its members represent the citizens at large, development community, environmental advocates, recreation advocates, other stormwater permittees (local business) and youth.

KSAC meetings are open to the public. The City's Senior Stormwater Engineer, Van McKay, is the liaison to the KSAC.

KSAC were consistently involved in reviewing identified gaps, discussing proposed amendments to codes and manuals and recommending proposed amendments to City Council. KSAC were presented with the entire detailed gap analysis, and they discussed the findings with staff and consultants thoroughly over the course of several meetings in 2016 and 2017.

Gap analysis findings reviewed by KSAC included the following:

- Code and engineering standards where LID planning principals could be encouraged;
- Code and engineering standards that could restrict the use of LID;

- Code and engineering standards that could be amended or added to encourage and support the use of LID BMPs; and
- Elements of code and KEDM that would require amendments to adopt the 2014 SWMMWW.

KSAC group comments in meetings were recorded by Otak on the gap analysis spreadsheets. The gap analysis spreadsheets, including summaries of KSAC discussions, are presented in Attachment A to the *Low Impact Development Final Summary Report*, dated February 29, 2018.

In May 2017, KSAC were presented with the proposed amendments to the KEDM and KMC 13.09. At the May 25, 2017 meeting, KSAC carried a motion to recommend to City Council that the drafts of the KEDM and Chapter 13.09 be adopted.

In November 2017, Otak also attended a KSAC meeting to present drafts of forms, handouts and applications, such as the Kelso Stormwater Requirements Thresholds handout and the Abbreviated Stormwater Site Plan that is tailored to small sites.

KSAC members were invited to the other events, meetings, and hearings hosted by the City as part of this process.

Open House

In January 2017, City of Kelso hosted an open house at the City Council chambers for the community at large. The open house was included on the City's general calendar of events and members of the development and contracting community specifically were invited.

Figure 3. Example Poster

Otak staff and the City's Senior Stormwater Engineer were on hand to introduce LID topics and practices, discuss the 2014 SWMMWW, and answer questions.

A set of eight posters illustrated LID topics and proposed standard drawings for streets that incorporate LID. The posters are

presented in Attachment B.

Five stakeholders attended the open house, including two employees from the City of Longview, one member of the private development community, one employee from the Kelso School District (who is also a Planning Commission member), and one employee of the Port of Longview.

Comment cards were on hand, but no written comments were received.

City Council – Presentations and Hearings

Kelso's City Council meetings are open to the public and noticed in advance. Agendas are posted online prior to meetings. The public is invited to present "Citizen Business" prior to the Consent Agenda and to comment after presentations to the Council.

Otak presented at City Council three times. A presentation in June 2016 introduced the project and LID concepts to Council. In April 2017, Otak gave a progress report to Council and outlined the nature of proposed code and manual amendments. Otak summarized the final proposed code and manual amendments to City Council in June 2017.

City staff presented proposed updates to the UDC several times during 2016 and 2017 prior to adoption of Ordinance 17-3889 (UDC). The dates of those presentations are not recorded in this summary.

City Council held four Hearings to adopt proposed code and manual amendments. The first reading of Ordinance 17-3889 to adopt to UDC was February 21, 2017, and the second reading was March 21, 2107. The ordinance was adopted. The first reading of Ordinances 17-3894 and 17-3895 to update the KEDM and amend KMC 13.09 was June 6, 2017, and the second reading was June 21, 2017. The ordinances were adopted.

Community Training

On December 13, 2017, City of Kelso and City of Longview teamed to host a stormwater training session for individual property owners and the development and contracting community. The presenters were Van McKay, City of Kelso Senior Stormwater Engineer; Steve Haubner, City of Longview Stormwater Manager, and Trista Kobluskie, Stormwater Planner from Otak.

The training agenda included the following topics:

- Stormwater Regulations Background
- Project Classification by Size and Complexity

- Stormwater Minimum Requirements
- Focus on LID and Stormwater Concepts for Small Sites
- Detailed Review of Kelso Abbreviated Site Plan for Small Sites
- Detailed Review of Longview Abbreviated Site Plan for Small Sites
- Summary Review of Requirements Engineered Projects / Major Projects for Larger Sites
- Q&A

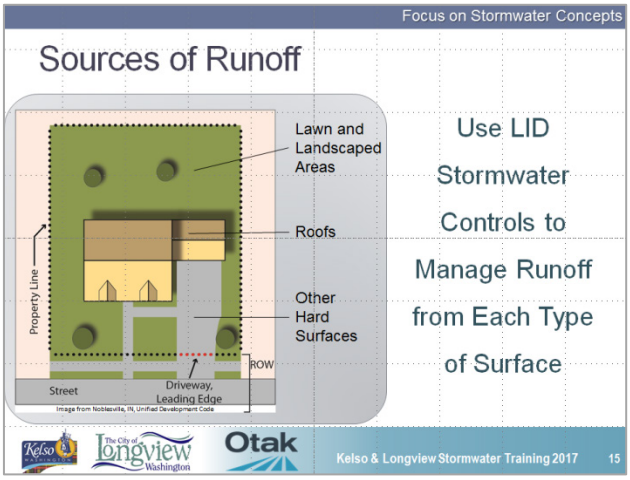


Figure 4. Example Slide from Community Training Presentation

A handful of representatives from the private development community attended.

The presentation was televised live on KLTV Kelso Longview Television.

Section 5—Public Comments

No written public comments were received throughout the public involvement campaign.

Attendees at the open houses and training sessions asked general questions about LID, questions about the process (e.g. dates of next public meetings), and clarifying questions about specific proposals or requirements. No specific comments or suggestions were recorded by staff or consultants at the events.

Several specific requests by KSAC were incorporated into final amendments of the KEDM and KMC 13.09 or may be incorporated into future updates.

These specific requests were recorded in a log of public comments. The Public Comments Log is included as Attachment C.

Attachment A

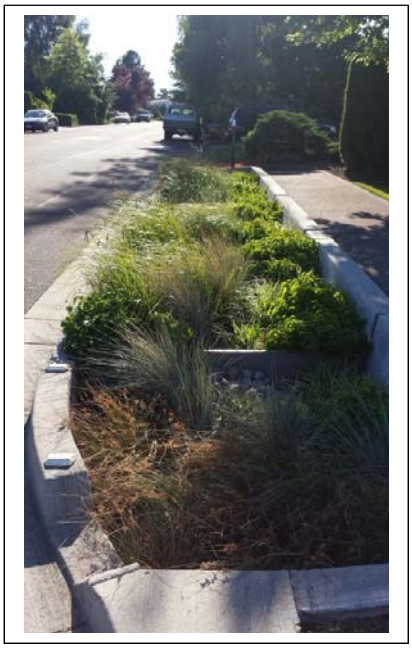
Newsletters

Kelso
Low Impact Development

Issue #1
February 17, 2017

Find Out More

Kelso LID Web Page:
http://www.kelso.gov/stormwater/low-impact-development-lid



An example of a bioretention area built to capture street runoff. (Photo by Otak, Inc.)

Upcoming Events

City Council Hearing on February 21, 2017

City Council Hearing on March 21, 2017

What Is Low Impact Development?

The Problem

Stormwater runoff is the main cause of water pollution in urban areas, and it contributes to flooding and erosion.

Rain can soak into the soil, stay on the surface and evaporate, or run off to streams and other water bodies. Prior to urbanization, when rain falls on undeveloped prairies and forests, most of the water is absorbed by the soil and plants. In natural systems in the Pacific Northwest, only a small fraction of precipitation typically runs off over the surface.

After we build cities and suburbs, rain that falls onto impervious surfaces such as roofs, streets, and parking lots cannot soak into the ground. Instead, stormwater quickly drains through storm sewers and into nearby water bodies and picks up pollutants along the way. The increased proportion of runoff means that even small storms can harm water quality, cause flooding, and erode stream banks, causing property damage and harming habitat.

The Solution

Low Impact Development (LID) is an approach to land development that mimics a site's natural pattern of runoff. LID emphasizes conserving natural areas and vegetation on site and minimizing impervious surfaces. Extra runoff that is produced by development is captured and treated on site. Small, distributed stormwater facilities slow runoff down, spread the runoff out, and soak it into the soil.

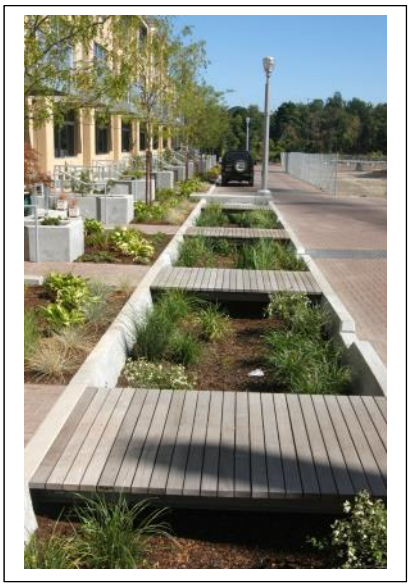
You have probably seen some types of LID around Kelso and other cities in Washington and Oregon. Bioretention and permeable pavement are just two examples of LID. (Continued on page 2.)

Regulatory Background

Most stormwater runoff in Kelso is conveyed through a network of pipes, ditches, catch basins and some water quality treatment facilities to the City's drainage channels and rivers – the Columbia, Cowlitz, and Coweeman. This network is called a municipal separate storm sewer system (MS4).

The Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) to protect the water quality of streams, rivers, and lakes by limiting how much pollution can be discharged to them. Kelso operates the MS4 under a municipal stormwater NPDES Permit.

Under the Permit, Kelso is required to incorporate LID into its development codes, update the Kelso Engineering Design Manual (KEDM), and adopt the 2014 Stormwater Management Manual for Western Washington (SWMMWW) to meet state standards for stormwater control on development sites.



Example of bioretention as landscaping in a mixed use development. (Photo by Otak, Inc.)

LID Update Process

To meet its Permit requirements, Kelso is incorporating LID principles into its existing codes and standards and adopting the 2014 SWMMWW.

In 2016, Kelso began reviewing its municipal code and engineering standards for subdivisions, planning and zoning, streets and sidewalks, stormwater design, and buildings and construction. We looked for opportunities to reduce impervious surfaces and keep native trees during the development process, which helps reduce and slow runoff. We looked for ways to add bioretention and permeable pavement to the Kelso Engineering Design Manual (KEDM).

We will use this review to recommend changes to the City code and the KEDM. City Council and Planning Commission will consider proposed updates this spring and summer. Opportunities for public involvement began in late January. Kelso must incorporate LID and adopt the 2014 SWMMWW by June 30, 2017. See the timeline below.

An example of grassed permeable pavers. (Public Domain)

What is Low Impact Development (cont.)

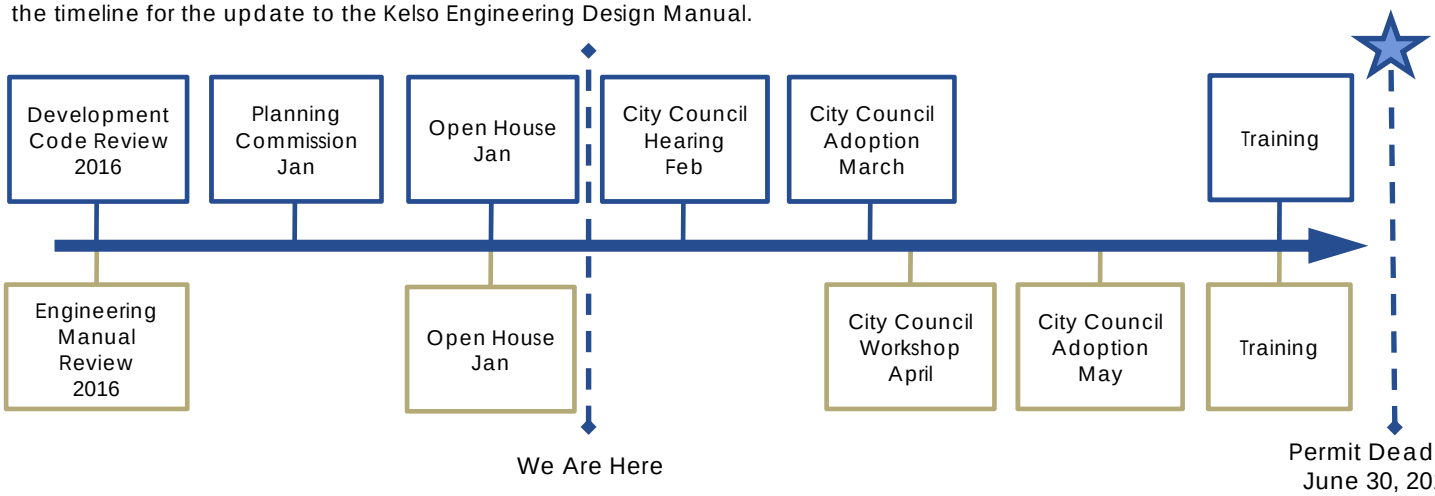
LID techniques mostly fall into two categories: minimizing impervious surfaces and treating and infiltrating stormwater on site.

Permeable pavement replaces impervious asphalt and concrete surfaces with porous asphalt and concrete surfaces. These materials contain small voids that provide a path for water to flow through. Water that falls on the surface infiltrates into the soil below. Pollutants that collect on these surfaces are filtered out. Parking lots, driveways, sidewalks, and other paved surfaces can all be built using permeable pavement.

Bioretention areas are simple structures that mimic natural processes to treat and infiltrate stormwater. Runoff from impervious areas is directed to small, shallow, plant-filled depressions where the water can pool and soak into porous soil. The water is then taken up and transpired by the plants or trickles down to recharge aquifers. The soil and plants in the bioretention area also absorb and break down pollutants and prevent them from reaching streams and lakes.

Timeline

Blue boxes on the top row show the timeline for the update to the development code. Tan boxes on the bottom row show the timeline for the update to the Kelso Engineering Design Manual.



Kelso
Low Impact Development

Issue #2
March 15, 2017

Find Out More

Kelso LID Web Page:
http://www.kelso.gov/stormwater/low-impact-development-lid

Upcoming Events

City Council Workshop on March 21, 2017

City Council Hearing on March 21, 2017

An illustration of a residential ribbon driveway, which reduces impervious surface (Otak, Inc.)

Focus on Kelso Engineering Design Manual - Streets and Paved Areas

As part of Kelso's effort to include Low Impact Development (LID) principles and best management practices in its development codes, the Kelso Engineering Design Manual (KEDM) will be updated.

In this issue, we focus on proposed updates to KEDM standards governing streets, driveways, frontages, and parking in the City.

Streets

Several changes are proposed to standards for streets.

- Allow narrower street width and narrower right-of-way (ROW) width in a new residential subdivision with approval of Community Development Director and Fire Marshal
- Allow sidewalk on only one side of the street in a new residential subdivision with approval
- In new subdivisions, allow utilities such as telephone and cable to be placed under the sidewalk instead of in a public utility easement on a residential lot when space is needed for a rain garden
- Allow bioretention in the ROW with planters and curb extensions

Why? *These measures reduce impervious surfaces and allow flexibility to manage stormwater runoff on private residential lots and in the ROW.*

Driveways

Several changes are proposed for driveway standards.

- Reduce maximum width of commercial driveway from 30 ft to 28 ft
- Allow residential driveway width as narrow as to 9 ft
- Allow ribbon driveway (two-track) design for residential and some commercial driveways
- Encourage use of permeable pavement for commercial driveways

Why? *These measures reduce impervious surfaces.*

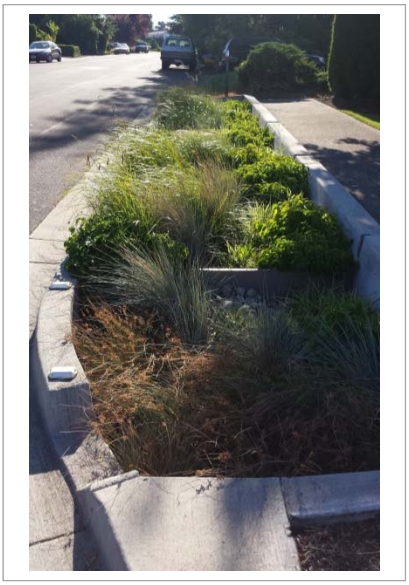
Parking

The following changes are proposed to parking standards:

- Encourage permeable pavement for commercial parking lots
- Allow parking lot landscaping to be used to manage runoff with bioretention facilities

Why? *These measures reduce impervious surfaces and allow flexibility to manage stormwater runoff on private commercial/industrial property.*

Continued on page 2.



Bioretention curb extension manages runoff in ROW (Otak, Inc.)

Bioretention planter in the landscape strip manages stormwater runoff in the ROW. See below for standard engineering plan for a similar facility. (Photo courtesy Muralmouth.Wordpress)

Focus on KEDM - Streets, Frontage, and Parking (con't.)

Frontage – Bioretention, Plants, and Trees

The following changes are proposed to standards for frontage landscaping:

- Allow two species of street tree to be planted within a bioretention facility in the ROW
- Specify plants for use in bioretention facilities in the ROW
- Require maintenance of plants in bioretention planter in landscape strip by adjacent property owner
- Assign responsibility for maintaining plants in bioretention curb extension to City

Why? *Plants are an integral part of managing runoff using bioretention.*

New Standard Plans and Details

- Standard plans for bioretention planter and curb extension
- Standard details for inlets and outlets to bioretention
- Curb extension planting template

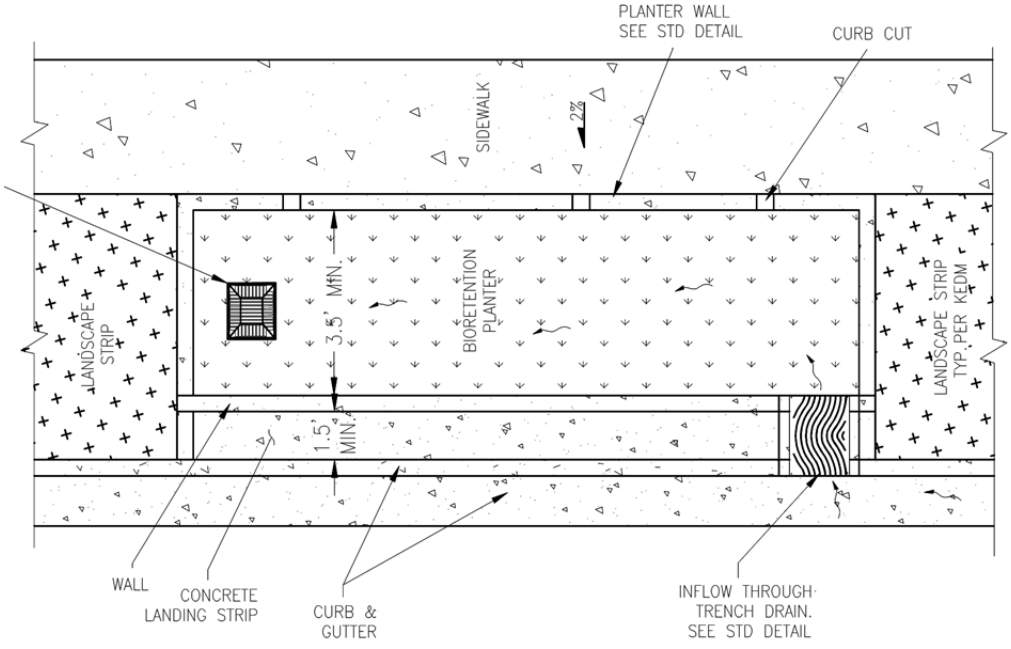
Why? *Standard Plans and Details make it easier to design, construct, and plant LID facilities.*

LID Update Process

To meet state stormwater requirements, Kelso is incorporating LID principles into its existing development standards and is adopting a new stormwater design manual – the 2014 Stormwater Management Manual for Western Washington.

LID is a way of managing stormwater by slowing it down, spreading it out, and soaking it in. It uses site planning to reduce impervious surfaces and retain native vegetation and focuses on installing small, vegetated stormwater practices distributed throughout a site to manage runoff.

Proposed Standard Plan for Bioretention Planter in the Landscape Strip



Kelso
Low Impact Development

Issue #3
June 5, 2017

Find Out More

Kelso LID Web Page:
http://www.kelso.gov/stormwater/low-impact-development-lid

Upcoming Events

City Council Hearing on June 6, 2017

City Council Hearing on June 20, 2017

Illustrations of ongoing stormwater facility maintenance (photos are courtesy of Department of Ecology and AHBL, Inc.)

Focus on the Stormwater Management Manual for Western Washington

As part of Kelso's effort to include Low Impact Development (LID) principles and best management practices in its development codes, the Kelso Engineering Design Manual (KEDM) will be updated.

In this issue, we focus on adopting the 2014 Stormwater Management Manual for Western Washington (SWMMWW) and on proposed changes to the KEDM: update the overall stormwater requirements, update and simplify submittals, and ensure long-term operations and maintenance of stormwater facilities.

General Design and Submittal Requirements

Several changes are proposed to the general requirements:

- Change the Site Grading Plan requirement and added a Permit requirement for projects with cut/fill of 50 cy of material or 7,000 sf of land disturbance. This is an increase from the previous threshold of 5,000 sf of disturbance.
- Add a Stormwater Submittals Guide.
- Exempt small sites from the KEDM for stormwater. Small sites use an Abbreviated Stormwater Site Plan worksheet.
- Reduce the Drainage Design Report requirement to a single submittal instead of a preliminary and final report submittal.
- Add a Long-Term Stormwater Site Management Plan requirement that ensures ongoing maintenance by facilities' owners.
- Add soil preservation and amendment language.

Why? *These measures adopt the SWMMWW, simplify the submittal process and ensure facilities are maintained by their owners.*

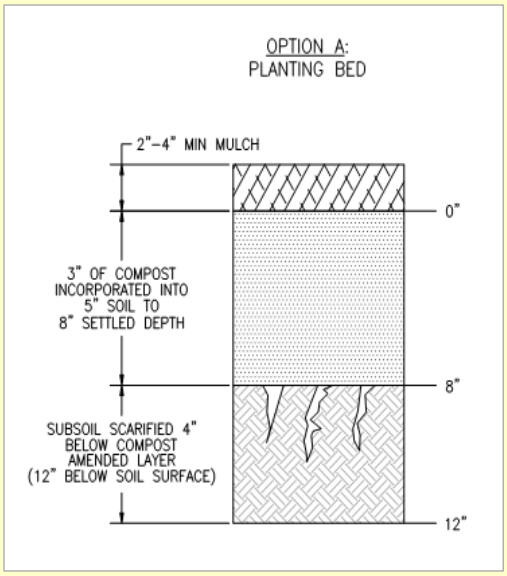
Storm Drainage, Grading, and Erosion Control

Several changes are proposed:

- Combine Chapter 4 "Storm Drainage" with Chapter 2 "Grading and Erosion Control."
- Adopt the storm drainage, grading and erosion control thresholds from the SWMMWW. (See illustration on page 2.)
- Eliminate the local stormwater management requirements, and replaced them with the SWMMWW requirements. This removes the local amenity and education requirements.
- Add a Stormwater Maintenance Bond requirement for the construction of public treatment and flow control facilities.

Why? *These changes adopt the SWMMW, simplify the KEDM, and ensure new facilities function as designed.*

Continued on page 2



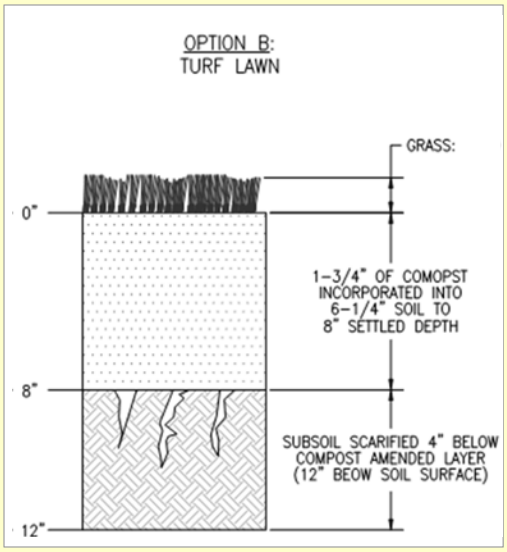


Illustration of Soil Amendments – Required on Most Construction Sites

Focus on SWMMWW (con't.)

Streets

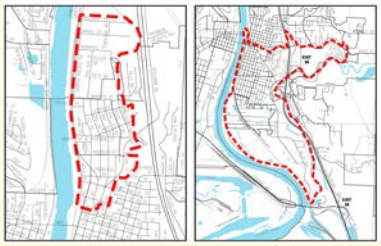
Several changes are proposed to the street requirements that apply to driveways and commercial parking lots.

- Encourage LID techniques such as ribbon driveways and permeable pavement for driveways and commercial parking lots.
- Allow LID techniques in the right-of-way and parking lot landscaping.

Why? *These measures reduce impervious surfaces and allow flexibility to manage stormwater runoff on private commercial/industrial property.*

Flow Control Exemption

Many construction and development sites in Kelso are exempt from the requirement to use flow control facilities such as detention ponds. Sites in Drainage Improvement District No 1 (left) and Consolidated Diking Improvement District No. 3 (right) do not have to use detention ponds, bioretention, or permeable pavement to control runoff.



LID Update Process

To meet state stormwater requirements, Kelso is incorporating LID principles into its existing development standards and is adopting the 2014 Stormwater Management Manual for Western Washington. LID is a way of managing stormwater by slowing it down, spreading it out, and soaking it in.

Thresholds for Stormwater Requirements

<2,000 sf hard surface and <7,000 sf land disturbance
- No submittals
- 1. Control erosion during construction

>50 cy cut/fill or >7,000 sf land disturbance
- Site grading plan and permit required
- 1. Control erosion during construction.
- 2. Amend soils

2,000-5,000 sf hard surface
- Submit Abbreviated Stormwater Site Plan
- 1. Control erosion during construction
- 2. Use rain garden, permeable pavement, and downspout drywells on site to manage runoff
- 3. Amend soils

>5,000 sf hard surface
- Submit engineered Stormwater Site Plan following KEDM
- 1. Control erosion during construction
- 2. Use bioretention, permeable pavement, and downspout drywells on site to manage runoff
- 3. Use swales and detention ponds for treatment and soil erosion
- 4. Amend soils

Kelso
Low Impact Development

Issue #4
Nov. 14, 2017

Find Out More

Kelso LID Web Page:
http://www.kelso.gov/stormwater/low-impact-development-lid

Upcoming Event

Stormwater Requirements Training

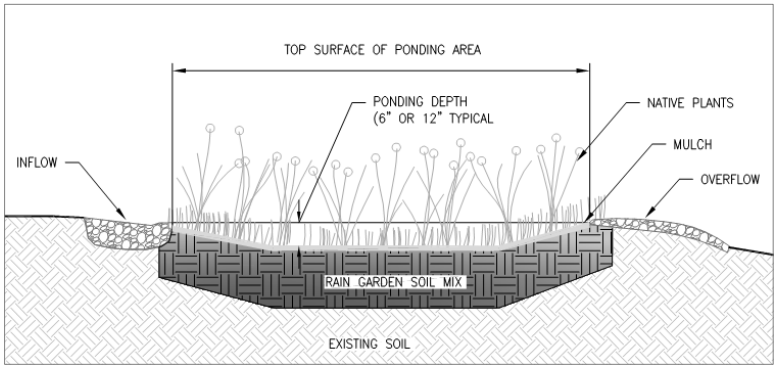
Dec. 13, 2017
1:00-3:30 pm
Kelso City Council Chambers
203 S. Pacific Avenue

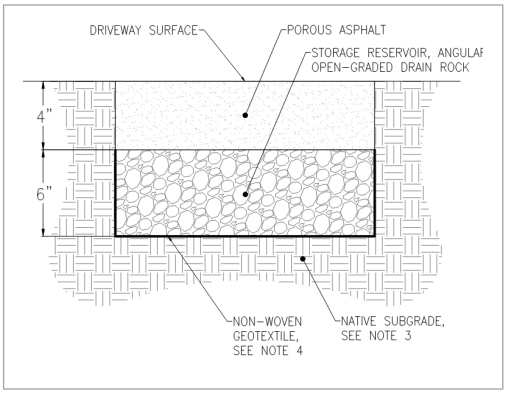
LID Update Process Complete

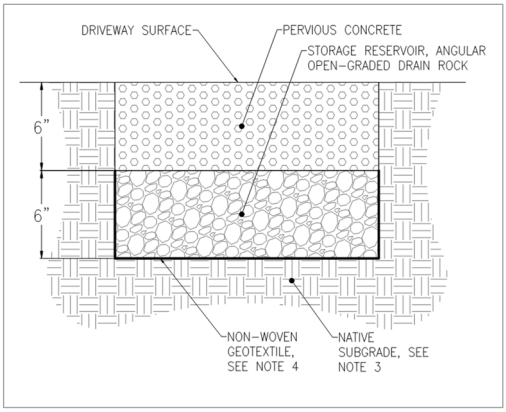
Kelso has updated its development codes to include Low Impact Development (LID) principles and best management practices. Changes can be found in the unified development code and the Kelso Engineering Design Manual (KEDM). As part of that effort, Kelso adopted the 2014 Stormwater Management Manual for Western Washington (SWMMWW). In addition to these changes, the LID update simplified the submittal process and resulted in new applications and informational handouts for small construction projects (described on page 2). A training to describe these changes to stormwater requirements is announced below.

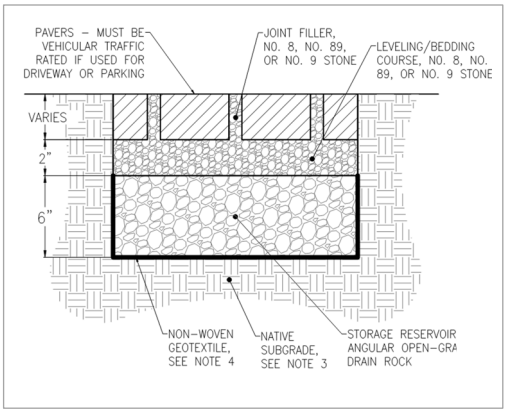
Free Stormwater Requirements Training for Developers and Property Owners

The City of Kelso and the City of Longview are partnering to provide training for the development community on the new LID standards and requirements for the respective cities. The free training will take place 1:00 - 3:30 pm Wednesday December 13th, 2017 at Kelso City Council Chambers.









*Illustrations of permeable pavement sections from the **Residential Permeable Pavement Design & Construction Guide**. Top – Porous Asphalt, Middle – Pervious Concrete, Bottom – Permeable Interlocking Concrete Pavers*

Announcing New Application Forms and Handouts for Small Projects

Kelso is introducing new applications and instruction handouts for small projects. The new applications incorporate LID best management practices (BMPs) for stormwater management and simplify the submittal process for small projects. Small projects use an **Abbreviated Stormwater Site Plan** worksheet with simplified requirements and step-by-step guidance. To assist with filling out the Abbreviated Stormwater Site Plan, the City also has the **Custom Soil Resource Report Instructions** and **Final Stormwater Management Feasibility Checklist** available.

For sites that construct Rain Gardens or Permeable Pavement, several other handouts are available. These include the **Residential Permeable Pavement Design & Construction Guide** and the **Rain Garden Design & Construction Guide for Small Projects**. These guides provide detailed instructions for small projects.

Rain gardens and permeable pavement are permanent on-site stormwater BMPs, and they must be maintained by future homeowners. A **Small Project Example Covenant** and **Maintenance Instructions** are available to include as part of the Abbreviated Stormwater Site Plan application.

Finally, the **Small Construction Erosion Control Plan** provides owners of small sites a simplified erosion control format and instructions to comply with City requirements to prevent eroded soils from leaving the site during construction. The plan includes a template to assist site owners with planning and placing erosion control BMPs.

The new forms can be found on the Kelso website at: http://www.kelso.gov/engineering/engineering-permits

Thresholds for Stormwater Requirements

<2,000 sf hard surface and <7,000 sf land disturbance

- No submittals
- 1. Control erosion during construction

>50 cy cut/fill or >7,000 sf land disturbance

- Site grading plan and permit required
- 1. Control erosion during construction.
- 2. Amend soils

2,000-5,000 sf hard surface

- Submit Abbreviated Stormwater Site Plan
- 1. Control erosion during construction
- 2. Use rain garden, permeable pavement, and downspout drywells on site to manage runoff
- 3. Amend soils

>5,000 sf hard surface

- Submit engineered Stormwater Site Plan following KEDM
- 1. Control erosion during construction
- 2. Use bioretention, permeable pavement, and downspout drywells on site to manage runoff
- 3. Use swales and detention ponds for treatment and detention
- 4. Amend soils

Attachment B

Posters

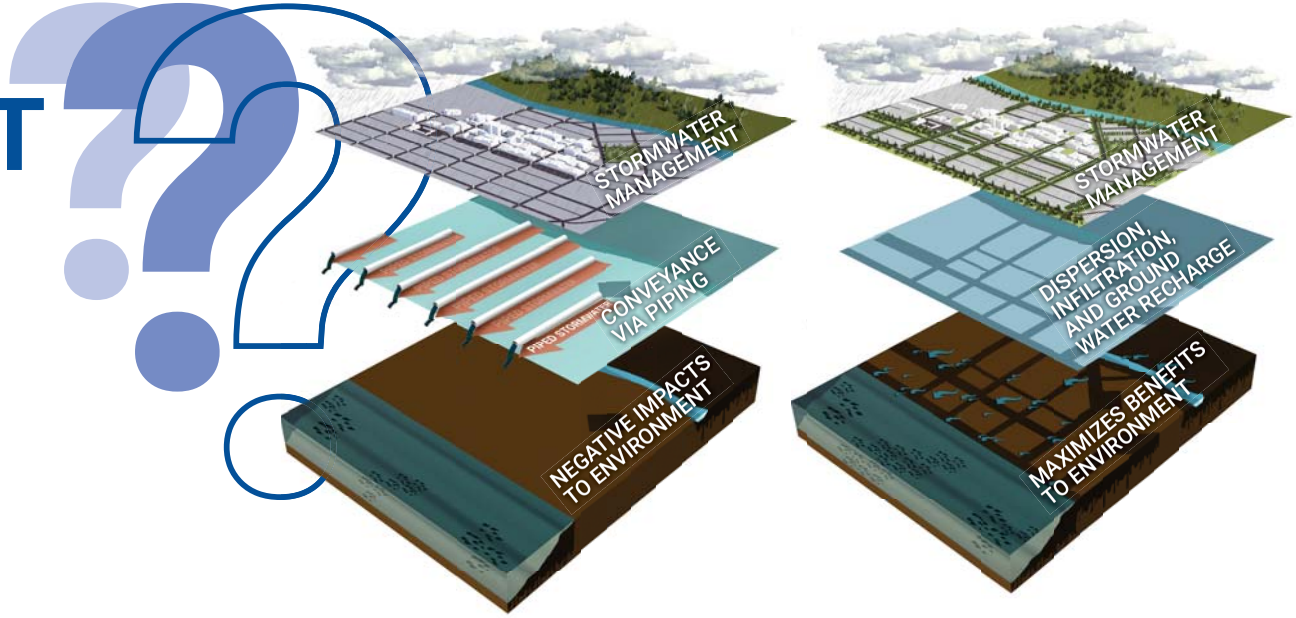
By mimicking natural water cycles, LID reduces the negative impacts of stormwater runoff and pollution on streams and rivers. Small-scale best management practices (BMPs) such as rain gardens and swales allow for collection, retention, storage, infiltration, and filtering near where the rain falls. As much runoff as possible is infiltrated into the ground.

what is LOW IMPACT DEVELOPMENT

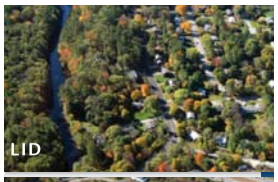
Low Impact Development (LID) manages rainfall in ways similar to nature. Rather than using big stormwater ponds, vaults, and pipes, LID introduces more dispersion, infiltration, transpiration, and evaporation into the design and development of sites and streets. Stormwater management functions are provided in ways that mimic the natural hydrologic processes prior to disturbance and development.

LID is implemented through land use, design, and stormwater management strategies and techniques, including:

- Conserving natural on-site features such as existing streams, ponds, trees, and native soils and landscape areas
- Site planning to minimize the "footprint" of impervious surfaces and the amount of clearing and grading
- Features that slow stormwater runoff and allow it soak into the ground such as rain gardens and bioretention planters
- Distributing small-scale BMPs across the landscape and adjacent to areas of flow, rather than centralizing stormwater storage
- Integrating site planning and stormwater management considerations at the initial design phases of a project to create a more hydrologically functional landscape



What's the Difference?



CONVENTIONAL

- Sends stormwater to the storm sewer or storm drainage system, taking pollutants with it
- Expensive infrastructure: piping, vaults, ponds, etc.
- Techniques haven't been updated in over 50 years
- Minimizes opportunities for groundwater infiltration and aquifer recharge
- Does not succeed in eliminating stream erosion or impacts to water quality

LOW IMPACT DEVELOPMENT

- Manages stormwater on-site, cleaning and reducing the amount of water that flows into drainage systems and streams
- Mimics natural hydrologic processes
- Best management practices are based on significant amounts of current research
- Less expensive bioretention systems naturally treat runoff and replenish aquifers
- Improves water quality, stream flows, and wetland hydrology; enhances the natural environment

why is LID BENEFICIAL?

environment: LID protects our natural ecosystems and provides improved water quality, increased groundwater recharge, improved air quality, enhanced aesthetics, and more open space.

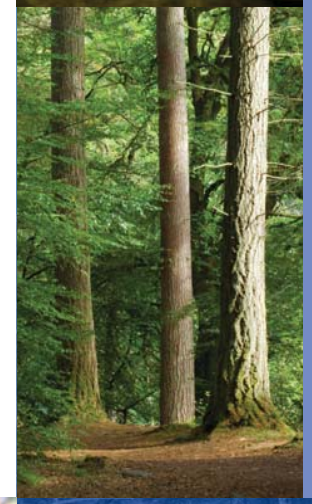
LID also brings **community** and **economic** benefits.

- » Clean water and reduced flooding enhance the communities we live in and our quality of life.
- » Protecting streams and rivers from pollutants is usually less expensive than cleaning contaminated water.
- » Lower infrastructure and maintenance costs reduce capital burdens.
- » Landscapes enhance property values and are easier to maintain.
- » Reducing the need for large stormwater detention ponds can increase the amount of buildable area within a development.

LID *is good for* PEOPLE

Did you know that Kelso is home to the following salmon and trout species?

- » Chinook
- » Coho
- » Sockeye
- » Pink
- » Chum
- » Steelhead
- » Bull Trout



LID *is good for* FISH

Several species of salmon, trout, and other aquatic wildlife are endangered, threatened, or otherwise at risk in the Columbia River and its tributaries. Studies have shown that untreated runoff and poor water quality can be lethal to juvenile salmon. Poor water quality and high velocity flows in streams can harm all aquatic species and the upland wildlife that are part of the food chain.

Uncontrolled runoff from expansive impervious surfaces and massive site grading worsens these problems. LID is a good solution for addressing these issues. This is the reason that the Washington State Department of Ecology is now requiring that LID best management practices be integrated into development projects in many cities and counties.

TREES PROTECT STREAMS

Research in King County shows that preserving and restoring trees and other native vegetation along streams helps maintain healthy habitat conditions for salmon and other fish and the bugs they eat.

Washington State Department of Ecology and many cities and counties in Western Washington already require LID techniques. The City of Kelso intends to adopt LID requirements by June 30, 2017.

For more information, refer to:

» *Stormwater Management Manual for Western Washington*
» *LID Technical Guidance Manual for Puget Sound*

best MANAGEMENT PRACTICES

LID Best Management Practices (BMPs)

include a variety of treatments and techniques for managing surface water runoff as part of site development and street improvements. These solutions help to slow runoff down, spread it out and soak it into the ground:

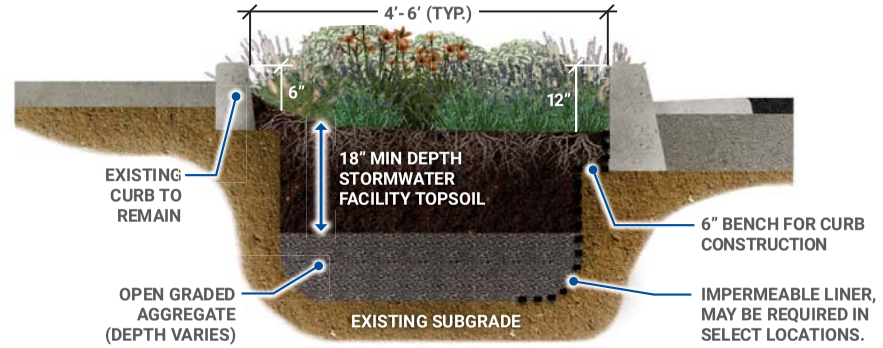
» **Bioretention areas** such as swales, cells, planters, or rain gardens can hold water and allow it to soak into the ground and evaporate.

» **Permeable pavements** such as pavers with joints or pervious concrete surfaces that allow water to flow through can be used on driveways, sidewalks, parking areas, and streets.

» **Reducing the "footprint"** of paved areas and impermeable surfaces also helps by reducing how much runoff is generated and by creating more space for trees, landscaping, and natural areas where water can soak into the ground.

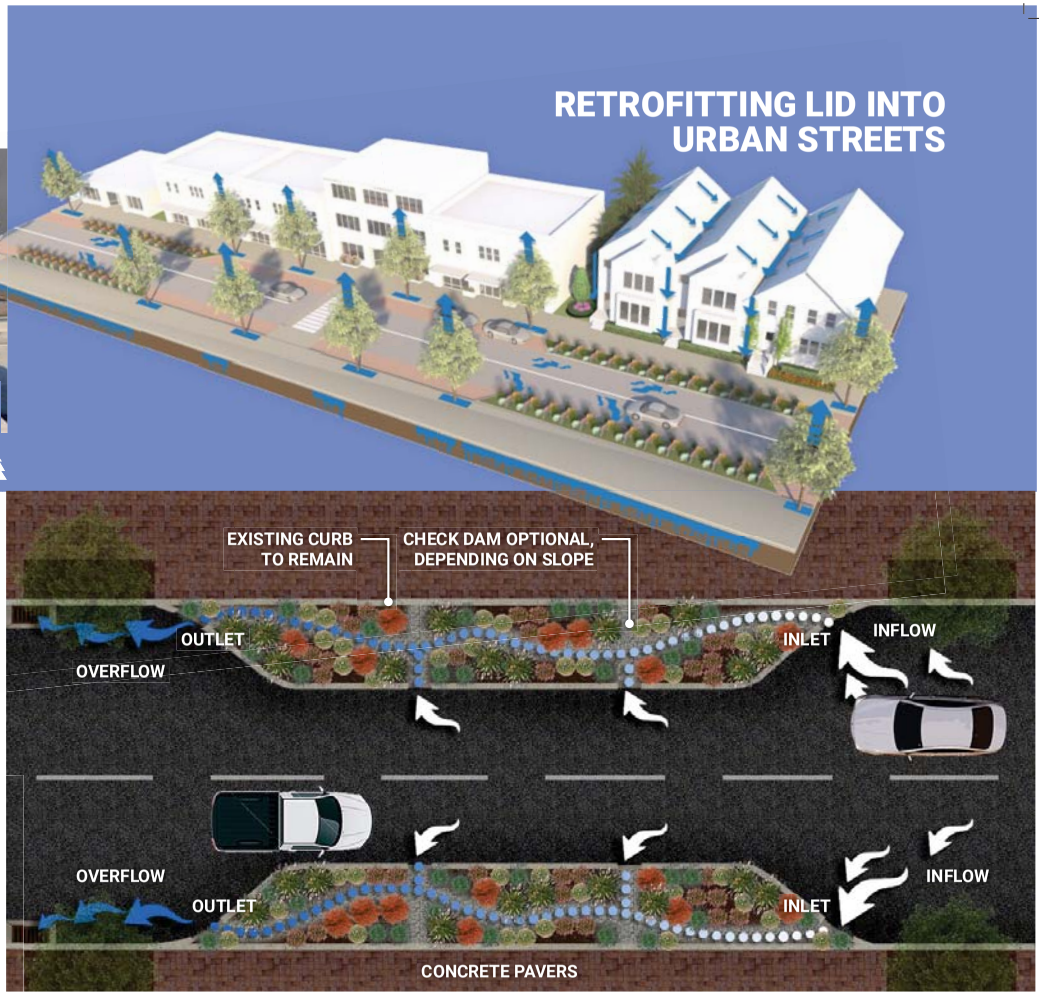
SLOW IT DOWN **SPREAD IT OUT** **SOAK IT IN**

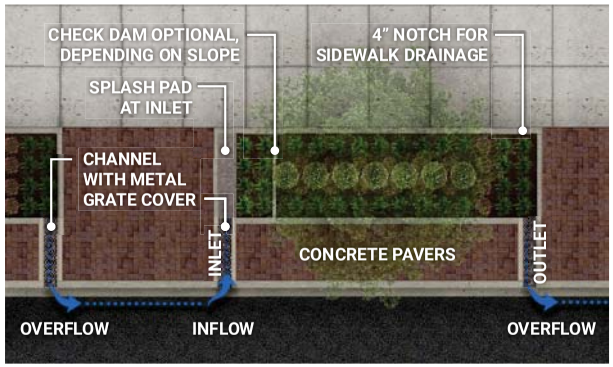
strategies for STREETS & RIGHTS-OF-WAY

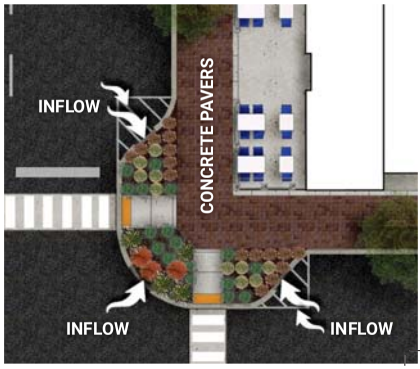


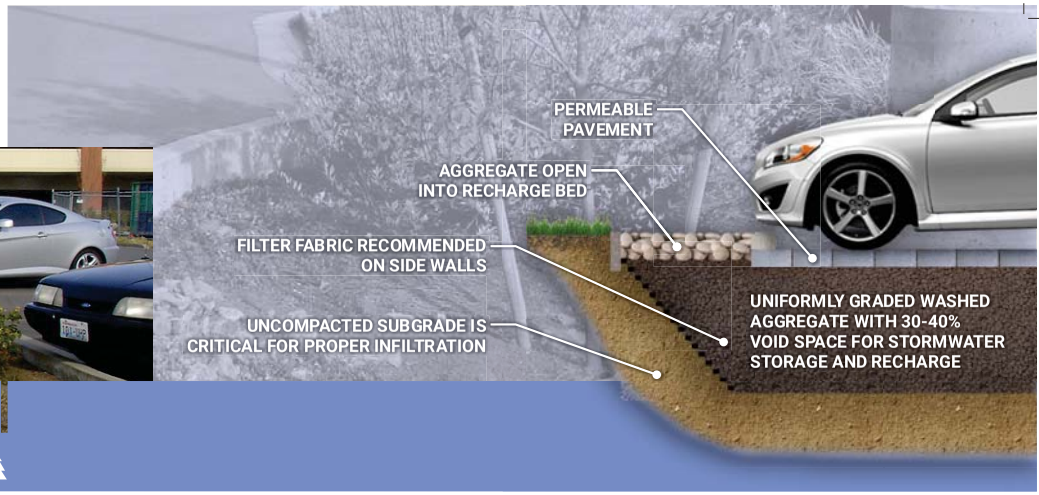
City Capital Improvement Projects will use LID:

- Use minimum widths allowable for travel lanes, shoulders, paths, and sidewalks.
- Infiltrate and slowly convey storm flows in roadside bioretention cells and swales.
- Make use of median islands, traffic circle islands, space at intersection bulb-outs, and planting strips along roadways for bioretention facilities and rain gardens.
- Design the roadway network to minimize site disturbance and reduce fragmentation of the landscape.
- Retrofit LID features into existing city streets to reduce impervious surface area, better manage stormwater runoff, and enhance the environment.

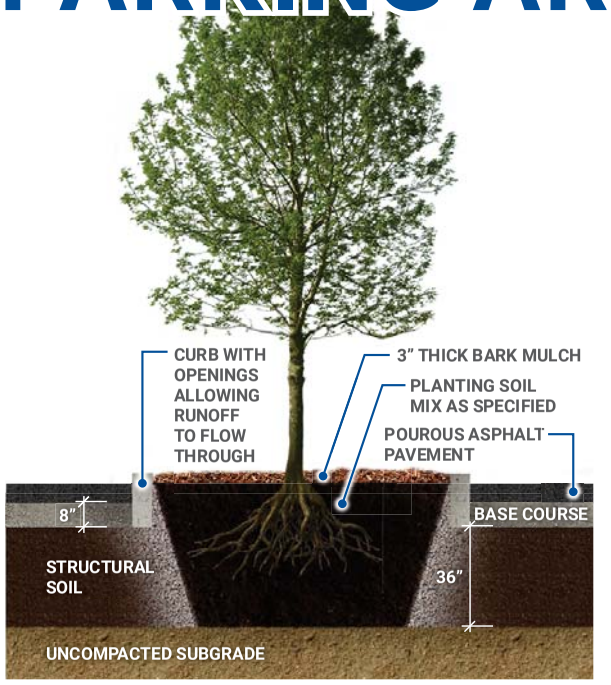




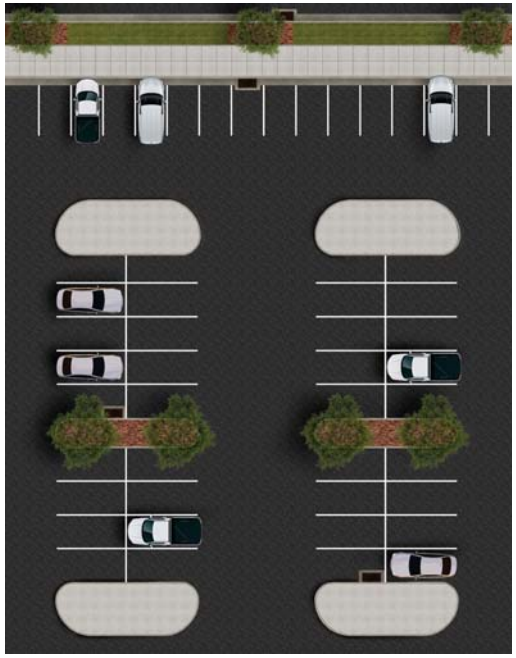




strategies for PARKING AREAS



- Use minimum needed dimensions for parking spaces, access aisles, and driveways to reduce the overall footprint of the paved area.
- Use permeable paving as much as possible in parking areas, adjacent sidewalks, and paths.
- Build some compact spaces.
- Make use of median islands and planting strips along parking areas for bioretention facilities and rain gardens.
- Retrofit LID features into existing parking areas to reduce impervious surface area, better manage stormwater runoff, and enhance the environment.

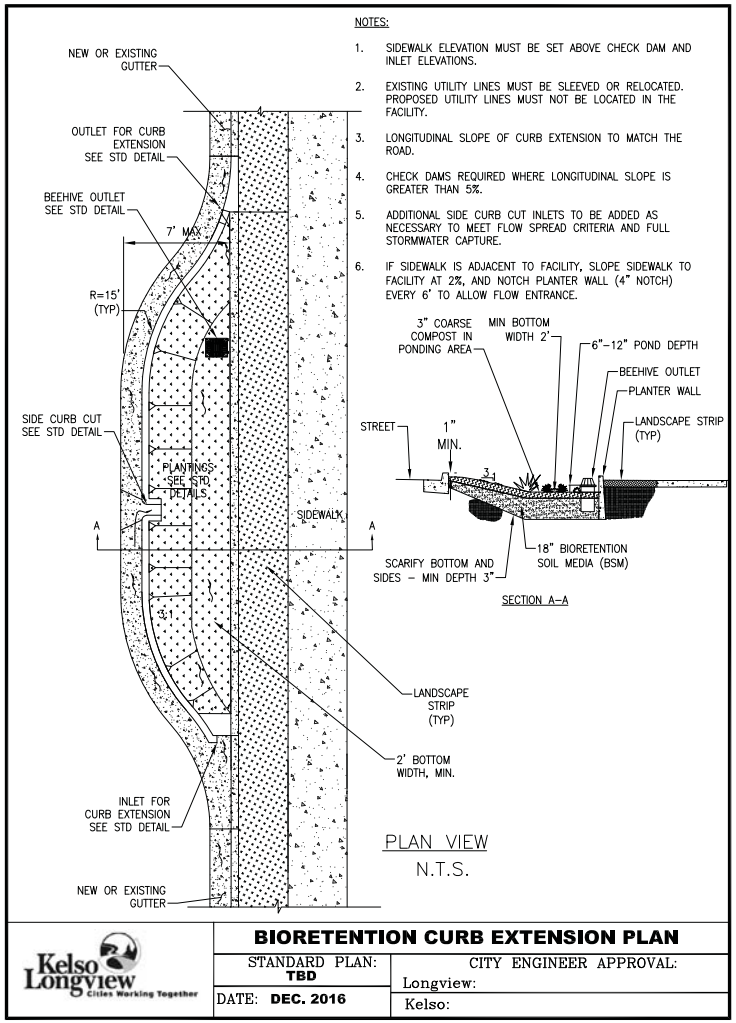


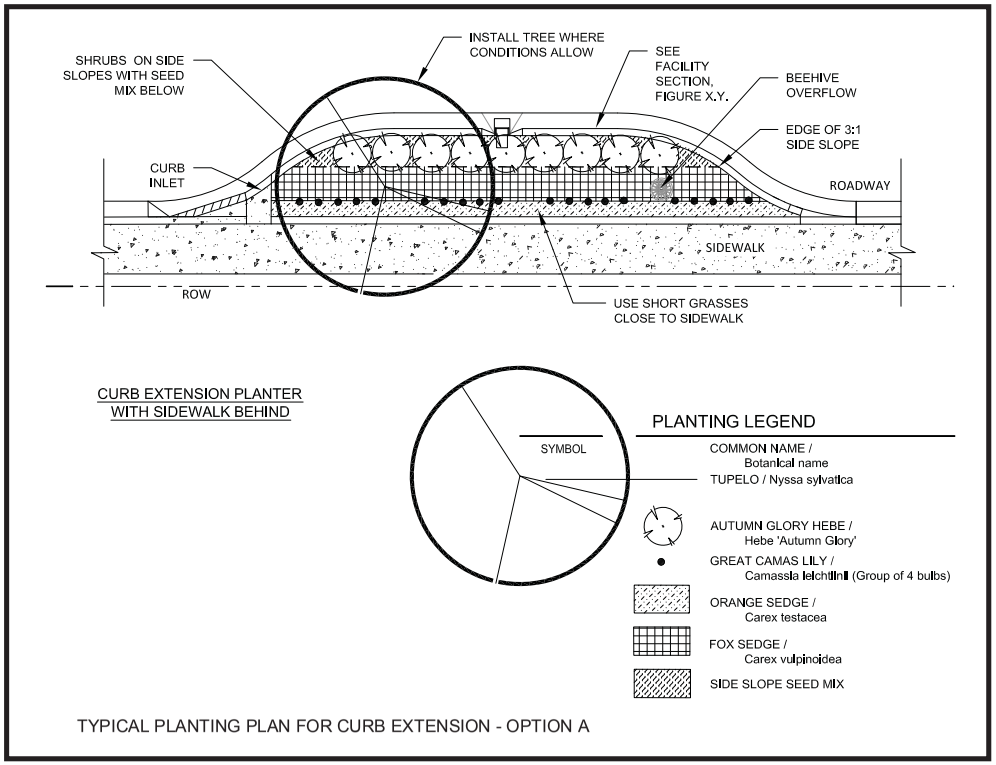
strategies for

SHORT PLATS, SUBDIVISIONS, & OTHER RESIDENTIAL DEVELOPMENT

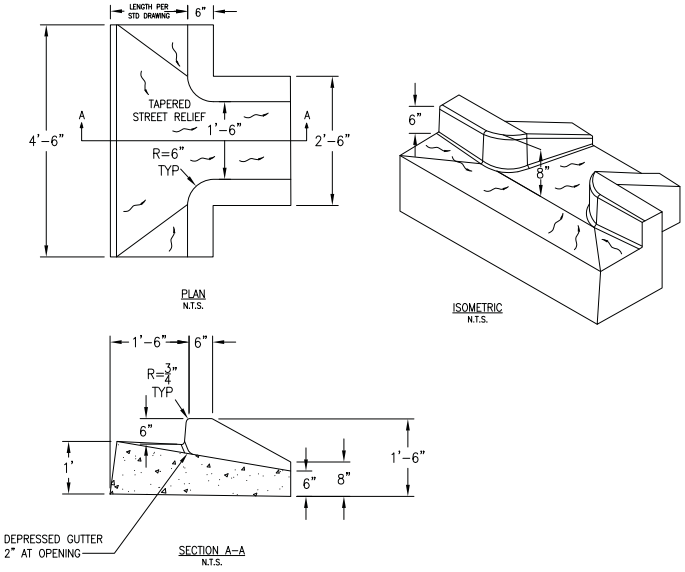
- Address stormwater management early in your site planning process—this will be more efficient and cost effective than waiting until the engineering stage of work.
- Work with a geotechnical engineer to check your soil conditions and infiltration rates to determine if and where infiltration facilities might be most feasible.
- As part of site planning, avoid compacting or paving over soils with high infiltration rates—plan ahead to make use of these areas in your development.
- Be efficient with land and get multiple uses by integrating open space and stormwater facilities. Rain gardens with paths and interpretive elements can serve as recreation space for residents. Stormwater can disperse over lawn areas. Retention and infiltration vaults can be covered with lawn and picnic areas.
- Use bioretention, rain gardens, permeable pavements, and other features to reduce the amount of stormwater infrastructure and piping needed—this will reduce your development costs.
- Minimize the footprint of impervious surfaces—use permeable pavements and minimum allowable roadway and sidewalk cross sections, driveway lengths, and parking stall sizes. Use two-track/ribbon driveways or shared driveways.
- Cluster homes and development to minimize the amount of land disturbance, preserve natural areas for stormwater absorption, and maximize vegetated area.
- Maximize preservation of trees and natural areas and planting/ restoration of native landscaping.
- Include landscape islands in streets, bulb-outs at intersections, and cul-de-sacs.
- Work with a good landscape architect to choose the best Pacific Northwest native plants for your landscaping, rain gardens, and bioretention facilities.

PROPOSED STANDARD DETAILS



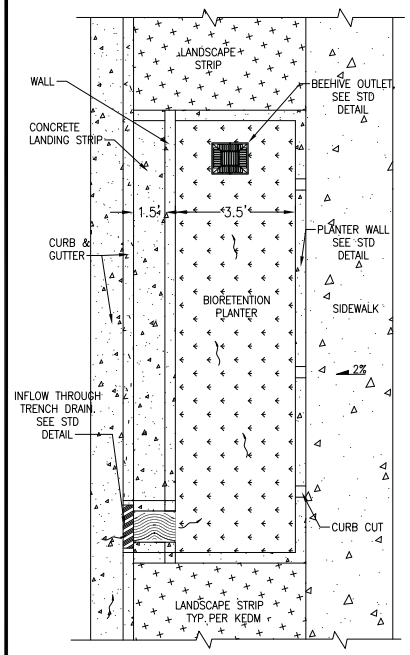


PROPOSED STANDARD DETAILS



NOTES:
1. FOR USE WITH STORMWATER FACILITIES WITH SIDE SLOPES.
2. REFER TO STANDARD DRAWING ST-090 & ST-110. MATCH GUTTER PAN OF ADJACENT CURB AND GUTTER.

Kelso Longview Cities Working Together	SIDE CURB CUT	
	STANDARD PLAN: **TBD**	CITY ENGINEER APPROVAL: Longview:
	DATE: **DEC. 2016**	Kelso:



PLAN VIEW
N.T.S.

NOTES:
1. SIDEWALK ELEVATION MUST BE SET ABOVE CHECK DAM AND INLET ELEVATIONS.
2. EXISTING UTILITY LINES MUST BE SLEEVED OR RELOCATED. PROPOSED UTILITY LINES MUST NOT BE LOCATED IN THE FACILITY.
3. LONGITUDINAL SLOPE OF PLANTER TO MATCH THE ROAD.
4. CHECK DAMS REQUIRED WHERE LONGITUDINAL SLOPE IS GREATER THAN 5%.
5. ADDITIONAL TRENCH DRAIN INLETS TO BE ADDED AS NECESSARY TO MEET FLOW SPREAD CRITERIA AND FULL STORMWATER CAPTURE.

Kelso Longview Cities Working Together	BIORETENTION PLANTER	
	STANDARD PLAN: **TBD**	CITY ENGINEER APPROVAL: Longview:
	DATE: **DEC. 2016**	Kelso:

Attachment C

Public Comment Log

Public Comment Log

Date	Commenter	Comment	Status
2/24/17	Tim Wines / KSAC	To reduce cost of submittals for LID facilities, the City could provide a standard planting plan for a bioretention cell.	A standard planting plan was created and is available as a handout
2/24/17	Tim Wines / KSAC	Advocates for changing the land-disturbance area threshold for requiring a grading permit from 5,000 sf (as proposed and as is currently required) to 7,000 sf, to match with the minimum land-disturbance threshold that will trigger Minimum Requirement #2 (construction site erosion control) in the stormwater manual.	One thresholds of the grading permit was changed from 5,000 sf of land disturbance to 7,000 sf of land disturbance
2/24/17	Tim Wines / KSAC	KEDM currently limits single-family residential driveway throat from 10 ft to 16 ft width. The proposed update presented to KSAC would change the range from 9 ft to 16 ft width. The comment is to allow single-family residential driveways to have up to 20 ft width throat to match the standard width of a 2-car garage door.	Driveway widths will be reconsidered when the City updates its standard details
2/24/17	KSAC	Discussion of a proposed update to KEDM, which would require the adjacent landowner to maintain the plants within a bioretention planter facility within the typical public street landscaping strip, if present. This would present a new responsibility for landowners that they may not be aware of. At the same time, it is similar in nature to the requirement for the adjacent landowner to maintain the sidewalk, landscape strip, and street tree(s), if present.	An exception was added for owner maintenance of plants in a curb extension-style bioretention facility that extends into the parking lane. Due to safety concerns, property owners will not be required to maintain plants in these facilities – responsibility will rest with City.

Date	Commenter	Comment	Status
2/24/17	Tim Wines / KSAC	The stormwater manual will require use of soil amendments on almost all development sites. Is there a way to avoid using soil amendments on sites where soil amendments may pose a landslide risk, in the opinion of a geotechnical engineer?	The City's reviewers will consider stamped reports from licensed geotechnical engineers on a case-by-case basis to assist in determining feasibility of LID BMPs.