

APPENDIX A

Existing City Stormwater Goals and Policies

Land Use Plan for the Lacey Urban Growth Area

The City of Lacey and Thurston County Land Use Plan for the Lacey Urban Growth Area (Lacey and Thurston County 2008) includes goals and policies for utilities and capital facilities as well as water resources that are related to the City's stormwater management program. The following goals are listed in Section VI of the City of Lacey and Thurston County Land Use Plan for the Lacey Urban Growth Area (Lacey and Thurston County 2008):

- Coordinate with the Comprehensive Plan's Utilities Element and Capital Facilities Element to ensure land use policies provide for developments that take full advantage of, but do not exceed, capabilities of utilities or infrastructure to provide necessary services (Section N - Utilities and Capital Facilities).
- Reduce impacts from flooding, encourage efficient stormwater management, and ensure the quality and quantity of groundwater resources are protected and preserved for all uses (Part O - Water Resources).

The policies to address the first goal (Section N - Utilities and Capital Facilities) include the following:

- Analyzing proposed development for anticipated impact on utilities and services, either as an element of the site plan review, subdivision review, or as a part of the environmental impact assessment (EIS).
- Providing adequate public facilities to settled areas, rather than extending new services to sparsely settled or undeveloped areas unless extension is required for purposes of groundwater protection; surface water protection; correction of identified existing residential, commercial or industrial needs; solving water service problems; or solving water quality problems.
- Working with developers to determine where and when new public facilities are to be placed to permit proper development of commercial and residential projects.
- Requiring residential and commercial development with readily available sanitary sewer laterals to hook up to sanitary sewer when their septic systems fail, need replacement, or require major repairs.
- Ensuring that properties located in the designated McAllister Springs Geologically Sensitive Area do not develop at densities greater than one unit per five acres on septic tanks and drain fields. If properties are developed at densities greater than this threshold, it shall be done so in a clustered manner. Working cooperatively with the Health Department and the Fire District to ensure that hazardous materials are contained properly and are not discharged in ways that can contaminate groundwater or the environment.

The policies to address the second goal (Part O - Water Resources) include the following:

- Ensuring that new development is in conformance with requirements and standards of the Northern Thurston County Ground Water Protection Management Plan (now incorporated in the LMC [Chapter 14.36 - Critical Aquifer Protection Areas]).

- Ensuring that new development is in conformance with requirements and standards of the Drainage Design and Erosion Control Manual for City of Lacey and Thurston Region (has been updated since the publication of the City of Lacey and Thurston County Land Use Plan for the Lacey Urban Growth Area. Current manual title is City of Lacey 2010 Stormwater Design Manual [Lacey 2010]).
- Ensuring coordination with the Puget Sound Water Quality Management Plan, the Northern Thurston County Ground Water Plan, the Coordinated Water System Plan, the Chambers Lake Stormwater Management Plan, the Woodland Creek/Lake Lois Enhancement Plan, the Chambers Creek Comprehensive Drainage Basin Plan, the Woodland and Woodard Creek Comprehensive Drainage Basin Plan, the Chambers/Ward/Hewitt Comprehensive Basin Management Plan, the McAllister/Eaton Creek Comprehensive Drainage Basin Plan, the Henderson Inlet Watershed Action Plan, the Budd/Deschutes Watershed Action Plan, the McAllister Springs Wellhead Protection Plan and the City of Lacey Wellhead Protection Plan.
- Ensuring that new development is in conformance with the City’s Environmental Protection and Resource Conservation Plan section on aquifer protection (now incorporated in the LMC [Chapter 14.36 - Critical Aquifer Protection Areas]).
- Participating in regional efforts towards developing and protecting long range domestic drinking water supplies outside of Urban Growth Management boundaries and identify groundwater watershed protection areas.
- Ensuring that groundwater, as a finite resource, is managed effectively to support all beneficial uses. Participating in regional efforts to manage ground and surface waters.
- Recognizing and paying attention to the phosphorous leaching problem in our lakes and dealing with the problem through a comprehensive water resources management approach.
- Encouraging and promoting sewer service to the McAllister Springs Geologically Sensitive Area within the urban growth area (UGA) (now incorporated in the LMC [Chapter 16.10 - McAllister Springs Geologically Sensitive Area Residential District]). Considering additional data and research on the effects of residential development on groundwater quality in future evaluation of appropriate density and standards for zoning.
- Considering additional groundwater protection measures within wellhead protection areas throughout the planning area, such as using subdivision covenants, conditions, and restrictions (CCRs) to help regulate land use activities that affect groundwater, encouraging developments with open space areas to preserve native vegetation or to landscape with vegetative materials certified as “low input” and other appropriate measures.
- Taking appropriate action to safeguard the City’s water supply as outlined in procedures developed by the Operations Division of the Public Works Department for water system security.

Capital Facilities Plan

The City's 2007-2026 Capital Facilities Plan (Lacey 2007) also includes goals and policies related to stormwater drainage. The following goals are listed in Section 7 (Storm Drainage) of the 2007-2026 Capital Facilities Plan (Lacey 2007):

1. Protect and conserve our water resources, preserve and enhance surface and groundwater quality and in so doing protect the uses of our water, the pleasure it provides us, and guard the livelihoods that it support
2. Eliminate or avoid flooding and erosion damage and ensure protection of the public's safety, health, and property
3. Protect, preserve, and enhance shellfish beds, wildlife and fish habitat, and other resources
4. Prevent the contamination of sediments from urban runoff
5. Achieve federal and state standards for water and sediment quality by reducing and eventually eliminating harmful pollutant discharges from stormwater

Storm drainage planning policies to address these goals from the 2007-2026 Capital Facilities Plan include the following:

- Continue to develop and implement a comprehensive stormwater management program consistent with requirements of the federal Clean Water Act, the state Puget Sound Water Quality Management Plan, and the state Growth Management Act
- Continue to work cooperatively with other local governments through joint basin planning in shared drainage basins to provide regionally coordinated planning, construction, and maintenance for regional stormwater facilities
- Encourage public involvement in and support for the City's stormwater management program activities
- Utilize a variety of funding sources for planning, acquisition, and construction projects
- Achieve goals in a manner that makes efficient use of limited resources to address the most critical problems first

APPENDIX B

Applicable Regulations

Introduction

This appendix summarizes regulations related to surface water management, water quality, flood protection, and habitat protection that affect the City of Lacey's (City) stormwater water management program (SWMP). Future stormwater water management requirements and regulations are also briefly discussed.

Federal and state regulations drive many aspects of the City stormwater management program. Recent significant regulatory changes, initiated by the Federal Water Pollution Control Act of 1972 (the Clean Water Act), include:

- Revised state water quality standards
- National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit requirements
- Total maximum daily load (TMDL) cleanup action requirements for water bodies, on the Washington State Department of Ecology's Clean Water Act Section 303(d) list due to significant water quality degradation

Additional federal and state regulations that apply to the City's surface water management program include the National Flood Insurance Program (NFIP), administered by the Federal Emergency Management Act (FEMA); the federal Endangered Species Act (ESA); the State Salmon Recovery Act; Watershed Planning Act; Growth Management Act; critical areas ordinance; State Environmental Policy Act (SEPA); and Shoreline Management Act.

Current Regulations and Regulatory Policies

This section highlights the requirements of the current Western Washington Phase II Municipal Stormwater Permit (Phase II Permit), Underground Injection Control (UIC) program, recommendations in the Puget Sound Water Quality Management Plan and Action Agenda, water quality standards, TMDLs, flood protection, and species and habitat protection.

2007-2013 Phase II Permit Requirements

Section 402 of the Clean Water Act requires some municipalities to obtain an NPDES permit for municipal stormwater discharges to receiving waters. In Washington State, the Department of Ecology (Ecology) is responsible for issuing and renewing these permits.

Discharges from municipal separate storm sewer systems ("MS4s") are regulated by Ecology under the NPDES program. An MS4 is a system designed to collect and convey stormwater runoff (from road drainage, constructed channels, and storm drains). The municipal NPDES permit program seeks to control or reduce pollutant discharge to the maximum extent practicable, through primarily programmatic efforts.

The City is listed as a *small* MS4 in the Phase II Permit, and is regulated by Ecology as a permittee. The Phase II Permit became effective for the City and numerous other jurisdictions in western Washington on February 16, 2007. The permit was modified on

June 17, 2009, to include some additional requirements related to low impact development (LID). The 2009 revision of the Phase II Permit expired on February 15, 2012, but remained in effect until July 31, 2012. Ecology reissued the Phase II Permit with little to no modifications in July 2012 extending the permit requirements until July 31, 2013. Throughout this Appendix and the Stormwater Comprehensive Plan (SCP) the 2007, 2009, and 2012 issuances of the permit are referred to as the 2007-2013 Phase II Permit. The Phase II Permit that becomes effective on August 1, 2013, is referred to as the 2013-2018 Phase II Permit and is described in the Evolving Regulations and Policies section at the end of this Appendix.

The Phase II Permit has 9 special conditions (S1 through S9) and 21 general conditions (G1 through G21). Requirements for the City's stormwater management program (SWMP) are presented under special condition 5 (S5) of the permit:

- Develop and implement a SWMP that meets Phase II Permit requirements by August 19, 2011
- Prepare and maintain written documentation of the SWMP
- Gather, track, and maintain information to evaluate SWMP implementation
- Incorporate mechanisms for interjurisdictional and interdepartmental coordination
- Design the SWMP to reduce discharge of pollutants to the maximum extent practicable; meet all known, available, and reasonable methods of prevention, control and treatment (AKART) requirements; and protect water quality
- Address the following components in the stormwater management program:
 - Public education and outreach
 - Public involvement and participation
 - Illicit discharge detection and elimination
 - Controlling runoff from new development, redevelopment, and construction sites
 - Pollution prevention and operation and maintenance for municipal operations

The City is also required to comply with the following special conditions:

- S7 - Compliance with TMDL requirements
- S8 - Monitoring
- S9 - Reporting

The requirements of the S5 and S7 through S9 requirements are summarized below. The City is not required to meet any S7 permit requirements for the 2007-2013 Phase II Permit.

Public Education and Outreach

Section S5.C.1.a-c of the 2007-2013 Phase II Permit lists the following requirements:

- Provide an education and outreach program targeting the following audiences:
 - General public
 - Businesses (including home-based and mobile businesses)
 - Homeowners, landscapers, and property managers
 - Engineers, contractors, and developers
 - City staff involved in review of development projects, and City staff involved in land use planning
- Measure the understanding and adoption of target behaviors among the targeted audiences
- Track and maintain records of public education and outreach activities

Public Involvement and Participation

Section S5.C.2.a b of the 2007-2013 Phase II Permit lists the following requirements:

- Create opportunities for the public to participate in the decision-making processes involving the development, implementation, and update of the SWMP
- Develop and implement a process for consideration of public comments on the SWMP
- Make the SWMP document and annual report submitted to Ecology available to the public

Illicit Discharge Detection and Elimination

Section S5.C.3.a-f of the 2007-2013 Phase II Permit lists the following requirements:

- Develop a storm sewer map
- Develop and implement an illicit discharge ordinance
- Develop and implement an ongoing program to detect and address illicit discharges, spills, illicit connections, and illegal dumping
- Inform public employees, businesses, and the general public of the hazards associated with illegal discharges and improper disposal of waste
- Adopt and implement procedures for IDDE program evaluation and assessment
- Provide training to staff on identification and reporting of illegal discharges

Controlling Runoff from New Development, Redevelopment, and Construction Sites

Section S5.C.4.a-f of the 2007-2013 Phase II Permit lists the following requirements:

- Develop and adopt a new ordinance or ordinance revisions that address runoff from new development, redevelopment, and construction projects in a manner that meets the minimum requirements established by Ecology for all projects that are 1 acre or larger
- Adopt a site planning process and selection and design criteria for BMPs that will protect water quality and reduce the discharge of pollutants to the maximum extent practicable
- Develop an approval process for new development that includes inspections of private stormwater facilities
- Develop provisions for techniques for LID that take into account site conditions, access, and long-term maintenance
- Develop and implement a permitting process with plan review, inspection, and enforcement capability for all sites that disturb a land area of 1 acre or more
- Inspect all construction sites prior to clearing and construction if they exhibit high potential for sediment transport during construction to ensure adequate erosion and sediment control BMPs, and again upon completion of construction to ensure proper installation of permanent stormwater controls
- Adopt an ordinance or other enforceable mechanism to verify long-term operation and maintenance (O&M) of post-construction facilities and BMPs
- Conduct annual inspections of stormwater treatment and flow control facilities permitted by the City; inspect all new flow control and water quality treatment facilities for new residential developments that are part of a larger common plan for development or sale
- Develop a record-keeping procedure for inspection reports, warning letters, notices of violations, and other enforcement records
- Provide copies of notice of intent (NOI) letters to representatives of proposed new development and redevelopment projects
- Train City staff responsible for implementing the program described above, including staff involved with permitting, plan review, construction site inspections, and enforcement

Pollution Prevention and Operations and Maintenance for Municipal Operations

Section S5.C.5.a-f of the 2007-2013 Phase II Permit lists the following requirements:

- Develop maintenance standards for facilities that currently do not have maintenance standards

- Inspect municipally owned or operated permanent stormwater treatment and flow control facilities (other than catch basins) annually and take appropriate maintenance actions
- Conduct spot checks of potentially damaged permanent treatment and flow control facilities (other than catch basins) after major (greater than 24-hour, 10-year recurrence interval rainfall) storm events
- Inspect all catch basins and inlets owned or operated by the City at least once before the end of the Phase II Permit term; clean catch basins if necessary
- Establish and implement practices to reduce stormwater impacts associated with runoff from streets, parking lots, roads, or highways owned or maintained by the City and road maintenance activities conducted by the City
- Establish and implement policies and procedures to reduce pollutants in discharges from all lands owned and maintained by the City, including parks, open space, road rights-of-way, maintenance yards, and stormwater treatment and flow control facilities
- Develop and implement an ongoing training program for City employees whose construction, operations, or maintenance job functions may adversely affect stormwater quality
- Develop and 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
- Maintain records of inspections and maintenance or repair activities

Compliance with Total Maximum Daily Load Requirements

Section S7 of the 2007-2013 Phase II Permit lists the following requirements:

- Implement the specific requirements identified in Appendix 2 of the Phase II Permit for applicable TMDLs listed in Appendix 2
- Conduct monitoring according to a quality assurance project plan (QAPP) approved by Ecology where monitoring is required in Appendix 2 of the Phase II Permit
- Compliance with the permit constitutes compliance with applicable TMDLs not listed in Appendix 2 of the Phase II Permit
- Comply with permit modifications and TMDL implementation plans prepared by Ecology for TMDLs that are approved by the U.S. Environmental Protection Agency (EPA) after the Phase II Permit has been issued

The City is currently not affected by any TMDLs listed in Appendix 2 of the 2007-2013 Phase II Permit. However, several receiving waters within the City limits, receiving waters within the urban growth area (UGA), and waterbodies outside of the City limits that receive drainage

from tributaries or stormwater facilities within the City limits are listed for water quality impairments under Category 5 of Ecology’s Clean Water Act Section 303(d) list (impaired waters exceeding water quality standards that require a TMDL) and Category 4A (waterbodies that have an approved TMDL in place that is actively being implemented).

Monitoring

Section S8 of the 2007-2013 Phase II Permit lists the following requirements:

- Conduct water quality monitoring required for compliance with TMDLs listed in Appendix 2 of the Phase II Permit
- Conduct sampling or testing required for characterizing illegal discharges
- Provide a description of stormwater monitoring or studies conducted during the reporting period
- Provide an assessment of the appropriateness of the BMPs identified for each component of the SWMP, any changes made or expected to be made, and the reasons for these changes
- Identify sites for long-term stormwater monitoring
- Develop proposed questions and identify sites for SWMP effectiveness monitoring

Reporting

Section S9 of the 2007-2013 Phase II Permit lists the following requirements:

- Submit two printed copies and one electronic copy of an annual report to Ecology no later than March 31 of each year (beginning in 2008)
- Keep all records related to the Phase II Permit and the SWMP for at least 5 years
- Make records related to the Phase II Permit and the SWMP available to the public at reasonable times during business hours
- Include a summary of identified barriers to the use of LID and implementation schedule for non-structural actions and LID techniques in the March 2011 annual report to Ecology

Applicability

The 2007-2013 Phase II Permit became effective for the City on February 15, 2007, and although it expired on February 15, 2012, it remained in effect until July 31, 2012. Ecology reissued the 2007-2013 Phase II Permit with little to no modifications in July 2012 that will extend the current permit requirements until July 31, 2013.

Underground Injection Control Requirements

Chapter 173-218 WAC (UIC Program) satisfies Part C of the Federal Safe Drinking Water Act and the Washington State Water Pollution Control Act, Chapter 90.48 RCW. The most common type of UIC well in Washington is a Class V injection well. Class V injection wells include manmade subsurface fluid distribution systems designed to discharge fluids into the ground and consists of an assemblage of perforated pipes, drain tiles, or other similar mechanisms, or a dug hole that is deeper than the largest surface dimension (WAC 173-218-040). Examples include drywells, pipe or French drains, drain fields, and other similar devices that are used to discharge stormwater directly into the ground (Ecology 2006a).

The basic requirements of the UIC Program include (Ecology 2006a):

- Registering existing UIC wells with Ecology (constructed prior to February 3, 2006)
 - Less than 50 wells: register by February 3, 2009
 - More than 50 wells: register by February 3, 2011
- Conducting well assessment for all existing wells
 - Less than 50 wells: assess wells by February 3, 2011
 - More than 50 wells: assess wells by February 3, 2013
- Constructing new UIC wells according to Chapter 173 218 WAC specifications
- Retrofitting existing UIC wells that are determined to be a high threat to groundwater (i.e., receives prohibited discharges or high pollutant loading from adjacent land use, located in an area with shallow groundwater or a groundwater protection area)
- Submitting an annual update to Ecology describing any well status changes, such as changes in ownership, or well decommissioning

Ecology's UIC guidance includes information for defining when wells pose a high threat to groundwater.

Applicability

The City of Lacey manages owns more than 50 UIC wells; therefore the City should identify all wells (includes some facilities not currently identified as drywells in the storm drain GIS), register all wells, and conduct well assessments by February 3, 2013, and begin planning and constructing retrofits for wells with a high threat to groundwater.

City's SWMP must also include language regarding the registration, construction standards, and assessment of UIC wells. Construction standards are contained in the City of Lacey 2010 Stormwater Design Manual and plans for registration and assessment are contained in the body of the SCP.

Puget Sound Water Quality Management Plan and Action Agenda

The Puget Sound Partnership was established by Washington state statute in 1983 as the Puget Sound Water Quality Authority, later becoming the Puget Sound Action Team and eventually the Puget Sound Partnership (PSP) in 2007. The Puget Sound Water Quality Authority was directed to identify pollution-related threats to Puget Sound’s resources, conduct risk assessments, and coordinate and report on information relating to water quality in Puget Sound. The Puget Sound Water Quality Management Plan, first drafted in 1987, was last updated in 2001 for the period from 2001 through 2003 (PSAT 2000). The management plan was used to direct the work activities of the Action Team and to budget for addressing priority measures to restore and protect the health and diversity of the Sound.

In December 2008, the PSP published an Action Agenda for restoration and protection of Puget Sound which was revised in May 2009 (PSP 2009). This sweeping document supersedes the previous water quality management plan, encompassing a wider range of ecological (including water quality), social, and economic issues. The Action Agenda calls on all governments and citizens in the Puget Sound basin to support its priorities and initiatives. In the 2011 update to the Action Agenda, the PSP added a list of ecosystem recovery targets to aid in achieving substantial restoration and recovery of the Puget Sound by the year 2020 (PSP 2011). The 2012 update will identify strategies and actions to help reduce the effect of five main pressures on the ecosystem: land development, shoreline alteration, runoff from the built environment, wastewater, and loss of floodplain function (PSP 2011).

Applicability

A key theme of the Action Agenda is stormwater pollution. The Action Agenda and other work by the PSP is not legally binding on the City. However, because the City is located within the Puget Sound drainage basin, many of the provisions of PSP’s plan will affect the decisions of regulatory authorities in the region, indirectly affecting the City’s SWMP.

Water Quality Standards

Various federal and state laws related to water and sediment quality significantly affect stormwater management in the City. The primary regulatory influences are the federal Clean Water Act and several state-administered water quality programs, including Ecology’s surface water quality standards set forth in Washington Administrative Code (WAC) section 173-201A and TMDLs that may be implemented in the near future to address water quality management for surface water bodies listed on the State’s Clean Water Act Section 303(d) list.

State Surface Water Quality Standards

Surface water quality standards describe the quality of water expected to support beneficial surface water uses. Section 303(c) of the Clean Water Act states that water quality standards are the responsibility of states and qualified tribes. Ecology administers water quality standards in Washington state to be “consistent with public health and public enjoyment of the waters and the propagation and protection of fish, shellfish, and wildlife” (WAC 173-201A).

Effective July 2003, Ecology restructured its surface water quality standards to more explicitly define water quality requirements for aquatic life, recreation, water supply, and other miscellaneous uses. For example, designated uses for aquatic life include: *char spawning and rearing; core summer salmonid habitat; salmonid spawning, rearing, and migration; salmonid rearing and migration only; non-anadromous interior redband trout; and indigenous warm water species*. There are now 18 designated uses in WAC 173-201A, and Ecology has established water quality criteria (such as maximum temperature and fecal coliform bacteria levels) for each of them.

303(d) Listings

The following receiving water in the City is currently listed under Category 5 of Ecology's 303(d) list for water quality impairments (Ecology 2011), but does not yet have a TMDL:

- Woodland Creek - temperature

The following receiving waters on Ecology's Category 5 303(d) list (Ecology 2011) are not located within the City limits, but either border the City's boundaries, or receive runoff from tributaries or stormwater facilities within the City limits:

- Budd Inlet - dissolved oxygen, various toxics (tissue)
- Deschutes River - temperature, fecal coliform bacteria, dissolved oxygen, fine sediment
- Henderson Inlet - dissolved oxygen
- Long Lake and Patterson (south arm) Lake - total phosphorus
- Long Lake - PCB (tissue), 2,3,7,8 TCDD (tissue)
- Woodard Creek - dissolved oxygen

Applicability

The City is responsible for regulating surface water discharges to receiving waters in its jurisdiction to meet Ecology's surface water quality standards. None of the water bodies in the City or downstream of the City are explicitly addressed in Ecology's water quality standards. However, in accordance with the Phase II Permit, the City needs to manage stormwater discharges from its municipal drainage systems in a manner that supports achieving the water quality standards for all surface waters to the best of its ability.

The 303(d) listings summarized above do not currently have a TMDL study or TMDL implementation plan in place; however, the City should consider activities and local requirements that could proactively reduce pollutant loading and position the City to take action if a TMDL is developed in the future. Current TMDL listings are summarized in the following section.

TMDLs for Degraded Water Bodies

Ecology is required to establish a TMDL for each pollutant identified in each impaired water body on the Section 303(d) list. TMDL's represent the daily limit on pollutants the water body can contain while still complying with water quality standards. A TMDL is established with the use of data and modeling. The TMDL is then divided among all point source polluters and nonpoint sources of the pollutant in the tributary drainage area. The TMDL typically includes a margin of safety and accounts for future growth. Ecology can limit pollutant discharge by prioritizing a TMDL allocation for the listed surface water or by using mechanisms such as the Phase II Permit to establish water quality control requirements for individual drainage basins. This could lead to mandatory limits on human activities in that basin.

Deschutes River TMDL

Portions of the Deschutes River, Capitol Lake, and Budd Inlet do not meet water quality standards for one or more of the following: dissolved oxygen (DO), nutrients, pH, temperature, fecal coliform bacteria, or fine sediment (Roberts and Pelletier 2007). Ecology conducted a TMDL study of these waterbodies in 2003 (Ecology 2008a). The purpose of the TMDL study was to identify potential sources and maximum loading of these pollutants and to recommend loading reduction targets in order to meet water quality standards. The major findings of the TMDL study are outlined below (Ecology 2008a).

- The highest fecal coliform bacteria concentrations were found in upper Deschutes River and in the tributaries to Budd Inlet. A significant increase in fecal coliform bacteria concentrations was observed during the summer months.
- The highest temperatures were found upstream of Capitol Lake and just downstream of Deschutes Falls; however, the tributaries and springs to the Deschutes River generally exhibited temperatures a few degrees cooler than the mainstem of the river.
- Nutrients, pH and DO concentrations were found to vary distinctly with the seasons. Total nitrogen and phosphorus concentrations were highest in the downstream stretch of the Deschutes River, and upon reaching Capitol Lake, nitrogen concentrations decreased while phosphorus concentrations continued to rise. Both Capitol Lake and Budd Inlet contain DO concentrations that exceed their loading capacity.
- The high concentration of fine sediment in the Deschutes River and Capitol Lake most likely caused by bank erosion, anthropogenic sources, and contributions from unpaved roads.

Recommended actions for reduction of pollutants include (Ecology 2008a):

- More intensive source identification and cleanup programs
- Restoration of effective shade and channel conditions to improve water temperature, pH and dissolved oxygen concentrations
- Establishment of mature riparian vegetated corridor to reduce stream erosion, fine sediment and phosphorus concentration

- The Water Quality Improvement Report will determine the load reductions necessary for DO and total phosphorus in Capitol Lake and DO in Budd Inlet

Deschutes River TMDL Applicability

Ecology is currently developing a Water Quality Improvement Report, or TMDL water cleanup plan, based on the findings of the TMDL study (Ecology 2008a). After submittal to the EPA, Ecology will develop a TMDL Implementation Plan, which will determine what measures will be taken to achieve water quality goals and identify the parties responsible for their implementation (Ecology 2012).

Henderson Inlet TMDL

The Henderson Inlet watershed includes Woodland and Woodard Creek and the following tributaries in the UGA: Eagle Creek, Fox Creek, and Jorgenson Creek. Ecology conducted a TMDL study of the Henderson Inlet watershed from 2002 to 2005 for fecal coliform bacteria, temperature, DO, and pH (Ecology 2006b).

The TMDL study determined that fecal coliform reduction is required in Woodland and Woodard Creek as well as their tributaries however placed priority on pollutant reduction in Woodland Creek as it is the greatest pollutant contributor to Henderson Inlet. The highest concentration of bacteria was found in Woodland Creek RM 3.7 along Martin Way, which receives stormwater discharge from Tanglewilde, a densely concentrated development on on-site sewage (Ecology 2006b). Woodland Creek RM 2.6-1.6 also contained high concentrations of fecal coliform bacteria, likely due to on-site septic systems, pet waste, stormwater discharge, and agricultural activities (Ecology 2006b). Onsite sewage treatment systems along Woodland Creek and the shore of Henderson Inlet may also be contributing to high fecal coliform bacteria concentrations; however, further investigation of these areas is required (Ecology 2006b). Recommended fecal coliform bacteria loading reduction actions include (Ecology 2006b):

- Stormwater discharge regulation along Martin Way with highest priority placed on Tanglewilde development discharge
- Regulation of on-site septic systems located on Woodland Creek and Woodard Creek, especially along Martin Way (Woodland Creek RM 2.6-1.6)
- Investigation and regulation of on-site sewage treatment along Jorgenson Creek, upstream of Pleasant Glade Road
- Restricted domestic animal access

Woodland Creek is the only waterbody in the Henderson Inlet on Ecology's 303(d) list for temperature. Recommended actions for temperature management along Woodland Creek include (Ecology 2006b):

- Implementation of LID principles for new developments
- Continued management of stormwater runoff from impervious surfaces

- Protect riparian vegetation along Woodland Creek and its streams and tributaries

Woodland Creek, Woodard Creek and the Henderson Inlet are on the 303(d) list for dissolved oxygen. Low dissolved oxygen concentrations in both Woodland and Woodard Creeks are most likely caused by natural conditions and wetlands upstream. Regardless of the source, low DO can contribute to high BOD concentrations and should be investigated further. The highest priority locations include Woodland Creek RM 1.6 and the southern inlet to the Henderson Inlet (Ecology 2006b). Recommended actions for DO regulation include (Ecology 2006b):

- Continued monitoring of DO
- Develop a model of Henderson Inlet to evaluate the sources and impacts of dissolved oxygen on the watershed

Although Woodard Creek is on Ecology's 303(d) list for pH and Woodland Creek for low pH levels along RM 6.9 and 6.2, low pH along these areas is considered a natural condition and is not addressed in detail in this TMDL study.

Henderson Inlet TMDL Applicability

Since the TMDL study, impressive action has been taken to improve the water quality in the Henderson Inlet. In 2005, Thurston County created a septic system program to improve the function and management of septic systems in the Henderson Watershed (Lacey 2011). Ecology developed a TMDL Implementation Plan in 2008 (Ecology 2008b), which provided a list of cleanup actions that will reduce pollutant loads to meet water quality standards by 2015. The City of Lacey was identified as the organization responsible for the following required clean up actions (Ecology 2008b):

- Pollutant Load Reduction Project in Lake Lois to mouth of Jorgenson Creek (RM 4.3 to 1.4)
- Monitor bacteria concentration in discharge from College Regional Stormwater Facility

The City of Lacey has also been deemed responsible for the following actions, as defined in Ecology's 2013-2018 Phase II Permit:

- Raise awareness of pollution through continuation of Stormwater Facilities Maintenance Program, brochures, educational signage, and maintenance of pet waste stations
- Develop and implement a fecal coliform wet weather sampling program for the College Regional Stormwater Facility by December 31, 2013
- Coordinate with the City of Olympia to develop and implement a plan to detect and eliminate fecal coliform bacteria discharges from the Fones/Taylor wetland treatment facilities by December 13, 2014
- Manage vegetation along Woodland Creek and its tributaries

Additional recommended actions for the City of Lacey include (Ecology 2008b):

- Encourage residents to use water wisely
- Protect lower Woodland Creek tributaries (including riparian vegetation) from degradation
- Prohibition of exempt wells where city water is available within the City of Lacey limits
- Nutrient removal in stormwater throughout Woodland Creek subbasin

In addition to the TMDL Implementation Plan (Ecology 2008b), multiple organizations have taken initiative to improve water quality in the Henderson Inlet. In 2008, the City of Lacey and Saint Martin Abbey completed the construction of a stormwater treatment facility that treats 430 acres of stormwater runoff. Thurston County founded the Henderson Inlet Shellfish Protection District whose collaborative efforts with residents, stakeholders, and the City of Lacey have helped reopen 240 acres of shellfish beds that were restricted 25 years ago due to declining water quality (Lacey 2011). Although water quality in the Henderson watershed is showing a definite improvement, significant efforts still need to be made to achieve water quality standards by 2015.

Nisqually River TMDL

Ecology conducted a TMDL study for fecal coliform bacteria and DO in the Nisqually River, the Nisqually reach of the Puget Sound, and three of its tributaries: Ohop Creek, Red Salmon Creek, and McAllister Creek (Ecology 2005). This study showed both the main stem of the Nisqually River and Nisqually Reach met state water quality criteria for fecal coliform bacteria; however, Ohop Creek, Red Salmon Creek and McAllister Creek failed to meet water quality criteria (Ecology 2005). Although no bacteria loading reductions are required for the Nisqually River or the Nisqually Reach, the TMDL study recommended continued monitoring and attention of these areas due to historical water quality problems near important shellfish habitats (Ecology 2005). Monitoring locations along Ohop Creek, Red Salmon Creek and McAllister Creek for fecal coliform bacteria and dissolved oxygen were also identified in the study. Recommendations made for the reduction of fecal coliform bacteria in Ohop Creek, Red Salmon, and McAllister Creek include (Ecology 2005):

- Investigation of stormwater sources on Lynch Creek
- Investigation of possible bacteria sources to Ohop Creek and Meadows subdivision that drains to Little McAllister Creek
- Exclusion of livestock from wet areas along Red Salmon Creek
- Investigation of on-site septic systems next to Wash Creek, near the Luhr Beach neighborhood, residential areas between McAllister RM 4.7 and 4.5, and near Medicine Creek RM 0.3
- Improvements to Meadows subdivision stormwater system
- Limited domestic animal access to ditches and waterways, with priority given to areas that drain to McAllister Creek and tide gates 9,13,12,4, and 5

- Installation of pet waste stations and portable toilets

The natural conditions of McAllister Creek have resulted in DO concentrations below water quality standards. The already low DO levels, however, have the potential to decrease further if nutrient concentrations are high. The TMDL study made the following recommendations and to protect and improve DO levels from further degradation in McAllister Creek (Ecology 2005):

- Investigation of potential changes in nutrient concentrations, especially nitrate and nitrogen in groundwater
- Application of fertilizers at agronomic rates, protection of riparian buffer zones

Nisqually River TMDL Applicability

Ecology developed a TMDL Implementation Plan for the Nisqually River Basin in 2007, in which action items were identified for various parties and organizations responsible for the cleanup efforts (Ecology 2005). No action items were identified for the City of Lacey.

Ecology's 2013-2018 Phase II Permit requires Thurston County to take the following actions to reduce fecal coliform bacteria in areas discharging to the Nisqually Reach:

- Install and maintain pet waste bag dispenser units and explanatory signs in public areas with dog usage
- Increase awareness of bacteria pollution through mailings, door hangers, etc.
- Maintain vegetation around stormwater facilities, ditches, and ponds

Flood Protection

The U.S. Congress established the National Flood Insurance Program (NFIP) with the passage of the National Flood Insurance Act of 1968. The NFIP is a federal program enabling property owners in participating communities to purchase insurance as protection against flood losses, in exchange for floodplain management regulations that reduce future flood damages. Participation in the NFIP is based on an agreement between local communities and the federal government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk for new construction, the federal government will make flood insurance available within the community as a financial protection against flood losses. This insurance is designed to provide an alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. The Federal Emergency Management Agency (FEMA) is currently responsible for the NFIP.

On September 22, 2008, the National Marine Fisheries Service (NMFS) issued a Biological Opinion that required changes to the implementation of the National Flood Insurance Program in order to meet the requirements of the Endangered Species Act (ESA) in the Puget Sound watershed (NMFS 2008). FEMA offers several ways to meet this ESA requirement:

- Prohibit all development in the floodway and other areas as specified by the RPA.

- Enact regulations that allow development that meet the criteria specified in the Biological Opinion (referred to as the “three-door approach”) by either:
 - Adopting a Model Ordinance, or Enforcing the same requirements in other ordinances, such as the growth management, zoning, or critical areas regulations, or
 - Showing compliance with ESA on a permit by permit basis. This will typically involve requiring applicants for floodplain development permits to develop in the Special Flood Hazard Area to submit permit applications to the National Marine Fisheries Service. If the Door 3 option is chosen, NFIP communities must ensure that permit applicants have demonstrated compliance with ESA before issuing a floodplain development permit.

Applicability

Section 1315 of the National Flood Insurance Act prohibits FEMA from providing flood insurance unless a community adopts and enforces floodplain management regulations that meet or exceed floodplain management criteria established under Section 1361(c) of the act. These floodplain management criteria are specified in the Code of Federal Regulations (CFR), Title 44, Part 60, Criteria for Land Management and Use. The emphasis of the National Flood Insurance Program (NFIP) floodplain management requirements is focused on reducing threats to lives and the potential for damages to property in flood-prone areas.

In addition to providing flood insurance and reducing flood damages through floodplain management regulations, the NFIP identifies and maps the nation’s floodplains. Mapping of floodplains creates broad-based awareness of the flood hazards and provides the data needed for floodplain management programs and for determining flood insurance rates for new construction.

The City complies with the NFIP with a flood control ordinance and explicit code requirements for development in flood hazard areas. The City currently manages floodplain hazards through its Flood Hazard Prevention code (LMC Chapter 14.34), which address areas of special flood hazard as identified by the Federal Insurance Administration in “The Flood Insurance Study for the City of Lacey,” dated January 1980, with accompanying Flood Insurance Rate Maps (FIRMs). The flood insurance study and FIRM are on file at the City. Mapped floodplains in the City include flood hazard areas within FIRM Boundaries.

The flood hazard prevention code is also consistent with the requirements of the Growth Management Act wherein local governments are required to designate and protect five types of “critical areas,” including flood hazard areas. Wetlands and streams and their buffers are also protected as critical areas and generally correspond with FEMA floodplains. The combination of development restrictions for floodplains, wetlands, and streams limit development within the FEMA designated floodplains. See the *Growth Management Act* section for an understanding of development regulations as they relate to public facilities (i.e., stormwater facilities) maintenance and/or construction within critical areas.

The City of Lacey made the decision to proceed with the “Door 2” approach as it applies to the Biological Opinion for the NFIP. The City has amended its flood hazard prevention ordinance and has developed documentation to show their suite of rules and regulations, when combined with the NFIP, will assure no adverse effect on salmon populations or their habitats. The City, has submitted documentation on behalf of the Door 2 approach, is still waiting for FEMA approval according to the latest documentation available on the FEMA website (FEMA 2012).

Species and Habitat Protection

This section summarizes the requirements of the Endangered Species Act (ESA), State Salmon Recovery Act, Watershed Planning Act, Growth Management Act, critical areas, State Environmental Policy Act (SEPA), Shoreline Management Act, and other applicable regulations.

The Endangered Species Act

The 1973 ESA is a federal act administered by the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) (i.e., the Services) that provides for protection of species determined to be threatened or endangered of becoming extinct, and their habitat (i.e., critical habitat). The USFWS is responsible for predominant freshwater species (e.g., Puget Sound bull trout), terrestrial wildlife, and plants, whereas NOAA Fisheries is responsible for predominant marine species (e.g., Puget Sound Chinook). The Services consider a species endangered when it is “in danger of extinction throughout all or a significant portion of its range” and threatened when it is “likely to become endangered within the foreseeable future throughout all or a significant portion of its range.”

The ESA prohibits take of listed species defined as to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct.” Take also includes “significant modification or degradation of critical habitat.” The take prohibition applies to all persons including private citizens and federal, state, and local government entities. Proponents of activities with a federal nexus (e.g., carried out by a federal agency, federally funded, or require a federal permit) are required to consult with the Services according to Section 7 of the ESA unless they are exempted according to a Section 4(d) rule as discussed below.

For species listed as “endangered,” Section 9 take prohibitions are applied. The Services protect “threatened” species through a more flexible ESA Section 4(d) rule that prohibits take. On July 10, 2000, NOAA Fisheries published a final rule under Section 4(d), which prohibits actions that result in take of Puget Sound salmon species listed as threatened. On September 25, 2008, NOAA Fisheries included Puget Sound steelhead within this rule based on its recent listing as threatened. The rule follows the standard practice of prohibiting the take of a threatened species without written authorization. However, the rule does not prohibit all take. The rule exempts certain activities from take prohibitions if the take occurs as the result of a program approved by NOAA Fisheries that adequately protects listed species and their habitat. NOAA Fisheries specifies 13 categories of activities that can limit the situations

in which take prohibitions apply, known as 4(d) limits. By providing limitation from take liability, NOAA Fisheries encourages governments and private citizens to adjust their programs and activities to be “salmon safe.”

Applicability

In the vicinity of the City, the Services have listed the following species as threatened or endangered, including critical habitat for some of the species:

- Puget Sound Chinook salmon (*Oncorhynchus tshawytscha*) is listed as threatened, including critical habitat
- Coastal-Puget Sound bull trout (*Salvelinus confluentus*) is listed as threatened, including critical habitat
- Puget Sound steelhead (*O. mykiss*) is listed as threatened
- Southern Pacific eulachon (*Thaleichthys pacificus*) is listed as threatened
- Southern Resident killer whale (*Orcinus orca*) is listed as endangered, including critical habitat

According to the Washington Department of Fish and Wildlife (WDFW) SalmonScape (WDFW 2012), Woodland Creek supports salmonids within the City limits. Within City boundaries, south of the I-5 corridor, fall Chinook are presumed present and winter steelhead have been documented as present. For both species, north of the I-5 corridor (outside of City boundaries), both species have been documented for spawning and presence. No other streams within the City limits have documented occurrence of threatened or endangered species. This is primarily attributable to the small size (flow rate and length) of these streams, as well as the limited (urbanized) habitat conditions. Because City tributaries and stormwater systems flow into Woodland Creek and Puget Sound where listed species are present, there is the potential for the “taking” of listed species.

If a changes in ESA listings occur, and associated habitat is identified in the City’s jurisdiction, it could require changes in City policies and programs, including (but not limited to) road maintenance practices, stormwater treatment, maintenance of storm drainage facilities, monitoring of water quality and flow, and watershed programs. For example, mazama pocket gopher (*Thomomys mazama* ssp.) is currently under review for listing. USFWS has found that listing is currently warranted but precluded from ESA regulation (76 FR 66389).

Consultation with the Services is required for activities with a federal nexus (e.g., carried out by a federal agency, federally funded, or require a federal permit) proposed by the City, other government entities, or individuals, that could directly or indirectly modify critical habitat, or kill or injure listed species. Specific examples include:

- Constructing or maintaining barriers that eliminate or impede a listed species’ access to habitat essential for its survival or recovery
- Removing, poisoning, or contaminating plants, fish, wildlife, or other biota required by the listed species for feeding, sheltering, or other essential functions

- Discharging pollutants (including those in stormwater runoff) into a listed species' habitat
- Removing or altering rocks, soil, gravel, vegetation, or other physical structures that are essential to the integrity and function of a listed species' habitat
- Removing water or otherwise altering streamflow when it is likely to impair spawning, migration, or other essential functions
- Releasing non-indigenous or artificially propagated individuals into a listed species' habitat
- Constructing or operating inadequate fish screens or fish passage facilities at dams or water diversion structures in a listed species' habitat
- Constructing or using inadequate bridges, roads, or trails on stream banks or unstable hill slopes adjacent or above a listed species' habitat
- Constructing or using inadequate pipes, tanks, or storage devices containing toxic substances, where the release of such a substance is likely to significantly modify or degrade listed species' habitat
- Conducting timber harvest, grazing, mining or other land use activities that increase sediment loading to streams
- Disturbing streambeds so as to trample eggs or trap adult fish preparing to spawn
- Altering lands or waters in a manner that promotes unusual concentrations of predators
- Shoreline and riparian disturbances that retard or prevent the development of habitat conditions upon which listed species depend
- Filling or isolating side channels, ponds and intermittent waters upon which listed species depend for refuge during high flows

Many of these activities are applicable to the City because the City is either engaged in them or writes permits for private developments that also have a federal nexus. The City does not have specific regulations addressing “take” as it applies to ESA, but does address ESA-listed species through SEPA compliance and critical area protection. In accordance with the SEPA (RCW 43.C.120 and SEPA rules, WAC 197-11-904), permit applicants are required to identify ESA species in their project area. The City also applies critical area protection under the Growth Management Act for habitat conservation areas protection (LMC Chapter 14.33). Thus, it is the City’s policy to require site planning and habitat management to avoid or minimize damage to habitat conservation areas including nesting and feeding areas for rare and endangered birds and habitat for fish and other wildlife including those that are rare and endangered. Official designation of fish and wildlife habitat conservation areas include areas with which state or federally designated endangered, threatened, and sensitive species have primary association. Although SEPA and the critical areas ordinance require the consideration

of listed species, these regulations do not require analysis to determine the potential for “take” of listed species if they are determined to be present in the vicinity of a proposed project. That analysis is, instead, explicitly addressed under the requirements of the ESA.

Project proponents with a federal nexus may be required to assess the project’s potential impact on listed species and critical habitat in greater detail, and in the case of no-effect may be required to write a Biological Assessment report in support of consultation with the Services or federal funding or permitting agency (e.g., the U.S. Army Corps of Engineers).

The following are examples of actions that may trigger impacts on ESA-listed species:

- Grading of a site
- Clearing of a site
- Work below the ordinary high watermark of any wetlands or creeks that have ESA listed species present, ESA species habitat, or drain to watercourses that have habitat for ESA listed species
- Installation of additional impervious surfaces
- Discharge of stormwater to watercourses that have ESA listed species, ESA species habitat, or drain to watercourses that have habitat for ESA listed species
- Processing, handling, storage, or treatment of hazardous substances in the vicinity of ESA listed species or their habitat
- Withdrawal, interception, or injection of groundwater
- Landscaping or reoccurring activities that require the application of herbicides, pesticides, and fertilizers
- Physical alterations to a watercourse or its banks

State Salmon Recovery Act

The State has responded to the ESA listings described above by enacting legislation authorizing (but not requiring) local governments and other stakeholders to take certain actions to promote salmon recovery. The Washington state legislature established the Salmon Recovery Act (RCW 77.85) through House Bill 2496 for the improvement and recovery of salmonid fish runs throughout the state. This act established a Salmon Recovery Office within the Office of the Governor to coordinate a state strategy for salmon recovery to healthy sustainable population levels with the purpose of coordinating and assisting the development of salmon recovery plans.

Applicability

The City is primarily located in WRIA 13 Deschutes Watershed in the Puget Sound Salmon Recovery Region, the largest of eight located across the state. Puget Sound Partnership is the regional salmon recovery organization charged with overseeing salmon recovery efforts and

implementing the regional recovery plan (SSPS 2007) finalized and adopted by NMFS in 2007. The plan includes measures that address stormwater and wastewater. It encourages retrofitting stormwater systems to improve water retention and treatment. It also promotes land use practices that prevent stormwater flows, monitoring and wastewater reuse, and a streetsweeping program. The plan also includes strategies to identify flow related problems and develop instream flow protection and enhancement actions. It calls for an aggressive and coordinated effort among all interested parties.

Watershed Planning Act

The Watershed Planning Act (Chapter 90.82 RCW) was passed by the State Legislature in 1998 (and amended in 2003) to provide a forum for citizens of the watershed to develop and implement locally-based solutions to watershed issues. The intent of the Watershed Management Act is, “meeting the needs of a growing population and a healthy economy statewide; meeting the needs of fish and healthy watersheds statewide; and advancing these two principles together, in increments over time.” The Watershed Management Act goes on to state that, “The legislature finds that improved management of the State’s water resources, clarifying the authorities, requirements, and timelines for establishing instream flows, providing timely decisions on water transfers, clarifying the authority of water conservancy boards, and enhancing the flexibility of our water management system to meet both environmental and economic goals are important steps to providing a better future for our State.”

Applicability

The City of Lacey is located in Watershed Resource Inventory Area (WRIA) 11, the Nisqually River Watershed, and WRIA 13, the Deschutes Watershed. WRIA 11 adopted the Nisqually Watershed Plan in April 2004 and the implementation component of the plan was completed in 2007. The Deschutes Watershed Planning Unit completed a final draft watershed plan in October 2004, but was unable to reach consensus on the plan, and therefore was not adopted. However, content of the plan is still accessible through the Thurston County Resource Stewardship Water Resources Program. Because the Deschutes Watershed Plan was not adopted, the following discussion is limited to the Nisqually Watershed Plan.

Eleven state and local governments (expanded initiating governments) within WRIA 11 signed a Memorandum of Agreement (MOA) in 1999 that established the Nisqually Planning Unit and set up roles and responsibilities of each government in creating the Plan. The local Planning Unit is comprised of members from three counties (Pierce, Thurston, and Lewis); cities and towns (Yelm, Lacey, Olympia, and Eatonville); the Nisqually Tribe; the Ashford Water District; the Elbe Water District; and Ecology. The Nisqually Tribe was the lead agency for the plan. The plan includes recommendations for water conservation, reuse, and reclamation; including a cooperative water supply planning and evaluation associated with the McAllister sub-basin of which there is a shared mutual interest among the Nisqually Tribe, Thurston County, and the cities of Olympia, Yelm, Lacey, and others. The Plan provides an overview of actions specific to Lacey including a general policy statement, general planning policies, actions associated with aquifer recharge areas, short and long term solutions.

Growth Management Act

The GMA was passed by the Washington state legislature in 1990. The GMA was enacted in response to rapid population growth and concerns about suburban sprawl, environmental protection, and quality of life. The GMA has been amended several times and is codified primarily in Chapter 36.70A of the Revised Code of Washington. Under the requirements of Section 4 of the GMA, the City must develop and adopt comprehensive plans and development regulations that prevent the adverse effects of uncontrolled development and poor land use practices. One of the key directives of the GMA is to use “best available science” to support effective land use planning that can avert environmental degradation.

Applicability

The GMA provides a framework for regional coordination. To satisfy GMA requirements, the City’s comprehensive planning must include the following elements: land use, housing, capital facilities, utilities, and transportation. The City’s planning must be consistent with Thurston County’s planning efforts and growth management policies. Joint plans such as the GMA and the Urban Growth Management Agreement (developed before the GMA) serve as Comprehensive Plans for unincorporated areas in the Urban Growth Boundaries of the cities and towns within Thurston County (Thurston County 2007). The Thurston County Comprehensive Plan supports interjurisdictional coordination and agreements, including the Lacey-Olympia-Tumwater-Thurston County (LOTT) wastewater alliance. The LOTT alliance agreement, titled “Interlocal Cooperation Act Agreement For Wastewater Management By The LOTT Wastewater Alliance By And Among City Of Lacey, City Of Olympia, City Of Tumwater And Thurston County” specifies requirements for the construction, maintenance and billing of joint stormwater treatment facilities (Lacey 2005). The City is ineligible to receive state or federal funds if it is not compliant with the GMA. The City’s SWMP supports the City’s overall Comprehensive Plan, which addresses GMA compliance issues.

Critical Areas

The GMA also requires cities and counties to designate and protect five types of critical areas:

- Frequently flooded areas
- Geologically hazardous areas
- Fish and wildlife conservation areas
- Wetlands
- Areas with a critical recharging effect on aquifers for potable water

The City of Lacey development regulations (LMC 14.28) are consistent with the intent of the GMA and the Environmental Protection and Resources Conservation Plan element of the 2003 *City of Lacey and Thurston County Land Use Plan for the Urban Growth Area*.

Applicability

Pursuant to Title 14: Buildings and Construction [LMC 14.28 (Wetlands Protection), LMC 14.33 (Habitat Conservation Areas Protected), LMC 14.36 (Critical Aquifer Recharge Areas Protection), and LMC 14.37 (Geologically Sensitive Areas Protection)], the normal and routine maintenance or repair of existing utility structures or right-of-way is exempt from the critical area review requirements as long as these activities are undertaken using BMPs and do not adversely impact the critical area or critical area buffer. New construction would not be exempt from critical area review requirements for wetlands, habitat conservation areas, critical aquifer recharge areas, or geologically sensitive areas protection.

Under LMC 14.34 (Flood Hazard Prevention), exemptions from critical area review that could for apply to stormwater projects within flood hazard areas include the following:

- B - Public works projects involving the provision or transmission of a utility where no alternative routing options are reasonable
- C - Public works projects consistent with the City Transportation Plan where no alternative routing options are reasonable
- D - Maintenance activities and improvements to pre-existing structures that do not increase the footprint of area located within a flood hazard area
- E - Public activities and improvements approved by the City of Lacey determined to be in the public's best interest

Work in the flood hazard area includes a long list of requirements for construction including adherence to FEMA requirements, full critical habitat mitigation, and limitations on impervious surface creation. New construction would not be exempt from critical area review requirements within a flood hazard area.

State Environmental Policy Act

SEPA (Chapter 43.21C RCW) was adopted in 1971 to ensure that environmental values were considered during decision-making by state and local agencies. Under LMC Chapter 14.4 Environmental Policy, the City adopts SEPA, RCW 43.21C.120, and the SEPA Rules, WAC 197-11-904.

Applicability

SEPA requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An Environmental Impact Statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. A SEPA checklist is typically prepared to determine whether an EIS is required. However, not all projects require SEPA, and are considered *categorically exempt*. Categorical exemptions are reserved for projects that either are unlikely to have a significant adverse environmental impact or were designated exempt by the State legislature.

Stormwater construction and maintenance activities are categorically exempt from threshold determination and Environmental Policy Act requirements as described under WAC 197-11-80023(b): *all storm water, water and sewer facilities, lines, equipment, hookups, or appurtenances including utilizing or related to lines eight inches or less in diameter*; However, under the authority of WAC 197-11-908, the City has opted to eliminate some categorically exempt activities identified under WAC 197-11-800. Of the exemptions eliminated, the following exempt activity [under WAC 197-11-800(2)(c)] that is not exempt under LMC has the potential to include stormwater-related projects associated with street improvements:

...involves the construction or installation of minor road and street improvements...installation of catch basins and culverts, and reconstruction of existing roadbed (existing curb-to-curb in urban locations), including adding or widening of shoulders, addition of bicycle lanes, paths and facilities...

Shoreline Management Act

The Shoreline Management Act (SMA) was passed by the Washington state legislature in 1971 (RCW 90.58). The primary goal of the SMA is *to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines*. Under the SMA, each city and county with "shorelines of the state" must prepare and adopt a Shoreline Master Program (SMP) that is based on state laws and rules but is tailored to the specific geographic, economic and environmental needs of the community.

Applicability

The updated City of Lacey Shoreline Master Program was adopted on October 13, 2011. The local SMP is essentially a shoreline-specific combined comprehensive plan, zoning ordinance, and development permit system. All SMPs must satisfy the requirements of Chapter 173-26, Washington Administrative Code (WAC), State master program approval/amendment procedures and master program guidelines, and Chapter 173-27 WAC. In the City, shoreline permitting and enforcement procedures are summarized as follows:

1. All development and use of shorelines of the state shall be carried out in a manner that is consistent with this SMP and the policy of the Act as required by RCW 90.58.140(1), whether or not a shoreline permit or statement of exemption is required.
2. No use, land or water alteration, or development shall be undertaken within jurisdiction of the Shoreline Management Act by any person without first obtaining a permit, except the Administrator may issue a letter of exemption from a substantial development permit under Section 17.30.030.
3. Permit processes and fees related to implementation of this Shoreline Master Program (SMP) are contained within the City's Development Guidelines and Public Works Standards (DGPWS). The processes outlined in the City DGPWS follow the requirements of state law and provide a local process for implementation of Lacey's Shoreline Master Program

The City of Lacey has authority over the following shorelines within its municipal boundaries and urban growth area:

- Marine Waters: Nisqually Reach
- Lakes: Chambers Lake, Hicks Lake, Long Lake, Pattison Lake, Southwick Lake
- Streams and Floodplains: Woodland Creek

Depending on what type of activity and the shoreline environment stormwater management would be working in, the type of permit can vary. The City SMP identifies those activities that are considered exempt from the requirement to obtain a shoreline substantial development permit. Section 17.30.035 of the SMP identifies *the Normal maintenance or repair of existing structures or developments* as an exemption from the requirement of a shoreline substantial development permit. However, regardless of an exemption, activities that occur in the shoreline are required to adhere to the development standards under Part 3 of the SMP. The implementation of stormwater CIP projects in the shoreline would regularly apply Section 17.69.000 Utilities-Goals and Policies, Section 17.69.020: Utilities - Development Standards, and 17.70.000 Water Quality -Goals and Policies, and 17.70.10 Water Quality - Development Standards.

The following describes the shoreline environmental designations and the permit requirements necessary for utilities when an exemption would not apply:

- **Shoreline Residential:** The purpose of the shoreline residential environment is to accommodate residential development and appurtenant structures. An additional purpose is to provide appropriate public access and recreational uses. This designation requires conditional use permit within 100 feet of the ordinary high water mark (OHWM) or a substantial development permit from 100 feet from the OHWM to the landward edge of the shoreline jurisdiction.
- **Urban Conservancy:** The purpose of the urban conservancy environment is to protect and restore ecological functions of open space, flood plain and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses. This designation requires a conditional use permit within 100 feet of the ordinary high water mark (OHWM) or a substantial development permit from 100 feet from the OHWM to the landward edge of the shoreline jurisdiction.
- **Natural:** The purpose of the natural environment is to protect those shoreline areas that are relatively free of human influence or that include intact or minimally degraded shoreline functions intolerant of human use. These systems require that only very low intensity uses be allowed in order to maintain the ecological functions and ecosystem-wide processes. This designation requires a shoreline conditional use permit.
- **Aquatic:** The purpose of the aquatic environment is to protect, restore, and manage the unique characteristics and resources of the areas waterward of the ordinary high-water mark. This designation requires a shoreline conditional use permit. In the

aquatic environment, the use of shoreline modification may be allowed if it is allowed in the adjacent upland shoreline environment designation.

Other Regulations

In addition to local requirements, wetland and stream regulations are imposed by federal and state agencies. These regulations require permitting and mitigation for impacts on wetlands and streams. The Clean Water Act sections 404, 401, and Hydraulic permit approval are the most common permits that would be required for work associated with surface water management projects. There is also the potential that project activities would require a Section 10 permit under the Rivers and Harbors Act due to Lacey's presence along the Nisqually Reach. The following describes the permits in greater detail, followed by a description of the Joint Aquatics Resources Permit Application which would allow the City of Lacey to apply for each of these permits through a single application.

Clean Water Act Sections 404 and 401

Section 404 of the federal Clean Water Act regulates activities in waters of the United States, including wetlands (33 USC 1344), but not wetland buffers. The U.S. Army Corps of Engineers (USACE) administers the permitting program under this law. Such permits include nationwide (general) permits or individual permits. Nationwide permits (NWP) cover a category or categories of activities that are either similar in nature and cause only minimal individual and cumulative adverse impacts. Individual permits are intended for projects where activities have more than minimal adverse impacts and evaluation of the permit application involves more thorough review of the potential effects of the proposed activity. Close coordination with USACE to confirm the type of review necessary is an integral part of project planning. The difference in review timeframes for an individual permit versus a nationwide permit could have implications on schedule.

Section 401 of the Clean Water Act requires that proposed dredge and fill activities permitted under Section 404 be reviewed and certified by Ecology to ensure that the project meets state water quality standards. These regulations will be applicable if any portion of the onsite wetlands are filled, dredged, or otherwise affected by project activities.

Rivers and Harbors Act - Section 10

Section 10 of the Rivers and Harbors Act requires Corps approval prior to construction, including excavation or fill in, over, or under navigable waters of the United States; including wetland subject to ebb and flow of tides, or any work that obstructs to navigation. The City of Lacey abuts Nisqually Reach, which is considered a water of the United States. If work occurs in the reach, a Section 10 permit would have to be obtained. As with Section 404, a Section 10 permit could be an individual or nationwide permit.

Hydraulic Project Approval

The Washington State Hydraulic Code [RCW 77.55] regulates construction activities that use, divert, obstruct, or change the natural flow or bed of any fresh water or salt water of the state. The WDFW administers the Hydraulic Project Approval (HPA) under this law.

Joint Aquatic Resources Permit Application (JARPA)

The Section 10, Section 404, the HPA, Section 401, and Section 10 permit can all be applied for through a streamlined permit application called the Joint Aquatic Resource Application (JARPA). Activities that trigger these permits are associated with work in a surface water body (e.g.; streams, lakes, tidal waters) or a wetland (e.g.; bogs, riverine wetlands, salt marshes).

Surface waters and wetlands are also considered as Critical Areas under the GMA (LMC, Title 14), thereby subject to City of Lacey regulations. For both the purposes of local regulations and those of state and federal entities (e.g.; Ecology, Corps of Engineers), it is important that the extent of the surface water body or wetland be properly defined, rated by professional scientists, and the amount of dredge or fill be appropriately calculated by certified engineers.

Finally, it is also important to understand that although this is one permit application, the typical review schedules vary among the regulatory authorities reviewing the application. It is also important to understand where there may be a need for prior approval for a separate permit or authorization before approval under the JARPA. For example, the HPA permit (WDFW) is typically reviewed in a shorter timeframe than a 404 permit (Corps); however, the HPA permit cannot be approved until the SEPA determination is finalized. To avoid project delays, it is recommended to meet with the regulatory agencies making permitting decisions. Oftentimes they will require more information or materials not specifically required in the JARPA. Early coordination with all of the regulatory agencies may prevent delays in the processing of the JARPA.

Evolving Regulations and Policies

The City faces several evolving regulations relevant to stormwater management. These regulations are expected to increase the City's obligations to protect water quality and fish habitat, increase monitoring requirements, and require greater integration and coordination between programs aimed at improving environmental protection. This section summarizes regulatory policies and requirements that the City will need to accommodate in its ongoing stormwater management program.

2013-2018 Phase II Permit Requirements

A new Phase II Permit was issued in August 2012 and includes updated requirements that will be effective from August 1, 2013, to July 31, 2018. The 2013-2018 Phase II Permit includes the same key components of the SWMP as the 2007-2013 Phase II Permit, but simplifies the title of the "Pollution prevention, operation, and maintenance for municipal operations" section to "Municipal operations and maintenance." The requirements of the 2013-2018 Phase II Permit are summarized below.

Public Education and Outreach

Section S5.C.1.a-c of the 2013-2018 Phase II Permit is fairly similar to the 2007-2013 Phase II Permit with the following changes:

- The general public audience has been expanded to include school age children
- The following subject areas were added:
 - General public and businesses
 - Impacts of illicit discharges and how to report them
 - Prevention of illicit discharges
 - Equipment maintenance
 - Residents, landscapers, and property managers/owners
 - Vehicle, equipment, and home/building maintenance
 - Pet waste management and disposal
 - Dumpster and trash compactor maintenance
- The following subject areas were modified:
 - “Environmental stewardship actions and opportunities” has been modified to “Opportunities to become involved in stewardship activities” (for general public and businesses).
 - “Low Impact Development (LID) techniques, including site design, pervious paving, retention of forests and mature trees” has been modified to “LID principles and LID BMPs” (for homeowners, landscapers, property managers, engineers, contractors, developers, review staff, and land use planners)
 - “Stormwater pond maintenance” has been modified to “Stormwater facility maintenance” (for homeowners, landscapers, and property managers)
- Stewardship opportunities such as stream teams, storm drain stenciling, volunteer monitoring, riparian plantings, and education activities are better defined and are now included in this section (formerly in the Public Involvement and Participation section of the 2007-2013 Phase II Permit)
- Clarification and deadlines have been added to the requirement for measuring the understanding and adoption of targeted behaviors (at least one new targeted audience in at least one new subject area; modifications to education and outreach resources; and evaluate changes in adoption of targeted behaviors by February 2, 2016)
- Clarification was added that the measurement of the understanding and adoption of targeted behaviors can be performed by an individual permittee or by a regional group.

Notable ongoing requirements in the 2013-2018 Phase II Permit include the following:

- Provide an education and outreach program targeting the following audiences:

- General public and businesses (including home-based and mobile businesses)
- Residents, landscapers, and property managers/owners
- Engineers, contractors, developers, and land use planners

Public Involvement and Participation

Section S5.C.2.a b of the 2013-2018 Phase II Permit is fairly similar to the 2007-2013 Phase II Permit with the following changes:

- Stewardship programs and environmental activities have been moved to the Public Education and Outreach section of the permit
- A deadline has been added for posting the Stormwater Management Program Report and annual report on the City’s website (May 31st of each year)
- Clarification was added to the permit that all other submittals should be available to the public upon request, but are not required to be posted on the City’s website

Notable ongoing requirements in the 2013-2018 Phase II Permit include the following:

- Create opportunities for the public to participate in the decision-making processes involving the development, implementation, and update of the SWMP
- Post the SWMP Plan and annual report submitted to Ecology on the City’s website

Illicit Discharge Detection and Elimination

Section S5.C.3.a f of the 2013-2018 Phase II Permit is fairly similar to the 2007-2013 Phase II Permit with the following changes:

- New permit language to address concerns with homeland security policies regarding requests for maps
- Minor text edits to the allowable and conditionally allowable discharges to be included in the illicit discharge ordinance (by February 2, 2018)
- New permit language for conditionally allowable discharges from spas and hot tubs (discharges shall be thermally controlled in addition to dechlorination)
- Modification of the “enforcement strategy” to “compliance strategy” and clarification provided on what this strategy should include
- Modification of the field screening methodology from dry weather outfall reconnaissance to field screening (based on methods selected by the City) of 40 percent of the City storm drainage system (i.e., roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, storm drains, and outfalls) by December 31, 2017 and, on average, 12 percent each year thereafter

Notable ongoing requirements in the 2013-2018 Phase II Permit include the following:

- Ongoing mapping requirement
- Ongoing implementation of the illicit discharge hotline, IDDE public education, staff training, IDDE program, and record-keeping

Controlling Runoff from New Development, Redevelopment, and Construction Sites

Section S5.C.4.a-h of the 2013-2018 Phase II Permit contains a few minor edits and a few major edits compared to the 2007-2013 Phase II Permit. The major changes include:

- Elimination of the 1-acre threshold (the lower threshold is now 2,000 square feet [sf] of impervious area or 7,000 sf of land disturbing activity); ordinances shall be revised by December 31, 2016
- New language for On-site Stormwater Management (Minimum Requirement [MR] #5) that includes detailed and involved requirements to meet either a specific LID performance standard, or one of two “mandatory” LID BMP lists depending on the project types and locations (see permit for full details on new LID requirements)
- New requirement to review and revise local development-related codes, rules, standards, and other enforceable documents to incorporate and require LID principles and LID BMPs by December 31, 2016
- Clarification and deadline added for provisions to verify adequate long-term operations and maintenance (O&M) of stormwater treatment and flow control facilities (by December 31, 2016)
- New requirement to review and revise local development-related codes, rules, standards, and other enforceable documents to incorporate and require LID principles and LID BMPs by December 31, 2016
- New requirement to summarize the results of the code review and revision process in the annual report due no later than March 31, 2017
- New requirement for watershed-scale stormwater planning (not applicable to the City since it is not located in any of the proposed Phase I basins)

The 2013-2018 Phase II Permit includes the following minor changes:

- Removal of the Erosivity Waiver
- Clarification of the inspection frequency for new stormwater treatment and flow control BMPs/facilities and catch basins for residential developments (every 6 months until 90 percent of the lots are constructed, or when construction is stopped and the site is fully stabilized)

Notable ongoing requirements in the 2013-2018 Phase II Permit include the following:

- Inspect all construction sites prior to clearing and construction, during construction, and again upon completion of construction; annual inspections of stormwater treatment and flow control facilities permitted by the City
- Ongoing record-keeping and staff training

Municipal Operations and Maintenance

Section S5.C.5.a-i of the 2013-2018 Phase II Permit has been renamed to Municipal Operations and Maintenance, but contains similar requirements to the 2007-2013 Phase II Permit. The 2013-2018 Phase II Permit includes the following changes:

- Establishes a deadline (December 31, 2016) for updating maintenance standards to be consistent with those in Ecology’s revised Stormwater Management Manual for Western Washington (Ecology 2012b)
- Removing the definition of “major” storm events as greater than the 24-hour, 10-year recurrence interval rainfall due to permittee feedback that storm drainage systems are too variable to be tied to a prescriptive storm event
- There are now three options for catch basin and inlet inspections:
 - Option 1: Catch basins and inlets must be inspected at least once no later than August 1, 2017, and every 2 years thereafter (instead of once before the end of the permit term [every 5 years] in the 2007-2013 Phase II Permit)
 - Option 2: Inspections and cleaning of catch basins may occur on a “circuit basis” with inspections of 25 percent of catch basins and inlets within each circuit to identify maintenance needs
 - Option 3: Clean all pipes, ditches, catch basins, and inlets within a circuit once during the permit term instead of following the specified inspection schedule or conducting inspections on a “circuit basis”
- Modifications to the practices, policies, and procedures include:
 - “Development of nutrient management and integrated pest management plans” has been modified to “reducing nutrients and pesticides using environmentally friendly alternatives”
 - “Pet waste” has been added to “Trash management”

Notable ongoing permit requirements in the 2013-2018 Phase II Permit include the following:

- Annual inspections of municipally owned or operated permanent stormwater treatment and flow control BMPs/facilities
- Spot checks of potentially damaged permanent stormwater treatment and flow control BMPs/facilities after major storm events

- Staff training
- SWPPP implementation
- Record-keeping

Compliance with Total Maximum Daily Load Requirements

Section S7 of the 2013-2018 Phase II Permit is similar to Section 7 of the 2007-2013 Phase II Permit with the following changes:

- The definition of applicable TMDLs has been modified to “TMDLs which have been approved by EPA on or before the issuance of the permit or prior to the date that Ecology issues coverage under this permit (August 2013), whichever is later”
- A new requirement has been added to include a summary of the relevant SWMP and Appendix 2 activities conducted in the TMDL area to address the applicable TMDL parameter(s)
- The QAPP reference has been removed

The Henderson Inlet Watershed Fecal Coliform Bacteria Water Quality Improvement Project is listed in Appendix 2 of the 2013-2018 Phase II Permit. Required actions for the City to comply with this TMDL include the following:

- Continue the Private Stormwater Facilities Maintenance Program (educational resources for commercial and residential stormwater facility/BMP owners)
- Offer bacteria pollution reduction brochures, signage, and pet waste stations to HOAs
- Maintain pet waste bag dispenser units in City parks
- Install educational signage at City facilities/property
- Develop a targeted educational plan for septic system owners that includes; goals, target audiences, messages, format, distribution and evaluation methods by December 31, 2016. This can be achieved individually or through regional efforts
- Continue developing and implementing a fecal coliform bacteria wet weather sampling program for the College Regional Stormwater Facility by December 31, 2013
- Develop and implement a coordinated plan with the City of Olympia to detect and eliminate fecal coliform bacteria discharges from the Fones/Taylor wetland treatment facilities by December 31, 2014
- Manage vegetation along Woodland Creek and its tributaries

Monitoring and Assessment

Section S8 of the 2013-2018 Phase II Permit has been completely changed from the requirements in the 2007-2013 Phase II Permit. Monitoring required by the 2013-2018 Phase II Permit includes the following three components:

1. Water quality monitoring required for compliance with TMDLs (summarized in the previous section of this document)
2. Sampling or testing required for characterizing illicit discharges (summarized in the IDDE section [S5.C.3] of this document)
3. Regional Stormwater Monitoring Program (RSMP) or opt-out monitoring

The RSMP includes the following three major components along with the requirements for the opt-in and opt-out options:

- Status and Trends Monitoring
 - **Opt-in Option:** Pay into a collective fund (annual dues of \$9,799 beginning August 15, 2014) to implement the Puget Sound marine nearshore and small streams status and trends component of the RSMP
 - **Opt-out Option:** Conduct wadeable stream water quality, benthos, habitat, and sediment chemistry monitoring for four potential RSMP stream sites within the City boundaries; conduct sediment chemistry, mussels, and bacteria monitoring at four potential RSMP marine nearshore sites; and report data and analyses annually
- Effectiveness Studies
 - **Opt-in Option:** Pay into a collective fund (annual dues of \$16,326 beginning August 15, 2014) to implement the effectiveness studies component of the RSMP
 - **Opt-out Option:** Select two sites for stormwater discharge monitoring, submit a QAPP to Ecology, and fully implement monitoring by October 1, 2014, in accordance with Appendix 9 of the 2013-2018 Phase II Permit
- Source Identification and Diagnostic Monitoring Information Repository
 - **Opt-in Option:** Pay into a collective fund (annual dues of \$1,514 beginning August 15, 2014) to implement the source identification and diagnostic monitoring component of the RSMP
 - **Opt-out Option:** None provided

Reporting

Section S9 of the 2013-2018 Phase II Permit is similar to the 2007-2013 Phase II Permit with the following changes:

- Permittees shall submit annual reports electronically; no printed copies of annual reports are required to be submitted to Ecology
- The annual report submittal shall include a copy of the Stormwater Management Program Report (description of activities and actions for the upcoming calendar year), the annual report form provided by Ecology (description of activities and actions for the previous calendar year), and attachments to the annual report form, if applicable
- The LID reporting requirements have been removed since the permittees will be addressing the LID requirements in Section S5.C.4 during the 2013-2018 permit term. Two new reporting requirements in the 2013-2018 Phase II Permit include:
 - Identifying all departments within the City that conduct stormwater-related activities, their roles and responsibilities under the permit, and a current organizational chart with key personnel in the First Year Annual Report (March 31, 2015) (Section S5.A.5.b)
 - Submitting a summary of the review and revision process for incorporating LID principles and LID BMPs into local development codes, rules, standards, and other enforceable documents with the Fourth Year Annual Report (March 31, 2017) (Section S5.C.4.g.ii)

Puget Sound Partnership

The Puget Sound Partnership is a collective effort of citizens, governments, tribes, scientists, and businesses working together to restore and protect the Puget Sound. The governor and legislature requested that the PSP create a strong Action Agenda that leads to a healthy Puget Sound by 2020. As noted above, the Action Agenda produced in December 2008 (and revised in May 2009) prioritizes a variety of actions and policies to be coordinated amongst a broad array of federal, state, local, and tribal agencies and private entities. The 2012 Action Agenda Update identifies three strategic initiatives to guide priorities: prevention of pollution from urban stormwater runoff, protection and restoration of habitat, and recovery of shellfish beds (PSP 2012). Decisions will be based on science, focusing on actions that have the biggest impact, and hold people and organizations accountable for results. The City is located in the South Sound Action Area which includes the following priority action area strategies (PSP 2009):

- A. Protect intact ecosystem processes, structure, and functions
 - Protect high value habitat
 - Update and implement regulatory programs: Shoreline Master Program updates, Critical Area Ordinances
 - Protect and conserve water flows through nutrient removal and expansion of LOTT Alliance water facilities
- B. Restore ecosystem processes, structures, and functions

- Implement priority ecosystem restoration projects (includes implementing Salmon Recovery 3-year work plans for WRIs 11 and 13)
- Support habitat and shoreline restoration efforts in Budd Inlet
- Revitalize waterfront communities

C. Reduce sources of water pollution

- Prevent pollution through coordinated implementation of existing Watershed Action Plans, Shellfish Protection Districts, and other water pollution cleanup plans; implementation of Oakland Bay Sa-Heh-Wa-Mish Initiative and Oakland Bay Water District strategies; reopen shellfish habitat (including Henderson Inlet)
- Manage stormwater runoff by implementing LID strategies and retrofits, and supporting development of local surface water management facilities
- Upgrade and manage wastewater treatment plants (including LOTT and Chamber's Bay treatment facility)
- Manage on-site sewage systems (includes implementing Thurston County's onsite management plans)
- Prioritize in water and upland toxic cleanup sites

D. Work effectively and efficiently together on priority actions

E. Implement the Action Agenda (includes science and monitoring: Implementation of BMPs for geoduck aquaculture and resolution of shoreline use conflicts)

As noted above, the PSP added a list of ecosystem recovery targets in the 2011 Action Agenda Update to aid in the restoration of the Puget Sound by 2020. These targets identify actions that reflect the regions commitment to human health and quality of life, species and food webs, protection of habitats, water body quality and ecosystem health. The following targets have been identified and approved:

- Monitor and improve water quality at swimming beaches
- Maintain summer stream flows
- Monitor water insects (benthic invertebrates) in freshwater as a measure of water quality and ecosystem health
- Improve dissolved oxygen levels by reducing human-related nitrogen contributions
- Reduce toxics in fish to below threshold levels
- Monitor fresh water quality and achieve a decrease in number of impaired [303(d) list] fresh waterbodies in Puget Sound
- Improve salmon-recovery in deltas and estuaries

- Improve quality of marine sediment to meet Sediment Quality Standards set by Washington state
- Restore degraded floodplain areas
- Increase population of wild Chinook salmon
- Monitor shoreline armoring and alterations
- Enhanced operation of on-site sewage systems
- Recover populations of orca whales
- Increase spawning biomass of herring

As noted above, the 2012 Action Agenda identifies three strategic initiatives to guide priorities: prevention of pollution from urban stormwater runoff, protection and restoration of habitat, and recovery of shellfish beds (PSP 2012). The South Sound Action Area identified ecosystem restoration priority strategies that contribute to the strategic initiatives listed above:

- Strategic Initiative: Prevention of pollution from urban stormwater runoff
 - Increase treatment levels at Wastewater Treatment Plants in South Sound
 - Clean up industrially polluted sites according to the State’s Model Toxics Control Act process
 - Complete and Implement Deschutes and Oakland TMDLs
 - Achieve a balance of local, state, and federal funding for implementation of NPDES permit
 - Retrofit non-compliant stormwater systems
 - Support non-NPDES mandated stormwater programs in smaller communities
 - Support Eco-net endorsed education efforts
- Strategic Initiative: Protection and Restoration of Habitat
 - Obtain public ownership of McNeil Island for preservation, restoration and low impact public access
 - Develop and implement South Puget Sound Conservation Plan elements, including high priority actions from restoration plans, habitat action plans, and protection plans
 - Implement top tier projects from the South Sound Watersheds 3-year plan
 - Implement all South Sound nearshore projects described by the Puget Sound Nearshore Estuary Restoration Program’s 10% feasibility list

- Support efforts to partner with railroad on significant shoreline improvements
- Support Shoreline Management Program updates designed to protect existing, functioning drift cells in South Sound
- Strategic Initiative: Recovery of Shellfish Beds
 - Use the results of the Department of Ecology’s South Puget Sound Dissolved Oxygen model to determine sub-basin nutrient reduction targets for South Sound
 - Complete the Eld/Totten/Little Skookum TMDL and implement recommendations
 - Re-open shellfish beds in Henderson, Burley Lagoon, Minter, Oakland Bay, and North Bay.
 - Prevent closure of shellfish beds at Filucy Bay and Rocky Bay
 - Support programs and projects that implement, teach or otherwise encourage best management practices to remove nutrients and/or pathogens from surface waters.
 - Improve operations and maintenance of septic systems
 - Enhance on-site septic repair grant and loan programs
 - Support Eco-net endorsed educational efforts

The City should closely monitor implementation of the Action Agenda, as this may lead to opportunities for grant funding, partnering with other local governments, and assistance with technical guidance that is of interest to the City.

Upcoming State Water Quality Standards

Following is a summary of upcoming revisions to the state water quality standards based on evolving human health criteria, and methods for compliance with the revised standards.

Washington State Surface Water Quality Standards (WAC 173-201A)

Ecology is working on the following updates to the Surface Water Quality Standards (WAC 173-201A) [<http://www.ecy.wa.gov/programs/wq/swqs/Currswqsruleactiv.html>]:

1. Establishing new human health criteria
2. Providing new implementation and compliance tools for dischargers

Prior to adoption of the new final rule, Ecology has implemented a water quality policy forum to educate and obtain feedback from municipal stormwater permittees and other stakeholders on these updates. Presently, Ecology has conducted four of the seven planned policy forums across the state, and expects to publish rule language by December 2013, and adopt the final rule by March 2014.

Human Health Criteria

Washington's surface water quality standards include aquatic life criteria for toxic substances, but lack human health criteria for toxic substances. EPA requested that Washington use new science and information to update the standards with human health criteria for toxic substances to protect people who consume water, fish, and shellfish. Ecology has been using the 1992 National Toxics Rule mandated by EPA for developing 303(d) lists of impaired waters, TMDLs, and discharge permits to protect human health from toxic substance consumption. This rule is outdated and EPA has since recommended national human health criteria for 114 toxic substances [<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>]. These EPA criteria recommend maximum concentrations of toxic substances in surface waters (or fish tissue for methylmercury only) that vary by designated uses of the surface water for protection from consumption of either 1) water and organism (fish/shellfish) or 2) organism only.

Human health criteria for organism (fish/shellfish) consumption are of primary concern for stormwater dischargers. These criteria vary directly with the reference dose (daily intake), relative source contribution (from other sources), and human body weight, vary inversely with the fish consumption rate and bioconcentration factor, and can also vary by the carcinogen risk factor. Criteria adopted by Ecology will likely be lower than the EPA criteria due to the high fish consumption rate of tribal and other populations in Washington State.

Mercury and polychlorinated biphenyls (PCBs) are examples of persistent bioaccumulative toxins that will be most challenging for human health criteria development, and discharge permit compliance because they are commonly associated with 303(d) listings and TMDLs, and largely originate from out-of-state sources of atmospheric deposition. For example, Oregon recently adopted human health criteria in 2011 for methylmercury and PCBs that are 10 times lower than EPA criteria because they are based on a 10 times higher fish consumption rate (175 versus the 17.5 grams per day used for EPA criteria, and compared to only 6.5 grams per day currently used by Washington from the 1992 National Toxics Rule) [<http://www.deq.state.or.us/wq/standards/toxics.htm>]. The majority (74 percent) of current 303(d) listings for freshwater fish tissue are for two carcinogens: PCBs and dichloro-diphenyl-trichloroethane (DDT; including dichlorodiphenyldichloroethylene [DDE] and dichlorodiphenyldichloroethane [DDD] degradation products). Ecology may choose to use a lower risk factor for some carcinogens, such as the risk factor of 10^{-5} used by Great Lakes states versus EPA's and Washington's current risk factor of 10^{-6} , which would increase criteria for carcinogens and possibly negate a decrease from a revised consumption rate.

Implementation and Compliance Tools

New human health criteria may result in lower discharge permit limits that will be challenging for municipalities and industries to achieve. Recognizing this, Ecology is concurrently revising the water quality standards rule to allow permit compliance while toxic substance source control efforts and technologies are improved. At water quality policy forums, Ecology has provided examples of permitting scenarios for various types of dischargers to 303(d) listed or unlisted waterbody segments. These forums include the following response to a question on the potential impact of new human health criteria to municipal stormwater permittees:

“The most immediate impact would likely be additional 303(d) listed waterbody segments as criteria are implemented (under the current 303(d) listing policy). The current permits contain requirements for discharges to 303(d) listed waterbody segments for which TMDL studies have been completed and approved by EPA. These requirements contain a series of actions for permittees to take if the TMDL identifies municipal stormwater discharges as a cause of or contributor to the impairment, and if the actions for the stormwater system go beyond the regular permit requirements. Ecology incorporates them when reissuing the permit, unless there is a compelling reason to bring them in sooner. Actions required in the permits provide a path for permittees to address situations where criteria are exceeded in waters. Permittees that follow this path are not in violation of the permit.”

Initially, increased listings of impaired water body segments would not require additional actions by municipal stormwater permittees unless Ecology determines that stormwater treatment requirements currently defined as AKART in stormwater manuals are no longer protective of water quality. However, new TMDL implementation plans resulting from those listings ultimately may require additional source control, treatment, and monitoring by municipal stormwater permittees.

Adoption of human health criteria is not likely to increase 303(d) listings for conventional, microbial, and inorganic substances because either these parameters do not have human health criteria or the human health criteria are higher than the aquatic life criteria. Exceptions include arsenic that typically exceeds EPA human health criteria but not aquatic life criteria in surface waters, and manganese that often exceeds human health criteria in surface waters and has no aquatic life criteria. Adoption of human health criteria is likely to increase 303(d) listings for some organic chemical substances that are detected in surface waters, and either do not have aquatic life criteria or the human health criteria are lower than the aquatic life criteria, and commonly observed concentrations. Examples (and the associated human health criterion for organism only) include bis(2-ethylhexyl) phthalate (2.2 micrograms per liter [$\mu\text{g}/\text{L}$]), several polycyclic aromatic hydrocarbons (0.018 $\mu\text{g}/\text{L}$), and total PCBs (0.000064 $\mu\text{g}/\text{L}$).

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APPENDIX C

Project Summary Sheets

Project Summary Sheets

This appendix includes summary sheets for stormwater related capital improvement program (CIP) and non-CIP projects. The projects have been developed in order to solve problems that were identified by City staff. The solutions presented in these summary sheets are based on limited design detail. The costs presented here are based on itemized cost estimates that include material quantities and unit prices that were based on similar projects in the region. Unit price sources included the Washington State Department of Transportation Unit Bid analysis web site, unit price data from Seattle Public Utilities, bid tabulations for recent projects in the City and other jurisdictions, and cost estimates obtained from contractors, product vendors, and consultants. These costs are intended to provide an indication of the level of funding needed for implementation for project planning purposes, and should be assessed in greater detail and adjusted as necessary before launching analysis and design of any particular project. The costs estimates incorporate appropriate contingencies to account for uncertainty, the lack of detail in the design, and professional judgment.

The projects are listed in Table C-1 below. Table C-2 below describes special considerations that should be evaluated during future project development. The project summary sheets provided in this appendix include information on the problem, proposed solution, cost estimate assumptions, map, photo, and estimated total project costs.

Table C-1. Capital Improvement Program Projects and Non-Capital Improvement Program Projects.

Project Number	Project Name	Project Cost (2013 dollars)
CIP Projects		
1	Vactor Decant Facility Project	\$456,000
2	Ulery Drainage System Improvements	\$58,000
3	Lacey Boulevard Pipe Replacement	\$53,000
4	Brentwood Stormwater Installation	\$446,000
5	Chambers Lake Stormwater Facility Project	\$2,414,000
6	22nd Avenue SE System Rehabilitation	\$133,000
7	Diamond Stormwater Alternative	\$306,000
8	25th Loop Storm Improvements	\$324,000
9	Clearbrook Drainage System Improvements	\$378,000
10	Homann Area System Rehabilitation	\$406,000
11	1010 Midway Storm Improvements	\$38,000
12	Belair / Impala Stormwater Installation	\$489,000
13	College Regional Stormwater Facility Expansion / Modification	\$4,131,000
14	Alder and Gemini Drainage System Improvements	\$430,000
15	White Fir Stormwater Installation	\$151,000
16	5th Court SE and 5th Way Easement Storm Improvements	\$24,000
17	Shady Lane Treatment Facility Improvements	\$134,000
18	Code Revisions for LID	\$90,000
19	Stormwater Design Manual Update	\$200,000
20	Stormwater Comprehensive Plan Update	\$150,000
21	Hicks Lake to Pattison Lake Conveyance Replacement	\$1,260,000
Non- CIP Projects		
OM1	Rehabilitation of Existing Ruddell Road SE Stormwater Facility	\$50,000
OM2	Rehabilitation of Existing College Street SE at 53rd Avenue SE Ponds	\$50,000
OM3	Rehabilitation of Existing Lakepointe Park Ponds - Compton Pond and Stockton Pond	\$50,000
OM4	Rehabilitation of Existing Fones Road Stormwater Facility	\$50,000
OM5	Rehabilitation of Existing College Regional Stormwater Facility	\$50,000
OM6	Rehabilitation of Existing Woodland Creek/7th Avenue SE Stormwater Facility	\$50,000
OM7-OM11	Annual Stormwater Pond Rehabilitation	\$250,000

Notes:

- 1- OM = Operation and maintenance project
- 2- Chambers Lake Stormwater Facility Project is partially funded by a \$1,000,000 grant from the Department of Ecology.
- 3- Hicks Lake to Pattison Lake Conveyance Replacement Project is funded at the 50 percent level with the other 50 percent coming from Thurston County. Reaching an agreement with Thurston County for 50 percent participation is a condition for beginning design on the project.

Table C-2. Special Considerations to be Evaluated During Future Project Development.

Project Number	Project Name	Considerations
CIP Projects		
1	Vactor Decant Facility Project	
2	Ulery Drainage System Improvements	1. During the design phase, consider an alternative that would divert flow to Woodland Creek stormwater treatment facility as an alternative to directing it to 7th Avenue pond.
3	Lacey Boulevard Pipe Replacement	
4	Brentwood Stormwater Installation	
5	Chambers Lake Stormwater Facility Project	
6	22nd Avenue SE System Rehabilitation	1. Select the porous surfacing option (pavers, concrete, asphalt) during the design phase and consider soliciting input from the community. 2. Construct with College Street SE and 22nd Avenue SE roundabout.
7	Diamond Stormwater Alternative	1. Consider installing duckbill backflow prevention valves and monitoring improvements prior to installation of the pump station.
8	25th Loop Storm Improvements	1. Conduct hydrologic and hydraulic analysis to evaluate alternatives during predesign.
9	Clearbrook Drainage System Improvements	1. Evaluate the potential for shallow or deep infiltration and the potential to improve infiltration and avoid outlet modifications.
10	Homann Area System Rehabilitation	1. Conduct dispersed infiltration testing (PIT tests) in the neighborhood to evaluate potential for neighborhood-scale LID.
11	1010 Midway Storm Improvements	
12	Belair / Impala Stormwater Installation	
13	College Regional Stormwater Facility Expansion / Modification	1. Evaluate relative costs and benefits of Option A and Option B during predesign phase. 2. Construction should begin once expansion and construction of St. Martin's Abbey/ University campus reaches a specific point. 3. Consider modifying the outlet to the facility with a real-time control (RTC) outlet structure to increase detention and reduce construction costs.

Table C-2 (continued). Special Considerations to be Evaluated During Future Project Development.

Project Number	Project Name	Considerations
CIP Projects (continued)		
14	Alder and Gemini Drainage System Improvements	1. Conduct infiltration testing and infiltration alternatives evaluation during the predesign.
15	White Fir Stormwater Installation	1. Designer should evaluate whether the outlet pipe under Ruddell Road SE needs replacing. 2. It appears that the infiltration pond isn't draining because of high groundwater, rather than clogged soils. Designer should consider converting the infiltration pond into a wetland.
16	5th Court SE and 5th Way Easement Storm Improvements	
17	Shady Lane Treatment Facility Improvements	
18	Code Revisions for LID	
19	Stormwater Design Manual Update	
20	Stormwater Comprehensive Plan Update	
21	Hicks Lake to Pattison Lake Conveyance Replacement	1. Further evaluate fish passability requirements with WDFW consultation. 2. Preliminary evaluation indicates that the pipe condition may be too degraded for sliplining or cured in place pipe lining of existing culvert; however, designer should reconfirm. 3. Coordinate with Thurston County for inter-jurisdictional support.
Non-CIP Projects		
OM1	Rehabilitation of Existing Ruddell Road SE Stormwater Facility	
OM2	Rehabilitation of Existing College Street SE at 53rd Avenue SE Ponds	
OM3	Rehabilitation of Existing Lakepointe Park Ponds - Compton Pond and Stockton Pond	
OM4	Rehabilitation of Existing Fones Road Stormwater Facility	
OM5	Rehabilitation of Existing College Regional Stormwater Facility	

Table C-2 (continued). Special Considerations to be Evaluated During Future Project Development.

Project Number	Project Name	Considerations
OM6	Rehabilitation of Existing Woodland Creek/7th Avenue SE Stormwater Facility	
OM7	Annual Stormwater Pond Rehabilitation	



Capital Improvement Program Project Summary Sheet

Stormwater Project: **1**

Project Name: Vactor Decant Facility Project

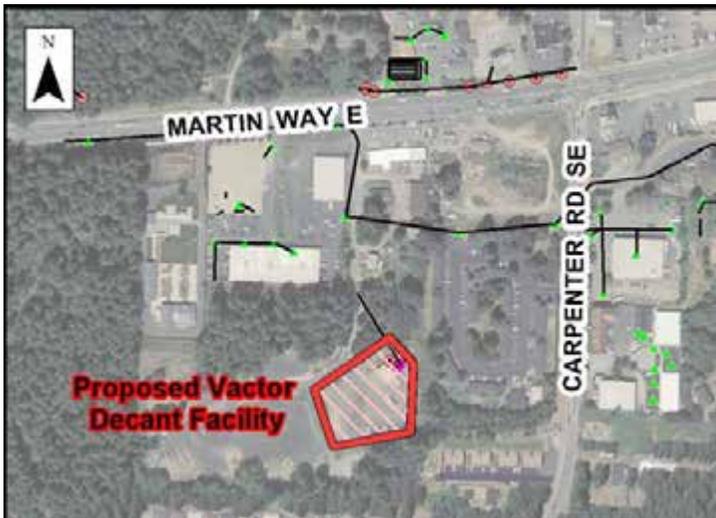
Location: 6245 Martin Way East

Problem Description: A portion of the site is being used as a vactor decant station. This project will enhance the function of current operations by improving pollutant and debris removal.

Project Solution: Constructions of a sloped concrete pad with roof structure, drainage system, storage tanks and piping. The concrete pad will serve as a surface for wet debris collected by Vactor trucks during maintenance of the municipal storm drainage system. Decant water will drain to the storage tanks for settling and discharge to an on-site sanitary sewer.

Cost Estimate Assumptions: 2500 square foot concrete pad, roof structure, six 5,000 gallon settling tanks, associated piping and structures.

Project Priority High



Project sketch



Existing vactor decant station

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Pre-design	0											
Design	40,000	40,000										
Construction	348,500		362,440									
Permitting	0											
CM (Incl. Insp.)	61,500		63,960									
City PM	6,000	6,000										
TOTAL EXPENSES	456,000	46,000	426,400									

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 2

Project Name: Ulery Drainage System Improvements

Location: 7th Ave SE and Ulery St SE

Problem Description: Lack of drainage infrastructure in this area is causing nuisance flooding of the roadway and shoulder. Stormwater sheet flows north on Ulery St SE and ponds at the intersection with 7th Ave SE. There is also nuisance flooding of driveways due to sheet flow along the north edge of 7th Ave SE.

Project Solution: Install new catch basins at the intersection of Ulery St SE and 7th Ave SE. Connect to existing storm drain system.

Cost Estimate Assumptions: 80 LF of 12 In Dia SD, 3 CB Type 1, 1 CB Type 2 tying into existing SD.

Project Priority High



Project sketch



7th Ave SE, facing east at the intersection with Ulery St SE.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Pre-design	3,000	3,000										
Design	10,000	10,000										
Construction	33,000	33,000										
Permitting	5,000	5,000										
CM (Incl. Insp.)	5,000	5,000										
City PM	2,000	2,000										
TOTAL EXPENSES	58,000	58,000										

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 3

Project Name: Lacey Boulevard Pipe Replacement

Location: Lacey Boulevard SE at Alder St SE

Problem Description: An existing storm drain pipe is crushed and causes frequent flooding of a major roadway.

Project Solution: Replace the crushed pipe in Lacey Blvd.

Cost Estimate Assumptions: 40 LF 12 In Dia SD, 1 CB Type 2, 1 CB Type 1

Project Priority: High



Project sketch



Lacey Blvd SE at intersection with Alder St SE.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	2,000											
Design	15,000					17,548						
Construction	26,000						31,633					
Permitting	5,000					5,849						
CM (Incl. Insp.)	4,000						4,867					
City PM	1,000					1,170						
TOTAL EXPENSES	53,000					26,907	36,500					

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 4

Project Name: Brentwood Stormwater Installation

Location: Brentwood Dr SE

Problem Description: Lack of drainage infrastructure in this area is causing nuisance flooding. All stormwater runoff flows overland towards Ruddell Rd SE causing chronic flooding on residential streets and in some driveways. Flooding is most significant at the downstream end of the neighborhood. Drainage infrastructure is needed in this neighborhood.

Project Solution: Install storm drain along Brentwood Dr SE to convey stormwater to Ruddell Road Stormwater Treatment Facility.

Cost Estimate Assumptions: 3,040 LF of 12 In Dia SD, 14 CB Type 1, 8 Rehab Drywell, 7 connection to existing drainage structure.

Project Priority High/Moderate



Project sketch



2011 flooding along Brentwood Dr SE at entrance to Wonderwood Park.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	25,000		26,000									
Design	46,000		47,840									
Construction	309,000			334,214								
Permitting	5,000		5,200									
CM (Incl. Insp.)	46,000			49,754								
City PM	15,000		15,600									
TOTAL EXPENSES	446,000		94,640	383,968								

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 5

Project Name:	Chambers Lake Stormwater Facility Project
Location:	Northeast side of Chambers Lake between Lakeview Drive SE and 26th Loop SE
Problem Description:	Chambers Lake has been classified as eutrophic and this is the largest untreated stormwater outfall to Chambers Lake. The City proposes constructing a stormwater treatment wetland to improve stormwater quality entering Chambers Lake and create habitat and recreational amenity.
Project Solution:	Treatment wetland integrated into the Chambers Lake Natural Area. The wetland will remove up to 61% of total suspended solids and 92% of total phosphorus from the stormwater outfall and may be conducted in coordination with a future road project and a future sewer upgrade.
Cost Estimate Assumptions:	5.85 acre stormwater treatment wetland including habitat features. See Design Report prepared by ENTRANCO in 1995 and Predesign Report prepared by Herrera in 2013.
Project Priority	High/Moderate



Project sketch



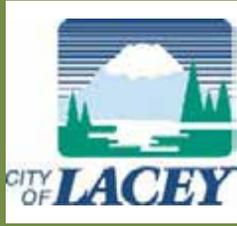
Existing foot path through the future constructed wetland area.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	0											
Design	175,000	175,000										
Construction	1,854,000		1,757,600	177,382								
Permitting	40,000	40,000										
CM (Incl. Insp.)	180,000		159,120	29,203								
City PM	105,000	26,000	55,120	28,122								
TOTAL EXPENSES	2,414,000	169,000	2,109,120	234,707								

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 6

Project Name: 22nd Ave SE System Rehabilitation

Location: 22nd Ave SE between College St SE and Golf Club Rd SE

Problem Description: Three existing drywells are no longer functioning and causing flooding on several properties. Ponded water extends up to the front steps of residences. However, residents don't want to sacrifice parking for open conveyance or bioretention facilities.

Project Solution: Manage stormwater onsite using permeable pavers for 360 LF on the east side of 22nd Ave SE between Golf Club Rd SE and College St SE. Install pavers between existing asphalt road edge and sidewalk. This solutions manages stormwater while preserving current parking uses. Also install pipe on the northeast end of 22nd Ave SE to connect existing drainage pathway to the existing catch basin in College St SE.

Cost Estimate Assumptions: 3,600 SF of permeable pavers with 1 ft thick storage coarse, 50 LF 12 In Dia SD, 1 connection to existing CB.

Project Priority Moderate



Project sketch



Road shoulder for permeable paver installation between roadway and sidewalk.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Pre-design	10,000					11,699						
Design	15,000					17,548						
Construction	86,000						104,632					
Permitting	5,000					5,849						
CM (Incl. Insp.)	13,000						15,816					
City PM	4,000					4,679						
TOTAL EXPENSES	133,000					39,775	120,449					

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: **7**

Project Name: Diamond Stormwater Alternative

Location: Diamond Road SE, between intersections with Diamond Loop SE

Problem Description: Stormwater at this location is pumped away during extreme storm events (i.e. every couple years). An alternative solution is needed that would manage stormwater without pumping it away.

Project Solution: Install backflow preventers on 2 existing storm drain outfalls to pond. Install a new storm pump station adjacent to the sanitary sewer pump station on Diamond Loop SE, a force main to convey flow to the stormwater outfalls, and a filtration system at the pump station inlet to provide water quality treatment.

Cost Estimate Assumptions: 24 In Tideflex valve, 18 In Tideflex valve, submersible 350 gpm pump station, 170LF 4 In Dia force main discharging adjacent to existing outfall pipe.

Project Priority Moderate



Project sketch



Existing 24 In Dia outfall to pond where the Tideflex valve would be installed.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	25,000					29,246						
Design	15,000					17,548						
Construction	180,000						218,998					
Permitting	50,000					58,493						
CM (Incl. Insp.)	27,000						32,850					
City PM	9,000					10,529						
TOTAL EXPENSES	306,000					115,816	251,847					

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 8

Project Name: 25th Loop Storm Improvements

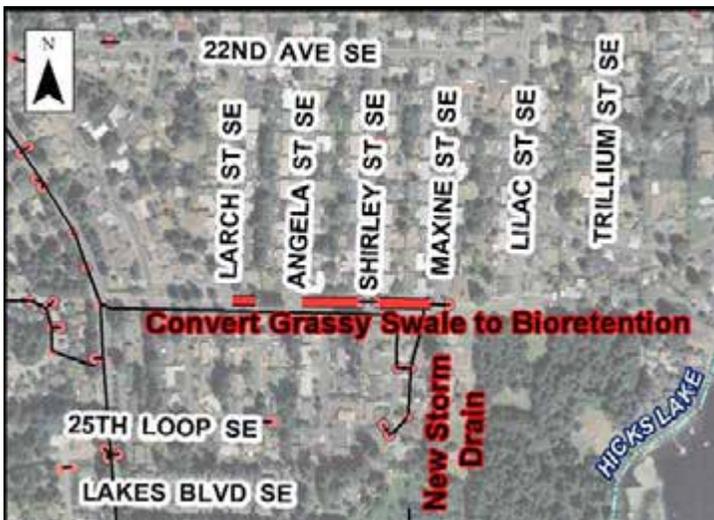
Location: 25th Ave SE and 25th Loop SE

Problem Description: Drainage from neighborhood to the north overflows to 25th Loop SE and the outlet of this basin has been partially blocked by a private driveway. A stormwater pump station has been installed but requires frequent maintenance so a better long term solution is needed.

Project Solution: Convert 500 linear feet of existing grassy swale to bioretention facilities. Install new storm drain from the existing pump station location southward, across private property, to an existing depression.

Cost Estimate Assumptions: 3 bioretention facilities, miscellaneous right of way improvements, 540 LF of 12 In Dia SD.

Project Priority Moderate



Project sketch



Shirley St SE right of way for potential retrofit.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Pre-design	30,000						36,500					
Design	40,000						48,666					
Construction	208,000							263,182				
Permitting	5,000						6,083					
CM (Incl. Insp.)	31,000							39,225				
City PM	10,000						12,167					
TOTAL EXPENSES	324,000						103,415	302,411				

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 9

Project Name:	Clearbrook Drainage System Improvements
Location:	South of Lacey Blvd between Clearbrook Dr SE and Yonkers Dr SE
Problem Description:	The aging storm drain in this area has limited slope and there is no fall between the storm drain outlets and Clearbrook Pond. The system frequently gets backwatered, causes street flooding, and threatens to flood one house during any significant rain event.
Project Solution:	Lower invert of pond outlet and increase pipe size (larger pipe at reduced slope). Excavate a linear swale around the perimeter to provide adequate fall for the pipes and install two pedestrian bridges. Add an upstream infiltration facility in 19th Ct NE with stormwater treatment.
Cost Estimate Assumptions:	850 LF grass lined swale, 520 LF 18 In Dia SD, 175 LF 48 In Dia infiltration gallery, stormwater filter system with high flow bypass.
Project Priority	Moderate



Project sketch



Clearbrook pond. Looking from the western inlet towards the outlet. Swale would be constructed at the grade break.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	20,000						24,333					
Design	35,000						42,583					
Construction	265,000							335,305				
Permitting	5,000						6,083					
CM (Incl. Insp.)	40,000							50,613				
City PM	13,000						15,816					
TOTAL EXPENSES	378,000						88,816	385,922				

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: **10**

Project Name:	Homann Area System Rehabilitation
Location:	Homann Dr SE and 17th Ave SE to Glen Mary Drive SE and Homann Park
Problem Description:	Drywells and infiltration trenches in this area are no longer functioning and causing localized nuisance flooding.
Project Solution:	Install 10 new bioretention facilities in the right of way to enhance local infiltration and take advantage of high infiltrating soils in the area.
Cost Estimate Assumptions:	Construct 10 bioretention facilities, connect to existing infiltration trenches to maximize infiltration potential.
Project Priority	Moderate



Project sketch



Potential bioretention facility location.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	60,000						72,999					
Design	80,000						97,332					
Construction	217,000							274,570				
Permitting	5,000						6,083					
CM (Incl. Insp.)	33,000							41,756				
City PM	11,000						13,383					
TOTAL EXPENSES	406,000						189,798	316,330				

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 11

Project Name: 1010 Midway Storm Improvements

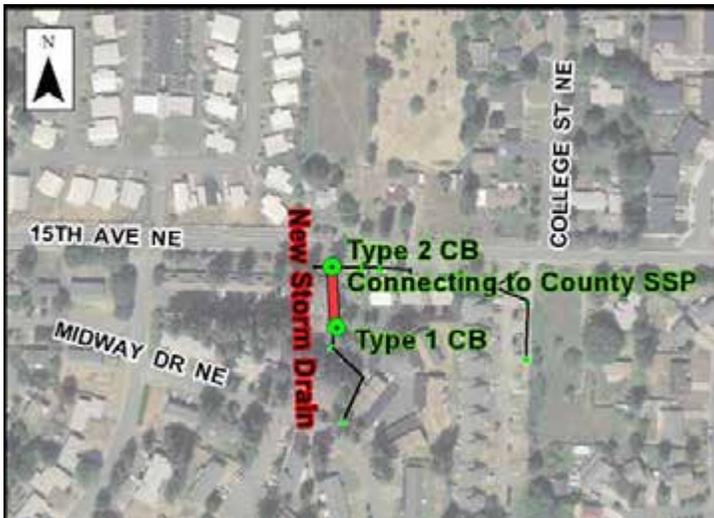
Location: Midway Dr NE and 15th Ave NE

Problem Description: A clogged storm drain pipe and blind connection into the County storm drain is causing flooding.

Project Solution: Replace a portion of the existing storm drain pipe and install new catch basins at both ends.

Cost Estimate Assumptions: 100 LF of 12 In Dia SD, 1 CB Type 1, 1 CB Type 2.

Project Priority Moderate



Project sketch



Existing catch basin in right of way along 15th Ave NE near Midway Dr NE.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Pre-design	3,000						3,650					
Design	10,000						12,167					
Construction	21,000							26,571				
Permitting	0											
CM (Incl. Insp.)	3,000							3,796				
City PM	1,000						1,217					
TOTAL EXPENSES	38,000						17,033	30,368				

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 12

Project Name: Belair / Impala Stormwater Installation

Location: Impala Dr SE, 32nd Ave SE

Problem Description: Lack of drainage infrastructure in this area is causing nuisance flooding. All stormwater runoff flows overland towards Wonderwood Park causing chronic flooding on residential streets and in some driveways. Flooding is most significant at the downstream end of the neighborhood. Drainage infrastructure is needed in this neighborhood.

Project Solution: Install storm drain along Impala Dr SE and 32nd Ave SE to convey stormwater to Ruddell Road Stormwater Treatment Facility.

Cost Estimate Assumptions: 3,360 LF of 12 In Dia SD, 22 CB Type 1, 4 connection to existing drainage structures.

Project Priority Moderate



Project sketch



2012 flooding at the intersection of Impala Dr SE and 32nd Ave SE.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	25,000							31,633				
Design	51,000							64,531				
Construction	340,000								447,417			
Permitting	5,000							6,327				
CM (Incl. Insp.)	51,000								67,113			
City PM	17,000							21,510				
TOTAL EXPENSES	489,000							124,001	514,529			

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 13

Project Name: College Regional Stormwater Facility Expansion / Modification

Location: College Regional Stormwater Facility at St. Martin's Abbey/University

Problem Description: Under a 2008 agreement between the City and St. Martin's Abbey/University, the City is required to modify the facility to accommodate additional flow from the University resulting from campus growth and improvements. The facility outfall may require improvements to accommodate additional flow.

Project Solution: Construct a new storm drain from College Regional Stormwater Facility to Woodland Creek. Option A would reroute the flow path to the eastward down an alignment that slopes correctly, but does not currently connect. Option B would route flow under Martin Way and northward.

Cost Estimate Assumptions: Assumes solution moves forward with Option A and will require 4,500 LF of 42 In Dia SD.

Project Priority Moderate



Project sketch



College Regional Stormwater Facility.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	51,000								67,113			
Design	310,000								407,939			
Construction	3,100,000									2,121,282	2,206,133	
Permitting	50,000								65,797			
CM (Incl. Insp.)	465,000									318,192	330,920	
City PM	155,000								203,969			
TOTAL EXPENSES	4,131,000								744,817	2,439,474	2,537,053	

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 14

Project Name: Alder and Gemini Drainage System Improvements

Location: Alder St SE and Gemini St SE, south of Lacey Boulevard SE,

Problem Description: Lack of drainage infrastructure along Alder St and Gemini St causing frequent nuisance flooding.

Project Solution: Rehab existing drywells, install new storm drain to convey stormwater to new infiltration galleries in community open space, and an overflow from the infiltration facility to the storm drain in Lacey Blvd.

Cost Estimate Assumptions: 1,185 LF 12 In Dia SD, 5 con. to ex. drainage str., 4 drywell rehabs, 1 high flow bypass, 1 stormwater filter, 1 drywell retrofit with stormwater filter, 4 CB Type 1, 200 LF 48 In Dia infiltration gallery in open space.

Project Priority Low



Project sketch



Alder St SE near intersection with Gemini St SE.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	22,000										31,313	
Design	45,000										64,049	
Construction	298,000											441,113
Permitting	5,000										7,117	
CM (Incl. Insp.)	45,000											66,611
City PM	15,000										21,350	
TOTAL EXPENSES	430,000										123,828	507,724

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 15

Project Name: White Fir Stormwater Installation

Location: White Fir Drive NE

Problem Description: Lack of drainage infrastructure in this area is causing nuisance flooding.

Project Solution: Install new permeable gravel shoulder with underdrain pipe on north and south shoulders of White Fir Dr NE. Connect underdrain to existing storm drain system. Existing system discharges to infiltration area that is functioning well.

Cost Estimate Assumptions: 1,400 LF of permeable gravel shoulder (700 LF on both sides of road) 10 ft wide, 1,400 LF 8 In Dia Underdrain Pipe, repair 15 driveway aprons. 4 connections to existing drainage structures.

Project Priority Low



Project sketch



White Fir Dr NE in project area.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	3,000											4,441
Design	15,000											22,204
Construction	107,000											158,386
Permitting	5,000											7,401
CM (Incl. Insp.)	16,000											23,684
City PM	5,000											7,401
TOTAL EXPENSES	151,000											223,517

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 16

Project Name: 5th Ct SE and 5th Way Easement Storm Improvements

Location: North of 5th Way SE and west of 5th Ct SE.

Problem Description: Pipes/ structures in backyard area creating a maintenance problem because access is limited.

Project Solution: Construct channelized inverts in the bottom of existing CB's to enable jetting of pipes as needed for maintenance. Will also require increased maintenance of upstream and downstream structures.

Cost Estimate Assumptions: Modify 4 CB Type 2 by filling sumps with cement concrete and installing channelized inverts.

Project Priority Low



Project sketch



Existing easement and catch basin rim.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Pre-design	0											
Design	0											
Construction	20,000											29,605
Permitting	0											
CM (Incl. Insp.)	3,000											4,441
City PM	1,000											1,480
TOTAL EXPENSES	24,000											35,526

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 17

Project Name:	Shady Lane Treatment Facility Improvements
Location:	Shady Lane Road SE and Sierra Drive SE
Problem Description:	A large amount of sediment has accumulated in the wet pond and needs to be removed. High water levels have resulted in backwatering but no flooding. The outfall to the lake has become partially obstructed with sediment and needs to be dredged out and modified to make it easy to maintain.
Project Solution:	Remove sediment and vegetation. Revegetate in accordance with the Lacey Stormwater Design Manual. Install maintenance access, install structure at inlet to reduce sediment buildup, install low-maintenance outlet structure.
Cost Estimate Assumptions:	Remove 2' of accumulated sediment from the wet pond, replant 0.2 acres, replace outfall, install hydrodynamic separator upstream.
Project Priority	Moderate



Project sketch



Shady Lane Treatment Facility.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	5,000				5,624							
Design	20,000				22,497							
Construction	78,000				87,739							
Permitting	15,000				16,873							
CM (Incl. Insp.)	12,000				13,498							
City PM	4,000				4,499							
TOTAL EXPENSES	134,000				150,732							

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: **18**

Project Name: Code Revisions for LID

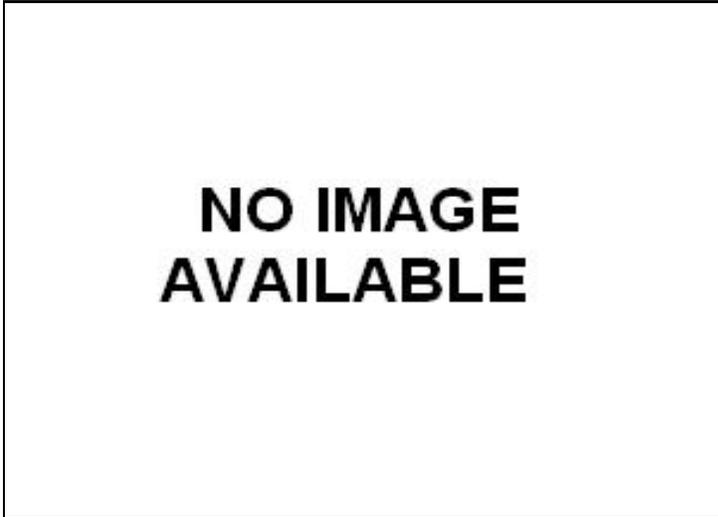
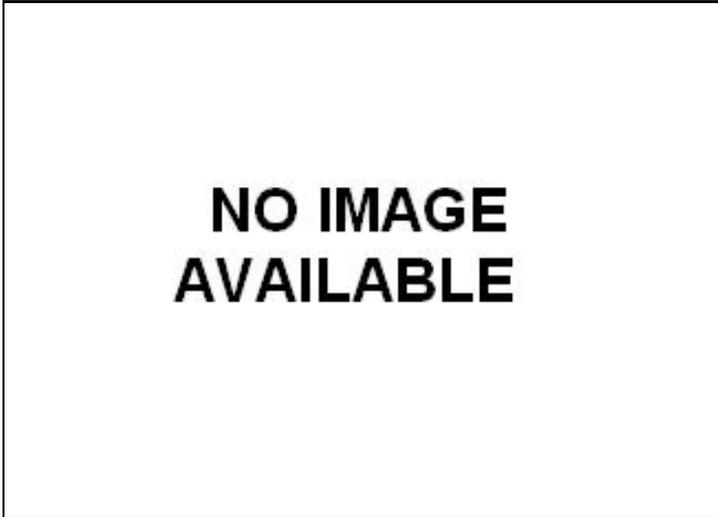
Location: NA

Problem Description: The City is required to review, revise, and make effective local development-related codes, rules, standards, and other enforceable documents to incorporate and require Low Impact Development (LID) principles and LID Best Management Practices (BMPs) by December 31, 2016, per Section S5.C.4.f of the 2013-2018 NPDES Phase II permit.

Project Solution: The City will need to review and update additional codes, rules, standards, and enforceable documents to incorporate LID principals and LID BMPs.

Cost Estimate Assumptions: See Appendix D.

Project Priority Mandatory



Project sketch

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Pre-design	0											
Design	0											
Construction	0											
Permitting	0											
CM (Incl. Insp.)	0											
City PM	0											
TOTAL EXPENSES	90,000			43,264	56,243							

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: **19**

Project Name: Stormwater Design Manual Update

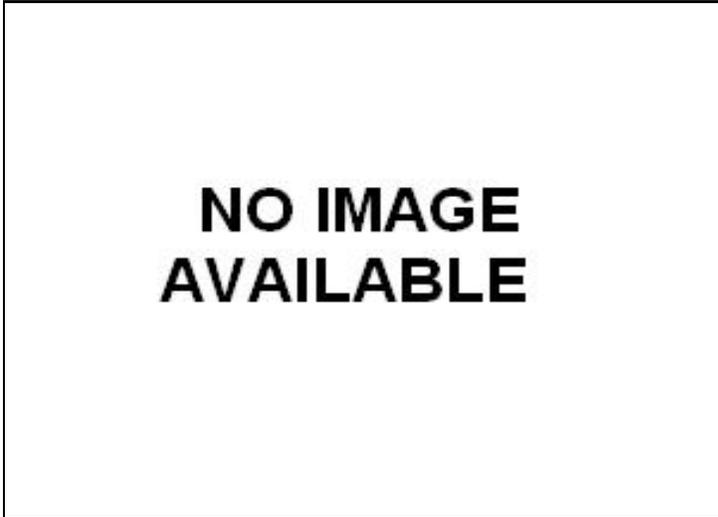
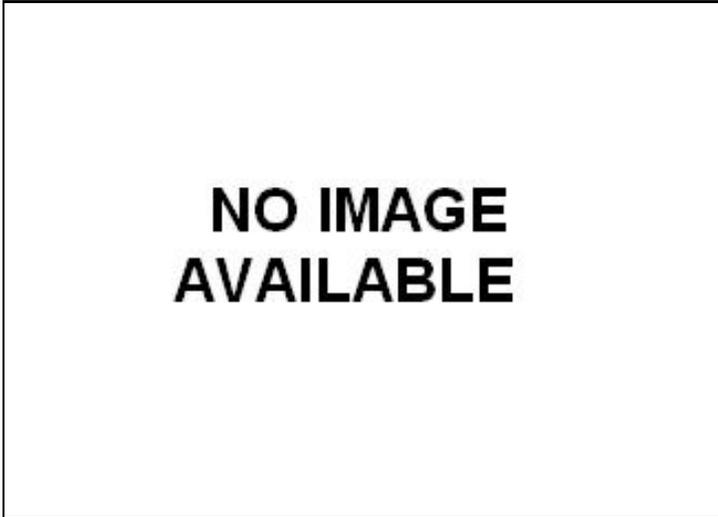
Location: NA

Problem Description: The 2013- 2018 NPDES Phase II Permit requires the City to implement a stormwater manual that is technically equivalent to Ecology's 2012 Stormwater Manual by December 31, 2016.

Project Solution: The 2010 Stormwater Design Manual will need to be updated to meet this requirement.

Cost Estimate Assumptions: See Appendix D.

Project Priority Mandatory



Project sketch

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Pre-design	0											
Design	0											
Construction	0											
Permitting	0											
CM (Incl. Insp.)	0											
City PM	0											
TOTAL EXPENSES	200,000		41,600	86,528	89,989							

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 20

Project Name: Stormwater Comprehensive Plan Update

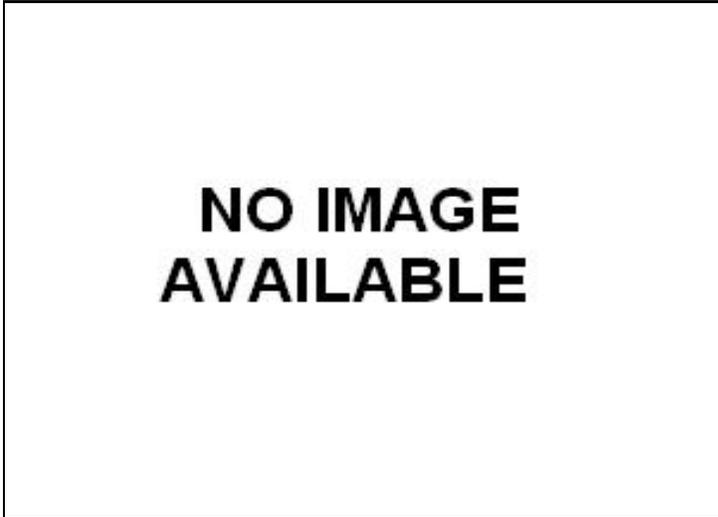
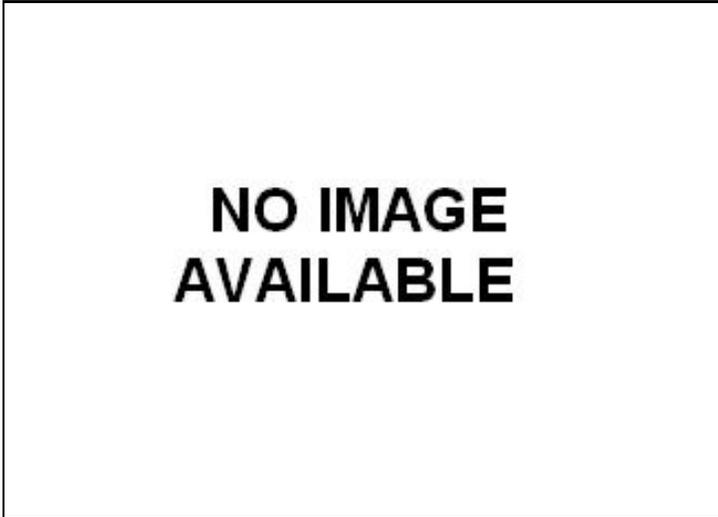
Location: NA

Problem Description: The growth management act requires Cities to periodically update their comprehensive plan, of which the Stormwater Comprehensive Plan (SCP) is a part. Ecology plans to update the 2013-2018 Phase II Permit for the next permit cycle (2018-2023).

Project Solution: The City will need to update the SCP to reflect the 2018 updates to the Phase II Permit. The SCP will build on the City's existing stormwater management program and known stormwater problems to ensure that the stormwater infrastructure, policies, and funding mechanisms will meet the City's stormwater management needs for the 2018-2023 permit cycle.

Cost Estimate Assumptions: See Appendix D.

Project Priority: Routine



Project sketch

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	0											
Design	0											
Construction	0											
Permitting	0											
CM (Incl. Insp.)	0											
City PM	0											
TOTAL EXPENSES	150,000					11,699	85,166	88,572				

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: 21

Project Name: Hicks Lake to Pattison Lake Conveyance Replacement

Location: North of Mullen Rd. between Hicks Lake and Pattison Lake

Problem Description: Existing 400' long culvert is collapsing. The condition of the pipe may make repair impossible / uneconomical and conditions of the hydraulic project approval may require the solution to meet WDFW water crossing design guidelines. The culvert has the potential to flood homes within city limits if it collapses.

Project Solution: Work with Thurston County to construct a new fish passable channel and culvert on new alignment to the north, extend existing stream channel to meet new pipe channel, and fill existing pipe with CDF.

Cost Estimate Assumptions: 350 LF of stream channel, 50 LF by 15 ft wide fish passable 3-sided concrete box culvert, 300 LF of stream channel modification and enhancement, CDF for existing 400 LF pipe. Summary sheet includes total cost.

Project Priority High



Project sketch



Culvert inlet backwater conditions.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	40,000		41,600									
Design	100,000		104,000									
Construction	900,000			973,440								
Permitting	40,000		41,600									
CM (Incl. Insp.)	135,000			146,016								
City PM	45,000		46,800									
TOTAL EXPENSES	1,260,000		234,000	1,119,456								

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: **OM1**

Project Name: Rehabilitation of Existing Ruddell Road SE Stormwater Facility

Location: Ruddell Road SE at 45th Ave Park

Problem Description: A large amount of sediment has accumulated in the wet pond and needs to be removed. The outlet is prone to clogging and needs to be replaced or modified.

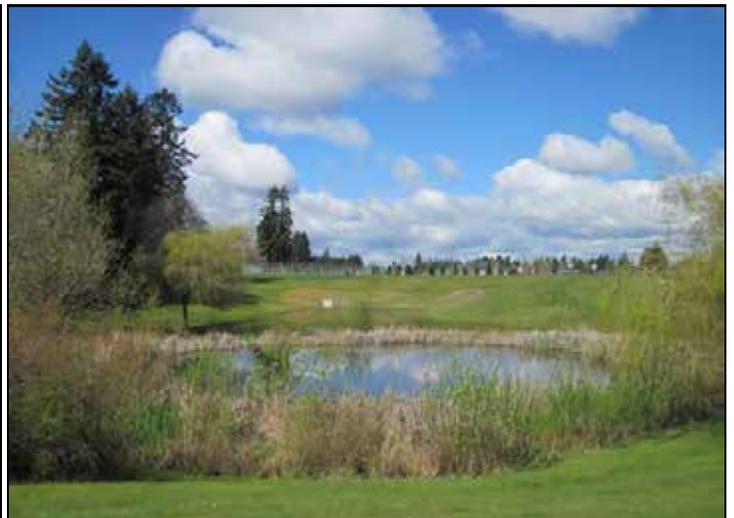
Project Solution: Remove sediment and vegetation. Replant in accordance with the Lacey Stormwater Design Manual. Modify or replace outlet to prevent clogging.

Cost Estimate Assumptions: Perform pond rehabilitation in-house for under \$50,000.

Project Priority: Routine



Project sketch



Ruddell Road SE Stormwater Facility. Wet pond in foreground.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	0											
Design	0											
Construction	50,000	50,000										
Permitting	0											
CM (Incl. Insp.)	0											
City PM	0											
TOTAL EXPENSES	50,000	50,000										

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: **OM2**

Project Name: Rehabilitation of Existing College St SE at 53rd Ave SE Ponds

Location: College St SE at 53rd Ave SE

Problem Description: A large amount of sediment has accumulated in the wet pond and needs to be removed.

Project Solution: Remove sediment and replant in accordance with the Lacey Stormwater Design Manual.

Cost Estimate Assumptions: Perform pond rehabilitation in-house for under \$50,000.

Project Priority: Routine



Project sketch



College St SE at 53rd Ave Pond.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	0											
Design	0											
Construction	50,000		52,000									
Permitting	0											
CM (Incl. Insp.)	0											
City PM	0											
TOTAL EXPENSES	50,000		52,000									

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: **OM3**

Project Name: Rehabilitation of Existing Lakepointe Park Ponds - Compton Pond and Stockton Pond

Location: Lakepointe Park

Problem Description: A large amount of sediment has accumulated in the wet ponds and needs to be removed. Water levels in the ponds are too high and cause backwater and occasional flooding in the upstream pipe network.

Project Solution: Remove sediment and replant in accordance with the Lacey Stormwater Design Manual.

Cost Estimate Assumptions: Perform pond rehabilitation in-house for under \$50,000.

Project Priority: Routine



Project sketch



Stockton Wet pond with infiltration area in field beyond.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Pre-design	0											
Design	0											
Construction	50,000			54,080								
Permitting	0											
CM (Incl. Insp.)	0											
City PM	0											
TOTAL EXPENSES	50,000			54,080								

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: **OM4**

Project Name: Rehabilitation of Existing Fones Road Stormwater Facility

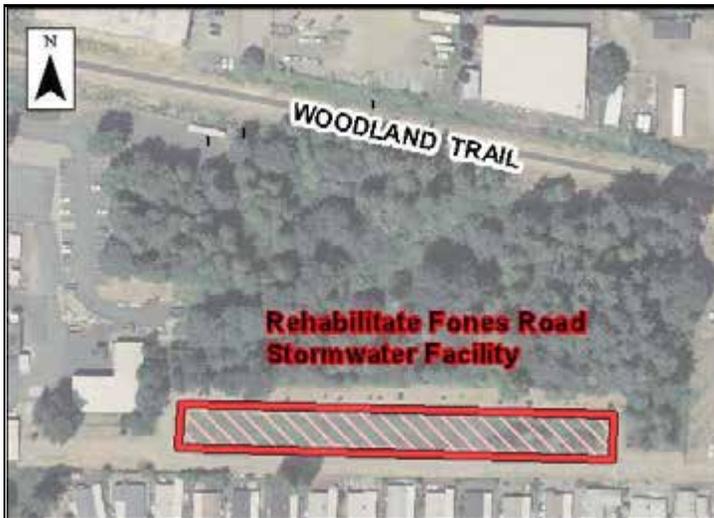
Location: E. of Fones Road at 12th Ave SE

Problem Description: Remove sediment & vegetation from wet ponds.

Project Solution: Remove sediment and replant in accordance with the Lacey Stormwater Design Manual.

Cost Estimate Assumptions: Perform pond rehabilitation in-house for under \$50,000.

Project Priority: Routine



Project sketch



Fones Road Stormwater Facility

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Pre-design	0											
Design	0											
Construction	50,000				56,243							
Permitting	0											
CM (Incl. Insp.)	0											
City PM	0											
TOTAL EXPENSES	50,000				56,243							

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: **OM5**

Project Name: Rehabilitation of Existing College Regional Stormwater Facility

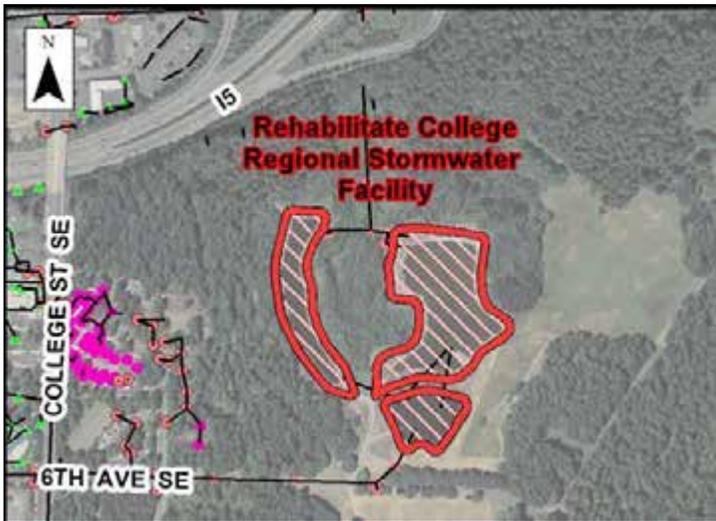
Location: College Regional Stormwater Facility at St. Martin's Abbey/University

Problem Description: Remove sediment & vegetation from wet pond.

Project Solution: Remove sediment and replant in accordance with the Lacey Stormwater Design Manual.

Cost Estimate Assumptions: Perform pond rehabilitation in-house for under \$50,000.

Project Priority: Routine



Project sketch



College Regional Stormwater Facility.

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	0											
Design	0											
Construction	50,000					58,493						
Permitting	0											
CM (Incl. Insp.)	0											
City PM	0											
TOTAL EXPENSES	50,000					58,493						

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: **OM6**

Project Name: Rehabilitation of Existing Woodland Creek/7th Avenue SE Stormwater Facility

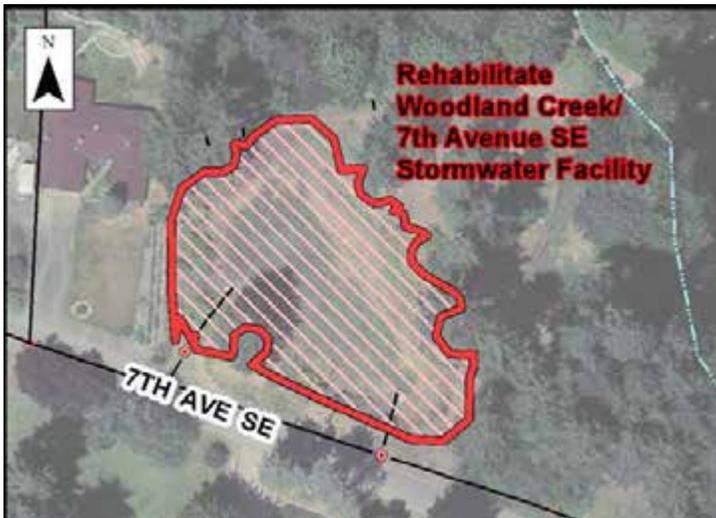
Location: 7th Ave SE and Ulery St SE

Problem Description: Remove sediment & vegetation from wet pond.

Project Solution: Remove sediment and replant in accordance with the Lacey Stormwater Design Manual.

Cost Estimate Assumptions: Perform pond rehabilitation in-house for under \$50,000.

Project Priority: Routine



Project sketch



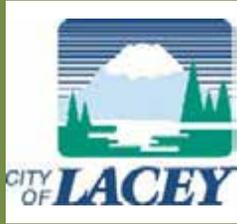
Woodland Creek/ 7th Avenue SE Stormwater Facility

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Predesign	0											
Design	0											
Construction	50,000						60,833					
Permitting	0											
CM (Incl. Insp.)	0											
City PM	0											
TOTAL EXPENSES	50,000						60,833					

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way



Capital Improvement Program Project Summary Sheet

Stormwater Project: **OM7-OM11**

Project Name: Annual Stormwater Pond Rehabilitation

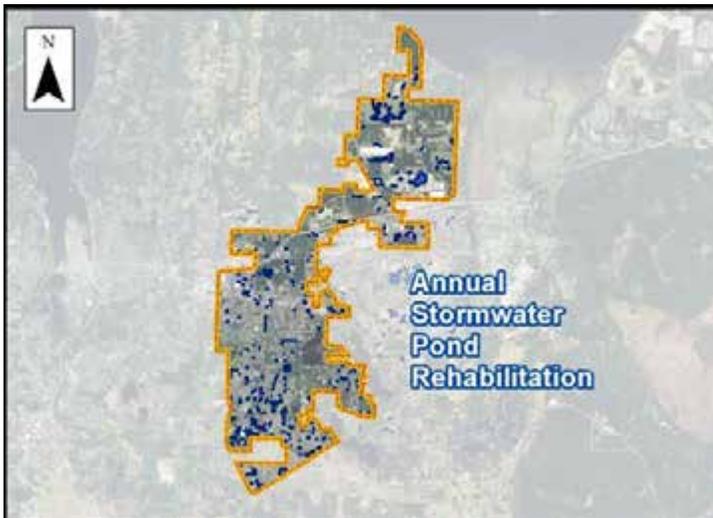
Location: City-wide

Problem Description: Stormwater ponds throughout the City collect sediment and other debris over time reducing their water quality treatment effectiveness, contributing to water quality degradation and clogging of downstream systems, and leading to flooding problems.

Project Solution: Annually rehabilitate one or more stormwater ponds. Remove sediment and replant in accordance with the Lacey Stormwater Design Manual.

Cost Estimate Assumptions: Perform pond rehabilitation in-house for under \$50,000.

Project Priority: Routine



Project sketch



Ruddell Road SE Stormwater Facility (example of stormwater pond in need of rehabilitation).

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Pre-design	0											
Design	0											
Construction	250,000							63,265	65,797	68,428	71,166	74,012
Permitting	0											
CM (Incl. Insp.)	0											
City PM	0											
TOTAL EXPENSES	250,000							6,327	65,797	68,428	71,166	74,012

1. Total costs are in 2013 dollars.

2. Future expenses reflect the following annual inflation rates: 2013 0%; 2014 - 2023 4% per year

Abbreviations: CB-catch basin; SD-storm drain; LF-linear feet; Dia-diameter; CDF-controlled density fill; rehab-rehabilitate; ROW-right-of-way

APPENDIX D

Project Cost Estimates

CLIENT: City of Lacey

PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 1 - Vactor Decant Facility Project

Prepared by: M. Fontaine

Checked by: M. Brennan

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Construction (incl. construction mgmt).			LS	\$410,000	
OTHER PROJECT COSTS					
Construction			LS	\$348,500	
Construction Management			15%	\$61,500	
Design			LS	\$40,000	
City of Lacey Project Management			LS	\$6,000	
Total Estimated Project Cost:				\$456,000	
Grant Amount			75%	\$342,000	
Cost to Lacey:				\$114,000	

CLIENT: City of Lacey
 PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 2 - Utery Drainage System Improvements

Prepared by: M. Fontaine
 Checked by: M. Brennan

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Removing Asphalt Conc. Pvmt., Incl. Haul	31	SY	\$30	\$930	SPU 2007 unit cost report
Structure Excavation Class B, Incl. Haul	51	CY	\$50	\$2,550	WSDOT UBA and City of Lacey recent bids. High end for small qty.
Bank Run Gravel for Trench Backfill	6	CY	\$100	\$600	City of Lacey recent bids. High end for small qty.
Crushed Surfacing, Base Course	10	TN	\$100	\$1,000	City of Lacey recent bids. High end for small qty.
HMA for Pavement Repair	13	TN	\$200	\$2,600	WSDOT UBA and City of Lacey recent bids. High end for small qty.
Catch Basin Type 1	3	EA	\$1,000	\$3,000	WSDOT UBA and City of Lacey recent bids.
Catch Basin Type 2	1	EA	\$3,000	\$3,000	WSDOT UBA and City of Lacey recent bids.
Schedule A SSP, 12 In. Dia.	80	LF	\$35	\$2,800	City of Lacey recent bids. High end for small qty.
TOTAL DIRECT COSTS:				\$16,500	
MARKUPS					
Mobilization			8%	\$1,320	
Temporary Erosion and Sediment Control			5%	\$825	Manage stockpiles.
Temporary Dewatering			10%	\$1,650	Minor trench dewatering. No bypass pumping - complete work in the dry.
Traffic Control			10%	\$1,650	Sings and flaggers at intersection. 2 day project duration.
Contingency			50%	\$8,250	Potential utility conflicts - pipes crossing roadway.
Sales Tax			8.7%	\$2,627	
Total Construction Cost:				\$33,000	
PREDESIGN COSTS					
Survey			LS	\$3,000	Base mapping.
Geotechnical Evaluation			LS	\$0	
Predesign			LS	\$0	
OTHER PROJECT COSTS					
Total Predesign (Survey, Geotech, Predesign)			LS	\$3,000	
Design			LS	\$10,000	1 plan sheet, 1 profile sheet.
Permitting			LS	\$5,000	Grading permit and street use permit.
Construction Management			15%	\$5,000	
City of Lacey Project Management			5%	\$2,000	
Total Estimated Project Cost:				\$58,000	

CLIENT: City of Lacey
 PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 3 - Lacey Boulevard Pipe Replacement

Prepared by: M. Fontaine
 Checked by: M. Brennan
 Reversed by: M. Fontaine

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Removing Asphalt Conc. Pvmt., Incl. Haul	16	SY	\$40	\$640	SPU 2007 unit cost report. Small qty.
Structure Excavation Class B, Incl. Haul	17	CY	\$60	\$1,020	Pipe trench excavation. Small qty.
Crushed Surfacing, Base Course	8	TN	\$100	\$800	City of Lacey recent bids. Small qty.
HMA for Pavement Repair	5	TN	\$200	\$1,000	City of Lacey recent bids. Small qty.
Catch Basin - Type 2	1	EA	\$5,000	\$5,000	In Lacey Blvd. City of Lacey recent bids.
Catch Basin - Type 1	1	EA	\$1,000	\$1,000	City of Lacey recent bids.
Schedule A SSP, 12 In. Dia.	40	LF	\$50	\$2,000	City of Lacey recent bids. Small qty.
TOTAL DIRECT COSTS:				\$11,000	
MARKUPS					
Mobilization			8%	\$880	
					Manage stockpiles, protect inlets, street
Temporary Erosion and Sediment Control			5%	\$550	sweeping.
Temporary Dewatering			5%	\$550	May require minor trench dewatering.
Traffic Control			25%	\$2,750	Busy street.
					Utility conflicts unknown and infiltration facility
Contingency			75%	\$8,250	sizing incomplete.
Sales Tax			8.7%	\$2,086	
Total Construction Cost:				\$26,000	
PREDESIGN COSTS					
Survey			LS	\$2,000	Base mapping.
Geotechnical Evaluation			LS	\$0	PIT tests and memo for infiltration gallery.
					Evaluate alignment, drywell rehab
Pre-design			LS	\$0	alternatives, and potential for infiltration in
					\$0 open space. Brief memo.
OTHER PROJECT COSTS					
Total Pre-design (Survey, Geotech, Pre-design)			LS	\$2,000	
					Assumes general sheet, 1 plan w/ profile, 1
Design			LS	\$15,000	detail sheet. No utility relocates included in
Permitting			LS	\$5,000	design.
Construction Management			15%	\$4,000	Grading permit and street use permit.
City of Lacey Project Management			5%	\$1,000	
Total Estimated Project Cost:				\$53,000	

CLIENT: City of Lacey
 PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 4 - Brentwood Stormwater Installation

Prepared by: M. Fontaine
 Checked by: M. Brennan
 Revised by: M. Fontaine

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Brentwood					
Removing Asphalt Conc. Pvmnt., Incl. Haul	1,182	SY	\$10	\$11,820	SPU 2007 unit cost report.
Structure Excavation Class B, Incl. Haul	1,449	CY	\$18	\$26,082	Assumes 2' cover. WSDOT UBA and City of Lacey recent bids.
Bank Run Gravel for Trench Backfill	197	CY	\$10	\$1,970	City of Lacey recent bids.
Crushed Surfacing, Base Course	296	TN	\$50	\$14,800	WSDOT UBA and City of Lacey recent bids.
HMA for Pavement Repair	386	TN	\$100	\$38,600	WSDOT UBA and City of Lacey recent bids.
Catch Basin Type 1	14	EA	\$800	\$11,200	City of Lacey recent bids.
Connect to Drainage Structure	7	EA	\$500	\$3,500	WSDOT UBA and City of Lacey recent bids.
Rehab Drywell	8	EA	\$200	\$1,600	Engineers estimate. Jet out drywell pores and vacator out sediment.
Schedule A SSP, 12 In. Dia.	3,040	LF	\$30	\$91,200	City of Lacey recent bids.
TOTAL DIRECT COSTS:				\$201,000	
MARKUPS					
Mobilization			8%	\$16,080	
Temporary Erosion and Sediment Control			1%	\$2,010	Manage soil stockpiles.
Temporary Dewatering			1%	\$1,005	Minor trench dewatering.
Traffic Control			2%	\$4,020	
Contingency			30%	\$60,300	Utility conflicts unknown. May require upsizing downstream pipe.
Sales Tax			8.7%	\$24,744	
Total Construction Cost:				\$309,000	
PREDESIGN COSTS					
Survey			LS	\$5,000	Base mapping. Large project area.
Geotechnical Evaluation			LS	\$10,000	Assumes geotech study and 2 PIT tests.
Predesign			LS	\$10,000	Evaluate potential pipe alignment alternatives, infiltration options, and options for drywell rehabilitation. Short memo and simple figures.
OTHER PROJECT COSTS					
Total Predesign (Survey, Geotech, Predesign)				\$25,000	
Design			15%	\$46,000	
Permitting			LS	\$5,000	Grading permit and street use permit.
Construction Management			15%	\$46,000	
City of Lacey Project Management			5%	\$15,000	
Total Estimated Project Cost:				\$446,000	

Herrera Environmental Consultants, Inc.

10-04793-000

CLIENT: City of Lacey

PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 5 - Chambers Lake Stormwater Facility Project

Prepared by: M. Fontaine

Checked by: N. Christensen

Table 1. Conceptual Cost Estimate for Grant Application

Item	Quantity	Unit	Unit Cost	Amount	Notes
Schedule A - Grant Eligible Construction Items					
Clearing and Grubbing	6	AC	\$10,000	\$60,000	Bids for Eastsound Wetland project, WSDOT UBA.
Pond Excavation, Incl. Haul	53,000	CY	\$19	\$1,007,000	Economies of scale for large quantity and leave some excavated materials onsite for landscaping berms instead of hauling.
Gravel Borrow, Incl. Haul	45	TN	\$12	\$540	LID cost analysis regional unit prices.
Embankment Compaction	2,340	CY	\$6	\$14,040	LID cost analysis regional unit prices.
Class II Reinforced Concrete SSP, 48-in dia	300	LF	\$130	\$39,000	WSDOT UBA, The Guide Winter 2013. Includes 30% for installation.
Catch Basin type II 84-inch diameter with debris barrier	3	EA	\$5,070	\$15,210	The Guide Winter 2013. Includes 30% for installation.
Catch Basin type II 84-inch diameter with solid lid and 48" flow control structure	1	EA	\$13,070	\$13,070	The Guide Winter 2013. Includes 30% for installation. 48" flow control structure SPU JOC Contract 2010.
Riprap, Hand Placed	23	CY	\$110	\$2,530	LID cost analysis regional unit prices.
Quarry Spalls	67	TN	\$20	\$1,340	Recent bids: WSDOT SR 18 – 180th to Maple Valley.
Silt Fence	2,300	LF	\$3	\$6,900	LID cost analysis regional unit prices.
Compost for soil ammendment	591	CY	\$35	\$20,685	Recent bids: Eastsound Wetland and SPU Ballard Raingarden. Economies of scale for large qty.
Planting	4	AC	\$15,000	\$60,000	Pre-design estimate for planting (shrubs and seeds) was apx. \$150,000 in 1995 dollars. \$15,000 per acre should be adequate for quality planting, including shrubs, but using wetland or forbe seeding where appropriate.
Irrigation System	20,000	SF	\$1.5	\$40,000	Assumes 15% of wetland area is irrigated.
Property Restoration	1	FA	\$20,000	\$20,000	
Subtotal Schedule A				\$1,300,315	
Schedule A Sales Tax			8.7%	\$113,127	
Total Schedule A				\$1,413,000	

Herrera Environmental Consultants, Inc.

10-04793-000

CLIENT: City of Lacey

PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 5 - Chambers Lake Stormwater Facility Project

Prepared by: M. Fontaine

Checked by: N. Christensen

Table 1. Conceptual Cost Estimate for Grant Application

Schedule B - Grant Ineligible Construction Items				
Habitat Logs	10	EA	\$2,000	\$20,000 Some logs installed in water and some as perches. Bids for Eastsound Wetland project.
Bollard Type 1	4	EA	\$350	\$1,400 1995 cost estimate adjusted to 2013 costs.
Project Signs	1	EA	\$2,500	\$3,000 Engineers estimate.
Subtotal Schedule B				\$24,400
Schedule B Sales Tax			8.7%	\$2,123
Total Schedule B				\$27,000
TOTAL DIRECT COSTS:				\$1,440,000
MARKUPS- Grant Eligible				
Mobilization			8%	\$115,200
Temporary Erosion and Sediment Control			1%	\$14,400 Manage stockpiles and sweep streets.
Temporary Dewatering			LS	\$100,000 Order of magnitude.
Traffic Control			0.5%	\$7,200 Low traffic street.
Contractor Bid Overrun Allowance			10%	\$144,000
Markups Sales Tax			8.7%	\$33,130
Total Construction Cost:				\$1,854,000
INITIAL DESIGN COSTS				
Survey			LS	\$20,000 Base mapping.
Geotechnical Evaluation			LS	\$40,000 Monitor groundwater level. Soil and liner recommendation
Predesign			LS	\$0 Complete.
OTHER PROJECT COSTS				
Initial Design (Survey, Geotech, Predesign)				\$60,000
Design and specifications. Complexity due to high groundwater and piping around existing sanitary sewer.				
Design			LS	\$175,000
Permitting			LS	\$40,000 Assumes clearing and grading permit, SEPA checklist, wetland delineation, and critical areas report.
Construction Management			LS	\$180,000
City of Lacey Project Management			LS	\$105,000
Total Estimated Project Cost:				\$2,414,000

CLIENT: City of Lacey
 PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 6 - 22nd Avenue System Rehabilitation

Prepared by: M. Fontaine
 Checked by: M. Brennan

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Pavers					
Roadway Excavation, Incl. Haul	244	CY	\$20	\$4,880	WSDOT UBA and City of Lacey recent bids and City of Edmonds 230th St SW reconstruction project.
Permeable Ballast	133	TN	\$60	\$7,980	Subgrade/storage. SPU 2007 unit cost report.
Aggregate for Bituminous Surface Treatment 5/8 inch - US No. 4	66	TN	\$45	\$2,970	Choker course. SPU 2007 unit cost report.
Permeable Pavers	3,600	SF	\$6	\$21,600	Assumes Eco-Loc mechanically set pavers. Includes 2 inches bedding (Aggregate for bituminous surface treatment 3/8" - US No. 10). Based on in-place cost provided by Mutual Materials 425-452-2300.
Underdrain Pipe 6 In. Dia.	360	LF	\$15	\$5,400	Include underdrain pipe for potential future adaptive management.
Connect Northeast End to Existing CB					
Removing Cement Conc Sidewalk	14	SY	\$50	\$700	SPU 2007 unit cost report. High end for small qty.
Structure Excavation Class B	11	CY	\$20	\$220	Same assumptions as roadway excavation.
Schedule A SSP, 12 In. Dia.	50	LF	\$35	\$1,750	City of Lacey recent bids.
Connect to Drainage Structure	1	EA	\$750	\$750	City of Lacey recent bids.
Monolithic Cement Conc. Sidewalk and Curb	14	SY	\$100	\$1,400	Recent bids, City of Lacey various projects and City of Edmonds 230th St SW reconstruction project.
TOTAL DIRECT COSTS:				\$47,700	
MARKUPS AND OTHER COSTS					
Mobilization			8%	\$3,816	
Temporary Erosion and Sediment Control			5%	\$2,385	
Temporary Dewatering			0%	\$0	
Traffic Control			2%	\$954	Signs. No flaggers or road closures.
Contingency			50%	\$23,850	Potential utility conflicts and may require connection of overflow to downstream system at west.
Sales Tax			8.7%	\$6,847	
Total Construction Cost:				\$86,000	
PREDESIGN COSTS					
Survey			LS	\$3,000	Base mapping.
Geotechnical Evaluation			LS	\$7,000	PIT test and memo. Based on recent cost for similar work from Kleinfelder.
Predesign			0%	\$0	
OTHER PROJECT COSTS					
Total Predesign (Survey, Geotech, Predesign)				\$10,000	
Design				LS	\$15,000
Permitting				LS	\$5,000
Construction Management				15%	\$13,000
City of Lacey Project Management				5%	\$4,000
Total Estimated Project Cost:				\$133,000	

CLIENT: City of Lacey

PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 7 - Diamond Stormwater Alternative

Prepared by: M. Fontaine
 Checked by: M. Brennan
 Reversed by: M. Fontaine

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Pump Station					
					WSDOT UBA and City of Lacey recent bids. High end for small qty. Pump station and force main outfall.
Structure Excavation Class B, Incl. Haul	336	CY	\$20	\$6,720	
Bank Run Gravel for Trench Backfill	265	CY	\$5	\$1,325	City of Lacey recent bids.
Crushed Surfacing, Base Course	4	TN	\$100	\$400	Restore easement. City of Lacey recent bids. High end for small qty.
Pump Station	1	EA	\$62,000	\$62,000	Assumes 350 gpm duplex pump station. 5' ID x 8' deep wetwell. Valves in H-20 rated wetwell. Control panel on post with autodialer telemetry. Includes wet well piping and appurtenance. Based on estimate from Romtec, Mark Sheldon, msheldon@romtecutilities.com, 541-496-9676.
Labor for Pump Station Installation	40	HRS	\$70	\$2,800	Based on Romtec estimate - see above. Labor rates based on The Guide Winter 2010.
4 In. HDPE SDR 11 Force Main, Outfall Segment	175	LF	\$10	\$1,750	Force main outfall segment from downstream-most manhole structure to outfall in wetland. Based on material cost from HD Fowler, includes 50% markup for provision and installation.
Phone Line to Site	1	LS	\$2,000	\$2,000	Phone line for telemetry equipment. Engineers estimate.
Electric to Site	1	LS	\$5,000	\$5,000	Provide 3-phase power. Engineers estimate.
Backflow Prevention Valves					
Tideflex Valve - TF1 - 24" w/ Bands	1	EA	\$8,200	\$8,200	Based on price quote from ANTEC CORP - Matthew Davidson - 425-888-9090. Includes shipping and 30% markup for overhead and installation.
Tideflex Valve - TF1 - 18" w/ Bands	1	EA	\$5,500	\$5,500	Based on price quote from ANTEC CORP - same assumptions as above.
TOTAL DIRECT COSTS:				\$96,000	
MARKUPS					
Mobilization			8%	\$7,680	Not applied to force main in SSP.
Temporary Erosion and Sediment Control			2%	\$1,920	Manage stockpiles and protect inlets.
Temporary Dewatering			5%	\$4,800	Dewatering and treatment likely required.
Traffic Control			3%	\$2,880	Signs and flaggers for a couple days.
Contingency			60%	\$57,600	
Sales Tax			8.7%	\$8,352	
Total Construction Cost:				\$180,000	
PREDESIGN COSTS					
Survey			LS	\$5,000	Base mapping.
Geotechnical Evaluation			LS	\$0	
Pre-design			LS	\$20,000	Assumes additional alternatives assessment, basic wetland hydroperiod assessment, agency consultation, and brief memo.
OTHER PROJECT COSTS					
Total Pre-design (Survey, Geotech, Pre-design)				\$25,000	
Design			LS	\$15,000	Pump station design provided by vendor.
Permitting			LS	\$50,000	Assumes Clearing and Grading Permit, SEPA Checklist, JARPA, Critical Areas Report, and Biological Assessment.
Construction Management			15%	\$27,000	
City of Lacey Project Management			5%	\$9,000	
Total Estimated Project Cost:				\$306,000	

CLIENT: City of Lacey

PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 8 - 25th Loop Storm Improvements

Prepared by: M. Fontaine

Checked by: M. Brennan

Revised by: M. Fontaine

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Removing Asphalt Conc. Pvmt., Incl. Haul	109	SY	\$30	\$3,270	SPU 2007 unit cost report.
Structure Excavation Class B, Incl. Haul	644	CY	\$20	\$12,880	Convert grassy swale to bioretention: 500 ft long by 15 ft wide. WSDOT UBA and City of Lacey recent bids.
Bank Run Gravel for Trench Backfill	106	TN	\$10	\$1,060	City of Lacey recent bids.
Crushed Surfacing, Base Course	34	TN	\$60	\$2,040	City of Lacey recent bids. High end for small qty.
HMA for Pavement Repair	36	TN	\$200	\$7,200	WSDOT UBA and City of Lacey recent bids. High end for small qty.
Catch Basin Type 1	2	EA	\$1,000	\$2,000	City of Lacey recent bids.
Catch Basin Type 2	1	EA	\$3,000	\$3,000	Connect to existing system. City of Lacey recent bids.
Schedule A SSP, 12 In. Dia.	540	LF	\$30	\$16,200	City of Lacey recent bids.
Topsoil Type A	17	CY	\$20	\$340	4 in. thickness on landscaped areas for restoration. City of Lacey recent bids.
Underdrain Pipe, 6 In. Dia.	500	LF	\$8	\$4,000	Install underdrains so facility can be connected to drywell or storm sewer in future if needed (adaptive management). WSDOT UBA.
Aggregate for Underdrain	74	TN	\$50	\$3,700	SPU 2007 unit cost report.
Bioretention Soil	347	CY	\$50	\$17,350	Engineers estimate. City of Seattle bids for Ballard raingardens.
Planting	7,500	SF	\$5	\$37,500	Tracy Tacket SPU personal communication.
Compost Banket	833	SY	\$4	\$3,332	WSDOT UBA.
Miscellaneous Restoration	1	LS	\$5,000	\$5,000	Engineers estimate.
TOTAL DIRECT COSTS:				\$119,000	
MARKUPS					
Mobilization			8%	\$9,520	
Temporary Erosion and Sediment Control			1%	\$1,190	Manage stockpiles.
Temporary Dewatering			0%	\$0	No dewatering
Traffic Control			2%	\$2,380	Signs and flaggers for a couple days.
Contingency			50%	\$59,500	Unknown utility conflicts and ability to acquire easement.
Sales Tax			8.7%	\$16,668	
Total Construction Cost:				\$208,000	
PREDESIGN COSTS					
Survey			LS	\$5,000	Base survey of 5 blocks.
Geotechnical Evaluation			LS	\$10,000	2 PIT tests and short memo.
Pre-design			LS	\$15,000	Evaluate alternatives.
OTHER PROJECT COSTS					
Total Pre-design (Survey, Geotech, Pre-design)				\$30,000	
Design			LS	\$40,000	Assume only minor right of way improvement design and no utility relocation design.
Permitting			LS	\$5,000	Grading permit and street use permit.
Construction Management			15%	\$31,000	
City of Lacey Project Management			5%	\$10,000	
Total Estimated Project Cost:				\$324,000	

CLIENT: City of Lacey

PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 9 - Clearbrook Drainage System Improvements

Prepared by: M. Fontaine

Checked by: N. Christensen

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Outlet Pipe Replacement (cost would be similar for piping to proposed Holmann Park system assuming 0\$ easement)					
Removing Asphalt Conc. Pvmnt., Incl. Haul	191	SY	\$15	\$2,865	SPU 2007 unit cost report.
Structure Excavation Class B, Incl. Haul	343	CY	\$20	\$6,860	Assumes 3' pipe cover. WSDOT UBA and City of Lacey recent bids.
Bank Run Gravel for Trench Backfill	108	CY	\$10	\$1,080	6" btwn pipe bedding and base course. City of Lacey recent bids.
Crushed Surfacing, Base Course	54	TN	\$60	\$3,240	City of Lacey recent bids.
HMA for Pavement Repair	71	TN	\$110	\$7,810	WSDOT UBA and City of Lacey recent bids.
Catch Basin Type 2	1	EA	\$1,000	\$1,000	City of Lacey recent bids.
Connect to Drainage Structure	1	EA	\$750	\$750	WSDOT UBA and City of Lacey recent bids.
Replace Outlet Structure	1	EA	\$3,000	\$3,000	Engineers estimate.
Schedule A SSP, 18 In. Dia.	520	LF	\$30	\$15,600	For new pond outlet. City of Lacey recent bids.
Pond Rehabilitation					
Pond Excavation, Incl. Haul	787	CY	\$17	\$13,379	1.5' deep swale around perimeter of pond.
Construction Geotextile for Separation	944	SY	\$3	\$2,832	Recent bids: Eastsound Wetland.
Streambed Gravel	315	CY	\$75	\$23,625	Line Swale 1' deep with streambed gravel.
Planting	0.2	AC	\$30,000	\$6,000	Based on recent bids: Eastsound Wetland. Higher end planting for high quality early aesthetic. Includes plant establishment.
Pedestrian Bridge	2	EA	\$10,000	\$20,000	Simple pedestrian bridges. Recent bids: Eastsound wetland.
Site Restoration	1	LS	\$5,000	\$5,000	Engineers Estimate
Infiltration Gallery at 19th Ct NE					
Media Filtration Structure	1	EA	\$26,000	\$26,000	Upstream of infiltration gallery. Basic treatment - assume Contech StormFilter™ 48" Dia with high flow and overflow bypassed downstream. Based on price quote from Contech (Katheryn Thomason 503-258-3176) 16,800 to 20,000 delivered. Includes 30% markup for installation.
Infiltration Gallery, 48 In. Dia. Perf Pipe	175	LF	\$150	\$26,250	Under existing open space. Engineer estimate and City of Lacey recent bids.
Site Restoration	1	LS	\$2,000	\$2,000	Engineer estimate.
TOTAL DIRECT COSTS:				\$167,000	
MARKUPS					
Mobilization			8%	\$13,360	
Temporary Erosion and Sediment Control			2%	\$3,340	Manage soil stockpiles and sweeping.
Temporary Dewatering			2%	\$3,340	
Traffic Control			4%	\$6,680	
Contingency			30%	\$50,100	Utility conflicts unknown.
Sales Tax			8.7%	\$21,212	
Total Construction Cost:				\$265,000	
PREDESIGN COSTS					
Survey			LS	\$5,000	Base mapping. Multiple locations.
Geotechnical Evaluation			LS	\$15,000	Evaluate feasibility for deep infiltration at this site and recommend whether to revise concept to include treatment and deep infiltration rather than improved conveyance offsite.
Predesign			LS		Included in geotech.
OTHER PROJECT COSTS					
Total Predesign (Survey, Geotech, Predesign)				\$20,000	
Design			10%	\$35,000	2 general sheets, 3 plan sheets, 2 detail sheet.
Permitting			LS	\$5,000	Grading permit and street use permit.
Construction Management			15%	\$40,000	
City of Lacey Project Management			5%	\$13,000	
Total Estimated Project Cost:				\$378,000	

CLIENT: City of Lacey
 PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 10 - Homann Area System Rehabilitation

Prepared by: M. Fontaine
 Checked by: M. Brennan
 Revised by: M. Fontaine

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Removing Asphalt Conc. Pvmt., Incl. Haul	440	SY	\$20	\$8,800	SPU 2007 unit cost report.
Structure Excavation Class B, Incl. Haul	760	CY	\$20	\$15,200	WSDOT UBA and City of Lacey recent bids.
Connect to Drainage Structure	10	EA	\$2,000	\$20,000	Connect to existing infiltration trenches.
Bioretention Soil	420	CY	\$50	\$21,000	Engineers estimate. City of Seattle bids for Ballard raingardens.
Planting	4,000	SF	\$5	\$20,000	Tracy Tacket SPU personal communication.
Mulch	70	CY	\$4	\$280	WSDOT UBA.
Miscellaneous Restoration	1	LS	\$50,000	\$50,000	Includes new curbing, restoration of adjacent properties, HMA repair.
TOTAL DIRECT COSTS:				\$135,000	
MARKUPS					
Mobilization			8%	\$10,800	
Temporary Erosion and Sediment Control			5%	\$6,750	
Temporary Dewatering			0%	\$0	No dewatering.
Traffic Control			5%	\$6,750	Traffic control plan. Minimal required for residential neighborhood.
Contingency			30%	\$40,500	Unknown utility conflicts.
Sales Tax			8.7%	\$17,383	
Total Construction Cost:				\$217,000	
PREDESIGN COSTS					
Survey		LS	\$10,000	\$10,000	Base mapping.
Geotechnical Evaluation		LS	\$30,000	\$30,000	PIT test, evaluate deep infiltration potential (up to 10'), recommendations for protection of existing road grade, memo.
Predesign		LS	\$20,000	\$20,000	Small study to refine quantity and size of bioretention facilities and conduct initial public outreach.
OTHER PROJECT COSTS					
Total Pre-design (Survey, Geotech, Predesign)				\$60,000	
Design		LS	\$80,000	\$80,000	Cover sheet, general notes, 1 plan/profile sheet per facility (x10 facilities), 2 detail sheets. Includes public outreach.
Permitting		LS	\$5,000	\$5,000	Grading permit and street use permit.
Construction Management		15%	\$33,000	\$33,000	
City of Lacey Project Management		5%	\$11,000	\$11,000	
Total Estimated Project Cost:				\$406,000	

CLIENT: City of Lacey

PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 11 - 1010 Midway Storm Improvements

Prepared by: M. Fontaine

Checked by: M. Brennan

Revised by: M. Fontaine

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Structure Excavation Class B, Incl. Haul	42	CY	\$20	\$840	WSDOT UBA and City of Lacey recent bids. High end for small qty.
Bank Run Gravel for Trench Backfill	28	TN	\$10	\$280	City of Lacey recent bids.
Catch Basin Type 1	1	EA	\$1,000	\$1,000	City of Lacey recent bids.
Catch Basin Type 2	1	EA	\$3,000	\$3,000	City of Lacey recent bids.
Schedule A SSP, 12 In. Dia.	100	LF	\$30	\$3,000	City of Lacey recent bids.
Topsoil Type A	4	CY	\$20	\$80	4 in. thickness on landscaped areas for restoration. City of Lacey recent bids.
Miscellaneous Restoration	1	LS	\$5,000	\$5,000	Engineers estimate. Restore private property and right of way.
TOTAL DIRECT COSTS:				\$13,000	
MARKUPS					
Mobilization			8%	\$1,040	
Temporary Erosion and Sediment Control			5%	\$650	Manage stockpiles.
Temporary Dewatering			5%	\$650	Minor trench dewatering.
Traffic Control			3%	\$390	Signs and flagger for 1 to 2 days.
Contingency			30%	\$3,900	Uncertain utility conflicts.
Sales Tax			8.7%	\$1,708	
Total Construction Cost:				\$21,000	
PREDESIGN COSTS					
Survey			LS	\$2,000	Base mapping.
Geotechnical Evaluation			LS	\$0	
Predesign			5%	\$1,050	Oversee survey.
OTHER PROJECT COSTS					
Total Predesign (Survey, Geotech, Predesign)				\$3,000	
Design			LS	\$10,000	1 sheet with plan and profile. Use typical details.
Permitting			LS	\$0	
Construction Management			15%	\$3,000	
City of Lacey Project Management			5%	\$1,000	
Total Estimated Project Cost:				\$38,000	

CLIENT: City of Lacey
 PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 12 - Belair / Impala Stormwater Installation

Prepared by: M. Fontaine
 Checked by: M. Brennan
 Reversed by: M. Fontaine

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Belair / Impala					
Removing Asphalt Conc. Pvmt., Incl. Haul	1,307	SY	\$10	\$13,070	SPU 2007 unit cost report.
Structure Excavation Class B, Incl. Haul	1,468	CY	\$18	\$26,424	Assumes 2' cover. WSDOT UBA and City of Lacey recent bids.
Bank Run Gravel for Trench Backfill	218	CY	\$10	\$2,180	6" btwn pipe bedding and base course. City of Lacey recent bids.
Crushed surfacing, base course	327	TN	\$50	\$16,350	City of Lacey recent bids.
HMA for Pavement Repair	426	TN	\$100	\$42,600	WSDOT UBA and City of Lacey recent bids.
Catch Basin Type 1	22	EA	\$800	\$17,600	City of Lacey recent bids.
Connect to Drainage Structure	4	EA	\$500	\$2,000	WSDOT UBA and City of Lacey recent bids.
Schedule A SSP, 12 In. Dia.	3,360	LF	\$30	\$100,800	City of Lacey recent bids.
TOTAL DIRECT COSTS:				\$221,000	
MARKUPS					
Mobilization			8%	\$17,680	
Temporary Erosion and Sediment Control			1%	\$2,210	Manage soil stockpiles.
Temporary Dewatering			1%	\$1,105	Minor trench dewatering.
Traffic Control			2%	\$4,420	
Contingency			30%	\$66,300	Utility conflicts unknown. May require upsizing downstream pipe.
Sales Tax			8.7%	\$27,206	
Total Construction Cost:				\$340,000	
PREDESIGN COSTS					
Survey			LS	\$5,000	Base mapping. Large project area.
Geotechnical Evaluation			LS	\$10,000	Assumes geotech study and 2 PIT tests.
Predesign			LS	\$10,000	Evaluate potential pipe alignment alternatives, infiltration options, and options for drywell rehabilitation. Short memo and simple figures.
OTHER PROJECT COSTS					
Total Predesign (Survey, Geotech, Predesign)				\$25,000	
Design			15%	\$51,000	
Permitting			LS	\$5,000	Grading permit and street use permit.
Construction Management			15%	\$51,000	
City of Lacey Project Management			5%	\$17,000	
Total Estimated Project Cost:				\$489,000	

CLIENT: City of Lacey

PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 13 - College Regional Stormwater Facility Outfall Replacement

Prepared by: M. Fontaine

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
48 In. Dia. SSP - 4,500 LF	1	LS	\$2,380,000	\$2,380,000	Tabula 3.1. All inclusive, except contingency and allied costs.
TOTAL DIRECT COSTS:				\$2,380,000	
MARKUPS					
Mobilization			0%	\$0	Included in Tabula estimate.
Temporary Erosion and Sediment Control			0%	\$0	Included in Tabula estimate.
Temporary Dewatering			0%	\$0	Included in Tabula estimate.
Traffic Control			0%	\$0	Included in Tabula estimate.
Contingency			20%	\$476,000	Tabula estimates are typically conservative. Gain efficiency by integrating with WSDOT project.
Sales Tax			8.7%	\$248,472	
Total Construction Cost:				\$3,100,000	
PREDESIGN COSTS					
Survey			LS	\$20,000	
Geotechnical Evaluation			LS	\$0	
Predesign			1%	\$31,000	
OTHER PROJECT COSTS					
Total Predesign (Survey, Geotech, Predesign)				\$51,000	
Design			10%	\$310,000	
Permitting			LS	\$50,000	Assumes SEPA checklist, Critical Areas review, wetland delineation, JARPA, and ESA biological assessment.
Construction Management			15%	\$465,000	
City of Lacey Project Management			5%	\$155,000	
Total Estimated Project Cost:				\$4,131,000	

CLIENT: City of Lacey
 PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT14 - Alder and Gemini Drainage System Improvements

Prepared by: M. Fontaine
 Checked by: M. Brennan
 Reversed by: M. Fontaine

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Removing Asphalt Conc. Pvmt., Incl. Haul	461	SY	\$20	\$9,220	SPU 2007 unit cost report.
Structure Excavation Class B, Incl. Haul	800	CY	\$20	\$16,000	Excavation for pipe, infiltration gallery, and structures. WSDOT UBA and City of Lacey recent bids.
Bank Run Gravel for Trench Backfill	77	CY	\$10	\$770	City of Lacey recent bids.
Crushed Surfacing, Base Course	115	TN	\$60	\$6,900	City of Lacey recent bids.
HMA for Pavement Repair	150	TN	\$110	\$16,500	City of Lacey recent bids.
Connect to Drainage Structure	5	EA	\$750	\$3,750	City of Lacey recent bids.
Catch Basin - Type 1	4	EA	\$1,000	\$4,000	City of Lacey recent bids.
Schedule A SSP, 12 In. Dia.	1,185	LF	\$30	\$35,550	City of Lacey recent bids.
Connect to Drainage Structure	4	EA	\$750	\$3,000	WSDOT UBA and City of Lacey recent bids.
Rehab Drywell	4	EA	\$300	\$1,200	Engineers estimate. Jet out drywell pores and vector out sediment.
High Flow Bypass Structure	1	EA	\$6,500	\$6,500	Bypass high flow around infiltration gallery. Based on price quote from CONTECH (Katheryn Thomason 503-258-3176). 48" barrel, steps, catch basin lid, adjustable weir, and delivery. Includes 30% markup.
Media Filtration Structure	1	EA	\$26,000	\$26,000	Upstream of infiltration gallery. Basic treatment - assume contech stormfilter 48" Dia. Based on price quote from CONTECH (Katheryn Thomason 503-258-3176) 16,800 to 20,000 delivered. Includes 30% markup for installation.
Drywell Stormwater Filter, 48 In. Dia.	1	EA	\$26,000	\$26,000	Retrofit existing drywell. Based on price quote from CONTECH (Mike Scott 425-835-0440). Assumes new 3 cartridge drywell storm filter, 1 drywell riser segment, 30% markup on materials, and installation.
Infiltration Gallery, 48 In. Dia.	200	LF	\$150	\$30,000	Under existing open space. Engineer estimate and City of Lacey recent bids.
TOTAL DIRECT COSTS:				\$185,000	
MARKUPS					
Mobilization			8%	\$14,800	
Temporary Erosion and Sediment Control			3%	\$5,550	Manage stockpiles, protect inlets, street sweeping.
Temporary Dewatering			5%	\$9,250	May require minor trench dewatering.
Traffic Control			2%	\$3,700	Residential street.
Contingency			30%	\$55,500	Utility conflicts unknown and infiltration facility sizing incomplete.
Sales Tax			8.7%	\$23,821	
Total Construction Cost:				\$298,000	
PREDESIGN COSTS					
Survey			LS	\$5,000	Base mapping. Large project area.
Geotechnical Evaluation			LS	\$7,000	PIT tests and memo for infiltration gallery.
Pre-design			LS	\$10,000	Evaluate alignment, drywell rehab alternatives, and potential for infiltration in open space. Brief memo.
OTHER PROJECT COSTS					
Total Pre-design (Survey, Geotech, Pre-design)			LS	\$22,000	
Design			LS	\$45,000	Assumes general sheet, 3 plans w/ profile, 1 detail sheet. No utility relocations included in design.
Permitting			LS	\$5,000	Grading permit and street use permit.
Construction Management			15%	\$45,000	
City of Lacey Project Management			5%	\$15,000	
Total Estimated Project Cost:				\$430,000	

CLIENT: City of Lacey

PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 15 - White Fir Stormwater Installation

Prepared by: M. Fontaine

Checked by: M. Brennan

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Removing Asphalt Conc. Pvmt., Incl. Haul	133	SY	\$30	\$3,990	Remove pavement at driveway aprons. SPU 2007 unit cost report.
Structure Excavation Class B, Incl. Haul	311	CY	\$20	\$6,220	700 LF, both sides of street. WSDOT UBA.
Permeable Ballast	372	TN	\$60	\$22,320	2 ft thick, 4 ft wide on shoulders
Underdrain Pipe, 8 In. Dia.	1400	LF	\$14	\$19,600	Both sides of road. WSDOT UBA.
Crushed Surfacing, Base Course	27	TN	\$100	\$2,700	Base for driveway apron repair. City of Lacey recent bids. High end for small qty.
HMA for Pavement Repair	15	TN	\$200	\$3,000	Repair for 15 driveway aprons. WSDOT UBA and City of Lacey recent bids. High end for small qty.
Connect to Existing Structure	4	EA	\$750	\$3,000	WSDOT UBA and City of Lacey recent bids.
TOTAL DIRECT COSTS:				\$60,830	
MARKUPS					
Mobilization			8%	\$4,866	
Temporary Erosion and Sediment Control			2%	\$1,217	Manage stockpiles.
Temporary Dewatering			0%	\$0	No dewatering anticipated.
Traffic Control			2%	\$1,217	Residential street. Signs and use laborer to direct traffic as needed.
Contingency			50%	\$30,415	Potential utility conflicts. Residents may request more expensive driveway repairs.
Sales Tax			8.7%	\$8,573	
Total Construction Cost:				\$107,000	
PREDESIGN COSTS					
Survey			LS	\$3,000	Base mapping.
Geotechnical Evaluation			LS	\$0	
Predesign			LS	\$0	
OTHER PROJECT COSTS					
Total Predesign (Survey, Geotech, Predesign)				\$3,000	
Design			LS	\$15,000	Assumes no utility relocates included.
Permitting			LS	\$5,000	Grading permit and street use permit.
Construction Management			15%	\$16,000	Simple project.
City of Lacey Project Management			5%	\$5,000	
Total Estimated Project Cost:				\$151,000	

CLIENT: City of Lacey
 PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 16 - 5th Ct SE and 5th Way SE Easement Storm Improvements

Prepared by: M. Fontaine
 Checked by: M. Brennan

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Modify Drainage Structure	4	EA	\$2,500	\$10,000	Fill sump with cement concrete and construct channelized invert. Engineers estimate. Deep structure. Confined space entry.
Miscellaneous Restoration	1	LS	\$3,000	\$3,000	Restore site to existing conditions after project completion. May require some work on fences.
TOTAL DIRECT COSTS:				\$13,000	
MARKUPS					
Mobilization			8%	\$1,040	
Temporary Erosion and Sediment Control			0%	\$0	No earth movement.
Temporary Dewatering			0%	\$0	Work in the dry.
Traffic Control			0%	\$0	No work in streets.
Contingency			30%	\$3,900	Narrow easement may require alternative methods.
Sales Tax			8.7%	\$1,561	
Total Construction Cost:				\$20,000	
PREDESIGN COSTS					
Survey			LS	\$0	
Geotechnical Evaluation			LS	\$0	
Predesign			LS	\$0	
OTHER PROJECT COSTS					
Total Predesign (Survey, Geotech, Predesign)				\$0	
Design			LS	\$0	No design. City engineer estimates quantities and directs means and methods.
Permitting			LS	\$0	
Construction Management			15%	\$3,000	
City of Lacey Project Management			5%	\$1,000	
Total Estimated Project Cost:				\$24,000	

CLIENT: City of Lacey

PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 17- Shady Lane Treatment Facility

Prepared by: M. Fontaine

Checked by: N. Christensen

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Pond Excavation, Incl. Haul	728	CY	\$17	\$12,376	Muck out wet ponds. Avg depth of 2'. No liner protection.
Hydrodynamic Separator	1	EA	\$ 7,500	\$7,500	Engineers estimate.
Outlet Structure	1	EA	\$ 7,500	\$7,500	Engineers estimate.
Planting - Shrubs and Seeding Mix	0.2	AC	\$ 10,000	\$2,000	Replant wetpond. Shrubs and wetland seeding.
Site Restoration	1	LS	\$ 5,000	\$5,000	
Replace Outfall	1	LS	\$ 15,000	\$15,000	Difficult access.
TOTAL DIRECT COSTS:				\$49,000	
MARKUPS AND OTHER COSTS					
Mobilization			8%	\$3,920	
Temporary Erosion and Sediment Control			2%	\$980	
Temporary Dewatering			10%	\$4,900	Significant dewatering.
Traffic Control			0%	\$0	
Contingency			30%	\$14,700	30% contingency due to uncertain excavation quantities.
Sales Tax			8.7%	\$4,263	
Total Construction Cost:				\$78,000	
PREDESIGN COSTS					
Survey			LS	\$5,000	Base map. Difficult conditions.
Geotechnical Evaluation			LS	\$0	
Predesign			LS	\$0	
OTHER PROJECT COSTS					
Total Predesign (Survey, Geotech, Predesign)				\$5,000	
Design			LS	\$20,000	Basic grading plan, planting plan, details for new outfall, and special provisions.
Permitting			LS	\$15,000	Will require permits from Army Corps, WDFW, and potentially City of Lacey, but permitting should not be difficult because work appears to fall under the Army Corps Nationwide permit.
Construction Management			15%	\$12,000	
City of Lacey Project Management			5%	\$4,000	
Total Estimated Project Cost:				\$134,000	

CIP Project #18- Code Revisions for LID (Low Impact Development)

- **Problem Description:** The City is required to review, revise, and make effective local development-related codes, rules, standards, and other enforceable documents to incorporate and require LID principles and LID BMPs by December 31, 2016, per Section S5.C.4.f of the 2013-2018 NPDES Phase II permit. The City has conducted a preliminary evaluation of barriers to LID; however, this effort will be more extensive and will involve reviewing additional codes, rules, standards, and enforceable documents, and revising them as needed to remove barriers to LID implementation.
- **Project Solution:**
 - Task 1 - Preliminary Assessment of Codes and Policies: This task involves reviewing the Lacey Municipal Code (LMC), Development Guidelines and Public Works Standards, citywide Comprehensive plan, and other applicable codes and policies to identify which elements satisfy the 2013-2018 NPDES Phase II Permit requirements and which elements need to be revised or updated. A review team will be identified for each set of codes and policies.
 - Task 2 - Develop Draft Revisions to Applicable City Codes and Policies: The results from the Task 1 review of City codes and policies will be used to develop draft revisions that satisfy the 2013-2018 NPDES Phase II Permit requirements and help to make LID more implementable in the City. This task is expected to include significant coordination with City staff regarding the recommended updates to ensure that the internal and external stakeholders will be amenable to the proposed changes
 - Task 3 - Final Revisions to Applicable City Codes and Policies: This task involves meeting with City Council and the Planning Commission to discuss the proposed revisions, modifying revisions based on input from Council and Commission members, and receiving approval for the final revisions.
 - Task 4 - Project Management: Coordinate with other City staff or any subconsultants regarding scope, schedule, budget, and invoices.
- **Cost Estimate Assumptions:** See task descriptions above.
- **Project Priority:** Mandatory

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2021
Task 1	\$10,000			\$10,000								
Task 2	\$50,000			\$20,000	\$20,000							
Task 3	\$20,000				\$20,000							
Task 4	\$10,000			3,000	\$2,000							
City PM				7,000	8,000							
TOTAL EXPENSES	\$90,000			\$40,000	\$50,000							

CIP Project #19- Stormwater Design Manual Update

- **Problem Description:** The 2013-2018 NPDES Phase II Permit requires the City to implement a stormwater manual that is technically-equivalent to Ecology’s 2012 Stormwater Management Manual for Western Washington (SWMMWW) by December 31, 2016. The 2010 Stormwater Design Manual will need to be updated to meet this requirement. Particular focus should be given to updating the City’s Design Manual to meet the new LID requirements in the Phase II Permit and maintaining equivalency with the SWMMWW.
- **Project Solution:**
 - Task 1 - Public Information, Education, and Involvement: This task includes developing a public involvement plan, facilitating public meetings and staff and stakeholder trainings on required manual revisions.
 - Task 2- Review Stormwater Guidance Documents for Regulatory Compliance- This task involves coordinating with project advisory committee to obtain feedback on the current function and use of the manual, as well as reviewing stormwater guidance documents, City recommendations, and the 2013 Phase II NPDES Permit requirements to identify gaps in the existing manual language.
 - Task 3 - Stormwater Design Manual Revisions: New manual content will include information gathered in Task 2, and will address issues specific to the City, including submittal requirements and other aspects such as plant lists and BMP selection criteria tailored to City conditions.
 - Task 4 - Project Management: Coordinate with other City staff or any subconsultants regarding scope, schedule, budget, and invoices.
- **Cost Estimate Assumptions:** See task descriptions above.
- **Project Priority:** Mandatory

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2021
Task 1	\$25,000		\$10,000	\$5,000	\$10,000							
Task 2	\$35,000		\$20,000	\$15,000								
Task 3	\$100,000			\$45,000	\$55,000							
Task 4	\$20,000		\$5,000	\$7,500	\$7,500							
Task 4	\$20,000		\$5,000	\$7,500	\$7,500							
TOTAL EXPENSES	\$200,000		\$40,000	\$80,000	\$80,000							

CIP Project #20- Stormwater Comprehensive Plan Update

- **Problem Description:** The growth management act requires Cities to periodically update their comprehensive plan, of which the Stormwater Comprehensive Plan (SCP) is a part. The City's first SCP was developed in 2012 and finalized in 2013. The SCP guides the City's Stormwater Utility programs and projects for continued regulatory compliance and stormwater system performance. Ecology plans to update the 2013-2018 Phase II Permit for the next permit cycle (2018-2023) and the SCP update will help identify how the City will address the new requirements cost effectively, in addition to updating the stormwater capital improvement program (CIP) project plan.
- **Project Solution:** The City will need to update the SCP to reflect the 2018 updates to the Phase II Permit. The SCP will build on the City's existing stormwater management program and known stormwater problems to ensure that the stormwater infrastructure, policies, and funding mechanisms will meet the City's stormwater management needs for the 2018-2023 permit cycle. Major SCP update tasks are listed below:
 - Task 1 - Review Existing Documentation: Review applicable data, reports, studies, maps, and other information related to the City's stormwater management program, surface water resources, and capital improvement program (CIP)
 - Task 2 - Stormwater Program Gap Analysis and Needs Assessment:
 - Conduct a kick-off workshop with City staff, including representatives from the Community Development Department and Public Works Department (including maintenance personnel).
 - Analyze the City's stormwater management program (SWMP) policies and procedures; focus on key issues identified by the City; identify gaps in program coverage and work with the City to develop a plan that addresses those gaps.
 - Evaluate the future full time equivalent (FTE) staffing needs of the City to implement capital and programmatic activities necessary over the next NPDES Phase II Municipal Stormwater Permit term (2018-2023) compared to current FTE levels.
 - Task 3 - Update the Stormwater Capital Improvement Plan (CIP) Projects:
 - Develop solutions to specific drainage and water quality problems identified in Tasks 1 and 2, and recommend a preferred solution for each problem to the City.
 - Prioritize CIP projects based on the most important criteria for the City, which may include problem severity, cost, benefits, coordination with other projects, etc.
 - Task 4 - Prepare Financial Analysis and Recommend Stormwater Utility Rates and Fee Structure: Estimate resources required to implement stormwater program updates and identified CIP projects.
 - Task 5 - Prepare Stormwater Comprehensive Plan:
 - Prepare a draft SCP update following an outline that will receive formal approval by the City project team
 - Finalize the SCP, incorporate comments from the City, stakeholders, and general public

- Task 6- Advisory Group and Public Involvement: Seek input from internal City advisory group, private property owners, developers, representatives of the development community, and homeowners associations on the SCP.
- Task 7 - Project Management/Contract Administration: Coordinate with other City staff or any subconsultants regarding scope, schedule, budget, and invoices.
- **Cost Estimate Assumptions**: See task descriptions above.
- **Project Priority**: Mandatory

Expenses	Total Costs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Task 1	\$6,000					\$6,000						
Task 2	\$20,000						\$12,000	\$8,000				
Task 3	\$11,000						\$8,000	\$3,000				
Task 4	\$10,000							\$10,000				
Task 5	\$39,000						\$20,000	\$19,000				
Task 6	\$7,000						\$5,000	\$2,000				
Task 7	\$25,000					\$2,000	\$10,000	\$13,000				
City PM	\$32,000					\$2,000	\$15,000	\$15,000				
TOTAL EXPENSES	\$150,000					\$10,000	\$70,000	\$70,000				

CLIENT: City of Lacey
 PROJECT: Stormwater Comprehensive Plan - CIP Cost Estimates

PROJECT 21 - Hicks Lake to Pattison Lake Conveyance Repair (Note: City will fund 50 percent of this cost)

Prepared by: M. Fontaine
 Checked by: M. Brennan
 Revised by: M. Fontaine

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Clearing and Grubbing	0.3	AC	\$10,000	\$3,000	For new creek channel. Bids for Eastsound Wetland project.
Removing Asphalt Conc. Pvmt., Incl. Haul	67	SY	\$30	\$2,010	Remove pavement in driveway. SPU 2007 unit cost report.
Structure Excavation, Class B	8,300	CY	\$10	\$83,000	For excavation of culvert and stream segments upstream and downstream of channel. Assumes trapezoidal stream channel section with 2-1 side slope (H-V) includes overexcavation on each side for stabilization. WSDOT UBA and City of Lacey recent bids.
Stream Channel Excavation, Incl Haul	500	CY	\$40	\$20,000	For stream extension, WSDOT UBA, high end for difficult access.
Shoring or Extra Excavation Class B	2,100	SF	\$12	\$25,200	Culvert segment only. 15 ft depth. WSDOT personal communication.
Haul	8,770	CY	\$10	\$87,700	Assumes all excavated material must be hauled offsite, except backfill above culvert. Assumes short haul.
Controlled Density Fill	100	CY	\$110	\$11,000	Stabilize abandoned pipe. WSDOT UBA for unit price.
Bank Run Gravel for Trench Backfill	30	CY	\$10	\$300	Backfill above culvert.
Crushed Surfacing, Base Course	11	TN	\$100	\$1,100	City of Lacey recent bids. High end for small qty.
Permeable Ballast	40	TN	\$100	\$4,000	Foundation for culvert footing. High end for small qty.
HMA for Pavement Repair	15	TN	\$200	\$3,000	Repair driveway. WSDOT UBA and City of Lacey recent bids. High end for small qty.
3 Sided Concrete Culvert Structure	50	LF	\$1,170	\$58,500	Unit price based on quote from Old Castle Precast, Ted Reynolds, 253-561-8132, cost includes delivery to site and 20% markup for overhead and installation.
Seeding, Fertilizing, and Mulching	0.10	AC	\$8,000	\$771	Restore lawn on east side of project area. 210' L x 20' W. WSDOT UBA. High end for small qty.
Headwalls	2	EA	\$1,500	\$3,000	Upstream and downstream end of culvert. Quote from Old Castle, see above.
Debris Barrier for Culvert Inlet	1	LS	\$2,000	\$2,000	Engineers estimate.
Riparian / Wetland Planting	0.5	AC	\$40,000	\$20,000	Site restoration, unit price based on recent bids.
Streambank Stabilization - Low Bank	300	LF	\$150	\$45,000	New downstream channel. Bioengineered treatments, both sides.
Streambank Stabilization - High Bank	350	LF	\$250	\$87,500	High bank upstream and downstream of culvert. Bioengineered treatments, both sides.
Streambed Gravel	660	TN	\$50	\$33,000	Assume 20' wide channel and 1' thickness. WSDOT UBA. With road wads. Part of mitigation for work in critical area, unit price based on recent bids for Herrera projects.
Large Wood Pieces	6	EA	\$2,000	\$12,000	Recent bids for Herrera projects.
Misc. Site Restoration	1	LS	\$5,000	\$5,000	Private property and site access restoration. Engineers estimate.
TOTAL DIRECT COSTS:				\$510,000	Rounded to nearest \$10,000.
MARKUPS					
Mobilization			8%	\$40,800	
Temporary Erosion and Sediment Control			2%	\$10,200	
Temporary Dewatering			2%	\$10,200	Use existing pipe for streamflow bypass prior to filling with CDF.
Traffic Control			2%	\$10,200	
Contingency			40%	\$204,000	Agency requirements for fish passage are not yet known. Current Willingness of property owners is unknown and no easement costs are included in estimate.
Sales Tax			8.7%	\$68,330	
Total Construction Cost:				\$900,000	Rounded to nearest \$100,000.
PREDESIGN COSTS					
Survey		LS	\$10,000	\$10,000	Base mapping of culvert alignment and stream. Requires survey in difficult terrain.
Geotechnical Evaluation		LS	\$20,000	\$20,000	For culvert footing.
Pre-design		LS	\$10,000	\$10,000	Complete the agency consultation and preliminary design development.
OTHER PROJECT COSTS					
Total Pre-design (Survey, Geotech, Pre-design)				\$40,000	
Design		LS	\$100,000	\$100,000	Assumes simple alternatives analysis, basic hydrologic analysis, and preparation of PS&E. Does not include development of custom HSPF model for basin. May vary depending on fish passage requirements.
Permitting		LS	\$40,000	\$40,000	Assumes SEPA checklist, Critical Areas review, wetland delineation, JARPA, and ESA biological assessment.
Construction Management		15%	\$135,000	\$135,000	
City of Lacey Project Management		5%	\$45,000	\$45,000	
Total Estimated Project Cost:				\$1,260,000	Rounded to nearest \$10,000.

APPENDIX E

Program Level of Effort (hours) Estimate

Table 1. Summary of current activities, gaps, and staffing needs for implementation of the City of Lacey Stormwater Management Program.

Permit Major Requirement	2013				2014				2015				2016				2017				2018	
	1Q	2Q	3Q	4Q	1Q	2Q																
Stormwater Program Administration and Management																						
Stormwater Program Management hours	320	330	270	260	320	320	310	350	360	300	290	350	330	280	280	320	320	270	260	290	310	
Stormwater O&M hours	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	
Total Hours	760	770	710	700	760	760	760	750	790	800	740	730	790	770	720	720	760	760	710	700	730	750
Public Education and Outreach																						
Stormwater Program Management hours	50	138	30	10	90	162	70	50	74	154	46	26	66	154	30	10	50	138	30	10	50	138
Stormwater O&M hours	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	50	138	30	10	90	162	70	50	74	154	46	26	66	154	30	10	50	138	30	10	50	138
Public Involvement and Participation																						
Stormwater Program Management hours	10	30	18	10	10	30	18	10	10	30	18	10	10	30	18	10	10	30	18	10	10	30
Stormwater O&M hours	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	10	30	18	10	10	30																
Illicit Discharge Detection and Elimination																						
Stormwater Program Management hours	200	208	206	206	182	190	182	182	182	190	182	182	174	182	174	174	174	198	190	206	174	182
Stormwater O&M hours	200	208	318	318	318	326	318	318	318	326	318	318	318	326	318	318	318	326	318	318	318	326
Total Hours	400	416	524	524	500	516	500	500	500	516	500	500	492	508	492	492	492	524	508	524	492	508
Controlling Runoff from New Development,																						
Stormwater Program Management hours	178	178	186	186	202	202	310	310	302	302	302	294	334	258	266	290	274	210	218	218	202	210
Stormwater O&M hours	580	550	554	576	596	566	574	596	596	566	574	596	616	586	594	616	616	586	594	616	616	586
Total Hours	758	728	740	762	798	768	884	906	898	868	876	890	950	844	860	906	890	796	812	834	818	796
Pollution Prevention and Operation and																						
Stormwater Program Management hours	236	220	220	220	228	212	220	220	236	220	212	212	228	212	212	228	212	212	212	228	212	212
Stormwater O&M hours	2,160	2,342	3,208	2,082	2,080	2,310	3,198	2,080	2,088	2,308	3,200	2,082	2,080	2,310	3,200	2,082	2,080	2,310	3,200	2,082	2,080	2,310
Total Hours	2,396	2,562	3,428	2,302	2,308	2,522	3,418	2,300	2,324	2,528	3,412	2,294	2,308	2,522	3,412	2,294	2,308	2,522	3,412	2,294	2,308	2,522
Monitoring																						
Stormwater Program Management hours	40	40	8	8	0	0	2	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0
Stormwater O&M hours	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	40	40	8	8	0	0	2	0	0	0												
Compliance with Total Maximum Daily Loads																						
Stormwater Program Management hours	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Stormwater O&M hours	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	24																					
Reporting																						
Stormwater Program Management hours	80	0	0	0	80	0	0	0	60	0	0	0	60	0	0	0	60	0	0	0	60	0
Stormwater O&M hours	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	80	0	0	0	80	0	0	0	60	0												
Non-NPDES Permit Activities (Underground)																						
Stormwater Program Management hours	40	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stormwater O&M hours	100	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	140	56	0																			
Totals																						
Stormwater Program Management hours	1,178	1,184	962	924	1,136	1,140	1,146	1,106	1,238	1,280	1,086	1,038	1,246	1,190	1,006	1,000	1,140	1,132	964	940	1,038	1,106
Stormwater O&M Crew hours	3,480	3,580	4,520	3,416	3,434	3,642	4,530	3,434	3,442	3,640	4,532	3,436	3,454	3,662	4,552	3,456	3,454	3,662	4,552	3,456	3,454	3,662
Total Stormwater Program Management FTEs	2.7	2.7	2.2	2.1	2.6	2.6	2.6	2.5	2.8	2.9	2.5	2.3	2.8	2.7	2.3	2.3	2.6	2.6	2.2	2.1	2.3	2.5
Total Stormwater O&M Crew FTEs	7.9	8.1	10.2	7.7	7.8	8.2	10.2	7.8	7.8	8.2	10.3	7.8	7.8	8.3	10.3	7.8	7.8	8.3	10.3	7.8	7.8	8.3
Average Stormwater Program Management FTEs	2.5																					
Average Stormwater O&M Crew FTEs	8.3																					
Total FTEs	9.0																					

Table 2. Stormwater Program Management labor hours for implementation of the City of Lacey's Stormwater Management Program. ^{1,2}

Task ID	Task	2013				2014				2015				2016				2017				2018		Current Activity/ Gap/New Activity ³	Deadline	Assumptions	
		1Q	2Q	3Q	4Q	1Q	2Q																				
Stormwater Program Administration and Management																											
	Development and management of the stormwater program.	320	330	270	260	320	320	320	310	350	360	300	290	350	330	280	280	320	320	270	260	290	310	Current activity		Ongoing	management of an NPDES permit compliant stormwater program requires additional engineering staff time for supervision, communication, and prioritization that is equivalent to 40 percent of the time spent on the five primary components listed in the NPDES permit.
Public Education and Outreach																											
PE-1	Continue participating in Lacey Spring Fun Fair.	48				48				48				48				48				48		Current activity	NA	Fair is hosted in May (2Q). 2-day fair (16 hours) with time for set-up and take down (4 hours) and preparing materials (4 hours). Assumes 2 staff members attend	
PE-2	Continue participating in Nisqually Watershed Festival.		20				20				20				20				20					Current activity	NA	Festival is hosted in August (3Q) each year. 1-day festival (6 hours) with time for set-up and take down (2 hours) and preparing materials (2 hours). Assumes 2 staff members attend	
PE-3	Continue participating in SEA Cinema (Environmental Film Festival).	10				10				10				10				10				10		Current activity	NA	Festival is held in June (2Q). 1-day festival (6 hours) with time for set-up and take down (4 hours) and preparing materials (4 hours). Assumes 1 staff member attends	
PE-4	Continue participating in the Lacey Community Market Pet Day, Home & Garden Day, and Family Day.																							Current activity	NA	Pet Day, Home & Garden Day, and Family Day are held in August (3Q). 1-day (6 hours) with time for set-up and take-down (2 hours) and preparing materials (2 hours) for each event. Assumes 2 staff members attend.	
PE-5	Continue to host stormwater pond workshop for homeowners' associations.	30				16	30			8	30			30				30				30		Current activity (modified)	NA	Workshop is held every year in the spring (April). Workshop (2 hours) with time for set-up and take down (1 hour) and updating and preparing materials (5 hours), and advertising (2 hours). Assumes 3 staff members participate. Assumes 16 hours in 2014 (1Q) and 8 hours in 2015 (1Q) to modify workshop to address maintenance of other stormwater facilities in addition to ponds	
PE-6	Update records of public education and outreach activities.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	Current activity	Ongoing	Maintain records of all public education and outreach activities listed above as well as any educational activities not listed.	
PE-7	Lacey Schools Program	40	40			40	40			40	40			40	40			40	40			40	40	Current activity	NA	Assumes 40 hours per quarter for 1Q and 2Q with 2 staff members participating	
PE-8	Develop educational materials for home-based and mobile businesses.																							Gap	Ongoing	Assumes that brochures and letters are prepared in 2011-2012 and mailed in 2012.	
PE-9	Develop educational materials for engineers, contractors, developers, review staff, and land use planners.																							Gap	Ongoing	Assumed that brochures and materials are prepared and distributed in 2012.	
PE-10	Develop new educational materials and update old educational materials as future needs are identified.	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	Gap	Ongoing	1 day per quarter to prepare new educational material and update old material.	
PE-11	Develop and distribute new educational materials for one new targeted audience and one new subject area.					24	24	16	16															New activity	Before Feb. 2, 2015	Assumes that new materials are developed and distributed in 2014.	
PE-12	Measure the understanding and adoption of the targeted behaviors for the new targeted audience and subject area.						24	24		16	16	16	16											New activity	Feb. 2, 2015	Assumes a baseline survey occurs in 3Q and 4Q of 2014 and the measurement of the understanding and adoption of targeted behaviors occurs in 2015.	
PE-13	Evaluate the changes in adoption of the targeted behaviors and modify public education and outreach program as needed.													16	16									New activity	Feb. 2, 2016	Assumes that the evaluation of the the understanding and adoption of targeted behaviors occurs in 2016.	
Total number of hours per quarter for this permit section		50	138	30	10	90	162	70	50	74	154	46	26	66	154	30	10	50	138	30	10	50	138				
Public Involvement and Participation																											
PI-1	Public meetings during the Stormwater Comprehensive Plan development process.																							Current activity	NA	Public meeting (4 hours) in April 2012 with time for preparation (4 hours). Assumes 2 staff members attend.	
PI-2	Presentation and Public Hearing with Planning Commission.																							Current activity	NA	Presentation for Planning Commission in April 2012 and final public hearing in May 2012.	
PI-3	Preparing quarterly <i>Stream Team Newsletter</i> .	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	Current activity	Ongoing	April and October 2010 newsletters	
PI-4	Preparing annual stormwater utility newsletter (<i>The Wet Street Journal</i>).		16	8			16	8			16	8			16	8			16	8			16	Current activity	Ongoing	Annual newsletter	
PI-5	Posting revised SWMP document and Phase II permit annual report on the City website.	4				4				4				4				4				4		Current activity	May 31 of each year	Deadline for posting Annual Report and SWMP provided in 2013-2018 NPDES Phase II Permit.	
Total number of hours per quarter for this permit section		10	30	18	10	10	30																				
Illicit Discharge Detection and Elimination																											
IDDE-1	Updating storm sewer map.	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	Current activity	Ongoing	Coordination with the O&M crew, updating the storm sewer map, incorporating additional information collected in the field, and providing information to other IDDE team members as requested. Assumes 75% of time is for GIS staff.	
IDDE-2	Implementing an ongoing program to detect and eliminate illicit discharges	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	Current activity	Ongoing	Assistance with implementation of the IDDE program.	
IDDE-3	Conduct field assessment on one priority waterbody per year. Oversee field crews during investigation and detection in response to reports of illicit discharge. Conduct elimination and enforcement activities	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	Current activity	Dry weather assessment (2012), Remaining requirements are ongoing	Preparation for field assessments (2012 only). Planning and oversight of field crews, analysis of results, and ongoing oversight of investigation and enforcement of illicit discharges reported by the public and City staff (ongoing).	
IDDE-4	Refresher IDDE training for municipal staff	8				8				8				8				8				8		Current activity	Ongoing	Refresher training occurs once annually and is taught by City staff	
IDDE-5	Developing educational materials to inform businesses and the general public of the hazards associated with illegal discharges and improper disposal of waste.	40	40																					Gap	Ongoing	Development of public education material; develop an approach for efficiently and effectively distributing information; and conduct ongoing education and outreach with businesses, homeowners, and City staff. The hours allotted to this task could vary depending on the level of effort for outreach	
IDDE-6	Implement procedures for IDDE program evaluation (number and type of spills, ID, inspections, and feedback from public education efforts).	10	10																					Gap	Ongoing	Staff time to oversee development of procedures for performing program evaluation and implementing those procedures.	
IDDE-7	Developing and testing a tracking form for calls to the spill response hotline																							Gap	NA	Assumes that forms are developed and tested in 2012.	
IDDE-8	Improving coordination between the Community Development/Building and the Public Works Departments regarding response and enforcement for construction projects.	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	Gap	Ongoing	Assumes quarterly meetings.	
IDDE-9	Working cooperatively with the Health Department and the Fire District to ensure that hazardous materials in the designated McAllister Springs Geologically Sensitive area are properly contained.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	Gap	Ongoing	Assumes a low-level of effort for ongoing coordination.	
IDDE-10	Update IDDE ordinance														16	16	32							New activity	Feb. 2, 2018	Only minor edits are required to the existing ordinance. Ordinance will be updated at the end of 2017 to meet the 2018 permit deadline.	
IDDE-11	Implement an IDDE compliance strategy that includes informal compliance actions such as public education and technical assistance as well as enforcement.		16	16		16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	New activity	Ongoing	Ongoing implementation of expanded compliance strategy. Public education and enforcement are already addressed in IDDE-3 and IDDE-5, respectively. Note that the permit states what the compliance strategy "should" contain, not what it "must" contain	
IDDE-12	Select and implement a field screening methodology appropriate to the City's storm drainage system. Complete field screening for 40% of storm drainage system by December 31, 2017, 12% each year thereafter.		40	40		16	16	16	16	16	16	16	16	8	8	8	8	8	8	8	8	8	8	New activity	40 percent by Feb. 2, 2016; 20 percent per year after Feb. 2, 2016	Methodology will be selected in 2013. Assumes that the selected methodology will not include TV pipe inspection. This task also includes planning and oversight of field crews.	
Total number of hours per quarter for this permit section		200	208	206	206	182	190	182	182	182	190	182	182	174	182	174	174	174	198	190	206	174	182				

Table 2. Stormwater Program Management labor hours for implementation of the City of Lacey's Stormwater Management Program. ^{1,2}

Task ID	Task	2013				2014				2015				2016				2017				2018		Current Activity/ Gap/New Activity ³	Deadline	Assumptions
		1Q	2Q	3Q	4Q	1Q	2Q	1Q	2Q																	
Controlling Runoff from New Development, Redevelopment, and Construction Sites																										
DEV-1	Pre-, during, and post-construction site inspections.	32	32	32	32	48	48	48	48	48	48	48	48	64	64	64	64	64	64	64	64	64	64	Current activity/Gap	Ongoing	Currently are implementing during and post-construction site inspections between the Engineering and Operations divisions, but pre-construction inspections are a gap. Assumes 3 sites at 1 hour each per week (approximately 32 hours per quarter) ramping up to 64 hours per quarter in 2016.
DEV-2	Ongoing recordkeeping for inspection reports, warning letters, notices of violations, and other enforcement records.	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	Current activity	Ongoing	Ongoing recordkeeping and coordination.
DEV-3	Ongoing review of codes and standards for consistency with the 2010 Stormwater Design Manual.	16	16	24	32	16	16	24	32					16	16	24	32	16	16	24	32	16	16	Current activity	Ongoing	Review quarterly, prepare for updates in 3Q, and coordinate updates in 4Q. No activity in 2015 since this Refresher training annually (2Q assumed) and update records. Updating training in 1Q of 2016 and 2017 for consistency with revised/new manual
DEV-4	Ongoing staff training on implementing the 2010 Stormwater Design Manual.		8			8				8				60	8			40	8				8	Current activity (modified)	Ongoing	Developing new forms and procedures. Updating forms and procedures for new/revised manual in 2016.
DEV-5	Improving plan review and enforcement coordination, documentation, and tracking processes and procedures.	16	16	16	16	16	16	16	16	16	16	16	16	40	24	24	24	16	16	16	16	16	16	Gap (modified)	Ongoing	
DEV-6	Conduct staff training on record-keeping of permit-related activities	8				8				8				8				8						Gap	NA	Develop appropriate training and conduct training in 1st quarter of 2012. Refresher training annually and update records.
DEV-7	Revising information management systems to track and report construction, new development, and redevelopment permits, inspection and enforcement actions and Private Drainage Inspection Program inspections and enforcement actions	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	Gap	NA	Assumes work will occur in 2012, 1 day per quarter for entering and reviewing new data.
DEV-8	Coordination between departments, implementation, and tracking for erosion and sediment control inspections.	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	Gap	Ongoing	Assumes quarterly meetings. Additional time for tracking and implementation.
DEV-9	Annual inspections of stormwater treatment and flow control facilities permitted by the City after facilities have been constructed.	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	Gap	Ongoing	24 hours per quarter for administration of requirements for private facilities, including oversight, inspection, and enforcement on private developments
DEV-10	Stormwater plan reviews of new and redevelopment projects.	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	Gap	Ongoing	Assumes consistent workload throughout the year to interpret plans
DEV-11	Developing and implementing a process for notifying owners and operators of active construction sites that the summer construction season ends September 30, and October 1 is the annual start of the seasonal work limitations on land-disturbing activities.			8				8				8				8				8				Gap	Ongoing	Develop process in summer 2012 and implement in fall of 2012. Ongoing notification in 3Q.
DEV-12	Evaluating and implementing additional groundwater protection measures within wellhead protection areas.	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	Gap	Ongoing	Assumes consistent workload throughout the year to evaluate groundwater protection measures and coordinate with other City staff on implementation
DEV-13	Develop and establish post-construction private drainage system maintenance standards for new approved facility types	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	Gap	Ongoing	Assumes a low-level of effort for ongoing management and coordination.
DEV-14	Update 2010 Stormwater Design Manual and code to meet the requirements of S5.C.4.a (new Ecology Stormwater Manual and removal of 1-acre threshold)						100	100		100	100	100	100											New activity	Dec. 31, 2015	Assumes that the 2010 Stormwater Design Manual will be updated internally.
DEV-15	Reviewing and revising local development codes, rules, standards, and other enforceable documents (2010 Stormwater Design Manual) to incorporate and require LID principles and LID BMPs.					8	8	8	8	24	24	24	24	40	40	40	40							New activity	Dec. 31, 2016	Only includes time for the Stormwater Manager. This task will involve a large City-wide effort that will involve many other departments.
DEV-16	Summarizing the results of the review and revision process for incorporating LID principles and LID BMPs with the Fourth Annual Report.															24		24						New activity	March 31, 2017	The summary shall include a list of the participants; codes, rules, standards, and other documents reviewed; and the amendments made to those documents to incorporate and require LID principles and LID BMPs.
Total number of hours per quarter		178	178	186	186	202	202	310	310	302	302	302	294	334	258	266	290	274	210	218	218	202	210			
Pollution Prevention and Operation and Maintenance for Municipal Operations																										
PPOM-1	Overseeing stormwater O&M program (catch basin inspection and cleaning, facility cleaning and maintenance, spill response and control, and flooding response and repair)	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	Current activity	Ongoing	Includes oversight of field crews and record keeping. Also includes time to record inspections, provide inspectors with data as needed, and maintain record keeping system.
PPOM-2	Coordinating updates to standard operating procedures (SOPs) for utility installation, street cleaning, ditch maintenance, and other City activities as needed.	8	8	8	8	8	8	16	16	16	16	8	8	8	8	8	8	8	8	8	8	8	8	Current activity (modified)	Dec. 31, 2015	Reviewing SOPs and checking in with Public Works staff regularly. Updating maintenance standards as necessary for consistency with revised requirements in the 2012 Stormwater Management Manual for Western Washington.
PPOM-3	Refresher training for construction and O&M staff.	16				16				16				16				16				16		Current activity	Ongoing	Review and update training program annually. Assumes 2 staff members attend
PPOM-4	Overseeing implementation of the City Stormwater Pollution Prevention Plan (SWPPP)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	Current activity	Ongoing	Review procedures and checklists quarterly.
PPOM-5	Maintain records of inspections and maintenance or repair activities.	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	Current activity	Ongoing	Coordination with O&M crew. Also assumes time to enter records and maintain the record keeping system.
PPOM-6	Ongoing retrofit program to inspect, maintain, repair, and rehabilitate aging City stormwater facilities	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	Gap	NA	Establishing program and ongoing coordination with the O&M crew.
PPOM-7	Maintaining and updating a CIP project list for stormwater infrastructure	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	Gap	NA	Tracking problems, project planning, and oversight of design and construction
PPOM-8	Researching, purchasing, and implementing software to track catch basin cleaning that can be linked to route books developed by the City.	8	8	8	8																			Gap	NA	Researching software in late 2012, assistance with implementation in 2013.
PPOM-9	Line inspection program to cover programmatic inspection/repair/replacement of the storm system	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	Gap	NA	Starting program and coordination with the O&M crew.
PPOM-10	Active ditch inspection and maintenance program	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	Gap	NA	Starting program and coordination with the O&M crew.
PPOM-11	Active culvert inspection and maintenance program	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	Gap	NA	Starting program and coordination with the O&M crew.
PPOM-12	Improving tracking of stormwater-related problems (i.e., plugged grates, failed facilities, and localized flooding).	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	Gap	NA	Assisting O&M crew with tracking and recordkeeping.
Total number of hours per quarter for this permit section		236	220	220	220	228	212	220	220	236	220	212	212	228	212	212	212	228	212	212	212	228	212			

Table 2. Stormwater Program Management labor hours for implementation of the City of Lacey's Stormwater Management Program. ^{1,2}

Task ID	Task	2013				2014				2015				2016				2017				2018		Current Activity/ Gap/New Activity ³	Deadline	Assumptions
		1Q	2Q	3Q	4Q	1Q	2Q																			
Compliance with Total Maximum Daily Loads																										
TMDL-1	Continuing the Private Stormwater Facilities Maintenance Program (educational resources for commercial and residential stormwater facility/BMP owners)																						Current activity	NA	Hours for this item are presented above under PE-5.	
TMDL-2	Offering bacteria pollution reduction brochures, signage, and pet waste stations to HOAs.	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	Current activity (modified)	NA	Distributing new pet waste stations, follow-up surveys, and distributing brochures.
TMDL-3	Maintain pet waste bag dispenser units in City parks.																							Current activity	NA	Hours for this task are not included in this table since this task is currently handled by City Parks staff. Implementation of this task requires approximately 30 hours per quarter.
TMDL-4	Install educational signage at City facilities/property.																							New activity	NA	Assumes project management in 2012 for installation of 25 educational stormwater signs at City stormwater facilities.
TMDL-5	Continue developing and implementing a fecal coliform bacteria wet weather sampling program for the College Regional Stormwater Facility																							Current activity	Dec. 31, 2013	Hours for this item are presented below under MON-4.
TMDL-6	Develop and implement a coordinated plan with the City of Olympia to detect and eliminate fecal coliform bacteria discharges from the Fones/Taylor wetland treatment facilities.																							New activity	Dec. 31, 2014	This task will most likely be addressed through the City's IDDE program, thus an estimate of hours is not included in this table for now.
TMDL-7	Develop an inventory and map septic systems within the Henderson Inlet watershed.																							New activity	Dec. 31, 2013	Hours for this task are not included in this table since this task is currently handled by the Thurston County Environmental Health Henderson Watershed Septic O&M Program.
TMDL-8	Manage vegetation along Woodland Creek and its tributaries.	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	Current activity	NA	Ongoing tree planting, planting site maintenance, and invasive species removal. Does not include volunteer hours.
Total number of hours per quarter for this permit section		24																								
Monitoring																										
MON-1	Gather data on pollutant loading to better assess the effectiveness of the existing Woodland Creek and Ruddell Road stormwater treatment facilities.	8	8																					Gap	NA	Assumes a consultant or other staff will perform monitoring work. Time included for coordination and data review.
MON-2	Improve monitoring coordination for shared facilities (e.g., the Fones Road Stormwater Facilities) or for areas with multiple authorities (e.g., the Woodland Creek basin where Thurston County has most of the authority at the mouth and headwaters)	8	8																					Gap	NA	Ongoing coordination meetings with Thurston County and other jurisdictions.
MON-3	Considering additional data and research on the effects of residential development on groundwater quality in future evaluation of appropriate density and standards for zoning.	24	24																					Gap	NA	Review data and research projects (3 days per quarter).
MON-4	Develop monitoring protocol to perform this monitoring at the College Regional Stormwater Facility																							Gap	Dec. 31, 2013	Per agreement with St. Martin's Abbey
MON-5	Decide whether to pay into a collective fund to implement the Regional Stormwater Monitoring Program (RSMP) for the following program components: Status and Trends Monitoring, Effectiveness Studies, and Source Identification and Diagnostic Monitoring.			8	8																			New activity	Dec. 1, 2013	
MON-6	Send payments to Ecology annually or develop a Quality Assurance Project Plan (QAPP) and submit results to Ecology annually (or quarterly for Source Identification and Diagnostic Monitoring).							2				2				2				2				New activity	Payments due: Aug. 15 of each year (beginning in 2014) or results due annually (starting in 2014) or quarterly (starting May 1, 2014)	Level of effort assumes that the City will choose the pay-in option for the RSMP. The level of effort will be modified if the City decides to implement their own monitoring.
Total number of hours per quarter for this permit section		40	40	8	8	0	0	2	0	0	0															
Reporting																										
RPT-1	Submit fourth annual report and copy of current SWMP document.																							Current activity	March 31, 2012	Update the previous annual report with new accomplishments and planned activities.
RPT-2	Submit fifth annual report and copy of current SWMP document.	80																						Current activity ⁴	March 31, 2013	Update the previous annual report with new accomplishments and planned activities. Additional time to address requirements of the new permit.
RPT-3	Submit first annual report and Stormwater Management Program Report (SWMP) for the 2013-2018 permit. First annual report shall include information on staff organization, roles, and responsibilities related to stormwater.					80																		New activity	March 31, 2014	Update the previous annual report with new accomplishments. Update the SWMP with planned activities. Additional time to identify all departments within the City that conduct stormwater-related activities, their roles and responsibilities under the permit, and develop a current organizational chart with key personnel to be included with the annual report.
RPT-4	Submit the second, third, and fifth annual reports and SWMPs for the 2013-2018 permit.									60				60								60		New activity	March 31, 2015; March 31, 2016; and March 31, 2018	Update the previous annual report with new accomplishments. Update the SWMP with planned activities.
RPT-5	Submit the fourth annual report and SWMP for the 2013-2018 permit. Fourth annual report shall include a summary of the review and revision process for incorporating LID principles and LID BMPs City codes, rules, standards, and enforceable documents.																	60						New activity	March 31, 2017	Update the previous annual report with new accomplishments. Update the SWMP with planned activities. Additional time to incorporate the summary of the review and revision process for incorporating LID principles and LID BMPs into local development codes, rules, standards, and other enforceable documents included in DEV-15.
Total number of hours per quarter for this permit section		80	0	0	0	80	0	0	0	60	0															
Non-NPDES Permit Activities (Underground Injection Control Regulations)																										
UIC-1	Registering UIC wells with Ecology																							Gap	Feb. 3, 2011	Determining the number and location of City-owned UIC wells.
UIC-2	Conducting well assessments on the City's UIC wells.	40	16																					Gap	Feb. 3, 2013	Coordination with O&M crew and record keeping.
Total number of hours per quarter to address this regulation		40	16	0																						
Total number of hours per quarter		1,178	1,184	962	924	1,136	1,140	1,146	1,106	1,238	1,280	1,086	1,038	1,246	1,190	1,006	1,000	1,140	1,132	964	940	1,038	1,106	1,122		
Total number of FTEs per quarter		2.7	2.7	2.2	2.1	2.6	2.6	2.6	2.5	2.8	2.9	2.5	2.3	2.8	2.7	2.3	2.3	2.6	2.6	2.2	2.1	2.3	2.5	2.5		

Assumptions and Notes.
 1. Activities will be performed at a rate that meets the requirements of the NPDES Phase II Permit. Assumes that hours for required activities will shift to the following quarter if they are not implemented during the quarter designated in this table.
 2. FTE estimates assume 15% of staff time in each quarter is used for vacation, holidays, sick days, training, other admin duties (e.g., FTE calculated as # weeks times 40 hours per week times 85%)
 3. Current activities based on SWMP (Lacey 2010) and discussions with City staff. Gaps include permit requirements that are not currently being fully met. New activities based on the Draft NPDES Phase II Permit (Oct. 2011).
 4. Assumes that a fifth annual report will be due on March 31, 2013, consistent with the current permit requirements.

Table 3. Stormwater O&M crew labor hours for implementation of the City of Lacey's Stormwater Management Program. ^{1,2}

Task ID	Task	2013				2014				2015				2016				2017				2018		Current Activity/ Gap/New Activity ³	Deadline	Assumptions	
		1Q	2Q	3Q	4Q	1Q	2Q																				
Stormwater O&M Crew Management and Supervision																											
	Management and oversight of NPDES related work performed by public works crews.	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	Current activity	Ongoing	Ongoing coordination with field crews regarding stormwater O&M. Assumes 1 FTE.	
Illicit Discharge Detection and Elimination																											
IDDE-1	Updating storm sewer map.	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	Current activity	Ongoing	Maintaining storm sewer map and entering input data received from the field. Assumes 20 hour per quarter for each of 4 O&M staff.	
IDDE-2	Implementing an ongoing program to detect and eliminate illicit discharges.	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	Current activity	Ongoing	Conducting inspections in response to illicit discharge reports received from the public and City staff. Assumes up to 80 calls per year with approximately 2 hours and 3 O&M staff responding to each.	
IDDE-3	Conduct field assessment on one high priority site per year.																							Current activity	Dry weather assessment (2012)	2 person crew for approximately 3 days (dry weather inspections in 3Q).	
IDDE-4	Refresher IDDE training for municipal staff.	8				8				8				8				8				8		Current activity	Ongoing	Hours included for 4 O&M staff to attend training. Storm supervisor hours not included since they have been accounted for previously.	
IDDE-11	Implement an IDDE compliance strategy that includes informal compliance actions such as public education and technical assistance as well as enforcement.			8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	New activity	Ongoing	Ongoing implementation of expanded compliance strategy.	
IDDE-12	Select and implement a field screening methodology appropriate to the City's storm drainage system. Complete field screening for 40% of storm drainage system by December 31, 2017, 12% each year thereafter.			110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	New activity	Complete field screening for 40% of storm drainage system by December 31, 2017, 12% each year thereafter	Methodology will be selected in 2013. Assumes that the selected methodology will not include TV pipe inspection. Assumes 25% FTE based on projected staffing needs to support this task.	
Total number of hours per quarter for this permit section		200	208	318	318	318	326																				
Controlling Runoff from New Development, Redevelopment, and Construction Sites																											
DEV-1	Pre-, during, and post-construction site inspections.	40	40	40	40	60	60	60	60	60	60	60	60	80	80	80	80	80	80	80	80	80	80	Current activity/Gap	Ongoing	Currently are implementing during and post-construction site inspections between the Engineering and Operations divisions, but pre-construction inspections are a gap. Assumes 1 hour per site per week, 40 hours per quarter ramping up to 80 hours per quarter in 2016.	
DEV-2	Ongoing recordkeeping for inspection reports, warning letters, notices of violations, and other enforcement records.	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	Current activity	Ongoing	Assumes 2 days per quarter for recordkeeping and coordination.	
DEV-4	Conducting staff training and public education and outreach on implementing the 2010 Stormwater Design Manual.	8				8				8				8				8				8		Current activity	Ongoing	Hours included for 4 O&M staff to attend training. Storm supervisor hours not included since they have been accounted for previously.	
DEV-8	Coordination between departments, implementation, and tracking for erosion and sediment control inspections.	40	2	2	40	40	2	2	40	40	2	2	40	40	2	2	40	40	2	2	40	40	2	Gap	Ongoing	Assumes quarterly meetings. Additional time for tracking and implementation in the 1st and 4th quarters.	
DEV-9	Annual inspections of stormwater treatment and flow control facilities permitted by the City after facilities have been constructed.	480	480	480	480	480	480	480	480	480	480	480	480	480	480	480	480	480	480	480	480	480	480	Current activity/Gap	Ongoing	Assumes 1 FTE for inspection and enforcement of private facility maintenance requirements (businesses) plus 40 hours per quarter for support from other O&M staff (HOAs).	
DEV-11	Developing and implementing a process for notifying owners and operators of active construction sites that the summer construction season ends September 30, and October 1 is the annual start of the seasonal work limitations on land-disturbing activities.	4	4	16			16				16				16				16					Gap	Ongoing	Develop process in summer 2012 and implement in fall of 2012. Ongoing notification in 3Q.	
Total number of hours per quarter for this permit section		580	550	554	576	596	566	574	596	596	566	574	596	616	586	594	616	616	586	594	616	616	586				

Table 3. Stormwater O&M crew labor hours for implementation of the City of Lacey's Stormwater Management Program. ^{1,2}

Task ID	Task	2013				2014				2015				2016				2017				2018		Current Activity/ Gap/New Activity ³	Deadline	Assumptions			
		1Q	2Q	3Q	4Q	1Q	2Q																						
Pollution Prevention and Operation and Maintenance for Municipal Operations																													
implementing stormwater O&M program. Includes:																													
PPOM-1	<ul style="list-style-type: none"> Inspecting ponds, catch basins, vaults, and outfalls annually. Catch basin cleaning. Conducting spot checks of treatment and flow control facilities after major storm events. Additional maintenance of public stormwater facilities in order to meet permit requirements. 	1700	1710	2560	1710	1700	1710	2550	1700	1700	2560	1710	1700	1710	2560	1710	1700	1710	2560	1710	1700	1710	2560	1710	1700	1710	Current activity	Ongoing	Includes time spent on annual inspection and maintenance of ponds, catch basins, vaults, and outfalls; catch basin cleaning; and spot checks of facilities after storm events. Assumes 2 additional FTEs during 3Q due to seasonal help. Assumes fewer hours when public works crews are performing other PPOM current activities.
PPOM-2	Reviewing and updating standard operating procedures (SOPs) for utility installation, street cleaning, ditch maintenance, and other City activities as needed.	16	8	8	8	16	8	16	16	24	16	8	8	16	8	16	8	16	8	16	8	16	8	16	8	Current activity (modified)	Dec. 31, 2015	Assumes that additional staff time is spent during the first quarter each year updating the pollution prevention practices and training plans. Updating maintenance standards as necessary for consistency with revised requirements in the 2012 Stormwater Management Manual for Western Washington.	
PPOM-3	Refresher training for construction and O&M staff.			40				40						40												Current activity	Ongoing	40 hours per year for public works crew to attend annual refresher training.	
PPOM-4	Implementation of the City Stormwater Pollution Prevention Plan (SWPPP)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	Current activity	Ongoing	3 days per quarter to implement and follow additional operations BMPs and to perform regular inspections of equipment and facilities.	
PPOM-5	Maintain records of inspections and maintenance or repair activities.	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	Current activity	Ongoing	3 days per quarter for additional record keeping duties. Additional recordkeeping is the responsibility of engineering staff. See Table 2.	
PPOM-6	Ongoing retrofit program to inspect, maintain, repair, and rehabilitate aging City stormwater facilities	40	80	80	40	40	80	80	40	40	80	80	40	40	80	80	40	40	80	80	40	40	80	80	40	Gap	NA	Includes time for inspections in 2Q and 3Q and recordkeeping for 1Q and 4Q. Does not include time for maintenance or repair since those costs will be incorporated into CIP project cost estimates. Additional inspections above and beyond what is required for PPOM-1.	
PPOM-7	Maintaining and updating a CIP project list for stormwater infrastructure.	24	8	8	24	24	8	8	24	24	8	8	24	24	8	8	24	24	8	8	24	24	8	8	24	Gap	NA	Coordinating with engineering staff in the winter months (1Q and 4Q) to prepare CIP list. Ongoing coordination in summer months during inspections.	
PPOM-8	Implementing software to track catch basin cleaning that can be linked to route books developed by the City.	80	32	8																						Gap	NA	Implementation and training on how to use new software in 2013.	
PPOM-9	Line inspection program to cover programmatic inspection/repair/replacement of the storm system		220	220			220	220			220	220			220	220							220			Gap	NA	Assumes 25% FTE based on projected staffing needs to support this task.	
PPOM-10	Active ditch inspection and maintenance program.	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	Gap	NA	Assumes 25% FTE based on projected staffing needs to support this task.	
PPOM-11	Active culvert inspection and maintenance program.	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	Gap	NA	Assumes 25% FTE based on projected staffing needs to support this task.	
PPOM-12	Improving tracking of stormwater-related problems (i.e., plugged grates, failed facilities, and localized flooding).	32	16	16	32	32	16	16	32	32	16	16	32	32	16	16	32	32	16	16	32	32	16	16	32	Gap	NA	Ongoing effort (assumes 2 days per quarter in 2Q and 3Q, 4 days per quarter in 1Q and 4Q).	
Total number of hours per quarter for this permit section		2160	2342	3208	2082	2080	2310	3198	2080	2088	2308	3200	2082	2080	2310	3200	2082	2080	2310	3200	2082	2080	2310						
Non-NPDES Permit Activities (Underground Injection Control Regulations)																													
UIC-1	Registering UIC wells with Ecology	20																								Gap	Feb. 3, 2011	Spot checks on stormwater facilities to verify number and location of City-owned UIC wells.	
UIC-2	Conducting well assessments on the City's UIC wells.	80	40																							Gap	Feb. 3, 2013	Assumes 1 week per quarter in 3Q and 4Q 2012 with 2 O&M staff for well assessments. Hours in 1Q 2013 are for follow-up record keeping.	
Total number of hours per quarter to address this regulation		100	40	0	0																								
Total number of hours per quarter		3,480	3,580	4,520	3,416	3,434	3,642	4,530	3,434	3,442	3,640	4,532	3,436	3,454	3,662	4,552	3,456	3,454	3,662	4,552	3,456	3,454	3,662	3,454	3,662	3,687			
Total number of FTEs per quarter		7.9	8.1	10.2	7.7	7.8	8.2	10.2	7.8	7.8	8.2	10.3	7.8	7.8	8.3	10.3	7.8	7.8	8.3	10.3	7.8	7.8	8.3	7.8	8.3	8.3			

Assumptions and Notes.
 1. Activities will be performed at a rate that meets the requirements of the NPDES Phase II Permit. Assumes that hours will shift to the following quarter if they are not implemented during the quarter designated in this table.
 2. FTE estimates assume 15% of staff time in each quarter is used for vacation, holidays, sick days, training, other admin duties (e.g., FTE calculated as 52 weeks per year times 40 hours per week times 85%)
 3. Current activities based on SWMP (Lacey 2010) and discussions with City staff. Gaps include permit requirements that are not currently being fully met. New activities based on the Draft NPDES Phase II Permit (Oct. 2011).

APPENDIX F

Summary of 10-Year Financial Forecast

City of Lacey

Stormwater Utility Rate Analysis

Summary

Key Assumptions	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Minimum Oper Reserve (days of O&M expense)	60 days										
Target Capital Contingency (% of asset original cost)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Target System Reinvestment (% of full deprec)	13%	0%	0%	20%	25%	25%	25%	25%	25%	25%	25%

Capital Funding	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Total Capital Projects	2013 Dollars:	\$ 273,000	\$ 2,681,500	\$ 1,209,500	\$ 264,000	\$ 166,000	\$ 734,001	\$ 986,000	\$ 956,999	\$ 1,782,500	\$ 1,869,500	\$ 518,000
	Escalated:	273,000	2,788,760	1,308,195	296,964	194,197	893,024	1,247,604	1,259,346	2,439,474	2,660,881	766,767
Grant Proceeds	\$ 177,500	\$ 1,176,800	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Rates *	95,500	227,960	1,308,195	296,964	194,197	(406,976)	1,247,604	(1,540,654)	2,439,474	560,881	766,767	766,767
Revenue Bond Proceeds	-	1,384,000	-	-	-	1,300,000	-	2,800,000	-	2,100,000	-	-
Total Funding Sources	\$ 273,000	\$ 2,788,760	\$ 1,308,195	\$ 296,964	\$ 194,197	\$ 893,024	\$ 1,247,604	\$ 1,259,346	\$ 2,439,474	\$ 2,660,881	\$ 766,767	

* Includes system reinvestment funds as well as draws from/(additions to) capital fund balance.

Revenue Requirements	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Revenues											
Rate Revenues Under Existing Rates	\$ 2,133,749	\$ 2,160,421	\$ 2,187,426	\$ 2,214,769	\$ 2,242,454	\$ 2,270,484	\$ 2,298,865	\$ 2,327,601	\$ 2,356,696	\$ 2,386,155	\$ 2,415,982
Non-Rate Revenues	14,445	16,782	20,857	16,107	16,341	15,584	15,030	15,922	15,884	17,590	18,037
Total Revenues	\$ 2,148,194	\$ 2,177,203	\$ 2,208,283	\$ 2,230,876	\$ 2,258,795	\$ 2,286,068	\$ 2,313,895	\$ 2,343,523	\$ 2,372,580	\$ 2,403,745	\$ 2,434,019
Expenses											
Cash Operating Expenses	\$2,022,063	\$2,086,556	\$2,452,282	\$2,533,242	\$2,617,091	\$2,703,943	\$2,793,918	\$2,887,140	\$2,983,738	\$3,083,850	\$ 3,187,617
Debt Service - New Revenue Bonds	-	122,072	122,072	122,072	122,072	236,735	236,735	483,701	483,701	668,925	668,925
Rate-Funded Capital	-	-	494,224	-	-	-	-	-	-	-	-
Rate-Funded System Reinvestment	200,000	-	-	337,213	424,444	424,444	428,139	438,261	442,252	442,252	478,011
Total Expenses	\$ 2,222,063	\$ 2,208,627	\$ 3,068,578	\$ 2,992,527	\$ 3,163,607	\$ 3,365,122	\$ 3,458,792	\$ 3,809,102	\$ 3,909,691	\$ 4,195,027	\$ 4,334,553
Cash Surplus / (Deficiency)	\$ (73,869)	\$ (31,424)	\$ (860,296)	\$ (761,652)	\$ (904,812)	\$ (1,079,053)	\$ (1,144,897)	\$ (1,465,578)	\$ (1,537,111)	\$ (1,791,283)	\$ (1,900,534)
Annual Rate Adjustment	0.00%	9.00%	9.00%	9.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
Cumulative Annual Rate Adjustment	0.00%	9.00%	18.81%	29.50%	37.27%	45.51%	54.24%	63.49%	73.30%	83.70%	94.72%
After Rate Increase:											
Rate Revenues	\$ 2,133,749	\$ 2,354,859	\$ 2,598,881	\$ 2,868,190	\$ 3,078,285	\$ 3,303,769	\$ 3,545,770	\$ 3,805,498	\$ 4,084,251	\$ 4,383,422	\$ 4,704,508
Net Cash Flow	(73,869)	160,097	(455,012)	219,181	(81,518)	(61,268)	83,305	(9,850)	164,530	176,026	353,664
Operating Reserve	191 days	214 days	90 days	90 days	75 days	64 days	73 days	70 days	88 days	90 days	90 days
Debt Service Coverage (target: at least 1.25)	n/a	2.39	1.43	2.89	3.94	2.63	3.30	1.95	2.36	1.98	2.31
Projected Outstanding Debt	\$ -	\$ -	\$ 1,475,277	\$ 1,426,969	\$ 1,376,246	\$ 1,322,986	\$ 2,652,801	\$ 2,548,706	\$ 5,424,072	\$ 5,211,574	\$ 7,226,951
Outstanding Debt as % of Net Capital Assets	0.0%	2.9%	2.6%	2.5%	2.3%	4.5%	4.1%	8.3%	7.5%	9.8%	9.1%

Single Family Rate Forecast	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Single Family Monthly Rate	\$7.36	\$8.03	\$8.75	\$9.54	\$10.11	\$10.72	\$11.36	\$12.04	\$12.76	\$13.53	\$14.34
\$ Increase in Single Family Monthly Rate	-	\$0.67	\$0.72	\$0.79	\$0.57	\$0.61	\$0.64	\$0.68	\$0.72	\$0.77	\$0.81
Cumulative \$ Increase since 2013	-	\$0.67	\$1.39	\$2.18	\$2.75	\$3.36	\$4.00	\$4.68	\$5.40	\$6.17	\$6.98

Ending Fund Balances	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Operating Fund	\$ 1,030,987	\$ 1,191,085	\$ 591,338	\$ 609,098	\$ 527,580	\$ 466,313	\$ 549,617	\$ 539,768	\$ 704,298	\$ 742,854	\$ 767,738
Capital Fund	1,035,202	813,971	152,060	395,251	629,450	1,467,164	662,371	2,647,910	677,168	702,781	749,832
Debt Reserves	-	122,072	122,072	122,072	122,072	236,735	236,735	483,701	483,701	668,925	668,925
Total	\$ 2,066,189	\$ 2,127,127	\$ 865,470	\$ 1,126,421	\$ 1,279,102	\$ 2,170,212	\$ 1,448,723	\$ 3,671,379	\$ 1,865,167	\$ 2,114,560	\$ 2,186,496
Target capital contingency	\$ 564,880	\$ 592,768	\$ 605,850	\$ 608,819	\$ 610,761	\$ 619,691	\$ 632,167	\$ 644,761	\$ 669,156	\$ 695,764	\$ 703,432
Capital contingency deficit	-	-	(453,789)	(213,568)	-	-	-	-	-	-	-

City of Lacey

Stormwater Utility Rate Analysis

Assumptions

Economic & Financial Factors		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	General Cost Inflation	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
2	Construction Cost Inflation		4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
3	Labor Cost Inflation	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
4	Benefit Cost Inflation	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
5	General Inflation plus Growth	4.29%	4.29%	4.29%	4.29%	4.29%	4.29%	4.29%	4.29%	4.29%	4.29%	4.29%
6	[Other]											
7	[Other]											
8	No Escalation	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Fund Earnings	0.40%	0.65%	0.90%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
9	Customer Growth	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%
	Cumulative Growth	2.12%	3.40%	4.69%	6.00%	7.32%	8.66%	10.02%	11.40%	12.79%	14.20%	15.63%
	State B&O tax - service rate	1.650%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%

Accounting Assumptions

FISCAL POLICY RESTRICTIONS

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Min. Op. Fund Balance Target (days of O&M expense)	60	60	60	60	60	60	60	60	60	60	60
Max. Op. Fund Balance (days of O&M expense)	365	365	90	90	90	90	90	90	90	90	90

Minimum Capital Fund Balance Target

Select Minimum Capital Fund Balance Target

Defined as % of Plant

1 - Defined as % of Plant

Plant-in-Service in 2011

Minimum Capital Fund Balance - % of plant assets

\$ 564,880	\$ 592,768	\$ 605,850	\$ 608,819	\$ 610,761	\$ 619,691	\$ 632,167	\$ 644,761	\$ 669,156	\$ 695,764	\$ 703,432
1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%

2 - Amount at Right ==>

City of Lacey

Stormwater Utility Rate Analysis

Assumptions

RATE FUNDED SYSTEM REINVESTMENT

Select Reinvestment Funding Strategy

Equal to Depreciation Expense

Increment after 2016:

up to max:

Amount of Annual Cash Funding from Rates:

	13%	14%	17%	20%	25%	25%	25%	25%	25%	25%	25%	25%
1 - Equal to Annual Depreciation Expense												
2 - Equal to Annual Depreciation Expense less Annual Debt Principal Payments												
3 - Equal to Amount at Right ==>	\$ 200,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000
4 - Do Not Fund System Reinvestment												
Assumed System Reinvestment Funding	200,000	-	-	337,213	424,444	424,444	428,139	438,261	442,252	442,252	478,011	

Capital Financing Assumptions

GENERAL FACILITIES CHARGE REVENUES

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total General Facilities Charge Revenues	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

REVENUE BONDS

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Term (years)	20	20	20	20	20	20	20	20	20	20	20
Interest Cost	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Issuance Cost	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Bond Coverage Requirement	<input type="text" value="1.25"/>										

OTHER LOANS

Term (years)	
Interest Cost	
Issuance Cost	

City of Lacey
Stormwater Utility Rate Analysis
Operating Revenue and Expenditure Forecast

FORECAST BASIS		Actual	Budget	Projection										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Revenues														
STORMWATER UTILITY OPERATIONS														
RATE REVENUES														
Stormwater Sales	9	Customer Growth	\$ 2,077,931	\$ 2,133,749	\$ 2,160,421	\$ 2,187,426	\$ 2,214,769	\$ 2,242,454	\$ 2,270,484	\$ 2,298,865	\$ 2,327,601	\$ 2,356,696	\$ 2,386,155	\$ 2,415,982
[Other]	8	No Escalation	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL RATE REVENUES			2,077,931	2,133,749	2,160,421	2,187,426	2,214,769	2,242,454	2,270,484	2,298,865	2,327,601	2,356,696	2,386,155	2,415,982
			% Change:	2.69%										
OTHER OPERATING REVENUES														
Department of Ecology Grant	8	No Escalation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Plan Checking Fees	9	Customer Growth	4,295	4,405	4,460	4,516	4,572	4,629	4,687	4,746	4,805	4,865	4,926	4,988
Inspection service - streets	8	No Escalation	8,118	5,621	5,621	5,621	5,621	5,621	5,621	5,621	5,621	5,621	5,621	5,621
Other misc revenues	8	No Escalation	-	-	-	-	-	-	-	-	-	-	-	-
[Other]	8	No Escalation	-	-	-	-	-	-	-	-	-	-	-	-
[Other]	8	No Escalation	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL OTHER OPERATING REVENUES			12,413	10,026	10,081	10,137	10,193	10,250	10,308	10,367	10,426	10,486	10,547	10,609
TOTAL REVENUES			\$ 2,090,344	\$ 2,143,775	\$ 2,170,502	\$ 2,197,563	\$ 2,224,962	\$ 2,252,704	\$ 2,280,793	\$ 2,309,232	\$ 2,338,027	\$ 2,367,182	\$ 2,396,702	\$ 2,426,590

City of Lacey
Stormwater Utility Rate Analysis
Operating Revenue and Expenditure Forecast

		Actual	Budget	Projection										
FORECAST BASIS		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Expenditures [d]	FORECAST BASIS	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
PHYSICAL ENVIRONMENT - STORMWATER UTILITY														
General Services														
53-538-10-01	Salaries - Regular	3	\$ 167,846	\$ 187,728	\$ 193,360	\$ 199,161	\$ 205,135	\$ 211,290	\$ 217,628	\$ 224,157	\$ 230,882	\$ 237,808	\$ 244,942	\$ 252,291
53-538-10-05	Salaries - Overtime	3	2,863	1,000	1,030	1,061	1,093	1,126	1,159	1,194	1,230	1,267	1,305	1,344
53-538-10-06	Salaries - Part-time	3	(142)	948	976	1,006	1,036	1,067	1,099	1,132	1,166	1,201	1,237	1,274
53-538-20-01	Employer paid benefits	4	60,549	77,039	81,661	86,561	91,755	97,260	103,096	109,281	115,838	122,788	130,156	137,965
53-538-31-01	Office and operating supply	1	396	1,500	1,545	1,591	1,639	1,688	1,739	1,791	1,845	1,900	1,957	2,016
53-538-31-02	Small tools and equipment	1	-	1,500	1,545	1,591	1,639	1,688	1,739	1,791	1,845	1,900	1,957	2,016
53-538-31-17	Supplies - uniform purchase	1	997	2,260	2,328	2,398	2,470	2,544	2,620	2,699	2,780	2,863	2,949	3,037
53-538-31-27	Software upgrade	1	-	5,260	5,418	5,580	5,748	5,920	6,098	6,281	6,469	6,663	6,863	7,069
53-538-41-01	Professional services - Other	1	1,152	15,500	15,965	16,444	16,937	17,445	17,969	18,508	19,063	19,635	20,224	20,831
53-538-41-02	Professional services - Engineering	1	226,413	249,345	256,825	264,530	272,466	280,640	289,059	297,731	306,663	315,863	325,339	335,099
53-538-41-05	Professional services - Audit	1	1,401	450	464	477	492	506	522	537	553	570	587	605
53-538-41-15	Professional services - Legal	1	3,884	2,200	2,266	2,334	2,404	2,476	2,550	2,627	2,706	2,787	2,871	2,957
53-538-41-17	Professional services - Water Resources	1	340,447	372,639	383,818	395,333	407,193	419,408	431,991	444,950	458,299	472,048	486,209	500,796
53-538-41-23	Professional services - Local Monitor	1	12,689	30,000	40,000	41,200	42,436	43,709	45,020	46,371	47,762	49,195	50,671	52,191
53-538-41-27	Professional services - PIE Program	1	24,229	22,750	23,433	24,135	24,860	25,605	26,373	27,165	27,980	28,819	29,684	30,574
53-538-41-32	Professional services - Utility Locates	1	560	725	747	769	792	816	840	866	892	918	946	974
53-538-41-33	Professional services - Facility Eval.	1	-	4,600	4,738	4,880	5,027	5,177	5,333	5,493	5,657	5,827	6,002	6,182
53-538-41-42	Illicit Discharge Detection	1	46	9,000	9,270	9,548	9,835	10,130	10,433	10,746	11,069	11,401	11,743	12,095
53-538-41-43	Analyze Stormwater Sample	1	-	10,000	10,300	10,609	10,927	11,255	11,593	11,941	12,299	12,668	13,048	13,439
53-538-42-01	Communications - Telephone	1	538	350	361	371	382	394	406	418	430	443	457	470
53-538-43-01	Travel - Transportation / Per Diem	1	-	2,228	2,295	2,364	2,435	2,508	2,583	2,660	2,740	2,822	2,907	2,994
53-538-43-02	Travel - Dues, Subscriptions, Publications	1	-	145	149	154	158	163	168	173	178	184	189	195
53-538-43-03	Travel - Registrations	1	160	2,568	2,645	2,724	2,806	2,890	2,977	3,066	3,158	3,253	3,351	3,451
53-538-45-01	Rentals - Equipment Rental	1	2,655	2,900	2,987	3,077	3,169	3,264	3,362	3,463	3,567	3,674	3,784	3,897
53-538-45-02	Rentals - IMS Rental	1	29,805	34,525	35,561	36,628	37,726	38,858	40,024	41,225	42,461	43,735	45,047	46,399
53-538-45-05	Rentals - Other	1	-	-	-	-	-	-	-	-	-	-	-	-
53-538-46-01	Insurance - Liability	1	14,978	16,261	16,749	17,251	17,769	18,302	18,851	19,416	19,999	20,599	21,217	21,853
53-538-49-25	Miscellaneous - Assessments / Taxes	1	11,477	12,900	13,500	13,905	14,322	14,752	15,194	15,650	16,120	16,603	17,101	17,614
53-538-49-35	Miscellaneous - CDL Physicals / Licenses	1	256	120	124	127	131	135	139	143	148	152	157	161
53-538-49-43	Miscellaneous - Regional Monitoring Program	1	2,856	15,000	10,000	10,300	10,609	10,927	11,255	11,593	11,941	12,299	12,668	13,048
53-538-49-44	Miscellaneous - Project Green	1	11,000	11,000	11,330	11,670	12,020	12,381	12,752	13,135	13,529	13,934	14,353	14,783
53-538-49-45	Miscellaneous - Fones Road Treatment	1	-	8,250	8,498	8,752	9,015	9,285	9,564	9,851	10,146	10,451	10,764	11,087
53-538-50-02	Services - Common Facilities 1902	1	11,145	15,198	15,654	16,124	16,607	17,105	17,619	18,147	18,692	19,252	19,830	20,425
53-538-50-03	Services - Intra-governmental	1	3,530	3,530	3,636	3,745	3,857	3,973	4,092	4,215	4,341	4,472	4,606	4,744
TOTAL			931,728	1,119,419	1,159,176	1,196,401	1,234,890	1,274,689	1,315,848	1,358,416	1,402,447	1,447,995	1,495,119	1,543,877

City of Lacey
Stormwater Utility Rate Analysis
Operating Revenue and Expenditure Forecast

FORECAST BASIS			Actual	Budget	Projection									
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Customer Service														
51-514-10-01	Salaries - Regular	3	\$ 4,684	\$ 5,034	\$ 5,185	\$ 5,341	\$ 5,501	\$ 5,666	\$ 5,836	\$ 6,011	\$ 6,191	\$ 6,377	\$ 6,568	\$ 6,765
51-514-20-01	Employer paid benefits	4	2,313	2,640	2,798	2,966	3,144	3,333	3,533	3,745	3,970	4,208	4,460	4,728
51-514-31-01	Supplies - Office & Operating Supply	1	-	200	206	212	219	225	232	239	246	253	261	269
51-514-42-01	Communications - Telephone	1	-	50	52	53	55	56	58	60	61	63	65	67
51-514-42-02	Communications - Postage	1	1,750	1,750	1,803	1,857	1,912	1,970	2,029	2,090	2,152	2,217	2,283	2,352
51-514-45-02	IMS Rental	1	5,036	5,834	6,009	6,189	6,375	6,566	6,763	6,966	7,175	7,390	7,612	7,840
51-514-45-08	Lease Miscellaneous	1	-	500	515	530	546	563	580	597	615	633	652	672
51-514-46-06	Insurance - AWC L&I Pool	1	718	765	788	812	836	861	887	913	941	969	998	1,028
51-514-49-01	Miscellaneous - State B&O Taxes		Calculated; B&O tax rate	38,545	32,558	32,963	33,374	33,791	34,212	34,638	35,070	35,508	35,951	36,399
51-514-49-02	Printing and binding	1	-	500	515	530	546	563	580	597	615	633	652	672
51-514-49-27	Miscellaneous - Bad debt expense	1	408	1,800	1,854	1,910	1,967	2,026	2,087	2,149	2,214	2,280	2,349	2,419
59-597-69-02	Transfers out - Construction (Calculated separately)		-	-	-	-	-	-	-	-	-	-	-	-
TOTAL			54,499	57,618	52,282	53,364	54,475	55,619	56,795	58,005	59,251	60,532	61,852	63,211
Stormwater Facility Maintenance														
53-538-10-01	Salaries - Regular	3	\$ 267,411	\$ 287,393	\$ 296,015	\$ 304,895	\$ 314,042	\$ 323,463	\$ 333,167	\$ 343,162	\$ 353,457	\$ 364,061	\$ 374,983	\$ 386,232
53-538-10-05	Salaries - Overtime	3	6,885	4,000	4,120	4,244	4,371	4,502	4,637	4,776	4,919	5,067	5,219	5,376
53-538-10-06	Salaries - Part-time	3	19,128	18,015	18,555	19,112	19,685	20,276	20,884	21,511	22,156	22,821	23,505	24,211
53-538-20-01	Employer paid benefits	4	129,752	140,705	149,147	158,096	167,582	177,637	188,295	199,593	211,568	224,262	237,718	251,981
53-538-20-03	Unemployment Compensation	4	3,779	-	-	-	-	-	-	-	-	-	-	-
53-538-31-01	Office and operating supply	1	22,968	35,040	36,091	37,174	38,289	39,438	40,621	41,840	43,095	44,388	45,719	47,091
53-538-31-02	Small tools and equipment	1	1,450	2,500	2,575	2,652	2,732	2,814	2,898	2,985	3,075	3,167	3,262	3,360
53-538-31-17	Supplies - Uniform Purchase	1	1,763	1,600	1,648	1,697	1,748	1,801	1,855	1,910	1,968	2,027	2,088	2,150
53-538-31-22	Manhole / Ring / Lid Replace	1	4,715	4,000	4,120	4,244	4,371	4,502	4,637	4,776	4,919	5,067	5,219	5,376
53-538-34-01	Fuel	1	-	750	773	796	820	844	869	896	922	950	979	1,008
53-538-41-01	Professional services - Other	1	9,434	13,000	13,390	13,792	14,205	14,632	15,071	15,523	15,988	16,468	16,962	17,471
53-538-45-01	Equipment rental	1	174,646	190,773	196,496	202,391	208,463	214,717	221,158	227,793	234,627	241,666	248,915	256,383
53-538-45-05	Rentals - Other	1	2,301	-	-	-	-	-	-	-	-	-	-	-
53-538-47-01	Utility - Electric	1	511	900	927	955	983	1,013	1,043	1,075	1,107	1,140	1,174	1,210
53-538-47-02	Utility - City of Lacey	1	12,191	13,000	13,390	13,792	14,205	14,632	15,071	15,523	15,988	16,468	16,962	17,471
53-538-48-01	Repair and Maintenance - Equipment	1	1,177	800	824	849	874	900	927	955	984	1,013	1,044	1,075
53-538-48-03	Repair and Maintenance - Facilities	1	-	52,050	53,612	55,220	56,876	58,583	60,340	62,150	64,015	65,935	67,913	69,951
53-538-49-10	Uniform Contract / Cleaning	1	-	500	515	530	546	563	580	597	615	633	652	672
53-538-49-29	Miscellaneous - Vector Waste	1	37,993	30,000	30,900	31,827	32,782	33,765	34,778	35,822	36,896	38,003	39,143	40,317
TOTAL			696,103	795,026	823,098	852,265	882,576	914,081	946,832	980,886	1,016,301	1,053,137	1,091,459	1,131,334
TOTAL - STORMWATER UTILITY (Baseline Budget Before Non-CIP Capital and Additional O&M)			1,682,330	1,972,063	2,034,556	2,102,030	2,171,941	2,244,389	2,319,475	2,397,307	2,477,998	2,561,664	2,648,429	2,738,422
Additions to Baseline Budget														
Non-CIP Capital			\$ -	\$ 50,000	\$ 52,000	\$ 54,080	\$ 56,243	\$ 58,493	\$ 60,833	\$ 63,266	\$ 65,797	\$ 68,428	\$ 71,166	\$ 74,012
Additional Annual O&M Impacts			-	-	-	296,173	305,058	314,209	323,636	333,345	343,345	353,645	364,255	375,182
TOTAL			\$ -	\$ 50,000	\$ 52,000	\$ 350,253	\$ 361,301	\$ 372,702	\$ 384,468	\$ 396,611	\$ 409,142	\$ 422,074	\$ 435,420	\$ 449,195
GRAND TOTAL CASH O&M EXPENDITURES			\$ 1,682,330	\$ 2,022,063	\$ 2,086,556	\$ 2,452,282	\$ 2,533,242	\$ 2,617,091	\$ 2,703,943	\$ 2,793,918	\$ 2,887,140	\$ 2,983,738	\$ 3,083,850	\$ 3,187,617
Depreciation Expense in: 2012			[e] \$ 1,581,102											
Projected Depreciation Expense			\$ 1,581,102	\$ 1,581,102	\$ 1,582,552	\$ 1,594,362	\$ 1,686,066	\$ 1,697,775	\$ 1,697,775	\$ 1,712,557	\$ 1,753,046	\$ 1,769,009	\$ 1,769,009	\$ 1,912,042
Last year's plus annual additions from CIP debt principal payments			-	-	(46,008)	(48,308)	(50,723)	(53,260)	(99,138)	(104,095)	(202,378)	(212,497)	(292,931)	(307,578)
System Reinvestment Funding			\$ 1,581,102	\$ 1,581,102	\$ 1,536,544	\$ 1,546,054	\$ 1,635,343	\$ 1,644,515	\$ 1,598,637	\$ 1,608,463	\$ 1,550,667	\$ 1,556,512	\$ 1,476,078	\$ 1,604,465

City of Lacey
Stormwater Utility Rate Analysis
Additional O&M and Non-CIP Capital Costs

Include non-CIP capital costs into the projections?
 (1-Yes, 2-No)
 1 Non-CIP capital costs are included in the projections.

Non-CIP Capital Costs		FORECAST BASIS	TOTAL	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Non-CIP Project Implementation in Current Dollars														
OM1	Rehabilitation of Existing Ruddell Road SE Stormwater Facility		\$ 50,000	\$ 50,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
OM2	Rehabilitation of Existing College St SE at 53rd Ave SE Ponds		50,000	-	50,000	-	-	-	-	-	-	-	-	-
OM3	Rehabilitation of Existing Lakepointe Park Ponds - Compton Pond & Stockton Pond		50,000	-	-	50,000	-	-	-	-	-	-	-	-
OM4	Rehabilitation of Existing Fones Road Stormwater Facility		50,000	-	-	-	50,000	-	-	-	-	-	-	-
OM5	Rehabilitation of Existing College Regional Stormwater Facility		50,000	-	-	-	-	50,000	-	-	-	-	-	-
OM6	Rehabilitation of Existing Woodland Creek / 7th Ave. SE Stormwater Facility		50,000	-	-	-	-	-	50,000	-	-	-	-	-
OM7	Annual Stormwater Pond Rehabilitation No 1 through 5		250,000	-	-	-	-	-	-	50,000	50,000	50,000	50,000	50,000
TOTAL			\$ 550,000	\$ 50,000										
2 Construction Cost Inflation														
Annual Inflation				0.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
Cumulative Inflation				0.00%	4.00%	8.16%	12.49%	16.99%	21.67%	26.53%	31.59%	36.86%	42.33%	48.02%

Non-CIP Project Implementation in Inflated Dollars														
	Rehabilitation of Existing Ruddell Road SE Stormwater Facility		\$ 50,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Rehabilitation of Existing College St SE at 53rd Ave SE Ponds		-	52,000	-	-	-	-	-	-	-	-	-	-
	Rehabilitation of Existing Lakepointe Park Ponds - Compton Pond & Stockton Pond		-	-	54,080	-	-	-	-	-	-	-	-	-
	Rehabilitation of Existing Fones Road Stormwater Facility		-	-	-	56,243	-	-	-	-	-	-	-	-
	Rehabilitation of Existing College Regional Stormwater Facility		-	-	-	-	58,493	-	-	-	-	-	-	-
	Rehabilitation of Existing Woodland Creek / 7th Ave. SE Stormwater Facility		-	-	-	-	-	60,833	-	-	-	-	-	-
	Annual Stormwater Pond Rehabilitation No 1 through 5		-	-	-	-	-	-	63,266	65,797	68,428	71,166	74,012	
TOTAL			\$ 50,000	\$ 52,000	\$ 54,080	\$ 56,243	\$ 58,493	\$ 60,833	\$ 63,266	\$ 65,797	\$ 68,428	\$ 71,166	\$ 74,012	

Include additional O&M costs into the projections?
 (1-Yes, 2-No)
 1 Additional O&M costs are included in the projections.

Additional O&M Costs		FORECAST BASIS	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Current Costs and Future Escalated Cost Bases for Additional O&M Impacts													
0.5 FTE(@60K) for Stormwater Program Management	3	Labor Cost Inflation	\$ 107,527	\$ 110,753	\$ 114,075	\$ 117,498	\$ 121,023	\$ 124,653	\$ 128,393	\$ 132,245	\$ 136,212	\$ 140,298	\$ 144,507
2.5 FTE (@ \$60K) for Operations & Maintenance	3	Labor Cost Inflation	90,163	92,868	95,654	98,524	101,479	104,524	107,659	110,889	114,216	117,642	121,172
Schedule of Additional O&M Impacts													
0.5 FTE(@60K) for Stormwater Program Management			-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2.5 FTE (@ \$60K) for Operations & Maintenance			-	-	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Additional O&M Impacts in Escalated Dollars													
0.5 FTE(@60K) for Stormwater Program Management			\$ -	\$ -	\$ 57,038	\$ 58,749	\$ 60,511	\$ 62,327	\$ 64,196	\$ 66,122	\$ 68,106	\$ 70,149	\$ 72,254
2.5 FTE (@ \$60K) for Operations & Maintenance			-	-	239,135	246,309	253,698	261,309	269,148	277,223	285,539	294,106	302,929
Total Additional FTE and O&M Costs			\$ -	\$ -	\$ 296,173	\$ 305,058	\$ 314,209	\$ 323,636	\$ 333,345	\$ 343,345	\$ 353,645	\$ 364,255	\$ 375,182

City of Lacey
Stormwater Utility Rate Analysis
Capital Improvement Program

Capital Improvement Program in Constant Dollars

Note: Input numbers were de-escalated to preserve model's working formulas. To compare with Herrera's numbers, see inflated table below.

Project Costs are in 2013 dollars.

Shading indicates Tier 2 project.	Total Project Cost (2013 forward)	Scenario: Total CIP										
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1 - Vactor Decant Facility Project	\$ 456,000	\$ 46,000	\$ 410,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2 - Ulery Drainage System Improvements	58,000	58,000	-	-	-	-	-	-	-	-	-	-
3 - Lacey Boulevard Pipe Replacement	53,001	-	-	-	-	23,000	30,000	-	-	-	-	-
4 - Brentwood Stormwater Installation	446,000	-	91,000	355,000	-	-	-	-	-	-	-	-
5 - Chambers Lake Stormwater Facility Project	2,414,000	169,000	2,028,000	217,000	-	-	-	-	-	-	-	-
6 - 22nd Ave SE System Rehabilitation	133,000	-	-	-	-	34,000	99,000	-	-	-	-	-
7 - Diamond Stormwater Alternative	306,000	-	-	-	-	99,000	207,000	-	-	-	-	-
8 - 25th Loop Storm Improvements	323,999	-	-	-	-	-	85,000	239,000	-	-	-	-
9 - Clearbrook Drainage System Improvements	378,000	-	-	-	-	-	73,000	305,000	-	-	-	-
10 - Homann Area System Rehabilitation	406,000	-	-	-	-	-	156,000	250,000	-	-	-	-
11 - 1010 Midway Storm Improvements	38,000	-	-	-	-	-	14,000	24,000	-	-	-	-
12 - Belair / Impala Stormwater Installation	489,000	-	-	-	-	-	-	98,000	391,000	-	-	-
13 - College Regional Stormwater Facility	4,130,999	-	-	-	-	-	-	-	566,000	1,782,500	1,782,500	-
14 - Alder and Gemini Drainage System Improvements	430,000	-	-	-	-	-	-	-	-	-	87,000	343,000
15 - White Fir Stormwater Installation	151,000	-	-	-	-	-	-	-	-	-	-	151,000
16 - 5th Ct SE and 5th Way Easement Storm Improvements	24,000	-	-	-	-	-	-	-	-	-	-	24,000
17 - Shady Lane Treatment Facility Improvements	134,000	-	-	-	134,000	-	-	-	-	-	-	-
18 - Code Revisions for L.I.D. (Low Impact Development)	90,000	-	-	40,000	50,000	-	-	-	-	-	-	-
19 - Stormwater Design Manual Update	200,000	-	40,000	80,000	80,000	-	-	-	-	-	-	-
20 - Stormwater Comprehensive Plan Update	150,000	-	-	-	-	10,000	70,000	70,000	-	-	-	-
21 - Hicks Lake-Pattison Lake Conveyance (50% share)	630,000	-	112,500	517,500	-	-	-	-	-	-	-	-
TOTAL COSTS in CONSTANT DOLLARS	\$ 11,441,000	\$ 273,000	\$ 2,681,500	\$ 1,209,500	\$ 264,000	\$ 166,000	\$ 734,001	\$ 986,000	\$ 956,999	\$ 1,782,500	\$ 1,869,500	\$ 518,000
Total Expansion Projects	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Upgrade Projects	\$ 4,117,000	\$ 227,000	\$ 2,119,000	\$ 572,000	\$ -	\$ 23,000	\$ 358,000	\$ 818,000	\$ -	\$ -	\$ -	\$ -
Total R&R Projects	\$ 7,323,999	\$ 46,000	\$ 562,500	\$ 637,500	\$ 264,000	\$ 143,000	\$ 376,000	\$ 168,000	\$ 956,999	\$ 1,782,500	\$ 1,869,500	\$ 518,000

City of Lacey
Stormwater Utility Rate Analysis
Capital Improvement Program

Capital Improvement Program in Inflated Dollars

Assumed Construction Cost Inflation

Annual	0.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
Cumulative	0.00%	4.00%	8.16%	12.49%	16.99%	21.67%	26.53%	31.59%	36.86%	42.33%	48.02%	

	Total Project Cost (2013 forward)	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1 - Vactor Decant Facility Project	\$ 472,400	\$ 46,000	\$ 426,400	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2 - Utery Drainage System Improvements	58,000	58,000	-	-	-	-	-	-	-	-	-	-
3 - Lacey Boulevard Pipe Replacement	63,407	-	-	-	-	26,907	36,500	-	-	-	-	-
4 - Brentwood Stormwater Installation	478,608	-	94,640	383,968	-	-	-	-	-	-	-	-
5 - Chambers Lake Stormwater Facility Project	2,512,827	169,000	2,109,120	234,707	-	-	-	-	-	-	-	-
6 - 22nd Ave SE System Rehabilitation	160,224	-	-	-	-	39,775	120,449	-	-	-	-	-
7 - Diamond Stormwater Alternative	367,663	-	-	-	-	115,816	251,847	-	-	-	-	-
8 - 25th Loop Storm Improvements	405,826	-	-	-	-	-	103,415	302,411	-	-	-	-
9 - Clearbrook Drainage System Improvements	474,738	-	-	-	-	-	88,816	385,922	-	-	-	-
10 - Homann Area System Rehabilitation	506,128	-	-	-	-	-	189,798	316,330	-	-	-	-
11 - 1010 Midway Storm Improvements	47,401	-	-	-	-	-	17,033	30,368	-	-	-	-
12 - Belair / Impala Stormwater Installation	638,530	-	-	-	-	-	-	124,001	514,529	-	-	-
13 - College Regional Stormwater Facility	5,721,344	-	-	-	-	-	-	-	744,817	2,439,474	2,537,053	-
14 - Alder and Gemini Drainage System Improvements	631,552	-	-	-	-	-	-	-	-	-	123,828	507,724
15 - White Fir Stormwater Installation	223,517	-	-	-	-	-	-	-	-	-	-	223,517
16 - 5th Ct SE and 5th Way Easement Storm Improvemts	35,526	-	-	-	-	-	-	-	-	-	-	35,526
17 - Shady Lane Treatment Facility Improvements	150,732	-	-	-	150,732	-	-	-	-	-	-	-
18 - Code Revisions for L.I.D. (Low Impact Development)	99,507	-	-	43,264	56,243	-	-	-	-	-	-	-
19 - Stormwater Design Manual Update	218,117	-	41,600	86,528	89,989	-	-	-	-	-	-	-
20 - Stormwater Comprehensive Plan Update	185,437	-	-	-	-	11,699	85,166	88,572	-	-	-	-
21 - Hicks Lake-Pattison Lake Conveyance (50% share)	676,728	-	117,000	559,728	-	-	-	-	-	-	-	-
TOTAL COSTS in INFLATED DOLLARS	\$ 14,128,212	\$ 273,000	\$ 2,788,760	\$ 1,308,195	\$ 296,964	\$ 194,197	\$ 893,024	\$ 1,247,604	\$ 1,259,346	\$ 2,439,474	\$ 2,660,881	\$ 766,767
Total Expansion Projects	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Upgrade Projects	\$ 4,546,935	\$ 227,000	\$ 2,203,760	\$ 618,675	\$ -	\$ 26,907	\$ 435,562	\$ 1,035,031	\$ -	\$ -	\$ -	\$ -
Total R&R Projects	\$ 9,581,277	\$ 46,000	\$ 585,000	\$ 689,520	\$ 296,964	\$ 167,290	\$ 457,462	\$ 212,573	\$ 1,259,346	\$ 2,439,474	\$ 2,660,881	\$ 766,767

TRUE

City of Lacey
Stormwater Utility Rate Analysis
Capital Funding Analysis

Summary of Expenditures

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
CAPITAL PROJECTS											
Expansion Projects	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Upgrade Projects	\$ 227,000	\$ 2,203,760	\$ 618,675	\$ -	\$ 26,907	\$ 435,562	\$ 1,035,031	\$ -	\$ -	\$ -	\$ -
Repairs and Replacements	46,000	585,000	689,520	296,964	167,290	457,462	212,573	1,259,346	2,439,474	2,660,881	766,767
TOTAL CAPITAL EXPENDITURES	\$ 273,000	\$ 2,788,760	\$ 1,308,195	\$ 296,964	\$ 194,197	\$ 893,024	\$ 1,247,604	\$ 1,259,346	\$ 2,439,474	\$ 2,660,881	\$ 766,767

Capital Financing Plan

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Grant - 75% of Vactor Decant Facility Project Cost	\$ 34,500	\$ 319,800									
Grant - Chambers Lake Stormwater Facility Project	\$ 143,000	\$ 857,000									
Other Loans											
System Reinvestment Funding Proceeds	95,500	-	-	296,964	194,197	424,444	428,139	438,261	442,252	442,252	478,011
GFC Revenues	-	-	-	-	-	-	-	-	-	-	-
Capital Fund Balance available at beginning of year	-	1,035,202	813,971	-	-	468,580	819,465	662,371	1,997,222	677,168	288,756
Revenue Bond Proceeds	-	576,758	-	-	-	-	-	158,713	-	1,541,461	-
Current-Year Rate Revenue	-	-	494,224	-	-	-	-	-	-	-	-
Total	\$ 273,000	\$ 2,788,760	\$ 1,308,195	\$ 296,964	\$ 194,197	\$ 893,024	\$ 1,247,604	\$ 1,259,346	\$ 2,439,474	\$ 2,660,881	\$ 766,767

TOTAL CAPITAL RESOURCES

TOTAL CAPITAL RESOURCES	\$ 273,000	\$ 2,788,760	\$ 1,308,195	\$ 296,964	\$ 194,197	\$ 893,024	\$ 1,247,604	\$ 1,259,346	\$ 2,439,474	\$ 2,660,881	\$ 766,767
<i>Info: Capital Contingency Deficit</i>	-	-	(453,789)	(213,568)	-	-	-	-	-	-	-
Adjustment for Bond Proceeds Spent in Subsequent Years	-	807,242	-	-	-	1,300,000	-	2,641,287	-	558,539	-

Summary of Funding Sources

Grants	177,500	1,176,800	-	-	-	-	-	-	-	-	-
Rates, including Draws from/(Additions to) Fund Balance	95,500	227,960	1,308,195	296,964	194,197	(406,976)	1,247,604	(1,540,654)	2,439,474	560,881	766,767
Revenue Bond Proceeds	-	1,384,000	-	-	-	1,300,000	-	2,800,000	-	2,100,000	-
Other Loans	-	-	-	-	-	-	-	-	-	-	-
GFCs	-	-	-	-	-	-	-	-	-	-	-
Total by Year	273,000	2,788,760	1,308,195	296,964	194,197	893,024	1,247,604	1,259,346	2,439,474	2,660,881	766,767

NOTE A: SELECTION OF FUNDING SOURCE FOR REMAINING CAPITAL FUNDING NEEDS

Select the Residual Funding Source	1
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1 - Revenue Bond Proceeds

2 - Rates

NOTE C: USER INPUT FOR REVENUE BOND PROCEEDS

Select Amount of Bond Proceeds	1
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1 - Amounts at Right ==>

2 - Calculated by the Model

\$ -	\$ 1,384,000	\$ -	\$ -	\$ -	\$ -	\$ 1,300,000	\$ -	\$ 2,800,000	\$ -	\$ 2,100,000	\$ -
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City of Lacey
Stormwater Utility Rate Analysis
Capital Funding Analysis

New Debt Computations	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
REVENUE BONDS											
Amount to Fund	\$ -	\$ 1,384,000	\$ -	\$ -	\$ -	\$ 1,300,000	\$ -	\$ 2,800,000	\$ -	\$ 2,100,000	\$ -
Issuance Costs	-	15,213	-	-	-	14,290	-	30,777	-	23,083	-
Reserve Required	-	122,072	-	-	-	114,663	-	246,966	-	185,225	-
Amount of Debt Issue	\$ -	\$ 1,521,285	\$ -	\$ -	\$ -	\$ 1,428,952	\$ -	\$ 3,077,744	\$ -	\$ 2,308,308	\$ -
OTHER LOANS											
Amount to Fund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Issuance Costs	-	-	-	-	-	-	-	-	-	-	-
Amount of Debt Issue	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Debt Service Summary											
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
EXISTING DEBT SERVICE											
Annual Interest Payments	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Annual Principal Payments	-	-	-	-	-	-	-	-	-	-	-
Total Debt Service Payments	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Revenue Bond Payments Only	-	-	-	-	-	-	-	-	-	-	-
NEW DEBT SERVICE											
Annual Interest Payments	\$ -	\$ 76,064	\$ 73,764	\$ 71,348	\$ 68,812	\$ 137,597	\$ 132,640	\$ 281,322	\$ 271,204	\$ 375,994	\$ 361,348
Annual Principal Payments	-	46,008	48,308	50,723	53,260	99,138	104,095	202,378	212,497	292,931	307,578
Total Debt Service Payments	\$ -	\$ 122,072	\$ 122,072	\$ 122,072	\$ 122,072	\$ 236,735	\$ 236,735	\$ 483,701	\$ 483,701	\$ 668,925	\$ 668,925
Revenue Bond Payments Only	-	122,072	122,072	122,072	122,072	236,735	236,735	483,701	483,701	668,925	668,925
TOTAL DEBT SERVICE PAYMENTS	\$ -	\$ 122,072	\$ 122,072	\$ 122,072	\$ 122,072	\$ 236,735	\$ 236,735	\$ 483,701	\$ 483,701	\$ 668,925	\$ 668,925
Total Interest Payments	-	76,064	73,764	71,348	68,812	137,597	132,640	281,322	271,204	375,994	361,348
Total Principal Payments	-	46,008	48,308	50,723	53,260	99,138	104,095	202,378	212,497	292,931	307,578
Total Revenue Bond Payments Only	-	122,072	122,072	122,072	122,072	236,735	236,735	483,701	483,701	668,925	668,925
Outstanding Principal	-	1,475,277	1,426,969	1,376,246	1,322,986	2,652,801	2,548,706	5,424,072	5,211,574	7,226,951	6,919,373
Debt as % of Net Capital Assets											
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total Outstanding Debt Principal	-	1,475,277	1,426,969	1,376,246	1,322,986	2,652,801	2,548,706	5,424,072	5,211,574	7,226,951	6,919,373
Capital Assets Net of Depreciation											
Beginning of Year Net Capital Assets	45,907,874	47,328,571	51,300,545	53,891,254	55,535,499	57,118,084	59,439,060	62,172,640	64,986,302	69,050,434	73,437,576
Projected Depreciation assuming average 40-year life 2.50%	1,147,697	1,183,214	1,282,514	1,347,281	1,388,387	1,427,952	1,485,976	1,554,316	1,624,658	1,726,261	1,835,939
Capital Additions	273,000	2,788,760	1,308,195	296,964	194,197	893,024	1,247,604	1,259,346	2,439,474	2,660,881	766,767
Projected Net Capital Assets - End of Year	47,328,571	51,300,545	53,891,254	55,535,499	57,118,084	59,439,060	62,172,640	64,986,302	69,050,434	73,437,576	76,040,282
Debt as % of Net Capital Assets	0.0%	2.9%	2.6%	2.5%	2.3%	4.5%	4.1%	8.3%	7.5%	9.8%	9.1%

City of Lacey
Stormwater Utility Rate Analysis
Revenue Requirements Analysis

Cash Flow Sufficiency Test

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
EXPENSES											
Cash Operating Expenses	\$ 2,022,063	\$ 2,086,556	\$ 2,452,282	\$ 2,533,242	\$ 2,617,091	\$ 2,703,943	\$ 2,793,918	\$ 2,887,140	\$ 2,983,738	\$ 3,083,850	\$ 3,187,617
Existing Debt Service	-	-	-	-	-	-	-	-	-	-	-
New Debt Service	-	122,072	122,072	122,072	122,072	236,735	236,735	483,701	483,701	668,925	668,925
Rate-Funded CIP	-	-	494,224	-	-	-	-	-	-	-	-
Rate-Funded System Reinvestment at Current Rates	200,000	-	-	337,213	424,444	424,444	428,139	438,261	442,252	442,252	478,011
Additions Required to Meet Minimum Op. Fund Balance	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	\$ 2,222,063	\$ 2,208,627	\$ 3,068,578	\$ 2,992,527	\$ 3,163,607	\$ 3,365,122	\$ 3,458,792	\$ 3,809,102	\$ 3,909,691	\$ 4,195,027	\$ 4,334,553
REVENUES											
Rate Revenue	\$ 2,133,749	\$ 2,160,421	\$ 2,187,426	\$ 2,214,769	\$ 2,242,454	\$ 2,270,484	\$ 2,298,865	\$ 2,327,601	\$ 2,356,696	\$ 2,386,155	\$ 2,415,982
Other Revenue	10,026	10,081	10,137	10,193	10,250	10,308	10,367	10,426	10,486	10,547	10,609
Operating Fund Interest Earnings	4,419	6,701	10,720	5,913	6,091	5,276	4,663	5,496	5,398	7,043	7,429
Total Revenue	\$ 2,148,194	\$ 2,177,203	\$ 2,208,283	\$ 2,230,876	\$ 2,258,795	\$ 2,286,068	\$ 2,313,895	\$ 2,343,523	\$ 2,372,580	\$ 2,403,745	\$ 2,434,019
USE OF OPERATING RESERVES	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -					
NET CASH FLOW (DEFICIENCY)	\$ (73,869)	\$ (31,424)	\$ (860,296)	\$ (761,652)	\$ (904,812)	\$ (1,079,053)	\$ (1,144,897)	\$ (1,465,578)	\$ (1,537,111)	\$ (1,791,283)	\$ (1,900,534)

Coverage Sufficiency Test

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Coverage Test - Include GFC Revenues (1=Y; 0=N)?	0										
EXPENSES											
Cash Operating Expenses	\$ 2,022,063	\$ 2,086,556	\$ 2,452,282	\$ 2,533,242	\$ 2,617,091	\$ 2,703,943	\$ 2,793,918	\$ 2,887,140	\$ 2,983,738	\$ 3,083,850	\$ 3,187,617
Revenue Bond Debt Service	-	122,072	122,072	122,072	122,072	236,735	236,735	483,701	483,701	668,925	668,925
Revenue Bond Coverage Requirement	-	30,518	30,518	30,518	30,518	59,184	59,184	120,925	120,925	167,231	167,231
Total Expenses	\$ 2,022,063	\$ 2,239,145	\$ 2,604,872	\$ 2,685,832	\$ 2,769,681	\$ 2,999,862	\$ 3,089,836	\$ 3,491,765	\$ 3,588,364	\$ 3,920,007	\$ 4,023,774
ALLOWABLE REVENUES											
Rate Revenue	\$ 2,133,749	\$ 2,160,421	\$ 2,187,426	\$ 2,214,769	\$ 2,242,454	\$ 2,270,484	\$ 2,298,865	\$ 2,327,601	\$ 2,356,696	\$ 2,386,155	\$ 2,415,982
GFC Revenue	-	-	-	-	-	-	-	-	-	-	-
Other Revenue	10,026	10,081	10,137	10,193	10,250	10,308	10,367	10,426	10,486	10,547	10,609
Interest Earnings - All Funds	8,127	13,430	18,045	7,434	10,043	11,570	19,335	12,120	31,877	13,815	14,456
Total Revenue	\$ 2,151,902	\$ 2,183,932	\$ 2,215,608	\$ 2,232,396	\$ 2,262,747	\$ 2,292,363	\$ 2,328,567	\$ 2,350,147	\$ 2,399,059	\$ 2,410,517	\$ 2,441,047
Coverage Realized	n/a	0.80	(1.94)	(2.46)	(2.90)	(1.74)	(1.97)	(1.11)	(1.21)	(1.01)	(1.12)
COVERAGE SURPLUS (DEFICIENCY)	\$ 129,839	\$ (55,213)	\$ (389,264)	\$ (453,436)	\$ (506,934)	\$ (707,499)	\$ (761,269)	\$ (1,141,618)	\$ (1,189,305)	\$ (1,509,490)	\$ (1,582,727)

City of Lacey
Stormwater Utility Rate Analysis
Revenue Requirements Analysis

Maximum Revenue Deficiency	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Sufficiency Test Driving the Deficiency	<i>Cash</i>	<i>Coverage</i>	<i>Cash</i>	<i>Cash</i>	<i>Cash</i>	<i>Cash</i>	<i>Cash</i>	<i>Cash</i>	<i>Cash</i>	<i>Cash</i>	<i>Cash</i>
Maximum Deficiency From Tests	\$ 73,869	\$ 55,213	\$ 860,296	\$ 761,652	\$ 904,812	\$ 1,079,053	\$ 1,144,897	\$ 1,465,578	\$ 1,537,111	\$ 1,791,283	\$ 1,900,534
less: Net Revenue From Prior Rate Increases		-	(193,915)	(410,349)	(651,665)	(833,585)	(1,030,508)	(1,243,554)	(1,473,925)	(1,722,912)	(1,991,900)
Total Revenue Deficiency (before taxes)	\$ 73,869	\$ 55,213	\$ 666,380	\$ 351,303	\$ 253,147	\$ 245,468	\$ 114,389	\$ 222,024	\$ 63,186	\$ 68,371	\$ -
Additional Taxes from Revenue Deficiency	1,239	841	10,148	5,350	3,855	3,738	1,742	3,381	962	1,041	-
Total Revenue Deficiency (after taxes)	\$ 75,108	\$ 56,054	\$ 676,528	\$ 356,652	\$ 257,002	\$ 249,207	\$ 116,131	\$ 225,405	\$ 64,148	\$ 69,412	\$ -

Rate Increases	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Rate Revenue with no Increase	\$ 2,133,749	\$ 2,160,421	\$ 2,187,426	\$ 2,214,769	\$ 2,242,454	\$ 2,270,484	\$ 2,298,865	\$ 2,327,601	\$ 2,356,696	\$ 2,386,155	\$ 2,415,982
Revenues from Prior Rate Increases	-	-	196,868	416,598	661,589	846,279	1,046,201	1,262,491	1,496,371	1,749,149	2,022,233
Rate Revenue Before Rate Increase (Incl. previous increases)	2,133,749	2,160,421	2,384,294	2,631,367	2,904,042	3,116,763	3,345,066	3,590,093	3,853,067	4,135,304	4,438,215
Required Annual Rate Increase	3.52%	2.59%	28.37%	13.55%	8.85%	8.00%	3.47170%	6.28%	1.66%	1.68%	0.00%
Number of Months New Rates Will Be In Effect	12	12	12	12	12	12	12	12	12	12	12
Percentage Increase to Needed Generate Required Revenue	3.52%	2.59%	28.37%	13.55%	8.85%	8.00%	3.47%	6.28%	1.66%	1.68%	0.00%
Rate Increases After Smoothing	0.00%	9.00%	9.00%	9.00%	6.00%						
ANNUAL RATE INCREASE	0.00%	9.00%	9.00%	9.00%	6.00%						
CUMULATIVE RATE INCREASE	0.00%	9.00%	18.81%	29.50%	37.27%	45.51%	54.24%	63.49%	73.30%	83.70%	94.72%

<i>Memo only: No of days of operating reserves</i>	191	214	90	90	75	64	73	70	88	90	90
<i>Memo only: lowest projected number of days of reserves</i>	64										
<i>Memo only: Annual CIP</i>	\$ 273,000	\$ 2,788,760	\$ 1,308,195	\$ 296,964	\$ 194,197	\$ 893,024	\$ 1,247,604	\$ 1,259,346	\$ 2,439,474	\$ 2,660,881	\$ 766,767

Impacts of Rate Increases	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Rate Revenues After Rate Increase	\$ 2,133,749	\$ 2,354,859	\$ 2,598,881	\$ 2,868,190	\$ 3,078,285	\$ 3,303,769	\$ 3,545,770	\$ 3,805,498	\$ 4,084,251	\$ 4,383,422	\$ 4,704,508
Full Year Rate Revenues After Rate Increase	2,133,749	2,354,859	2,598,881	2,868,190	3,078,285	3,303,769	3,545,770	3,805,498	4,084,251	4,383,422	4,704,508
Additional Taxes Due to Rate Increases	-	2,917	6,172	9,801	12,537	15,499	18,704	22,168	25,913	29,959	34,328
Net Cash Flow After Rate Increase	(73,869)	160,097	(455,012)	219,181	(81,518)	(61,268)	83,305	(9,850)	164,530	176,026	353,664
Coverage After Rate Increase	n/a	2.39	1.43	2.89	3.94	2.63	3.30	1.95	2.36	1.98	2.31

City of Lacey
Stormwater Utility Rate Analysis
Fund Activity

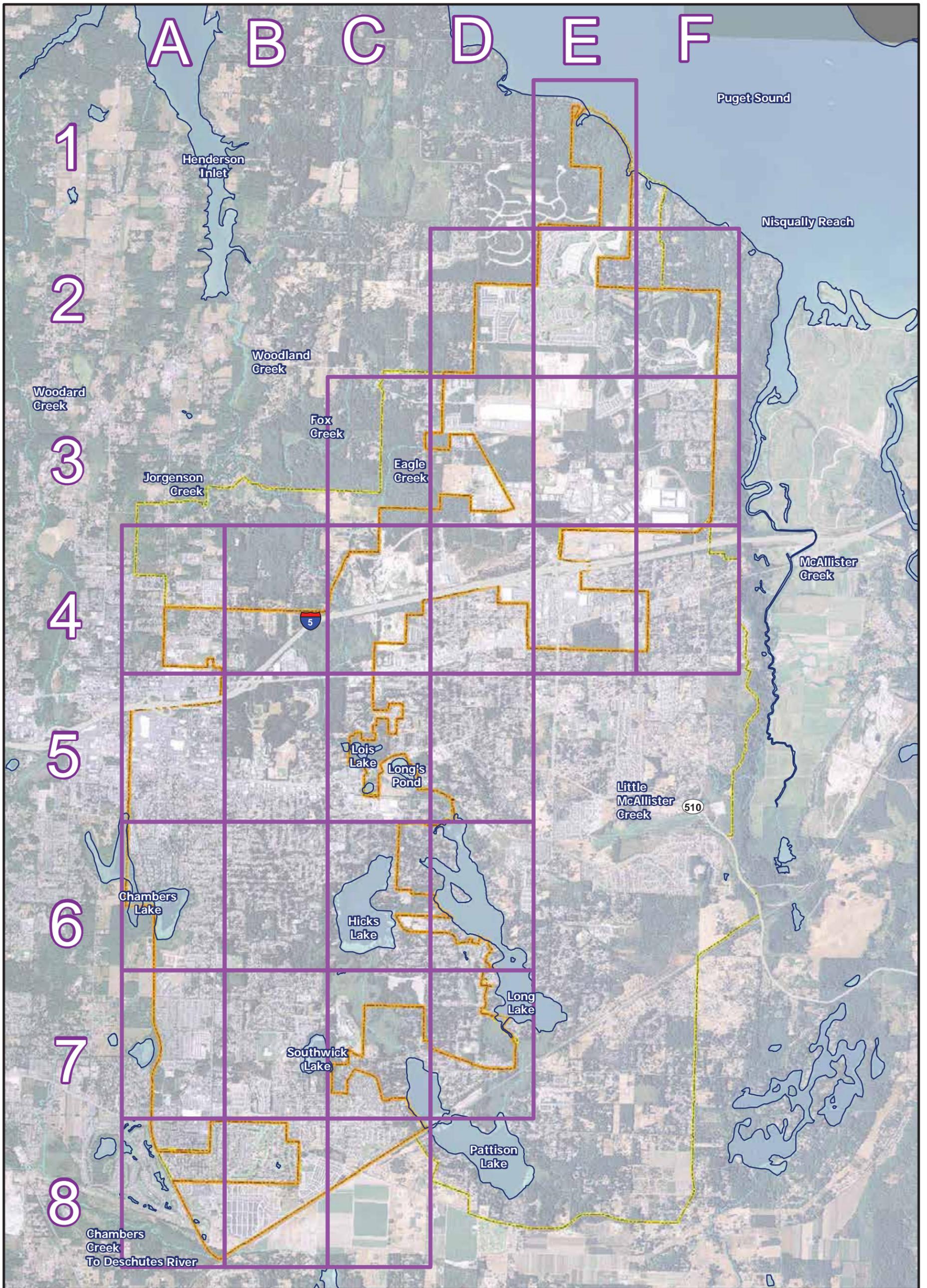
Funds	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
OPERATING FUND (Fund 403)												
Beginning Balance	\$ 1,104,856	\$ 1,030,987	\$ 1,191,085	\$ 591,338	\$ 609,098	\$ 527,580	\$ 466,313	\$ 549,617	\$ 539,768	\$ 704,298	\$ 742,854	\$ 742,854
plus: Net Cash Flow after Rate Increase	(73,869)	160,097	(455,012)	219,181	(81,518)	(61,268)	83,305	(9,850)	164,530	176,026	353,664	353,664
Less: Use of Operating Reserves	-	-	-	-	-	-	-	-	-	-	-	-
less: Transfer of Surplus to Capital Fund	-	-	(144,735)	(201,421)	-	-	-	-	-	(137,470)	(328,780)	(328,780)
Ending Balance	\$ 1,104,856	\$ 1,030,987	\$ 1,191,085	\$ 591,338	\$ 609,098	\$ 527,580	\$ 466,313	\$ 549,617	\$ 539,768	\$ 704,298	\$ 742,854	\$ 767,738
<i>Minimum Target Balance</i>	137,896	324,175	334,447	394,225	406,065	420,592	434,484	448,874	462,515	479,229	495,236	511,825
<i>Maximum Funds to be Kept as Operating Reserves</i>	206,844	1,972,063	2,034,556	591,338	609,098	630,887	651,726	673,311	693,773	718,843	742,854	767,738
<i>Info: No of Days of Cash Operating Expenses</i>	240	191	214	90	90	75	64	73	70	88	90	90
<i>Operating Revenues</i>		2,133,749	2,354,859	2,598,881	2,868,190	3,078,285	3,303,769	3,545,770	3,805,498	4,084,251	4,383,422	4,704,508
<i>Info: No of Days of Operating Revenues</i>		176	185	83	78	63	52	57	51.77	62.94	61.86	59.57
CAPITAL FUND (Fund 412)												
Beginning Balance	\$ 926,994	\$ 1,035,202	\$ 813,971	\$ 152,060	\$ 395,251	\$ 629,450	\$ 1,467,164	\$ 662,371	\$ 2,647,910	\$ 677,168	\$ 702,781	\$ 702,781
plus: Rate-Funded System Reinvestment	200,000	-	-	337,213	424,444	424,444	428,139	438,261	442,252	442,252	478,011	478,011
plus: Grants / Developer Donations / Other Outside Sources	177,500	1,176,800	-	-	-	-	-	-	-	-	-	-
plus: GFC Revenues	-	-	-	-	-	-	-	-	-	-	-	-
plus: Net Debt Proceeds Available for Projects	-	1,384,000	-	-	-	1,300,000	-	2,800,000	-	2,100,000	-	-
plus: Direct Rate Funding	-	-	494,224	-	-	-	-	-	-	-	-	-
plus: Interest Earnings	3,708	6,729	7,326	1,521	3,953	6,295	14,672	6,624	26,479	6,772	7,028	7,028
plus: Transfer of Surplus from Operating Fund	-	-	144,735	201,421	-	-	-	-	-	137,470	328,780	328,780
plus: Transfer from Fund 414	-	-	-	-	-	-	-	-	-	-	-	-
less: Capital Expenditures	(273,000)	(2,788,760)	(1,308,195)	(296,964)	(194,197)	(893,024)	(1,247,604)	(1,259,346)	(2,439,474)	(2,660,881)	(766,767)	(766,767)
Ending Balance	\$ 926,994	\$ 1,035,202	\$ 813,971	\$ 152,060	\$ 395,251	\$ 629,450	\$ 1,467,164	\$ 662,371	\$ 2,647,910	\$ 677,168	\$ 702,781	\$ 749,832
<i>Minimum Target Balance</i>	\$ 562,150	\$ 564,880	\$ 592,768	\$ 605,850	\$ 608,819	\$ 610,761	\$ 619,691	\$ 632,167	\$ 644,761	\$ 669,156	\$ 695,764	\$ 703,432
<i>Capital Contingency Deficit</i>	\$ -	\$ -	\$ -	\$ (453,789)	\$ (213,568)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
DEBT RESERVE												
Beginning Balance	\$ -	\$ -	\$ 122,072	\$ 122,072	\$ 122,072	\$ 122,072	\$ 236,735	\$ 236,735	\$ 483,701	\$ 483,701	\$ 668,925	\$ 668,925
plus: Reserve Funding from Rates	-	0	-	-	-	-	-	-	-	-	-	-
plus: Reserve Funding from New Debt	-	122,072	-	-	-	114,663	-	246,966	-	185,225	-	-
less: Use of Reserves for Debt Service	-	-	-	-	-	-	-	-	-	-	-	-
Ending Balance	\$ -	\$ -	\$ 122,072	\$ 122,072	\$ 122,072	\$ 122,072	\$ 236,735	\$ 236,735	\$ 483,701	\$ 483,701	\$ 668,925	\$ 668,925
<i>Minimum Target Balance</i>	-	-	122,072	122,072	122,072	122,072	236,735	236,735	483,701	483,701	668,925	668,925

City of Lacey
Stormwater Utility Rate Analysis
Rate Schedule with Across-the-Board Increases

Key Assumptions	Percent Impervious Surface												
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Single-family and Duplex:													
<i>(Per parcel)</i>													
Single-family Residential		\$7.36	\$8.03	\$8.75	\$9.54	\$10.11	\$10.72	\$11.36	\$12.04	\$12.76	\$13.53	\$14.34	
Duplex-family Residential		\$14.73	\$16.05	\$17.50	\$19.08	\$20.22	\$21.44	\$22.72	\$24.08	\$25.52	\$27.06	\$28.68	
Multi-family and Commercial:													
<i>(Per gross acre)</i>													
Very Light	0% to 10%	\$3.38	\$3.68	\$4.01	\$4.37	\$4.63	\$4.91	\$5.20	\$5.51	\$5.84	\$6.19	\$6.56	
Moderate Light	>10% to 25%	\$12.22	\$13.32	\$14.52	\$15.83	\$16.78	\$17.79	\$18.86	\$19.99	\$21.19	\$22.46	\$23.81	
Light	>25% to 40%	\$23.65	\$25.78	\$28.10	\$30.63	\$32.47	\$34.42	\$36.49	\$38.68	\$41.00	\$43.46	\$46.07	
Moderate Light	>40% to 55%	\$36.05	\$39.29	\$42.83	\$46.68	\$49.48	\$52.45	\$55.60	\$58.94	\$62.48	\$66.23	\$70.20	
Moderately Heavy	>55% to 70%	\$49.08	\$53.50	\$58.32	\$63.57	\$67.38	\$71.42	\$75.71	\$80.25	\$85.07	\$90.17	\$95.58	
Heavy	>70% to 85%	\$63.31	\$69.01	\$75.22	\$81.99	\$86.91	\$92.12	\$97.65	\$103.51	\$109.72	\$116.30	\$123.28	
Very Heavy	>85% to 100%	\$78.33	\$85.38	\$93.06	\$101.44	\$107.53	\$113.98	\$120.82	\$128.07	\$135.75	\$143.90	\$152.53	

APPENDIX G

Stormwater System Atlas



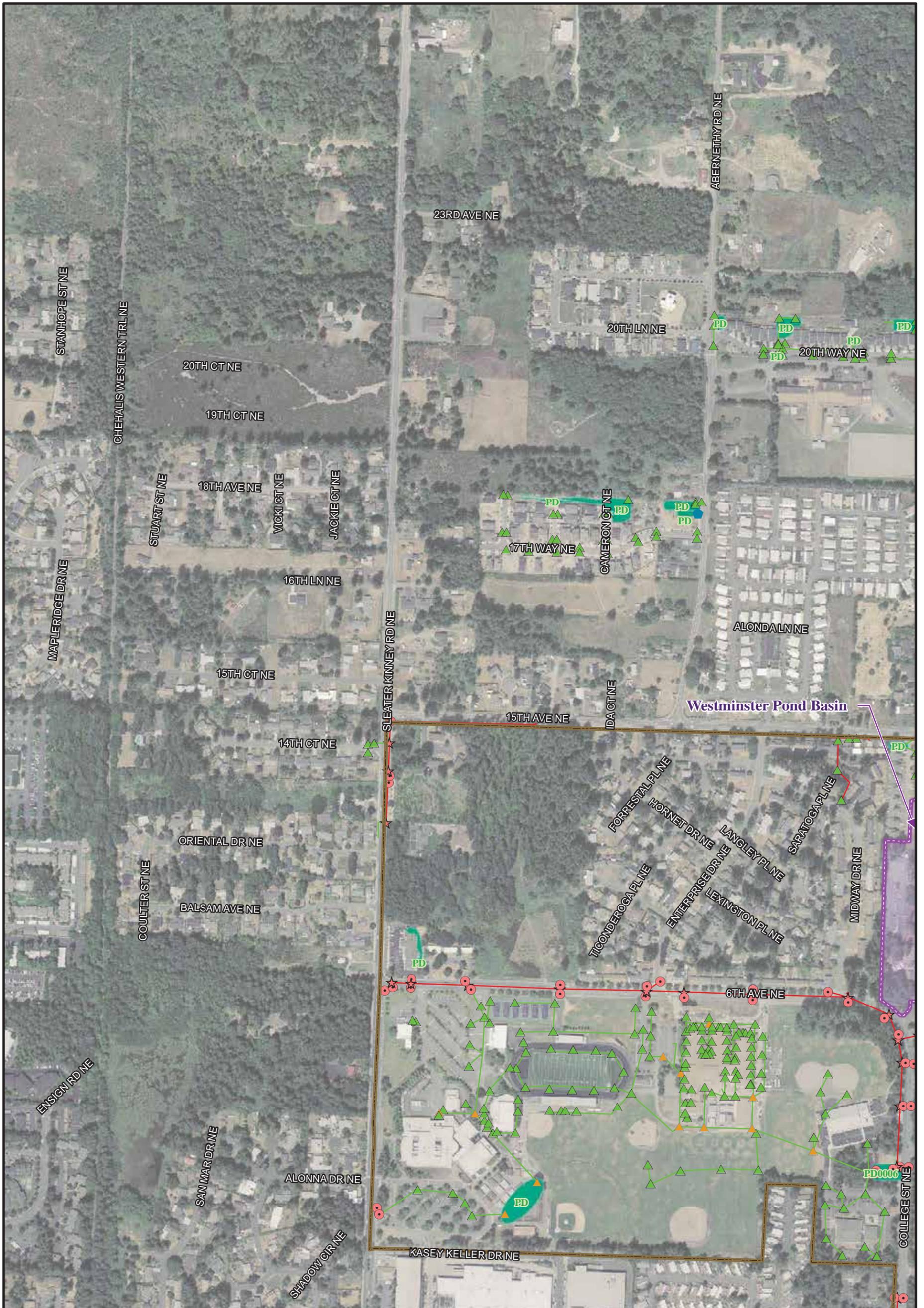
Legend

- Atlas index
- Waterbody
- City of Lacey (COL)
- Urban growth boundary
- Stream

STORMWATER ATLAS INDEX



Aerial: USDA (2009)
 City of Lacey, Waterbody, Stream (City of Lacey)



Legend

- Lake
- Stream

Storm Structures

- Catch basin
- Dry well
- Junction box

- Manhole
- Miscellaneous
- Private structure
- Thurston County structure

Storm lines

- Public
- Private
- Unknown

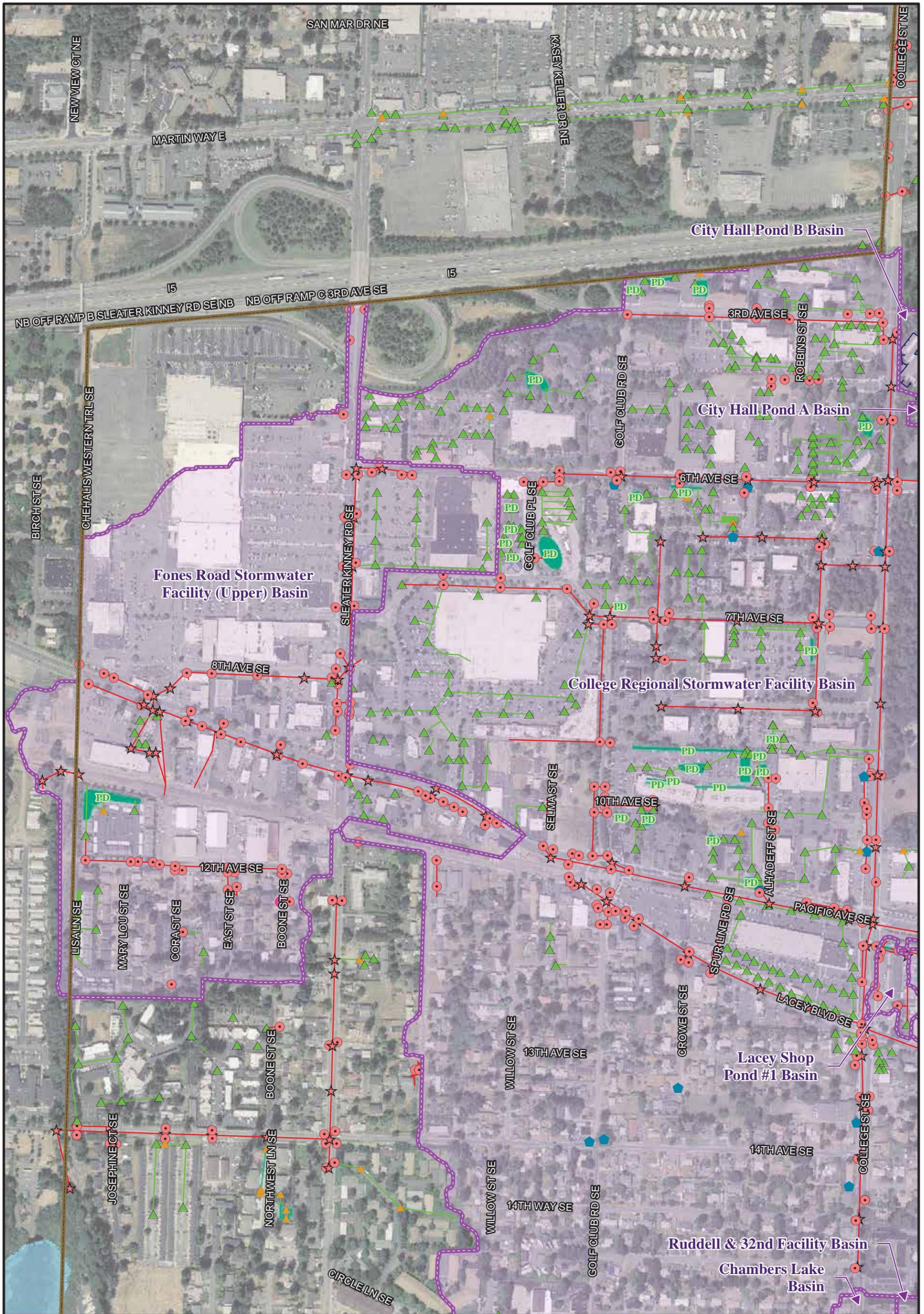
- Storm pond
- Facility drainage basin
- City limits

Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

**City of Lacey Stormwater Atlas:
Sheet A-4**



Aerial: City of Lacey (2009)



Legend

- Lake
- Stream

Storm Structures

- Catch basin
- Dry well
- Junction box

- Manhole
 - Miscellaneous
 - Private structure
 - Thurston County structure
- Storm lines**
- Public
 - Private
 - Unknown

- Storm pond
- Facility drainage basin
- City limits

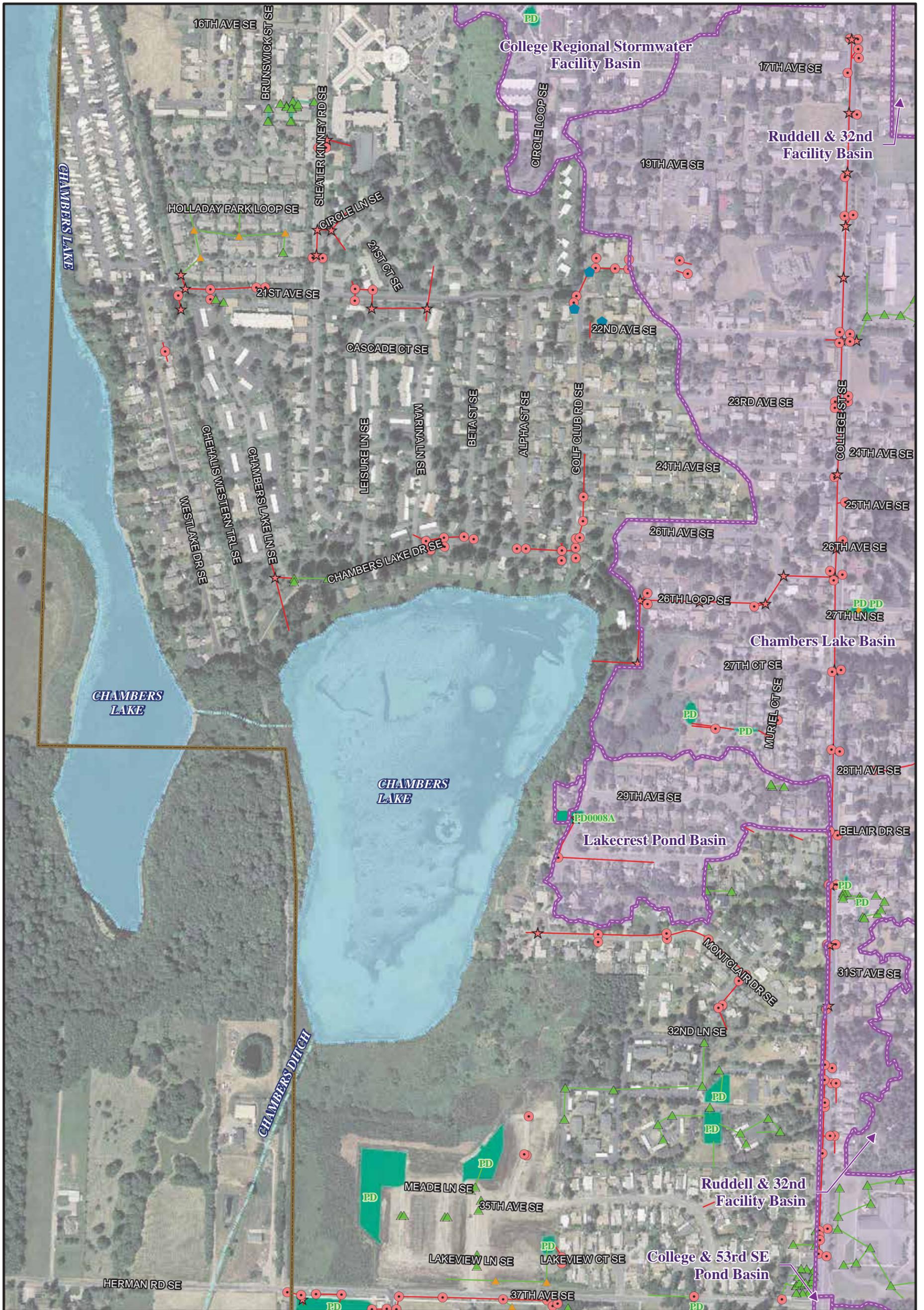
Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

**City of Lacey Stormwater Atlas:
Sheet A-5**



Aerial: City of Lacey (2009)

K:\Projects\Y2010\10-04793-000\Project\Stormwater_Atlas.mxd (11/26/2013)



Legend

- Lake
- Stream

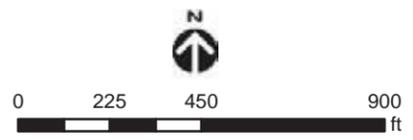
Storm Structures

- Catch basin
- Dry well
- Junction box

- Manhole
 - Miscellaneous
 - Private structure
 - Thurston County structure
- Storm lines**
- Public
 - Private
 - Unknown

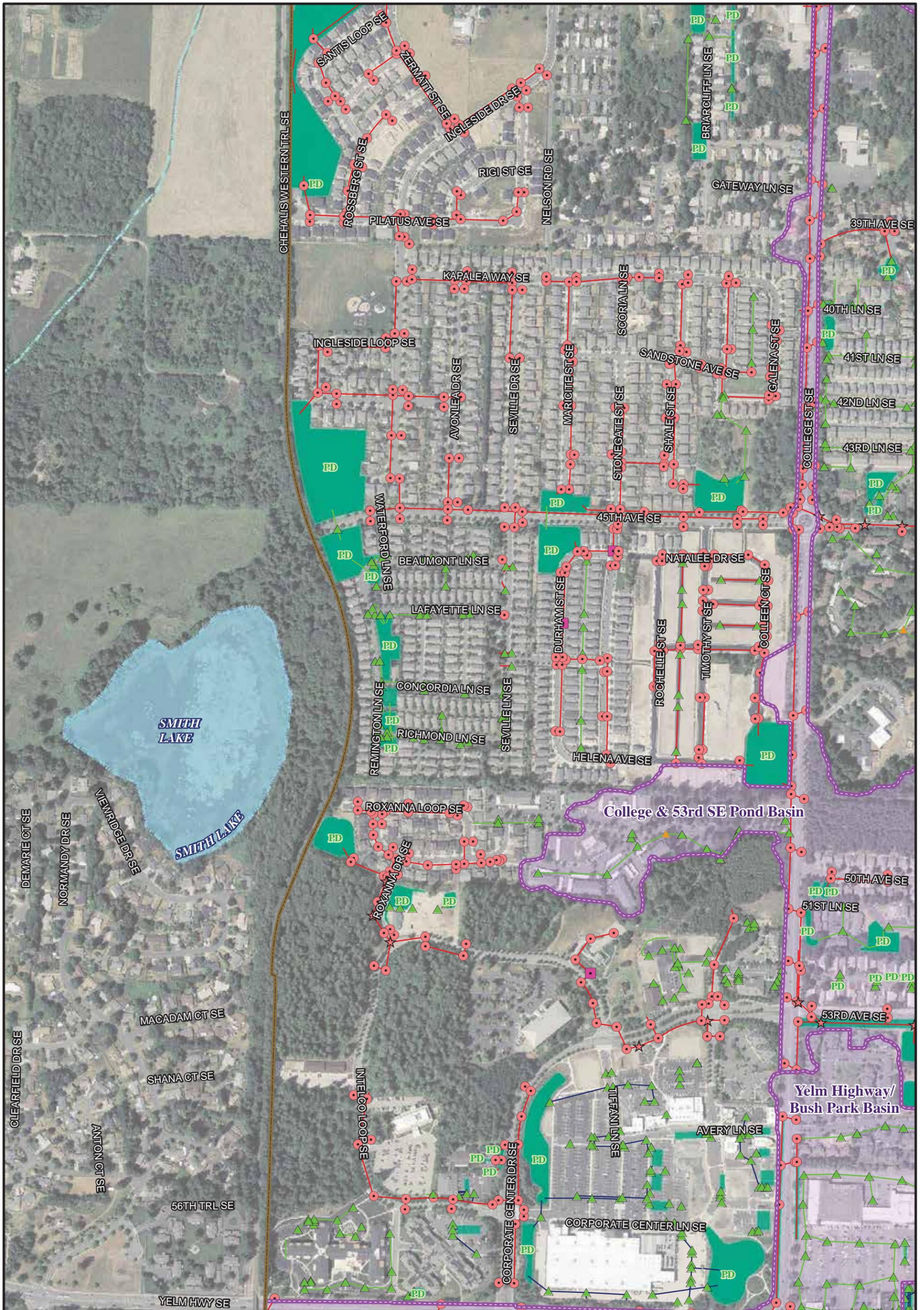
- Storm pond
- Facility drainage basin
- City limits

**City of Lacey Stormwater Atlas:
Sheet A-6**



Aerial: City of Lacey (2009)

K:\Projects\Y2010\10-04793-000\Project\Stormwater_Atlas.mxd (11/26/2013)



Legend

- Blue rectangle: Lake
- Blue dashed line: Stream
- Red star: Manhole
- Blue pentagon: Miscellaneous
- Green triangle: Private structure
- Orange triangle: Thurston County structure
- Green rectangle: Storm pond
- Purple dashed line: Facility drainage basin
- Brown rectangle: City limits

Storm Structures

- Red circle: Catch basin
- Pink circle: Dry well
- Pink square: Junction box

Storm lines

- Red line: Public
- Green line: Private
- Blue line: Unknown

City of Lacey Stormwater Atlas: Sheet A-7

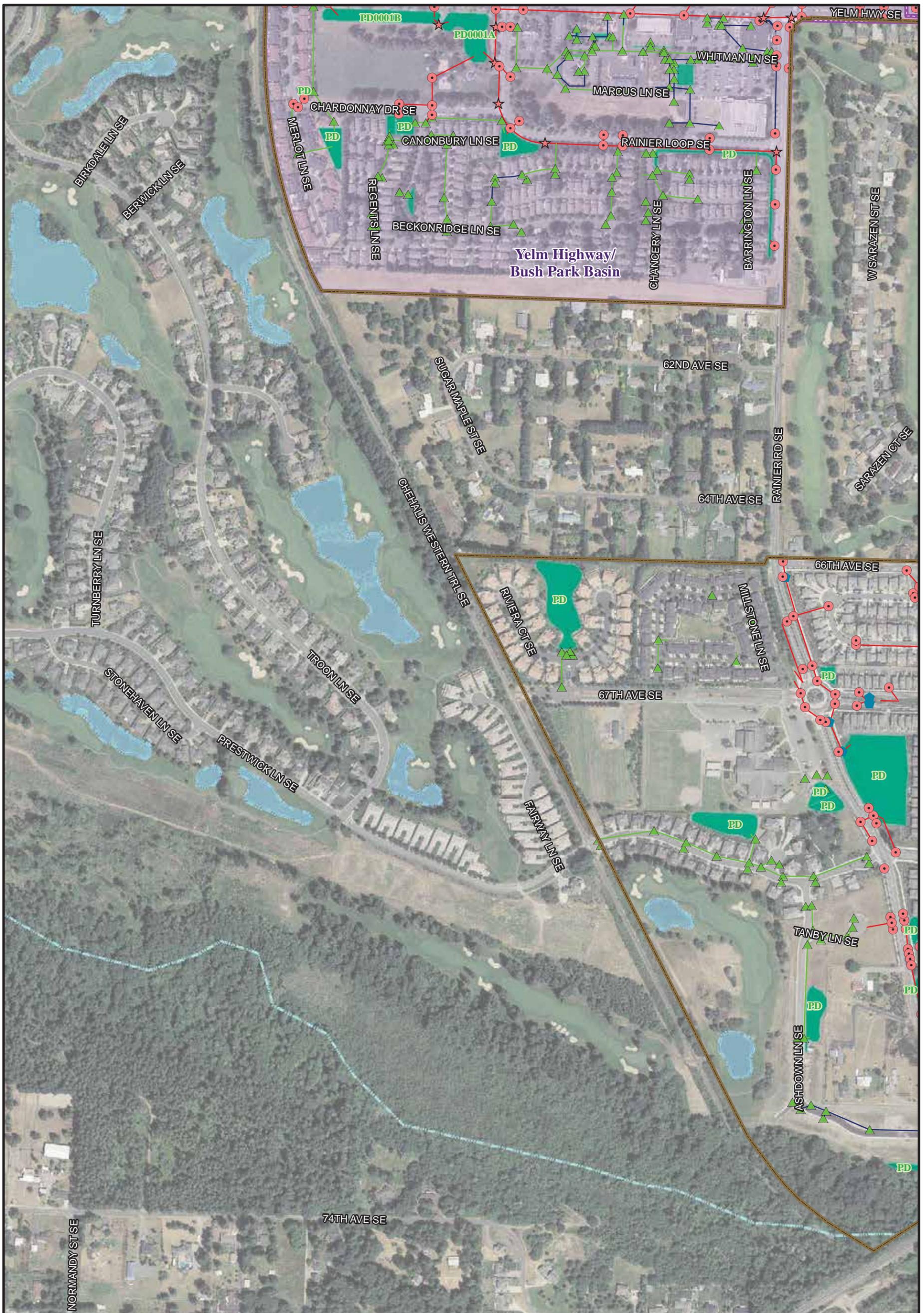
Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

0 225 450 900 ft

HERRERA

Aerial: City of Lacey (2009)

K:\Projects\Y2010\10-04793-000\Project\Stormwater_Atlas.mxd (11/26/2013)



Legend

- Lake
- Stream

Storm Structures

- Catch basin
- Dry well
- Junction box

- Manhole
- Miscellaneous
- Private structure
- Thurston County structure

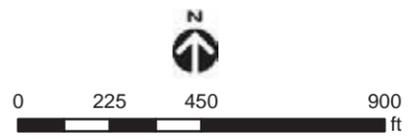
Storm lines

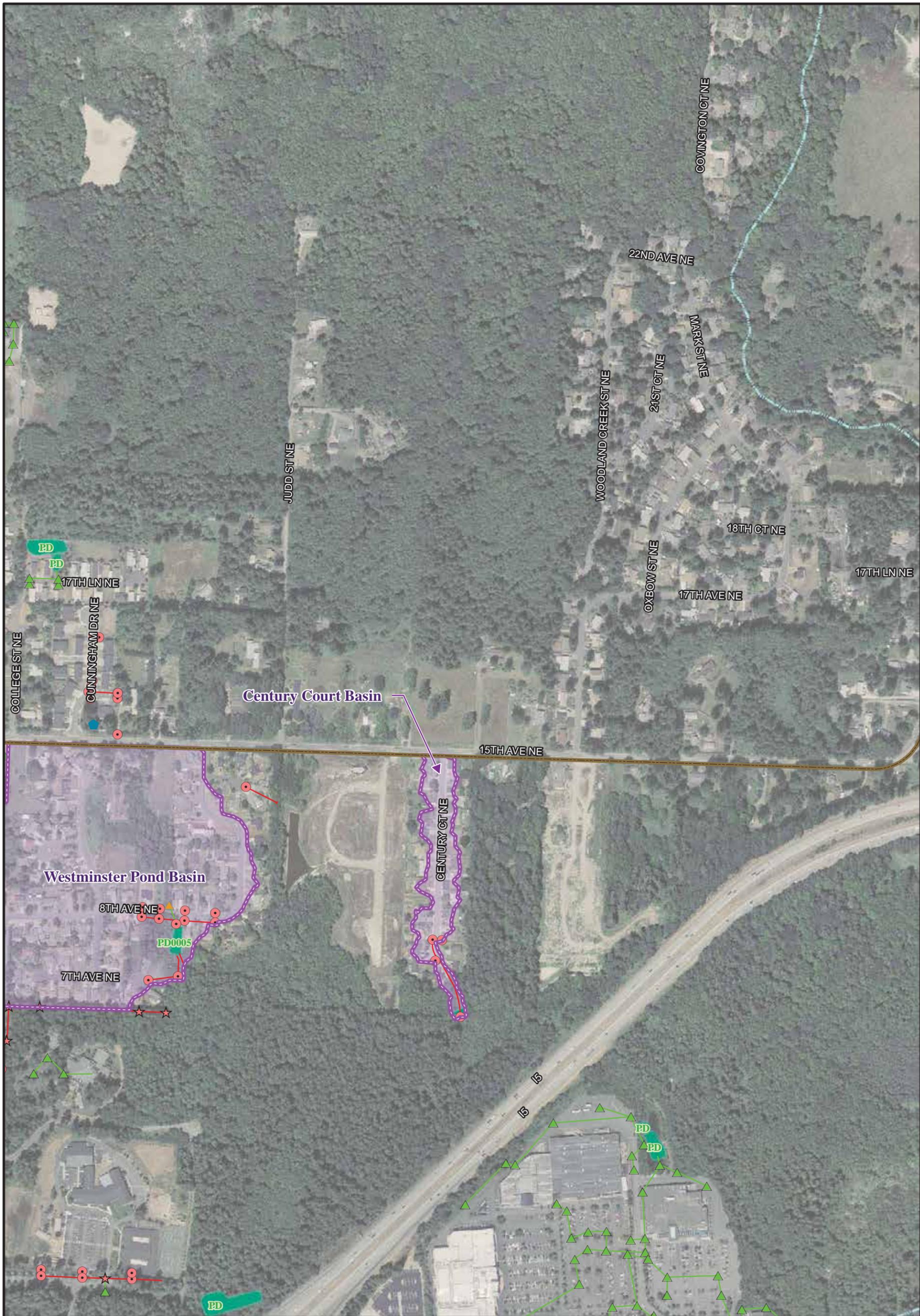
- Public
- Private
- Unknown

- Storm pond
- Facility drainage basin
- City limits

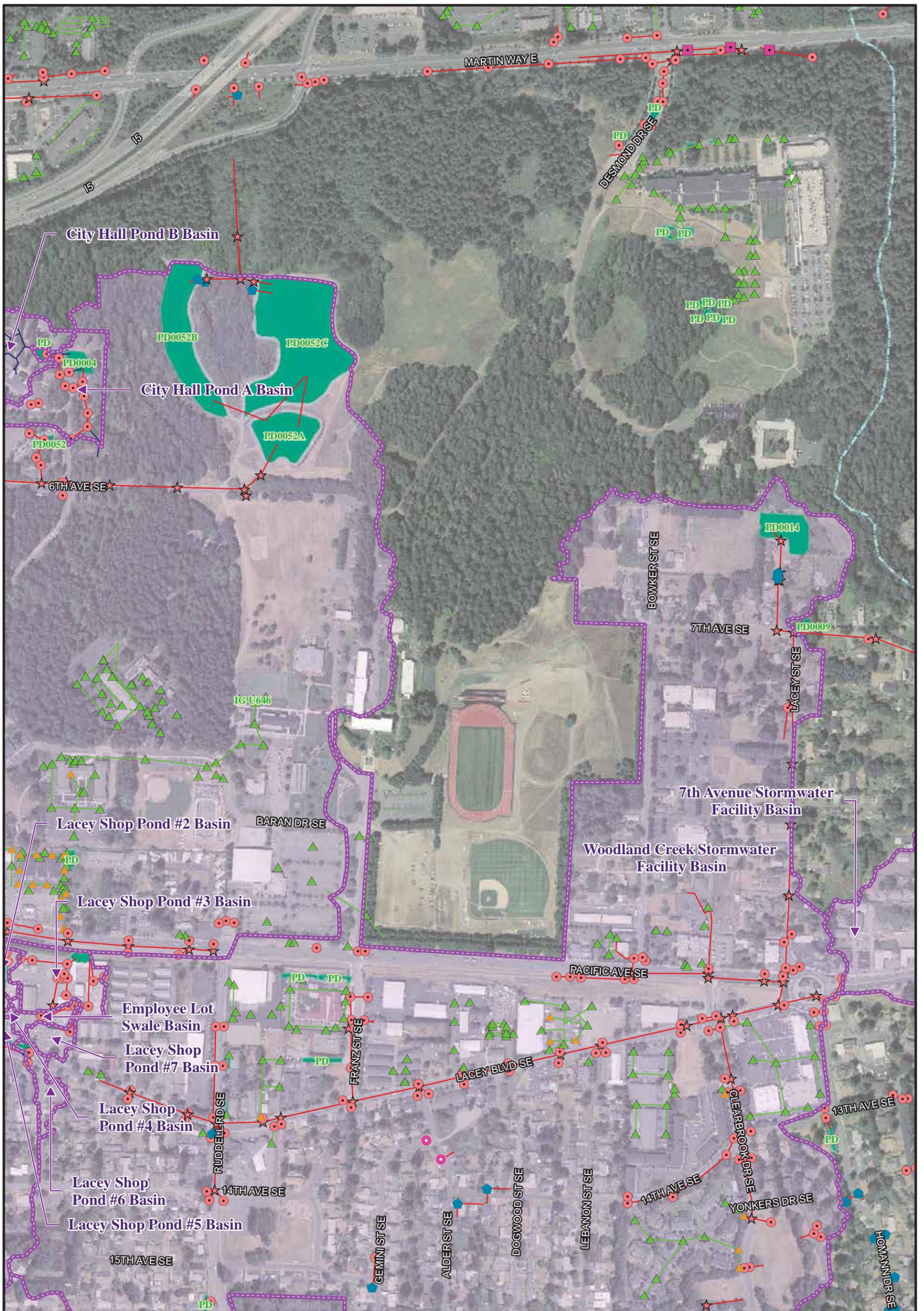
Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

City of Lacey Stormwater Atlas: Sheet A-8





Legend Lake Stream Storm Structures Catch basin Dry well Junction box		Manhole Miscellaneous Private structure Thurston County structure Storm lines Public Private Unknown		Storm pond Facility drainage basin City limits <p>Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.</p>	
City of Lacey Stormwater Atlas: Sheet B-4					
 Aerial: City of Lacey (2009) <small>K:\Projects\Y2010\10-04793-000\Project\Stormwater_Atlas.mxd (11/26/2013)</small>					



Legend

- Lake
- Stream
- Storm Structures**
- Catch basin
- Dry well
- Junction box
- Manhole
- Miscellaneous
- Private structure
- Thurston County structure
- Storm lines**
- Public
- Private
- Unknown

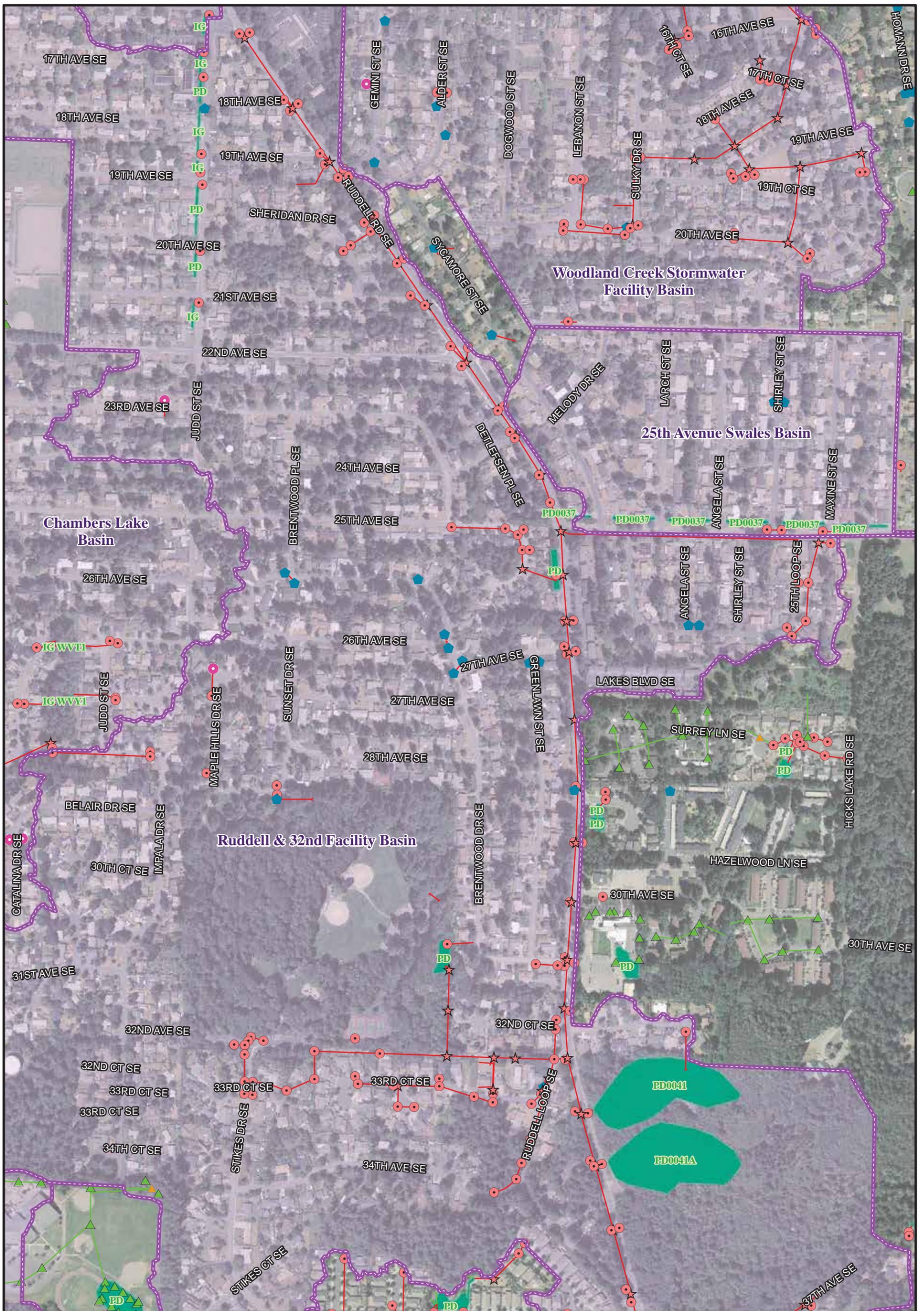
- Storm pond
- Facility drainage basin
- City limits

**City of Lacey Stormwater Atlas:
Sheet B-5**



Aerial: City of Lacey (2009)

Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.



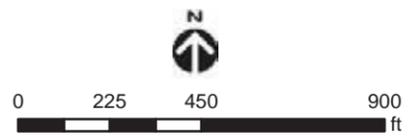
Legend

- Lake
- Stream
- Storm Structures**
- Catch basin
- Dry well
- Junction box
- Manhole
- Miscellaneous
- Private structure
- Thurston County structure
- Storm lines**
- Public
- Private
- Unknown

- Storm pond
- Facility drainage basin
- City limits

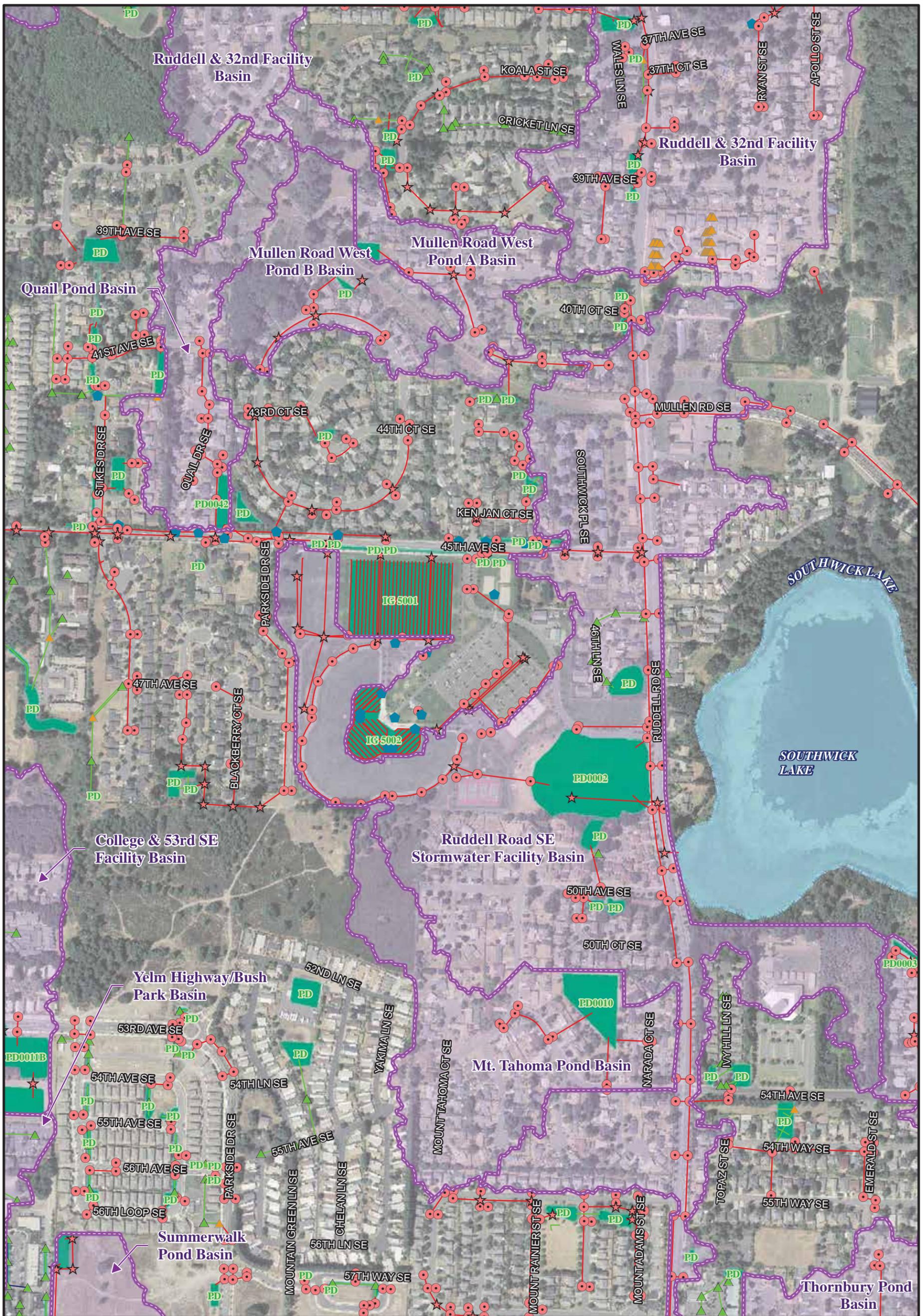
Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

**City of Lacey Stormwater Atlas:
Sheet B-6**



Aerial: City of Lacey (2009)

K:\Projects\Y2010\10-04793-000\Project\Stormwater Atlas.mxd (11/26/2013)



Legend	
	Lake
	Stream
	Catch basin
	Dry well
	Junction box
	Manhole
	Miscellaneous
	Private structure
	Thurston County structure
	Public Storm lines
	Private Storm lines
	Unknown Storm lines
	Storm pond
	Facility drainage basin
	City limits

Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

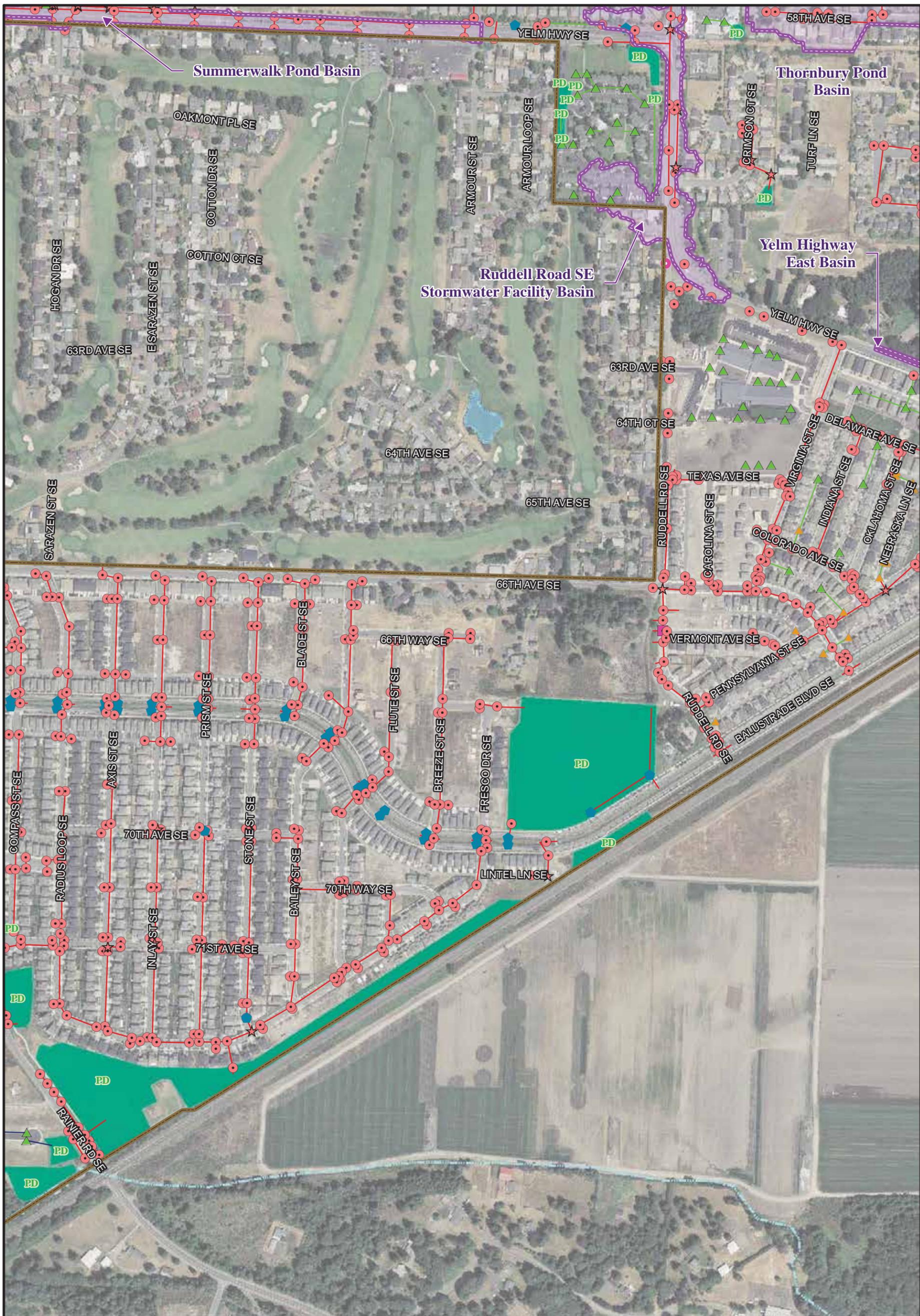
**City of Lacey Stormwater Atlas:
Sheet B-7**

N

0 225 450 900

 ft

Aerial: City of Lacey (2009)
K:\Projects\Y2010\10-04793-000\Project\Stormwater_Atlas.mxd (11/26/2013)



Legend

- Lake
- Stream

Storm Structures

- Catch basin
- Dry well
- Junction box

- Manhole
- Miscellaneous
- Private structure
- Thurston County structure

Storm lines

- Public
- Private
- Unknown

- Storm pond
- Facility drainage basin
- City limits

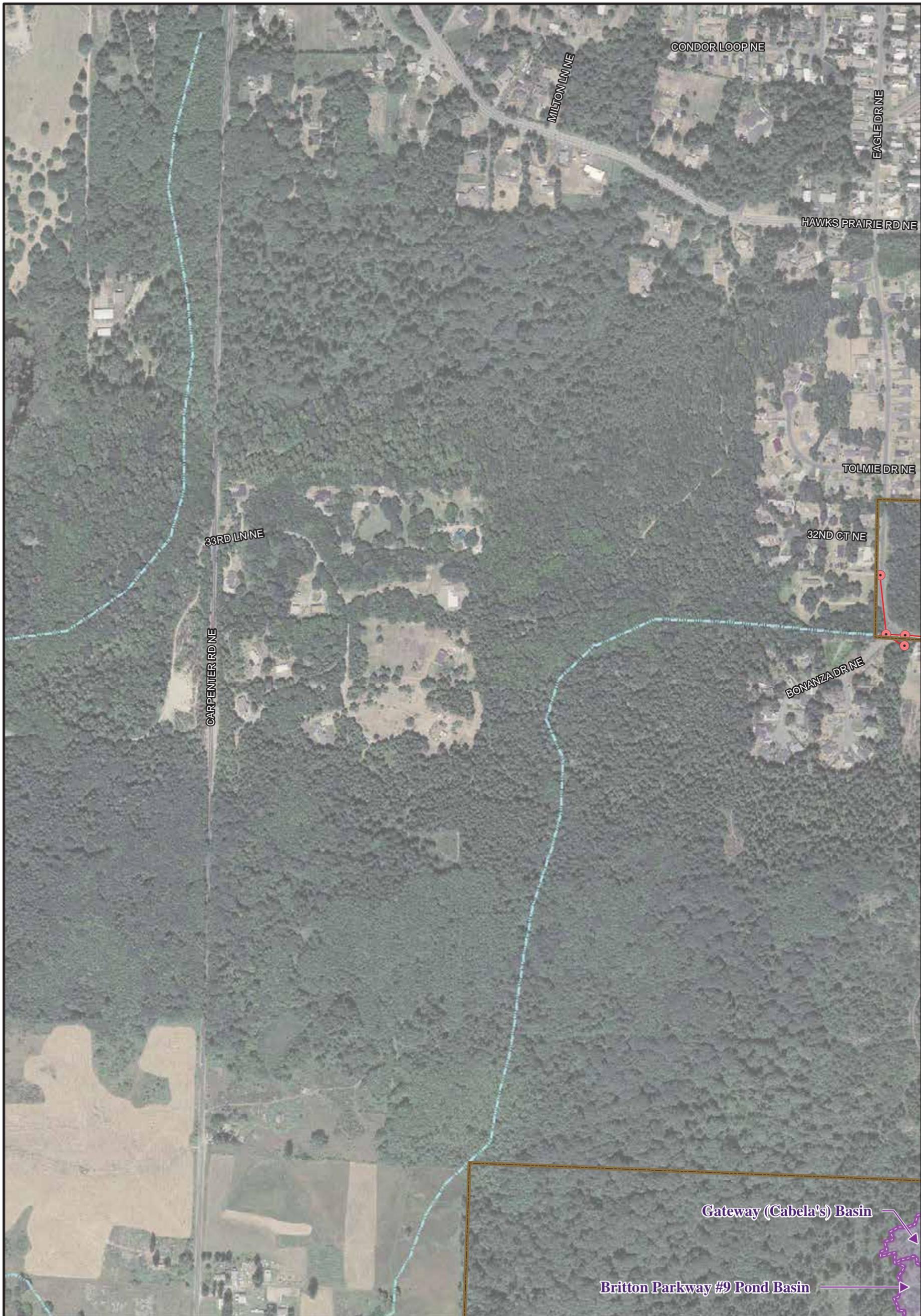
Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

**City of Lacey Stormwater Atlas:
Sheet B-8**



Aerial: City of Lacey (2009)

K:\Projects\Y2010\10-04793-000\Project\Stormwater_Atlas.mxd (11/26/2013)



Legend

- Lake
- Stream

Storm Structures

- Catch basin
- Dry well
- Junction box

- Manhole
- Miscellaneous
- Private structure
- Thurston County structure

Storm lines

- Public
- Private
- Unknown

- Storm pond
- Facility drainage basin
- City limits

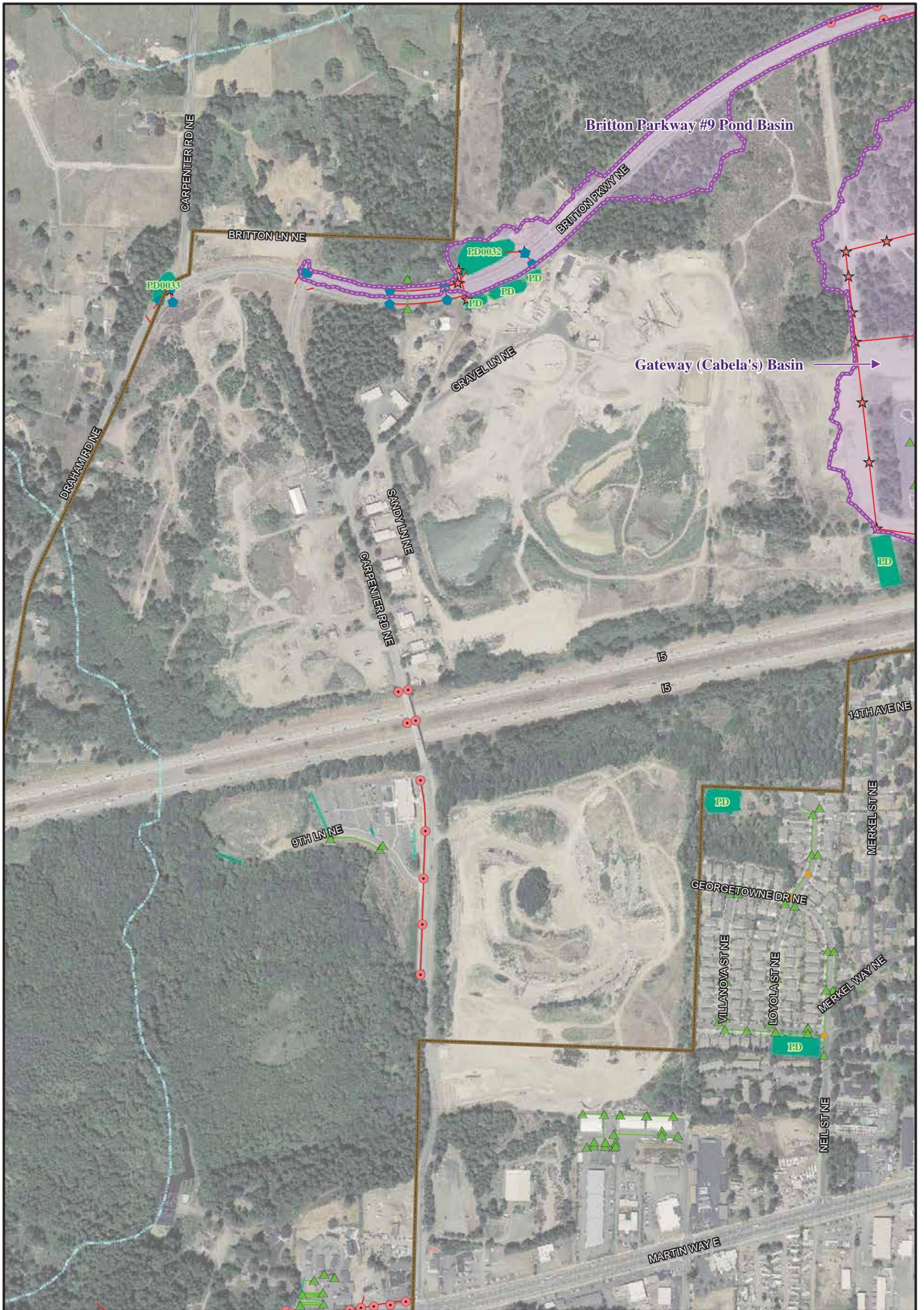
Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

**City of Lacey Stormwater Atlas:
Sheet C-3**



Aerial: City of Lacey (2009)

K:\Projects\Y2010\10-04793-000\Project\Stormwater_Atlas.mxd (11/26/2013)



Legend

- Lake
- Stream

Storm Structures

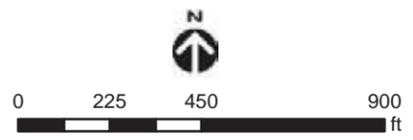
- Catch basin
- Dry well
- Junction box

- Manhole
 - Miscellaneous
 - Private structure
 - Thurston County structure
- Storm lines**
- Public
 - Private
 - Unknown

- Storm pond
- Facility drainage basin
- City limits

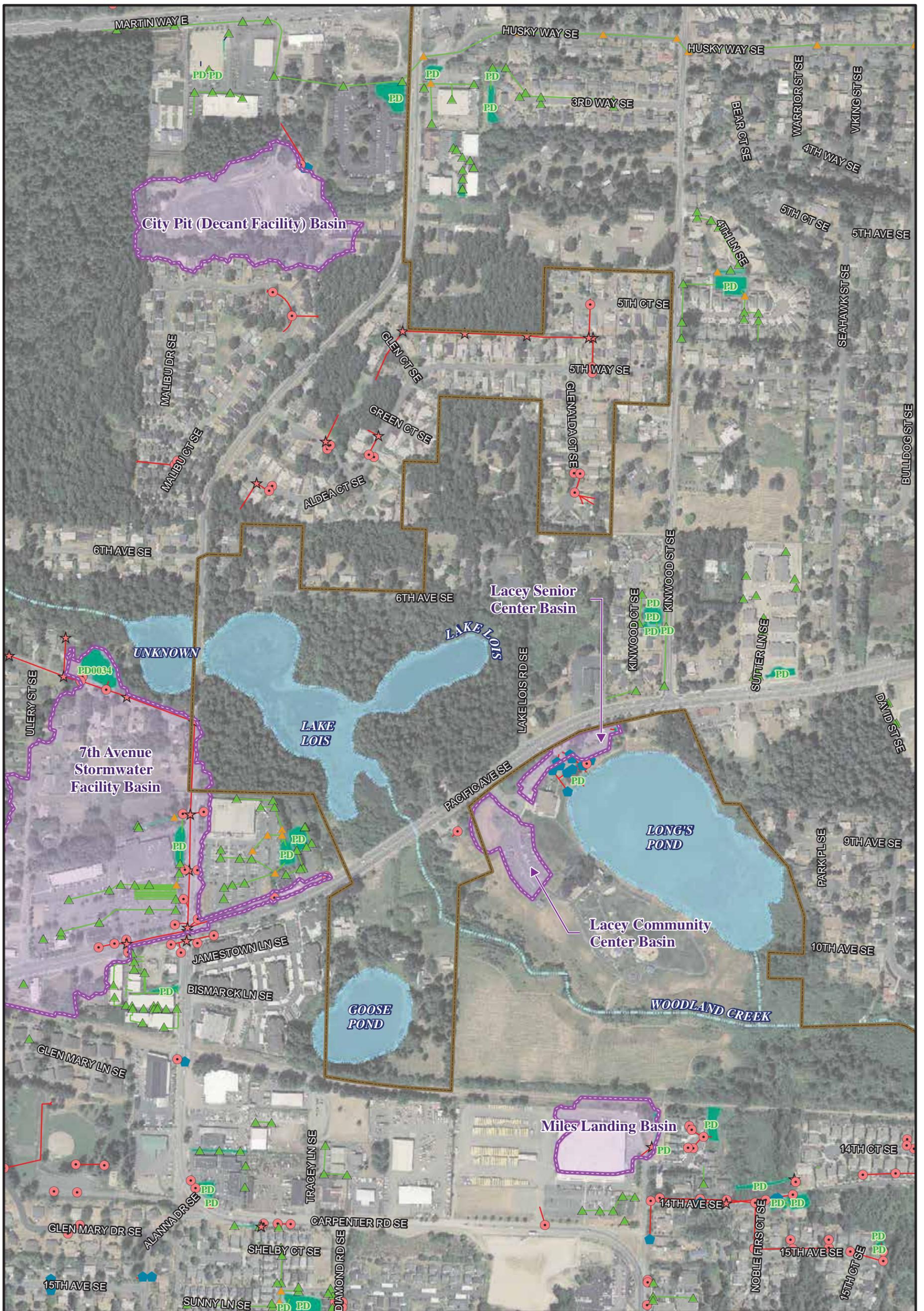
Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

City of Lacey Stormwater Atlas: Sheet C-4



Aerial: City of Lacey (2009)

K:\Projects\Y2010\10-04793-000\Project\Stormwater Atlas.mxd (11/26/2013)



Legend

- Lake
- Stream
- Storm Structures**
- Catch basin
- Dry well
- Junction box
- Manhole
- Miscellaneous
- Private structure
- Thurston County structure
- Storm lines**
- Public
- Private
- Unknown

- Storm pond
- Facility drainage basin
- City limits

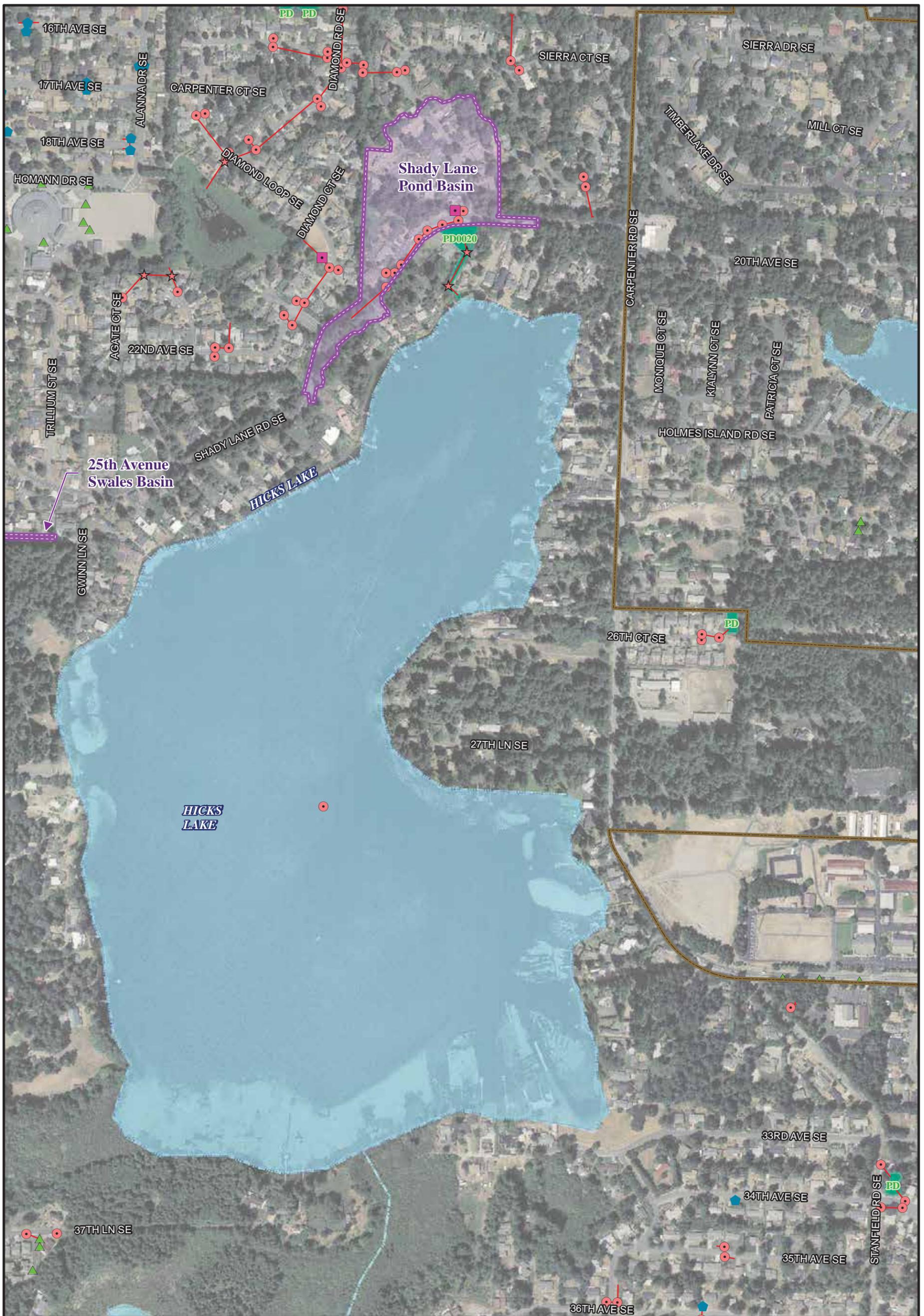
**City of Lacey Stormwater Atlas:
Sheet C-5**



Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.



Aerial: City of Lacey (2009)



Legend

- Lake
- Stream
- Storm Structures**
- Catch basin
- Dry well
- Junction box
- Manhole
- Miscellaneous
- Private structure
- Thurston County structure
- Storm lines**
- Public
- Private
- Unknown

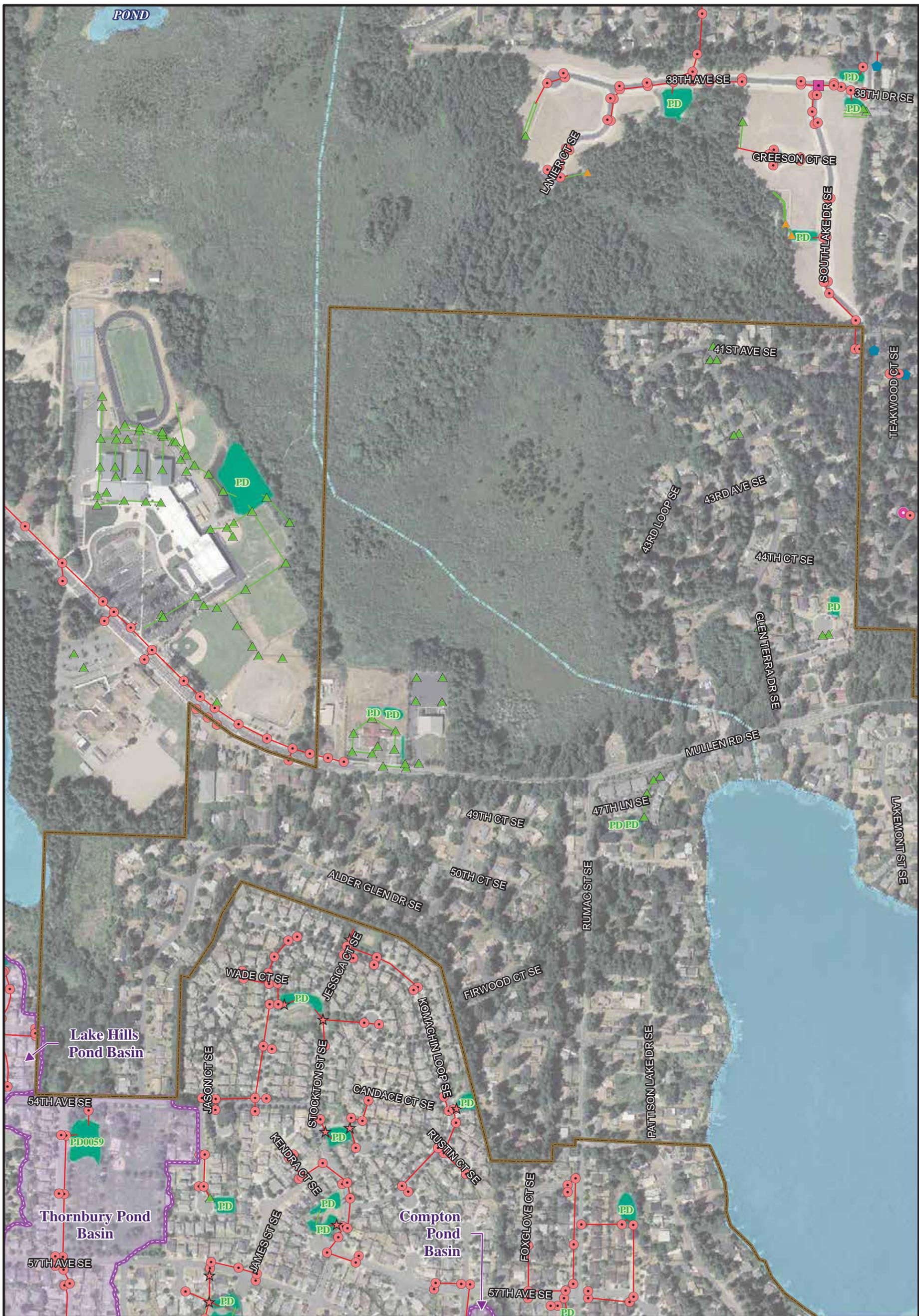
- Storm pond
- Facility drainage basin
- City limits

Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

**City of Lacey Stormwater Atlas:
Sheet C-6**



K:\Projects\Y2010\10-04793-000\Project\Stormwater_Atlas.mxd (11/26/2013)



Legend		★ Manhole	■ Storm pond
■ Lake	◆ Miscellaneous	▲ Private structure	▭ Facility drainage basin
— Stream	▲ Thurston County structure	— Public Storm lines	▭ City limits
Storm Structures	● Catch basin	— Private Storm lines	— Unknown
● Dry well	■ Junction box		

Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

**City of Lacey Stormwater Atlas:
Sheet C-7**

0 225 450 900 ft

HERRERA

Aerial: City of Lacey (2009)

K:\Projects\Y2010\10-04793-000\Project\Stormwater_Atlas.mxd (11/26/2013)



Legend

- Lake
- Stream

Storm Structures

- Catch basin
- Dry well
- Junction box

- Manhole
- Miscellaneous
- Private structure
- Thurston County structure

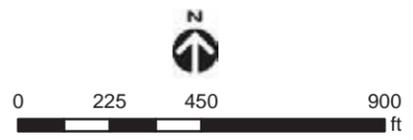
Storm lines

- Public
- Private
- Unknown

- Storm pond
- Facility drainage basin
- City limits

Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

City of Lacey Stormwater Atlas: Sheet C-8



K:\Projects\Y2010\10-04793-000\Project\Stormwater Atlas.mxd (11/26/2013)



Legend		★ Manhole	■ Storm pond
■ Lake	◆ Miscellaneous	▲ Private structure	▭ Facility drainage basin
— Stream	▲ Thurston County structure	— Storm lines	▭ City limits
Storm Structures	● Catch basin	— Public	— Unknown
● Dry well	■ Junction box	— Private	

Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

**City of Lacey Stormwater Atlas:
Sheet D-2**

N

0 225 450 900
ft

HERRERA

Aerial: City of Lacey (2009)

K:\Projects\Y2010\10-04793-000\Project\Stormwater_Atlas.mxd (11/26/2013)



Legend

- Lake
- Stream

Storm Structures

- Catch basin
- Dry well
- Junction box

- Manhole
- Miscellaneous
- Private structure
- Thurston County structure

Storm lines

- Public
- Private
- Unknown

- Storm pond
- Facility drainage basin
- City limits

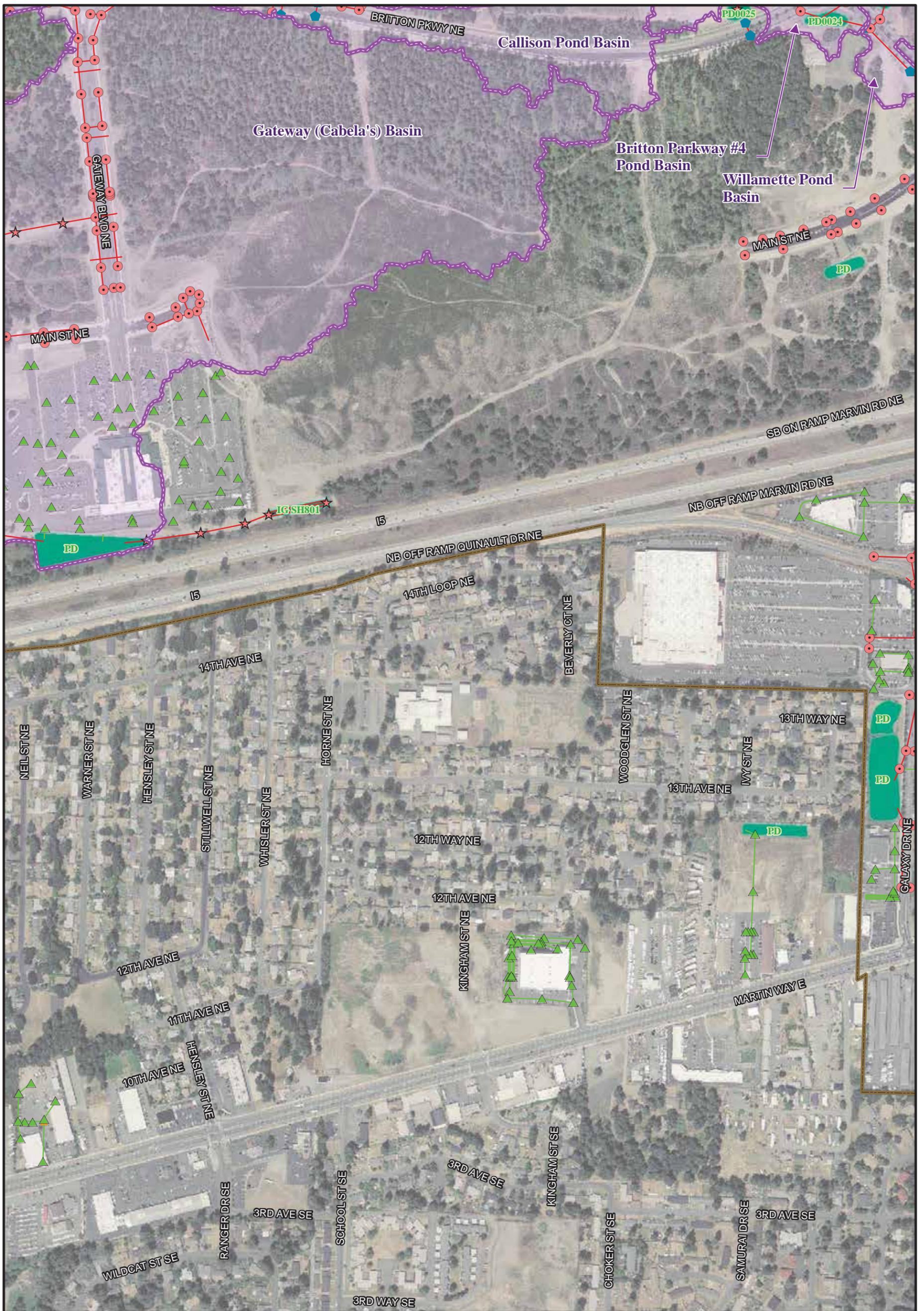
Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

**City of Lacey Stormwater Atlas:
Sheet D-3**



Aerial: City of Lacey (2009)

K:\Projects\Y2010\10-04793-000\Project\Stormwater_Atlas.mxd (11/26/2013)



Legend

- Lake
- Stream

Storm Structures

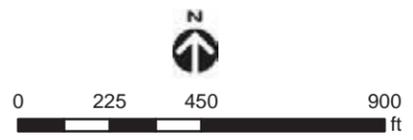
- Catch basin
- Dry well
- Junction box

- Manhole
- Miscellaneous
- Private structure
- Thurston County structure

- Storm lines**
- Public
 - Private
 - Unknown

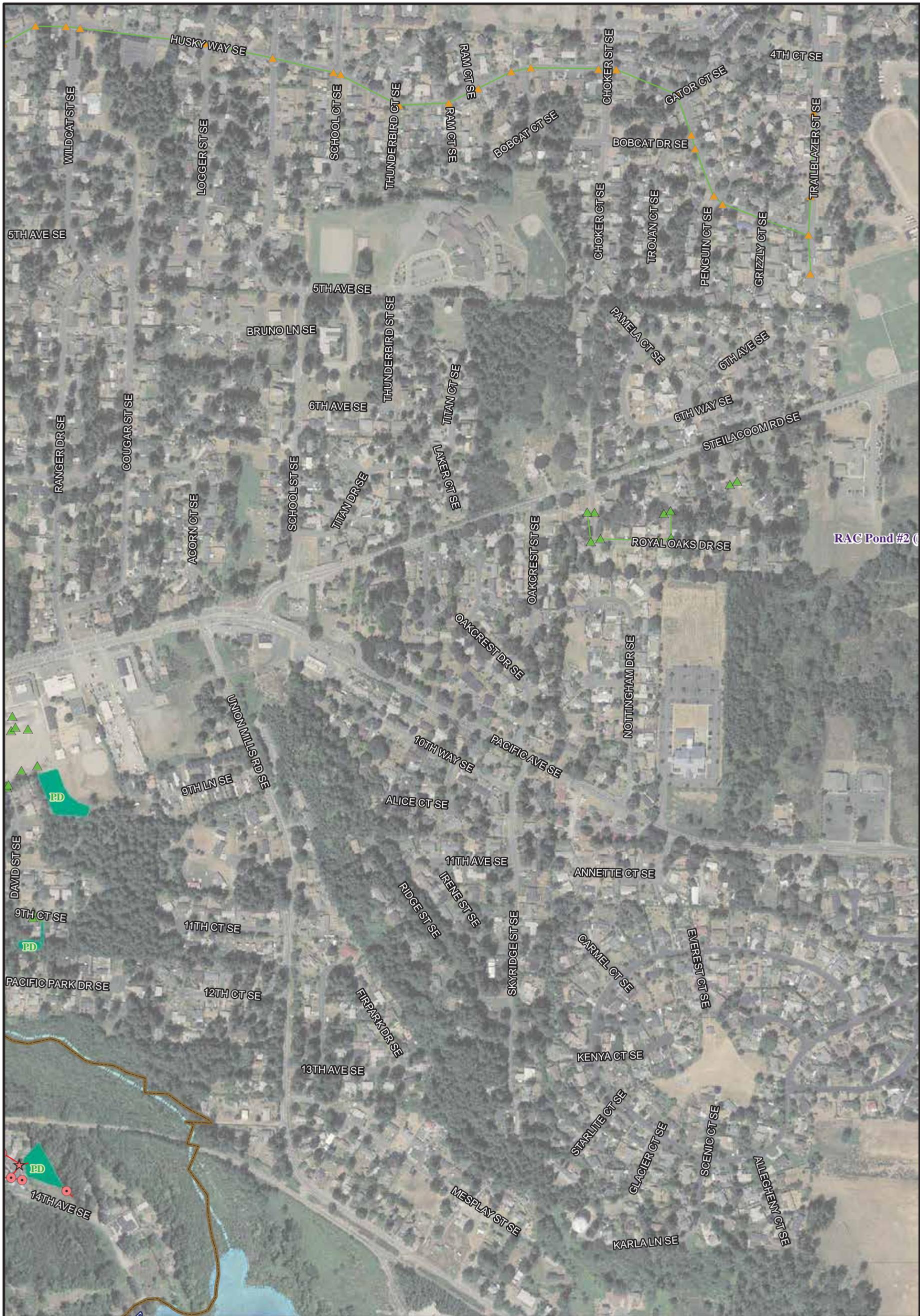
- Storm pond
- Facility drainage basin
- City limits

**City of Lacey Stormwater Atlas:
Sheet D-4**



Aerial: City of Lacey (2009)

Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.



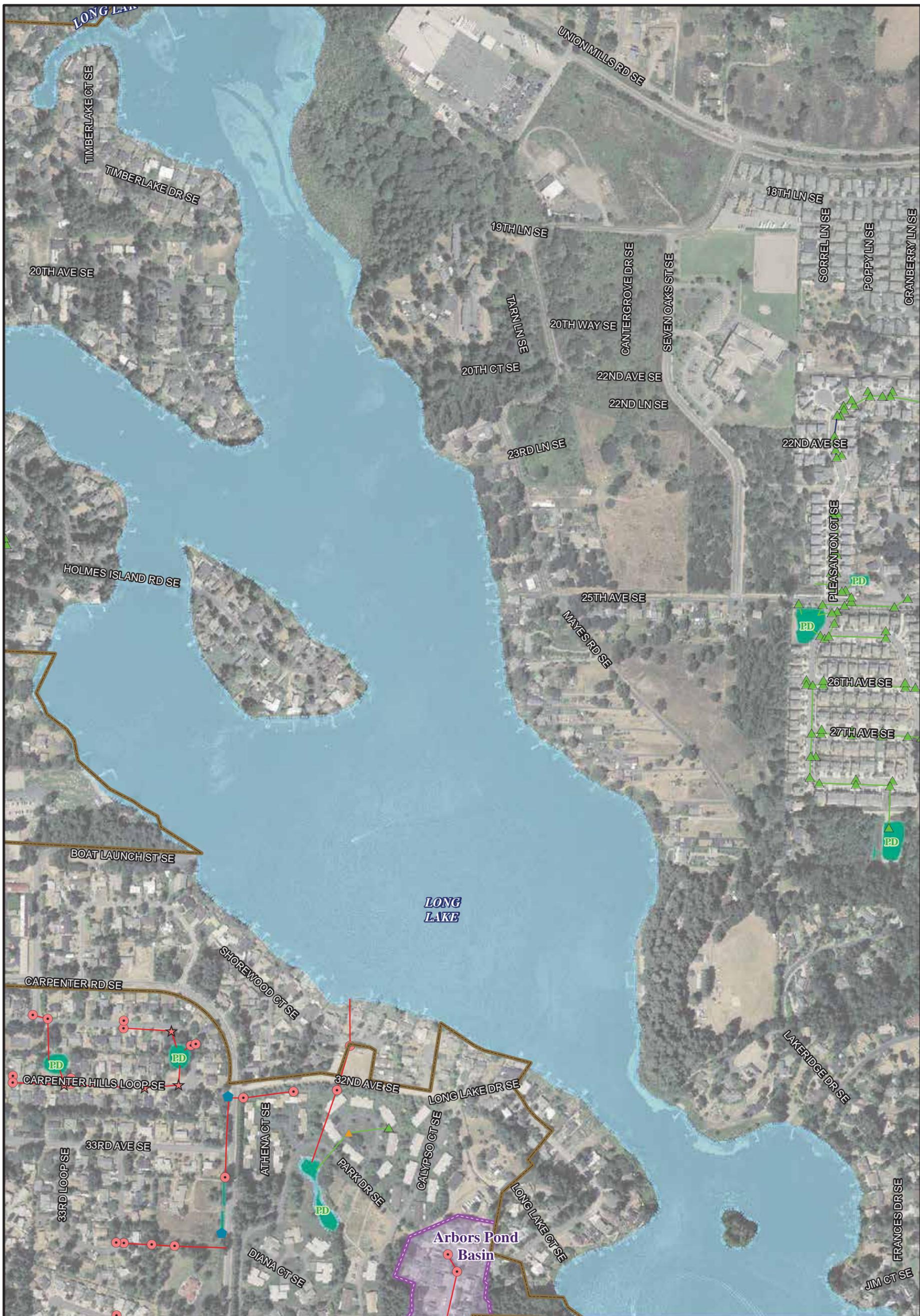
Legend		★ Manhole	■ Storm pond
■ Lake	◆ Miscellaneous	▲ Private structure	▭ Facility drainage basin
— Stream	▲ Thurston County structure	▭ City limits	
Storm Structures		Storm lines	
● Catch basin	— Public	— Unknown	
■ Dry well	— Private		
■ Junction box			

**City of Lacey Stormwater Atlas:
Sheet D-5**

Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

0 225 450 900 ft

HERRERA
Aerial: City of Lacey (2009)
K:\Projects\Y2010\10-04793-000\Project\Stormwater_Atlas.mxd (11/26/2013)



Legend		★ Manhole	■ Storm pond
■ Lake	◆ Miscellaneous	▲ Private structure	▭ Facility drainage basin
— Stream	▲ Thurston County structure	— Public Storm lines	▭ City limits
Storm Structures	● Catch basin	— Private Storm lines	
● Dry well	— Public Storm lines	— Unknown Storm lines	
■ Junction box			

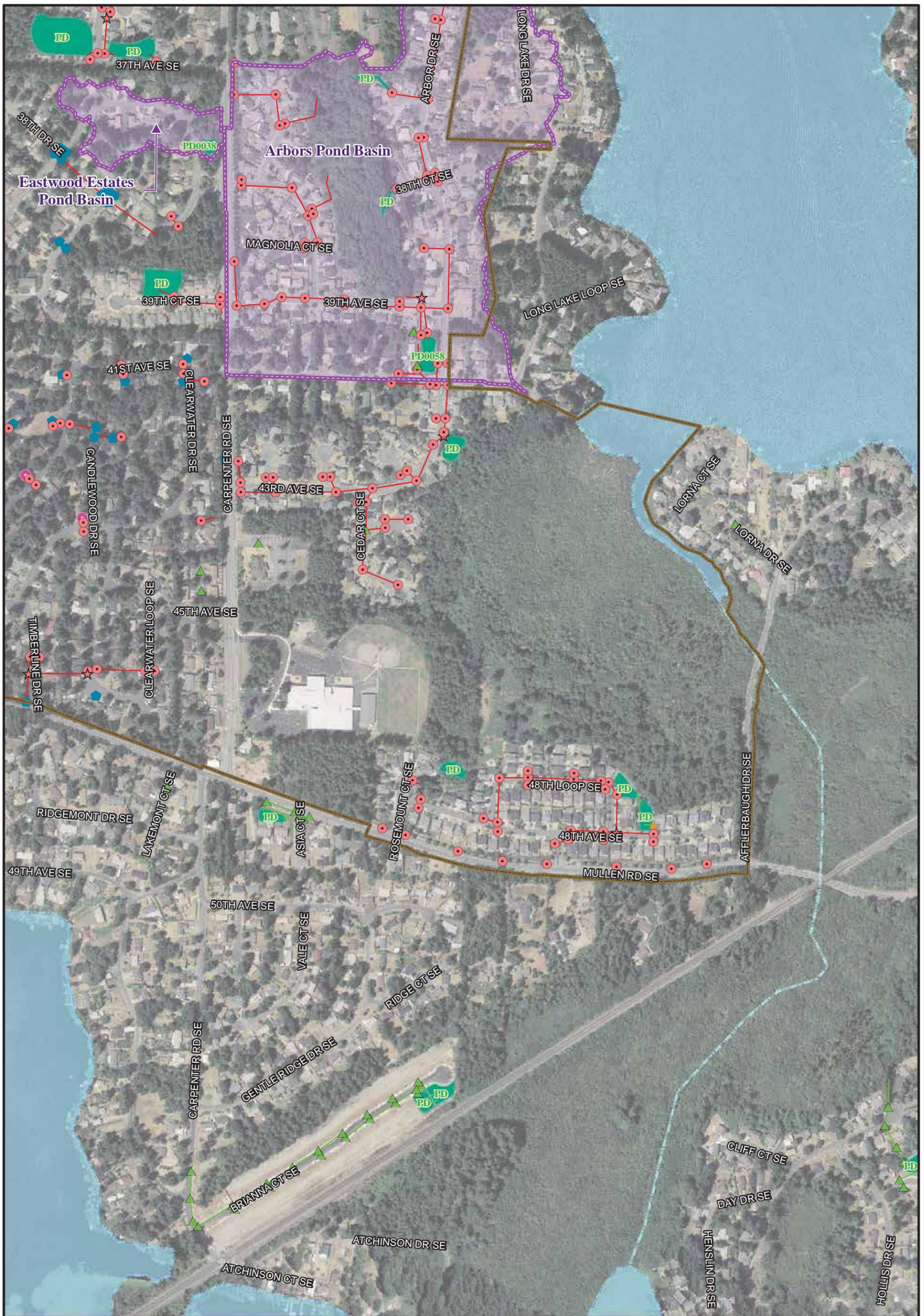
Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

**City of Lacey Stormwater Atlas:
Sheet D-6**

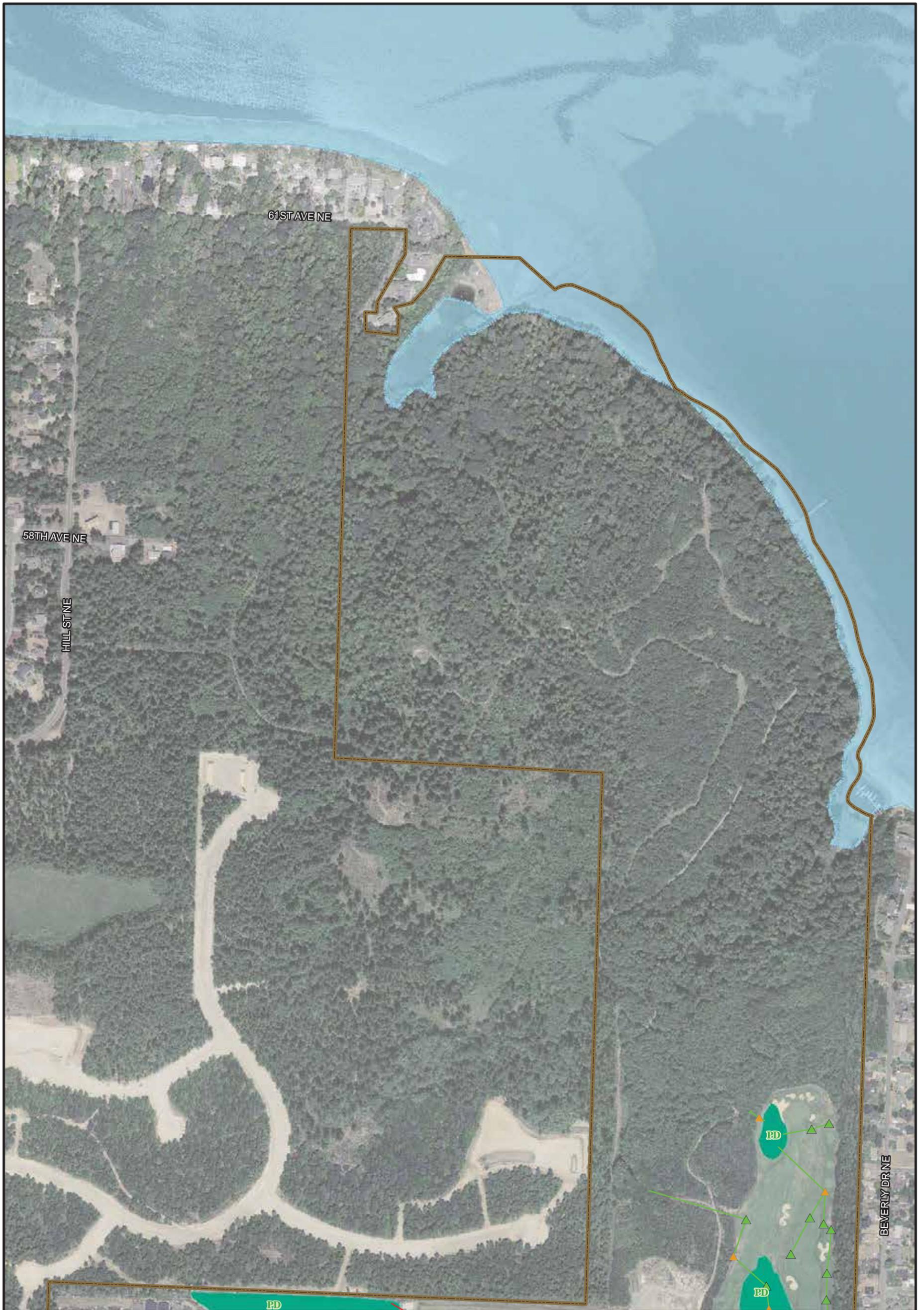
0 225 450 900 ft

HERRERA
Aerial: City of Lacey (2009)

K:\Projects\Y2010\10-04793-000\Project\Stormwater Atlas.mxd (11/26/2013)



Legend Lake Stream Storm Structures Catch basin Dry well Junction box		Manhole Miscellaneous Private structure Thurston County structure Storm lines Public Private Unknown		Storm pond Facility drainage basin City limits <p>Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.</p>	
City of Lacey Stormwater Atlas: Sheet D-7					
 Aerial: City of Lacey (2009) <small>K:\Projects\Y2010\10-04793-000\Project\Stormwater_Atlas.mxd (11/26/2013)</small>					



Legend

- Lake
- Stream

Storm Structures

- Catch basin
- Dry well
- Junction box

- Manhole
- Miscellaneous
- Private structure
- Thurston County structure

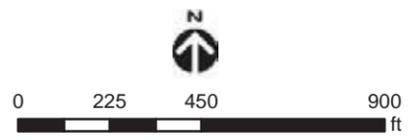
Storm lines

- Public
- Private
- Unknown

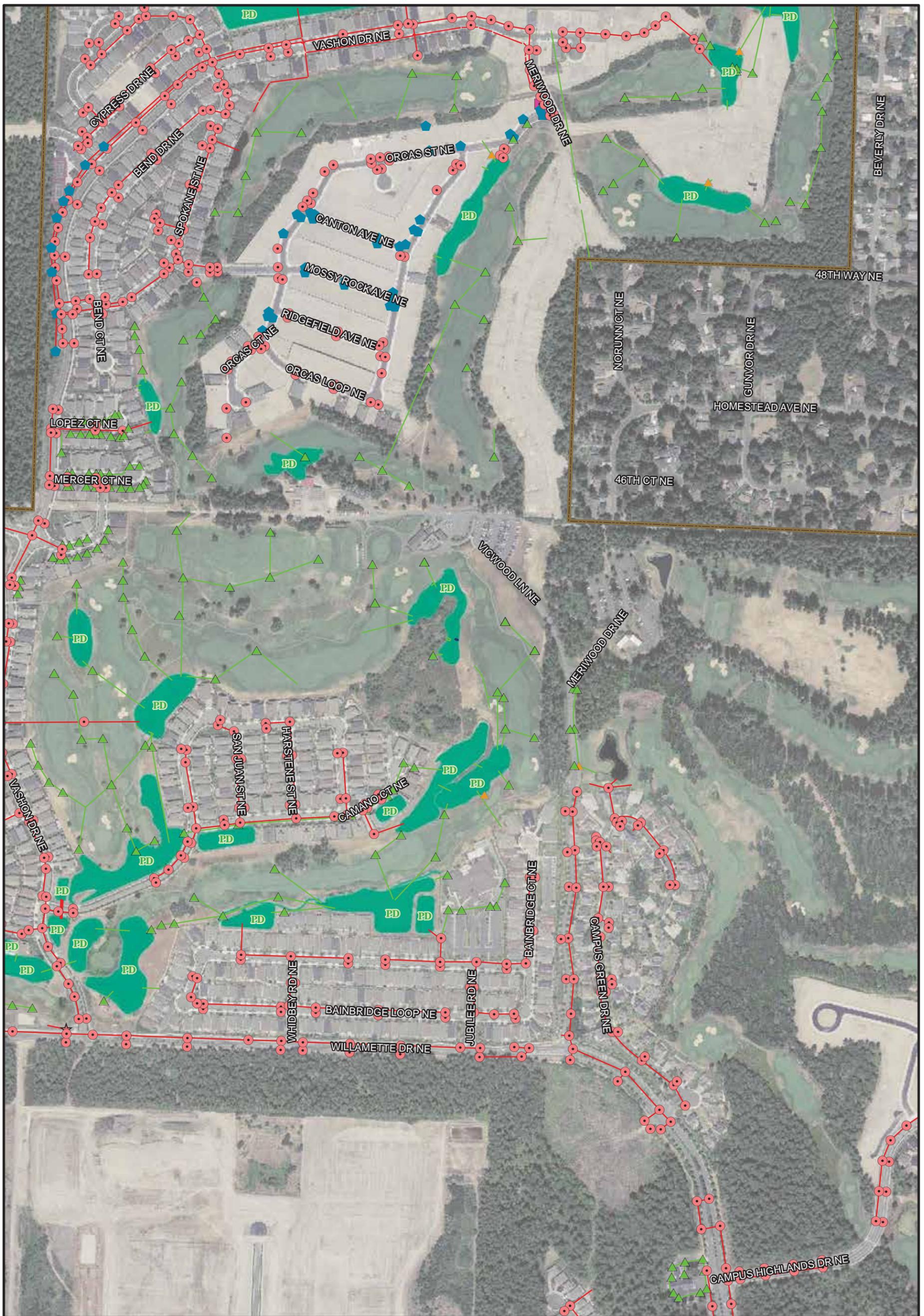
- Storm pond
- Facility drainage basin
- City limits

Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

**City of Lacey Stormwater Atlas:
Sheet E-1**



K:\Projects\Y2010\10-04793-000\Project\Stormwater_Atlas.mxd (11/26/2013)



Legend

- Lake
- Stream

Storm Structures

- Catch basin
- Dry well
- Junction box

- Manhole
- Miscellaneous
- Private structure
- Thurston County structure

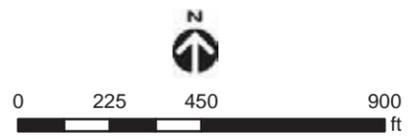
Storm lines

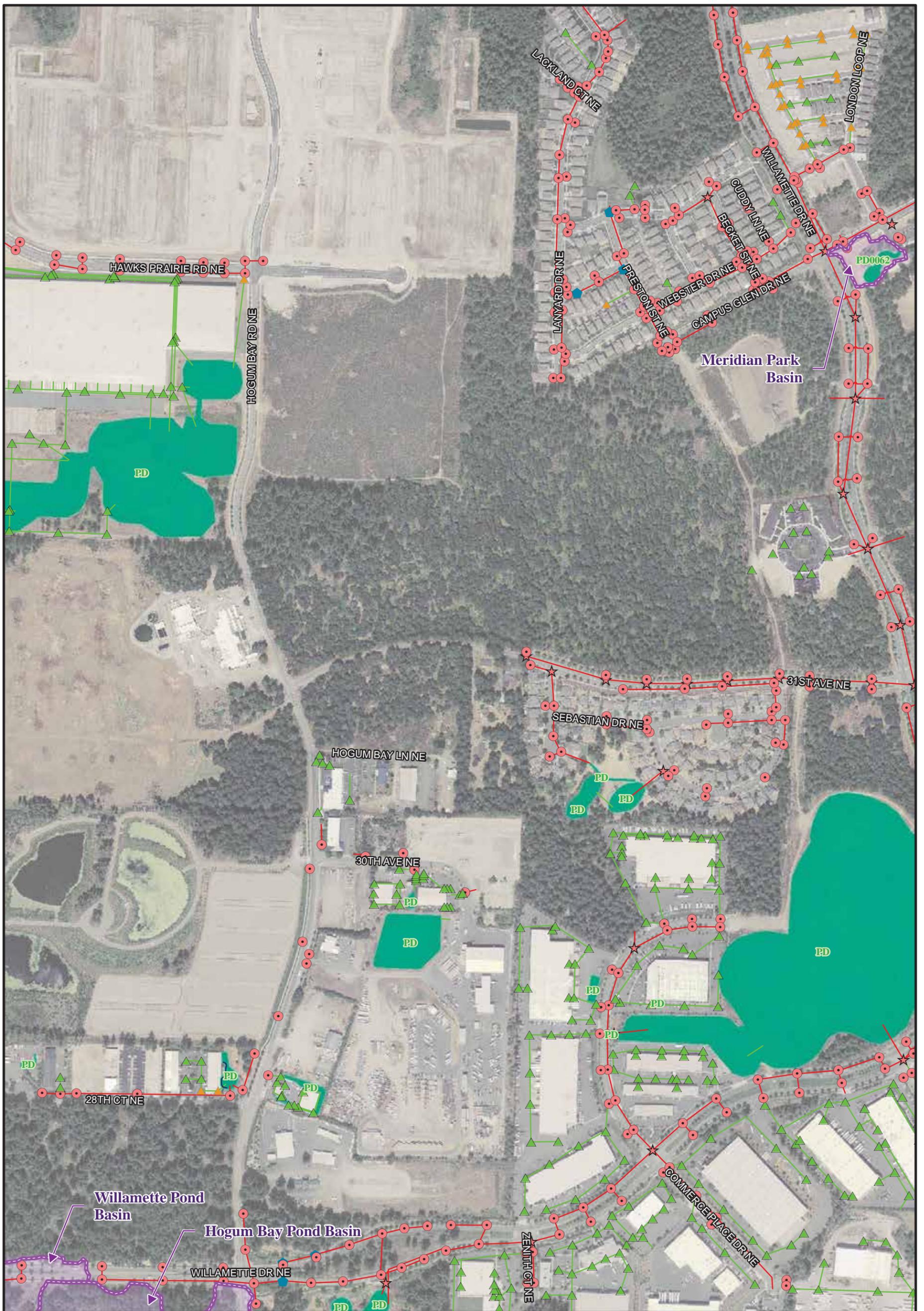
- Public
- Private
- Unknown

- Storm pond
- Facility drainage basin
- City limits

Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

**City of Lacey Stormwater Atlas:
Sheet E-2**





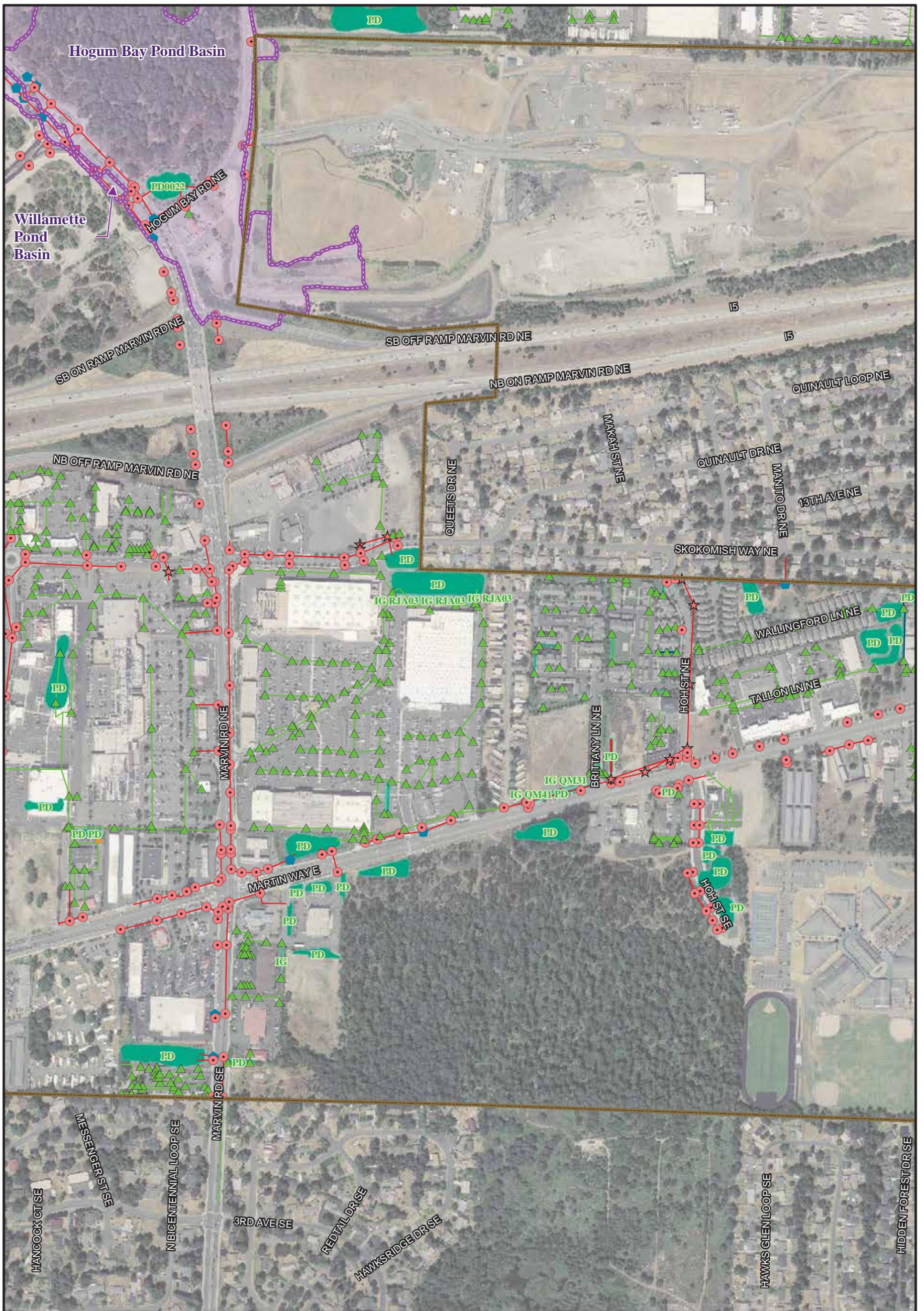
Legend	★ Manhole	■ Storm pond
■ Lake	◆ Miscellaneous	▭ Facility drainage basin
— Stream	▲ Private structure	▭ City limits
Storm Structures	▲ Thurston County structure	
● Catch basin	Storm lines	
● Dry well	— Public	— Unknown
■ Junction box	— Private	

Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

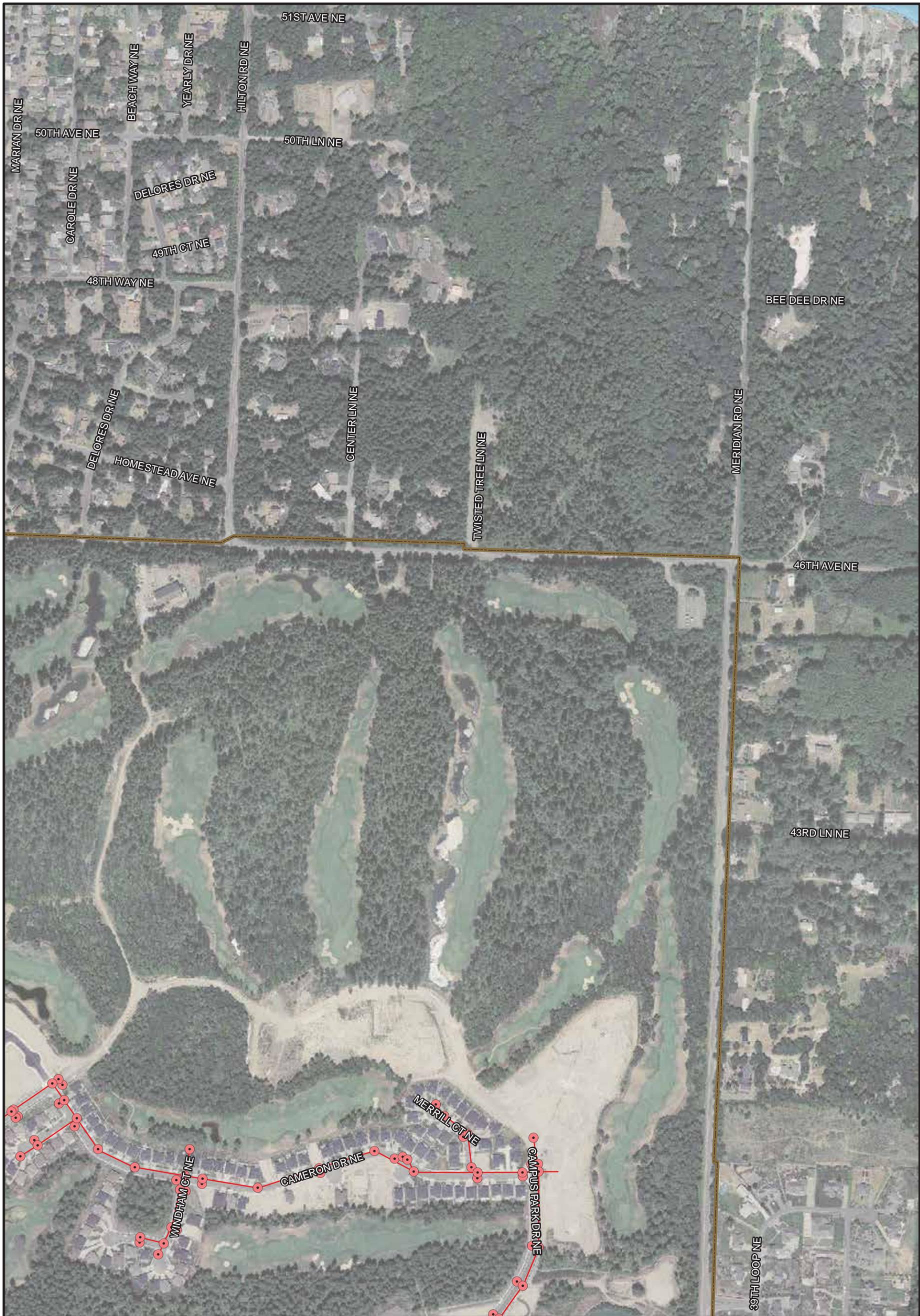
**City of Lacey Stormwater Atlas:
Sheet E-3**

0 225 450 900 ft

HERRERA
Aerial: City of Lacey (2009)
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Legend Lake Stream Storm Structures Catch basin Dry well Junction box		Manhole Miscellaneous Private structure Thurston County structure Storm lines Public Private Unknown		Storm pond Facility drainage basin City limits	
<p>City of Lacey Stormwater Atlas: Sheet E-4</p> <p style="text-align: center;"> 0 225 450 900 ft </p> <p style="text-align: center;"> Aerial: City of Lacey (2009) <small>K:\Projects\Y2010\10-04793-000\Project\Stormwater Atlas.mxd (11/26/2013)</small> </p>					
<p>Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.</p>					



Legend		★ Manhole	■ Storm pond
■ Lake	◆ Miscellaneous	■ Facility drainage basin	
— Stream	▲ Private structure	■ City limits	
Storm Structures		▲ Thurston County structure	
● Catch basin	Storm lines		
● Dry well	— Public	— Unknown	
■ Junction box	— Private		

**City of Lacey Stormwater Atlas:
Sheet F-2**

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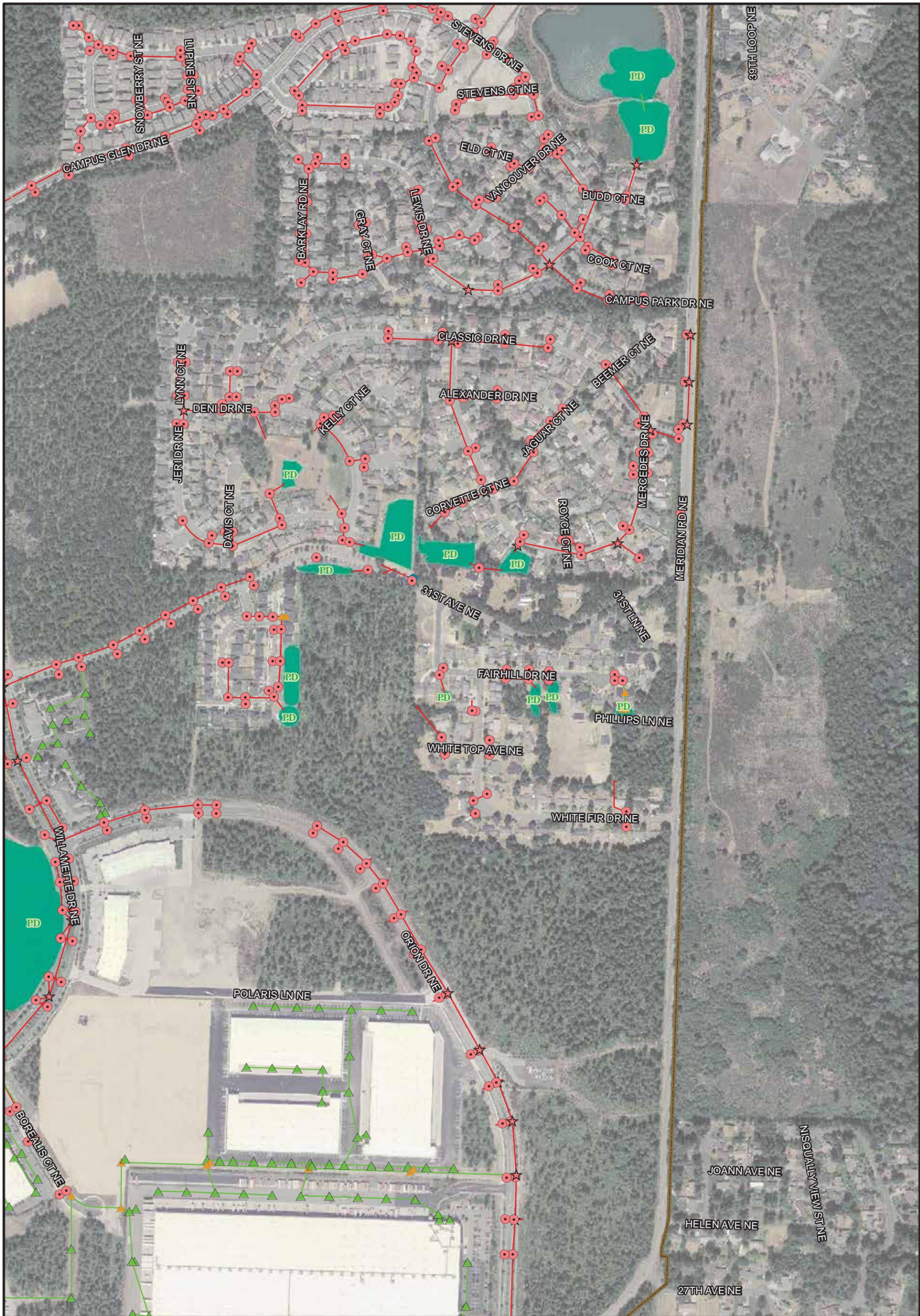
0 225 450 900
ft

HERRERA

Aerial: City of Lacey (2009)

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Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.



Legend

- Lake
- Stream

Storm Structures

- Catch basin
- Dry well
- Junction box

- Manhole
- Miscellaneous
- Private structure
- Thurston County structure

Storm lines

- Public
- Private
- Unknown

- Storm pond
- Facility drainage basin
- City limits

Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

City of Lacey Stormwater Atlas: Sheet F-3



Aerial: City of Lacey (2009)

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Legend

- Lake
- Stream

Storm Structures

- Catch basin
- Dry well
- Junction box

- Manhole
- Miscellaneous
- Private structure
- Thurston County structure

Storm lines

- Public
- Private
- Unknown

- Storm pond
- Facility drainage basin
- City limits

Note: This atlas shows the drainage area to a subset of all stormwater facilities within the City of Lacey. Area between basins either infiltrates or drains to another stormwater facility not included in this exercise.

**City of Lacey Stormwater Atlas:
Sheet F-4**



Aerial: City of Lacey (2009)

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APPENDIX H

Stormwater Treatment Facilities

Table H-1. City of Lacey Stormwater Treatment Facilities

No.	Facility ID ^{1,2}	Facility Description in HTE ¹	Facility Reference Name ("Alias") ³	Drainage Area (acres) ⁴	Primary Discharge to	Overflow/Outfall (Drainage Basin)
1	PD0001 ^{7,10}	Storm Pond - Yelm Highway SE	Yelm Highway/Bush Park Pond	110	GW	Deschutes River
2	PD0002 ¹¹	Storm Pond - Ruddell Road SE	Ruddell Road SE Stormwater Facility	114	GW	Southwick Lake
3	PD0003 ¹¹	Storm Pond - Lakehills	Lakehills Pond	6	GW	Southwick Lake
4	PD0004	Storm Pond - City Hall Pond A	City Hall Pond A	4.2 ⁸	GW	Woodland Creek
5	PD0004-B	Storm Pond - City Hall Pond B	City Hall Pond B	3 ⁸	GW	Woodland Creek
6	PD0005	Storm Pond - Westminster	Westminster Pond	34	wetlands	Woodland Creek
7	PD0008 ⁷	Storm Pond - Lakecrest	Lakecrest Pond	18	Chambers Lake	Chambers Lake
8	PD0010	Storm Pond - Mt. Tahoma	Mt. Tahoma Pond	27	GW	Deschutes River
9	PD0011 ⁷	Storm Pond - College SE Pnd A	College & 53rd SE Pond	51	GW	Deschutes River
10	PD0012	Storm Pond - Lacey Shop #1	Lacey Shop Pond #1	2	GW	Woodland Creek
11	PD0014	Storm Pond - WCSTF	Woodland Creek Stormwater Facility	299	GW	Woodland Creek
12	PD0020	Storm Pond - Shady Lane	Shady Lane Pond	12	Hicks Lake	Hicks Lake
13	PD0022 ^{10,11}	Storm Pond - Hogum Bay	Hogum Bay Pond	34	GW	Woodland Creek
14	PD0023	Storm Pond - Willamette	Willamette Pond	8	GW	Woodland Creek
15	PD0024 ¹¹	Storm Pond - Britton Prkwy #4	Britton Parkway #4 Pond	41	GW	Woodland Creek
16	PD0029	Storm Pond - Callison	Callison Pond	27	GW	Eagle Creek
17	PD0032	Storm Pond - Britton Prkwy #9	Britton Parkway #9 Pond	14	GW	Eagle Creek
18	PD0034 ¹¹	Storm Pond - 7th Ave SE	7th Avenue Stormwater Facility	36	GW	Woodland Creek ⁹
19	PD0035	Storm Pond - Stockton St SE	Stockton Pond (Lakepointe Park Ponds)	37	GW	Deschutes River
20	PD0036	Storm Pond - Compton Blvd SE	Compton Pond (Lakepointe Park Ponds)	37	GW	Pattison Lake ⁹
21	PD0037 ⁷	Storm Pond - 25th Ave Swales	25th Avenue Swales	41	GW	Hicks Lake
22	PD0038	Storm Pond - Eastwood Estates	Eastwood Estates Pond	5	GW	Long Lake
23	PD0039	Storm Pond - Lacey Shop #2	Lacey Shop Pond #2	0.6	GW	Woodland Creek
24	PD0040	Storm Pond - Lacey Shop #3	Lacey Shop Pond #3	3	GW	Woodland Creek
25	PD0041 ⁷	Storm Pond - Ruddell/32nd Fac.	Ruddell & 32nd Facility	436	wetlands	Hicks Lake
27	PD0042	Storm Pond - Quail Dr	Quail Pond	14	GW	Hicks Lake
28	PD0045	Storm Pond - Lacey Shop #4	Lacey Shop Pond #4	0.1	GW	Woodland Creek
29	PD0046	Storm Pond - Lacey Shop #5	Lacey Shop Pond #5	0.3	GW	Woodland Creek
30	PD0047	Storm Pond - Lacey Shop #6	Lacey Shop Pond #6	1	GW	Woodland Creek
31	PD0048	Storm Pond - Lacey Shop #7	Lacey Shop Pond #7	0.8	GW	Woodland Creek
32	PD0049	Storm Pond - Employee Lot	Employee Lot Swale	0.7	GW	Woodland Creek
33	PD0050 ¹⁰	Storm Pond - Century Ct	Century Court	4	wetlands	Woodland Creek
34	PD0051 ^{10,11}	Storm Pond - Fones Rd Pond	Fones Road Stormwater Facility (Upper)	97	GW	Woodard Creek
35	PD0052 ⁷	Storm Pond - College Reg Fac	College Regional Stormwater Facility	424	GW	Woodland Creek
38	PD0054	Storm Pond - Mills Landing	Mills Landing	4	wetlands	Woodland Creek
39	PD0055	Storm Pond - RAC #1	RAC Pond #1 (Regional Athletic Complex)	18	GW	Little McAllister Creek
40	PD0056	Storm Pond - RAC #2	RAC Pond #2 (Regional Athletic Complex)	2	GW	Little McAllister Creek
41	PD0057 ¹¹	Storm Pond - Cabela's	Gateway (Cabela's)	156	GW	Eagle Creek
42	PD0058 ¹¹	Storm Pond - Arbors 1	Arbors Pond 1	59	wetlands	Long Lake
43	PD0059	Storm Pond - Thornbury	Thornbury Pond	29	GW	Southwick Lake ⁹
44	PD0060 ¹¹	Storm Pond - Community Center	Lacey Community Center	2.2	Goose Lake	Woodland Creek
45	PD0061	Storm Pond - Senior Center	Lacey Senior Center	1.2	GW	Woodland Creek
46	PD0062	Storm Pond - Meridian Park	Meridian Park	1	GW	McAllister Creek
47	PD0063 ¹⁰	Storm Pond - Summerwalk	Summerwalk Pond	9	GW	Deschutes River
48	PD0064	Storm Pond - Hks H2O Plnt	Hawks Prairie Water Treatment Facility	5.4 ⁸	GW	Eagle Creek
49	PD0064A	Storm Pond - Hks H2O Plnt A	Hawks Prairie Water Treatment Facility	2 ⁸	GW	Eagle Creek
50	PD0065	Storm Pond - Mullen West Pnd A	Mullen Road West Pond A	13	GW	Hicks Lake
51	PD0066	Storm Pond - Mullen West Pnd B	Mullen Road West Pond B	15	GW	Hicks Lake
52	PD0067	Storm Pond - Yelm Hwy East	Yelm Highway East	1	GW	Deschutes River
53	PD0068	Storm Pond - City Pit	City Pit (Decant Facility)	11	GW	Woodland Creek

NOTES:

- Facility ID Number and Facility Description are per PW Operations' records in HTE.
- Facility ID numbers have gaps due to some facilities being retired/eliminated, with no renumbering.
- Reference Name ("Alias") is commonly-used name, to be used for GIS mapping of Lacey's storm system.
- Drainage area for most ponds does not include area within the upstream drainage basin that is managed by other ponds.
- Value is provided for a different cell or element of this pond.
- List is not all-inclusive; these are the primary large storm facilities listed in HTE "Storm Ponds" list and maintained by PW-Operations Stormwater Department.
GW = Groundwater (infiltration)
- Drainage areas apply to two or more adjacent ponds with the same number (e.g. PD0008 is a combined area for PD0008A and PD0008B).
- Total drainage area for this facility is the sum of multiple rows that apply to this facility (e.g., Total drainage area for the Ruddell & 32nd Facility is the sum of PD0041 and PD0041-A drainage areas).
- The drainage area extends across multiple drainage basins. The drainage basin in which the facility is located is listed.
- The drainage basin may include additional area outside of the City limits that is not included in this table. Sufficient stormwater utility data was unavailable outside of the City limits to extend the basin boundary.
- Total drainage area includes area outside of the City limits. This area was included based on topography only and is approximate.

