CITY OF LYNDEN

STORMWATER MANAGEMENT ACTION PLAN

CENTRAL BUSINESS DISTRICT

SUB-BASIN # 9

CITY OF LYNDEN
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MARCH, 2023

REVIEWED AND ACCEPTED

Director of Public Works

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1 INTRODUCTION

The City of Lynden (City) has developed a Stormwater Management Program (SWMP) to meet the terms and conditions of its Western Washington Phase II Municipal Stormwater Permit (Permit) under the National Pollutant Discharge Elimination System (NPDES). This permit is required because the City of Lynden has been designated by the Environmental Protection Agency and the Washington State Department of Ecology as one of thousands of municipalities in the United States requiring a special stormwater permit. These permits were deemed necessary because stormwater runoff from streets, parking lots, construction sites, industrial properties, and residential areas is now recognized as one of the leading sources of pollution to our streams, lakes, wetlands, the Nooksack River and Puget Sound.

As part of this stormwater permit, stormwater planning elements are required (per permit section S5.C.1.d). This report documents the development of a Stormwater Management Action Plan or SMAP**.** A Stormwater Management Action Plan requires a planning approach that emphasizes protection of designated uses and improvements to receiving water quality and habitat under both existing and anticipated future developed conditions. The focus of a SMAP is addressing impacts from the cumulative development in a watershed rather than on single site or subdivision impacts. The plan will prioritize projects and activities to reduce harmful effects of stormwater runoff to waters of the State.

The goal of a SMAP is to help answer these two important questions:

1) How can we most strategically address existing stormwater problems?
2) How can we meet our future population and density targets while also protecting and improving conditions in receiving waters?

1.1 BACKGROUND ON THE STORMWATER MANAGEMENT ACTION PLAN PROCESS

The first step in the development of a Stormwater Management Action Plan (SMAP) was to conduct a Receiving Water Conditions Assessment (S5.C.1.d.i) to characterize the sub-basins within the City limits and to understand the relative influence that stormwater quality improvement efforts could affect. The goal was to determine across the City sub-basins, those that would gain the most benefit from stormwater management efforts.

The outcome of the Receiving Water Conditions Assessment was a watershed inventory that included a description of the relative conditions of the receiving waters and the contributing areas. Within the City of Lynden's jurisdiction, 15 main and 3 minor stormwater sub-basins were delineated (Figure 1) and characterized. Acreage of each sub-basin within the city limits was calculated and compared to the sub-basin total area. Land use by sub-basin was calculated based on the assessor's parcel database. Road density was also calculated by sub-basin. These characteristics were compared across sub-basins along with other qualitative parameters to complete the first round of the receiving waters assessment / watershed inventory step of the SMAP. More specifics on each of these sub-basins can be found in the Watershed

Characterization Report (Receiving Water Assessment/ Watershed Inventory) submitted to Ecology in March 2022 with the 2021 annual report.

The second step in developing a SMAP was to undertake a receiving waters prioritization process. The goal of this step was to prioritize the City's sub-basins by developing a method using existing data sources to arrive at a ranked list of those sub-basins that would gain the most benefit from stormwater management efforts.

The stormwater management influence was assessed which included collecting existing data and comparing attributes for each of the sub-basins. The City developed a sub-basin prioritization method. More specifics on this process can be found in the Receiving Water Prioritization report (S5.C.1.d.ii) which was completed in June 2022.

Ranking was based on a combination of factors including:

- % of sub-basin under City jurisdiction
- Road density - % area in roads and right of ways (as a surrogate for impervious surfaces)
- Land use
- # of known outfalls
- # of capital improvement projects underway or planned
- Known deficiencies (high, moderate, low) based on R&E deficiency map 2015 and updated with knowledge of recent development and completed capital project (as a surrogate for age of infrastructure), and
- Development pressure (high, moderate, low) assigned in coordination with planning department sub area plans and the Comprehensive Land Use Plan.

Through this process the City selected the Central Business District (CBD) sub-basin 9 as the top ranking sub-basin (Figure 2). This sub-basin encompasses the designated downtown Historic Business District (HBD) and surrounding drainage areas. Sub-basin 9 drains directly to the Nooksack River and the entire sub-basin is within the City's jurisdiction. It was also chosen because stormwater runoff from this area is not likely to improve without intervention from the City. The built-out nature of the sub-basin means that improving the receiving water from this sub-basin, the Nooksack River, through stormwater retrofits is the focus; protection of the resource through land acquisition is limited. Other municipal projects are underway in the same area and provide the opportunity to accomplish more with combined street and stormwater projects.

This report documents the development of the SMAP for the Central Business District sub-basin 9 (S5.C.1.d.iii). Two sources were used for guidance in this assessment: Building Cities in the Rain – Watershed Prioritization (Commerce, 2016) and DOE Stormwater Management Action Planning Guidance (DOE, 2019).

Figure 1: Lynden Stormwater Management Sub-basins

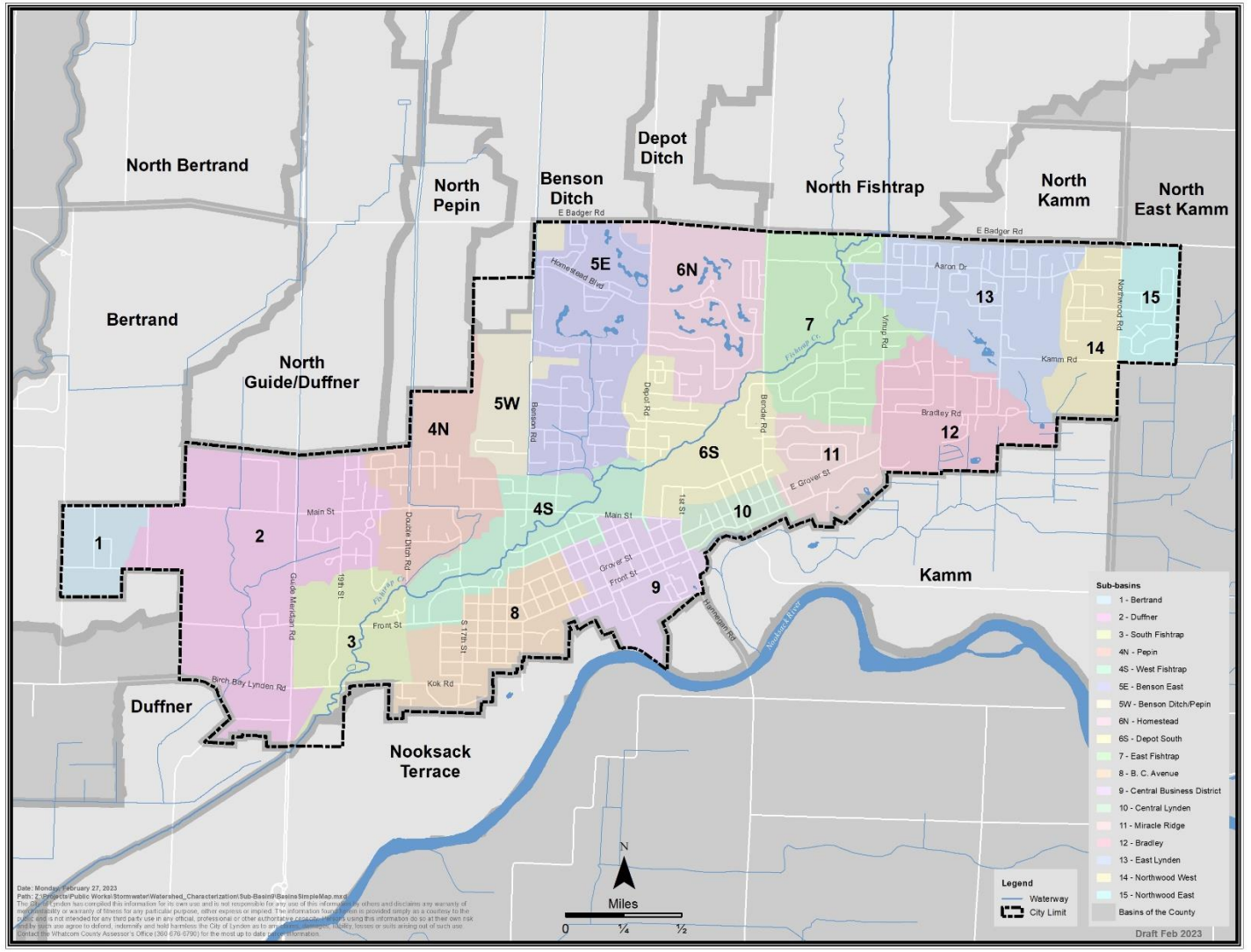
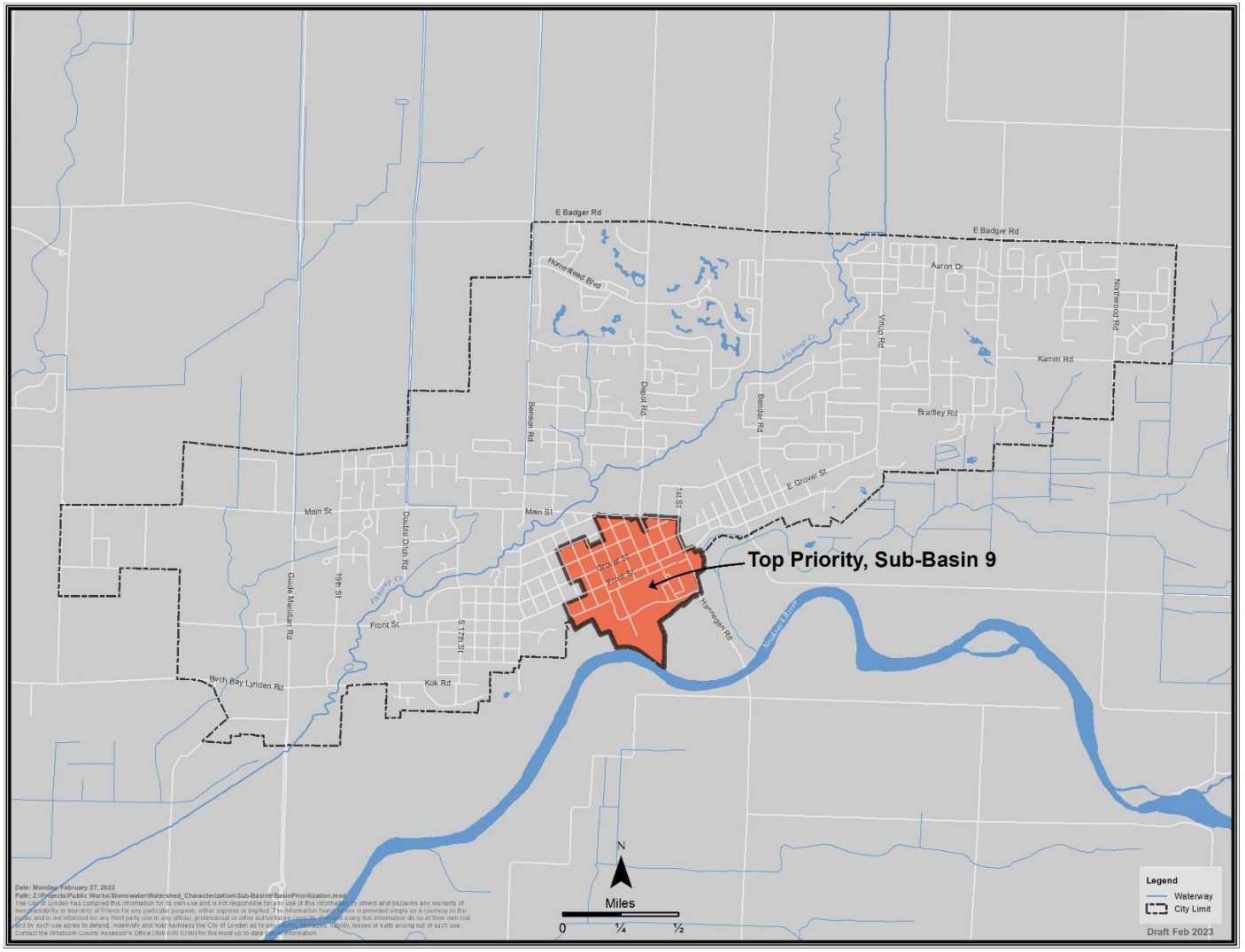


Figure 2: Lynden Stormwater Management Basin Prioritization



2 BACKGROUND ON THE CENTRAL BUSINESS DISTRICT SUB-BASIN

The Central Business District or CBD sub-basin drains 149 acres and is entirely within the city limits. This sub-basin is the zone where the City's economic activity originated. It encompasses the designated Historic Business District (HBD) and surrounding drainage areas. The historic business district is a section of downtown Lynden lined with commercial and retail businesses located along Front St. The boundaries of the HBD are considered to be the alley between Grover St. and Front St. to the north, Judson Alley to the south to 7th St to the west, and the vicinity of 3rd St. to the east. The total area of the HBD is approximately 12.4 acres.

The Central Business District sub-basin is intended to be an active mix of professional offices and residences, personal services and small retail establishments serving the employees and residents of the area. Emphasis on the City's cultural history is anchored by the Pioneer Museum on the east and the Windmill Inn on the west. Storefronts and streetscapes encourage pedestrian activity.

Land use in the CBD is mixed (Table 1 and Figure 3). Commercial and road infrastructure (Figure 4) are the most common usage. Single and multiple family residential properties occupy a quarter of the land base and parks and undeveloped lands also play a role.

Table 1: Land Use in the Central Business District Sub-basin

CBD (Central Business District) Sub-basin No. 9*		
Consolidated Land Use Category +	**Acres**	**% of Sub-basin Area**
Agriculture and undeveloped	2	1%
General commercial	34	23%
High use commercial	2	2%
Industrial	14	9%
Parks and undeveloped	27	18%
Residential Multi	18	12%
Residential Single	14	10%
Roads	38	26%
Grand Total	149	100%

* Central Business District was designated as sub-basin 9, referred to as the HBD sub-basin in the Watershed Characterization Report

\+ Land use designations are parcel based and calculated by summing different land use types into the categories presented in the Whatcom Co Assessor's parcel database

Figure 3: Land Use in the Central Business District Sub-basin

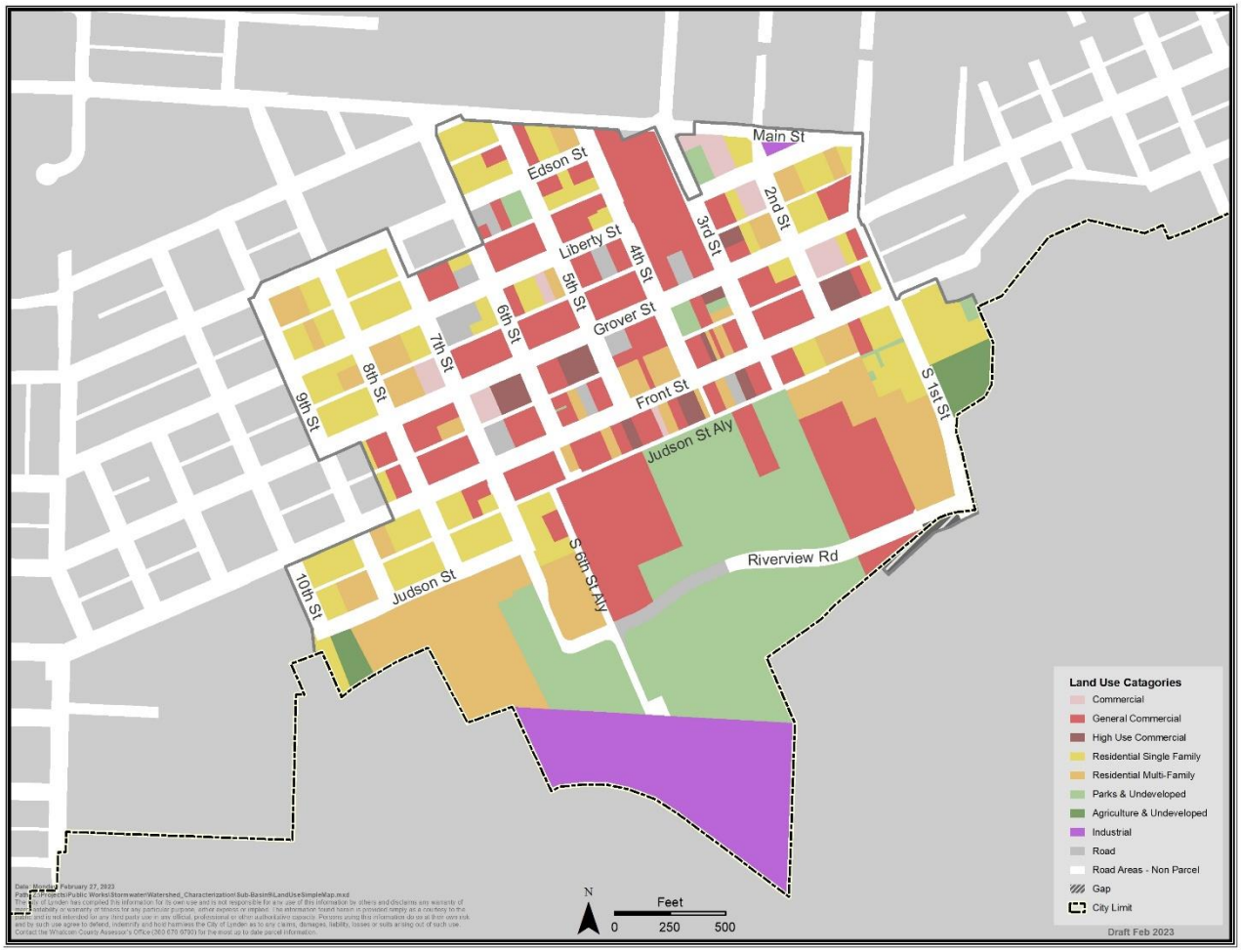
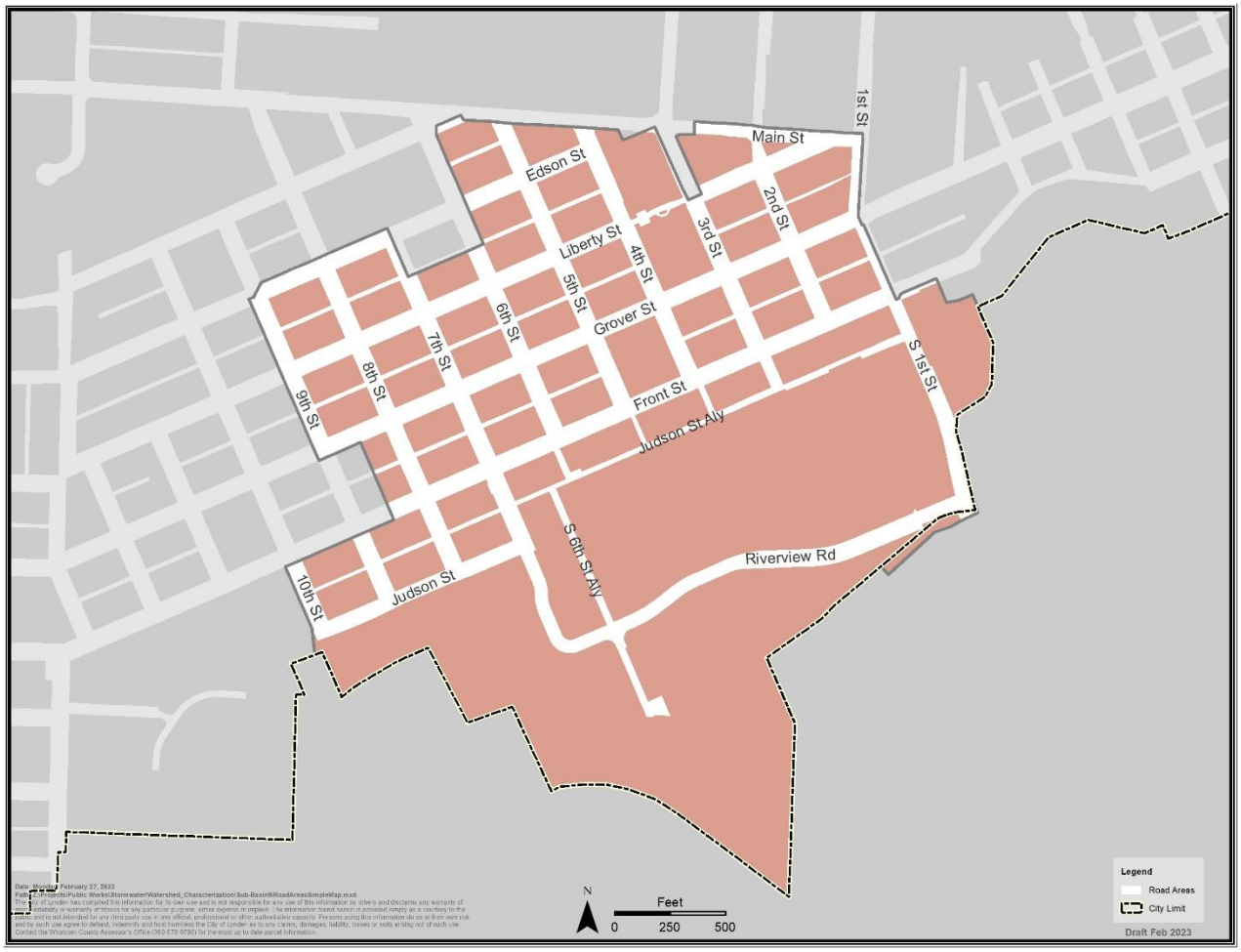


Figure 4: Roads in the Central Business District Sub-basin



3 STORMWATER RETROFITS IN THE CBD (S5.C.1.D.III.A)

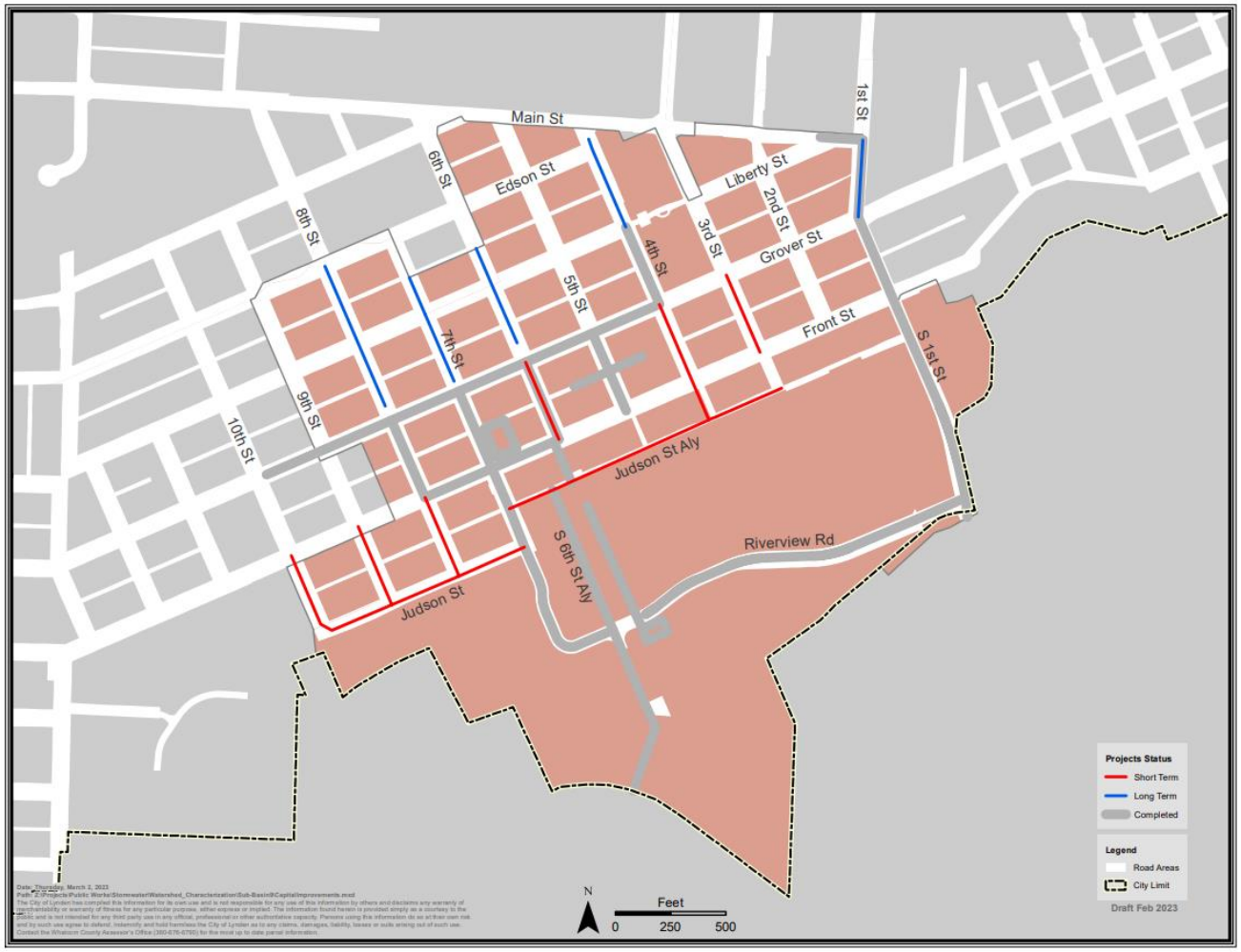
The City has been focused on implementing stormwater retrofits and improvements in the CBD sub-basin for many years. The need for improvements to deal with the aging infrastructure and the lack of space due to the built out nature of the area required a many phased approach. Nine projects have been completed in the CBD since 2007 (Table 2 and Figure 5) and many others are in motion.

Table 2: Completed Stormwater Retrofit and Improvement Projects

Stormwater Management Action Plan Number	Project Name and Short Description	Timeline notes
SW-CBD-1	2005 Arterial Reconstruction Grover	2007- 2008
SW-CBD-2	Library Offsite stormwater improvements	2007-2008
SW-CBD-3	2009 Arterial Improvement	2009
SW-CBD-4	The HBD Treatment Facility associated with Phase 1 of the City's WaterTreatment Plant project	2012
SW-CBD-5	5th Street Revitalization – 5th street between Front and Grover + 4/5th alley and parking lot	2015
SW-CBD-6	Riverview Road Gap Elimination	2016 -2017
SW-CBD-7	7th Street Rehabilitation Improved two blocks of 7th Street between Grover Street and Judson Street and a public parking lot.	2021
SW-CBD-8**	Judson Area Low Impact Development - Preliminary Design (DOE Stormwater Grant)	2021
SW-CBD-9***	Whatcom County Lynden Levee and Channel Realignment repair work; wetland mitigation floodgate installation	2021 - 2022

* Stormwater capital improvement project identifier SWO-3/-4
** Stormwater capital improvement project identifier SWO-10a
*** In coordination with Whatcom County

Figure 5: Status of Stormwater Improvement Projects in the Central Business District Sub-basin



3.1 COMPLETED STORMWATER PROJECT DESCRIPTIONS

SW-CBD-1 - 3 - Street Rehabilitation and Stormwater Improvements

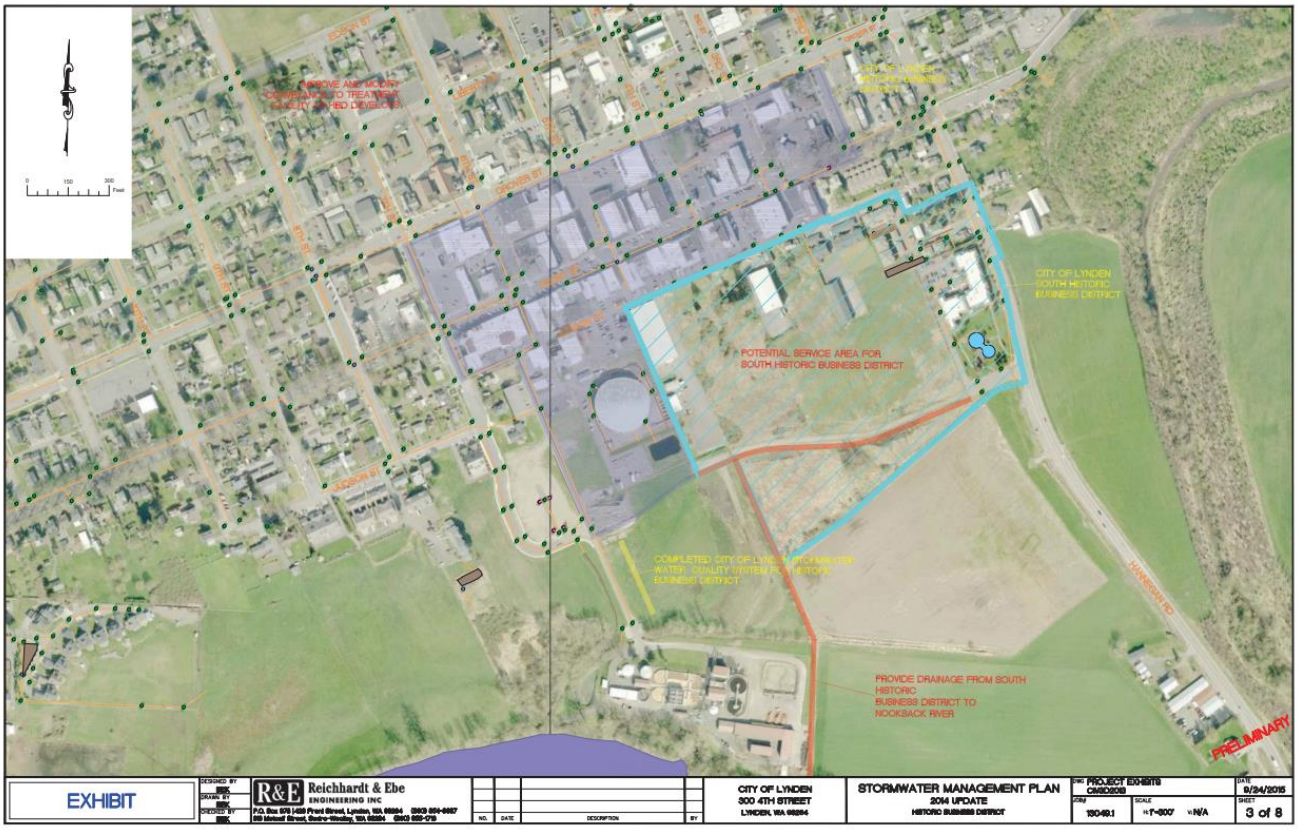
Three projects were designed and completed in the CBD from 2007-2009. These included rehabilitation of arterial streets in concert with updated stormwater conveyance and stormwater infiltration facilities as a retrofits. Road work and stormwater features were improved along 5th Street and 1st Street. Additional offsite stormwater improvements to 4th Street, Grover and 6th Street were made during the library update project.

SW-CBD-4 - The HBD Stormwater Treatment Facility

Many stormwater improvements were made in conjunction with Phase 1 of the City's WaterTreatment Plant project in 2012 (Figure 6). With future development pressures in mind, the City developed a stormwater bioretention facility was built to handle all of the inputs from the historic business district.

The Water Treatment Plant Replacement project was a phased project designed to replace the City's existing water treatment plant. It included the construction of a frontage road across the south side of the proposed treatment plant (Riverview) and a stormwater runoff facility. In conjunction with the above mentioned improvements, the City has taken steps to promote growth and development within the Historic Business District (HBD). The City's constructed stormwater treatment facility in association with the new treatment plant to accommodate stormwater runoff from the HBD is located south of the completed 6th Street roadway. This facility pre-dated the City's permit and is not required under the permit to be inspected annually. While it is still functional long-range planning is a top priority to keep this facility as an asset in water treatment of the HBD runoff.

Figure 6: Historic Business District Sub-basin Stormwater Drainage to Facility



SW-CBD-5&7 – Street Rehabilitation and Stormwater improvements

These two street projects were completed from 2015-2021 and contained stormwater elements. The 5th Street project improved roadways and stormwater facilities between Front Street and Grover and included partial improvement to the alleys. The 7th Street project involved work between Judson and Grover Streets, including roadway and sidewalks. Additional improvements include installing a storm drain system and improving the water main. Upgrades to the 7th Street parking lot were also included with this project. For the 7th street revitalization, runoff Treatment was not required, however, given the City's commitment to

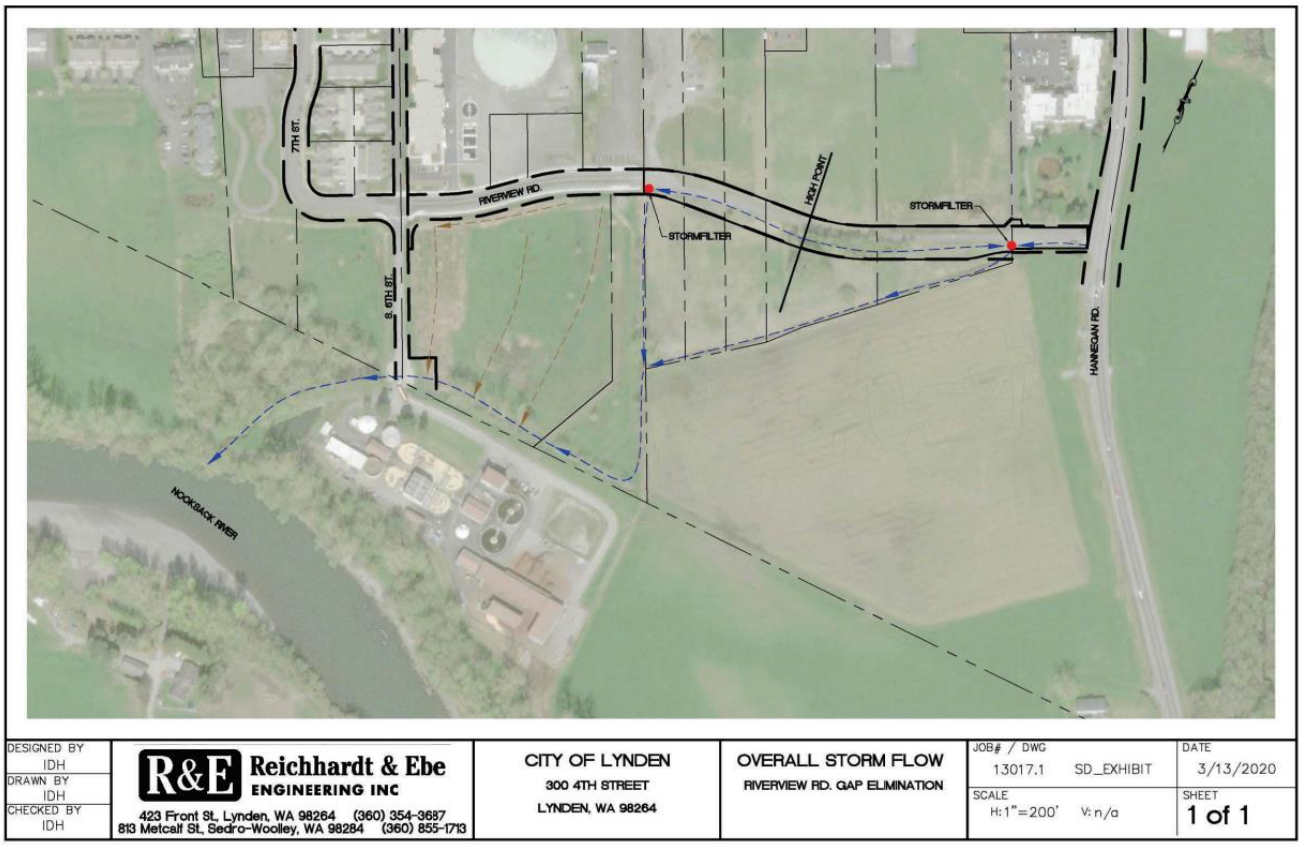
protecting the environment, runoff treatment was implemented into the project to go above and beyond Ecology's Stormwater Manual's (SWMMWW) minimum requirements. The Reichhardt & Ebe Engineering Memo (2021) stated the following:

> The Geotechnical Report, indicated that the site soils are suitable for stormwater infiltration. An Infiltration Trench with a sand filter was selected for treatment. The existing stormwater conveyance system along 7th Street was divided into two separate subbasins: The area south of Front Street draining into the existing stormwater conveyance system along Riverview Road, and the area north of Front Street draining into the existing stormwater conveyance system along Front Street; both the Riverview Road and the Front Street conveyance systems drain to the same outfall along the Nooksack River near the City's Wastewater Treatment Plant. The existing, City owned parking lot was rebuilt alongside the 7th Street Improvements which provided ample room for an infiltration trench. Due to limited space south of Front Street and limited topography it was decided only to incorporate treatment for the runoff from the areas north of Front Street and to place the treatment facility under the parking lot.

SW-CBD-6 – Riverview Road Gap Elimination

A new roadway was designed and built to eliminate the gap in Riverview Rd. that existed from approximately 600 feet east of S. 6th St. to approximately 100 feet west of S. 1st. St./Hannegan Rd (Reichhardt & Ebe Engineering, 2016). Figure 7 displays this road improvement section and associated stormwater runoff from the project that is managed with a stormwater filtration system. The stormwater filtration system provides the treatment necessary to meet the requirements set by the Washington State Department of Ecology (DOE). Detention is not required as the project site drains to an entirely manmade conveyance system that extends to an exempt receiving water. Stormwater pipes for future private drainage north of the project site are provided as part of the project. The intent of these pipes is to provide the property owners adjacent to the project site a way under the newly constructed roadway Since the completion of the Riverview Road project, no stormwater will be discharged from these pipes. These pipes will not be connected to the City owned stormwater system.

Figure 7: River Road Gap Elimination Stormwater Infrastructure



SW-CBD-8 – Judson Street Low Impact Development Demonstration

The Judson Street Low Impact Development demonstration project will improve water quality in the Nooksack River through design of stormwater low impact development (LID) best management practices at Judson Street. The City has secured grant funding from the Department of Ecology to design and build this LID demonstration project in the Central Business District. This multi-phase project will retrofit five square blocks in downtown Lynden with improved stormwater infrastructure in concert with a roadway maintenance project. This project will improve water quality in the Nooksack River through design of stormwater low impact development (LID) best management practices at Judson Street in the City of Lynden. The preliminary design has been completed for all phases and includes enhanced treatment for total suspended solids, dissolved coper, and dissolved zinc. The next phases of this project are discussed in Section 7.0 and include construction that will provide treatment and infiltration for runoff from 2.17 acres of residential development. The third phase of this project includes construction that will provide runoff treatment and infiltration for runoff from 1.71 acres of residential development.

SW-CBD-9 – Whatcom County Channel Realignment Project

This project included realigning a channel that runs adjacent to the Lynden Wastewater Treatment Plant and enhancing habitat in the newly created channel. It was constructed in conjunction with a levee improvement

project by the US Army Corps of Engineers (USACE). The USACE project included replacing two existing culverts that penetrate the levee with a new culvert and fish-friendly flood gate and restoring the levee crest and erosion protection. Both projects were constructed in tandem between June to September 2021. Riparian planting at both project sites and mitigation sites was completed in March 2022.

Summary of Completed Projects

While this section describes the capital improvement efforts that the City has already completed, Section 7 of this report provides information on stormwater management actions, projects, and retrofits for both the short-term and long-term horizons.

4 Land Management/ Development Strategies (S5.C.1.D.III.B)

Planning Development Strategies

The Central Business District sub-basin falls within the City's planning Central Lynden Subarea. The CBD ranked top priority for developing a SMAP for many reasons with redevelopment, limited space and aging infrastructure factoring in, as well as the fact that the City has jurisdiction of the entire basin. For the most part, the Central Lynden Subarea is well built out. The CBD is expected to continue to see some redevelopment, including additional residential where feasible.

Long-range plans will include looking at zoning and build-out projections. The CSL zoned portion of the subarea is functioning as a mixed-use overlay. A recent Ordinance 1657 addresses some changes that will allow more residential units in this commercial zoned area referred to as Small Scale Mixed Use in portions of the Central Lynden Subarea. This change may result in the ability to redevelop or develop new units in this location and probably more likely in the long-term as ownership turns over. The South Historic portion of the sub-basin is currently seeing a significant development.

Comprehensive Development Plan

The City is gearing up for an update to the Comprehensive Plan update for 2026. The efforts will get underway in 2023. Stormwater management issues will be fully integrated into the update. As part of this update, discussion about supporting appropriately designed infill projects and efforts to increase housing density within established residential zones will be addressed.

5 Targeted or Enhanced Implementation Actions (S5.C.1.D.III.C)

The City has identified enhanced operational practices to target stormwater management needs and implement actions through many elements of the stormwater program. These are summarized below:

- *Illicit Discharge Detection and Elimination (IDDE) field screening program*
  For the Central Business District, the IDDE efforts will include more frequent stormwater facility inspections and catchbasin cleaning as required. Focus will also be concentrated on maintaining the stormwater facility located south and east of Riverview Road and 6th Street.

- *Pollution Source Control Program*
  Potential pollutant generating businesses will be targeted in the Source Control Inspection Program. However, many of the businesses in the sub-basin are not potential pollutant generators per the Ecology Permit Appendix 8, but they do have a dumpsters outside their back door. These will be targeted through our Dumpster Management Program so that they don't fall through the cracks.

- *O&M Inspections or Enhanced Maintenance Program*
  Increased sweeping of the Central Business District will be scheduled per the City's Enhanced Maintenance Plan which is under finalization at this time. The City was awarded new grant funds to complete the maintenance plan and purchase a second sweeper. The new sweeper truck is expected in 2024 and will allow for the short-term and long-term action of an increased sweeping program.

- *Public Education and Outreach Programs*
  The Judson Street LID Demonstration project with include educational signage.

6 Coordination with Long-range Planning Efforts (S5.C.1.D.III.D)

The primary goal of the City's Coordinated Long- Range Plan was to summarize water quality and watershed protection policies, strategies, codes, and other measures that protect and improve local receiving water through planning efforts and report on how planning efforts (Comprehensive Plan, Growth Management, Shoreline Master Plan, Transportation plans etc.) addressed water quality improvements. The planning report was submitted to Ecology in December 2022 and provided specific answers to the Department of Ecology's Stormwater Annual Report questions 6 through 14 per (S5.C.1.b.i(a) and (b)).

7 Stormwater Management Actions - Short-term and Long-term (S5.C.1.D.III.E)

This section sets out the plan for current and future stormwater management work in the Central Business District. The City's strives to combine stormwater upgrades with every street improvement projects. Building on past efforts and successes this plan focuses on areas within the CBD that have yet to be addressed. The City has been awarded grant funding for many of the short-term projects and will use time in the short-term to identify methods of funding the long-term plans. For the purposes of this planning process the terms are defined in the following sections.

7.1 Short-term Actions

The City has 6 projects funded and underway in the short-term. Table 3 shows the short-term stormwater management action efforts with implementation schedule and budget. Figure 5 shows the progression of stormwater improvements by color coding the completed projects and the short and long-term projects.

Table 3: Short-Term Stormwater Projects (0-6 years)

Stormwater Management Action Plan Number	Description	Implementation Schedule and Timeline notes	Budget ($ in Thousands)		
			Local	State	Total
SW-CBD-10	Historic Business District (HBD) Stormwater Treatment Facility Inspection and Maintenance Plan	Within 2 yrs	30		30
SW - CBD-11 (SWO-10b* and STIP #10)	Judson LID Area -8th Street & Alley	Within 1 yrs	50	120	170
SW – CBD -12 (SWO-10c* and STIP #11a**)	Judson LID Area -9th Street & Alley	Within 2 yrs	202	859	1,06
SW-CBD-13 (SWO-10d* and STIP #11b**)	Judson LID Area -10th & Judson Front St. to Judson and E/W Alley to 10th	Within 5 yrs	50	120	170
SW-CBD-14 (STIP #22**)	Judson Street Alley – widen and reconstruct	2026-2028 construction slated	TBD+		
SW-CBD-15 (STIP #17**)	3rd Street Reconstruction	2026-2028 construction slated	20		20

* Stormwater capital improvement project identifier
**Six-year transportation improvement plan project identifier
+ To be determined

SW-CBD-10- Historic Business District Stormwater Facility Inspection and Maintenance Plan

The stormwater treatment facility was built in 2012 prior to the City's Phase II permit was issued. This facility is functioning but requires maintenance to meet current stormwater regulations. Although not required by the permit to conduct maintenance on this facility because it pre-dated the Permit issuance to the City, the City has identified this facility for stormwater management action efforts.

SW-CBD-11- 14 - Judson Area LID Demonstration Project – Construction Phases

The City has been awarded grant funds to continue this project from the completed design to construction. This project is slated to improve drainage and water quality to the Nooksack River through design of Low Impact Development (LID) facilities along Judson Street in the City of Lynden. This project will include approximately 5 square blocks between Front Street and Judson Street, from 7th to 10th Streets. The project is intended to apply LID Best Management Practices (BMPs) focused on using soils and vegetation to mimic pre-disturbance hydrologic processes of infiltration, filtration, storage, evaporation, or transpiration. Enhanced BMPs will also be employed to address road runoff pollutants.

During the design phase, soils, safety and space availability, and lifecycle maintenance will be weighed in the selection of appropriate BMP solutions. Community cooperation associated with retrofitting LID techniques into an existing neighborhood will be considered. Because the City has received requests from the public to provide street upgrades an outreach effort will be made as part of this project to communicate the benefits of LID and associated street improvement. The City will evaluate the cost of BMP lifecycle maintenance and will also identify stewardship opportunities with the neighborhood and community. This project will include an educational component with informational signage and tours.

SW-CBD-15– 3rd Street Reconstruction

Third Street will be reconstructed from Glover north to Main Street. This is a transportation STIP project and will include stormwater improvement elements.

7.2 Reoccurring Operational Best Management Actions

The City has identified several operational best management practices that will be conducted citywide to improve water quality. These BMPs will occur at an increased frequency in the Central Business District and implementation will be scheduled to begin in the short-term and continue for the long-term. Table 4 summarizes these practices.

Table 4: Reoccurring Operational Best Management Practices

Stormwater Management Action Plan Number	Project Name and Short Description	Timeline notes
SW -CBD -16	Comprehensive Plan update	To be initiated in 2023 for update in 2026 and will lay out long-term projects - Rezoning etc.
SW-CBD- 17	Low Impact Development Demonstration project maintenance and tours	On-going
SW-CBD- 18	WTP and HBD stormwater facility inspection and maintenance	On-going
SW-CBD- 19	Increased Sweeping frequency	On-going
SW-CBD- 20	Targeted Source Control efforts	On-going
SW-CBD- 21	Dumpster maintenance outreach and education	On-going

7.3 Long-term Actions

The City has been looking at improving stormwater management for a long time and continues to be dedicated to adding more management actions in the long-term. Table 5 identifies the long-term actions and Figure 5 shows them geographically. All of the long-term capital projects includes street reconstruction project in concert with stormwater retrofits. These long-term actions are currently slated partially for local funding and the City will be finding additional ways to finance these efforts through grant funding.

Table 5: Long-Term Stormwater Projects (7-20 years)

Stormwater Management Action Plan Number	Description	Implementation Schedule and Timeline notes
SW-CBD- 22 (STIP #19**)	6th Street Reconstruction	TBD construction slated
SW-CBD- 23	1st and 4th Street Reconstruction North of Grover to Main	TBD 1st Phase
SW-CBD-24	6th, 7th, and 8th Street Reconstruction North of Grover	TBD 2nd Phase

8 ADAPTIVE MANAGEMENT FEEDBACK PROCESS (S5.C.1.D.III.F)

As the short-term facility improvement and operational best management practices roll out the City will constantly be reassessing the need for adaption and alternative options. The Six-year Transportation Plan is updated annually and projects will be modified or added as deemed necessary. The Comprehensive Stormwater Plan capital improvement projects are also reviewed annually and are submitted to Ecology per Appendix 2 of the Phase II permit. In addition, the City's Comprehensive Plan per the Growth Management Act is up for an update in 2026 and any changes in land use, rezoning etc. will be incorporated into the Stormwater Management Action Plan and adaptation will be made as appropriate. The City also encourages the public to provide comment on the SMAP through its stormwater website.

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