APPENDIX A

Detailed Stormwater Goals and Policies

DETAILED STORMWATER GOALS AND POLICIES

City staff developed long-term goals for each SWMP program element below. Program elements are a comprehensive list of functions performed or influenced by the SWMP. This Appendix lists policies from the previous Stormwater Comprehensive Plan developed in 2013 (SCP 2013) related to each long-term goal. Policies that apply to multiple program elements are indicated with an asterisk.

- **Flood Reduction:** There is no flooding of the public stormwater system due to large storm events.

  FC1. Comply with all applicable requirements from federal, state, Thurston County, and City of Lacey related to flood protection

  FC2. Develop new drainage projects for the CIP plan to address flooding problems when these problems cannot be addressed through maintenance of the existing infrastructure

  FC3. Continue to encourage and allow the use of LID stormwater Best Management Practices for flow control for new development and redevelopment in accordance with current regulations *

  FC4. Provide adequate stormwater conveyance in the public storm drain system as follows:

  - Accommodate the 10-year 24-hour event from existing development within the public storm drain system, except as noted in the three bullets below
  - Accommodate the 25-year 24-hour event from existing development for storm drains and culverts that pass under public roads
  - Accommodate the 25-year 24-hour event from existing development within the long term UGA boundary public right-of-way without having water over more than 50 percent of the driving lane
  - Accommodate the 100-year 24-hour event from existing development for culverts and bridges that convey natural channels

- **Surface Water Quality Improvement:** All surface water bodies in Lacey meet water quality criteria for designated recreation and fish uses.

WQ1. Comply with all applicable requirements from federal, state, and local governments related to water quality *

WQ2. Develop new stormwater treatment projects for the CIP plan when these problems cannot be addressed through source control or maintenance of the existing infrastructure *

WQ3. When practicable, add or improve water quality treatment whenever constructing new stormwater infrastructure or conducting maintenance, repair, rehabilitation, or replacement of aging City stormwater infrastructure *

WQ4. Protect surface water quality by addressing potential nutrient loading from stormwater *

- **Ground Water Quality Protection:** Groundwater quality is not negatively affected (quantity or quality) by stormwater practices.

WQ5. Protect groundwater resources by regulating land use activities, such as requiring a higher level of stormwater treatment within wellhead protection areas, and encouraging practices that minimize impacts to groundwater, such as preserving native vegetation or planting low-input vegetation

- **Habitat Improvement:** Aquatic species thrive in surface water bodies in Lacey.

G2. Improve public knowledge of stormwater runoff issues, encourage public involvement in stewardship activities, and encourage public support for the City's stormwater management program *

G3. Ensure that new development, redevelopment, and City projects are in conformance with the City's adopted stormwater requirements *

G4. Analyze proposed new development and redevelopment for potential impacts on the downstream storm drainage system and water quality as part of the stormwater plan review process *

G10. Oversee construction and maintenance of privately owned stormwater facilities to ensure that they function as designed to protect private property, public property, and the environment *

FC3. Continue to encourage and allow the use of LID stormwater Best Management Practices for flow control for new development and redevelopment in accordance with current regulations *

WQ1. Comply with all applicable requirements from federal, state, and local governments related to water quality *

WQ2. Develop new stormwater treatment projects for the CIP plan when these problems cannot be addressed through source control or maintenance of the existing infrastructure *

WQ3. When practicable, add or improve water quality treatment whenever constructing new stormwater facilities or conducting maintenance, repair, rehabilitation, or replacement of aging City stormwater facilities *

WQ4. Protect surface water quality by addressing potential nutrient loading from stormwater *

- **Public Participation (education, outreach, and involvement):** The public understands how their actions and choices affect stormwater and acts in ways that reduce stormwater flow rates and improve water quality and aquatic habitat.

  G2. Improve public knowledge of stormwater runoff issues, encourage public involvement in stewardship activities, and encourage public support for the City's stormwater management program *

- **Pollutant Source Control:** Pollutants do not enter stormwater.

  G2. Improve public knowledge of stormwater runoff issues, encourage public involvement in stewardship activities, and encourage public support for the City's stormwater management program *

  G3. Ensure that new development, redevelopment, and City projects are in conformance with the City's adopted stormwater requirements *

  G4. Analyze proposed new development and redevelopment for potential impacts on the downstream storm drainage system and water quality as part of the stormwater plan review process *

  G10. Oversee construction and maintenance of privately owned stormwater facilities to ensure that they function as designed to protect private property, public property, and the environment *

  FC4. Continue to encourage and allow the use of LID stormwater Best Management Practices for flow control for new development and redevelopment in accordance with current regulations *

- **Infrastructure Operations and Maintenance:** All stormwater infrastructure operates as intended.

  G6. Construct new or improved stormwater facilities in accordance with the current CIP plan

G11. Proactively maintain, repair, rehabilitate, and replace aging City stormwater facilities and minimize the need for costly and disruptive emergency repairs

- **Development Practices:** Runoff from developed areas mimics forested hydrology and water quality.

  G3. Ensure that new development, redevelopment, and City projects are in conformance with the City's adopted stormwater requirements *

  G4. Analyze proposed new development and redevelopment for potential impacts on the downstream storm drainage system and water quality as part of the stormwater plan review process *

  G10. Oversee construction and maintenance of privately owned stormwater facilities to ensure that they function as designed to protect private property, public property, and the environment *

  FC5. Continue to encourage and allow the use of LID stormwater Best Management Practices for flow control for new development and redevelopment in accordance with current regulations *

- **Comprehensive Planning, Administration, and Funding:** Revenue is wisely invested and produces measurable positive outcomes, including regulatory compliance. Utility rates are fair and equitable.

  G1. Continue to develop and implement a comprehensive stormwater management program consistent with requirements of the federal Clean Water Act, the Phase II Permit issued by the Washington State Department of Ecology, the state Growth Management Act, and the Puget Sound Action Agenda

  G5. Coordinate with other departments throughout the stormwater plan review, permitting, and project approval process to ensure that the process results in a functional stormwater system

  G7. Review the CIP list annually to identify new projects, remove completed projects, refine planned projects, and reevaluate project prioritization

  G8. Participate in the development and implementation of regional water quality management plans, groundwater management plans, stormwater management plans, lake management plans, drainage basin plans, watershed action plans, and wellhead protection plans to ensure that Lacey's water resources are protected

  G9. 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.

G12. Revise this Stormwater Comprehensive Plan every 6 years, or sooner if needed, to ensure that it provides for effective long-term stormwater project planning, system maintenance, response to mandates, and program funding

M1. Prioritize the most beneficial and cost-effective projects and programs to ensure that available resources are used efficiently

M2. Implement an equitable and logical stormwater utility rate structure

M3. Review the rate structure and projected future rates and expenses on a regular basis to ensure that utility rates will adequately fund implementation of this plan

M4. Actively seek outside funding to leverage or complement utility funds in order to implement this plan

APPENDIX B

Surface Water Bodies that Receive Stormwater Runoff

Surface Water Bodies that Receive Stormwater Runoff

The City has an abundance of natural water resources that includes a chain of connected lakes that flow from one to another through wetlands, culminating in Woodland Creek, which drains to Henderson Inlet on Puget Sound. This chain begins with Hicks Lake, which flows into Pattison Lake, which in turn flows into Long Lake. The outflow from Long Lake forms Woodland Creek which then flows through Lake Lois, turns north, flows out of Lacey and enters the southern end of Henderson Inlet.

During the development of the 2013 SCP, all drainage basin boundaries within the City limits and the UGA were delineated using digital elevation data (PSLC 2002) and the City's storm drain system GIS data (City of Lacey 2011). In addition, the City developed a comprehensive GIS-based dataset of all impervious surfaces inside the City limits that delineates five surface types within the City limits based on aerial photography (Lacey 2018):

- Building footprints
- Roadways
- Parking lots
- Sidewalks
- Driveways

Finally, drainage basins were delineated for 53 stormwater facilities. The regional stormwater pond drainage basins include all area that is immediately tributary to the pond, excluding upstream areas that are managed by other stormwater facilities.

Figure B-1 displays the water bodies and major drainage basins within the city limits and the UGA. Figure B-2 displays the impervious surface distribution within the City limits and Table B-1 displays the percent of impervious surface within each basin. A stormwater system atlas was developed in 2013 that displays the storm drain system, the impervious surface data set, and the regional stormwater pond drainage basins.

Table B-1. Drainage Basin Impervious Area.

Receiving Waterbody	Drainage Basin	Total Basin Area (ac)	Basin Area within the City Limits (ac)	Percent of Basin within the City Limits (%)	Percent Impervious within the City Limits [a]
Woodard Creek to Henderson Inlet	Indian Creek	893	128	14	65
	Woodard Creek Outlet	4,966	20	0.4	85
Deschutes River	Chambers Lake	947	601	63	35
	Deschutes River	18,565	1,387	7	46
Woodland Creek to Henderson Inlet	College Regional Stormwater Facility	424	424	100	54
	Eagle Creek	1,919	1,348	70	28
	Fox Creek	1,097	3	0.3	16
	Long's Pond	50	27	54	10
	Hicks Lake	1012	951	94	39
	Lake Lois	572	215	38	44
	Long Lake	2,160	432	20	27
	Pattison Lake	2,187	393	18	25
	Ruddell Road Stormwater Treatment Facility	114	113	99	41
	Southwick Lake	236	216	92	32
	Woodland Creek Outlet	5,878	2,321	39	38
Henderson Inlet	Henderson Inlet	15,423	989	6	28
McAllister Creek to Nisqually Reach	Little McAllister Creek	2,169	42	2	41
	McAllister Creek	16,574	627	4	31

Notes:
[a] Percent impervious calculations are based on drainage basin areas within the City limits only

This section is divided into three subsections summarizing background information on the following groups of waterbodies:

- Waterbodies within the City limits
- Waterbodies within the UGA
- Waterbodies outside of the City limits and the UGA that receive drainage from tributaries or stormwater facilities within the City limits

Each section includes a description of the larger watershed (Henderson Inlet, Deschutes, or Nisqually) that the waterbody is located in, the size and land use in the drainage basin, a

summary of basic waterbody information, a brief description of the results of prior studies, and water quality issues (as determined by Ecology's water quality assessment).

Ecology groups waterbodies into five categories as part of the state water quality assessment. Category 1 (meets tested standards for clean waters), Category 2 (waters of concern), and Category 3 (insufficient data) are not described in this section since the available data does not demonstrate that there is water quality impairment. Category 4 includes three subcategories: Category 4a (has a TMDL), Category 4b (has a pollution control program), and Category 4c (is impaired by a non-pollutant). These subcategories are highlighted in the waterbody descriptions if applicable since waterbodies in this category either have water quality issues that the City is aware of and taking steps to address (Category 4a and 4b) or the impairment is due to a non-pollutant (Category 4c), such as instream flow, that is not regulated by a TMDL process. Category 5 is also known as the 303(d) list and identifies impaired waterbodies that have exceeded water quality standards for one or more pollutants. The most recent 303(d) list is the 2012 list developed by Ecology in 2015 and approved by the U.S. Environmental Protection Agency in 2016. The EPA approved the list as the 2012 303(d) list rather than the 2014 list Ecology originally designated because the assessment includes freshwater data collected through May 1, 2011. While in the past, Ecology assessed either fresh water or marine water, future biennial 303(d) list reviews aim to address all waters of the state, including fresh water and marine water . TMDLs, or water cleanup plans, are established for parameters identified on the 303(d) list. The status of the TMDL implementation plans for each waterbody is also summarized below.

1 Water Bodies Within the City Limits

Four lakes and one major stream system are located within the City limits. With one exception, these waterbodies are all part of the Henderson Inlet Watershed; Chambers Lake is part of the Deschutes Watershed. The following waterbodies are summarized below:

Henderson Inlet Watershed

- Woodland Creek
- Hicks Lake
- Southwick Lake
- Long's Pond

Deschutes Watershed

- Chambers Lake

1.1 Woodland Creek

Woodland Creek originates in a horseshoe-shaped chain of lakes connected by extensive wetlands in southeast Lacey. Hicks Lake flows into Pattison Lake, which then flows into Long Lake. From the north end of Long Lake, Woodland Creek flows through Woodland Creek Community Park, past Long's Pond to Lake Lois. From Lake Lois, the creek carves a narrow ravine through forest land, crosses Martin Way and Interstate 5, and then flows through rolling hills and wetlands before ultimately discharging to the southern tip of Henderson Inlet. A total of 2.4 miles of the creek lies within the City limits, and a total of 1.9 miles of the creek lies within City-owned parcels (within the UGA). The contributing basin area is 16,560 acres, 79 percent of which is within the Lacey city limits and UGA. The basin consists primarily of urban and rural residential areas as well as commercial areas, and suburban residential development is rapidly increasing in the headwater areas near the mouth of the basin. The stream portion between lake Lois and the springs north of Martin Way usually dries up during the summer months, significantly reducing fish habitat and productivity in the upper reach of the stream.

Pollutants from urban stormwater runoff have contributed to declining water quality in Woodland Creek. Pet wastes and failing septic systems were identified as common sources of bacteria in stormwater runoff in residential settings and rural settings in the previous water quality assessment (Thurston County 2007). Despite continued efforts to improve water quality, Woodland Creek has consistently failed to meet water quality standards for fecal coliform bacteria and currently has a TMDL (Category 4A) for fecal coliform bacteria along with several tributaries located in the UGA (described in the following section) (Ecology 2019). Bacterial pollution, largely from Woodland Creek, affects shellfish harvests in Henderson Inlet. Much of the pollution in the rural area was historically caused by failing on-site sewer systems and agricultural practices (Thurston County 2010). In 2001, Thurston County responded by establishing the Henderson Shellfish Protection District (Thurston County 2010). In 2005, the Thurston County Board of Health created the Henderson Watershed Protection Area, which requires inspection of all on-site sewage systems in the Henderson Watershed area. Additional measures to reduce pollutant loads in the stream include implementation of agricultural BMPs, new stormwater treatment facilities and improved farm planning and public education. These pollution reduction efforts have shown positive results, and in 2010, commercial shellfish harvest area increased by 240 acres due to improving water quality (Thurston County 2010). In June 2012, the Washington State Department of Health announced that 100 acres of commercial shellfish harvest area have also reopened to harvest (WADOH 2012), though 26 acres were classified as 'restricted' in 2018 (WADOH 2018).

Woodland Creek is included on Ecology's 303(d) list as part of the Henderson Inlet Total Maximum Daily Load (TMDL) for fecal coliform bacteria, dissolved oxygen, and pH impairment (Ecology 2019). Under the Henderson Inlet TMDL, the Cities of Lacey and Olympia have a coordinated plan to monitor and reduce fecal coliform bacteria discharged from the Fones Road Stormwater Treatment facility which drains to Woodland Creek via the Taylor wetland. The construction of the facility led to a reduction in fecal coliform bacteria loading to Woodland

Creek. Lacey also implements a wet weather sampling program for fecal coliform bacteria discharging from the College Regional Stormwater Facility and conducts re-vegetation and nuisance vegetation management along woodland creek and its tributaries.

The stream also exhibits high concentrations of total phosphorus and nitrate (Thurston County 2010) and high temperatures (Ecology 2019). The lower reach of Woodland Creek is also listed as Category 4C for instream flow ("intensified peak flows" from stormwater runoff), though recent flow control improvements in the basin are expected to reduce these peak flows. Other projects to improve water quality in Woodland Creek include the septic to sewer conversions in Woodland Creek Estates and the raingarden improvements done by Thurston County in the Tanglewilde Neighborhood (City of Lacey staff, personal communication).

1.1.1 College Creek

College Creek is a 1-mile long tributary to Woodland Creek and enters the stream from the west just downstream of I-5. College Creek is part of the Henderson Inlet TMDL (Category 4A) for fecal coliform bacteria, dissolved oxygen, and pH (Ecology 2019).

1.2 Hicks Lake

Hicks Lake is the first in a series of four lakes (Hicks, Pattison, and Long lakes, and Lake Lois) that comprise the Woodland Creek subbasin and flow to Henderson Inlet. Hicks Lake is the only one of the four lakes that is located inside the City limits; the other three lakes are located within the UGA. Hicks Lake has a drainage area of 1,010 acres, comprised primarily of urban and suburban residential areas with a small portion of undeveloped forest. Discharge from Hicks Lake flows to Pattison Lake through an outlet channel located on private property.

The mean depth of Hicks Lake is 18 feet, and the deepest portion of the lake extends to 35 feet (Ecology 1997). Flooding has been observed in the past during extreme storm events (Thurston County 2010).

The average 2018 trophic state index (TSI) is within the mesotrophic range (Thurston County 2018a). Based on the concentration of chlorophyll-a, Hicks Lake was classified as eutrophic in 17 out of 23 sample seasons since 1995 (Thurston County 2018a). In 2008, the nutrient (i.e., phosphorus) concentration in the lake was in the eutrophic range and the water clarity was lower than it was in the previous years (Thurston County 2010). This may in part be due to runoff from a high-density urban area that has become increasingly developed. Despite this, the total phosphorus concentration remains below state water quality standards (Thurston County 2018). The lake continues to be listed by Ecology as Category 4C due to the presence of swollen bladderwort (*Utricularia inflata*), an invasive exotic species (Ecology 2019).

Land use around the lake is primarily urban and suburban residential with a small percentage in undeveloped forest cover. Hicks Lake is a popular recreational lake, accessed through Wanschers Community Park on the lake's western shore and the adjacent boat launch.

1.3 Southwick Lake

Southwick Lake is a 36-acre lake, located to the west of Pattison Lake and south of Hicks Lake in the Henderson Inlet Watershed. The lake has no apparent inlets or outlets, and collects runoff from a drainage area of 260 acres. Most of the shoreline is under private ownership. Land use along the lake's shoreline is a combination of low to moderate density urban residential areas and open spaces. Lacustrine wetlands are located along the vegetated northern shoreline of Southwick Lake. Southwick Lake does not have any known water quality issues. Southwick Lake is located within the 100-year floodplain, thus the water level in the lake has the potential to rise significantly during large storm events (ESA Adolfson 2008).

1.4 Long's Pond

Long's Pond, also referred to as Goose Lake, is a 12acre lake located in the Henderson Inlet Watershed that receives flow from Long Lake through Woodland Creek and a series of wetlands (ESA Adolfson 2008). Himes Creek flows in or out of Long's Pond to Woodland Creek depending on water elevations. Long's Pond, which has a drainage area of 50 acres, does not have any known water quality issues. Woodland Creek Community Park comprises much of the lake's shoreline. Long's Pond is most popular for its youth fishing program (Lacey 2012a).

1.5 Chambers Lake

Chambers Lake is part of the Chambers Basin in the Deschutes Watershed. Little and Big Chambers Lake, previously one large lake, were separated into two lakes after the construction of the Chehalis Western Railroad in 1927, and are now connected with a 500-foot long channel (Thurston County 1995). The boundary that separates the City of Lacey from the City of Olympia lies between the two lakes therefore, Big Chambers Lake is primarily within the City of Olympia while Little Chambers is located in the City of Lacey. The Chambers Basin also includes Chambers Ditch, South Tributary and Chambers Creek.

Lacey and Olympia share jurisdiction of Big Chambers Lake, while the City of Lacey alone has jurisdiction of Little Chambers Lake. The drainage basin contributing to both lakes is 950 acres. Discharge from Big Chambers Lake flows through Little Chambers Lake, which discharges to the Deschutes River via Chambers Ditch and Chambers Creek. The shoreline of both lakes includes a variety of wetland habitats (ESA Adolfson 2008).

Big Chambers and Little Chambers Lakes are similar in size and depth, with areas of 68 and 58 acres and maximum depths of 5 and 7 feet, respectively. Big Chambers Lake has no inlets and is fed only by groundwater and stormwater runoff. The water level tends to fluctuate with the seasons (Thurston County 1995). The areas to the south and southwest of the lake have experienced flooding related to groundwater and surface water that has deemed it unsuitable for development (ESA Adolfson 2008).

Both Little and Big Chambers Lakes are classified as eutrophic and have dense populations of aquatic plants, despite efforts to reduce plant growth with the introduction of grass carp in 1990 (Thurston County 1995). Historically, many species of fish inhabit this lake, including cutthroat trout, bass, perch, catfish, crappie and spiny ray; however, over the years, cutthroat trout population has greatly declined (Thurston County 1995). In 2015, the City constructed the Chambers Lake Stormwater Treatment Facility to provide stormwater treatment for 187 acres that drain into Little Chambers Lake.

2 Water Bodies Within the Urban Growth Area

Five streams are located within the UGA; four of these streams are part of the Henderson Inlet Basin and one is part of the Nisqually Basin. The following waterbodies are summarized below:

Henderson Inlet Watershed

- Eagle Creek
- Fox Creek
- Jorgenson Creek
- Palm Creek

Nisqually Watershed

- Little McAllister Creek

2.1 Eagle Creek

Eagle Creek is a 2-mile long tributary to Woodland Creek, entering the stream along its eastern bank near river mile 2.25 (Thurston County 2004a). Eagle Creek has a drainage area of 1,920 acres and is currently included in the Henderson Inlet TMDL (Category 4A) for fecal coliform bacteria (Ecology 2019). Recommendations for managing sources of bacteria in the watershed TMDL include controlling domestic animal access to Eagle Creek and continuing monthly water quality monitoring.

2.2 Fox Creek

Fox Creek is a 1.2-mile long tributary to Woodland Creek and enters the stream along its northern bank near river mile 1.9 (Thurston County 2004a). Fox Creek has a drainage area of 1,100 acres and is currently included in the Henderson Inlet TMDL (Category 4A) for fecal coliform bacteria and dissolved oxygen (Ecology 2019).

2.3 Jorgenson Creek

Jorgenson Creek is a 1.0-mile long tributary of Woodland Creek, and flows into the stream along its southwest bank around river mile 1.2 (Thurston County 2004a). Jorgenson Creek has a drainage area of 510 acres and is currently included in the Henderson Inlet TMDL (Category 4A) for fecal coliform bacteria (Ecology 2019).

2.4 Palm Creek

Palm Creek is a 1-mile long tributary to Woodland Creek and enters the stream from the west between Hawks Prairie Rd NW and I-5. Palm Creek is part of the Henderson Inlet TMDL (Category 4A) for fecal coliform bacteria and dissolved oxygen (Ecology 2019).

2.5 Little McAllister Creek

Little McAllister Creek, located within the McAllister/Eaton Creek Basin and the Nisqually Watershed, originates in the spring-fed wetlands. The stream loses a total of 180 feet in elevation over 2 miles as it flows through a steep ravine, and ultimately discharges into agricultural ditches. The stream forks into two branches that flow to the south and to the west (Thurston County 2004b). The Little McAllister sub-basin is 2,170 acres and accounts for seven percent of the total McAllister/Eaton Creek Basin. A TMDL study of dissolved oxygen and bacteria in McAllister Creek and the Nisqually Watershed was conducted in 2005 and determined that a 74 percent reduction in fecal coliform bacteria in Little McAllister Creek was needed to meet water quality standards (Ecology 2005), though Lacey is not part of the current TMDL implementation plan.

3 Water Bodies Receiving Surface Water or Stormwater from Within the City Limits

The following waterbodies receiving surface water or stormwater discharges from within the City limits are summarized below:

Henderson Inlet Watershed

- Henderson Inlet
- Lake Lois
- Long Lake
- Pattison Lake
- Woodard Creek

Deschutes Watershed

- Deschutes River

Nisqually Watershed

- Puget Sound (Nisqually Reach)

3.1 Henderson Inlet

Bound on the east and west by the Nisqually Reach of Puget Sound and Budd Inlet, respectively, Henderson Inlet is one of five inlets that contribute to South Puget Sound. The drainage basin area of Henderson Inlet is approximately 1,190 acres within the city limits and UGA. Woodland and Woodard Creek drain 80 percent of the inlet; while Dobbs Creek (East Creek), Meyer Creek (Snug Creek), and Sleepy Creek (Libby Creek), and several other small streams account for the remaining 20 percent.

High levels of fecal coliform bacteria in the lower portion of Henderson Inlet have prohibited commercial shellfish harvesting since the 1980s. In 2001, the Thurston County Commissioners created the Henderson Inlet shellfish protection district. The district is composed of an appointed local stakeholder group, who develop water quality restoration recommendations. The district stakeholders currently meet every other month to discuss water clean-up plans for the area (Thurston County 2012).

Henderson Inlet is on Ecology's 303(d) list (Category 5) for dissolved oxygen and has a TMDL (Category 4A) for fecal coliform bacteria, dissolved oxygen, temperature, and pH (Ecology 2019). Several of its tributaries, including Dobbs Creek, Sleepy Creek, Woodland Creek, Woodard Creek, College Creek, Jorgenson Creek, Eagle Creek, Fox Creek, and Palm Creek are also on Ecology's 303(d) list (Category A4 or 5) for one or more violations of fecal coliform bacteria, temperature, dissolved oxygen, or pH.

3.2 Lake Lois

Lake Lois is last in the series of four lakes (Hicks, Pattison, and Long lakes, and Lake Lois) that make up Woodland Creek drainage system, which is part of the Henderson Inlet Watershed. The lake, which has a maximum depth of 10.5 feet, is separated into three lobes and spans a total area of just under 13 acres with a drainage area of 570 acres. The lower two lobes are bisected by the berm of Carpenter Road, but remain connected with culverts. Recent construction of Carpenter Road has increased the size of the culverts connecting the lower two lobes. A narrow, shallow channel connects the upper two lobes. The southern lobe of Lake Lois receives flow from Long Lake via Woodland Creek.

Located in the center of Lacey and partially inside the City Limits, Lake Lois is the main attraction of Lake Lois Park and Habitat Reserve, which is comprised of land purchased by the City of Lacey over a period of 30 years (Lacey 2012b). Lake Lois Park and Habitat Reserve (located to the west and east of Carpenter Road, respectively) were included in the Woodland Creek/Lake Lois Enhancement Project conducted by the City of Lacey in 1994 (Skillings-Connolly and FishPro 1995). This project was initiated in 1992 with the goal of improving the water quality over a 3-mile stretch of Woodland Creek, extending from the outlet of Long Lake to Draham Road. A major water quality concern leading to the development of the Enhancement Project was the presence of Eurasian watermilfoil (*Myriophyllum spicatum*), an invasive exotic species that has persisted in both Long Lake and Lake Lois since the late 1980s (Lacey and Ecology 1995) and has resulted in a Category 4A listing for Lake Lois for Eurasian water-milfoil (Ecology 2019). In 1978, Lake Lois was described as extremely eutrophic. As Lake Lois is very shallow, its water quality is largely influenced by the high nutrient loading from Long Lake.

A number of field surveys conducted between 1970 and 1992 suggest that the majority of fish activity in Lake Lois occurs in December and January, and that the coho salmon population greatly outnumbers the chum salmon population. City staff have noted that anadromous fish have not been seen in Lake Lois in recent years (Lacey City Staff, personal communication). The Enhancement Project suggested that reducing nutrients and dissolved pollutants in Lake Lois could be achieved by treating stormwater runoff in a stormwater treatment facility and bioswales prior to entering the southern lobe of the lake. The installation of a control structure at the outlet of Lake Lois was also suggested, which would regulate flow downstream and reduce peak flows during large storm events (Lacey and Ecology 1995).

3.3 Long Lake

Long Lake, located along the east boundary of Lacey in Thurston County, is comprised of two basins connected by a narrow channel. A small part of the south basin is located within the City Limits. The south basin is fed by Pattison Lake and a small stream, and the north basin flows to the north to the Henderson Inlet via Woodland Creek and Lake Lois. This 320-acre lake has a maximum depth of 21 feet and drainage area of 2,160 acres. It collects runoff from urban and suburban residential areas as well as a small percentage of agricultural and forested areas (Thurston County 2010). Most of the shoreline is surrounded by dense residential development and Long Lake Park, one of the most used parks in the City, lies on the West bank of the Northern basin (Lacey 2012b).

The lake experiences nuisance blue-green algae blooms and emergent aquatic plants that frequently interfere with recreational activities. The lake is on the Ecology's 303(d) list (Category 5) for total phosphorus, PCB (tissue), Dieldrin (tissue), and 2,3,7,8-TCDD (tissue) (Ecology 2019). In 2008, the south basin was treated with aluminum sulfate (alum) to reduce total phosphorus concentrations and decrease blue-green algae blooms. Though total phosphorus concentrations are lower in the south basin due to the alum treatment, phosphorus concentrations have been increasing since 2016 (Thurston County 2018b). Long Lake is also

listed under Category 4C for Eurasian watermilfoil (*Myriophyllum spicatum*), an invasive aquatic species (Ecology 2019), which has been controlled by the Long Lake Management District (LLMD) since the late 1980s. The LLMD has been actively controlling nuisance invasive and native plants in the lake using approved control methods, including aquatic herbicide treatments, bottom barriers, mechanical harvesting, and diver surveys.

3.4 Pattison Lake

Pattison Lake, also referred to as Patterson Lake, is part of the Henderson Inlet Watershed. This 271-acre lake, with a maximum depth of 22 feet, was separated decades ago into two basins to the north (81 acres) and south (190 acres) through placement of excavated railroad fill (Thurston County 2010). The edge of the northern basin borders the City Limits to the east. Pattison Lake is the second in the series of four lakes beginning with Hicks Lake that ultimately drain north to Henderson Inlet. Hicks Lake flows directly to Pattison Lake, which in turn flows into the south basin of Long Lake. The lake's drainage area is 2,190 acres and is comprised primarily of suburban residential areas and some undeveloped forested wetland areas (Thurston County 2010).

Both basins of Pattison Lake experience harmful algae blooms that decrease water clarity and have adverse effects on water quality. The south basin in particular experiences severe algae blooms and filamentous algae that cause problems with recreational activities such as boating and fishing. The south basin of Pattison Lake is categorized as a highly productive eutrophic lake, and is on Ecology's 303(d) list (Category 5) for total phosphorus (Ecology 2019). A series of treatments and water quality improvement efforts were conducted on Pattison Lake from the late 1970s to the early 1990s, including alum treatment and aquatic plant harvesting. The water level in the lake has slowly risen due to unintentional blockage of the outlet channel to Long Lake (Thurston County 2010).

Fishing, swimming and boating are popular recreational activities on Pattison Lake.

3.5 Woodard Creek

Woodard Creek, part of the Henderson Inlet Watershed, flows 7.5 miles along the outskirts of the City. Woodard Creek drains a basin of 4,910 acres, comprised of urban and rural residential as well as commercial areas (Thurston County 2010). Wetlands are located along the depressions and hills following the length of the stream, and collect runoff from high-density commercial areas in Lacey and Olympia. The wetland at the headwaters of the stream is surrounded by industrial and commercial development, and the estuarine wetland located at the stream's mouth is currently protected from development by the Washington State Department of Natural Resources.

The water quality of Woodard Creek has been impaired over the years due to harmful pollutants in urban runoff and rural activities (Thurston County 2010). The inlet of Woodard Creek, located

in the center of the City, is polluted mainly by stormwater runoff. The middle section of the stream is surrounded by more urban areas, and has a higher potential for pollution from agriculture, livestock, and septic systems. Woodard Creek has a TMDL for fecal coliform bacteria and dissolved oxygen (Category 4A) (Ecology 2019). The TMDL study conducted in 2006 determined that reduction of fecal coliform bacteria is necessary to meet water quality standards. Efforts to improve the water quality of the stream and reduce pollution have been made over the years by targeting these point sources and implementing agricultural BMPs in the surrounding area (Thurston County 2010).

3.6 Deschutes River

The Deschutes River is home to many fish species including Coho, Chinook, and chum salmon and flows 57 miles from the Gifford Pinchot National Forest in Lewis County to Budd Inlet in Olympia. The Deschutes River has a total basin area of 162 square miles. The upper and mid-watershed is comprised of forested, rural residential and agricultural areas; the lower watershed consists of primarily urban areas from the surrounding cities of Tumwater, Olympia, and Lacey (Thurston County 2010). Discharge from Big Chambers Lake flows through Little Chambers Lake (located in the City of Lacey), which discharges to the Deschutes River via Chambers Ditch and Chambers Creek. The lower reach of the Deschutes River discharges to South Puget Sound through Capitol Lake and Budd Inlet.

The Deschutes River enters Capitol Lake from the south. Capitol Lake was created in 1951 as a reflecting pool for the Capitol Building in Olympia and is separated into three basins. These basins are bound by Interstate 5 and railroad bridges, with depths varying from an average of 9 feet to maximum of 20 feet (Thurston County 2010). Capitol Lake has a drainage basin of 185 square miles, collecting runoff from commercial forestry, agriculture, and rural residential areas. Urban land uses from areas of the City of Olympia and Tumwater contribute to the lower portion of the watershed. Several public parks and walking trails run along the shore of the lake, making it a popular destination for boating, jogging, and bird watching (Thurston County 2010).

In 1998, the Deschutes River was placed on Ecology's 303(d) list for temperature, fecal coliform bacteria, dissolved oxygen, and fine sediment. Since then, efforts have been made to identify pollution sources, and in 2008, Ecology conducted a TMDL study of the river. Low dissolved oxygen levels in the river have been caused by excess nutrients and algae growth (Roberts and Pelletier 2007). One study by Ecology suggests that increasing riparian shade along the river could potentially decrease river temperatures and increase dissolved oxygen levels however, a decrease in nutrient levels in the river would be required for any observable increase in dissolved oxygen levels (Roberts and Pelletier 2007).The Deschutes River is currently listed on Ecology's 303(d) list for fine sediment, temperature, pH, bacteria, and dissolved oxygen (Ecology 2019).

The nutrient concentrations decrease as water flows from the Lower Deschutes River to Capitol Lake, indicating that during certain times of year the lake may buffer nutrient loading from the

Deschutes River to Budd Inlet (Roberts and Pelletier 2007). Capitol Lake experiences blue-green algae blooms in the summer, contributing to high loading of organic matter, and further decreasing dissolved oxygen into Budd Inlet. Capitol Lake is on Ecology's 303(d) list (Category 5) for total phosphorus and fecal coliform bacteria (Ecology 2019). The lake is also listed under Category 4C for Eurasian watermilfoil (*Myriophyllum spicatum*), an invasive exotic species (Ecology 2019). Capitol Lake is also infested by New Zealand mudsnails (*Potamopyrgus antipodarum*) (Deixis 2010).

The Deschutes River, Capitol Lake, and Budd Inlet TMDL Technical Report (Ecology 2012) published in June 2012 presents the loading capacity for fecal coliform, temperature, DO, pH, and fine sediment in portions of the watershed, and recommends loading reductions to meet water quality standards. This report recommends "zero" waste load targets (or allowable pollutant load) for fine sediment for any NPDES permitted entities (including Phase II Permittees) within the Deschutes watershed. The report recommends actions for decreasing concentrations of fecal coliform bacteria and improving levels of temperature, dissolved oxygen, and pH. Load allocations for each pollutant will be identified in the Water Quality Improvement Report that is being developed by Ecology. Ecology will work with the Deschutes Advisory Group to establish specific details for implementation actions that will be compiled into a Water Quality Implementation Plan.

3.7 Puget Sound (Nisqually Reach)

Puget Sound is the largest fjord-like estuary in the continental United States. Located between the Cascade and Olympic mountain ranges in Washington State, the Puget Sound basin covers more than 16,800 square miles of land and water (Hart Crowser et al. 2007). The basin is made up of a series of interconnected underwater basins, separated by shallow ridges or sills. The drainage basins in the City primarily discharge to Henderson Inlet; however, some surface water discharges to Budd Inlet and directly to Puget Sound (in the Nisqually Reach). The Nisqually Reach section of Puget Sound is fed by the Nisqually River. The City's contribution to water quality in the Nisqually Reach is primarily due to stormwater and surface water flows from Little McAllister Creek.

Over the past 150 years, human activity has introduced a wide range of toxic chemicals in the Puget Sound ecosystem at levels that are harmful to aquatic life (Puget Sound Partnership 2006). Despite a ban on some harmful chemicals in the 1970s and numerous cleanup efforts, toxic chemicals continue to persist and circulate throughout the Puget Sound ecosystem and are still being introduced via stormwater runoff, municipal sewage treatment plants, and atmospheric deposition. These toxic chemicals can have acute and chronic effects on nearshore organisms. Once in the food web, certain toxic chemicals can also be concentrated in larger predatory animals, ultimately affecting marine fish and mammals. These contaminants are also a significant concern for human health, especially for those who frequently consume fish with high contaminant levels.

Budd Inlet, one of the five inlets that comprise South Puget Sound, is on Ecology's 303(d) list (Category 5) for dissolved oxygen and various toxic compounds. While dissolved oxygen

levels are low in several South Puget Sound inlets, Budd Inlet consistently experiences the lowest levels each year (Roberts and Pelletier 2007). Excess nutrients (such as nitrogen and phosphorus) from point or non-point sources cause low dissolved oxygen levels in waterbodies, inhibiting the growth and survival of many aquatic species. The largest sources of nutrients to South Puget Sound include the effluent from the Lacey Olympia Tumwater Thurston County (LOTT) Clean Water Alliance wastewater treatment plant, and discharge from the Deschutes River and Capitol Lake, which both contain high levels of dissolved inorganic nitrogen. In 1994, the LOTT Clean Water Alliance began including denitrification in the wastewater treatment process in attempts to reduce nutrient loading into the Puget Sound (Roberts and Pelletier 2007).In 2001, The Thurston County Commissioners created the Nisqually Reach shellfish protection district. The district is composed of a local stakeholder group who develop water quality restoration recommendations. The district stakeholders currently meet every other month to discuss water clean-up plans for the area (Thurston County 2012). The Nisqually Reach section of Puget Sound is on Ecology's 303(d) list (Category 5) for fecal coliform bacteria.

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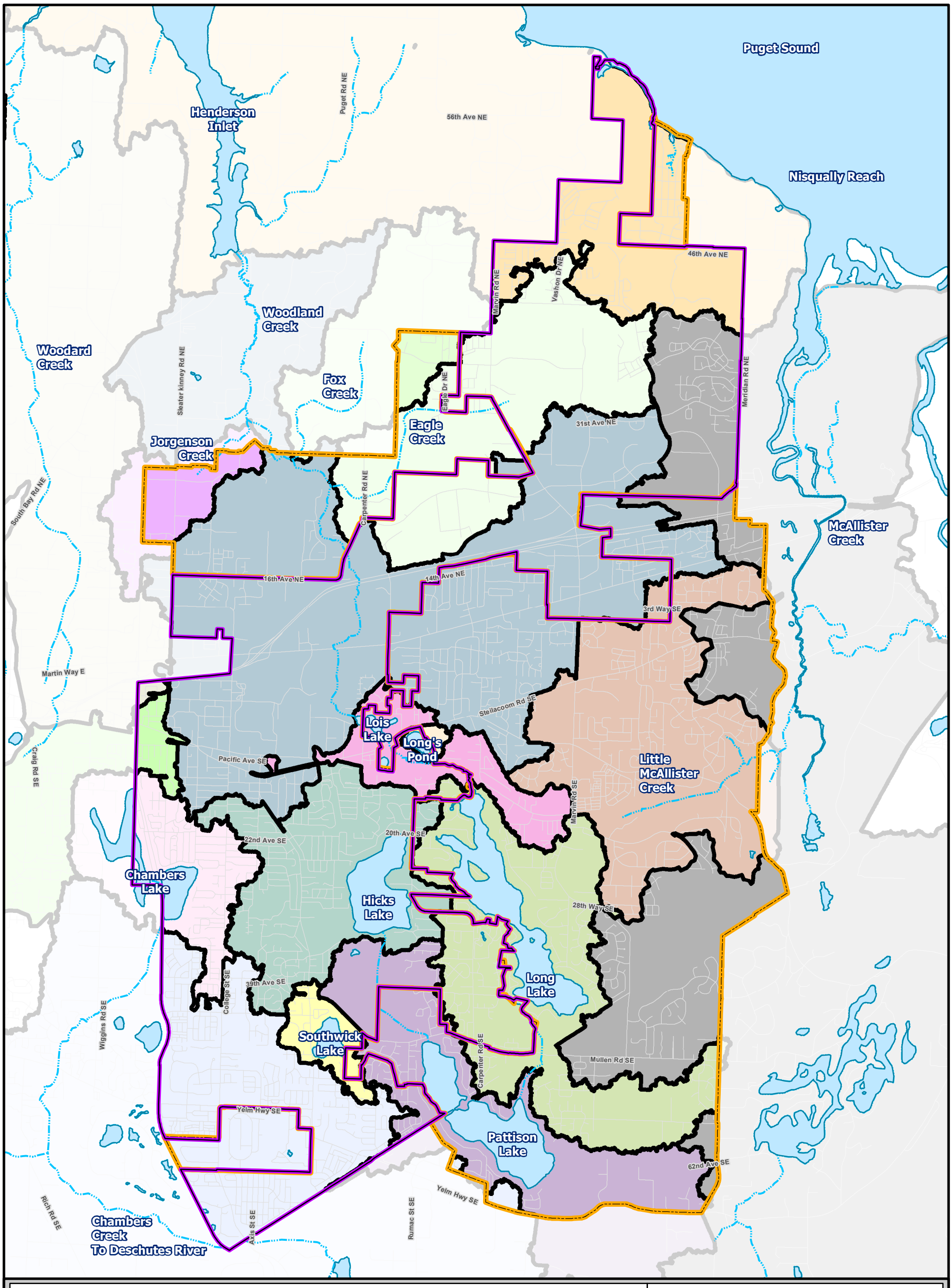

Legend

- City of Lacey
- Urban growth boundary
- Waterbody
- Stream

Basins

- Chambers Lake
- Deschutes River
- Eagle Creek
- Fox Creek
- Long's Pond
- Henderson Inlet
- Hicks Lake
- Indian Creek
- Jorgenson Creek
- Lake Lois
- Little McAllister Creek
- Long Lake
- McAllister Creek
- Pattison Lake
- Southwick Lake
- Woodard Creek Outlet
- Woodland Creek Outlet

Figure 2-4. Drainage Basins Within the City of Lacey.

N

0 2,000 4,000 8,000 Feet

HERRERA

City of Lacey, Waterbody, Stream, UGB (City of Lacey)

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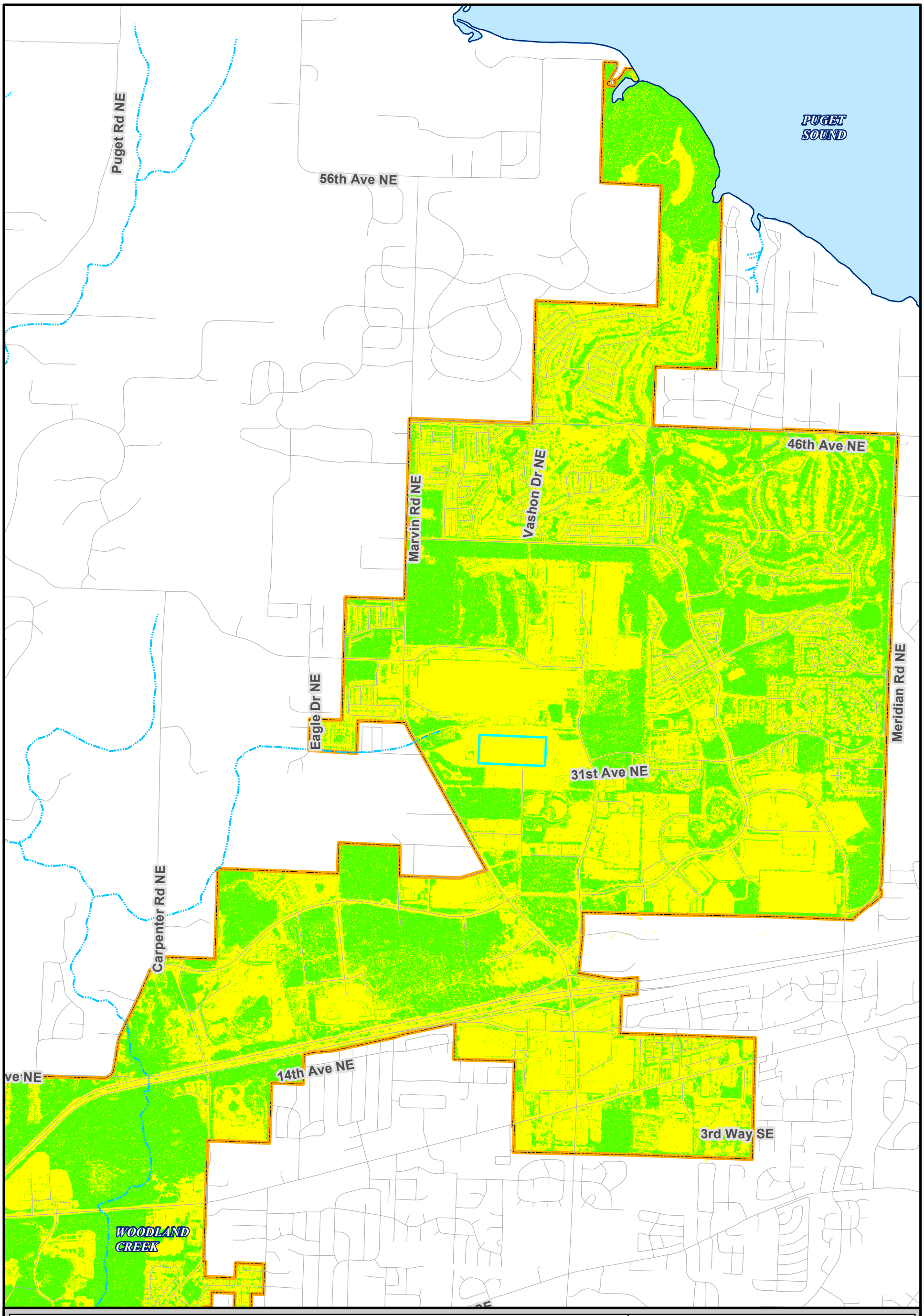

Legend

- Waterbody
- Stream
- City of Lacey
- Pervious area
- Impervious area

Figure 2-5.
Impervious Area in the City of Lacey (Sheet 1 of 2).

N

0 1,000 2,000 4,000 Feet

HERRERA

Aerial: City of Lacey (2018)

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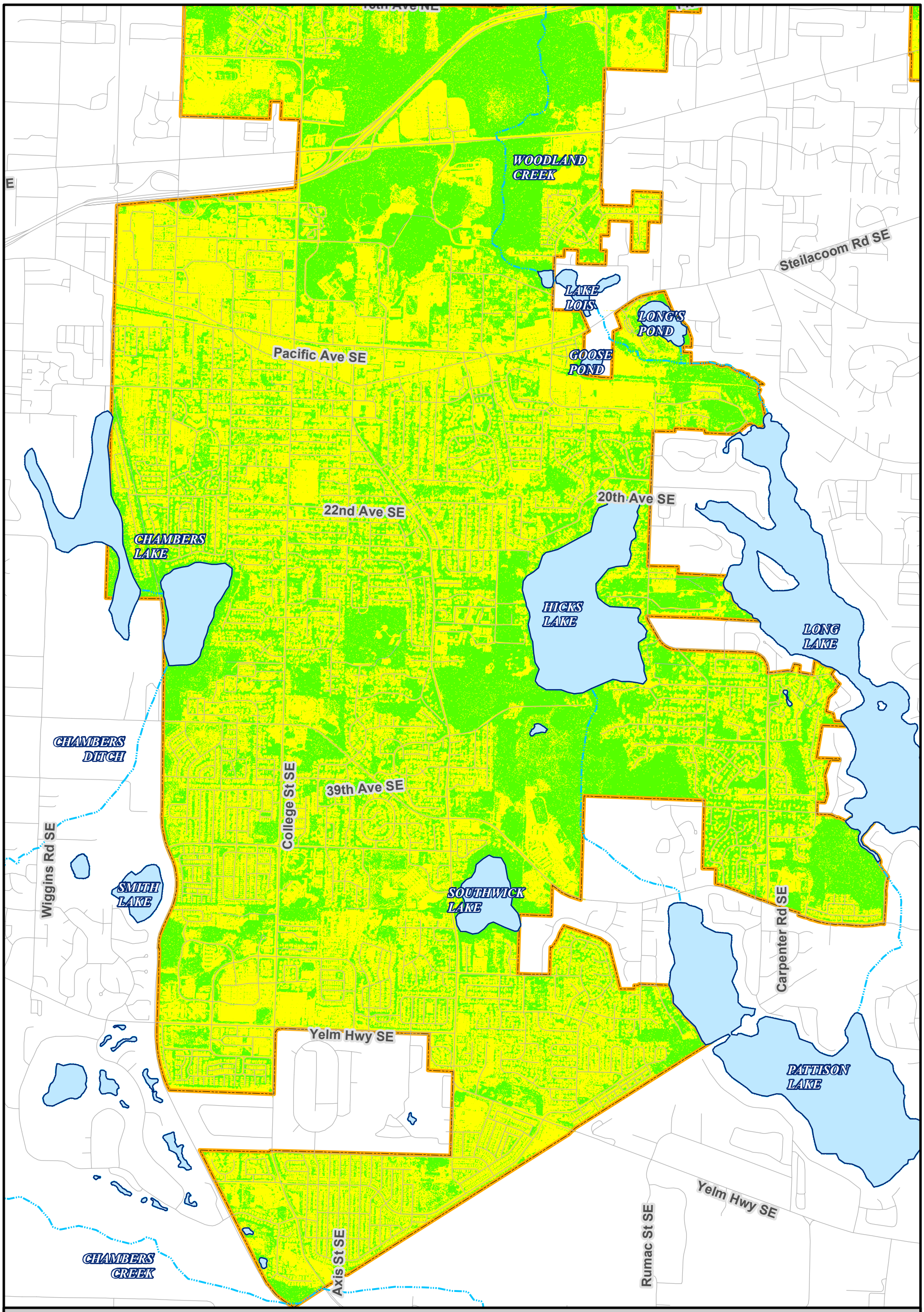

Legend

- Waterbody
- Stream
- City of Lacey
- Pervious area
- Impervious area

Figure 2-5.
Impervious Area in the City of Lacey (Sheet 2 of 2).

N

0 1,000 2,000 4,000 Feet

HERRERA

Aerial: City of Lacey (2018)

K:\Projects\Y2010\10-04793-000\Project\impervious_area_report_figure.mxd (7/24/2020)

APPENDIX C

Lacey Stormwater Facilities

City of Lacey Stormwater Treatment Facilities

Regional Public Facilities Maintained by Lacey Public Works - Operations Division

No.	Facility ID	Facility Name	Facility Type	Address	Location	Built	Facility Acres	Basin Acres	Primary Discharge to	Downstream Surface Water (watershed)
1	PD0001	Yelm Highway Pond	Constructed Wetland & Infiltration Basin	4500 Yelm Highway SE	Bush Park, Yelm Hwy & Rainier Loop	1991	3.40	110.0	GW	Deschutes River
2	PD0002	Ruddell Road SE Stormwater Facility	Wet Pond & Infiltration Basin	4701 Ruddell Road SE	SE corner of Rainier Vista Park	1991	4.50	114.0	GW	Southwick Lake
3	PD0003	Lakehills Pond	Retention Pond	5280 Lakehills Street SE	S. of Southwick Lake, N. end Lakehills off 54th	1991	0.28	6.0	GW	Southwick Lake
4	PD0004	City Hall Ponds	Retention Ponds & Infiltration Basin/Gallery	420 College Street SE	Within Parking Area of City Hall	1994	0.36	7.2	GW	Woodland Cr
5	PD0005	Westminster Pond	Retention/Detention Pond	4711 8th Ave NE	E. of College Street, S. side of 8th Avenue NE	2000	0.27	34.0	wetlands	College Creek
6	PD0008	Lakecrest Pond	Retention/Detention Pond	2900 Lakeview Dr SE	E. side of Chambers Lake at 29th Ave SE	1978	1.76	18.0	Chambers Lk	Deschutes River
7	PD0010	Mt. Tahoma Pond	Retention Pond	5600 54th Ave SE	N. of 54th, W. of Ruddell, E. of Mt. Tahoma Dr.	1979	2.59	27.0	GW	Deschutes River
8	PD0011	College Street SE	Wet Pond & Infiltration Basin	5300 53rd Ave SE	E. of College St. on S. side of 53rd Ave SE	1991	3.41	51.0	GW	Deschutes River
9	PD0012	Lacey Shop Ponds	Retention/Detention Pond, wet pond, swales	1200 College St SE	City Maintenance Shop	2004	1.00	2.0	GW	Woodland Cr
10	PD0014	Woodland Creek Stormwater Facility	Constructed Wetland & Infiltration Basin	5736 7th Ave SE	N. end of Lacey Street SE	1992	2.10	299.0	GW	Woodland Cr
11	PD0020	Shady Lane Pond	Wet Pond	6401 Shady Lane SE	Shady Lane at Sierra Dr, N. end of Hicks Lake	2000	0.55	12.0	Hicks Lake	Woodland Cr
12	PD0022	Hogum Bay Pond	Wet Pond, to Perforated Pipe	2140 Marvin Rd NE	NE corner of Hogum Bay Rd & Marvin Rd NE	1998	1.10	34.0	GW	Woodland Cr
13	PD0023	Willamette Pond	Wet Pond	2500 Marvin Rd NE	SE cor. Marvin & Willamette, at roundabout	1998	1.00	8.0	GW	Woodland Cr
14	PD0024	Britton Parkway #4 Pond	Wet Ponds	2425 Marvin Rd NE	S. side Britton (within proposed Lacey Town Center)	1998	1.00	41.0	GW	Woodland Cr
15	PD0029	Callison Pond	Infiltration Pond with Infiltration Trenches	7505 Britton Parkway NE	N. side of Britton Pkwy, W. of Callison Rd	1999	0.50	27.0	GW	Eagle Creek
16	PD0032	Britton Parkway #9 Pond	Infiltration Pond with Infiltration Trenches	6300 Britton Parkway NE	Just E. of Carpenter Road	1999	1.91	14.0	GW	Eagle Creek
17	PD0034	7th Avenue Stormwater Facility	Retention Pond	6022 7th Avenue SE	W. of Carpenter Rd near Lake Lois outlet	2001	0.55	36.0	GW	Woodland Cr
18	PD0035	Stockton Pond	Wet Pond & Retention Pond	6100 Stockton St SE	SW corner of Lakepoint Park, Stockton & Compton	1991	0.78	37.0	GW	Deschutes River
19	PD0036	Compton Pond	Wet Pond & Retention Pond	6600 Compton Blvd. SE	E. end of Lakepoint Park , Compton & 60th Ave SE	1991	1.00	37.0	GW	Pattison Lake
20	PD0037	25th Avenue Swales	Series of 6-7 Biofilter Swales	5400-5900 25th Avenue SE	N. side of 25th Ave. from Ruddell Road to Lilac St.	1995	0.33	41.0	GW	Hicks Lake
21	PD0038	Eastwood Estates Ponds	3 Infiltration ponds	7407 38th Dr. SE	Eastwood Estates, W. side Carpenter at 38th Loop	1978	0.01	5.0	GW	Long Lake
22	PD0041	Ruddell & 32nd Facility	Pre-treatment & Wetland Pond enhancement	3411 Ruddell Road SE	E. side of Ruddell to Hicks Lake	1999	4.77	436.0	wetlands	Hicks Lake
23	HICKWTLD	Hicks Lake Wetland (PD0041 Outfall)	Wetlands	3411 Ruddell Road SE	E. side of Ruddell to Hicks Lake	1999	22.52		wetlands	Hicks Lake
24	PD0042	Quail Pond	Wet Pond	4708 Quail Dr. SE	N. side of 45th Avenue SE, E. of Quail Drive	1993	0.71	14.0	GW	Hicks Lake
25	PD0050	Century Court	Retention/Detention Pond	701 Century Court NE	S. end of Century Court, off 15th Ave. NE	1978	2.00	4.0	wetlands	College Creek
26	PD0051	Fones Rd Ditch SW Facility (upper)	Wet Pond & Infiltration Basin	3700 14th Ave SE	E. of Fones Road at 12th Ave SE	2004	2.16	97.0	GW	Woodard Creek
27	PD0052	College Regional Stormwater Facility	Primary Wetpond & Retention Ponds	5100 Abbey Way SE	Saint Martin's University, N. side of Abbey Way	2008	20.00	424.0	GW	College Creek
28	PD0054	Mills Landing	Swale	1330 Carpenter Road SE	E. of NTPS bus lot, N. side Mills Landing Ct. SE	2009	0.64	4.0	wetlands	Woodland Cr
29	PD0055	RAC (Regional Athletic Complex)	Retention Ponds	8245 Steilacoom Road SE	E. side Marvin Rd, NW & SW cor. of baseball fields	2007	1.87	20.0	GW	Little McAllister Cr
30	PD0058	Arbors Pond	Retention Pond	7644 41st Avenue SE	NW corner of 41st Avenue SE & Arbor Drive	1992	0.50	59.0	wetlands	Long Lake
31	ARBWTLAND	Arbors Wetland (PD0058 Outfall)	Wetlands	7616 39th Ave. SE	Arbors Housing Development	1992	12.58		wetlands	Long Lake
32	PD0059	Thornbury Pond	Retention Pond, Oil-Water Separator	5400 Thornbury Drive	SE cor. 54th Ave & Thornbury Dr, E. of Ruddell	1990	0.70	29.0	GW	Southwick Lake
33	PD0060	Lacey Community Center	Pond	6729 Pacific Avenue SE	behind Community & Senior Ctrs, along Goose Lk	2002	0.61	2.2	Long's Pond	Woodland Cr
34	PD0061	Lacey Senior Center	Pond	6757 Pacific Avenue SE	NE end of parking lot	2002	0.01	1.2	GW	Woodland Cr
35	PD0062	Meridian Park	Retention Pond	8855 Campus Glen Dr NE	SE corner of Willamette Dr. & Campus Glen Dr. NE	2006	0.31	1.0	GW	McAllister Creek
36	PD0063	Summerwalk Pond	Retention Pond	4900 Yelm Highway SE	E. of Little Prairie Ctr, in SW part of Summerwalk	2005	0.80	9.0	GW	Deschutes River
37	PD0064	Hawks Prairie Water Treatment Facility	Bioswale and Detention Pond	4040 Marvin Road NE	SE of booster pump station	2009	1.60	2.0	GW/wetlands	Eagle Creek
38	PD0065	Mullen Road Extension	Wet Pond & Infiltration Basin	5400 Mullen Road SE	on both sides of Mullen, near Park Place Loop	2010	0.92	15.0	GW	Hicks Lake
39	PD0067	Yelm Highway East	Retention & Infiltration Basins	6130 Yelm Highway SE	N. side Yelm Hwy, W. of Compton/Balustrade Blvd.	2010	0.36	1.0	GW	Deschutes River
40	PD0068	City Pit (Decant Facility, etc.)	Retention & Infiltration Basin	6245 Martin Way E.	On the left as you enter the gate	2010	0.08	11.0	GW	Woodland Cr
41	PD0069	Chambers Lake Stormwater Facility	Constructed Wetlands	2750 Lakeview Dr. SE	On both sides of walking trail	2015	6.24	187.0	Chambers Lk	Deschutes River
42	PD0070	Rainier Road Swale	Swale	7400 Rainier Rd. SE	East side of Rainier Rd just North of RR Trestle	2009	0.01		Chambers Cr	Deschutes River
43	PD0071	Northridge	Retention Pond	5500 Mullen Rd. SE	S. side of Mullen Rd. between Park Pl. Lp. & Ruddell	1991	0.51	4.4	GW	Southwick Lake
44	PD0072	28th Court NE	Wet Pond	2801 Hogum Bay Rd. NE	On the NW corner of Hogum Bay & 28th Ct. NE	1994	1.00	14.6	GW	Eagle Creek
45	PD0073	Carpenter Road SE	Retention Pond	201 Carpenter Rd. SE	W. side of Carpenter Rd. across from Husky Way	2010	0.27	4.4	GW	Woodland Cr
46	PD0076	Martin Way/Woodland Creek Swale	Wetvaults, Infiltration Swale and Trench	Behind the guard rail	S. side Martin btw. Desmond Dr. & Woodland Cr	1993	0.25	16.7	GW	Woodland Cr
47	PD0077	Wonderwood Park	Retention Pond	Park entance off Brentwood	On the E. side of the parking lot	1978	0.19	54.0	GW	Hicks Lake
						Total	110.01	2370.7		

Notes:
1. Facility ID Number and Facility Description are per PW Operations' records in HTE.
2. Facility ID numbers have gaps due to some facilities having been retired/eliminated, with no renumbering.
3. List is not allinclusive; these are the main, larger storm facilities listed in HTE as "Storm Ponds" and maintained by Public Works - Operations Stormwater Department.
4. Basin Area excludes areas upstream that are managed by other ponds.
5. Basin Area data per GIS mapping compiled by Herrera for 2013 SCP.
6. GW = Groundwater (infiltration)

APPENDIX D

Capital Improvement Program Appendix

CAPITAL IMPROVEMENT PROGRAM APPENDIX

Solution Development

The stormwater CIP from the 2013 Stormwater Comprehensive Plan (2013 Plan) was updated using input from City staff on completed projects and new problems. Problems were evaluated using desktop methods and field evaluation to assess site-specific opportunities and constraints. New project concepts were developed using desktop methods and an estimated cost was defined for each project using a combination of parametric and analogous cost estimating techniques.

Conceptual Designs

Sites associated with stormwater problems were visited by Herrera staff to determine the potential cause(s) of the problems. Engineering judgment was then used to identify appropriate capital projects to address each stormwater problem, factoring in constraints and opportunities at each site. For some projects, multiple alternatives were considered.

Conceptual designs were developed for each project, using sound engineering judgement and desktop and field assessment. Each conceptual design includes a project summary sheet (problem description, and a list of the primary project components), a plan view figure of the stormwater facilities with dimensions (when applicable), and an itemized planning-level cost estimate (when applicable). Summary sheets and cost estimates are available at the end of this appendix.

Conceptual Cost Estimates

Costs for capital projects were estimated in different ways, depending on the type of project and project development history.

- Five projects were carried forward from the 2013 plan without major modification. Costs were converted to June 2019 dollars.
- Four projects from the 2013 plan received major updates and new cost estimates were developed using the methodology described below.
- Three new location-specific (i.e. construction) project concepts were developed and new cost estimates were developed using the methodology described below.

- Seven new projects were defined that are not location specific (i.e. not construction projects). These projects include annual programs and stormwater planning projects. Costs for these projects were developed based on City experience with the programs in the past and Herrera's experience with similar stormwater planning projects.

Cost estimates were prepared for location-specific (i.e. construction) projects based upon Herrera's experience in designing projects of a similar scale and in similar settings. Unless otherwise noted in the cost estimates, the following assumptions were applied:

- Construction bid items were based on WSDOT standard specifications where applicable, including material, construction requirements, measurement, and payment.

- Line item unit prices used in the construction cost estimates were derived from a combination of applicable sources, including contractor bid tabs from similar past projects, prices compiled by WSDOT, quotes from vendors, a cost estimating guide (The Guide 2018), site-specific understanding of probable contractor staging, access, and other project-specific requirements and constraints that would affect contractor bids for the project.

- Allied costs (project management, survey, geotechnical analyses, design, permitting, and construction management) were included for each project, as appropriate.

- The City would hire a consultant to perform the geotechnical analysis, design, and permitting.

- The City would perform the survey in-hours

- The City would manage the project for a cost equal to 20 percent of the construction cost and would perform construction management for a cost equal to 15 percent of the construction cost.

- Costs for survey, geotechnical analyses, design, and permitting were based on experience with design and permitting for similar projects and knowledge of site-specific job complexities and challenges. In some cases, professional judgment was used to estimate allied costs as a percentage of construction costs.

- A design contingency was applied to the cost to reflect the level of uncertainty associated with the project scope and potential risks. Contingency values are in line with recommendations by the Association for the Advancement of Cost Engineering (AACE 2005; Rothwell 2005).

- Property acquisition costs were not considered and may affect actual costs for some projects.

- An additional local cost adjustment factor of 10 percent was applied to construction costs to account for higher-than-expected costs for recent projects in the City.

Project Prioritization

The stormwater CIP problems and solutions were prioritized using a qualitative process and considering input from City staff, review of background documents, and field reconnaissance of existing problems. Each project was evaluated against the following primary and secondary prioritization criteria to assign project priority.

Primary Prioritization Criteria

The primary prioritization criteria are related to the risk associated with the problem that is being solved: likelihood of the problem occurring (i.e., probability) and the potential losses resulting from the problem (i.e. severity). Projects that address frequent problems with major potential losses have higher risk reduction benefit, and thus are typically assigned a higher priority. Projects that address less frequent problems with minor potential losses have lower risk, and thus are typically assigned a lower priority.

Probability: Probability of the problem occurring was evaluated qualitatively, based on the perceptions of City staff. Problems that occur more frequently were assigned a higher priority.

Severity: Consideration of severity involved qualitatively assessing the potential losses associated with the problem. Problems with greater potential losses were assigned a higher priority.

Relating Project Benefits to Program Elements and Goals. Probability and severity were considered in the context of the following program elements:

- **Flood Reduction:** How much does the project reduce flooding? (e.g., reduce frequency, extents, hazards, health risks, property damage)
- **Surface Water Quality Improvement:** How much does the project improve surface water quality? (e.g., decrease pollutant loading, provide source control)
- **Ground Water Quality Protection:** Does the project contribute to the protection of ground water quality? (e.g., improve groundwater recharge, remove pollutants from surface water prior to infiltration)
- **Habitat Improvement:** How much does the project improve habitat? (e.g., improve the function of existing natural areas, create new habitat)
- **Infrastructure Operations and Maintenance:** Is the project necessary for existing stormwater infrastructure to operate as intended? (e.g., rehabilitate existing infrastructure, increase service life of infrastructure)

Each project was assigned a score of high, medium, or low based on the primary prioritization criteria.

Secondary Prioritization Criteria

Secondary prioritization criteria were used to refine project prioritization and develop the implementation schedule through qualitative examination of the program elements of Public Participation and Comprehensive Planning, Administration, and Funding:

- **Public Participation:**
  - Will the project educate public about storm water?
  - Will the project provide an opportunity for stewardship activities?
- **Comprehensive Planning, Administration, and Funding:**
  - Are there other project benefits to the community? (e.g., enhance open space, connect greenways, improve walkability, provide wildlife corridors)
  - Will the project enhance social equity?
  - Can the project be scheduled to coincide with other City projects such that the total cost of both projects is reduced? (e.g., scheduling a drainage improvement project before an overlay project)
  - Is the project a candidate for outside grant funding that will magnify the benefits of utility funds?
  - Do we understand the problem well enough to design and implement an effective solution?

Results

The results of the prioritization process are shown in the Prioritization Matrix below. Projects that are required by regulations, such as updating the Stormwater Design Manual, were considered exempt from the prioritization process and assigned a priority of "Required".

REFERENCES

AACE. 2005. Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries, AACE International Recommended Practice No. 18R-97, TCM Framework: 7.3 – Cost Estimating and Budgeting. Association for the Advancement of Cost Engineering (AACE) International. February 2, 2005.

Rothwell, G. 2005. Contingency in Levelized Capital Cost Estimation. 2005 Association for the Advancement of Cost Engineering (AACE) International Transactions.

The Guide. Building Construction Material Prices for use in Alaska, Oregon and Washington since 1984. January 2018.

Prioritization Matrix						
Proj. No.	**Project Name**	**Primary Criteria Notes**	**Primary Criteria Score**	**Secondary Criteria Notes**	**Influence of Secondary Criteria**	**Overall Score**
19-1	Westminster Pond Modification	**Surface Water Quality** The current pond is clogged with sediment, so flow from the pond is discharging to College Creek without treatment. Rehabilitating the pond will improve water quality treatment function.	High	**Public Participation** Some opportunity for public education through educational signage at the site. **Comprehensive Planning, Administration, and Funding** This project may be eligible for a water quality grant to support the addition of a pretreatment BMP, but may not be a strong candidate because much of the work could be considered required maintenance.	No change	High
19-2	26th Loop Conveyance	**Flood Reduction** Minor nuisance flooding is impacting several yards. **Surface Water Quality** Runoff from Golf Club Rd. SE is entering Chambers Lake without treatment, potentially impairing water quality in the lake.	High	**Public Participation** Limited opportunity for education and stewardship **Comprehensive Planning, Administration, and Funding** No cost sharing opportunities.	No change	High
19-3	2021 Stormwater Design Manual (SDM) Update	This project is required by regulations and is exempt from the prioritization process. This project provides guidance for developers to more effectively and efficiently improve the following program elements: • **Flood Reduction** • **Surface Water Quality** • **Ground Water Quality** • **Infrastructure Operations and Maintenance**	Required	**Public Participation** Opportunities for stakeholder involvement during development of the updated manual. **Comprehensive Planning, Administration, and Funding** Opportunities for coordination with other development documents to align the SDM with City-wide development goals.	No change	Required

Prioritization Matrix						
Proj. No.	**Project Name**	**Primary Criteria Notes**	**Primary Criteria Score**	**Secondary Criteria Notes**	**Influence of Secondary Criteria**	**Overall Score**
19-4	Woodland Creek Stormwater Treatment Facility Oil Water Separator (OWS) Replacement	**Surface Water Quality** The current OWS at this location is frequently clogged by sediment and is providing little water quality treatment. **Infrastructure Operations and Maintenance** The current OWS contains plates which frequency break during replacement. Maintenance is costly and difficult.	High	**Public Participation** Limited opportunity for education and stewardship **Comprehensive Planning, Administration, and Funding** No cost sharing opportunities.	No change	High
19-5	Woodland Creek Community Park Habitat Restoration	**Habitat Improvement** Invasive species are out-competing native species and degrading habitat quality in Woodland Creek.	Low	**Public Participation** Excellent opportunity for stewardship by engaging volunteers to replant native species **Comprehensive Planning, Administration, and Funding** No cost sharing opportunities.	Increase (opportunity for community engagement)	High
19-6	Stormwater Management Action Planning (SMAP)	This project is required by regulations and is exempt from the prioritization process.	Required	**Public Participation** Opportunities for stakeholder involvement during SMAP process. **Comprehensive Planning, Administration, and Funding** Opportunity to direct stormwater funds towards the most impactful program activities and projects.	No change	Required
19-7	Regional Water Quality Facility Program	**Surface Water Quality** Untreated and partially-treated runoff decreases the quality of surface water	Medium	**Public Participation** Opportunity for education and stewardship **Comprehensive Planning, Administration, and Funding** Excellent opportunity for grant funding. A portion of the funding for this project is to apply for grant funding and the rest is intended as matching funds for a surface water grant.	No change	Medium

Prioritization Matrix						
Proj. No.	**Project Name**	**Primary Criteria Notes**	**Primary Criteria Score**	**Secondary Criteria Notes**	**Influence of Secondary Criteria**	**Overall Score**
19-8	Infiltration Retrofit Program	**Groundwater Quality** Untreated infiltration can degrade groundwater quality	Medium	**Public Participation** Limited opportunity for education and stewardship **Comprehensive Planning, Administration, and Funding** No cost sharing opportunities.	No change	Medium
19-9	Miscellaneous Storm System Improvements	This annual program will improve the following program elements: • **Flood Reduction** • **Surface Water Quality** • **Ground Water Quality** • **Infrastructure Operations and Maintenance**	Medium	**Public Participation** Limited opportunity for education and stewardship **Comprehensive Planning, Administration, and Funding** This program will increase efficiency and reduce costs by identifying opportunities for cost sharing with projects led by other utilities and jurisdictions and addressing infrastructure repair and replacement needs before they become an emergency repair situation	No change	Medium
19-10	Stormwater Comprehensive Plan Update	This project will provide guidance for the City to more effectively and efficiently improve the following program elements: • **Flood Reduction** • **Surface Water Quality** • **Ground Water Quality** • **Infrastructure Operations and Maintenance**	Required	**Public Participation** Opportunities for stakeholder involvement during development of the updated comprehensive plan **Comprehensive Planning, Administration, and Funding** Provides comprehensive planning for the stormwater program	Increase	Required
13-7	Diamond Stormwater Alternative	**Flood Reduction** Low frequency flooding with the potential to affect private properties. This project would reduce flood severity and frequency.	Medium	**Public Participation** Limited opportunity for education and stewardship. **Comprehensive Planning, Administration, and Funding** No opportunity for cost sharing.	No change	Medium

Prioritization Matrix						
Proj. No.	**Project Name**	**Primary Criteria Notes**	**Primary Criteria Score**	**Secondary Criteria Notes**	**Influence of Secondary Criteria**	**Overall Score**
13-9	Clearbrook Drainage System Improvements	**Flood Reduction** Surface ponding threatens one home. Flooding in multiple streets. This project would reduce flood severity and frequency.	Medium	**Public Participation** Opportunity for public involvement with Parks project; project will be visible **Comprehensive Planning, Administration, and Funding** Potential integration and cost sharing with parks project and coordination with Homann Area System Rehabilitation. The facility is currently privately owned; the City could assume responsibility for the private system.	No change	Medium
13-10	Homann Area System Rehabilitation (Option 1)	**Flood Reduction** The current system of gutters and infiltration galleries still results in high frequency, minor nuisance flooding. The proposed conveyance system will provide more effective flood control.	Medium	**Public Participation** Limited opportunity for education and stewardship **Comprehensive Planning, Administration, and Funding** Feasibility and effectiveness is not well known. May coordinate with future sewer expansion and the Clearbrook Project.	Reduce	Low (Conduct infiltration study during planning period.)
13-10	Homann Area System Rehabilitation (Option 2)	**Flood Reduction** The proposed solution will reduce minor nuisance flooding. **Surface Water Quality and Ground Water Quality** The proposed solution will treat stormwater prior to infiltration or discharge.	Medium	**Public Participation** Visibility of bioretention facilities in the neighborhood provides an opportunity for education about stormwater. **Comprehensive Planning, Administration, and Funding** Feasibility and effectiveness is not well known.	Reduce	Low (Conduct infiltration study during planning period.)

Prioritization Matrix						
Proj. No.	**Project Name**	**Primary Criteria Notes**	**Primary Criteria Score**	**Secondary Criteria Notes**	**Influence of Secondary Criteria**	**Overall Score**
13-11	1010 Midway Storm Improvements	**Flood Reduction** Flooding impacts a multifamily residential development.	Medium	**Public Participation** Limited opportunity for education and stewardship **Comprehensive Planning, Administration, and Funding** Interjurisdictional cooperation is needed with Thurston County to schedule and fund this project.	No change	Medium
13-12	Belair-Impala Stormwater Installation	**Flood Reduction** Significant nuisance flooding affecting a large geographic area with at least one private property. Frequency of flooding is high. This project would reduce flood severity and frequency.	Medium	**Public Participation** Limited opportunity for education and stewardship. **Comprehensive Planning, Administration, and Funding** Schedule to occur with the next overlay in this area. No outside funding potential.	No change	Medium
13-14	Alder and Gemini Drainage System Improvements	**Flood Reduction** Minor nuisance flooding.	Low	**Public Participation** Limited opportunity for education and stewardship **Comprehensive Planning, Administration, and Funding** No cost sharing opportunities.	No change	Low (Coordinate with Homann Infiltration Study)
13-15	White Fir Stormwater Installation	**Flood Reduction** High frequency, minor nuisance flooding. The City has received drainage complaints from the community. This project would reduce flood severity and frequency.	Low	**Public Participation** Limited opportunity for education and stewardship. **Comprehensive Planning, Administration, and Funding** Potential to coordinate with future sewer expansion project.	No change	Low

Prioritization Matrix						
Proj. No.	**Project Name**	**Primary Criteria Notes**	**Primary Criteria Score**	**Secondary Criteria Notes**	**Influence of Secondary Criteria**	**Overall Score**
13-16	5th Ct SE and 5th Way Easement Storm Improvements	**Flood Reduction** Potential minor impacts if structures are not maintained. **Infrastructure Operations and Maintenance** Maintenance is currently difficult due to the location of the conveyance system in a narrow easement between houses. Equipment does not fit in this space.	Low	**Public Participation** Limited opportunity for education and stewardship **Comprehensive Planning, Administration, and Funding** No cost sharing opportunities.	No change	Low
13-17	Shady Lane Treatment Facility Improvements	**Surface Water Quality** The facilities water quality treatment performance is limited by the unmaintained state. Improving the facility will enhance water quality.	Medium	**Public Participation** Limited opportunity for education and stewardship due to low-visibility site. **Comprehensive Planning, Administration, and Funding** No opportunity for cost sharing.	No change	Medium

Capital Improvement Program Project Summary Sheet

Westminster Pond Modification

Location: South side 8th Ave. NE just east of Westminster Drive NE

Number: 19-1 **Priority:** High

Estimated Cost: $340,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

Existing facility needs rehabilitation as the pond has become laden with sediment. Project may include a retrofit to improve performance / expand drainage area. Potentially manage flow from 6th Ave and College Street system. Existing wetlands may limit ability to expand facility.

Project Solution:

Rehabilitate the existing facility. Restore pond bottom to design elevation and establish new wet pond vegetation around the perimeter. Relocate existing south inlet location closer to north inlet via pipe extension. Intercept north inlet pipe upstream of pond inlet with pre-treatment device sized adequately for flows.

Cost Estimate Assumptions:

A 40% contingency has been added to the project cost to account for the uncertainty related to outlet relocation regarding required piping and berming, and to account for unknown inverts for the pretreatment device.

Existing stormwater pond, looking north

Existing stormwater pond, looking south

Legend

Existing

- Catch Basin
- Outfall
- Manhole
- Conveyance
- Pond
- Filter Strip

Proposed

- Structure
- Pipe or Culvert

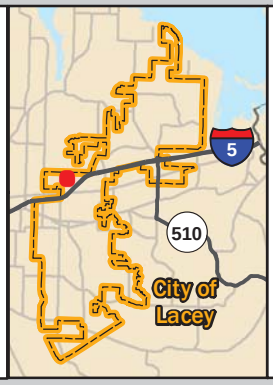

Figure 5. City of Lacey Stormwater CIP 19-1: Westminster Pond Modification.

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City of Lacey Aerial, 2015

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Engineering Construction Cost Estimate for Conceptual Design - DRAFT

Project Name: **Westminster Pond Modification**
Project Number: **17-06745-000**
Client: **City of Lacey Stormwater Comprehensive Plan Update**

QA Review

Completed/Updated By: Meghan Mullen and Trae Yang
Last Updated On: 6/11/2019
Reviewed By: Matt Fontaine
Reviewed On: 6/11/2019
Approved By: Matt Fontaine
Approved On: 6/11/2019

Item No.	Spec Division	Item Description	Qty	Unit	Unit Cost	Total Cost
	Div 1	**General Requirements**				
1		Mobilization	1	L.S.	10%	$ 9,467
2		Erosion/Water Pollution Control	1	L.S.	5%	$ 4,734
3		Temporary Dewatering	1	L.S.	10%	$ 9,467
4		Utility Protection and Relocation	1	L.S.	0%	$ -
5		Project Temporary Traffic Control	1	L.S.	0%	$ -
	Div 2	**Earthwork**				
6		Pond Excavation, Incl. Haul	580	C.Y.	$ 25	$ 14,500
7		Clearing and Grubbing	0.17	Acre	$ 8,800	$ 1,454
	Div 7	**Drainage Structures, Storm Sewers, Sanitary Sewers, Water Mains, and Conduits**				
8		GULD pretreatment device with installation	1	L.S.	$ 63,000	$ 63,000
9		Schedule A Storm Sewer Pipe 12 In. Diameter	100	L.F.	$ 50	$ 5,000
	Div 8	**Miscellaneous Construction**				
10		Planting -- Shrubs and Seeding Mix	0.1	Acre	$ 5,200	$ 716
11		Maintenance access	1	L.S.	$ 10,000	$ 10,000
		Construction Subtotal				**$ 118,338**
		Contingency	40%			**$ 47,335.08**
		Lacey Cost Adjustment Factor	10%			**$ 11,833.77**
		Subtotal (with Contingency and Lacey Cost Adj. Factor)				**$ 177,507**
		Tax	9.3%			**$ 16,508**
		Construction Total (with Contingency and Tax)				**$ 194,015**
		Survey		L.S.		**$ 10,000**
		Geotechnical / Infiltration Evaluation		L.S.		**$ -**
		Predesign		L.S.		**$ 10,000**
		Design	15%			**$ 29,000**
		Permitting		L.S.		**$ 30,000**
		Construction Management	15%			**$ 29,102.20**
		City of Lacey Project Management	20%			**$ 38,802.93**
		Estimated Project Total (rounded to 2 significant figures)				**$ 340,000**

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Capital Improvement Program Project Summary Sheet

26th Loop Conveyance

Location: 26th Loop SE and 26th Ave SE from Golf Club Road SE to Lakeside Dr SE

Number: 19-2 **Priority:** High

Estimated Cost: $510,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

Inadequate conveyance between College St. & Golf Club Rd. causes flooding of crawl spaces. Conveyance is hindered by sediment in ditches and a water main thrust block that limits ability to make the ditch deeper.

Project Solution:

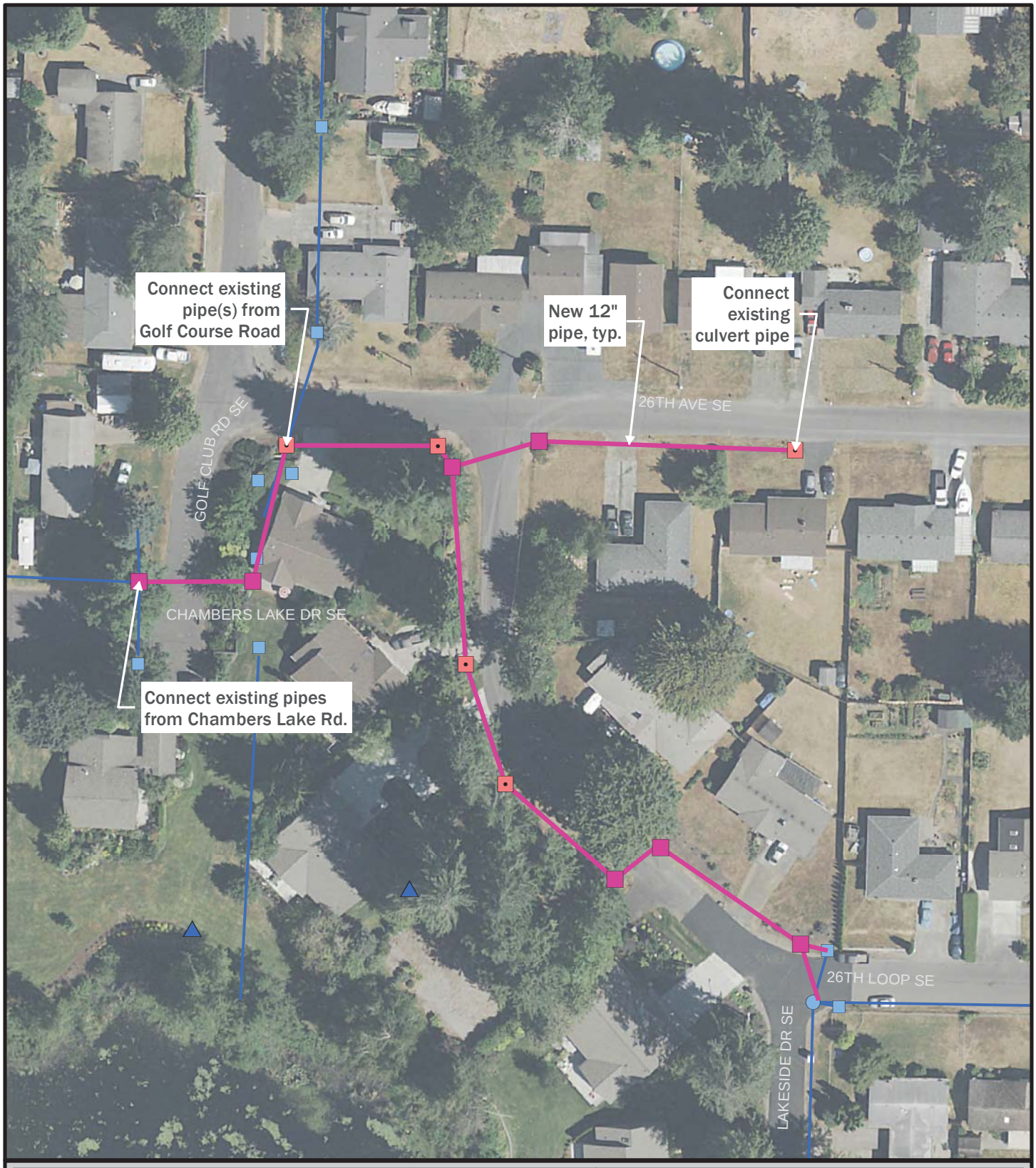
Tightline all flows from Chambers Lake Drive, Golf Club Road, and 26th Ave SE to the connection with Chambers Lake SDMH at the intersection of Lakeside and 26th Loop. New storm roadway crossings will be low to avoid existing water main and will continuously hold water. New piping along south and west side of roadways may impact existing mature trees and must be considered as a potential challenge. Additionally, existing connection elevation constraints require minimal (0.5%) slope throughout the system.

Cost Estimate Assumptions:

Assumes 50% contingency due to higher uncertainty of design. Assumes existing 12" pipes are adequate for flows.

Corner with thrust block preventing conveyance through existing ditch

Outlet of proposed conveyance extents to the Chambers Treatment Facility



Legend

Existing

- Catch Basin
- Outfall
- Junction Box
- Manhole
- Conveyance

Proposed

- Type 1 CB
- Type 2 CB
- Pipe or Culvert

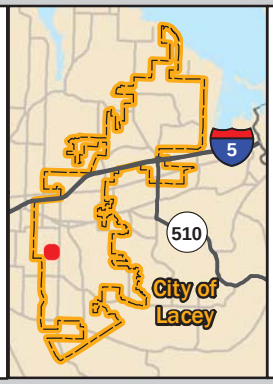


Figure 2. City of Lacey Stormwater CIP 19-2: 26th Loop Conveyance.

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City of Lacey Aerial, 2015

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Engineering Construction Cost Estimate for Conceptual Design - DRAFT

Project Name: **26th Loop**
Project Number: **17-06745-000**
Client: **City of Lacey Stormwater Comprehensive Plan Update**

QA Review

Completed/Updated By: Trae Yang
Last Updated On: 6/12/2019
Reviewed By: Matt Fontaine
Reviewed On: 6/12/2019
Approved By: Matt Fontaine
Approved On: 6/12/2019

Item No.	Spec Division	Item Description	Qty	Unit	Unit Cost	Total Cost
	Div 1	**General Requirements**				
1		Mobilization	1	L.S.	10%	$ 13,425.49
2		Erosion/Water Pollution Control	1	L.S.	5%	$ 6,712.75
3		Temporary Dewatering	1	L.S.	2%	$ 2,685.10
4		Utility Protection and Relocation	1	L.S.	20%	$ 26,850.99
5		Project Temporary Traffic Control	1	L.S.	10%	$ 13,425.49
	Div 2	**Earthwork**				
6		Clearing and Grubbing	1	L.S.	$ 2,000	$ 2,000
7		Structure Excavation, Incl. Haul	161	C.Y.	$ 30	$ 4,832
8		Removal of Structures and Obstructions	1	L.S.	$ 5,000	$ 5,000
9		CDF	111	C.Y.	$ 185	$ 20,444
10		Ditch excavation, incl haul	33	C.Y.	$ 30	$ 993
11		Ditch fill	116	C.Y.	$ 40	$ 4,634
	Div 5	**Surface Treatments and Pavements**				
12		HMA for pavement Repair	19	Ton	$ 300	$ 5,576
13		CSBC	20	Ton	$ 75	$ 1,526
	Div 7	**Drainage Structures, Storm Sewers, Sanitary Sewers, Water Mains, and Conduits**				
14		Schedule A Storm Sewer Pipe, 12 In. Diameter	745	L.F.	$ 50	$ 37,250
15		Type 1 Catch Basin	5	Each	$ 2,600	$ 13,000
16		Type 2 Catch Basin	7	Each	$ 5,000	$ 35,000
	Div 8	**Miscellaneous Construction**				
17		Planting and seeding	1	Acre	$ 4,000.00	$ 4,000.00
		Construction Subtotal				**$ 197,355**
		Contingency	50%			**$ 98,677.39**
		Lacey Cost Adjustment Factor	10%			**$ 19,735.48**
		Subtotal (with Contingency and Lacey Cost Adj. Factor)				**$ 315,768**
		Tax	9.3%			**$ 29,366**
		Construction Total (with Contingency and Tax)				**$ 345,134**
		Survey		L.S.		**$ 5,000**
		Geotechnical / Infiltration Evaluation		L.S.		**$ -**
		Predesign		L.S.		**$ -**
		Design	10%			**$ 35,000**
		Permitting		L.S.		**$ 5,000**
		Construction Management	15%			**$ 51,770.10**
		City of Lacey Project Management	20%			**$ 69,026.81**
		Estimated Project Total (rounded to 2 significant figures)				**$ 510,000**

Capital Improvement Program Project Summary Sheet

Stormwater Design Manual (SDM) Update

Location: Citywide

Number: 19-3 **Priority:** High

Estimated Cost: $180,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

The Stormwater Design Manual (SDM) will need to be updated for consistency with Ecology's 2019 Stormwater Management Manual for Western Washington, to better address the groundwater threat posed by deep underground infiltration (UIC) wells, and to create additional tools for SDM implementation.

Project Solution:

Create 2021 edition of Lacey's SDM for equivalency with Ecology's 2019 SWMMWW and include policies for deep UIC wells. Create additional tools that are needed for manual implementation, such as drainage control plan templates.

Cost Estimate Assumptions:

Experience with stormwater manual updates that are currently underway for other jurisdictions.

Construction site

Workshop and training opportunities

Capital Improvement Program Project Summary Sheet

Woodland Creek Stormwater Treatment Facility Oil Water Separator Replacement

Location: Bowker St SE at Woodland Creek Stormwater Treatment Facility

Number: 19-4 **Priority:** High

Estimated Cost: $480,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

The current oil-water separator (OWS) is not functioning. The plates clog quickly, are difficult to maintain, and break during maintenance.

Project Solution:

Hydrologic analysis of the basin determined a much higher flow rate than is feasible to manage using an API style OWS. Replace the existing OWS with a new GULD pretreatment device that is sized to manage 2- to 3-cfs, which is approximately 25 percent of the offline water quality treatment flow rate. This configuration will improve sediment removal upstream of the WCSTF and reduce the maintenance burden.

Cost Estimate Assumptions:

Assumes total replacement of existing OWS and addition of a new flow splitter and bypass pipes within footprint that is similar to the existing facility. Assumes 6" HMA over 6" CSTC for surface restoration. If flow splitter and bypass piping can be reused there would be a cost savings relative to this estimate.

Existing facility location

Existing OWS

Legend

Existing

- Manhole
- Conveyance

Proposed

- Manhole
- Pipe or Culvert
- Facility

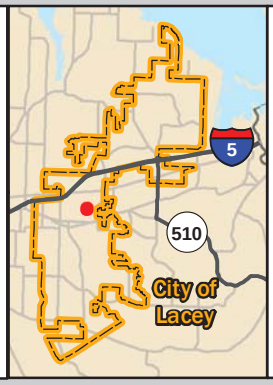

Figure 8. City of Lacey Stormwater CIP : OWS Retrofit for WCSTF.

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City of Lacey Aerial, 2015

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Engineering Construction Cost Estimate for Conceptual Design - DRAFT

Project Name: **Woodland Creek Oil Water Separator Replacement**
Project Number: **17-06745-000**
Client: **City of Lacey Stormwater Comprehensive Plan Update**

QA Review
Completed/Updated By: Trae Yang
Last Updated On: 6/12/2019
Reviewed By: Matt Fontaine
Reviewed On: 6/12/2019
Approved By: Matt Fontaine
Approved On: 6/12/2019

Item No.	Spec Division	Item Description	Qty	Unit	Unit Cost	Total Cost
	Div 1	**General Requirements**				
1		Mobilization	1	L.S.	10%	$ 19,177.51
2		Erosion/Water Pollution Control	1	L.S.	5%	$ 9,588.75
3		Temporary Dewatering	1	L.S.	2%	$ 3,835.50
4		Utility Protection and Relocation	1	L.S.	1%	$ 1,917.75
5		Project Temporary Traffic Control	1	L.S.	0%	$ -
	Div 2	**Earthwork**				
6		Clearing and Grubbing	0.02	Acre	$ 8,800	$ 176
7		Roadway Excavation, Incl. Haul	67	S.Y.	$ 20	$ 1,333
8		Structure Excavation Class B	103	C.Y.	$ 10	$ 1,025
	Div 5	**Surface Treatments and Pavements**				
9		HMA for pavement Repair	23	Ton	$ 150	$ 3,375
10		CSBC	21	Ton	$ 28	$ 576
	Div 7	**Drainage Structures, Storm Sewers, Sanitary Sewers, Water Mains, and Conduits**				
11		Sediment vault, installation, and pipe connections	1	L.S.	$ 169,000	$ 169,000
12		Schedule A Storm Sewer Pipe, 24 In. Diameter	54	L.F.	$ 85	$ 4,590
13		Flow Splitter manhole	1	Each	$ 6,500	$ 6,500
14		Type 1 Catch Basin	2	Each	$ 2,600	$ 5,200
	Div 8	**Miscellaneous Construction**				
		Construction Subtotal				**$ 226,295**
		Contingency	20%			**$ 45,258.92**
		Lacey Cost Adjustment Factor	10%			**$ 22,629.46**
		Subtotal (with Contingency and Lacey Cost Adj. Factor)				**$ 294,183**
		Tax	9.3%			**$ 27,359**
		Construction Total (with Contingency and Tax)				**$ 321,542**
		Survey		L.S.		**$ 5,000**
		Geotechnical / Infiltration Evaluation		L.S.		**$ -**
		Predesign		L.S.		**$ -**
		Design	10%			**$ 32,000**
		Permitting		L.S.		**$ 5,000**
		Construction Management	15%			**$ 48,231**
		City of Lacey Project Management	20%			**$ 64,308**
		Estimated Project Total (rounded to 2 significant figures)				**$ 480,000**

Capital Improvement Program Project Summary Sheet

Woodland Creek Community Park Habitat Restoration

Location: Woodland Creek Community Park

Number: 19-5 **Priority:** High

Estimated Cost: $50,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

Invasive species are impairing habitat at Woodland Creek Community Park.

Project Solution:

Remove invasive species from the Woodland Creek Community Park so that volunteers can replant the area with native species to restore habitat.

Cost Estimate Assumptions:

Invasive species removal here and potentially at other priority locations would be packaged together to create a $50,000 contract.

Woodland Creek bank

Park boundary

Capital Improvement Program Project Summary Sheet

Stormwater Management Action Planning (SMAP)

Location: Citywide

Number: 19-6 **Priority:** High

Estimated Cost: $100,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

The draft 2019 NPDES Phase II Permit requires permittees to identify, characterize, and prioritize basins for basin-specific Stormwater Management Action Planning (SMAP). SMAP will identify short-term and long-term actions for improving receiving water quality, including programs, policies, and projects. Initially, SMAP may outline data collection strategies to improve the City's understanding of hydrology, water quality, and associated problems and opportunities in each basin.

Project Solution:

Conduct Stormwater management action planning (SMAP) to meet NPDES requirements. The project will prioritize water bodies and basins within the City and develop a Stormwater Management Action Plan for at least 1 priority basin, which will include programmatic activities and stormwater facilities to improve stormwater management. The elements of the plan will be dictated by the goals of the City and stakeholders within the priority basin(s) and the work needs to be complete by the end of 2022.

Cost Estimate Assumptions:

Assumes $100,000 planning effort with consultant support and one-time City staff time estimated at 0.25 FTE.

"No dumping" educational campaign

Stormwater treatment facility

Capital Improvement Program Project Summary Sheet

Regional Water Quality Facility Program

Location: Citywide

Number: 19-7 **Priority:** Medium

Estimated Cost: $200,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

Many drainage basins in the city discharge to receiving waters without treatment.

Project Solution:

Conduct study in conjunction with SMAP to locate priority areas for construction of stormwater treatment facilities for existing untreated discharges.

Cost Estimate Assumptions:

The $200,000 total cost includes funding to prepare grant application(s) to construct stormwater facilities and assumes that these facilities will be partially grant funded. The annual cost to the City will be $100,000 for two years.

Infiltration gallery construction

Facility under construction

Capital Improvement Program Project Summary Sheet

Infiltration Retrofit Program

Location: Citywide

Number: 19-8 **Priority:** Medium

Estimated Cost: $200,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

The City is responsible for maintaining a number of corrugated metal pipe (CMP) or concrete galleries throughout the city. Over time, these galleries fail so that routine maintenance is no longer adequate to restore function. Many of these galleries do not provide water quality treatment, which endangers groundwater, and may be opportunities for improved infiltration to reduce flow to the stormwater conveyance system.

Project Solution:

Construct water quality facilities and infiltration improvement at CMP gallery locations. These facilities will improve groundwater protection and extend the functional life of infiltration facilities by removing sediment that would clog the facility.

Cost Estimate Assumptions:

The annual allotment of $100,000 is based on City expertise. The program is expected to continue for two years, resulting in a total cost of $200,000.

Infiltration gallery construction

Rain garden

Capital Improvement Program Project Summary Sheet

Miscellaneous Storm System Improvements

Location: Citywide

Number: 19-9 **Priority:** Medium

Estimated Cost: $900,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

Development within the City frequently provides time-sensitive opportunities to improve the stormwater management system without identified budgetary sources. Miscellaneous Storm System Improvements include funding for infrastructure investment such as property acquisition for future stormwater management projects or partnering opportunities that arise, often requiring relatively quick funding decisions to leverage the City's limited funds.

Project Solution:

Construct stormwater improvements in conjunction with street, water, and/or wastewater projects.

Cost Estimate Assumptions:

The annual allotment of $150,000 is based on City expertise. The program is expected to continue for six years, resulting in a total cost of $900,000.

Catch basin cleaning

Facility maintenance

Capital Improvement Program Project Summary Sheet

Stormwater Comprehensive Plan Update

Location: Citywide

Number: 19-10 **Priority:** Medium

Estimated Cost: $250,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

The City regularly updates their Stormwater Comprehensive Plan.

Project Solution:

2025 update to the SCP, including CIP and Stormwater Utility Financial Plan.

Cost Estimate Assumptions:

Cost estimate is based on City experience with past comprehensive plan updates.

Stormwater facility tour

Public involvement

Capital Improvement Program Project Summary Sheet

Land Purchase for Future Facility Improvements

Location: Southwest side of Hicks Lake

Number: 19-11 **Priority:** Medium

Estimated Cost: $350,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

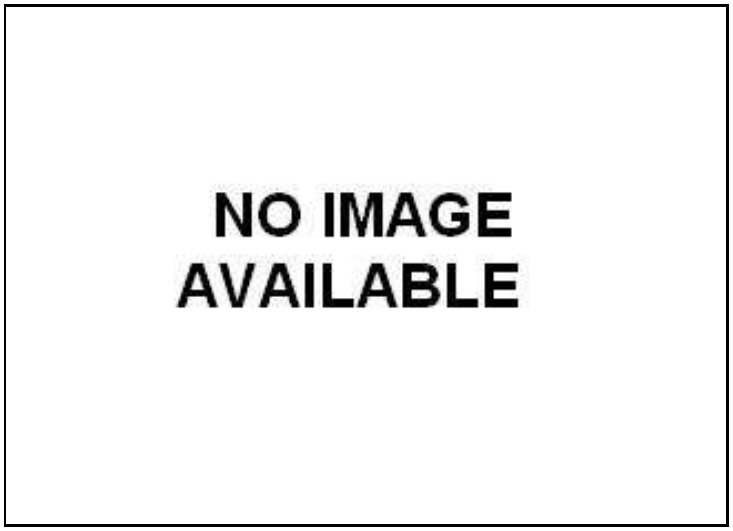
The Ruddell Road Stormwater Treatment facility was constructed in 1999 as a flow-through wetland. Flows to this facility have increased due to drainage system improvements in the Brentwood area to expand the stormwater conveyance system. The facility should be enlarged and improved to meet current standards. Additionally, the facility is difficult to access and the inlet pipe is a safety concern.

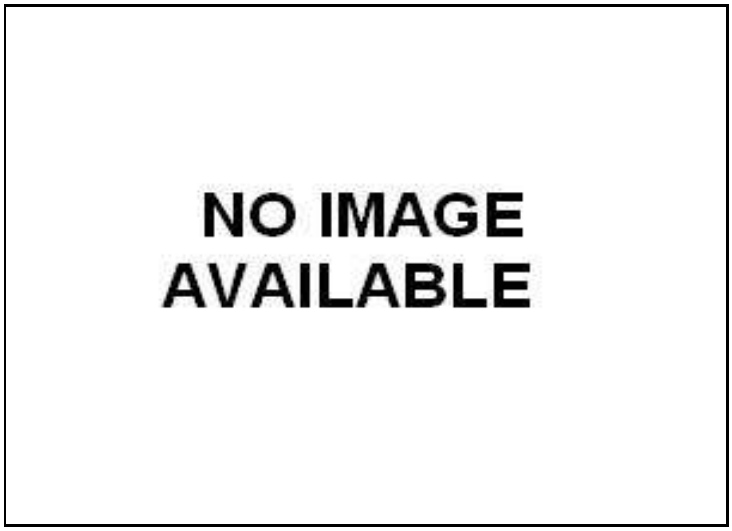
Project Solution:

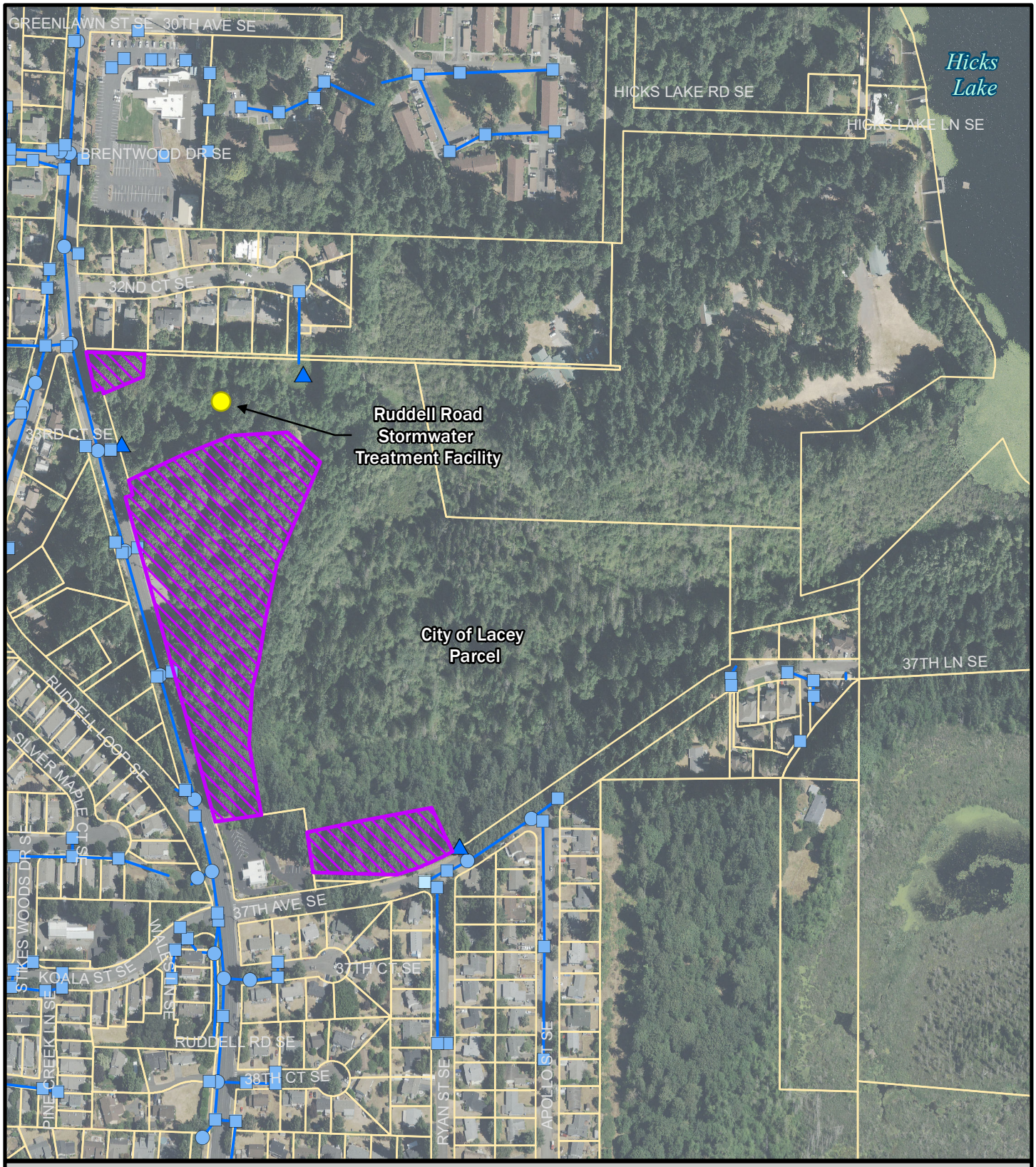
Water Resources and the Stormwater Utility see long-term value in the acquisition of three undeveloped parcels adjacent to City property containing the existing Ruddell Road Stormwater Treatment Facility and wetlands southwest of Hicks Lake. The three parcels are expected to be used to expand or improve the safety and performance of the existing facility, locate a new facility to provide treatment for existing untreated discharge, and provide habitat and wetland buffer preservation.

Cost Estimate Assumptions:

The cost for acquiring these parcels is based on an appraisal in June 2019.







Legend

- Ruddell Road Stormwater Treatment Facility
- Catch Basin
- Outfall
- Junction Box
- Manhole
- Conveyance
- Parcels for Acquisition

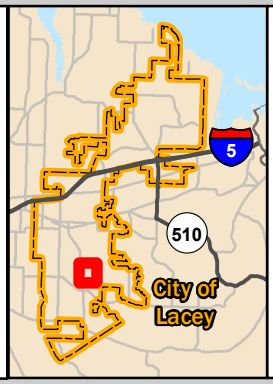


Figure 20.
Land Purchase for Future Facility Improvements.

N

0 175 350 700 Feet

HERRERA

City of Lacey Aerial, 2015

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Capital Improvement Program Project Summary Sheet

Diamond Stormwater Alternative

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

Number: 13-7 **Priority:** Medium

Estimated Cost: $380,000

ENR CCI 11,268.48 (June 2019)

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, 350 gpm submersible pump station, 170LF 4 In Dia force main discharging adjacent to existing outfall pipe. The cost has been increased from the original 2013 estimate.

Stormwater pond

Existing inlet

Legend

Existing

- Catch Basin
- Junction Box
- Manhole
- Conveyance

Proposed

- Structure
- Pipe or Culvert

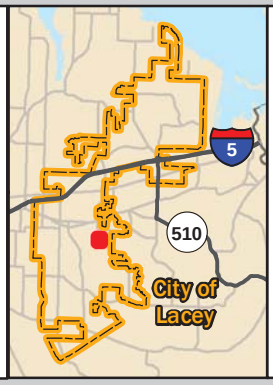

Figure 19. City of Lacey Stormwater CIP 13-7: Diamond Stormwater Alternative.

N

0 62.5 125 250 Feet

HERRERA

City of Lacey Aerial, 2015

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

PROJECT 7 - Diamond Stormwater Alternative

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

Table 1. Conceptual Cost Estimate

Item	Quantity	Unit	Unit Cost	Amount	Notes
Pump Station					
Structure Excavation Class B, Incl. Haul	336	CY	$20	$6,720	WSDOT UBA and City of Lacey recent bids. High end for small qty. Pump station and force main outfall.
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% makup 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	
Predesign			LS	$20,000	Assumes additional alternatives assessment, basic wetland hydroperiod assessment, agency consultation, and brief memo.
OTHER PROJECT COSTS					
Total Predesign (Survey, Geotech, Predesign)				$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**	

Capital Improvement Program Project Summary Sheet

Clearbrook Drainage System Improvements

Location: South of Lacey Blvd between Clearbrook Dr SE and Yonkers Dr SE

Number: 13-9 **Priority:** Medium

Estimated Cost: $480,000

ENR CCI 11,268.48 (June 2019)

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. The cost has been increased from the original 2013 estimate.

Evidence of ponding in low spots

Site of proposed swale

Legend

Existing

- Catch Basin
- Discharge
- Manhole
- Conveyance

Proposed

- Catch Basin
- Structure
- Bioretention
- Infiltration
- Pipe or Culvert
- Ditch
- ped bridge

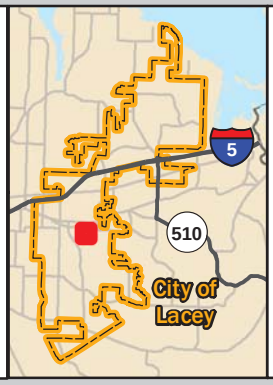

Figure 18. City of Lacey Stormwater CIP 13-9: Clearbrook Drainage System Improvements.

N

0 112.5 225 450 Feet

HERRERA

City of Lacey Aerial, 2015

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Herrera Environmental Consultants, Inc. 10-04793-000

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. Pvmt., 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**	

Capital Improvement Program Project Summary Sheet

Homann Area System Rehabilitation

Location: Homann Dr SE and 17th Ave SE to Glen Mary Drive SE and Homann Park

Number: 13-10 **Priority:** Medium

Estimated Cost: $1,800,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

Infiltration galleries in this area are no longer functioning due to poor soils and are causing localized nuisance flooding. The City has been making minor improvements in this area since 1985, though a long-term solution has not been put into place.

Project Solution:

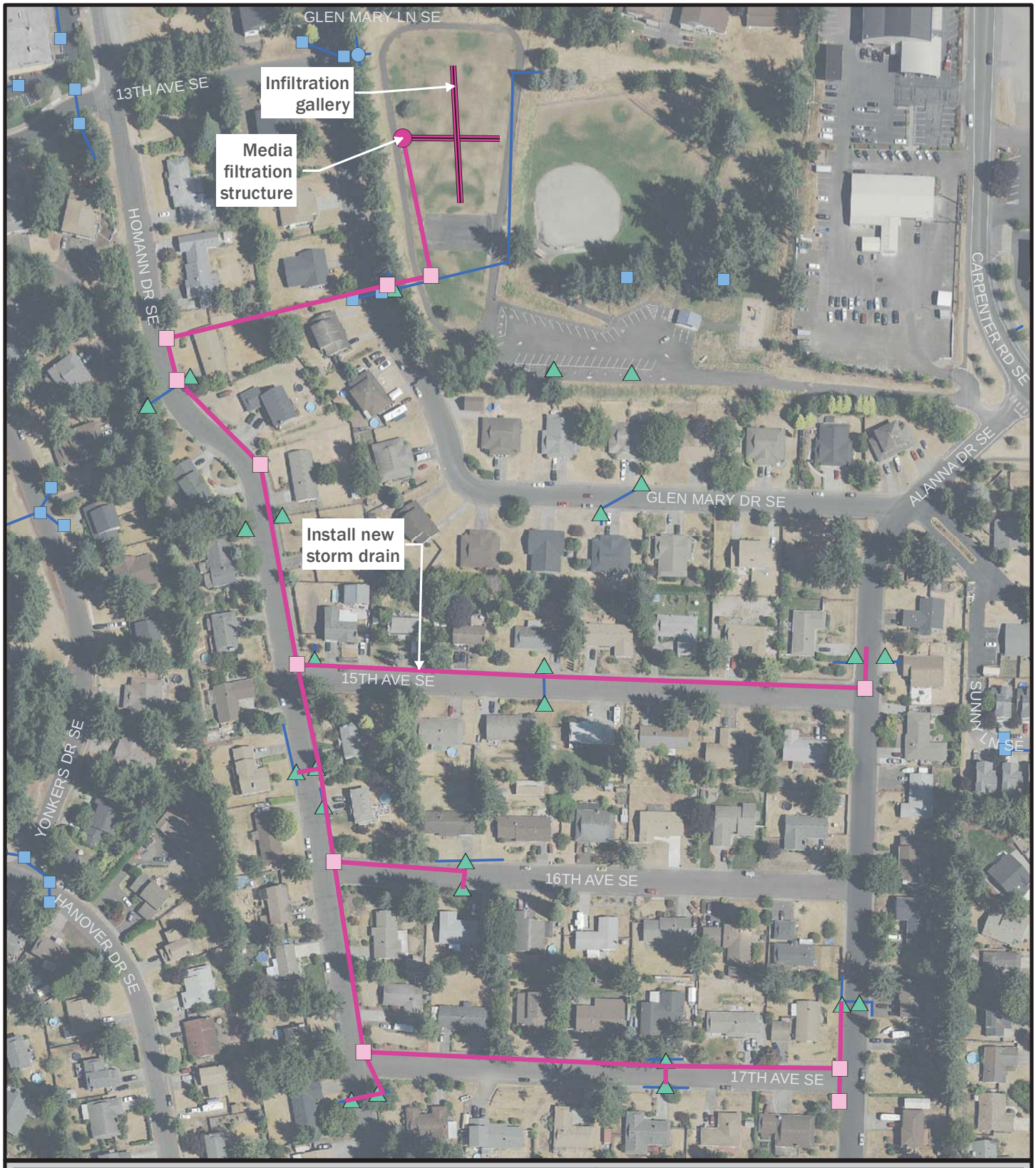
Conduct a cost benefit analysis including a geotechnical evaluation to either (Option 1) add stormwater conveyance and construct a regional infiltration facility located in the baseball field north of the site OR (Option 2) install bioretention facilities in the right of way to enhance local infiltration and take advantage of high infiltrating soils in the area.

Cost Estimate Assumptions:

Option 1: ($1.8M) Install about 4,000 LF of conveyance and new structures, rehabilitate existing drywells, and install an infiltration gallery in the baseball field north of the neighborhood. A media filtration structure is included upstream of the infiltration gallery. Only the design and analysis components of this project are included in the current CIP implementation schedule for $320,000.

Baseball field north of the site (to be used for regional infiltration in Option 1)

ROW in the neighborhood (to be used for bioretention in Option 2)



Legend

Existing	Proposed
Catch Basin	Catch Basin
Discharge	Structure
Manhole	Infiltration
Conveyance	Pipe or Culvert

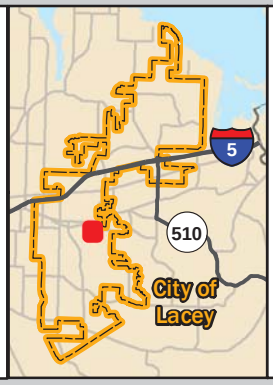


Figure 4. City of Lacey Stormwater CIP 13-10: Homann Area System Rehabilitation (Option 1).

N

0 100 200 400 Feet

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City of Lacey Aerial, 2015

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Legend

Existing	Proposed
Catch Basin	Bioretention
Discharge	Pipe or Culvert
Manhole	
Conveyance	

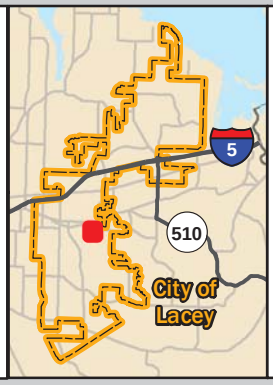

Figure 5. City of Lacey Stormwater CIP 13-10: Homann Area System Rehabilitation (Option 2).

N

0 100 200 400 Feet

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City of Lacey Aerial, 2015

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Engineering Construction Cost Estimate for Conceptual Design - DRAFT

Project Name: **Homann Area System Rehabilitation -- Option 1 (Infiltration Gallery)**
Project Number: **17-06745-000**
Client: **City of Lacey Stormwater Comprehensive Plan Update**

QA Review
Completed/Updated By: Meghan Mullen
Last Updated On: 4/22/2019
Reviewed By: Matt Fontaine
Reviewed On: 6/14/2019
Approved By: Matt Fontaine
Approved On: 6/14/2019

Item No.	Spec Division	Item Description	Qty	Unit	Unit Cost	Total Cost
	Div 1	**General Requirements**				
1		Mobilization	1	L.S.	10%	$ 44,204
2		Erosion/Water Pollution Control	1	L.S.	5%	$ 22,102
3		Temporary Dewatering	1	L.S.	1%	$ 4,420
4		Utility Protection and Relocation	1	L.S.	40%	$ 176,817
5		Project Temporary Traffice Control	1	L.S.	2%	$ 8,841
	Div 2	**Earthwork**				
6		Removing Asphalt Conc. Pvmt., Incl. Haul	1,214	S.Y.	$ 18	$ 21,850
7		Structure Excavation Class B, Incl. Haul	1,747	C.Y.	$ 15	$ 26,201
	Div 4	**Bases**				
8		Bank Run Gravel for Trench Backfill	252	C.Y.	$ 10	$ 2,523
9		Crushed surfacing, base course	374	Ton	$ 50	$ 18,714
	Div 5	**Surface Treatments and Pavements**				
10		HMA for Pavement Repair	396	Ton	$ 150	$ 59,405
	Div 7	**Drainage Structures, Storm Sewers, Sanitary Sewers, Water Mains, and Conduits**				
11		Catch Basin Type 1	7	Each	$ 3,000	$ 21,000
12		Catch Basin Type 2	4	Each	$ 5,000	$ 20,000
13		Connect to Drainage Structure	13	Each	$ 800	$ 10,400
14		Rehab Drywell	9		$ 500	$ 4,500
15		Schedule A SSP, 12 In. Dia.	3,070	L.F.	$ 50	$ 153,500
16		Schedule A SSP, 24 In. Dia.	640	L.F.	$ 80	$ 51,200
17		Media Filtration Structure	1	Each	$ 26,000	$ 26,000
18		Infiltration Gallery, 60 in. dia.	250	L.F.	$ 80	$ 20,000
	Div 8	**Miscellaneous Construction**				
19		Topsoil Type A	0.1	Acre	$ 41,000	$ 5,647
20		Seeding, Fertilizing, and Mulching	0.1	Acre	$ 8,000	$ 1,102
		Construction Subtotal				**$ 698,426**
		Contingency	30%			**$ 209,528**
		Lacey Cost Adjustment Factor	10%			**$ 69,842.63**
		Subtotal (with Contingency and Lacey Cost Adj. Factor)				**$ 977,797**
		Tax	9.3%			**$ 90,935**
		Construction Total (with Contingency and Tax)				**$ 1,068,732**
		Survey		L.S.		**$ 40,000**
		Geotechnical / Infiltration Evaluation		L.S.		**$ 40,000**
		Predesign		L.S.		**$ 30,000**
		Design	20%			**$ 214,000**
		Permitting		L.S.		**$ 5,000**
		Construction Management	15%			**$ 160,310**
		City of Lacey Project Management	20%			**$ 213,746**
		Estimated Project Total (rounded to 2 significant figures)				**$ 1,800,000**

Engineering Construction Cost Estimate for Conceptual Design - DRAFT

Project Name: **Homann Area System Rehabilitation -- Option 2 (Bioretention facilities)**
Project Number: **17-06745-000**
Client: **City of Lacey Stormwater Comprehensive Plan Update**

QA Review
Completed/Updated By: Meghan Mullen
Last Updated On: 4/23/2019
Reviewed By: Matt Fontaine
Reviewed On: 6/14/2019
Approved By: Matt Fontaine
Approved On: 6/14/2019

Item No.	Spec Division	Item Description	Qty	Unit	Unit Cost	Total Cost
	Div 1	**General Requirements**				
1		Mobilization	1	L.S.	10%	$ 20,102
2		Erosion/Water Pollution Control	1	L.S.	10%	$ 20,102
3		Temporary Dewatering	1	L.S.	0.5%	$ 1,005
4		Utility Protection and Relocation	1	L.S.	20%	$ 40,204
5		Project Temporary Traffice Control	1	L.S.	5%	$ 10,051
	Div 2	**Earthwork**				
6		Removing Asphalt Conc. Pvmt., Incl. Haul	440	S.Y.	$ 18	$ 7,920
7		Structure Excavation Class B, Incl. Haul	760	C.Y.	$ 15	$ 11,400
	Div 7	**Drainage Structures, Storm Sewers, Sanitary Sewers, Water Mains, and Conduits**				
8		Connect to Drainage Structure	10	Each	$ 800	$ 8,000
	Div 8	**Miscellaneous Construction**				
9		Bioretention Soil	420	C.Y.	$ 150	$ 63,000
10		Planting	4,000	S.F.	$ 10	$ 40,000
11		Mulch	70	C.Y.	$ 10	$ 700
12		Miscelaneous Restoration	1	L.S.	$ 70,000	$ 70,000
		Construction Subtotal				**$ 292,484**
		Contingency	30%			**$ 87,745.23**
		Lacey Cost Adjustment Factor	10%			**$ 29,248.41**
		Subtotal (with Contingency and Lacey Cost Adj. Factor)				**$ 409,478**
		Tax	9.3%			**$ 38,081**
		Construction Total (with Contingency and Tax)				**$ 447,559**
		Survey		L.S.		**$ 20,000**
		Geotechnical / Infiltration Evaluation		L.S.		**$ 40,000**
		Predesign		L.S.		**$ 30,000**
		Design	20%			**$ 90,000**
		Permitting		L.S.		**$ 5,000**
		Construction Management	15%			**$ 67,134**
		City of Lacey Project Management	20%			**$ 89,512**
		Estimated Project Total (rounded to 2 significant figures)				**$ 790,000**

Capital Improvement Program Project Summary Sheet

1010 Midway Storm Improvements

Location: Midway Dr NE and 15th Ave NE

Number: 13-11 **Priority:** Medium

Estimated Cost: $50,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

A clogged storm drain pipe and blind connection into the County storm drain is causing flooding. The County is responsible for maintenance, though flow comes from Olympia as well. Upstream, the system lacks capacity and is frequently clogged. 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. Access to the outfall from the pond is difficult due to a narrow easement.

Project Solution:

Replace a portion of the existing storm drain pipe and install new catch basins at both ends. Consider issues with high flow / inadequate conveyance capacity in the ditch and culvert system, in addition to the problem created by the blind tee.

Cost Estimate Assumptions:

100 LF of 12 In Dia SD, 1 CB Type 1, 1 CB Type 2. The cost has been increased from the original 2013 estimate.

Existing location of Tee beneath pavement

Looking west along 15th Ave. NE

Legend

Existing

- Catch Basin
- Conveyance

Proposed

- Type 1 CB
- Type 2 CB
- Pipe or Culvert

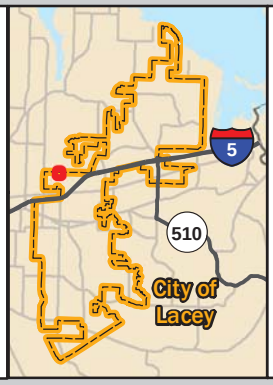

Figure 11. City of Lacey Stormwater CIP 13-11: 1010 Midway Storm Improvements.

N

0 40 80 160 Feet

HERRERA

City of Lacey Aerial, 2015

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Herrera Environmental Consultants, Inc. 10-04793-000

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
Revesed 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**	

Capital Improvement Program Project Summary Sheet

Belair-Impala Stormwater Installation

Location: Impala Dr SE, 32nd Ave SE (west of Stikes Dr.)

Number: 13-12 **Priority:** Medium

Estimated Cost: $1,100,000

ENR CCI 11,268.48 (June 2019)

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 on Stikes Dr. and the eastern portion of 32nd Ave is being completed as part of another project.

Project Solution:

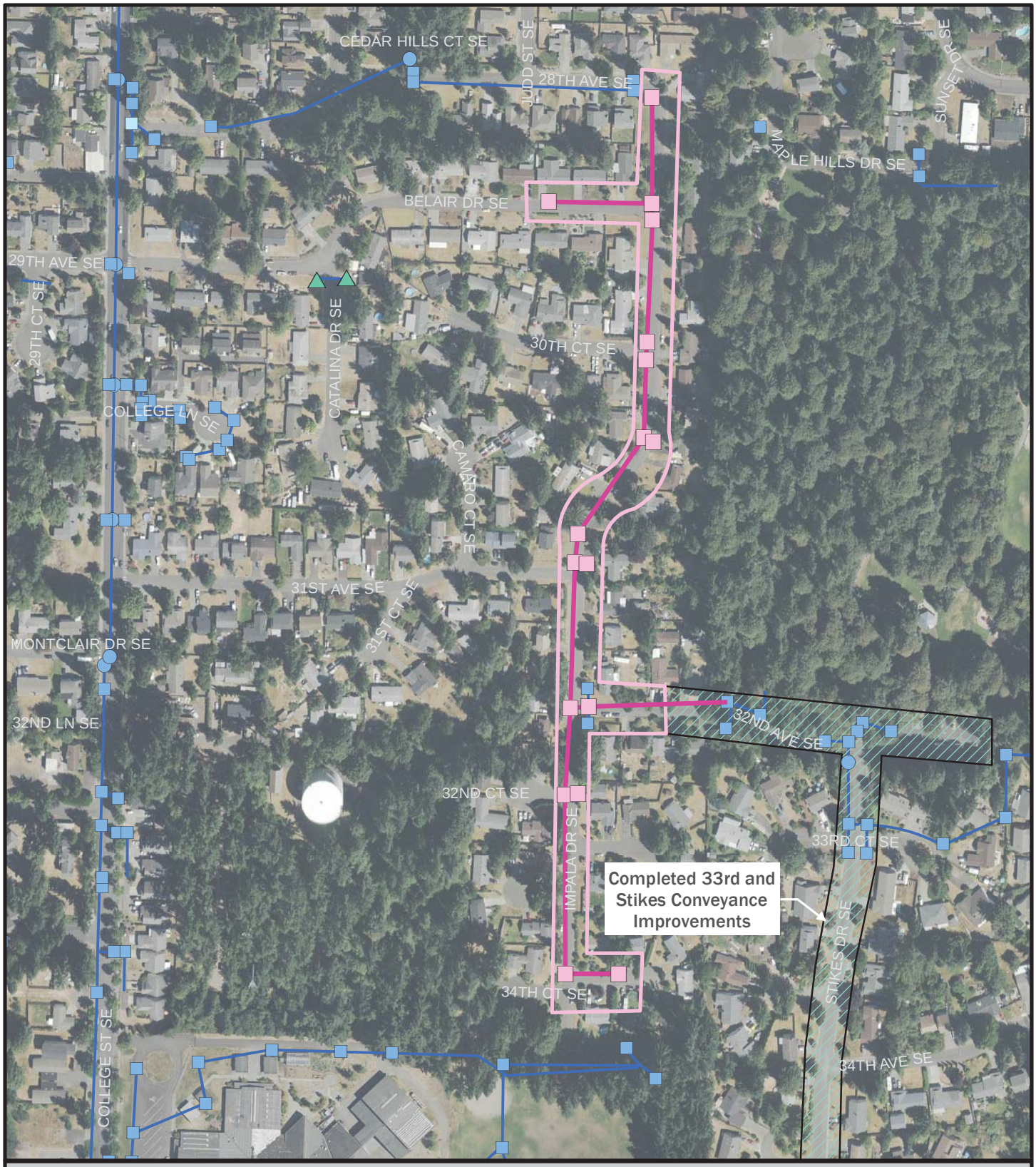
Install storm drain along Impala Dr SE and 32nd Ave SE to convey stormwater to the new drainage system installed as part of the 33rd Ave and Stikes Dr. project.

Cost Estimate Assumptions:

2,780 LF of 12 In Dia SD, 17 CB Type 1, 1 connection to existing drainage structures at the 33rd Ave and Stikes Dr. project boundary.

Completed Brentwood project nearby

Road without drainage system



Legend

Existing	Proposed
Catch Basin	Catch Basin
Discharge	Pipe or Culvert
Junction Box	Project Extent
Manhole	
Conveyance	
Completed CIP	

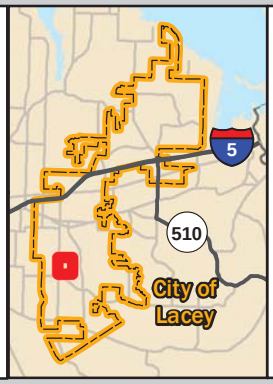


Figure 3. City of Lacey Stormwater CIP 13-12: Belair-Impala Stormwater Installation.

N

0 150 300 600 Feet

HERRERA

City of Lacey Aerial, 2015

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Engineering Construction Cost Estimate for Conceptual Design - DRAFT

Project Name: **Belair-Impala Stormwater Installation**
Project Number: **17-06745-000**
Client: **City of Lacey Stormwater Comprehensive Plan Update**

QA Review

Completed/Updated By: Meghan Mullen
Last Updated On: 4/15/2019
Reviewed By: Matt Fontaine
Reviewed On: 6/14/2019
Approved By: Matt Fontaine
Approved On: 6/14/2019

Item No.	Spec Division	Item Description	Qty	Unit	Unit Cost	Total Cost
	Div 1	**General Requirements**				
1		Mobilization	1	L.S.	10%	$ 33,386
2		Erosion/Water Pollution Control	1	L.S.	5%	$ 16,693
3		Temporary Dewatering	1	L.S.	2%	$ 6,677
4		Utility Protection and Relocation	1	L.S.	30%	$ 100,157
5		Project Temporary Traffice Control	1	L.S.	2%	$ 6,677
	Div 2	**Earthwork**				
7		Structure Excavation Class B, Incl. Haul	1,283	C.Y.	$ 20	$ 25,669
	Div 4	**Bases**				
8		Bank Run Gravel for Trench Backfill	178	C.Y.	$ 10	$ 1,776
9		Crushed surfacing, base course	266	Ton	$ 50	$ 13,319
	Div 5	**Surface Treatments and Pavements**				
10		HMA for Pavement Repair	348	Ton	$ 300	$ 104,291
	Div 7	**Drainage Structures, Storm Sewers, Sanitary Sewers, Water Mains, and Conduits**				
11		Catch Basin Type 1	17	Each	$ 3,000	$ 51,000
12		Connect to Drainage Structure	1	Each	$ 800	$ 800
13		Schedule A SSP, 12 In. Dia.	2,740	L.F.	$ 50	$ 137,000
		Construction Subtotal				**$ 497,445**
		Contingency	30%			**$ 149,233.41**
		Lacey Cost Adjustment Factor	10%			**$ 49,744.47**
		Subtotal (with Contingency and Lacey Cost Adj. Factor)				**$ 696,423**
		Tax	9.3%			**$ 64,767**
		Construction Total (with Contingency and Tax)				**$ 761,190**
		Survey		L.S.		**$ 20,000**
		Geotechnical / Infiltration Evaluation		L.S.		**$ 20,000**
		Predesign		L.S.		**$ 20,000**
		Design	20%			**$ 152,000**
		Permitting		L.S.		**$ 5,000**
		Construction Management	15%			**$ 114,178.48**
		City of Lacey Project Management	20%			**$ 152,237.98**
		Estimated Project Total (rounded to 2 significant figures)				**$ 1,200,000**

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Capital Improvement Program Project Summary Sheet

Alder and Gemini Drainage System Improvements

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

Number: 13-14 **Priority:** Medium

Estimated Cost: $520,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

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

Project Solution:

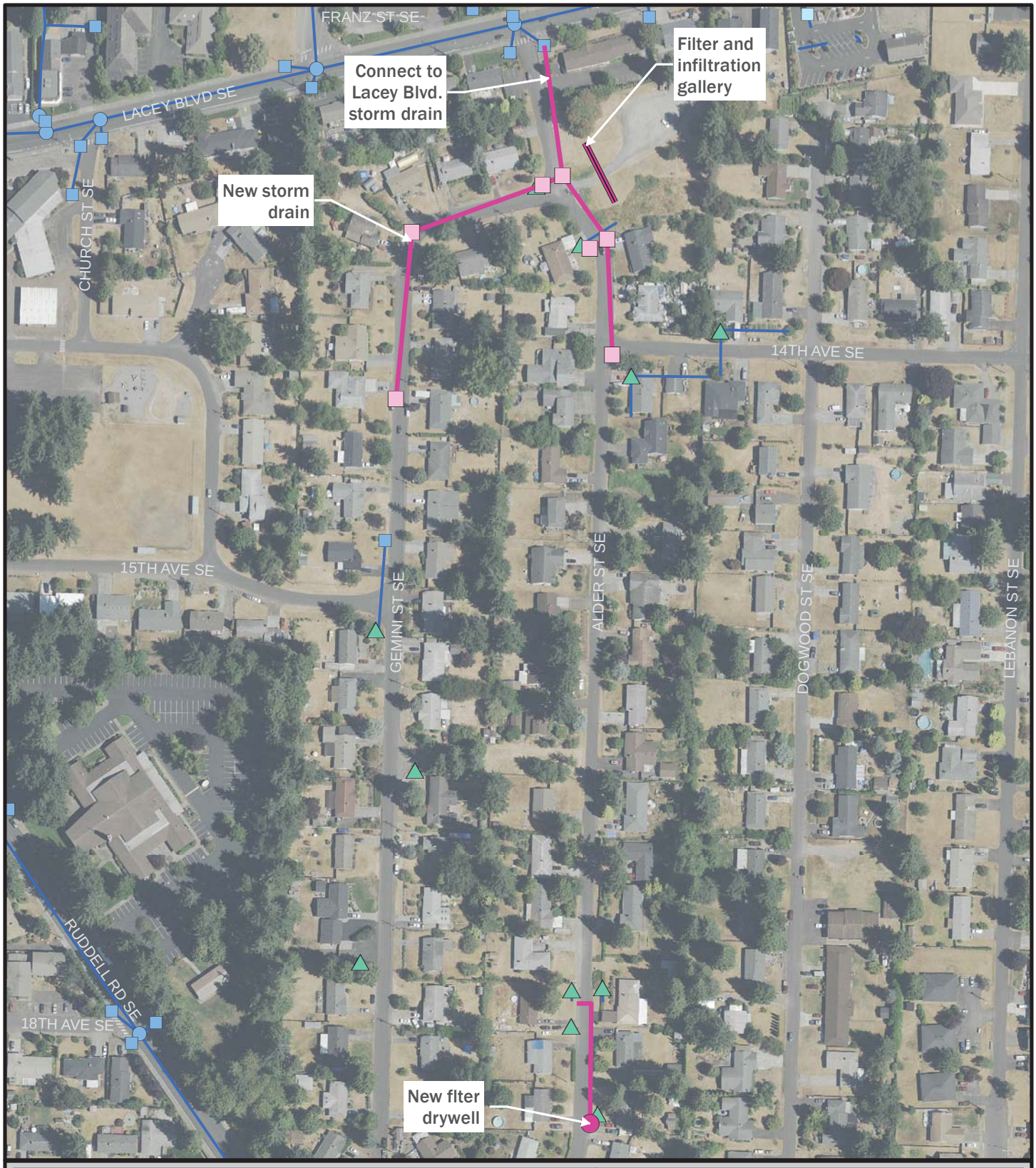
Rehab existing drywells, install new storm drain to convey stormwater to new infiltration galleries in community open space, and an overflow from the infiltration facility to the storm drain in Lacey Blvd. More thorough geotechnical analysis will be needed before infiltration facilities can be designed. As an alternative to infiltration, consider piping flow to the Woodland Creek Facility (via Lacey Boulevard).

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. The cost has been increased from the original 2013 estimate.

Neighborhood lacks stormwater drainage

Neighborhood lacks stormwater drainage



Legend

Existing	Proposed
Catch Basin	Catch Basin
Discharge	Structure
Junction Box	Infiltration
Manhole	Pipe or Culvert
Conveyance	

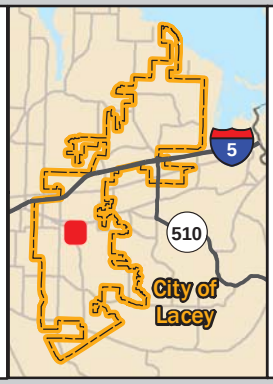


Figure 13. City of Lacey Stormwater CIP 13-14: Alder and Gemini Drainage System Improvements.

N

0 112.5 225 450 Feet

HERRERA

City of Lacey Aerial, 2015

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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
Revesed 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 vactor 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.
Predesign			LS	$10,000	Evaluate alignment, drywell rehab alternatives, and potential for infiltration in open space. Brief memo.
OTHER PROJECT COSTS					
Total Predesign (Survey, Geotech, Predesign)			LS	$22,000	
Design			LS	$45,000	Assumes general sheet, 3 plans w/ profile, 1 detail sheet. No utility relocates 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**	

Capital Improvement Program Project Summary Sheet

White Fir Stormwater Installation

Location: White Fir Drive NE

Number: 13-15 **Priority:** Low

Estimated Cost: $420,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

Lack of drainage infrastructure in this area is causing nuisance flooding. There is a poorly functioning dry well at the downstream end of the pipe network that should be evaluated.

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. Evaluate adequacy of proposed solution, particularly the adequacy of existing infiltration pond to manage the runoff.

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.

Site of future shoulder improvements, looking west.

Site of future shoulder improvements, looking east.

Legend

Existing

- Catch Basin
- Discharge
- Junction Box
- Conveyance

Proposed

- Infiltration

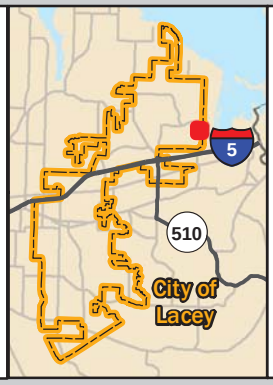

Figure 9. City of Lacey Stormwater CIP 13-15: White Fir Stormwater Installation.

N

0 75 150 300 Feet

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City of Lacey Aerial, 2015

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Engineering Construction Cost Estimate for Conceptual Design - DRAFT

Project Name: **White Fir Stormwater Installation**
Project Number: **17-06745-000**
Client: **City of Lacey Stormwater Comprehensive Plan Update**

QA Review

Completed/Updated By: Meghan Mullen
Last Updated On: 3/21/2019
Reviewed By: Matt Fontaine
Reviewed On: 6/11/2019
Approved By: Matt Fontaine
Approved On: 6/11/2019

Item No.	Spec Division	Item Description	Qty	Unit	Unit Cost	Total Cost
	Div 1	**General Requirements**				
1		Mobilization	1	L.S.	10%	$ 11,684.8
2		Erosion/Water Pollution Control	1	L.S.	5%	$ 5,842.4
3		Temporary Dewatering	1	L.S.	0%	$ -
4		Utility Protection and Relocation	1	L.S.	10%	$ 11,684.8
5		Project Temporary Traffice Control	1	L.S.	2%	$ 2,337.0
	Div 2	**Earthwork**				
7		Structure Excavation Class B, Incl. Haul	311	C.Y.	$ 20	$ 6,222.2
	Div 4	**Bases**				
8		Permeable Ballast	372	S.Y.	$ 60	$ 22,334.8
9		Crushed Surfacing, Base Course	27	C.Y.	$ 100	$ 2,740.7
	Div 5	**Surface Treatments and Pavements**				
10		HMA for Pavement Repair	15	Ton	$ 300	$ 4,350.0
	Div 7	**Drainage Structures, Storm Sewers, Sanitary Sewers, Water Mains, and Conduits**				
11		Underdrain Pipe, 8 In. Dia.	1,400	L.F.	$ 20	$ 28,000.0
12		Connect to Existing Structure	4	Each	$ 800	$ 3,200.0
13		Infiltration System Improvements	1	L.S.	$ 50,000	$ 50,000.0
		Construction Subtotal				**$ 148,397**
		Contingency	50%			**$ 74,198.33**
		Lacey Cost Adjustment Factor	10%			**$ 14,839.67**
		Subtotal (with Contingency and Lacey Cost Adj. Factor)				**$ 237,435**
		Tax	9.3%			**$ 22,081**
		Construction Total (with Contingency and Tax)				**$ 259,516**
		Survey		L.S.		**$ 10,000**
		Geotechnical / Infiltration Evaluation		L.S.		**$ 30,000**
		Predesign		L.S.		**$ -**
		Design	10%			**$ 26,000**
		Permitting		L.S.		**$ 5,000**
		Construction Management	15%			**$ 38,927.41**
		City of Lacey Project Management	20%			**$ 51,903.22**
		Estimated Project Total (rounded to 2 significant figures)				**$ 420,000**

Capital Improvement Program Project Summary Sheet

5th Ct SE and 5th Way Easement Storm Improvements

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

Number: 13-16 **Priority:** Low

Estimated Cost: $760,000

ENR CCI 11,268.48 (June 2019)

Problem Description:

Pipes/ structures in backyard are creating a maintenance problem because access is limited.

Project Solution:

Relocate conveyance to the street during the next overlay. Fill and abandon the existing pipe located in the narrow easement behind the houses.

Cost Estimate Assumptions:

About 1,200 LF 24" Dia. Pipe, 5 new catch basins, and 2 connections to existing drainage.

Existing structure access

Existing narrow easement behind houses

Legend

Existing	Proposed
Catch Basin	Catch Basin
Discharge	Demolish
Manhole	Pipe or Culvert
Conveyance	

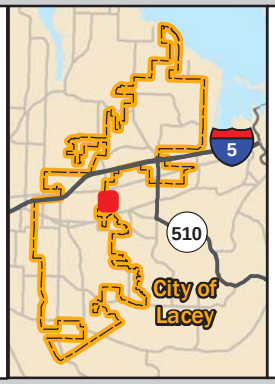

Figure 12. City of Lacey Stormwater CIP 13-16: 5th Ct SE and 5th Way Easement Storm Improvements.

N

0 100 200 400 Feet

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City of Lacey Aerial, 2015

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Engineering Construction Cost Estimate for Conceptual Design - DRAFT

Project Name: **5th Ct SE and 5th Way Easement Storm Improvements**
Project Number: **17-06745-000**
Client: **City of Lacey Stormwater Comprehensive Plan Update**

QA Review

Completed/Updated By: Meghan Mullen
Last Updated On: 4/15/2019
Reviewed By: Matt Fontaine
Reviewed On: 6/11/2019
Approved By: Matt Fontaine
Approved On: 6/11/2019

Item No.	Spec Division	Item Description	Qty	Unit	Unit Cost	Total Cost
	Div 1	**General Requirements**				
1		Mobilization	1	L.S.	10%	$ 24,830
2		Erosion/Water Pollution Control	1	L.S.	5%	$ 12,415
3		Temporary Dewatering	1	L.S.	2%	$ 4,966
4		Utility Protection and Relocation	1	L.S.	10%	$ 24,830
5		Project Temporary Traffice Control	1	L.S.	2%	$ 4,966
	Div 2	**Earthwork**				
7		Structure Excavation Class B, Incl. Haul	1,312	C.Y.	$ 20	$ 26,237
8		Controlled Density Fill	105	C.Y.	$ 210	$ 21,991
	Div 4	**Bases**				
9		Bank Run Gravel for Trench Backfill	500	C.Y.	$ 15	$ 7,500
10		Crushed surfacing, top course	150	Ton	$ 75	$ 11,250
	Div 5	**Surface Treatments and Pavements**				
11		HMA for Pavement Repair	196	Ton	$ 300	$ 58,725
	Div 7	**Drainage Structures, Storm Sewers, Sanitary Sewers, Water Mains, and Conduits**				
12		Catch Basin Type 2	5	Each	$ 5,000	$ 25,000
13		Connect to Drainage Structure	2	Each	$ 800	$ 1,600
14		Schedule A SSP, 24 In. Dia.	1,200	L.F.	$ 80	$ 96,000
		Construction Subtotal				**$ 320,311**
		Contingency	30%			**$ 96,093.33**
		Lacey Cost Adjustment Factor	10%			**$ 32,031.11**
		Subtotal (with Contingency and Lacey Cost Adj. Factor)				**$ 448,436**
		Tax	9.3%			**$ 41,705**
		Construction Total (with Contingency and Tax)				**$ 490,140**
		Survey		L.S.		**$ 10,000**
		Geotechnical Evaluation		L.S.		**$ -**
		Predesign		L.S.		**$ 10,000**
		Design	15%			**$ 74,000**
		Permitting		L.S.		**$ 5,000**
		Construction Management	15%			**$ 73,521.01**
		City of Lacey Project Management	20%			**$ 98,028.01**
		Estimated Project Total (rounded to 2 significant figures)				**$ 760,000**

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Capital Improvement Program Project Summary Sheet

Shady Lane Treatment Facility Improvements

Location: Shady Lane Road SE and Sierra Drive SE

Number: 13-17 **Priority:** Medium

Estimated Cost: $160,000

ENR CCI 11,268.48 (June 2019)

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.

Project Solution:

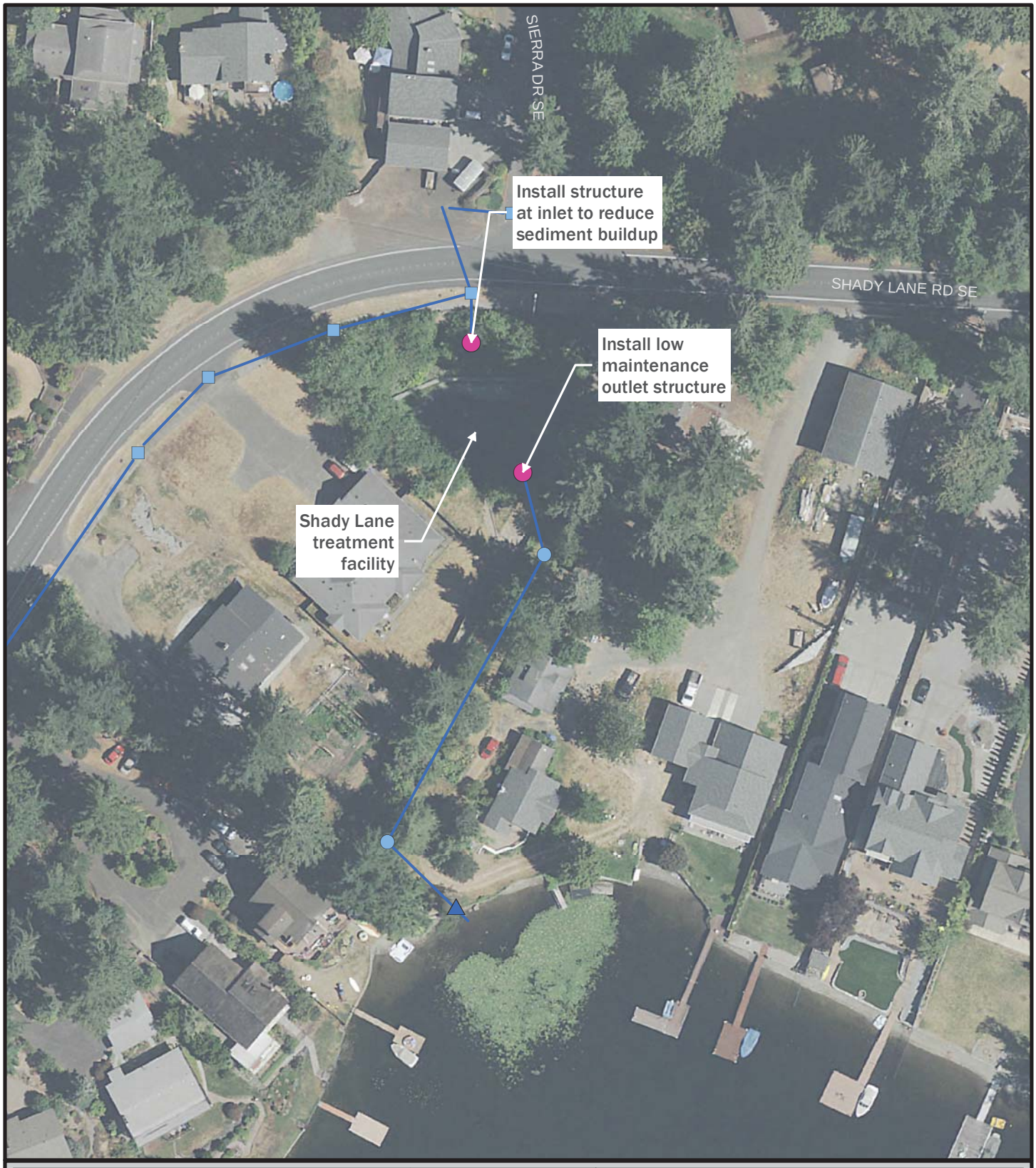
Remove sediment and vegetation. Revegetate in accordance with the Lacey Stormwater Design Manual. Install maintenance access, install structure at inlet to reduce sediment buildup, install low maintenance outlet structure. Because the spillway is functioning, consider abandoning the pipe to the outfall. Consider modifying the spillway to make maintenance easier.

Cost Estimate Assumptions:

Remove 2' of accumulated sediment from the wet pond, replant 0.2 acres, replace outfall, install hydrodynamic separator upstream. The cost has been increased from the original 2013 estimate. Permitting has not yet been accounted for in the cost estimate.

Facility spillway

Existing above-ground overflow from facility.



Legend

Existing

- Catch Basin
- Outfall
- Manhole
- Conveyance

Proposed

- Structure

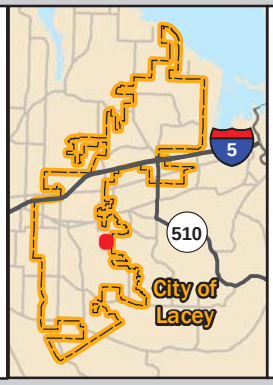


Figure 10. City of Lacey Stormwater CIP 13-17: Shady Lane Treatment Facility Improvements.

N

0 40 80 160 Feet

HERRERA

City of Lacey Aerial, 2015

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Herrera Environmental Consultants, Inc. 10-04793-000

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**	

APPENDIX E

Gap Analysis and Needs Assessment

Table E-1. Recommended Activities for Flood Reduction.		Funding							Staff (FTE)							
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
		2020	2021	2022	2023	2024	2025	2026	2020	2021	2022	2023	2024	2025	2026
Minimum		**Minimum**							**Minimum**							
CIP projects (TBD)	Stormwater projects identified through the CIP prioritization process and staff time ($) included in CIP cost estimates for City project management.															
Minimum Tier Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**								
Recommended		**Recommended**							**Recommended**							
All activities from Minimum (NPDES Compliant) tier	Same assumptions as Minimum tier (NPDES Compliant).	$ -	$ -	$ -	$ -	$ -	$ -	$ -								
Recommended Tier Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**								
Enhanced		**Enhanced**							**Enhanced**							
All activities from Recommended tier	Same assumptions as Recommended tier.	$ -	$ -	$ -	$ -	$ -	$ -	$ -								
Enhanced Tier Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**								

Table E-2. Recommended Activities for Surface Water Quality Improvement (retrofitting).		Funding							Staff (FTE)						
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
		2020	2021	2022	2023	2024	2025	2026	2020	2021	2022	2023	2024	2025	2026
Minimum		**Minimum**							**Minimum**						
Regional Water Quality Facility Program	Conduct study in conjunction with SMAP to locate, design and construct stormwater treatment facilities for existing untreated discharges, potentially supplementing with grant funding. Assumes $100,000 included in the CIP plan to develop the program. 0.1 FTE (one-time cost) to develop the program and 0.1 FTE ongoign cost to apply for grant funding and administer the program.										0.10	0.10	0.10	0.10	0.10
Minimum Tier Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**			**0.10**	**0.10**	**0.10**	**0.10**	**0.10**
Recommended		**Recommended**							**Recommended**						
All activities from Minimum (NPDES Compliant) tier	Same assumptions as Minimum tier (NPDES Compliant).	$ -	$ -	$ -	$ -	$ -	$ -	$ -			0.10	0.10	0.10	0.10	0.10
Recommended Tier Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**			**0.10**	**0.10**	**0.10**	**0.10**	**0.10**
Enhanced		**Enhanced**							**Enhanced**						
All activities from Recommended tier	Same assumptions as Recommended tier.	$ -	$ -	$ -	$ -	$ -	$ -	$ -			0.10	0.10	0.10	0.10	0.10
Enhanced Tier Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**			**0.10**	**0.10**	**0.10**	**0.10**	**0.10**

Table E-3. Recommended Activities for Groundwater Quality Protection.		Funding							Staff (FTE)							
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
		2020	2021	2022	2023	2024	2025	2026	2020	2021	2022	2023	2024	2025	2026
Minimum		**Minimum**							**Minimum**							
Develop stormwater infiltration policies and regulations to protect groundwater, particularly for deep UIC wells.	Groundwater protection policies and regulations to be developed as part of 2019 SCP update and 2021 SDM update. Staff time to implement the policies is included in Table 8.															
Minimum Tier Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**								
Recommended		**Recommended**							**Recommended**							
All activities from Minimum (NPDES Compliant) tier	Same assumptions as Minimum tier (NPDES Compliant).	$ -	$ -	$ -	$ -	$ -	$ -	$ -								
Water Quality and Infiltration Retrofit Program	Retrofit for WQ improvement and infiltration improvement at existing infiltration trench/gallery locations (add treatment BMPs). Annual project costs are included in the CIP plan. Two weeks per year of staff time to implement the program.									0.05	0.05	0.05	0.05	0.05	0.05
Enhanced regional monitoring	Enhance the regional program to monitor groundwater and review results for trends in pollutants (particularly pathogens and nitrates; site-specific nitrate loading). Hire 1 FTE to do additional monitoring, monitor program design, collect and manage field data, and track non-point-source-related environmental data. Note that this full FTE will be half funded by the water utility and half funded by the surface water utility, so only 0.5 FTE is recorded here.									0.50	0.50	0.50	0.50	0.50	0.50
UIC monitoring	Develop and implement a program to monitor groundwater in areas where deep UICs are proposed or existing. Assume 2 days per month of staff time to collect data and analyze results. Assume laboratory costs of $40 k per year ($100 for parameters or interest, 4 samples per year, and 10 sites).		$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000		0.11	0.11	0.11	0.11	0.11	0.11
Recommended Tier Total		**$ -**	**$ 40,000**	**$ 40,000**	**$ 40,000**	**$ 40,000**	**$ 40,000**	**$ 40,000**		**0.65**	**0.65**	**0.65**	**0.65**	**0.65**	**0.65**
Enhanced		**Enhanced**							**Enhanced**							
All activities from Recommended tier	Same assumptions as Recommended tier.	$ -	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000		0.65	0.65	0.65	0.65	0.65	0.65
Enhanced Tier Total		**$ -**	**$ 40,000**	**$ 40,000**	**$ 40,000**	**$ 40,000**	**$ 40,000**	**$ 40,000**		**0.65**	**0.65**	**0.65**	**0.65**	**0.65**	**0.65**

Table E-4. Recommended Activities for Habitat Improvement.		Funding							Staff (FTE)							
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
		2020	2021	2022	2023	2024	2025	2026	2020	2021	2022	2023	2024	2025	2026
Minimum		**Minimum**							**Minimum**							
CIP project(s)	Projects identified through the CIP project prioritization process.															
Minimum Tier Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**								
Recommended		**Recommended**							**Recommended**							
All activities from Minimum (NPDES Compliant) tier	Same assumptions as Minimum tier (NPDES Compliant).	$ -	$ -	$ -	$ -	$ -	$ -	$ -								
Stream team	Expansion of the habitat improvement program will be accomplished through public education activities listed in Table 5.															
Recommended Tier Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**								
Enhanced		**Enhanced**							**Enhanced**							
All activities from Recommended tier	Same assumptions as Recommended tier.															
Enhanced Tier Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**								

Table E-5. Recommended Activities for Public Participation (education, outreach, and involvement).		Funding							Staff (FTE)						
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
		2020	2021	2022	2023	2024	2025	2026	2020	2021	2022	2023	2024	2025	2026
Minimum		**Minimum**							**Minimum**						
Evaluate behavior change	Conduct new evaluation of a behavior change program. Use existing staff resporces to perform this work. (Due July 2020)														
Conduct CBSM	Conduct CBSM (community-based social marketing) to meet future permit requirements. Assumes 100 consultant hours at $100 per hour and 30 percent staff hours for project management. (Due February 2021)		$ 10,000							0.02					
SWMP reporting	Define public involvement opportunities for the annual SWMP update and reporting process. Assume 16 hours of staff time every year.									0.01	0.01	0.01	0.01	0.01	0.01
Post SWMP publicly	Make the SWMP document and Annual Compliance Report available to the public by posting on the City of Lacey website. Assume 4 hours of staff time each year.									0.00	0.00	0.00	0.00	0.00	0.00
Minimum Tier Total		**$ -**	**$ 10,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**		**0.03**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
Recommended		**Recommended**							**Recommended**						
All activities from Minimum (NPDES Compliant) tier	Same assumptions as Minimum tier (NPDES Compliant).	$ -	$ 10,000	$ -	$ -	$ -	$ -	$ -		0.03	0.01	0.01	0.01	0.01	0.01
Recommended Tier Total		**$ -**	**$ 10,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**		**0.03**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**

Table E-5. Recommended Activities for Public Participation (education, outreach, and involvement).		Funding							Staff (FTE)						
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
		2020	2021	2022	2023	2024	2025	2026	2020	2021	2022	2023	2024	2025	2026
Enhanced		**Enhanced**							**Enhanced**						
All activities from Recommended tier	Same assumptions as Recommended tier.	$ -	$ 10,000	$ -	$ -	$ -	$ -	$ -		0.03	0.01	0.01	0.01	0.01	0.01
Stream Restoration Organizing	Support stream restoration community organizing. o Increase awareness of Stream Team events, including advertisement in the parks catalogue o Increase contribution to REEP and Stream Team articles o Conduct additional 5th grade stormwater lessons to Lacey students and expand program to include multiple grade levels o Conduct additional Eye on Nature Field Trips with Lacey students at the Nisqually Wildlife Refuge o Conduct and offer additional riparian buffer restoration projects for City of Lacey residents o Expand Water Resources' ability to offer WIN Group project offerings at Woodland Creek Community Park								0.50	0.50	0.50	0.50	0.50	0.50	0.50
Update SOPs	Review and develop additional public education and outreach materials and Standard Operating Procedures (SOPs) for minimizing pollutant releases from permitted non-stormwater discharges.								0.25	0.25	0.25	0.25	0.25	0.25	0.25
Education support work	Hire staff to support office work related to public education reporting and effectiveness analysis (in addition to the permit-compliant tasks described in the Minimum tier) o Update the website more regularly o Conduct staff training and public education and outreach on implementation of the 2016 Stormwater Design Manual. o Determine a means of measuring impact of in-person programs o Implement new or modify existing education and outreach activities, continue to track activities and monitor success.								0.25	0.25	0.25	0.25	0.25	0.25	0.25
Enhanced Tier Total		**$ -**	**$ 10,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**1.00**	**1.03**	**1.01**	**1.01**	**1.01**	**1.01**	**1.01**

Table E-6. Recommended Activities for Pollution Source Control.		Funding							Staff (FTE)						
Recommendation	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
		2020	2021	2022	2023	2024	2025	2026	2020	2021	2022	2023	2024	2025	2026
Minimum (NPDES Compliant)		**Minimum (NPDES Compliant)**							**Minimum (NPDES Compliant)**						
Map outfall attributes	Map size and material for all known MS4 outfalls. City staff time estimated at 0.25 FTE. (Due January 2020; assumes work performed in 2019)														
Map private connections	Complete mapping of all known connections from the MS4 to a privately-owned stormwater system. City staff time estimated at 0.25 FTE. (Due August 2023)									0.25					
Auto accidents tracking	Integrate auto accidents into the Spill Response Plan. Use existing staff resources to accomplish this activity.														
Additional inspections	Add staff to inspect commercial and residential stormwater facilities. The number of facilities and the length of inspections has increased. Equipment is needed to improve the efficiency and equality of inspections and will be purchased in 2021.		$ 5,000							0.25	0.25	0.25	0.25	0.25	0.25
Business inventory	Develop and maintain source control inventory. Dedicated initial staff time to develop the inventory and update the inventory annually. (Due August 2022)										0.25				
Source control ordinance	Develop ordinance and enforcement policy. Assumes ongoing work to review and update the ordinance. (Due August 2022)										0.05	0.05	0.05	0.05	0.05
Business inspections training	Develop and implement on-going training program. Assumes 80 consultant hours at $100/hour and 30 percent staff time for project management to develop materials and present initial training, 0.10 FTE to conduct future trainings and research/attend external trainings. (Due January 2023)			$ 8,000							0.01	0.10	0.10	0.10	0.10
Implement business inspections	Implement business inspection program. Assumes 0.5 FTE for implementation. (Due January 2023)											0.50	0.50	0.50	0.50
Minimum Tier Total		**$ -**	**$ 5,000**	**$ 8,000**	**$ -**	**$ -**	**$ -**	**$ -**		**0.50**	**0.56**	**0.90**	**0.90**	**0.90**	**0.90**

Table E-6. Recommended Activities for Pollution Source Control.		Funding							Staff (FTE)						
Recommendation	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
		2020	2021	2022	2023	2024	2025	2026	2020	2021	2022	2023	2024	2025	2026
Recommended		**Recommended**							**Recommended**						
All activities from Minimum (NPDES Compliant) tier	Same assumptions as Minimum (NPDES Compliant).	$ -	$ 5,000	$ 8,000	$ -	$ -	$ -	$ -		0.50	0.56	0.90	0.90	0.90	0.90
Enhance screening program	Further develop and implement the Stormwater Outfall Illicit Discharge screening program. Assume an additional 0.25 FTE will be needed to implement this program.									0.25	0.25	0.25	0.25	0.25	0.25
Recommended Tier Total		**$ -**	**$ 5,000**	**$ 8,000**	**$ -**	**$ -**	**$ -**	**$ -**		**0.75**	**0.81**	**1.15**	**1.15**	**1.15**	**1.15**
Enhanced		**Enhanced**							**Enhanced**						
All activities from Recommended tier	Same assumptions as Recommended.	$ -	$ 5,000	$ 8,000	$ -	$ -	$ -	$ -		0.75	0.81	1.15	1.15	1.15	1.15
Enhanced Tier Total		**$ -**	**$ 5,000**	**$ 8,000**	**$ -**	**$ -**	**$ -**	**$ -**		**0.75**	**0.81**	**1.15**	**1.15**	**1.15**	**1.15**

Table E-7. Recommended Activities for Infrastructure Operations and Maintenance.		Funding							Staff (FTE)						
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
		2020	2021	2022	2023	2024	2025	2026	2020	2021	2022	2023	2024	2025	2026
Minimum (NPDES Compliant)		**Minimum (NPDES Compliant)**							**Minimum (NPDES Compliant)**						
Update SWPPPs	Update municipal Stormwater Pollution Prevention Plans (SWPPPs) to reflect changes at multiple facilities that may include Decant / Pit facility, Parks Regional Athletic Complex (RAC), Parks Rainier Vista Park, odor control facilities, and well sites. Assumes 200 consultant hours at $100/hour and 30 percent staff time for project management to update SWPPPs (Due December 2022).		$ 20,000							0.03					
SWPPP inspections	Conduct wet and dry weather inspection as outlined in the SWPPPs for City-owned facilities. The SWPPPs require quarterly inspections during storm events and one dry-weather inspection each year of all BMPs (8 hours assumed per sampling event).									0.05	0.05	0.05	0.05	0.05	0.05
SWPPP spill history	Update spill history record for City-owned facilities. Assume two days of staff time.									0.01					
Minimum Tier Total		**$ -**	**$ 20,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**		**0.09**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**

Table E-7. Recommended Activities for Infrastructure Operations and Maintenance.		Funding							Staff (FTE)						
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
		2020	2021	2022	2023	2024	2025	2026	2020	2021	2022	2023	2024	2025	2026
Recommended		**Recommended**							**Recommended**						
All activities from Minimum (NPDES Compliant) tier	Same assumptions as Minimum.	$ -	$ 20,000	$ -	$ -	$ -	$ -	$ -		0.09	0.05	0.05	0.05	0.05	0.05
Develop facility SOPs	Develop Standard Operating Procedures (SOPs) for inspection, operation, and maintenance of the following City facility types: - Stormwater catch basins - Flow control treatment facilities (multiple varieties of facilities) Assume 80 hours to develop SOPs.									0.05					
Document activity SOPs	Standard Operating Procedures (SOPs) are currently documented in work requests and should be documented formally (Due December 2022). Assuming all 15 generic activities in the NPDES permit apply and that SOPs are developed for each activity, assume 8 hours per activity to document SOPs.									0.07					
Ongoing improvements (2021)	As growth continues, the stormwater system will expand and continue to require ongoing improvements. To account for this growing need, the size of the maintenance crew will also need to increase. In 2021, the city expects to replace one of the seasonal employees with a journey-level FTE.									0.50	0.50	0.50	0.50	0.50	0.50
Ongoing improvements (2023)	To satisfy the need described above, hire another seasonal staff member.											0.50	0.50	0.50	0.50
Recommended Tier Total		**$ -**	**$ 20,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**		**0.70**	**0.55**	**1.05**	**1.05**	**1.05**	**1.05**
Enhanced		**Enhanced**							**Enhanced**						
All activities from Recommended tier	Same assumptions as Recommended.	$ -	$ 20,000	$ -	$ -	$ -	$ -	$ -		0.70	0.55	1.05	1.05	1.05	1.05
Enhanced Tier Total		**$ -**	**$ 20,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**		**0.70**	**0.55**	**1.05**	**1.05**	**1.05**	**1.05**

Table E-8. Recommended Activities for Development Practices.		Funding							Staff (FTE)							
Recommendation	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
		2020	2021	2022	2023	2024	2025	2026	2020	2021	2022	2023	2024	2025	2026
Minimum (NPDES Compliant)		**Minimum (NPDES Compliant)**							**Minimum (NPDES Compliant)**							
Annual LID review	Develop a framework for LID review of all new policies and continue annual review of new code and documents. Assumes $20,000 one-time effort with consultant support and one-time City staff time estimated at 40 hours. Assumes 40 hours per year for ongoing annual review.		$ 20,000							0.02	0.02	0.02	0.02	0.02	0.02
Update SDM	Update Stormwater Design Manual in 2021. Assume $100k for outside support is included in the CIP plan and 200 hours of staff time included here.									0.11					
Enhanced site plan review	Hire additional stormwater site plan review staff to distribute the burden of reviewing submittals against more complicated requirements. With current staffing levels, stormwater site plans cannot be reviewed on time, which results in financial and environmental risk for the City.									0.50	0.50	0.50	0.50	0.50	0.50
Enhanced site inspection	Hire additional site inspection staff. With current staffing levels, performance verification inspections cannot be conducted and inspectors don't have time to adequately review all stormwater facility elements (e.g. inspecting private roof drains, reviewing bioretention soil media [BSM] specifications, inspecting BSM delivered to the site,) which results in financial and environmental risk for the City.									0.50	0.50	0.50	0.50	0.50	0.50
SW plan review checklists	Update and develop additional stormwater plan review checklists and templates. Assumes 150 consultant hours at $100/hour and 80 hours of staff time to manage the project.		$ 15,000							0.05					
Minimum Tier Total		**$ -**	**$ 35,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**		**1.18**	**1.02**	**1.02**	**1.02**	**1.02**	**1.02**

Table E-8. Recommended Activities for Development Practices.		Funding							Staff (FTE)						
Recommendation	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
		2020	2021	2022	2023	2024	2025	2026	2020	2021	2022	2023	2024	2025	2026
Recommended		**Recommended**							**Recommended**						
All activities from Minimum (NPDES Compliant) tier	Same assumptions as Minimum.	$ -	$ 35,000	$ -	$ -	$ -	$ -	$ -		1.18	1.02	1.02	1.02	1.02	1.02
Self-reporting policy	Develop and implement a policy of self-reporting from contractors. Assumes 100 consultant hours at $100 per hour and equivalent staff time to develop the policy. Assumes 40 hours per year to implement the policy.		$ 10,000							0.06	0.02	0.02	0.02	0.02	0.02
Tenant improvement policy	Develop and implement a policy to address tenant improvements related to inspection of private facilities. Assumes 100 consultant hours at $100 per hour and equivalent staff time to develop the policy. Assumes 40 hours per year to implement the policy.		$ 10,000							0.06	0.02	0.02	0.02	0.02	0.02
Enhanced inspector training	Develop and implement on-going training program for construction site inspectors and private stormwater facility maintenance inspectors based on new permit requirements. Assumes 80 consultant hours at $100/hour and 30 percent staff time to manage the project to develop training material and conduct initial training. Includes annual staff time needed to update training material, conduct future trainings, and attend trainings.		$ 8,000							0.01	0.02	0.02	0.02	0.02	0.02
Enhanced developer tools	Develop additional stormwater plan review checklists and tools for contractors and developers. Assumes 150 consultant hours at $100/hour and 80 hours of staff time to manage the project.		$ 15,000							0.05					
Improve review process	Hire additional stormwater site plan review and site inspection staff to do a more thorough initial review and review stormwater submittals within 10 business days of receipt. This will further reduce risk to the City.										0.50	0.50	0.50	0.50	0.50
Recommended Tier Total		**$ -**	**$ 78,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**		**1.35**	**1.59**	**1.59**	**1.59**	**1.59**	**1.59**
Enhanced		**Enhanced**							**Enhanced**						
All activities from Recommended tier	Same assumptions as Recommended.	$ -	$ 78,000	$ -	$ -	$ -	$ -	$ -		1.35	1.59	1.59	1.59	1.59	1.59
Enhanced Tier Total		**$ -**	**$ 78,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**		**1.35**	**1.59**	**1.59**	**1.59**	**1.59**	**1.59**

Table E-9. Recommended Activities for Stormwater Planning, Administration, and Funding.		Funding							Staff (FTE)						
Recommendation	Assumptions	Year 1 2020	Year 2 2021	Year 3 2022	Year 4 2023	Year 5 2024	Year 6 2025	Year 7 2026	Year 1 2020	Year 2 2021	Year 3 2022	Year 4 2023	Year 5 2024	Year 6 2025	Year 7 2026
Minimum		**Minimum**							**Minimum**						
Long-range planning annual report questions	Answer annual report questions with the 2021 annual report to Ecology summarizing coordination with long-range planning efforts. Assumes $5,000 of consultant support plus 40 staff hours for management. (Responses due March 2021)		$ 5,000							0.02					
Long-range planning report	Prepare report in 2022 summarizing coordination with long-range planning efforts. Assumes $5,000 of consultant support plus 40 staff hours for management. (Report due January 2023)			$ 5,000							0.02				
SMAP	Stormwater management action planning (SMAP): priority watershed plan development. Assumes $100,000 planning effort with 1,000 hours of consultant support at $100/hr is included in the CIP. One-time City staff time estimated at 0.1 FTE. (Due March 2022 - March 2023)			$ 100,000							0.10				
Stormwater Comprehensive Plan Update	Assumes $250,000 of external support is included in the CIP plan and 0.2 FTE of staff time.												0.20		
Inter-disciplinary team	Convene an inter-disciplinary team to advise the SWMP. Assumes that this team will include approximately 10 staff that will meet quarterly for 2 hours, but only 4 staff will record their time to the SWM Utility. (Due August 2020)								0.02	0.02	0.02	0.02	0.02	0.02	0.02
Minimum Tier Total		**$ -**	**$ 5,000**	**$ 105,000**	**$ -**	**$ -**	**$ -**	**$ -**	**0.02**	**0.04**	**0.14**	**0.02**	**0.22**	**0.02**	**0.02**
Recommended		**Recommended**							**Recommended**						
All activities from Minimum (NPDES Compliant) tier	Same assumptions as Minimum tier (NPDES Compliant).	$ -	$ 5,000	$ 105,000	$ -	$ -	$ -	$ -	0.02	0.04	0.14	0.02	0.22	0.02	0.02
Update rate structure	Implement an impervious-area based rate structure. Assumes one-time staff time to implement the new rate structure based on the financial analysis performed during the Stormwater Comprehensive Plan update.									0.10					
Software integration	More efficiently integrate multiple software types (excel, collector, HTE, and others). Assume 80 hours of consultant time at $100 per hour and equivalent staff time to determine the best software integration approach. Assume 20 staff hours per year to provide training.		$ 8,000							0.06	0.01	0.01	0.01	0.01	0.01
Recommended Tier Total		**$ -**	**$ 13,000**	**$ 105,000**	**$ -**	**$ -**	**$ -**	**$ -**	**0.02**	**0.20**	**0.15**	**0.03**	**0.23**	**0.03**	**0.03**
Enhanced		**Enhanced**							**Enhanced**						
All activities from Recommended tier	Same assumptions as Recommended tier.	$ -	$ 13,000	$ 105,000	$ -	$ -	$ -	$ -	0.02	0.20	0.15	0.03	0.23	0.03	0.03
Enhanced Tier Total		**$ -**	**$ 13,000**	**$ 105,000**	**$ -**	**$ -**	**$ -**	**$ -**	**0.02**	**0.20**	**0.15**	**0.03**	**0.23**	**0.03**	**0.03**

Table E-10. Summary of Outside Support and Equipment Cost.							
Tier of Service	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
	2020	2021	2022	2023	2024	2025	2026
Minimum Tier Total	**$0**	**$75,000**	**$113,000**	**$0**	**$0**	**$0**	**$0**
Recommended Tier Total	**$0**	**$166,000**	**$153,000**	**$40,000**	**$40,000**	**$40,000**	**$40,000**
Enhanced Tier Total	**$0**	**$166,000**	**$153,000**	**$40,000**	**$40,000**	**$40,000**	**$40,000**

Table E-11. Summary of Staff Hours (FTE).							
Tier of Service	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
	2020	2021	2022	2023	2024	2025	2026
Minimum Tier Total	**0.02**	**1.84**	**1.88**	**2.09**	**2.29**	**2.09**	**2.09**
Recommended Tier Total	**0.02**	**3.68**	**3.86**	**4.58**	**4.78**	**4.58**	**4.58**
Enhanced Tier Total	**1.02**	**4.68**	**4.86**	**5.58**	**5.78**	**5.58**	**5.58**

APPENDIX F

Financial Analysis

APPENDIX F-1

Original Stormwater Utility Rate Study

City of Lacey

Stormwater Utility Rate Study

FINAL REPORT

June 2020

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June 12, 2020

Doug Christenson
Water Resources Engineer
City of Lacey, WA
420 College Street SE
Lacey, WA 98503

Subject: Stormwater Utility Rate Study in Support of the 2020 Stormwater Comprehensive Plan

Dear Mr. Christenson:

FCS GROUP is pleased to submit this report documenting the Stormwater Rate Study conducted for the City of Lacey. The recommended revenue increase needs are shown below; the 2020 increase was adopted by City Council in November of 2019, via *Ordinance No. 1556*.

Summary of Results	2020 (Adopted)	2021	2022	2023	2024	2025
Annual Rate Increases	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%

These increases are forecast to generate the revenue needed to fully fund the utility on a standalone basis, considering operating and maintenance expenditures, fiscal policy achievement, and the programmatic, staffing, and capital project needs identified in the City's Stormwater Comprehensive Plan. The detailed methodologies used to derive the revenue needs are included in this report.

It has been a pleasure to work with City staff on this effort. Please let us know if you have any questions or need additional information. John can be reached at (425) 336-1865 or JohnG@fcsgroup.com.

Sincerely,

John Ghilarducci
Project Principal

Tage Aaker
Project Manager

Amanda Levine
Analyst

TABLE OF CONTENTS

Section I. INTRODUCTION

Utility Background

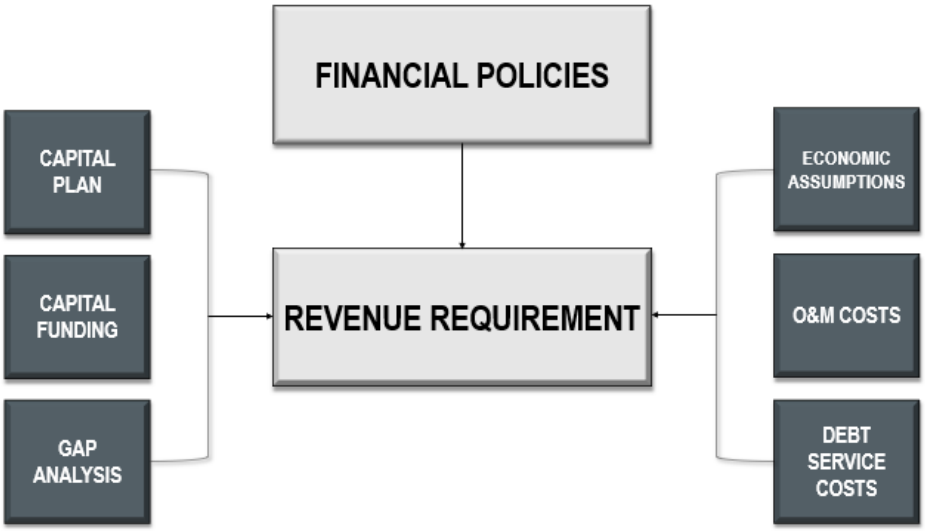
In 1985, the City of Lacey (City) formed a stormwater utility because of the increasing need to manage surface water. As noted in the City's Stormwater Comprehensive Plan (SCP), "The City's stormwater utility manages a large and complex storm drainage system in the public right-of-way. This storm drainage system is important to protecting public and private property, ensuring public safety, and providing flow control and water quality treatment to stormwater runoff before it discharges to receiving waters." The utility is responsible for 6,150 catch basis and storm drains, 135 miles of storm system pipe, 83 outfalls, and many other elements as noted in Table 2-1 of the SCP.

Monthly service charges are collected from properties within the City limits to provide resources to plan, manage, design, construct, maintain, and upgrade the City's system. The City of Lacey contracted with FCS GROUP to perform a stormwater utility rate study, the purpose of which is to ensure the City has the resources to continue to provide this valuable service into the future.

Rate Study

The main purpose of this rate study is to develop a funding plan ("revenue requirement") for the City's stormwater utility for the 2020-25 study period. This study period aligns with the capital improvement program (CIP) identified in the City's SCP. The revenue requirement identifies the total revenue needed to fully fund the utility on a standalone basis considering current financial obligations and future capital expenditures identified in the City's CIP. The revenue requirement also incorporates additional programmatic and staffing needs resulting from a gap analysis performed by Herrera Environmental Consultants, Inc. (Herrera), which was further refined and documented in the Draft SCP. Revenue increases are applied "across-the-board" for the utility; there were no rate design changes incorporated in this rate study.

Exhibit 1: Revenue Requirement Overview



Section II. FISCAL POLICIES

The basic framework for evaluating utility revenue needs includes sound fiscal policies. Several policy topics are important to consider further as part of managing the finances of the stormwater utility, including operating reserves, capital reserves, debt service coverage, and rate funded capital.

Operating Reserves

An operating reserve is designed to provide a liquidity cushion; it protects the utility from the risk of short-term variation in the timing of revenue collection or payment of expenses. City *Resolution No. 992*, which documents City-adopted fiscal policies, states there needs to be at least two months' worth of operating revenue (excluding one-time revenues) in each utility's operating fund. Based on this adopted policy, the forecast targets an operating reserve for the stormwater utility of between two and three months' worth of annual rate revenues.

Recommended Policy: Achieve a year-end minimum balance target of between **60-90 days (16%-25%)** of total annual operating revenues. This equates to a range of between **$675,000-$1 million** in 2020 based on the 2020 forecasted annual rate revenue of $4,100,000.

Capital Reserve

The capital reserve provides a source of emergency funding for unexpected asset failures or other unanticipated capital needs. It can also help the utility address cash flow issues related to capital projects. Given these different purposes, there are a variety of potential benchmarks for setting a minimum balance for this reserve. Some potential options include: a percentage (commonly 1 – 2%) of the original cost of total fixed assets; a rolling multi-year average of capital improvement program costs; or an amount sufficient to fund an equipment failure. This capital reserve policy is not intended to guard against catastrophic system failure or extreme acts of nature.

Recommended Policy: A *minimum* capital ending fund balance target of **1% of fixed assets** (non-depreciated original cost of construction) is recommended. This equates to **$640,000** based on a fixed asset inventory totaling approximately $64 million as of the beginning of 2020. The reserve increases as the City executes the CIP, thereby adding fixed assets to the utility. Capital reserves larger than this may be prudent if the City is saving for future capital projects that cannot be funded with same-year rate revenues.

Debt Service Coverage

Debt service coverage is typically a requirement associated with revenue bonds and some State loans, and it is an important benchmark to measure the riskiness of the utility's capital funding plans. Coverage is most easily understood as a factor applied to annual bonded debt service. If a utility sells revenue bonds, a coverage requirement of 1.20 means that the utility agrees to collect enough revenue to meet operating expenses and not only pay debt service but collect an additional 20% increment above bonded debt service.

The extra revenue is a financial cushion that makes bondholders more confident that debt service will be paid on time. The extra revenue can be used for capital expenditures, to build reserves for future

asset replacement, or for debt service on subordinate debt. Achieving a bonded debt service coverage level greater than the minimum required level is a positive signal that bond rating agencies notice, and it can result in more favorable terms if the utility needs to go to the market to sell bonds.

Recommended Policy: While 1.20 is the legal minimum coverage for the City's 2013 revenue bonds—the City's only stormwater utility related debt—we recommend a target coverage of at least 1.50 to 2.00. Throughout the forecast, a debt service coverage of 6.20 or greater is achieved.

Rate Funded Capital

Rate funded capital is the funding of long-term infrastructure replacement needs through a regular (annual) and predictable rate provision. Most commonly, utilities that have addressed replacement funding needs have used historical (original cost) depreciation expense as the basis for a reasonable level of reinvestment in the system. This strategy can help minimize a utility's reliance on debt.

Recommended Policy: The City desires to fund its capital program without relying on debt, and instead plans to rely on a mix of existing reserves and annual rate funded capital. Therefore, the utility should strive to generate revenues to cover operating costs, existing debt service, and the approximate annual average capital program. Any funding deficit between annual capital expenditures and annual rate funded capital must be covered by drawing down capital reserves. The recommended rate strategy allows the utility to cash-fund nearly $900,000 of capital projects per year by 2025 compared to average capital expenditures of $1.1 million per year.

While it is the City's written policy to fund annual depreciation expense ($1.85 million in 2018 for the stormwater utility) it appears unnecessary to fund that amount each year in the near-term since annual capital expenditures are only $1.1 million per year.

Setting aside $1.85 million per year would add roughly $750,000 per year to the already solid cash position of the utility's capital reserve. The City should reevaluate whether or not funding full depreciation expense is advisable during subsequent rate evaluations, taking into consideration prudent levels of annual capital expenditures in the near and long-term planning horizon.

Exhibit 2 provides a summary of the recommended fiscal policies for the stormwater utility.

Exhibit 2: Summary of Fiscal Policies

Policy	Recommended Target
Operating Reserve	60-90 days of operating revenues (16%-25%)
Capital Reserve	A minimum of 1% of the original cost of fixed assets
Debt Service Coverage	If debt is issued, an internal policy target of at least 1.50 to 2.00x is prudent
Rate Funded Capital	Set rates to allow the utility to cash fund its capital program, to be supplemented by existing capital reserves as available

Section III. REVENUE REQUIREMENT

This section presents the revenue requirement analysis results for the stormwater utility, as summarized in **Exhibit 3**. The 4.5% increase for 2020 has already been adopted by the City in *Ordinance No. 1556,* provided as **Appendix V.B.** to this report.

As mentioned previously, the revenue requirement analysis considers fiscal policies, operating and maintenance expenditures, additional programmatic and staffing needs identified in the recommended level of service in the Draft SCP, existing debt service, and capital expenditures from the CIP.

Exhibit 3: Summary Results of Revenue Requirement Forecast

Summary of Results	2020 (Adopted)	2021	2022	2023	2024	2025
Annual Rate Increases	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%

III.A. ECONOMIC & INFLATION FACTORS

The operating and maintenance expenditure forecast largely relies on the City's 2020 adopted budget for the stormwater operating fund (Fund 403). The line items in the budget are then adjusted each year by utilizing one of the following applicable factors:

- General Cost Inflation – assumed to be 2.5 percent per year based on both the Washington State Economic & Revenue Forecast Council projection for the Consumer Price Index as well as the recent historical performance of the Seattle-Tacoma-Bellevue Consumer Price Index.
- Construction Cost Inflation – assumed to be 3.0 percent per year based on the Engineering News-Record Construction Cost Index (20-City Average).
- Taxes – State Business and Occupation tax rate of 1.5 percent; City utility tax rate of 6.0 percent. Note that this 6.0 percent utility tax is applied as a markup on the utility bill above the stated rates shown in **Exhibit 13**.
- Personnel Cost Inflation – based on Employment Cost Indices from the U.S. Bureau of Labor Statistics.
  - » Labor Cost Inflation: assumed to be 2.5 percent per year.
  - » Benefits Cost Inflation: assumed to be 3.5 percent per year.
- Fund Earnings – assumed to be 0.25 percent per year based on input from City staff. Fund earnings have decreased significantly since March 2020 due to actions taken by the Federal Reserve System in response to the COVID-19 pandemic.
- Customer Account Growth – assumed to be 0.5 percent per year, based on discussions with the City staff at the time of analysis.

III.B. FUND BALANCES

The stormwater utility's operating activity is tracked in Fund 403 and its capital activity is tracked in Fund 412. The starting 2020 balance for Fund 403 totaled $2,798,566. For this analysis, 90-days' worth of operating revenues was set aside for the operating reserve minimum balance, which is approximately $1,000,000 based on forecasted operating revenues for 2020. The balance exceeding this minimum was assumed to be available for capital expenditures as shown in **Exhibit 4**.

Exhibit 4: Operating Fund Balance Calculations (Fund 403)

Fund 403	Source	1/1/2020 Balance	Setting the Operating Reserve
Operating Reserve	Cash	$2,462,770	Operating Reserve: $4,100,000 * 90/365 Rounded: **$1,000,000** Available for Capital: $2,798,566 - $1,000,000 $1,798,566
	Cash/ Money Market	$335,796	
	Total	$2,798,566	

The starting 2020 balance for Fund 412 totaled $3,639,538. When combined with the reserves available for capital from Fund 403, $5.4 million was assumed to be available for capital expenditures as shown in **Exhibit 5**.

Exhibit 5: Capital Fund Balance Calculations (Fund 412)

Fund 412	Source	1/1/2020 Balance	Available for Capital
Capital Reserve	Cash	$3,116,620	Fund 403 above 90-days: $1,798,566 Fund 412: $3,639,538 = **$5,438,104**
	Cash/ Money Market	$522,918	
	Total	$3,639,538	

III.C. EXISTING DEBT OBLIGATIONS

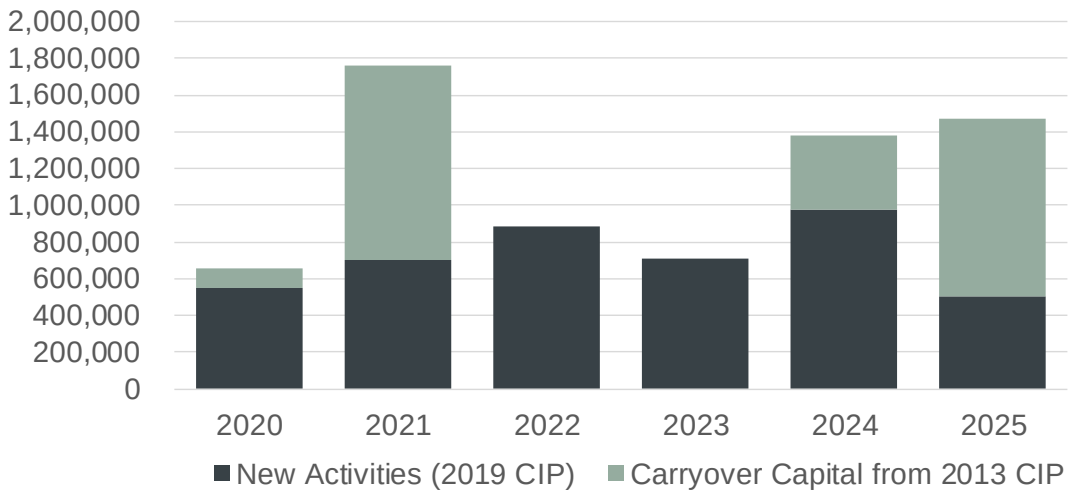
The City has only one existing debt obligation related to the stormwater utility: the 2013 Revenue Bond. The stormwater utility's share is 16.8% and the average principal plus interest payment is approximately $100,000 per year – the final payment for this loan will be made in 2033.

III.D. CAPITAL EXPENDITURE FORECAST

The 2020-25 CIP was provided by Herrera. Costs were provided by project, by year, and are in 2019 dollars. To estimate the actual spending by year, costs are escalated to the estimated year of construction. **Exhibit 6** shows the planned annual capital spending, with cost escalation. The graph is split into two colors to represent two types of capital projects represented in the utility's capital improvement program:

- The dark blue bar represents the "New Activities" from the 2020 SCP; and
- The green bar represents the "Carryover Capital from 2013 CIP" list.

Exhibit 6: Capital Improvement Program (escalated dollars)



A few summary notes related to the capital plan are provided below:

- The 2020-25 spending plan totals $6.2 million ($6.9 million with cost escalation)
- The average annual escalated CIP is $1.1 million; the highest spending is in 2021 ($1.8 million).

Exhibit 7 lists the "Carryover Projects" while **Exhibit 8** lists the "New Activities." Tables include the project name and ID number, the uninflated cost estimates (in $1,000s) and the estimated year(s) of design, permitting, and construction for each project. Note that the "2026+" column contains projects to be completed outside of the 2020-25 study period.

Exhibit 7: Carryover Projects from 2013 CIP: Capital Project Cost & Timing in $1,000s (2019 Dollars)

ID	Description	Total	2020	2021	2022	2023	2024	2025	2026 +
13-7	Diamond Stormwater Alternative	**$380**	$ -	$-	$-	$-	$-	$80	$300
13-9	Clearbrook Drainage System Improv.	**$480**						80	400
13-10	Homann Area System Rehabilitation	**$320**					120	200	
13-11	1010 Midway Storm Improv.	**$50**							50
13-12	Belair-Impala Storm System Installation	**$1,100**	100	1,000					
13-14	Alder and Gemini Drainage System Improv.	**$520**					70	450	
13-15	White Fir Stormwater Installation	**$420**							420
13-16	5th Ct SE and 5th Way Easement Storm Improv.	**$760**							760
13-17	Shady Lane Treatment Facility Improv.	**$160**					160		
	Carryover Projects Total	**$4,190**	**$100**	**$1,000**	**$-**	**$-**	**$350**	**$810**	**$1,930**

Exhibit 8: New Activities: Capital Project Cost & Timing in $1,000s (2019 Dollars)

ID	Description	Total	2020	2021	2022	2023	2024	2025	2026 +
19-1	Westminster Pond Modification	**$340**	$ -	$ -	$60	$280	$-	$-	$-
19-2	26th Loop Conveyance	**$510**				100	410		
19-3	Stormwater Design Manual (SDM) Update	**$180**	50	60	70				
19-4	Woodland Creek Stormwater Treatment Facility	**$480**		50	430				
19-5	Woodland Creek Community Park Habitat Restoration	**$50**		50					
19-6	Stormwater Management Action Planning (SMAP)	**$100**			100				
19-7	Regional Water Quality Facility Program	**$200**				100	100		
19-8	Infiltration Retrofit Program	**$200**					100	100	
19-9	Miscellaneous Storm System Improvements	**$900**	150	150	150	150	150	150	
19-10	Stormwater Comprehensive Plan (SCP) Update	**$250**					80	170	
19-11	Land Purchase for Future Facility Improvements	**$350**		350					
	CIP Projects already underway in 2020	**$336**	336						
	New Activities Projects Total	**$3,896**	**$536**	**$660**	**$810**	**$630**	**$840**	**$420**	**$ -**
	Grand Total of Exhibit 7 & 8	**$8,086**	**$636**	**$1,660**	**$810**	**$630**	**$1,190**	**$1,230**	**$1,930**

III.E. REVENUE REQUIREMENT

III.E.1. Methodology

The revenue requirement analysis evaluates the sufficiency of the utility's revenues against its financial obligations in the context of two sufficiency tests described below:

- **Cash Flow Test.** The cash flow test determines whether or not the utility's annual revenues are sufficient to cover the known cash requirements for each year of the forecast. The City can temporarily waive the requirements of the cash flow test as part of a conscious decision to phase in rate increases, as long as its operating reserve balance is sufficient to absorb the resulting cash-flow deficit.
- **Coverage Test.** The coverage test evaluates the utility's ability to meet applicable bond coverage requirements. As this test focuses on annual financial performance, it precludes the use of

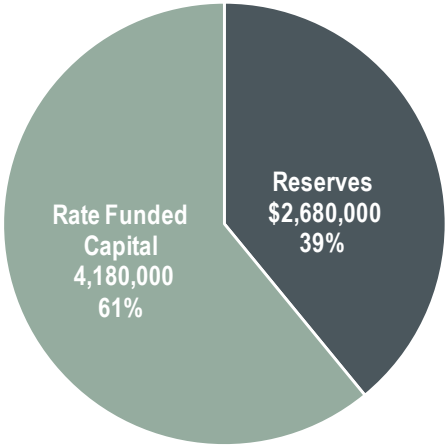
reserves to cover shortfalls. Since the City has revenue bonds outstanding, the coverage test must always be met, as failure to do so may result in a downgrading of the City's credit rating.

In determining the annual revenue requirement, the test with the greatest deficiency generally drives the rate increase in any given year. For this forecast, the cash flow sufficiency test is always greater than the debt service coverage test. As previously noted, with the recommended rate increases, a comfortable debt service coverage ratio of 6.20 or greater is achieved throughout the forecast.

III.E.2. Capital Funding Strategy

As previously mentioned, 2020-25 capital spending totals $6.2 million. After applying estimated cost escalation, capital spending through 2025 totals $6.9 million. Of that $6.9 million total, $2.7 million is expected to be funded with existing reserves accumulated as of the beginning of 2020 and $4.2 million is expected to be funded with rate revenues set aside for capital during the six-year planning period. The capital funding strategy includes no debt financing as shown in **Exhibit 9**.

Exhibit 9: Capital Funding Strategy 2020-25



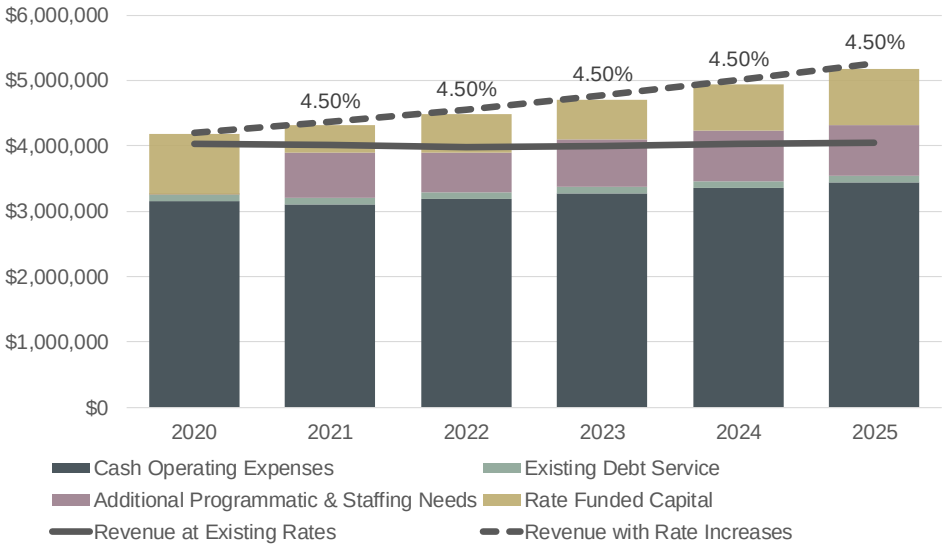
III.E.3. Revenue Requirement

Exhibit 10 graphically represents the revenue requirement forecast through 2025. The bars represent costs of the utility such as operating expenses, existing debt service and annual rate revenue earmarked for capital projects. The solid gray line represents revenue at existing 2020 rates and the dashed line shows forecasted revenue with rate increases. Other observations are provided below:

- Solid grey line: Revenue at existing rates.
  - » Rate revenue is expected to be roughly $4 million in 2020 and is expected to grow at 0.50% per year with customer growth.
  - » The City's 2020 rate revenue is sufficient to cover operating expenditures, debt service, and approximately $1 million in capital projects and/or capital reserve contributions.
- Dashed grey line: Revenues with rate increases.
  - » As the costs associated with the additional programmatic and staffing needs are incorporated into the forecast starting in 2021, rate revenue must increase to continue to allow the utility to cash-fund capital projects.
  - » Rate revenues are expected to grow to just over $5.2 million per year by 2025.

- Dark blue bar: Cash operating expenses.
  - » Operating expenses are based on the adopted 2020 budget and increase with the annual cost escalation assumptions previously discussed.
  - » This bar does not include the costs for additional programmatic and staffing needs, which make up a majority of the operating expense increases during the forecast.
- Light green bar: Existing debt service.
  - » The stormwater utility's share of the 2013 revenue bond debt service is approximately $100,000 per year and is expected to be fully repaid in 2033.
- Purple bar: Recommended Level of Service from the Draft SCP.
  - » Operating expenses increase significantly in 2021 to reflect findings from the gap analysis performed by Herrera and recommendations of the Draft SCP, which identified programmatic and staffing requirements in addition to the costs included in the adopted 2020 budget.
  - » Programmatic requirements ($70,000 per year on average) and staffing requirements will help support different programs including surface water quality improvement, groundwater quality protection, public participation, pollution source control, infrastructure operations and maintenance, development practices, and stormwater planning and administration. Based on the recommendations of the Draft SCP, 3.7 FTEs will be added in 2021, and an additional 0.9 FTE will be added in 2023. City staff provided low- and high-end salary and benefit estimates per FTE. The high-end estimates were used in the analysis to be conservative; this resulted in a range of $133,000-$158,000 per FTE depending on the position (plus cost escalation).
- Gold bar: Rate funded capital.
  - » In 2020, roughly $940,000 is available for rate funded capital. In 2021, there is a decrease due to increased operating expenses from the Draft SCP's recommended level of service. Approximately $415,000 is available in 2021 for rate funded capital.
  - » This amount increases gradually after 2021 as revenues increase with rate increases. By 2025, $870,000 per year would be available for capital projects.

Exhibit 10: Annual Stormwater Utility Revenue Requirement Forecast 2020-25

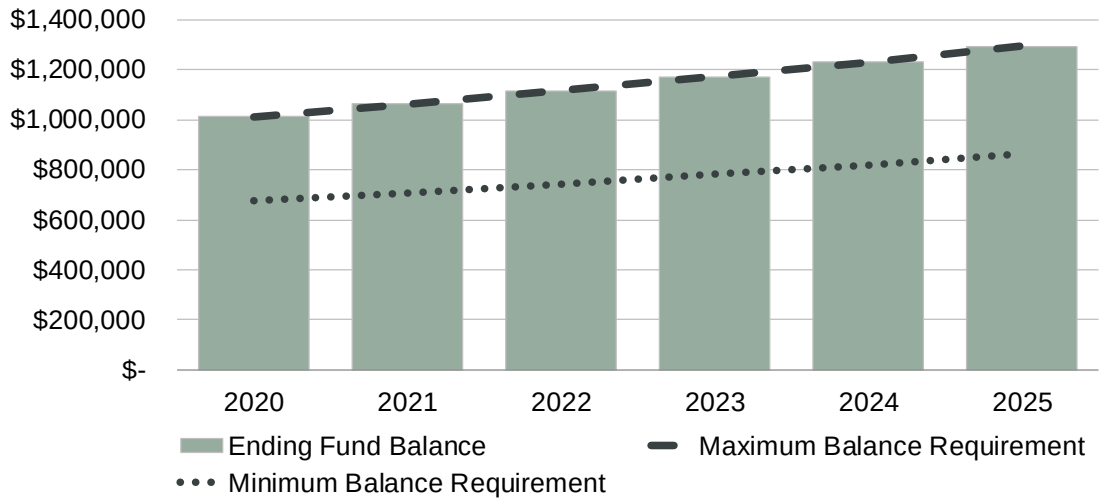


III.E.4. Forecasted Reserve Level

Operating Reserve

The target operating reserve is equal to 60-90 days of operating revenues. **Exhibit 11** shows that in each year of the forecast, the utility is expected to have 90 days of cash in the operating reserve. This target increases as rate revenues increase with annual rate adjustments.

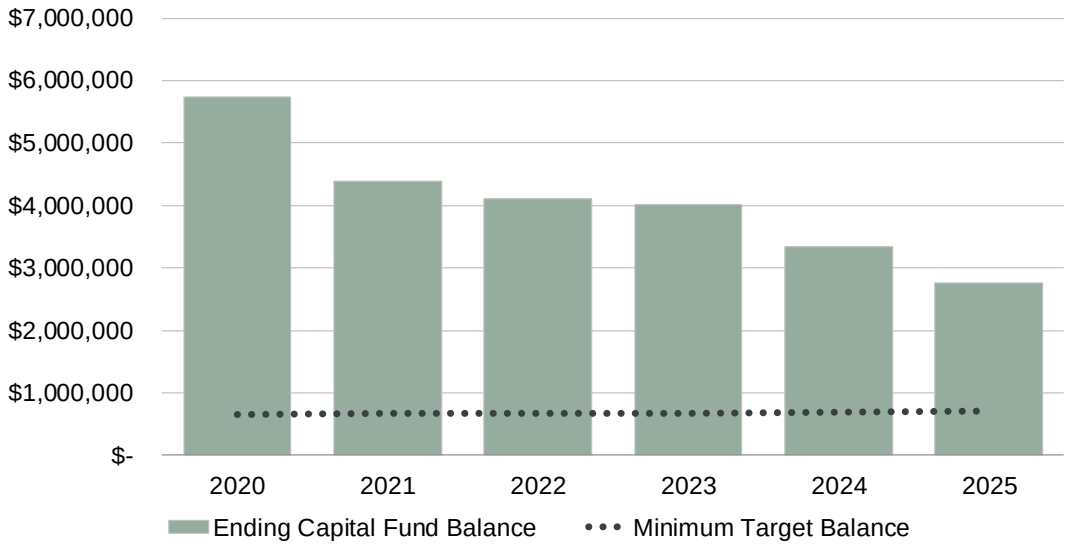
Exhibit 11: Operating Reserve Forecast (Fund 403)



Capital Reserve

The recommended policy for the capital reserve is to achieve a year-end balance of at least 1.0 percent of the original cost of fixed assets. The projected ending capital fund balance for 2020 is just under $6 million. As shown in **Exhibit 12**, this balance is forecast to be gradually drawn down to below $3 million by 2025, as capital expenditures slightly outpace annual rate funded capital.

Exhibit 12: Capital Reserve Forecast (Fund 412)



Section IV. Conclusion

Revenue Requirement & Rate Schedule

To cover the new forecasted financial obligations of the stormwater utility, an annual rate increase of 4.5 percent is needed each year in the planning period of 2021-2025. A rate increase of 4.5 percent has already been adopted for 2020. The recommended rate increases allow the utility to accomplish the following:

- Continue to fund existing operating expenses, plus cost escalation;
- Allow the utility to fund an average of $730,000 per year in additional programmatic and staffing costs to meet the programmatic and staffing needs identified in the Draft SCP;
- Allow the utility to fund $6.9 million in capital projects from 2020-2025 (escalated dollars) without relying on debt;
- Generate nearly $900,000 per year for rate-funded capital by 2025; and
- Maintain utility reserves at a healthy level throughout the forecast.

Exhibit 13 shows the proposed rate schedule with "across-the-board" increases for all customers.

Exhibit 13: Recommended Rate Schedule

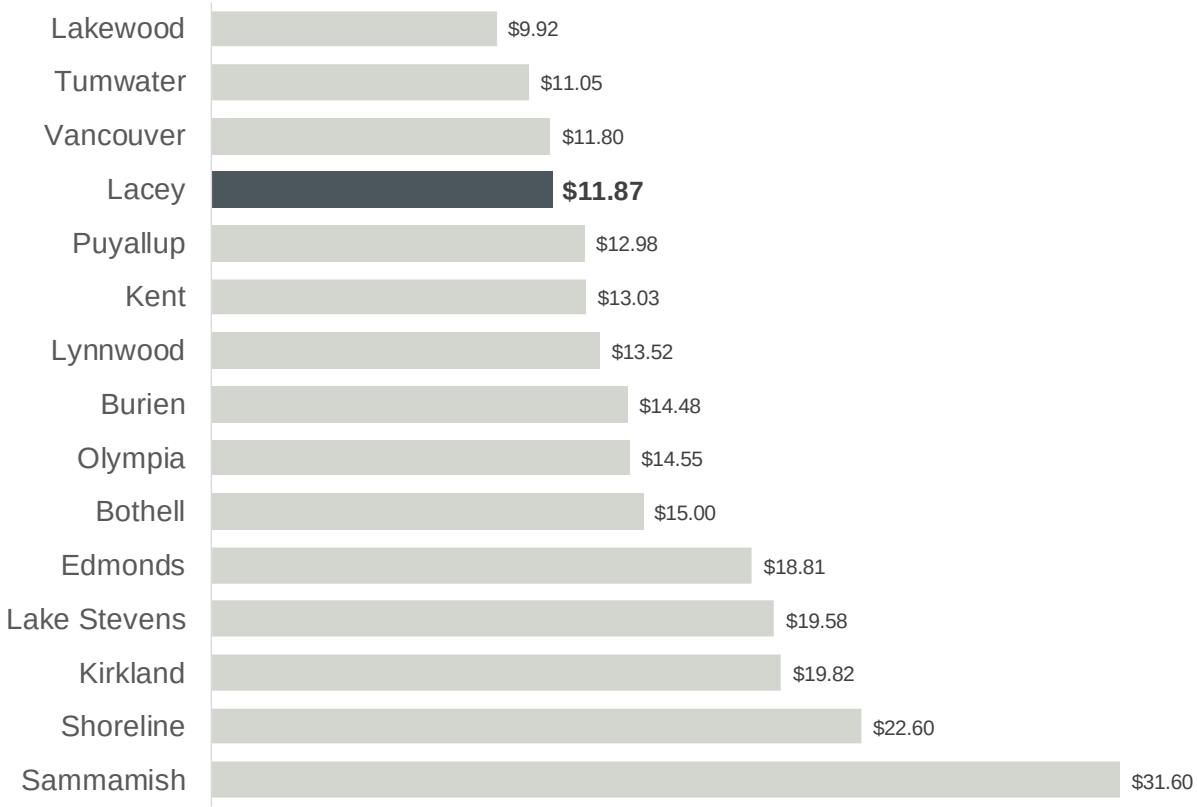
Summary of Results	2020 (Adopted)	2021	2022	2023	2024	2025
Annual Increases	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Residential Charges (per developed parcel)						
Single-Family Residential	$11.87	$12.41	$12.96	$13.55	$14.16	$14.79
Duplex-Family Residential	$23.74	$24.81	$25.93	$27.09	$28.31	$29.59
Non-Residential (per gross acre)						
Very Light (0% - 10%)	$5.45	$5.70	$5.95	$6.22	$6.50	$6.79
Moderately Light (>10% - 25%)	$19.69	$20.57	$21.50	$22.47	$23.48	$24.53
Light (>25% - 40%)	$38.12	$39.84	$41.63	$43.50	$45.46	$47.51
Moderate (>40% - 55%)	$58.11	$60.72	$63.46	$66.31	$69.30	$72.42
Moderately Heavy (>55% - 70%)	$79.11	$82.67	$86.39	$90.27	$94.34	$98.58
Heavy (>70% - 85%)	$102.05	$106.65	$111.45	$116.46	$121.70	$127.18
Very Heavy (>85% - 100%)	$126.26	$131.94	$137.88	$144.08	$150.56	$157.34

Single-Family Residential Rate Comparison

As a resource to the City and its customers, a rate survey of comparable utilities was performed. **Exhibit 14** shows each jurisdiction's 2020 monthly single-family residential (SFR) rate. Note that each jurisdiction has a unique set of geographic traits, customers, and system characteristics that can have a significant impact on rates. However, all jurisdictions included in the rate comparison are Western Washington cities that are all subject to the National Pollutant Discharge Elimination System (NPDES) Phase II Municipal Stormwater Permit.

Some cities embed their city utility tax in their rates, while others (like Lacey) separately itemize the tax on customer bills above the stated rates. We do not have data on the billing practices of other cities, so there may or may not be a tax embedded in other utility rates. The City utility tax was excluded from the City of Lacey rates.

Exhibit 14: Monthly 2020 Single-Family Residential Stormwater Rates



Updating This Study's Findings

It is recommended that the City revisit the study findings during the forecast period to check that the assumptions used are still appropriate and that no significant changes have occurred that would alter the results of the study. The City should use the study findings as a living document, routinely comparing the study outcomes to actual revenues and expenses. Any significant or unexpected changes may require adjustments to the rate strategy recommended in this report.

Rate Structure Considerations for the Future

While the City's existing rate structure charges a higher rate for higher densities of development (percent coverage), the actual rate per unit of impervious surface area changes very little from class to class (midpoint to midpoint). The structure also perpetuates inequities among non-SFR customers at the extreme ends of each class range. For example, a one-acre parcel that is 54% impervious would pay significantly less than a one-acre parcel that is 56% impervious, even though they have comparable amounts of impervious area. If two customers have similar amounts of impervious area, and thus similar contributions to the stormwater system, they should be charged similarly. An example of the inequity of the current system is shown below in **Exhibit 15,** where Parcel B has 4% more impervious area but is charged a monthly rate that is 36% higher because Parcel B falls within the 'Moderately Heavy' rate tier instead of the 'Moderate' rate tier.

Exhibit 15: Inequity Example #1 – Similar Customers Pay Different Rates

Parcel	Gross Acres	Percentage Impervious	Impervious Square Feet	Impervious Rate Category	Monthly Rate
A	1.0	54%	23,522	Moderate	$58.11
B	1.0	56%	24,394	Moderately Heavy	$79.11
		Increase	**4%**		**36%**

Meanwhile, that same one-acre parcel that is 56% impervious would pay the same as a similarly sized property that is 70% impervious. If two parcels have significantly different amounts of impervious area, and thus significantly different contributions to the stormwater system, they should be charged quite differently. An example of this inequity is shown in **Exhibit 16**, where Parcel C has 25% more impervious area but pays the same rate as Parcel B.

Exhibit 16: Inequity Example #2 – Dissimilar Customers Pay the Same Rate

Parcel	Gross Acres	Percentage Impervious	Impervious Square Feet	Impervious Rate Category	Monthly Rate
B	1.0	56%	24,394	Moderately Heavy	$79.11
C	1.0	70%	30,492	Moderately Heavy	$79.11
		Increase	**25%**		**0%**

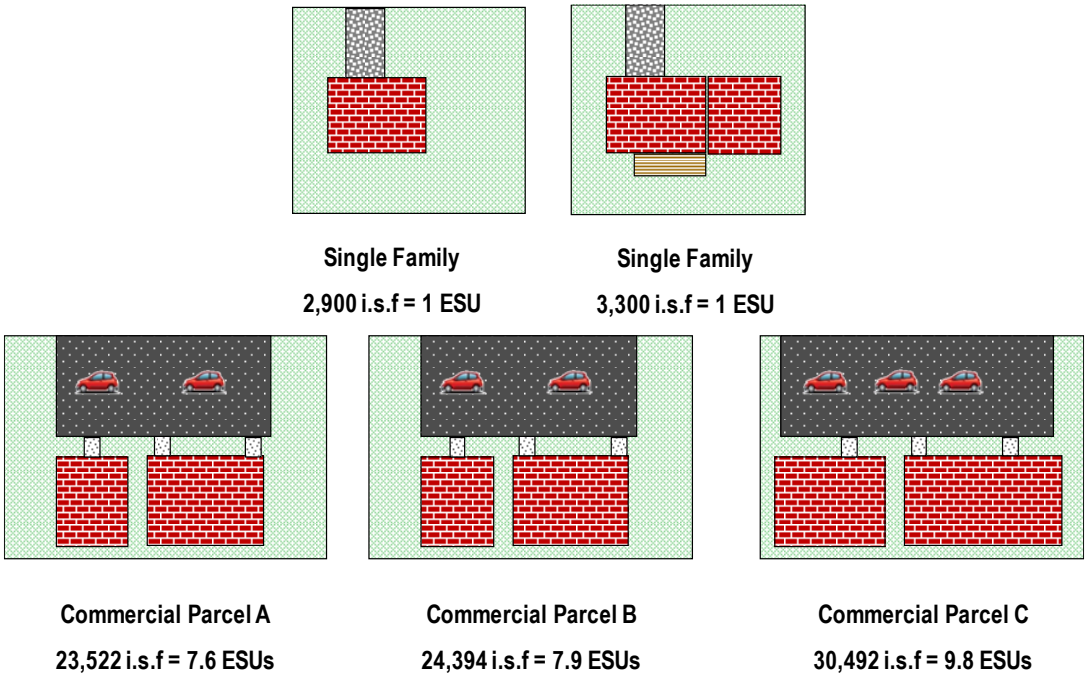
To address these inequities, it is recommended that the City consider an equivalent service unit (ESU) based approach sometime in the future. Under an ESU based approach, each non-SFR customer's bill is calculated based on the number of ESUs on the parcel. A uniform rate could

continue to be imposed on all SFR parcels regardless of impervious surface area, while the rate paid by non-SFR parcels would become more equitable.

With an ESU based approach, the rate is typically calculated as a dollar amount per ESU. One ESU is equal to the average impervious area found on an SFR parcel—for example: 3,100 impervious square feet. Note that a sampling analysis would be necessary to determine the average amount of impervious surface area on the City's SFR parcels, unless that data is already available.

Exhibit 17 shows an illustration of how the ESU rate approach could apply to different properties.

Exhibit 17: Example ESU Rate Structure Approach



The following observations are provided:

- Single-family residential parcels would still have a uniform, fixed monthly charge.
- Other developed parcels (commercial, multi-family, etc.): The charge for these customers would be based on the actual measured impervious surface area, expressed as a number of ESUs. In this example, one ESU is assumed to equal 3,100 impervious square feet.

Exhibit 18 revisits the example parcels from **Exhibits 15** and **16.** Under the ESU approach, Parcels A and B would be assigned 7.6 and 7.9 ESUs respectively, while Parcel C would be assigned 9.8 ESUs. Under the ESU approach charges would be more equitable:

- Parcel B has 4% more impervious area than Parcel A and would be charged 4% more than Parcel A. Under the current system Parcel B pays 36% more than Parcel A, despite having similar impervious area.
- Parcel C has 25% more impervious area than Parcel B, and would be charged 25% more than Parcel B. Under the current system Parcel B and Parcel C pay the same, despite having significantly different impervious area.

Exhibit 18: Example Charges Under an ESU-Based Rate Structure

Parcel	Gross Acres	Percentage Impervious	Impervious Square Feet	ESUs*	Monthly Charge**
A	1.0	54%	23,522	7.6	$76
B	1.0	56%	24,394	7.9	$79
C	1.0	70%	30,492	9.8	$98

** Hypothetical ESU value of 3,100 impervious square feet; assumes rounding to nearest 1/10th.*

*** Assuming a hypothetical rate of $10 per ESU for illustration purposes only.*

Section V. APPENDICES

V.A. RATE MODEL

Rate Adjustment	2020	2021	2022	2023	2024	2025
Annual Increase (%)	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Debt Service Coverage (bonded debt)	10.44	5.72	7.35	7.58	8.59	10.25
Single Family Monthly Charge	$11.87	$12.41	$12.96	$13.55	$14.16	$14.79
Monthly Increase	$0.51	$0.53	$0.56	$0.58	$0.61	$0.64

Operating Activity & Reserve		2020	2021	2022	2023	2024	2025
Beginning Fund Balance		**$ 1,000,000**	**$ 1,011,672**	**$ 1,062,484**	**$ 1,115,847**	**$ 1,171,890**	**$ 1,230,748**
Revenue							
403-0000-343.51-01	Sales	$ 4,102,893	$ 4,308,961	$ 4,525,379	$ 4,752,666	$ 4,991,368	$ 5,242,060
403-0000-345.83-00	Plan Checking Fees	4,069	4,069	4,069	4,069	4,069	4,069
403-0000-345.83-02	Inspection Services	14,634	14,634	14,634	14,634	14,634	14,634
	Street Sweeper Driver Grant	81,017	41,642	-	-	-	-
	Investment Interest	2,597	2,626	2,753	2,886	3,026	3,174
	Total Revenues	$ 4,205,209	$ 4,371,932	$ 4,546,835	$ 4,774,255	$ 5,013,098	$ 5,263,936
			4.0%	4.0%	5.0%	5.0%	5.0%
Operating Expenditures							
General Services							
403-4201-538.10-01	Salaries - Regular	$ 353,645	$ 362,486	$ 371,548	$ 380,837	$ 390,358	$ 400,117
403-4201-538.10-05	Salaries - Overtime	1,000	1,025	1,051	1,077	1,104	1,131
403-4201-538.10-06	Salaries - Part-Time	953	977	1,001	1,026	1,052	1,078
403-4201-538.20-01	Employer Paid Benefits	156,102	161,566	167,220	173,073	179,131	185,400
403-4201-538.31-01	Office & Operating Supply	2,541	2,605	2,670	2,736	2,805	2,875
403-4201-538.31-02	Small Tools & Equipment	1,500	1,538	1,576	1,615	1,656	1,697
403-4201-538.31-17	Supplies - Uniform Purchase	2,260	2,317	2,374	2,434	2,495	2,557
403-4201-538.31-27	Software Upgrade	5,260	5,392	5,526	5,664	5,806	5,951
403-4201-538.31-35	Replaced Equipment	15,000	15,375	15,759	16,153	16,557	16,971
403-4201-538.41-01	Prof. Svc - Other	15,759	16,153	16,557	16,971	17,395	17,830
403-4201-538.41-02	Prof. Svc - Engineering	275,136	282,014	289,065	296,291	303,699	311,291
403-4201-538.41-05	Prof. Svc - Audit	450	461	473	485	497	509
403-4201-538.41-15	Prof. Svc - Legal	2,200	2,255	2,311	2,369	2,428	2,489
403-4201-538.41-17	Prof. Svc - Water Resources	564,024	578,125	592,578	607,392	622,577	638,141
403-4201-538.41-23	Prof. Svc - Local Monitor	40,000	41,000	42,025	43,076	44,153	45,256
403-4201-538.41-27	Prof. Svc - PIE Program	50,000	51,250	52,531	53,845	55,191	56,570
403-4201-538.41-32	Prof. Svc - Utility Locates	725	743	762	781	800	820
403-4201-538.41-42	Illicit Discharge Detect.	9,000	9,225	9,456	9,692	9,934	10,183
403-4201-538.41-43	Analyze Stormwater Sample	10,000	10,250	10,506	10,769	11,038	11,314
403-4201-538.42-01	Telecommunications	2,500	2,563	2,627	2,692	2,760	2,829
403-4201-538.43-01	Transportation/Per Diem	2,228	2,284	2,341	2,399	2,459	2,521
403-4201-538.43-02	Dues, Subscriptions, Publ	173	177	182	186	191	196
403-4201-538.43-03	Registrations	2,818	2,888	2,961	3,035	3,111	3,188
403-4201-538.45-01	Equipment Rental	5,424	5,560	5,699	5,841	5,987	6,137
403-4201-538.45-02	IMS Rental	35,330	36,213	37,119	38,047	38,998	39,973
403-4201-538.45-03	Copier Rentals	499	511	524	537	551	565
403-4201-538.46-01	Insurance - Liability	13,888	14,235	14,591	14,956	15,330	15,713
403-4201-538.46-02	Insurance - Fire/Property	377	386	396	406	416	427
403-4201-538.47-01	Utility - Electric	2,800	2,870	2,942	3,015	3,091	3,168
403-4201-538.47-02	Utility - City of Lacey	529	542	556	570	584	599
403-4201-538.47-03	Utility - Natural Gas	811	831	852	873	895	918
403-4201-538.47-07	Utility - Solid Waste	2,000	2,050	2,101	2,154	2,208	2,263
403-4201-538.48-01	Rep & Maint - Equipment	553	567	581	596	610	626
403-4201-538.49-06	Maintenance Contracts	1,018	1,043	1,070	1,096	1,124	1,152
403-4201-538.49-23	Custodial	3,063	3,140	3,218	3,299	3,381	3,466
403-4201-538.49-25	Assessments/Taxes	20,000	20,500	21,013	21,538	22,076	22,628
403-4201-538.49-35	CDL - Physicals/Licenses	120	123	126	129	132	136
403-4201-538.49-43	Regional Monitoring Prog.	10,000	10,250	10,506	10,769	11,038	11,314
403-4201-538.49-44	Project Green	11,900	12,198	12,502	12,815	13,135	13,464
403-4201-538.50-90	Indirect Cost Plan Change	171,998	176,298	180,705	185,223	189,854	194,600
403-4201-538.60-01	Capital Outlays - Equipment	4,280	4,387	4,497	4,609	4,724	4,842
	Total General Services	$ 1,797,864	$ 1,844,372	$ 1,892,097	$ 1,941,071	$ 1,991,329	$ 2,042,903
			2.6%	2.6%	2.6%	2.6%	2.6%

Operating Activity & Reserve		2020	2021	2022	2023	2024	2025
Customer Service							
403-4202-514.10-01	Salaries - Regular	$ 7,768	$ 7,962	$ 8,161	$ 8,365	$ 8,574	$ 8,789
403-4202-514.20-01	Employer Paid Benefits	3,930	4,068	4,210	4,357	4,510	4,668
403-4202-514.31-01	Office & Operating Supply	200	205	210	215	221	226
403-4202-514.42-01	Telecommunications	50	51	53	54	55	57
403-4202-514.42-02	Communications - Postage	1,750	1,794	1,839	1,885	1,932	1,980
403-4202-514.45-02	IMS Rental	5,994	6,144	6,297	6,455	6,616	6,782
403-4202-514.45-08	Lease Miscellaneous	500	513	525	538	552	566
403-4202-514.46-06	AWC-L & I Pool	765	784	804	824	844	866
403-4202-514.49-01	Excise Taxes	62,427	62,739	63,053	63,368	63,685	64,003
403-4202-514.49-01	Excise Taxes - on New Rate Rev.	2,809	5,774	8,901	12,199	15,678	19,346
403-4202-514.49-02	Printing & Binding	500	513	525	538	552	566
403-4202-514.49-27	Bad Debt Expense	1,800	1,845	1,891	1,938	1,987	2,037
	Total Customer Service	$ 88,493	$ 92,390	$ 96,469	$ 100,738	$ 105,206	$ 109,883
			4.4%	4.4%	4.4%	4.4%	4.4%
Stormwater Facility Maintenance							
403-4203-538.10-01	Salaries - Regular	$ 374,446	$ 383,807	$ 393,402	$ 403,237	$ 413,318	$ 423,651
403-4203-538.10-05	Salaries - Overtime	4,000	4,100	4,203	4,308	4,415	4,526
403-4203-538.10-06	Salaries - Part-Time	44,761	45,880	47,027	48,203	49,408	50,643
403-4203-538.20-01	Employer Paid Benefits	209,073	216,391	223,964	231,803	239,916	248,313
403-4203-538.31-01	Office & Operating Supply	35,040	35,916	36,814	37,734	38,678	39,645
403-4203-538.31-02	Small Tools & Equipment	2,500	2,563	2,627	2,692	2,760	2,829
403-4203-538.31-17	Supplies - Uniform Purchase	1,600	1,640	1,681	1,723	1,766	1,810
403-4203-538.31-22	Manhole/Ring/Lid Replace	4,000	4,100	4,203	4,308	4,415	4,526
403-4203-538.34-01	Fuel	750	769	788	808	828	849
403-4203-538.41-01	Prof. Svc - Other	13,000	13,325	13,658	14,000	14,350	14,708
403-4203-538.45-01	Equipment Rental	356,747	365,666	374,807	384,177	393,782	403,626
403-4203-538.47-01	Utility - Electric	900	923	946	969	993	1,018
403-4203-538.47-02	Utility - City of Lacey	13,000	13,325	13,658	14,000	14,350	14,708
403-4203-538.48-01	Rep & Maint - Equipment	800	820	841	862	883	905
403-4203-538.48-03	Rep & Maint - Facilities	52,050	53,351	54,685	56,052	57,453	58,890
403-4203-538.49-10	Uniform Contract/Cleaning	500	513	525	538	552	566
403-4203-538.49-29	Vactor Waste	30,000	30,750	31,519	32,307	33,114	33,942
403-4203-538.60-03	Building Improv	125,000	-	-	-	-	-
	Total Stormwater Facility Maintenance	$ 1,268,167	$ 1,173,837	$ 1,205,347	$ 1,237,720	$ 1,270,981	$ 1,305,155
			-7.4%	2.7%	2.7%	2.7%	2.7%
Gap Analysis	Programmatic & Staffing Costs						
	Recommended Level of Service	$ 2,728	$ 694,816	$ 612,799	$ 732,486	$ 782,532	$ 773,807
	Total Operating Expenditures	$ 3,157,252	$ 3,805,415	$ 3,806,711	$ 4,012,015	$ 4,150,048	$ 4,231,749
			20.5%	0.0%	5.4%	3.4%	2.0%
Capital Activity							
	2013 Revenue Bonds Debt Service	$ 101,635	$ 101,525	$ 102,207	$ 101,971	$ 101,685	$ 101,517
	Rate Funded Capital	934,650	414,181	584,553	604,225	702,506	868,857
	Total Capital Activity	$ 1,036,285	$ 515,707	$ 686,760	$ 706,197	$ 804,192	$ 970,374
Revenue Less Obligations		$ 11,672	$ 50,811	$ 53,363	$ 56,043	$ 58,858	$ 61,814
Ending Fund Balance		**$ 1,011,672**	**$ 1,062,484**	**$ 1,115,847**	**$ 1,171,890**	**$ 1,230,748**	**$ 1,292,563**
90-Day Target		*1,011,672*	*1,062,484*	*1,115,847*	*1,171,890*	*1,230,748*	*1,292,563*

Capital Activity		2020	2021	2022	2023	2024	2025	Total
Beginning Fund Balance		**$ 5,438,103**	**$ 5,731,149**	**$ 4,398,564**	**$ 4,109,005**	**$ 4,014,433**	**$ 3,347,439**	
Revenues								
Rate Funded Capital		$ 934,650	$ 414,181	$ 584,553	$ 604,225	$ 702,506	$ 868,857	$ 4,108,973
Interest Earnings		13,595	14,328	10,996	10,273	10,036	8,369	$ 67,597
Total Resources		$ 6,386,349	$ 6,159,658	$ 4,994,114	$ 4,723,503	$ 4,726,975	$ 4,224,664	$ 4,176,570
Capital Expenditures								
19-1	Westminster Pond Modification	-	-	(65,564)	(315,142)	-	-	(380,706)
19-2	26th Loop Conveyance	-	-	-	(112,551)	(475,302)	-	(587,853)
19-3	Stormwater Design Manual (SDM) Update	(51,500)	(63,654)	(76,491)	-	-	-	(191,645)
19-4	Woodland Creek Stormwater Treatment Facility	-	(53,045)	(469,873)	-	-	-	(522,918)
19-5	Woodland Creek Community Park Habitat Restoration	-	(53,045)	-	-	-	-	(53,045)
19-6	Stormwater Management Action Planning (SMAP)	-	-	(109,273)	-	-	-	(109,273)
19-7	Regional Water Quality Facility Program	-	-	-	(112,551)	(115,927)	-	(228,478)
19-8	Infiltration Retrofit Program	-	-	-	-	(115,927)	(119,405)	(235,333)
19-9	Miscellaneous Storm System Improvements	(154,500)	(159,135)	(163,909)	(168,826)	(173,891)	(179,108)	(999,369)
19-10	Stormwater Comprehensive Plan (SCP) Update	-	-	-	-	(92,742)	(202,989)	(295,731)
19-11	Land Purchase for Future Facility Improvements	-	(371,315)	-	-	-	-	(371,315)
13-7	Diamond Stormwater Alternative	-	-	-	-	-	(95,524)	(95,524)
13-9	Clearbrook Drainage System Improvements	-	-	-	-	-	(95,524)	(95,524)
13-10	Homann Area System Rehabilitation (Analysis/Design)	-	-	-	-	(139,113)	(238,810)	(377,923)
13-11	1010 Midway Storm Improvements	-	-	-	-	-	-	-
13-12	Belair-Impala Storm System Installation	(103,000)	(1,060,900)	-	-	-	-	(1,163,900)
13-14	Alder and Gemini Drainage System Improvements	-	-	-	-	(81,149)	(537,324)	(618,473)
13-15	White Fir Stormwater Installation	-	-	-	-	-	-	-
13-16	5th Ct SE and 5th Way Easement Storm Improvements	-	-	-	-	-	-	-
13-17	Shady Lane Treatment Facility Improvements	-	-	-	-	(185,484)	-	(185,484)
	CIP already underway in 2020	(346,200)	-	-	-	-	-	(346,200)
Total Escalated Capital Expenditures		$ (655,200)	$ (1,761,094)	$ (885,109)	$ (709,071)	$ (1,379,536)	$ (1,468,684)	(6,858,694)
Ending Fund Balance		**$ 5,731,149**	**$ 4,398,564**	**$ 4,109,005**	**$ 4,014,433**	**$ 3,347,439**	**$ 2,755,980**	
	1% of Fixed Assets Target Min.	*648,274*	*665,885*	*674,736*	*681,827*	*695,622*	*710,309*	

Note: The following projects have planned expenditures in 2026 or beyond: 13-7; 13-9; 13-11; 13-15, and 13-16.

V.B. ORDINANCE NO. 1556

ORDINANCE NO. 1556

CITY OF LACEY

AN ORDINANCE RELATING TO STORMWATER SERVICE RATES, AMENDING SECTION 13.70.030 OF THE LACEY MUNICIPAL CODE AND APPROVING A SUMMARY FOR PUBLICATION.

WHEREAS, the City of Lacey is committed to comply with the Phase II Western Washington Municipal Stormwater Permit, which provides for the requirements necessary to preserve water quality and resources, and

WHEREAS, it is necessary to increase the stormwater service rates in order to provide for the additional maintenance costs to meet system requirements and provide funding for scheduled capital improvements; NOW, THEREFORE,

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF LACEY, WASHINGTON, as follows:

Section 1. Section 13.70.030 of the Lacey Municipal Code is hereby amended to read as follows:

13.70.030 Service charge rate.

Subject to the rate adjustments provided in LMC 13.70.035, the storm and surface water utility charges shall be levied upon the basis of a flat monthly rate for all developed single-family residential parcels and two-family residential parcels and a sliding rate for all other parcels. The sliding rate shall be determined by measuring the amount of impervious surface area on each parcel and dividing that figure by the total area of the parcel to determine the percent of impervious surface and therefore the rate category. The monthly charge shall be that amount resulting from multiplying the service charge for the rate category applicable to the parcel by the total area of the parcel. The rate categories, the parameters of impervious surface for said rate categories and the monthly service charge applicable to each category shall be as follows:

~~Rate Category~~	~~Percent of Impervious Surface~~	~~2014 Monthly Service Charge Per Gross Acre~~	~~2015 Monthly Service Charge Per Gross Acre~~	~~2016 Monthly Service Charge Per Gross Acre~~
~~1 Single Family Residence~~	~~N/A~~	~~8.03~~	~~8.75~~	~~9.54~~
~~2 Duplex Family Residence~~	~~N/A~~	~~16.05~~	~~17.50~~	~~19.07~~
~~3 Very Light~~	~~0% to 10%~~	~~3.68~~	~~4.01~~	~~4.38~~
~~4 Moderate Light~~	~~>10% to 25%~~	~~13.32~~	~~14.51~~	~~15.82~~
~~5 Light~~	~~>25% to 40%~~	~~25.78~~	~~28.10~~	~~30.63~~
~~6 Moderate~~	~~>40% to 55%~~	~~39.29~~	~~42.83~~	~~46.69~~
~~7 Moderately Heavy~~	~~>55% to 70%~~	~~53.50~~	~~58.31~~	~~63.56~~
~~8 Heavy~~	~~>70% to 85%~~	~~69.01~~	~~75.22~~	~~81.99~~
~~9 Very Heavy~~	~~>85% to 100%~~	~~85.38~~	~~93.07~~	~~101.44~~

Rate Category	Percent of Impervious Surface	~~2017 Monthly Service Charge Per Gross Acre~~	~~2018 Monthly Service Charge Per Gross Acre~~	~~2019 Monthly Service Charge Per Gross Acre~~	2020 Monthly Service Charge Per Gross Acre
1 Single Family Residence	N/A	~~10.11~~	~~10.72~~	~~11.36~~	11.87
2 Duplex Family Residence	N/A	~~20.22~~	~~21.43~~	~~22.72~~	23.74
3 Very Light	0% to 10%	~~4.64~~	~~4.92~~	~~5.21~~	5.45
4 Moderate Light	>10% to 25%	~~16.77~~	~~17.78~~	~~18.84~~	19.69
5 Light	>25% to 40%	~~32.46~~	~~34.41~~	~~36.48~~	38.12
6 Moderate	>40% to 55%	~~49.49~~	~~52.46~~	~~55.60~~	58.11
7 Moderately Heavy	>55% to 70%	~~67.37~~	~~71.42~~	~~75.70~~	79.11
8 Heavy	>70% to 85%	~~86.91~~	~~92.13~~	~~97.66~~	102.05
9 Very Heavy	>85% to 100%	~~107.53~~	~~113.98~~	~~120.82~~	126.26

The rates set forth above shall be effective for all stormwater utility billings during calendar year 2020 and thereafter ~~rendered on or after January 1, 2014, through 2019. Thereafter, the 2019 rates shall remain in effect~~ until further amended.

Section 2. This Ordinance shall be effective as of January 1, 2020.

Section 3. The City Clerk and the codifiers of this ordinance are authorized to make necessary corrections to this ordinance including, but not limited to, the correction of scrivener's/clerical errors, references, ordinance numbering, section/subsection numbers and any references thereto.

Section 4. The Summary attached hereto is hereby approved for publication.

PASSED BY THE CITY COUNCIL OF THE CITY OF LACEY, WASHINGTON, on this 14th day of November, 2019.

CITY COUNCIL

Mayor

Attest:

City Clerk

Approved as to form:

City Attorney

SUMMARY FOR PUBLICATION

ORDINANCE NO. 1556

CITY OF LACEY

The City Council of the City of Lacey, Washington, passed on November 14, 2019, Ordinance No. 1556, entitled "AN ORDINANCE RELATING TO STORMWATER SERVICE RATES, AMENDING SECTION 13.70.030 OF THE LACEY MUNICIPAL CODE AND APPROVING A SUMMARY FOR PUBLICATION."

A section by section summary of this ordinance is as follows:

Section 1 amends section 13.70.030 establishing stormwater rates for 2020 for purposes of providing revenue for increased maintenance and capital expenditures for the stormwater utility system.

Section 2 establishes the effective date of January 1, 2020.

Section 3 provides provisions for corrections.

Section 4 approves this summary.

A copy of the full text of this Ordinance will be mailed without charge to any person requesting the same from the City of Lacey.

Published: November 18, 2019

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V.C. FISCAL POLICIES PER RESOLUTION NO. 992

RESOLUTION NO. 992

CITY OF LACEY

A RESOLUTION OF THE CITY OF LACEY, WASHINGTON, AMENDING THE FISCAL POLICIES OF THE CITY.

WHEREAS, the stewardship of public funds, their safe-keeping, proper use and management, is one of the most important responsibilities entrusted to the officials and managers of the City of Lacey, and

WHEREAS, the City Council adopted Resolution No. 945 on May 14, 2009, which established the City of Lacey's fiscal policies, and

WHEREAS, new regulations, standards, and updated guidance require additions and amendments to the adopted fiscal policies,

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF LACEY, WASHINGTON, that those certain policies set forth in the document entitled City of Lacey Fiscal Policies, attached hereto and made a part hereof as though fully set forth at length are hereby approved and adopted as the fiscal policies to be followed by the City Council and management of the City of Lacey.

PASSED BY THE CITY COUNCIL OF THE CITY OF LACEY, WASHINGTON, this 28th day of February, 2013.

CITY COUNCIL

Mayor

Attest:

City Clerk

Approved as to form:

City Attorney

Resolution No. 992
Page 1

Reserve Fund Policies

Purpose:

Adequate reserve levels are a necessary component of the City's overall financial management strategy and a key factor in how external rating agencies (Standard & Poor's and Moody's) measure the City's overall financial strength.

Policies:

1. Reserves required by law, ordinance, and bond covenants shall be maintained.
2. It will be the policy of the City to maintain an operating reserve equal to at least two (2) months operating revenues in the General, Utility, and Internal Service funds.
    a. This reserve will exclude the beginning fund balance and identified one-time revenues.
    b. Operating reserves are maintained to address temporary revenue shortfalls; payment of approved expenditures due to cash flow shortage; reserves for expenditures deemed necessary by the City Council; and, temporary short-term interfund loans.
    c. The committed fund balance designation can only be removed by the same formal action of the City Council
3. Assigned fund balances are established based on the intent expressed by the City Council.
    a. The City Manager and Finance Director are authorized by Resolution No. 974 to classify fund balances as assigned.
4. All expenditures drawn from committed and assigned reserve accounts will require Council approval unless previously authorized by adoption and/or amendment of the annual budget.
    a. The order of the spending of fund balances shall be restricted, committed, assigned, and unassigned.

2

Enterprise Fund Policies

Purpose:

Enterprise funds are to be established for City services when it is the intent of the City to finance all costs of services through user charges.

Policies:

1. Enterprise funds will be established for all City-operated utility services, which include water, wastewater, stormwater, and reclaimed water.
2. Enterprise fund expenditures will be established at a level sufficient to properly maintain the fund's infrastructure and provide for necessary replacement while also contributing to capital development.
3. Each enterprise fund will maintain an adequate rate structure to cover the costs of all operations, including maintenance, depreciation, capital and debt service requirements, reserves (as established by fiscal policy or bond covenant), and any other cost deemed necessary.
4. Rates may be offset from available fund cash after requirements are met for cash flow and scheduled reserve contributions.
5. Enterprise funds will establish and maintain reserves for general contingency and capital purposes consistent with those maintained for general government services.
6. Revenue bonds will be issued only when projected operating revenues and general facility connection fees are insufficient for the enterprise's capital financing needs.
7. The City will insure that net operating revenues of the enterprise constitute a minimum of 1.2 times the annual debt service requirements.
8. Generally, the City will limit the maturities of all utility revenue bond issues to twenty (20) years but under unusual circumstances shall not exceed thirty (30) years.

5

Debt Management Policies

Purpose:

The issuance of debt by the City and the amount of debt is an important factor in measuring the City's financial performance and condition. A debt policy can assist the Council and staff to integrate the issuance of debt with other long-term planning, financial and management objectives. This policy requires an evaluation of the impact of each debt issue on the City's overall financial position, in addition to providing guidance to not exceed acceptable levels of indebtedness.

Policies:

1. The City will not use long-term debt to finance current operations.
2. Whenever possible, the City will identify alternative sources of funding to minimize the level of debt.
    a. The City will examine and pursue all applicable state and federal grant and low-interest loan programs for funding capital improvement projects.
3. Long-term borrowing will be confined to capital improvements or similar projects with an extended life when it is not practical to be financed from current revenues.
4. Debt payment schedules shall not extend beyond the estimated useful life of the asset being financed.
5. The City will keep the average maturity of general obligation bonds at or below twenty (20) years.
6. The City will maintain good communications with bond rating agencies (Standard & Poor's and Moody's) concerning its financial condition, and will take all appropriate and responsible measures to sustain quality bond ratings.
    a. The City's annual financial report will be distributed to the rating agencies and The Municipal Securities Rulemaking Board (MSRB) no later than July 31st of the following year of the report.
    b. The report shall include all secondary market disclosure required by the Securities Exchange Commission (SEC).
    c. Disclosures required by MSRB will be made within the required timeframes.
7. The City may use interfund loans rather than outside debt instruments to meet short-term cash flow needs.
    a. Interfund loans are to be authorized by Council resolution and will include a repayment schedule including an interest amount at least equivalent to prevailing rates set through the Washington State Local Government Investment Pool.
    b. A short-term, interfund loan is defined as three to five years when cash is available and will not impact the lending fund's current operating requirements.
8. Short-term debt instruments (e.g., Bond Anticipation Notes, etc.), if used, should be limited to twelve to twenty-four months and then only to meet the immediate financing needs of a project for which long-term financing has been secured but not yet received.
    a. Exceptions may be necessary for large scale LID/ULID projects.
9. Special Assessment bonds or other self-supporting bonds will be issued in place of general obligation bonds, where possible, to assure the greatest degree of public equity and flexibility for City finances.
10. The City will use the services of legally certified and credible bond counsel and underwriter in the preparation of all bond representations.

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11. The City will comply with all statutory debt limitations imposed by the Revised Code of Washington (RCW).
    a. The City's debt limit will not exceed an aggregated total of 7.5% of the assessed value of the taxable property within the City.
    b. Compliance with state law and this policy will be documented each year in the City's CAFR.
    c. The following individual percentages (as defined by state law) will not be exceeded in any specific debt category:
        i. General Debt — 2.5% of assessed value
        ii. Utility Debt — 2.5% of assessed value
        iii. Open Space and Park Facilities — 2.5% of assessed value
12. No debt will be issued for which the City is not confident that a sufficient, specifically identified revenue source is available for repayment.
13. Credit enhancements will be considered for each long-term bond issue where there is a cost/benefit to the City or unique circumstances warrant the expense.
14. Reserve accounts will be maintained as required by bond ordinances and where deemed advisable.
    a. The City will structure such debt service reserves so that they do not violate IRS arbitrage regulations.
15. The City will use refunding bonds where appropriate when restructuring its current outstanding debt and/or improving restrictive bond conditions.
16. Bond refunding opportunities will be evaluated as they become available. The net present value savings percentage and current market conditions will be considered before beginning the refunding process. The net present value savings percentage should be at least 5.0 percent.

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APPENDIX F-2

Alternative Stormwater Utility Rate Study: No Rate Increase for 2021 Memorandum

FCS GROUP
Solutions-Oriented Consulting

| Memorandum

Date: June 10, 2020

To: Doug Christenson, Water Resources Engineer;
Public Works, City of Lacey

From: John Ghilarducci, Principal
Tage Aaker, Project Manager

Subject: 2022-2025 Impact of No Rate Increase in 2021

Original Scenario

FCS GROUP recently completed a rate study for the City of Lacey's stormwater utility in May of 2020. The recommended rate adjustments from this study are shown in **Exhibit 1**. These increases enable the utility to operate on a standalone basis by recovering costs associated with operations and maintenance, fiscal policy achievement, and the programmatic, staffing, and capital project needs identified in the City's Stormwater Comprehensive Plan.

Exhibit 1: Original Scenario: Recommended Rate Adjustments and Capital Activity

Original Scenario	2021	2022	2023	2024	2025
Across-the-Board Increase	4.5%	4.5%	4.5%	4.5%	4.5%
Annual Rate Funded Capital	$414,000	$585,000	$604,000	$703,000	$869,000
Ending Capital Reserve	$4,399,000	$4,109,000	$4,014,000	$3,347,000	$2,756,000

Due to the economic impacts of the COVID-19 pandemic on the City's ratepayers, the City requested that FCS GROUP analyze the implications of not increasing utility rates in 2021. Two scenarios were generated for the City's consideration, and the preferred scenario is documented in this memo.

Preferred Alternative Scenario

This scenario intends to fund a similar amount of annual rate funded capital by 2025, by increasing rate adjustments in 2022-2025 to make up for a zero percent rate increase in 2021.

Exhibit 2: Alternative Scenario: Recommended Rate Adjustments and Capital Activity

Alternative Scenario	2021	2022	2023	2024	2025
Across-the-Board Increase	0.0%	5.5%	5.5%	5.5%	5.5%
Annual Rate Funded Capital	$232,000	$434,000	$489,000	$627,000	$838,000
Ending Capital Reserve	$4,216,000	$3,775,000	$3,564,000	$2,821,000	$2,198,000

The only difference between the Alternative Scenario and the Original Scenario documented in the main body of the report is the rate adjustments and resulting impacts on annual rate funded capital and the capital reserve. No changes to inflation, operating, or capital expenditures were made under this scenario. The capital reserve is sufficient to absorb the delay in rate increases – however, the ending capital reserve will be less in the Alternative Scenario as a result. The following observations are provided for the Alternative Scenario:

- The Alternative Scenario targets a similar level of rate funded capital by 2025;
  - » Original Scenario: $869,000
  - » Alternative Scenario: $838,000
- The capital reserve in the Alternative Scenario is lower than in the Original Scenario because of the 'late start' with no rate increases in 2021;
  - » Original Scenario: $2,756,000
  - » Alternative Scenario: $2,198,000
- The monthly rate in 2025 is similar under either scenario:
  - » Original Scenario: $14.79
  - » Alternative Scenario: $14.71
- In either scenario, in any year, the operative reserve meets the minimum target.
- In either scenario, in any year, the capital reserve exceeds the minimum target.

Summary

The City has sufficient reserves to defer stormwater rate increases until 2022. The recommended rate adjustment strategy if the City adopts no rate increase in 2021 is to increase rates at 5.5% per year for 2022-25. In comparison, the City could achieve a similar result by increasing rates at 4.5% per year for 2021-25. The detailed forecast tables for both the Original Scenario and Alternative Scenario are provided in the appendices to this memo.

Exhibit 3: Impact to Single-Family Monthly Rate

	2021	2022	2023	2024	2025
Original Scenario					
Across-the-Board Increase	4.5%	4.5%	4.5%	4.5%	4.5%
Monthly Single-Family Rate	$12.41	$12.96	$13.55	$14.16	$14.79
Alternative Scenario					
Across-the-Board Increase	0.0%	5.5%	5.5%	5.5%	5.5%
Monthly Single-Family Rate	$11.87	$12.52	$13.21	$13.94	$14.71
Alternative Below Original	($0.54)	($0.44)	($0.34)	($0.22)	($0.08)

APPENDICES – SUMMARY TABLES

City of Lacey
Revenue Requirement Study: Stormwater Utility **ALTERNATIVE SCENARIO**
One-Page Summary

Rate Adjustment	2020	2021	2022	2023	2024	2025
Annual Increase (%)	4.50%	0.00%	5.50%	5.50%	5.50%	5.50%
Debt Service Coverage (bonded debt)	10.44	3.92	5.87	6.44	7.83	9.94
Single Family Monthly Charge	$11.87	$11.87	$12.52	$13.21	$13.94	$14.71
Monthly Increase		$0.00	$0.65	$0.69	$0.73	$0.77

Operating Activity & Reserve		2020	2021	2022	2023	2024	2025
Beginning Fund Balance		**$ 1,000,000**	**$ 1,011,672**	**$ 1,062,484**	**$ 1,115,847**	**$ 1,171,890**	**$ 1,230,748**
Revenue							
403-0000-343.51-01	Sales	$ 4,102,893	$ 4,123,408	$ 4,371,946	$ 4,635,465	$ 4,914,868	$ 5,211,112
403-0000-345.83-00	Plan Checking Fees	4,069	4,069	4,069	4,069	4,069	4,069
403-0000-345.83-02	Inspection Services	14,634	14,634	14,634	14,634	14,634	14,634
	Street Sweeper Driver Grant	81,017	41,642	-	-	-	-
	Investment Interest	2,597	2,626	2,753	2,886	3,026	3,174
	Total Revenues	$ 4,205,209	$ 4,186,379	$ 4,393,402	$ 4,657,054	$ 4,936,597	$ 5,232,988
			-0.4%	4.9%	6.0%	6.0%	6.0%
Operating Expenditures							
General Services							
403-4201-538.10-01	Salaries - Regular	$ 353,645	$ 362,486	$ 371,548	$ 380,837	$ 390,358	$ 400,117
403-4201-538.10-05	Salaries - Overtime	1,000	1,025	1,051	1,077	1,104	1,131
403-4201-538.10-06	Salaries - Part-Time	953	977	1,001	1,026	1,052	1,078
403-4201-538.20-01	Employer Paid Benefits	156,102	161,566	167,220	173,073	179,131	185,400
403-4201-538.31-01	Office & Operating Supply	2,541	2,605	2,670	2,736	2,805	2,875
403-4201-538.31-02	Small Tools & Equipment	1,500	1,538	1,576	1,615	1,656	1,697
403-4201-538.31-17	Supplies - Uniform Purchase	2,260	2,317	2,374	2,434	2,495	2,557
403-4201-538.31-27	Software Upgrade	5,260	5,392	5,526	5,664	5,806	5,951
403-4201-538.31-35	Replaced Equipment	15,000	15,375	15,759	16,153	16,557	16,971
403-4201-538.41-01	Prof. Svc - Other	15,759	16,153	16,557	16,971	17,395	17,830
403-4201-538.41-02	Prof. Svc - Engineering	275,136	282,014	289,065	296,291	303,699	311,291
403-4201-538.41-05	Prof. Svc - Audit	450	461	473	485	497	509
403-4201-538.41-15	Prof. Svc - Legal	2,200	2,255	2,311	2,369	2,428	2,489
403-4201-538.41-17	Prof. Svc - Water Resources	564,024	578,125	592,578	607,392	622,577	638,141
403-4201-538.41-23	Prof. Svc - Local Monitor	40,000	41,000	42,025	43,076	44,153	45,256
403-4201-538.41-27	Prof. Svc - PIE Program	50,000	51,250	52,531	53,845	55,191	56,570
403-4201-538.41-32	Prof. Svc - Utility Locates	725	743	762	781	800	820
403-4201-538.41-42	Illicit Discharge Detect.	9,000	9,225	9,456	9,692	9,934	10,183
403-4201-538.41-43	Analyze Stormwater Sample	10,000	10,250	10,506	10,769	11,038	11,314
403-4201-538.42-01	Telecommunications	2,500	2,563	2,627	2,692	2,760	2,829
403-4201-538.43-01	Transportation/Per Diem	2,228	2,284	2,341	2,399	2,459	2,521
403-4201-538.43-02	Dues, Subscriptions, Publ	173	177	182	186	191	196
403-4201-538.43-03	Registrations	2,818	2,888	2,961	3,035	3,111	3,188
403-4201-538.45-01	Equipment Rental	5,424	5,560	5,699	5,841	5,987	6,137
403-4201-538.45-02	IMS Rental	35,330	36,213	37,119	38,047	38,998	39,973
403-4201-538.45-03	Copier Rentals	499	511	524	537	551	565
403-4201-538.46-01	Insurance - Liability	13,888	14,235	14,591	14,956	15,330	15,713
403-4201-538.46-02	Insurance - Fire/Property	377	386	396	406	416	427
403-4201-538.47-01	Utility - Electric	2,800	2,870	2,942	3,015	3,091	3,168
403-4201-538.47-02	Utility - City of Lacey	529	542	556	570	584	599
403-4201-538.47-03	Utility - Natural Gas	811	831	852	873	895	918
403-4201-538.47-07	Utility - Solid Waste	2,000	2,050	2,101	2,154	2,208	2,263
403-4201-538.48-01	Rep & Maint - Equipment	553	567	581	596	610	626
403-4201-538.49-06	Maintenance Contracts	1,018	1,043	1,070	1,096	1,124	1,152
403-4201-538.49-23	Custodial	3,063	3,140	3,218	3,299	3,381	3,466
403-4201-538.49-25	Assessments/Taxes	20,000	20,500	21,013	21,538	22,076	22,628
403-4201-538.49-35	CDL - Physicals/Licenses	120	123	126	129	132	136
403-4201-538.49-43	Regional Monitoring Prog.	10,000	10,250	10,506	10,769	11,038	11,314
403-4201-538.49-44	Project Green	11,900	12,198	12,502	12,815	13,135	13,464
403-4201-538.50-90	Indirect Cost Plan Change	171,998	176,298	180,705	185,223	189,854	194,600
403-4201-538.60-01	Capital Outlays - Equipment	4,280	4,387	4,497	4,609	4,724	4,842
	Total General Services	$ 1,797,864	$ 1,844,372	$ 1,892,097	$ 1,941,071	$ 1,991,329	$ 2,042,903
			2.6%	2.6%	2.6%	2.6%	2.6%

Operating Activity & Reserve		2020	2021	2022	2023	2024	2025
Customer Service							
403-4202-514.10-01	Salaries - Regular	$ 7,768	$ 7,962	$ 8,161	$ 8,365	$ 8,574	$ 8,789
403-4202-514.20-01	Employer Paid Benefits	3,930	4,068	4,210	4,357	4,510	4,668
403-4202-514.31-01	Office & Operating Supply	200	205	210	215	221	226
403-4202-514.42-01	Telecommunications	50	51	53	54	55	57
403-4202-514.42-02	Communications - Postage	1,750	1,794	1,839	1,885	1,932	1,980
403-4202-514.45-02	IMS Rental	5,994	6,144	6,297	6,455	6,616	6,782
403-4202-514.45-08	Lease Miscellaneous	500	513	525	538	552	566
403-4202-514.46-06	AWC-L & I Pool	765	784	804	824	844	866
403-4202-514.49-01	Excise Taxes	62,427	62,739	63,053	63,368	63,685	64,003
403-4202-514.49-01	Excise Taxes - on New Rate Rev.	2,809	2,823	6,461	10,336	14,462	18,854
403-4202-514.49-02	Printing & Binding	500	513	525	538	552	566
403-4202-514.49-27	Bad Debt Expense	1,800	1,845	1,891	1,938	1,987	2,037
	Total Customer Service	$ 88,493	$ 89,440	$ 94,029	$ 98,874	$ 103,990	$ 109,391
			1.1%	5.1%	5.2%	5.2%	5.2%
Stormwater Facility Maintenance							
403-4203-538.10-01	Salaries - Regular	$ 374,446	$ 383,807	$ 393,402	$ 403,237	$ 413,318	$ 423,651
403-4203-538.10-05	Salaries - Overtime	4,000	4,100	4,203	4,308	4,415	4,526
403-4203-538.10-06	Salaries - Part-Time	44,761	45,880	47,027	48,203	49,408	50,643
403-4203-538.20-01	Employer Paid Benefits	209,073	216,391	223,964	231,803	239,916	248,313
403-4203-538.31-01	Office & Operating Supply	35,040	35,916	36,814	37,734	38,678	39,645
403-4203-538.31-02	Small Tools & Equipment	2,500	2,563	2,627	2,692	2,760	2,829
403-4203-538.31-17	Supplies - Uniform Purchase	1,600	1,640	1,681	1,723	1,766	1,810
403-4203-538.31-22	Manhole/Ring/Lid Replace	4,000	4,100	4,203	4,308	4,415	4,526
403-4203-538.34-01	Fuel	750	769	788	808	828	849
403-4203-538.41-01	Prof. Svc - Other	13,000	13,325	13,658	14,000	14,350	14,708
403-4203-538.45-01	Equipment Rental	356,747	365,666	374,807	384,177	393,782	403,626
403-4203-538.47-01	Utility - Electric	900	923	946	969	993	1,018
403-4203-538.47-02	Utility - City of Lacey	13,000	13,325	13,658	14,000	14,350	14,708
403-4203-538.48-01	Rep & Maint - Equipment	800	820	841	862	883	905
403-4203-538.48-03	Rep & Maint - Facilities	52,050	53,351	54,685	56,052	57,453	58,890
403-4203-538.49-10	Uniform Contract/Cleaning	500	513	525	538	552	566
403-4203-538.49-29	Vactor Waste	30,000	30,750	31,519	32,307	33,114	33,942
403-4203-538.60-03	Building Improv	125,000	-	-	-	-	-
	Total Stormwater Facility Maintenance	$ 1,268,167	$ 1,173,837	$ 1,205,347	$ 1,237,720	$ 1,270,981	$ 1,305,155
			-7.4%	2.7%	2.7%	2.7%	2.7%
Gap Analysis	Programmatic & Staffing Costs						
	Recommended Level of Service	$ 2,728	$ 694,816	$ 612,799	$ 732,486	$ 782,532	$ 773,807
	Total Operating Expenditures	$ 3,157,252	$ 3,802,464	$ 3,804,271	$ 4,010,151	$ 4,148,832	$ 4,231,256
			20.4%	0.0%	5.4%	3.5%	2.0%
Capital Activity							
	2013 Revenue Bonds Debt Service	$ 101,635	$ 101,525	$ 102,207	$ 101,971	$ 101,685	$ 101,517
	Rate Funded Capital	934,650	231,578	433,560	488,888	627,222	838,400
	Total Capital Activity	$ 1,036,285	$ 333,104	$ 535,767	$ 590,860	$ 728,907	$ 939,917
Revenue Less Obligations		$ 11,672	$ 50,811	$ 53,363	$ 56,043	$ 58,858	$ 61,814
Ending Fund Balance		**$ 1,011,672**	**$ 1,062,484**	**$ 1,115,847**	**$ 1,171,890**	**$ 1,230,748**	**$ 1,292,563**
90-Day Target		*1,011,672*	*1,062,484*	*1,115,847*	*1,171,890*	*1,230,748*	*1,292,563*

Capital Activity		2020	2021	2022	2023	2024	2025	Total
Beginning Fund Balance		**$ 5,438,103**	**$ 5,731,149**	**$ 4,215,961**	**$ 3,774,953**	**$ 3,564,208**	**$ 2,820,804**	
Revenues								
Rate Funded Capital		$ 934,650	$ 231,578	$ 433,560	$ 488,888	$ 627,222	$ 838,400	$ 3,554,300
Interest Earnings		13,595	14,328	10,540	9,437	8,911	7,052	$ 63,863
Total Resources		$ 6,386,349	$ 5,977,055	$ 4,660,062	$ 4,273,278	$ 4,200,340	$ 3,666,257	$ 3,618,163
Capital Expenditures								
19-1	Westminster Pond Modification	-	-	(65,564)	(315,142)	-	-	(380,706)
19-2	26th Loop Conveyance	-	-	-	(112,551)	(475,302)	-	(587,853)
19-3	Stormwater Design Manual (SDM) Update	(51,500)	(63,654)	(76,491)	-	-	-	(191,645)
19-4	Woodland Creek Stormwater Treatment Facility	-	(53,045)	(469,873)	-	-	-	(522,918)
19-5	Woodland Creek Community Park Habitat Restoration	-	(53,045)	-	-	-	-	(53,045)
19-6	Stormwater Management Action Planning (SMAP)	-	-	(109,273)	-	-	-	(109,273)
19-7	Regional Water Quality Facility Program	-	-	-	(112,551)	(115,927)	-	(228,478)
19-8	Infiltration Retrofit Program	-	-	-	-	(115,927)	(119,405)	(235,333)
19-9	Miscellaneous Storm System Improvements	(154,500)	(159,135)	(163,909)	(168,826)	(173,891)	(179,108)	(999,369)
19-10	Stormwater Comprehensive Plan (SCP) Update	-	-	-	-	(92,742)	(202,989)	(295,731)
19-11	Land Purchase for Future Facility Improvements	-	(371,315)	-	-	-	-	(371,315)
13-7	Diamond Stormwater Alternative	-	-	-	-	-	(95,524)	(95,524)
13-9	Clearbrook Drainage System Improvements	-	-	-	-	-	(95,524)	(95,524)
13-10	Homann Area System Rehabilitation (Analysis/Design)	-	-	-	-	(139,113)	(238,810)	(377,923)
13-11	1010 Midway Storm Improvements	-	-	-	-	-	-	-
13-12	Belair-Impala Storm System Installation	(103,000)	(1,060,900)	-	-	-	-	(1,163,900)
13-14	Alder and Gemini Drainage System Improvements	-	-	-	-	(81,149)	(537,324)	(618,473)
13-15	White Fir Stormwater Installation	-	-	-	-	-	-	-
13-16	5th Ct SE and 5th Way Easement Storm Improvements	-	-	-	-	-	-	-
13-17	Shady Lane Treatment Facility Improvements	-	-	-	-	(185,484)	-	(185,484)
	CIP already underway in 2020	(346,200)	-	-	-	-	-	(346,200)
Total Escalated Capital Expenditures		$ (655,200)	$ (1,761,094)	$ (885,109)	$ (709,071)	$ (1,379,536)	$ (1,468,684)	(6,858,694)
Ending Fund Balance		**$ 5,731,149**	**$ 4,215,961**	**$ 3,774,953**	**$ 3,564,208**	**$ 2,820,804**	**$ 2,197,572**	
	1% of Fixed Assets Target Min.	*648,274*	*665,885*	*674,736*	*681,827*	*695,622*	*710,309*	

City of Lacey
Revenue Requirement Study: Stormwater Utility **ORIGINAL SCENARIO**
One-Page Summary

Rate Adjustment	2020	2021	2022	2023	2024	2025
Annual Increase (%)	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Debt Service Coverage (bonded debt)	10.44	5.72	7.35	7.58	8.59	10.25
Single Family Monthly Charge	$11.87	$12.41	$12.96	$13.55	$14.16	$14.79
Monthly Increase		$0.53	$0.56	$0.58	$0.61	$0.64

Operating Activity & Reserve		2020	2021	2022	2023	2024	2025
Beginning Fund Balance		**$ 1,000,000**	**$ 1,011,672**	**$ 1,062,484**	**$ 1,115,847**	**$ 1,171,890**	**$ 1,230,748**
Revenue							
403-0000-343.51-01	Sales	$ 4,102,893	$ 4,308,961	$ 4,525,379	$ 4,752,666	$ 4,991,368	$ 5,242,060
403-0000-345.83-00	Plan Checking Fees	4,069	4,069	4,069	4,069	4,069	4,069
403-0000-345.83-02	Inspection Services	14,634	14,634	14,634	14,634	14,634	14,634
	Street Sweeper Driver Grant	81,017	41,642	-	-	-	-
	Investment Interest	2,597	2,626	2,753	2,886	3,026	3,174
	Total Revenues	$ 4,205,209	$ 4,371,932	$ 4,546,835	$ 4,774,255	$ 5,013,098	$ 5,263,936
			4.0%	4.0%	5.0%	5.0%	5.0%
Operating Expenditures							
General Services							
403-4201-538.10-01	Salaries - Regular	$ 353,645	$ 362,486	$ 371,548	$ 380,837	$ 390,358	$ 400,117
403-4201-538.10-05	Salaries - Overtime	1,000	1,025	1,051	1,077	1,104	1,131
403-4201-538.10-06	Salaries - Part-Time	953	977	1,001	1,026	1,052	1,078
403-4201-538.20-01	Employer Paid Benefits	156,102	161,566	167,220	173,073	179,131	185,400
403-4201-538.31-01	Office & Operating Supply	2,541	2,605	2,670	2,736	2,805	2,875
403-4201-538.31-02	Small Tools & Equipment	1,500	1,538	1,576	1,615	1,656	1,697
403-4201-538.31-17	Supplies - Uniform Purchase	2,260	2,317	2,374	2,434	2,495	2,557
403-4201-538.31-27	Software Upgrade	5,260	5,392	5,526	5,664	5,806	5,951
403-4201-538.31-35	Replaced Equipment	15,000	15,375	15,759	16,153	16,557	16,971
403-4201-538.41-01	Prof. Svc - Other	15,759	16,153	16,557	16,971	17,395	17,830
403-4201-538.41-02	Prof. Svc - Engineering	275,136	282,014	289,065	296,291	303,699	311,291
403-4201-538.41-05	Prof. Svc - Audit	450	461	473	485	497	509
403-4201-538.41-15	Prof. Svc - Legal	2,200	2,255	2,311	2,369	2,428	2,489
403-4201-538.41-17	Prof. Svc - Water Resources	564,024	578,125	592,578	607,392	622,577	638,141
403-4201-538.41-23	Prof. Svc - Local Monitor	40,000	41,000	42,025	43,076	44,153	45,256
403-4201-538.41-27	Prof. Svc - PIE Program	50,000	51,250	52,531	53,845	55,191	56,570
403-4201-538.41-32	Prof. Svc - Utility Locates	725	743	762	781	800	820
403-4201-538.41-42	Illicit Discharge Detect.	9,000	9,225	9,456	9,692	9,934	10,183
403-4201-538.41-43	Analyze Stormwater Sample	10,000	10,250	10,506	10,769	11,038	11,314
403-4201-538.42-01	Telecommunications	2,500	2,563	2,627	2,692	2,760	2,829
403-4201-538.43-01	Transportation/Per Diem	2,228	2,284	2,341	2,399	2,459	2,521
403-4201-538.43-02	Dues, Subscriptions, Publ	173	177	182	186	191	196
403-4201-538.43-03	Registrations	2,818	2,888	2,961	3,035	3,111	3,188
403-4201-538.45-01	Equipment Rental	5,424	5,560	5,699	5,841	5,987	6,137
403-4201-538.45-02	IMS Rental	35,330	36,213	37,119	38,047	38,998	39,973
403-4201-538.45-03	Copier Rentals	499	511	524	537	551	565
403-4201-538.46-01	Insurance - Liability	13,888	14,235	14,591	14,956	15,330	15,713
403-4201-538.46-02	Insurance - Fire/Property	377	386	396	406	416	427
403-4201-538.47-01	Utility - Electric	2,800	2,870	2,942	3,015	3,091	3,168
403-4201-538.47-02	Utility - City of Lacey	529	542	556	570	584	599
403-4201-538.47-03	Utility - Natural Gas	811	831	852	873	895	918
403-4201-538.47-07	Utility - Solid Waste	2,000	2,050	2,101	2,154	2,208	2,263
403-4201-538.48-01	Rep & Maint - Equipment	553	567	581	596	610	626
403-4201-538.49-06	Maintenance Contracts	1,018	1,043	1,070	1,096	1,124	1,152
403-4201-538.49-23	Custodial	3,063	3,140	3,218	3,299	3,381	3,466
403-4201-538.49-25	Assessments/Taxes	20,000	20,500	21,013	21,538	22,076	22,628
403-4201-538.49-35	CDL - Physicals/Licenses	120	123	126	129	132	136
403-4201-538.49-43	Regional Monitoring Prog.	10,000	10,250	10,506	10,769	11,038	11,314
403-4201-538.49-44	Project Green	11,900	12,198	12,502	12,815	13,135	13,464
403-4201-538.50-90	Indirect Cost Plan Change	171,998	176,298	180,705	185,223	189,854	194,600
403-4201-538.60-01	Capital Outlays - Equipment	4,280	4,387	4,497	4,609	4,724	4,842
	Total General Services	$ 1,797,864	$ 1,844,372	$ 1,892,097	$ 1,941,071	$ 1,991,329	$ 2,042,903
			2.6%	2.6%	2.6%	2.6%	2.6%

Operating Activity & Reserve		2020	2021	2022	2023	2024	2025
Customer Service							
403-4202-514.10-01	Salaries - Regular	$ 7,768	$ 7,962	$ 8,161	$ 8,365	$ 8,574	$ 8,789
403-4202-514.20-01	Employer Paid Benefits	3,930	4,068	4,210	4,357	4,510	4,668
403-4202-514.31-01	Office & Operating Supply	200	205	210	215	221	226
403-4202-514.42-01	Telecommunications	50	51	53	54	55	57
403-4202-514.42-02	Communications - Postage	1,750	1,794	1,839	1,885	1,932	1,980
403-4202-514.45-02	IMS Rental	5,994	6,144	6,297	6,455	6,616	6,782
403-4202-514.45-08	Lease Miscellaneous	500	513	525	538	552	566
403-4202-514.46-06	AWC-L & I Pool	765	784	804	824	844	866
403-4202-514.49-01	Excise Taxes	62,427	62,739	63,053	63,368	63,685	64,003
403-4202-514.49-01	Excise Taxes - on New Rate Rev.	2,809	5,774	8,901	12,199	15,678	19,346
403-4202-514.49-02	Printing & Binding	500	513	525	538	552	566
403-4202-514.49-27	Bad Debt Expense	1,800	1,845	1,891	1,938	1,987	2,037
	Total Customer Service	$ 88,493	$ 92,390	$ 96,469	$ 100,738	$ 105,206	$ 109,883
			4.4%	4.4%	4.4%	4.4%	4.4%
Stormwater Facility Maintenance							
403-4203-538.10-01	Salaries - Regular	$ 374,446	$ 383,807	$ 393,402	$ 403,237	$ 413,318	$ 423,651
403-4203-538.10-05	Salaries - Overtime	4,000	4,100	4,203	4,308	4,415	4,526
403-4203-538.10-06	Salaries - Part-Time	44,761	45,880	47,027	48,203	49,408	50,643
403-4203-538.20-01	Employer Paid Benefits	209,073	216,391	223,964	231,803	239,916	248,313
403-4203-538.31-01	Office & Operating Supply	35,040	35,916	36,814	37,734	38,678	39,645
403-4203-538.31-02	Small Tools & Equipment	2,500	2,563	2,627	2,692	2,760	2,829
403-4203-538.31-17	Supplies - Uniform Purchase	1,600	1,640	1,681	1,723	1,766	1,810
403-4203-538.31-22	Manhole/Ring/Lid Replace	4,000	4,100	4,203	4,308	4,415	4,526
403-4203-538.34-01	Fuel	750	769	788	808	828	849
403-4203-538.41-01	Prof. Svc - Other	13,000	13,325	13,658	14,000	14,350	14,708
403-4203-538.45-01	Equipment Rental	356,747	365,666	374,807	384,177	393,782	403,626
403-4203-538.47-01	Utility - Electric	900	923	946	969	993	1,018
403-4203-538.47-02	Utility - City of Lacey	13,000	13,325	13,658	14,000	14,350	14,708
403-4203-538.48-01	Rep & Maint - Equipment	800	820	841	862	883	905
403-4203-538.48-03	Rep & Maint - Facilities	52,050	53,351	54,685	56,052	57,453	58,890
403-4203-538.49-10	Uniform Contract/Cleaning	500	513	525	538	552	566
403-4203-538.49-29	Vactor Waste	30,000	30,750	31,519	32,307	33,114	33,942
403-4203-538.60-03	Building Improv	125,000	-	-	-	-	-
	Total Stormwater Facility Maintenance	$ 1,268,167	$ 1,173,837	$ 1,205,347	$ 1,237,720	$ 1,270,981	$ 1,305,155
			-7.4%	2.7%	2.7%	2.7%	2.7%
Gap Analysis	Programmatic & Staffing Costs						
	Recommended Level of Service	$ 2,728	$ 694,816	$ 612,799	$ 732,486	$ 782,532	$ 773,807
	Total Operating Expenditures	$ 3,157,252	$ 3,805,415	$ 3,806,711	$ 4,012,015	$ 4,150,048	$ 4,231,749
			20.5%	0.0%	5.4%	3.4%	2.0%
Capital Activity							
	2013 Revenue Bonds Debt Service	$ 101,635	$ 101,525	$ 102,207	$ 101,971	$ 101,685	$ 101,517
	Rate Funded Capital	934,650	414,181	584,553	604,225	702,506	868,857
	Total Capital Activity	$ 1,036,285	$ 515,707	$ 686,760	$ 706,197	$ 804,192	$ 970,374
Revenue Less Obligations		$ 11,672	$ 50,811	$ 53,363	$ 56,043	$ 58,858	$ 61,814
Ending Fund Balance		**$ 1,011,672**	**$ 1,062,484**	**$ 1,115,847**	**$ 1,171,890**	**$ 1,230,748**	**$ 1,292,563**
90-Day Target		*1,011,672*	*1,062,484*	*1,115,847*	*1,171,890*	*1,230,748*	*1,292,563*

Capital Activity		2020	2021	2022	2023	2024	2025	Total
Beginning Fund Balance		**$ 5,438,103**	**$ 5,731,149**	**$ 4,398,564**	**$ 4,109,005**	**$ 4,014,433**	**$ 3,347,439**	
Revenues								
Rate Funded Capital		$ 934,650	$ 414,181	$ 584,553	$ 604,225	$ 702,506	$ 868,857	$ 4,108,973
Interest Earnings		13,595	14,328	10,996	10,273	10,036	8,369	$ 67,597
Total Resources		$ 6,386,349	$ 6,159,658	$ 4,994,114	$ 4,723,503	$ 4,726,975	$ 4,224,664	$ 4,176,570
Capital Expenditures								
19-1	Westminster Pond Modification	-	-	(65,564)	(315,142)	-	-	(380,706)
19-2	26th Loop Conveyance	-	-	-	(112,551)	(475,302)	-	(587,853)
19-3	Stormwater Design Manual (SDM) Update	(51,500)	(63,654)	(76,491)	-	-	-	(191,645)
19-4	Woodland Creek Stormwater Treatment Facility	-	(53,045)	(469,873)	-	-	-	(522,918)
19-5	Woodland Creek Community Park Habitat Restoration	-	(53,045)	-	-	-	-	(53,045)
19-6	Stormwater Management Action Planning (SMAP)	-	-	(109,273)	-	-	-	(109,273)
19-7	Regional Water Quality Facility Program	-	-	-	(112,551)	(115,927)	-	(228,478)
19-8	Infiltration Retrofit Program	-	-	-	-	(115,927)	(119,405)	(235,333)
19-9	Miscellaneous Storm System Improvements	(154,500)	(159,135)	(163,909)	(168,826)	(173,891)	(179,108)	(999,369)
19-10	Stormwater Comprehensive Plan (SCP) Update	-	-	-	-	(92,742)	(202,989)	(295,731)
19-11	Land Purchase for Future Facility Improvements	-	(371,315)	-	-	-	-	(371,315)
13-7	Diamond Stormwater Alternative	-	-	-	-	-	(95,524)	(95,524)
13-9	Clearbrook Drainage System Improvements	-	-	-	-	-	(95,524)	(95,524)
13-10	Homann Area System Rehabilitation (Analysis/Design)	-	-	-	-	(139,113)	(238,810)	(377,923)
13-11	1010 Midway Storm Improvements	-	-	-	-	-	-	-
13-12	Belair-Impala Storm System Installation	(103,000)	(1,060,900)	-	-	-	-	(1,163,900)
13-14	Alder and Gemini Drainage System Improvements	-	-	-	-	(81,149)	(537,324)	(618,473)
13-15	White Fir Stormwater Installation	-	-	-	-	-	-	-
13-16	5th Ct SE and 5th Way Easement Storm Improvements	-	-	-	-	-	-	-
13-17	Shady Lane Treatment Facility Improvements	-	-	-	-	(185,484)	-	(185,484)
	CIP already underway in 2020	(346,200)	-	-	-	-	-	(346,200)
Total Escalated Capital Expenditures		$ (655,200)	$ (1,761,094)	$ (885,109)	$ (709,071)	$ (1,379,536)	$ (1,468,684)	(6,858,694)
Ending Fund Balance		**$ 5,731,149**	**$ 4,398,564**	**$ 4,109,005**	**$ 4,014,433**	**$ 3,347,439**	**$ 2,755,980**	
	1% of Fixed Assets Target Min.	*648,274*	*665,885*	*674,736*	*681,827*	*695,622*	*710,309*	