Stormwater Management Plan (SWMP) (Final)

Prepared for

City of Liberty Lake

Prepared by

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Acronyms and Abbreviations

AKART	All know, available, and reasonable technologies
APA	Aquifer Protection Area
BMP	Best Management Practices
CIPs	Capital Improvement Projects
DNR	Department of Natural Resources
Ecology	Washington State Department of Ecology
EPA	Environmental Protection Agency
GIS	geographic information system
HOA	homeowners associations
IDDE	illicit discharge detection and elimination
LID	Low Impact Development
MS4	Municipal separate storm sewer system
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SRSM	Spokane Regional Stormwater Manual
SVRP	Spokane Valley Rathdrum Prairie
SWMP	Stormwater Management Program
SWMMEW	Stormwater Management Manual for Eastern Washington
TMDLs	total maximum daily loads
UIC	Underground Injection Control
WRIA	water resource inventory area

1. Introduction and Purpose

This document describes the core elements the City of Liberty Lake (City) is developing as part of the of Stormwater Master Plan (SWMP).

The objectives of the Stormwater Master Plan include:

- General program development.
- Stormwater Utility funding and code language for the establishment of an updated rate structure.
- Approaches to maintain and improve the functionality of the stormwater drainage system.
- Capital projects to resolve existing flooding problems.
- Resource planning.
- Policies and operating guidance.

1.1 Program Goals

1.1.1 Vision and Mission

The project kick-off with the joint City and Parametrix team was held in 2022. The focus of the kickoff was to develop the purpose and brainstorm the Plan needs and goals. The following Vision and Mission statement is recommended:

A fully functional, achievable, and sustainable stormwater system that is integrated into the landscape, supports envisioned growth, protects residents, and nurtures the environment.

Additional information to help guide plan preparation was collected by the team. This included resourcing inputs to inform the rate study and implementation plan as well as a discussion of administrative activities, organizational structure, and existing operation and maintenance practices.

1.2 Program Staff and Technical Advisory

The City identified departmental staff from a variety of disciplines to participate in stormwater planning activities.

The following departments or staff participated in the review and development of the SWMP:

- Public Works - Operations & Maintenance (Streets).
- Planning and Engineering (including GIS).
- Finance.

The development of the stormwater program plan included opportunities for public participation. The City provided a variety of public forums for interested parties to engage, comment, and provide feedback on Stormwater Program-related topics. The Liberty Lake City Council conducts public meetings offering opportunities for public comment on the first and third Tuesdays of each month.

Stormwater Program staff prepared reports and presented to the City Council five times during the planning process for the SWMP. Project materials were provided prior to City Council meetings to allow council members to familiarize themselves with the planning process, and the documents were posted online several days prior to the public meeting. The City Council meetings provided council members an opportunity to voice their concerns and offer direction for the Master Plan and for the

general public to comment on the materials presented. The public were given opportunities to comment during the public comment portion of the meetings. The following provides a summary of the reports and meetings held for the City Council:

- City Council Workshop 1: On March 19, 2024, City Staff supported by a consultant team provided a consolidated briefing to present four proposed site-specific Stormwater Program Capital Improvement Projects (CIPs), and two programmatic stormwater CIPs and solicited public comments. This meeting also provided updates on the status of the upcoming reauthorization of the Spokane County Regional Aquifer Protection Area (APA) fee, which was presented to the council by a program representative. The APA fee is discussed further in section 4.4.
- City Council Workshop 2: On May 21, 2024, the draft SWMP was presented to the City Council by City staff and the consultant team. Recommendations for level of service and program resources were discussed during this meeting, and public comments were solicited.
- City Council Workshop 3: On June 4, 2024, the draft Rate Study results were presented to the City Council by City staff and the consultant team. Recommendations for rate increases were discussed during this meeting.
- City Council Workshop 4: On June 18, 2024, the updated draft SWMP and Rate Study results were presented to the City Council by City staff and the consultant team. Recommendations for rate increases will be discussed during this meeting, and public comments were solicited.
- City Council SWMP and Rate Study Adoption: The Final SWMP and updated rates associated with the SWMP rate study will be posted on the City's website at least 10 days prior to a final presentation to the City Council by City staff and the consultant team.
  - → Tentatively, on September 3, 2024, City Council will hold a public hearing on the Final SWMP where the public will have an opportunity to comment. The first read of the ordinance adopting the Final SWMP and rate study by the City Council will take place following the public hearing.
  - → Tentatively, on September 20, 2024, the second read of the ordinance adopting the Final SWMP and rate study by the City Council will take place, where the public will again be given the opportunity to comment prior to the Council vote on the Ordinance Adopting the Final SWMP and Rate Study.

1.3 Plan Outline

The Plan structure generally follows this outline. Section 2 describes the study area, with a discussion of the physical setting and natural drainage system. Section 3 describes the current built environment in the context of how it affects water resources, such as land cover and stormwater facilities. This section includes the status of the City's mapped Stormwater Asset Database. Section 4 describes the programmatic elements of the project that will be defined, such as regulatory drivers, *Stormwater Design Manual* compliance, and related programs like the Underground Injection Control (UIC) program and APA program. Section 5 describes the proposed stormwater capital projects, both site specific and programmatic in nature. Section 6 describes the operation and resources needs assessment, including projected operations and maintenance activities, equipment and staffing needs. Section 7 describes the rate study and the proposed utility fee rate schedule updates. Section 8 includes the implementation plan, which provides the framework necessary to develop a program rate and budget and determine a timeline for program implementation.

1.4 Plan Resources

The City was incorporated in 2001, and this will be the first Stormwater Management Plan prepared for the Utility. Key material used for a starting point include the GIS mapping data collected and developed under Task 2 of this effort, such as topography, soils and their drainage characteristics, surface drainage disposition, the location of existing stormwater structures, and roads. Other geology and hydrology data was collected from reliable internet sources.

2. Background Conditions

As part of the City of Liberty Lake SWMP Project Task 2 of this effort, the City performed a gaps analysis to identify and summarize the program needs. The process consisted of outlining core SWMP elements and identifying program gaps to inform recommendations for improvement and develop resource estimates to meet the City's level of service goals under this plan. The following sections outline the data collected as part of this task.

2.1 Physical Conditions of the Area

2.1.1 Geology

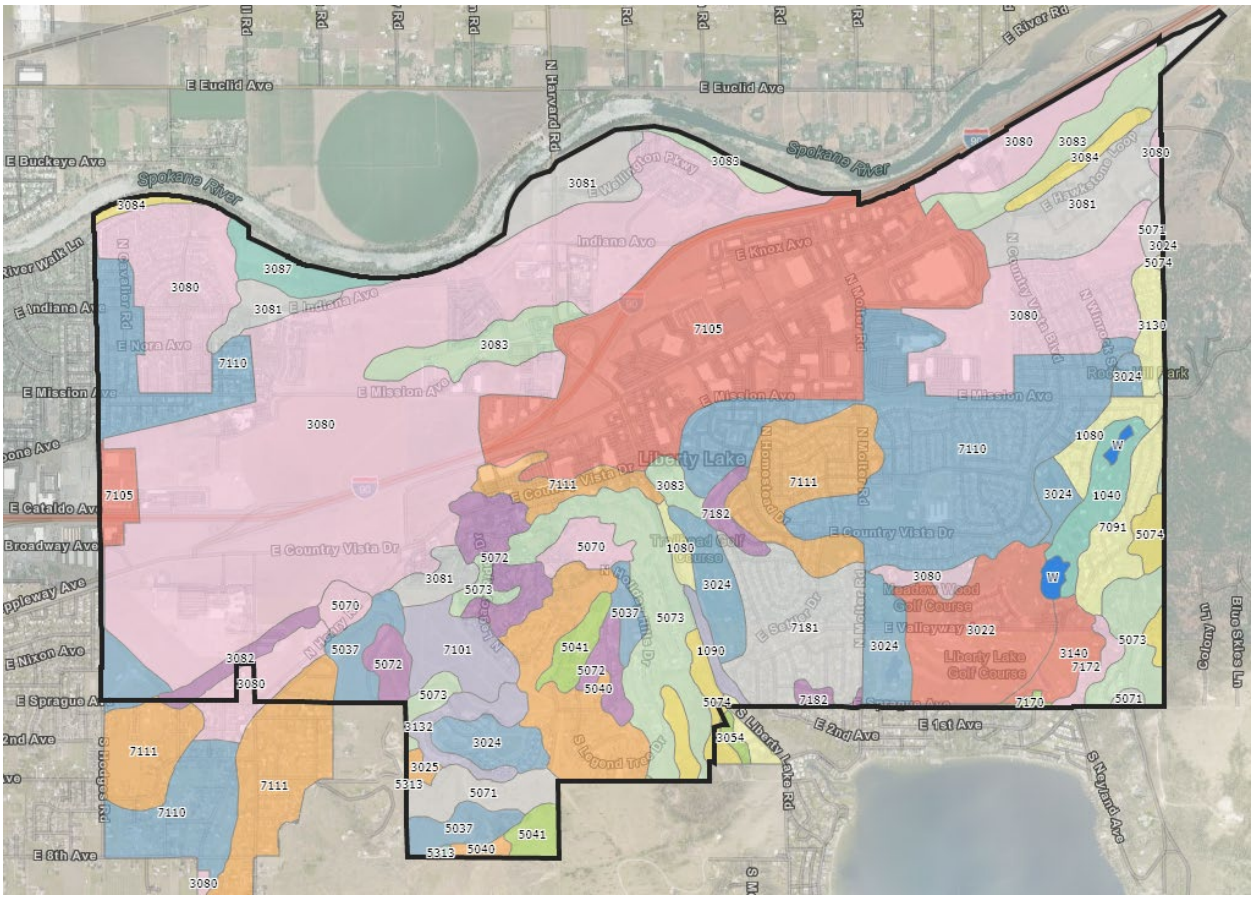
The geology of the Spokane River watershed and Liberty Lake area results in a unique landscape that influences characteristics of the hydrology and hydraulics of the area. Consideration of these characteristics informed the suitability of the approaches to stormwater management that the City develops as part of their SWMP.

At different times during the Pleistocene, glaciers from the Cordilleran ice sheet in Canada entered northern Washington and Idaho and advanced south, damming the Columbia and Clark Fork Rivers. Glacial Lakes Columbia and Missoula were created by the ice dams on these rivers, respectively. The Purcell Ice Lobe created a dam near Clark Fork, Idaho, that backed up water, creating the enormous Lake Missoula. When the ice dam failed, catastrophic outburst floods resulted, depositing glaciofluvial and glaciolacustrine material across the Spokane Valley and beyond. The torrential forces created by the emptying of the lake scoured the basalt plateau, which has been suggested to have occurred between 25 and 89 times, creating the present-day features of the channeled scablands, large outwash valleys, plains, and terraces (Lee 2009).

The outwash material consists of thick, unconsolidated, sorted material that was deposited in a high energy/high water velocity environment. It is coarse textured and includes varying amounts of sand, silt, gravel, cobbles, stones, and boulders. The material is derived mainly from granite, gneiss, schist, argillite, quartzite, and local angular to subangular basalt rock fragments in areas southwest of the Spokane River (USDA 2016). Liberty Lake, located south of the city limits in unincorporated Spokane County, is a glacial lake formed by the repeated glacial outburst floods of ancient Lake Missoula that created landform depressions and transported the gravel and sand sediment that make up the lakebed.

2.1.2 Soils

The Natural Resources Conservation Service (NRCS) Web Soil Survey identified soil mapping units within the project area (Figure 1). Three soil types comprise most of the soils in the area: Opportunity very gravelly ashy loam (0 to 3% slopes), Urban land gravelly substratum (0 to 15% slopes), and Urban land – Opportunity, disturbed complex (0 to 3% slopes). The Opportunity soil series, which makes up the greatest percentage of classified soils within the City, is primarily sandy and gravelly glaciofluvial deposits with small amounts of volcanic ash and loess that were deposited by the Missoula floods.



Soil Map Units (USDA SSURGO)

- 1040: Hardesty ashy silt loam, 0 to 3 percent slopes
- 1080: Narcisse silt loam, 0 to 3 percent slopes
- 1090: Peone-Saltese complex, 0 to 3 percent slopes
- 3022: Bong ashy sandy loam, moist, 0 to 8 percent slopes
- 3024: Phoebe-Bong, moist, complex, 0 to 8 percent slopes
- 3025: Bong ashy sandy loam, moist, 15 to 30 percent slopes
- 3054: Clayton ashy fine sandy loam, 0 to 8 percent slopes
- 3080: Opportunity very gravelly ashy loam, 0 to 3 percent slopes
- 3081: Opportunity very gravelly ashy loam, 3 to 8 percent slopes
- 3082: Opportunity very gravelly ashy loam, 8 to 15 percent slopes
- 3083: Garrison very gravelly ashy loam, 0 to 8 percent slopes
- 3084: Garrison very gravelly ashy loam, 8 to 15 percent slopes
- 3087: Garrison very gravelly ashy loam, 0 to 8 percent slopes, extremely stony surface
- 3130: Phoebe ashy sandy loam, 0 to 3 percent slopes
- 3132: Bong, moist-Phoebe complex, 8 to 15 percent slopes
- 3140: Springdale gravelly ashy coarse sandy loam, 0 to 8 percent slopes
- 5037: Spokane-Rock outcrop complex, 30 to 55 percent slopes
- 5040: Spokane-Swakane complex, 3 to 15 percent slopes
- 5041: Spokane-Swakane complex, 15 to 30 percent slopes
- 5070: Lenz-Spokane complex, 3 to 15 percent slopes
- 5071: Lenz-Spokane complex, 15 to 30 percent slopes
- 5072: Lenz-Rock outcrop complex, 3 to 15 percent slopes
- 5073: Lenz-Rock outcrop complex, 15 to 30 percent slopes
- 5074: Lenz-Rock outcrop complex, 30 to 60 percent slopes
- 5313: Kramerhill-Spokane complex, 8 to 25 percent slopes
- 7091: Urban land-Lenz, disturbed complex, 15 to 30 percent slopes
- 7101: Pits-Dumps complex
- 7105: Urban land, gravelly substratum, 0 to 15 percent slopes
- 7110: Urban land-Opportunity, disturbed complex, 0 to 3 percent slopes
- 7111: Urban land-Opportunity, disturbed complex, 3 to 8 percent slopes
- 7170: Urban land-Springdale, disturbed complex, 0 to 3 percent slopes
- 7172: Urban land-Springdale, disturbed complex, 8 to 15 percent slopes
- 7181: Urban land-Phoebe, disturbed complex, 3 to 8 percent slopes
- 7182: Urban land-Phoebe, disturbed complex, 8 to 15 percent slopes
- W: Water

Figure 1. Natural Resources Conservation Service City of Liberty Lake Soils by Type

Source: NRCS SSURGO 2023.

2.1.3 Groundwater

The principal aquifer that underlies the majority of the City is the Spokane Valley Rathdrum Prairie (SVRP) Aquifer (see Figure 2). There is a high degree of hydraulic continuity between the Spokane River and the SVRP Aquifer that affects seasonal and annual flows. The SVRP Aquifer and its overlying soils are permeable to the extent that streams running off the adjacent uplands completely infiltrate into the subsurface at the margins of the aquifer. As a result, there are no perennial tributaries to the Spokane River in the City (RWIT 2018).

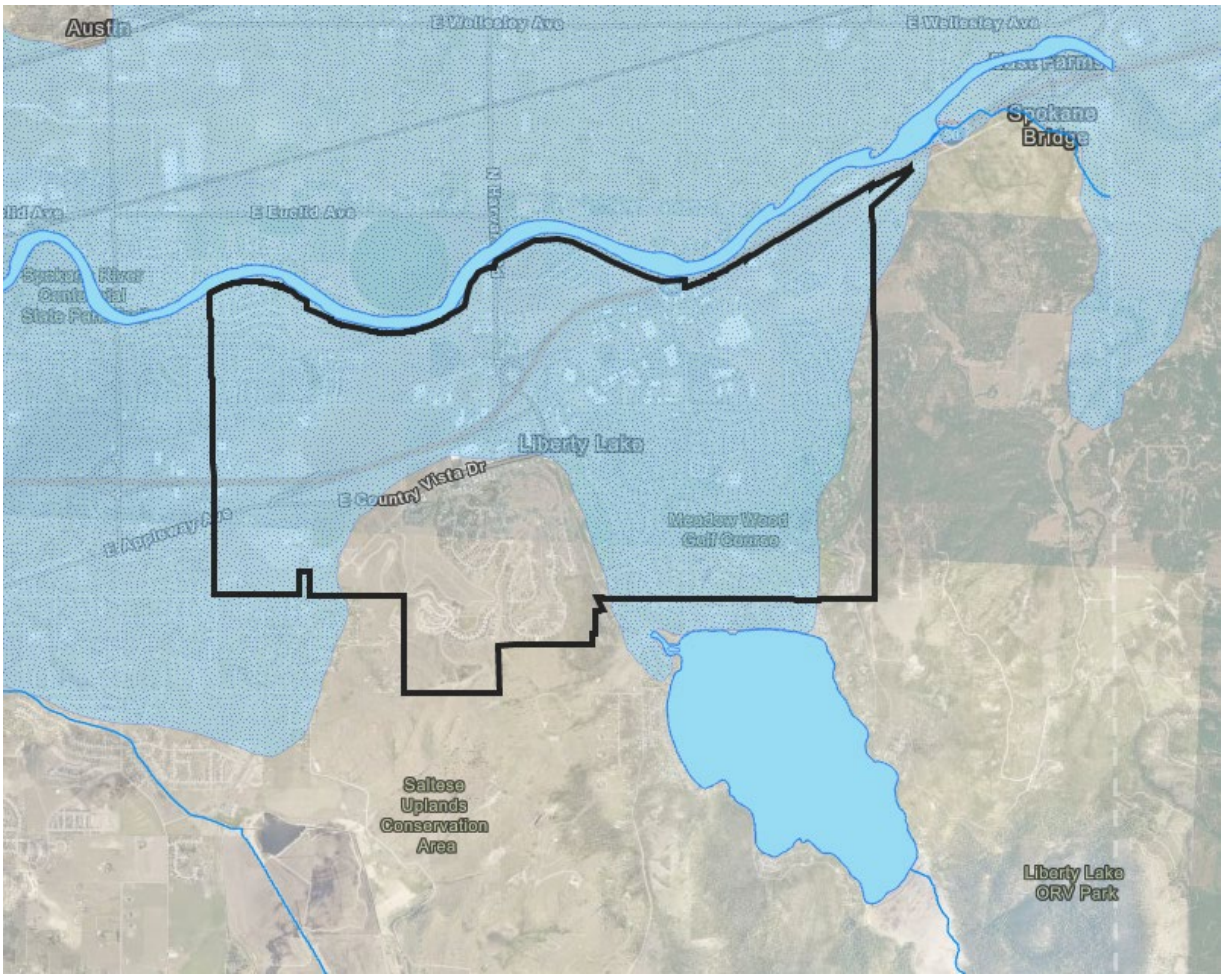


Figure 2. Rathdrum Prairie Aquifer Underlying the City of Liberty Lake

Source: Spokane County 2022

2.1.4 Topography

The topography data was obtained from the Washington Department of Natural Resources (DNR) LiDAR dataset, which draws data from LiDAR acquisitions surveyed in 2007 and 2015. The LiDAR data is sufficiently detailed in most areas for use in refinement of catchment delineations and for a preliminary desktop review to identify potential existing stormwater facilities. There are some areas with developments that occurred after the LiDAR acquisition, so those topographic changes are not reflected. Field survey or use of other city data was required in these areas to identify existing stormwater facilities. See Figure 3, which demonstrates the lidar coverage areas by associated survey date.

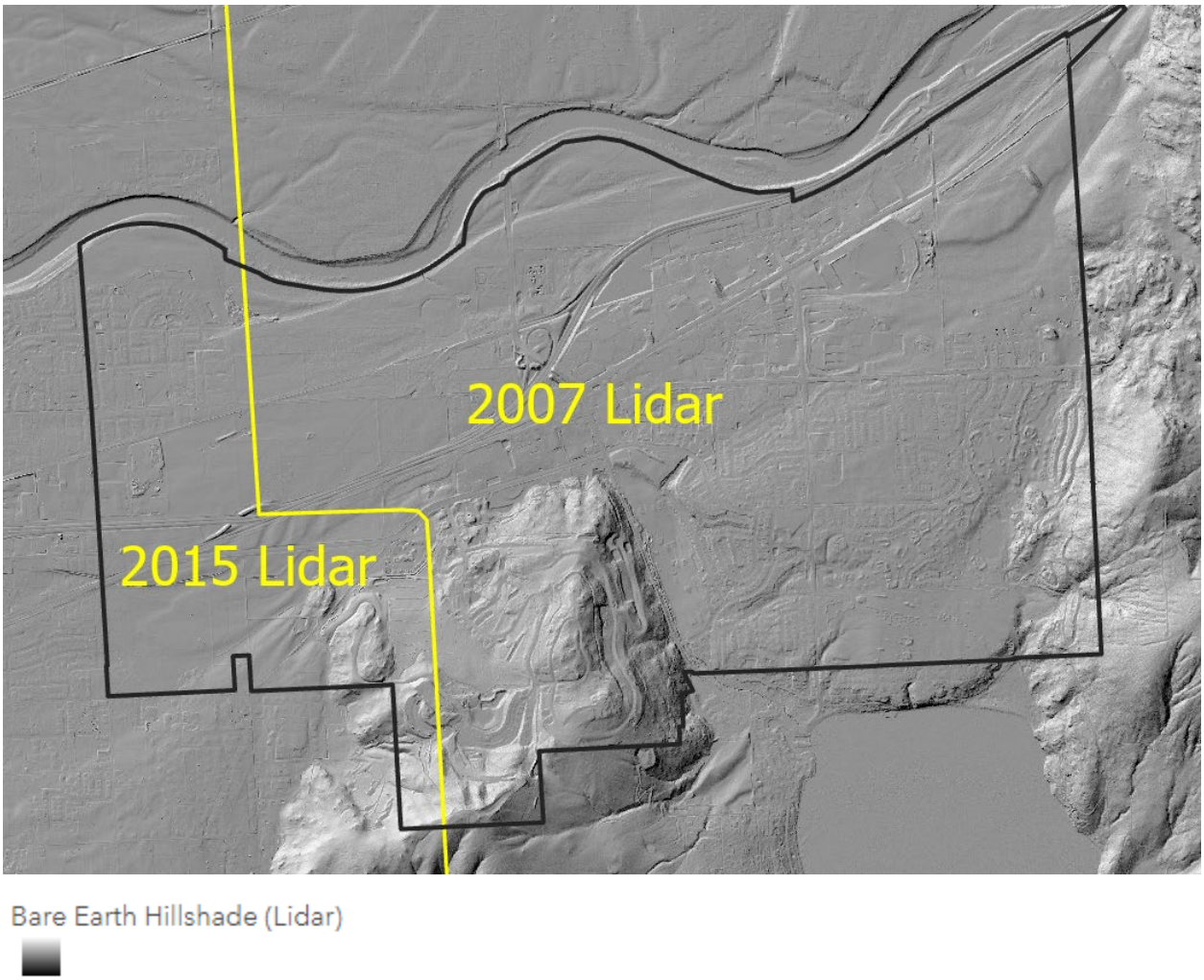


Figure 3. Lidar Data by Survey Collection Date

Sources: WA DNR 2007 and 2015; Parametrix 2023.

2.2 Area Hydrology

The City is located in climate region 3, which consists of intermountain areas and includes areas near Okanogan, Spokane, and the Palouse. The precipitation in the area falls predominantly in fall and winter months, as either snow or rain. The region receives an annual average precipitation range of 12 to 22 inches (Ecology 2019). Isopluvial maps are contour maps where the contours represent the statistical total amount of rainfall in a given time period. The 24-hour isopluvial maps are used for design. The total depth of rainfall (in tenths of an inch) for storms of 2-, 10-, 25-, and 100-year recurrence intervals and 24-hour duration are published by the National Oceanic and Atmospheric Administration in the form of isopluvial maps. Rainfall depths for selected 24-hour storm events in Liberty Lake at different recurrence intervals are shown in Table 1.

Table 1. Total Rainfall Depths for 24-Hour Events [1]

Return Frequency	Precipitation Depth (inches)
2-year	1.4
10-year	2.0
25-year	2.2
100-year	3.0

[1] Source: (Ecology 2019))

2.3 Surface Waters

The geology of the Spokane River watershed and Liberty Lake area results in a unique landscape that influences characteristics of the hydrology and hydraulics of the area. The City is located within WRIA 57, which is located on the eastern edge of the Columbia River Basalt Plateau in the foothills of the Rocky Mountain Range (see Figure 5). The major drainage of WRIA 57 is the Spokane River, which forms the northern border of the City, receiving flows from Lake Coeur d'Alene that are regulated by the Post Falls Dam for roughly half the year (RWIT 2018). The Spokane River also receives flows from a number of tributaries, including the Little Spokane and Hangman Creek, and has several dams along the mainstem that affect its hydrograph. The Spokane River terminates in WRIA 54 where the Long Lake Dam creates the Spokane River reservoir (also known as Long Lake).

Surface waters and water sources (other than ground) were imported to the Stormwater Asset Database from Washington DNR Streams and Waterbodies layers. Data from the Spokane River Watersheds Hydrogeologic Data Portal was also imported, which includes aquifer boundaries and depth to water, nitrate data, geologic cross sections, and primary water bearing units. This data is not needed for the stormwater program at this time but will be catalogued as available for future program applications. Based on the review of the hydrologic data, there are no persistent surface waters within the city limits.

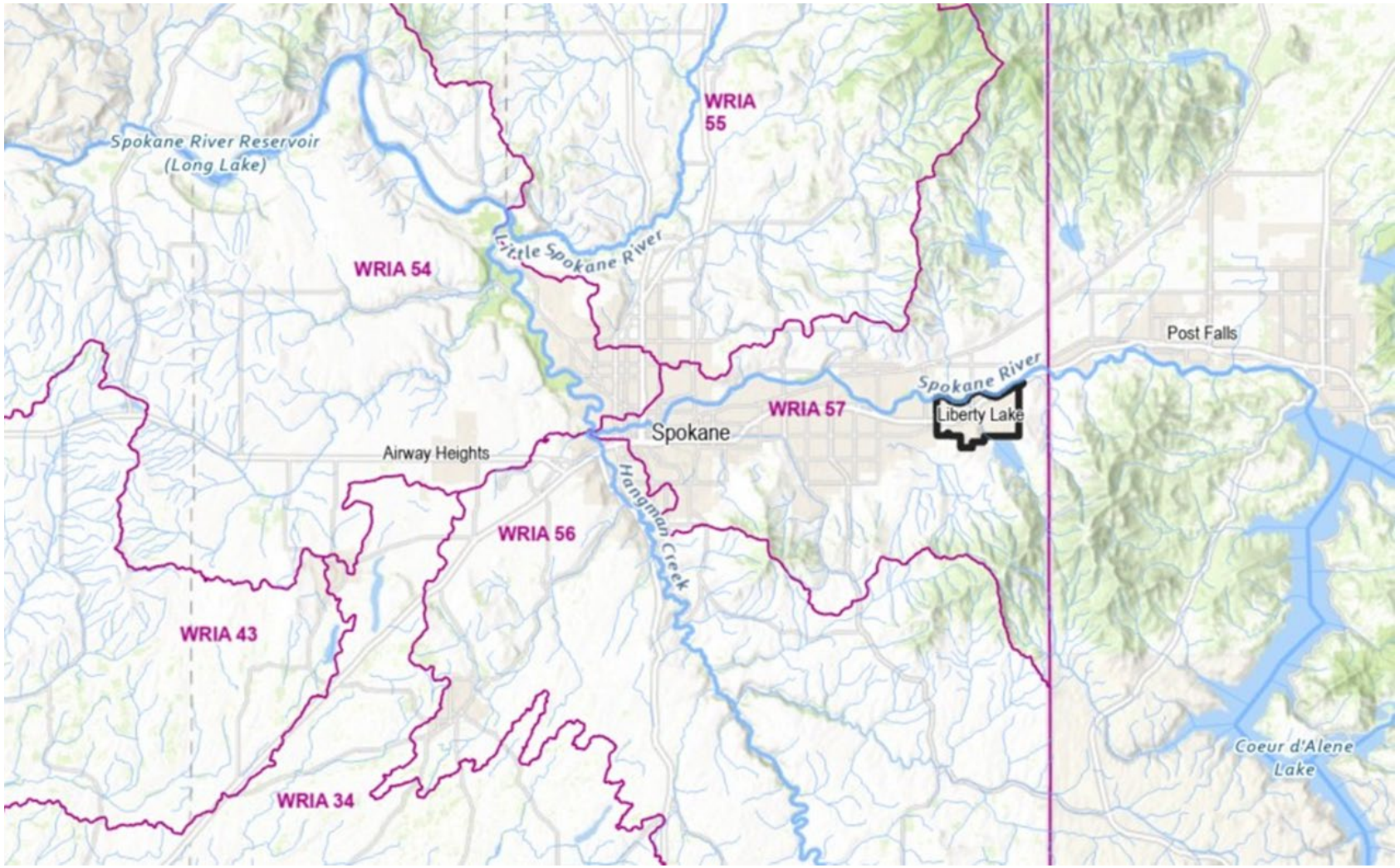


Figure 4. Spokane River Watersheds

2.4 Drainage and Stormwater Management Features

2.4.1 Disposition of Stormwater in the City of Liberty Lake

2.4.1.1 Discharges to Ground

The City is dominated by relatively low runoff and poorly defined natural drainage paths, which are a direct result of the lack of year-round rainfall to form drainage patterns and provide perennial streams. As a result, there is little to no known or observable hydrography for which an aerial interpretation can serve as the basis for mapping “streams” or “waters.”

2.4.1.2 Spokane River

There are no known or reported outfalls discharging directly to the Spokane River originating from City-operated or City-maintained drainage systems. Field investigations found no known or reported outfalls to the Spokane River; however, the existing map data sourced from Washington DNR indicates a pipe originating from the drainage sump adjacent to County Vista Drive connecting to the Spokane River (see Section 2.4.1.4)

2.4.1.3 Liberty Lake

Liberty Lake may receive seasonal flows from intermittent streams, mainly originating outside of City boundaries. Stormwater originating from within the City boundary has been observed to sheet flow south toward the lake, generally in response to large storms, storm melt events, and drainage from the built environment. However, there are no known discharges from the City’s road or stormwater system draining directly into Liberty Lake.

2.4.1.4 Liberty Lake Overflow Channel

The Liberty Lake overflow channel (mapped as a canal/ditch) is located on the northwest end of the lake, sloping northward along Liberty Lake Road toward the Spokane River, ending in two drainage sumps adjacent to Country Vista Drive. The overflow channel, which is an engineered channel and pipe controlled by an outlet structure, can provide a path for water from Liberty Lake to the Spokane River as indicated by the Washington DNR mapped data. This path could not be confirmed through field observation during the mapping efforts. Additionally, City staff has not observed any flows, the lake would have to rise several feet to reach the outlet profile, and there is no apparent persistent surface drainage that leaves the overflow channel.

Stormwater that enters the drainage overflow channel infiltrates into one of the two drainage sumps along the channel. The slope of the channel has been confirmed by the Liberty Lake Sewer and Water District; however, details of specific system features (physical attributes including flow capacity, sump dimensions and functionality, and elevation) are unknown. The system is managed by the Sewer and Water District.

2.4.1.5 Local Stormwater Discharge Patterns

As described in Section 2.4.1.1 above, the City landscape is dominated by relatively low runoff and poorly defined natural drainage paths. The developed areas and their built systems collect stormwater locally and dispose of it, generally to the ground. The stormwater runoff patterns in the City were mapped and categorized by its discharge type. The respective drainage disposition is detailed in Figure 5.

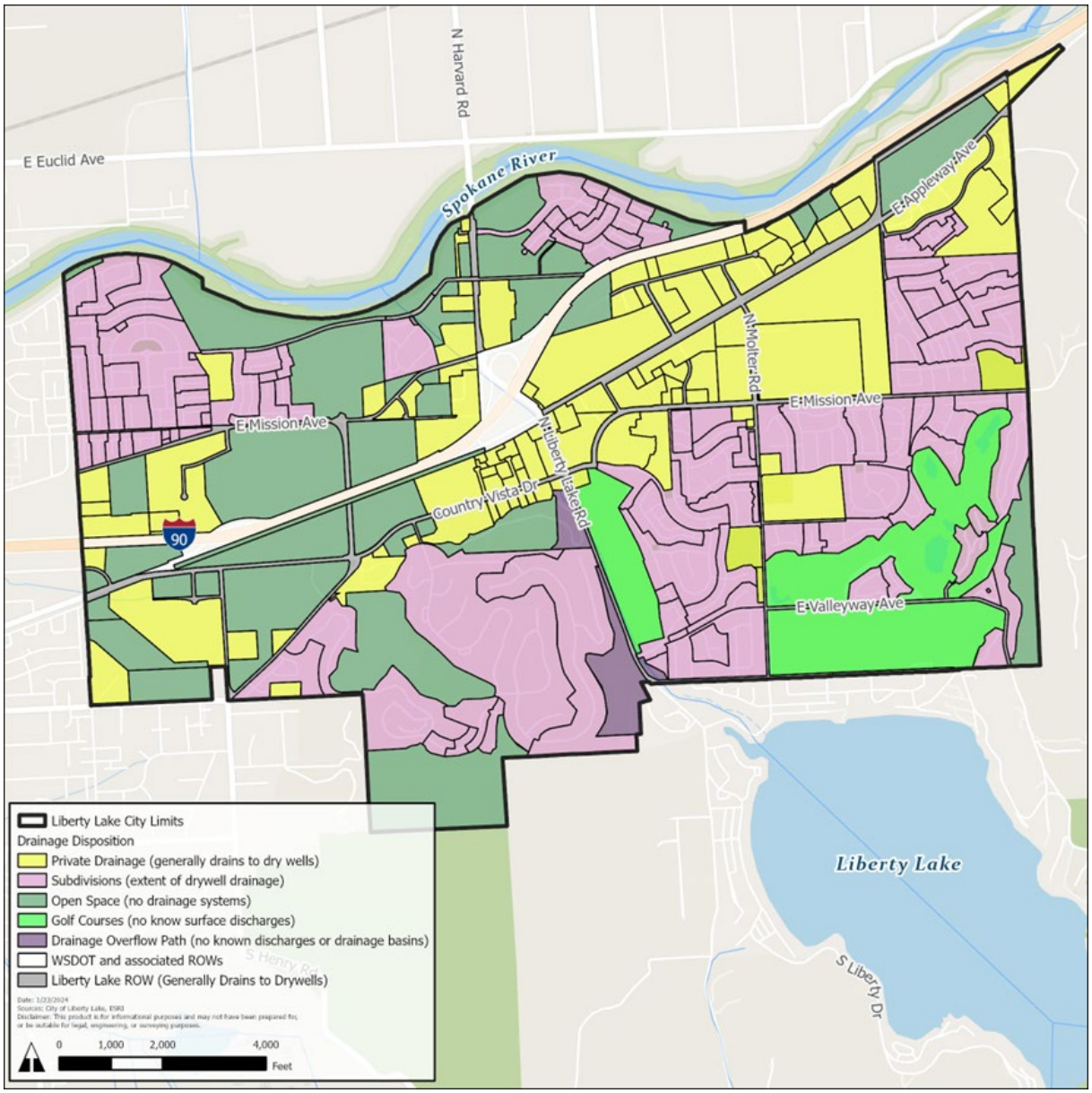


Figure 5. Drainage Disposition

2.5 Data Availability Assessment

This Plan, as is common with most master plans, is conducted using best available existing data. In some instances, additional data can be collected for use in the Plan and new assessments to process available data are prepared. The following sections provide a summary of limits of the available data for the plan.

3. Characteristics of The Built Environment

Stormwater plans are generally prepared to address current and proposed conditions and address the effects of land conversion on stream hydrology and pollution-generating activities on water quality. Stormwater management has been the norm for the past several decades in Washington and continues to evolve as the practice learns from the past and new issues come to the forefront. Existing land use and land cover typically cause impacts to natural drainage systems, such as rivers, streams, lakes, and wetlands. However, because there are no persistent surface waters in the City, almost no surface discharge of stormwater, and the discharge is to the ground, control of stormwater with development is focused on conveyance, infiltration, and water quality. Future development of vacant lands, redevelopment, and infill portend future potential impacts and, if not properly controlled, will provide the basis for future stormwater management needs. Protection of groundwater sources and maintenance of the existing stormwater system will be the focus of the City's stormwater plan.

Existing stormwater system coverage is also an important aspect of this plan. The goal of any stormwater plan is to provide stormwater controls for the developed land in the jurisdiction to the extent practicable. In the sections that follow, the current approach to providing stormwater coverage is described.

3.1 Mapped Stormwater Management Infrastructure

Management of the City's GIS includes mapping of stormwater assets and maintaining the GIS web page and mapping tools. This work includes data collection in the field and uploading information from reports into GIS, developing maps to help guide planning and design, and tracking completed maintenance activities, when needed. The City has developed a Stormwater Asset Database, and this system now provides a baseline for stormwater management activities. The detail and accuracy of the Stormwater Asset Database maps was not assessed but were assumed to have sufficient quality for planning-level assessments. The maps are not intended to be used for modeling or design at this time. The development process for the database is described in the *GIS Stormwater Asset Database Memorandum*, included as Appendix A.

The City's ArcGIS web map, can be accessed using the following public link:

https://coll.maps.arcgis.com/CoLLSWMP.

The GIS database of the City of Liberty Lake's stormwater system includes the following information:

- Soils.
- Topography.
- Water resources.
- Existing stormwater system, public and private.
- Land use.
- Permeable/impermeable areas.
- Utilities.
- Existing built environment.

3.2 Stormwater Infrastructure

The exact date of installation of much of the City's infrastructure is unknown. The City experienced growth prior to the incorporation of the City, occurring in the 1970s when housing opportunities increased north of Sprague Avenue. Much of the City's infrastructure is assumed to have been built by the early 1990s, when the City saw a boom in housing development with the creation of Homestead and Meadowwood as well as commercial and industrial development. For estimating infrastructure replacement needs, an average age of 30 years old was assumed for the existing infrastructure. The average life expectancy for stormwater infrastructure is 50 years. To plan and budget for maintaining existing stormwater infrastructure, a programmatic Stormwater Capital Improvement Program was added to set annual goals for swale improvements. To address development of a schedule for maintaining and replacing elements of the existing stormwater system, a stormwater structural maintenance (non-UIC) project was added to the programmatic Stormwater Capital Improvement Program (see Section 5.2 for more details about the programmatic projects). The following sections summarize the City's existing stormwater assets.

3.2.1 Underground Injection Control

UIC wells are a type of well that discharges surface water into the subsurface via a driven shaft, dug hole, or distribution system and includes dry wells and infiltration areas. UICs make up the majority of stormwater infrastructure in the City. Due to the City's location above the SVRP Aquifer and the well-draining soils of the area, UIC allows groundwater recharge while managing the City's stormwater runoff. Dry Wells, or Class V wells, are one type of UIC, which allows capture and infiltration of stormwater runoff. Drywells are pre-cast concrete barrels situated above the water table such that the bottom and sides are typically dry, except when receiving runoff. Drywells are the primary type of UIC used throughout the City, with a total of 490 registered drywells currently inventoried (Table 2). The number of additional unregistered drywells or UIC is not known.

3.2.2 Catch Basins

The City's Stormwater Asset Database includes catch basins, most of which are associated with UIC/drywells. The GIS database from the City did not include an inventory of manholes or a breakdown of the catch basin structure types, dimensions, or lid configuration. According to the City's Stormwater Asset Database, there are 313 inventoried catch basins within the City's boundary (see Table 2).

3.2.3 Curb Cuts

The City's Stormwater Asset Database includes curb cuts, which mainly serve as inlet structures for the UIC/drywells, swales, and ponds throughout the City. According to the City's database, there are approximately 589 mapped curb cuts within the City's boundary (see Table 2).

3.2.4 Ponds and Swales

Water quality treatment facilities in the City consist mainly of landscaping swales and ponds. According to the City's Stormwater Asset Database, there are approximately 305 stormwater swales and ponds, which translates to approximately 20 acres of land within the City's boundary. Additionally, the City maintains approximately 115 stormwater swales and ponds (approximately 5 acres of land) located on private developments on behalf of homeowners associations (HOAs) through agreements previously established with Spokane County. For the additional maintenance in HOA areas, the City collects a drainage annual service charge (see Appendix C). The area of swales and ponds managed by the Washington Department of Transportation was not quantified as part of this effort (see Table 2).

3.2.5 Pipes

Due to the well-draining soils underlying much of the City, most stormwater is conveyed by overland flow via curb and gutter to drywells, especially in residential areas. Because of this, piped conveyance within the City consists primarily of short connections from catch basins to drywells. On busier arterials or in areas of poorer-draining soils, flows are often collected with catch basins and then conveyed through a small pipe network to nearby drywells in areas of better infiltration. Pipe sizing attributes and flow direction were not collected as part of this effort and may be identified in future condition assessments if needed. According to the City's Stormwater Asset Database, there are approximately 60 sections of mapped pipes of varied lengths (see Table 2).

3.2.6 Other Stormwater Structures

At present, the City does not operate or maintain any water quality vaults or hydrodynamic separators; However, the addition of these structures is proposed along Sprague Avenue in the stormwater capital improvement projects (see Appendix B for details). Table 2 provides a summary of the current stormwater structure inventory within the City.

Table 2. City of Liberty Lake Stormwater Structure Inventory

Stormwater Asset Type	Quantity of Asset	Additional Information
UICs/Drywells	490	Registered with Ecology
Catch Basins	313	Structure type, dimensions, and lid configuration unknown
Curb Cuts	589	Inlet structures to drywells, ponds, and swales.
Ponds and Swales	305	Approximately 20 acres
Pipes	60	Sections of varied length, direction of flow unknown.

Ecology = Washington State Department of Ecology; UIC =Underground Injection Control.
Data collected as part of City Mapping effort November 2023.

3.3 Existing Land Cover

Land cover is a representation of the natural and built environment land surfaces. Natural surfaces typically include forest, grasslands, and other descriptions of the representative vegetation type as well as water and natural, unvegetated ground surfaces. The developed or built surfaces include pasture, landscape, and grass or cleared areas, as well as impervious surfaces such as roadways, buildings, gravel, and other paved surfaces. These surfaces define the hydrologic response of rainfall from the land, i.e. what amount of the rain is expected to run off because of the type of land cover or surface. In addition, land cover type and activities on those surfaces are an indicator of the potential pollutants in stormwater runoff, such as contaminants that wash off roads or soil that comes from bare surfaces.

A land cover layer was developed for the plan (see Appendix A) that groups characteristics of the built environment into the following land cover types: roads, buildings, other impervious, barren land, vegetation (grass/trees), and water. Data could be refined manually and updated as the built environment undergoes future changes.

3.4 Future Land Use

As new development occurs, the land cover changes, which changes the characteristics and amount of stormwater runoff from land. Stormwater comprehensive plans will often project future runoff amount and quality expected as development occurs to plan for those changes and mitigate the impacts. In addition, if stormwater systems are upgraded to reduce existing impacts, it is useful to project other future land cover changes and accommodate that change when designing stormwater controls. As described earlier, stormwater in the City is primarily discharged to the ground and the potential development impacts, such as stream hydromodification and surface water quality, are typically less worrisome in the City.

Future land use planning is often reflected in the City's zoning information. Any vacant lands or redevelopment is expected to remain consistent with the allowable development intensity described by the zoning layer. The zoning data is maintained by the City and updated periodically. Other future land use projections are typically prepared in other planning actions, such as the growth management plan. Future development analysis was not included in this plan because, as described earlier, there are no expected impacts to existing drainage systems or receiving waters, and all impacts can be managed by applying the current stormwater manual on the development site.

4. Programmatic Activities

The following sections will discuss the current status of each of the programmatic elements of the stormwater plan as listed below or, where no program currently exists, develop the framework for one.

4.1 Regulatory Requirements, Policies, and Procedures

The City of Liberty Lake's Stormwater Program is subject to regulatory requirements, policies, and procedures. This section of the SWMP outlines applicable regulatory categories and the requirements within each category. Each requirement (or policy or procedure) includes a description; a summary of how it impacts the City's Stormwater Program or Utility; and, if applicable, information about how the item was used for this study. Many of these regulations and polices are interconnected and related to each other, stemming from federal requirements that have handed down authority to regulate compliance at the state and local levels.

4.1.1 Phase II Permit – Municipal Separate Storm Sewer System

The Washington State Department of Ecology (Ecology) administers the Eastern Washington Phase II Municipal Separate Storm Sewer (MS4) Permit, which allows the permit to discharge stormwater to waters of the state. The MS4 Permit applies to both point discharges and potential overflow from UICs that could discharge to the MS4 and outfall to receiving waters. The MS4 Permit is typically issued in 5-year cycles. The current MS4 Permit is in effect through 2024, and the next permit will be issued for 2024 through 2029. The Phase II MS4 Permit is intended to meet the requirements of the National Pollutant Discharge Elimination System (NPDES) per the Clean Water Act of 1977 and is combined with the State of Washington Waste Discharge General Permit, which regulates discharges to waters of the state, including discharges to municipal sewerage system.

In 2021, Ecology informed the City that the U.S census had identified the City as subject to evaluation for coverage under the Clean Water Act's NPDES Municipal Stormwater Permit program, as outlined in 40 CFR 122.31(a)(1). The Environmental Protection Agency (EPA) has delegated its authority on the matter to Ecology to administer this program in Washington state. However, after reviewing the City's drainage disposition, Ecology determined in 2023 that the City meets criteria for

a waiver from 2024 Permit coverage because the City's MS4 (or lack thereof) serves a population of less than 1,000 people. Regardless, the Permit supported the basis of several program element concepts when the gap analysis was performed.

4.1.2 Underground Injection Control Program Rule (WAC 173-218)

The UIC Rule protects groundwater quality by regulating discharge of fluids into UIC wells to meet the goals and standards of Part C of the SDWA and the State of Washington's Water Pollution Control Act (Chapter 90.48 of the Revised Code of Washington [RCW]). The City has approximately 490 Ecology registered UICs, which are subject to the UIC Rule and regulated by Ecology. Section 5.6 of the *Stormwater Management Manual for Eastern Washington* (SWMMEW) defines site suitability, treatment requirements, and design criteria for discharge of stormwater to new UIC wells and the well assessment and retrofit requirements for existing UIC wells (Ecology 2019). For this Master Plan, the UIC Rule was used as guidance during assessment of the City's existing approach to UIC management, and it was also used for the development and estimation of future program recommendations.

4.1.3 Total Maximum Daily Load Listing

The Spokane River parallels the northern border of the City, which lies just south of the Centennial Trail property owned by Washington State Department of Parks and Recreation. The river is currently listed in Ecology's Water Quality Atlas as a Category 5 waterbody for polychlorinated biphenyls and has outstanding total maximum daily loads (TMDLs) for dissolved oxygen and dissolved metals. However, runoff from the City to the Spokane River, if any, is limited to direct nonpoint discharges from adjacent land (such as open spaces without defined drainage systems). There are currently no TMDLs that apply to the City of Liberty Lake.

4.1.4 National Flood Insurance Program and Floodplain Management (RCW 86.16)

Liberty Lake includes provisions for administering floodplain regulations in City Development Code §10-6F, Flood Damage Prevention Regulations, as adopted by the City by Ordinance 262 in 2019, in conformance with the National Flood Insurance Act of 1968. This act establishes the National Flood Insurance Program, which is governed by Ecology in the state of Washington. This program is currently administered through City staff outside of the Stormwater Utility and is funded through permit and development review fees. Additionally, Liberty Lake's Municipal Code of Ordinances Section 9-1-2. I requires all development within a floodplain to comply with Federal Emergency Management Agency standards and with construction specifications detailed in the provisions of the 2018 international codes (International Building Code and International Residential Code) for flood resistant construction.

4.1.5 State Environmental Policy Act

The State Environmental Policy Act (SEPA) requires that an environmental review be conducted via SEPA checklist and a threshold determination be made for development within the City limits, unless activities are exempt. A draft SEPA checklist was prepared for the Master Plan; however, upon further City staff review, the Master Plan and Rate Study were determined to be exempt from SEPA based on WAC 197-11-800(19) and WAC 197-11-800(14)(i).

4.2 SW Manual Compliance

4.2.1 Stormwater Management Manual for Eastern Washington

The current SWMMEW was published in 2019, and the next version of the 2024 SWMMEW is anticipated to be published in July 2024. The manual provides guidance for stormwater permit implementation and management (Ecology 2019). The SWMMEW was used to support elements of the data gaps analysis and to support the review of the existing UIC Program.

4.2.2 Spokane Regional Stormwater Manual

The *Spokane Regional Stormwater Manual* (SRSM) was developed jointly and published in 2008 by the cities of Spokane and Spokane Valley and Spokane County. The SRSM establishes stormwater management design standards and maintenance criteria for new development, redevelopment, and capital projects in the Spokane region. The purpose of this manual is to help communities in the Spokane region to protect water quality, prevent adverse impacts from flooding, and control stormwater runoff to levels equivalent to those that occurred prior to development (SRSM 2008).

The City adopts by reference the Spokane County guidelines for stormwater management in Liberty Lake Code of Ordinances Chapter 4, Section 8-4-1, and City Development Code §10-3H, which by extension follows the 2008 SRSM for all projects that include a stormwater element. Ecology approved the SRSM as equivalent to the MS4 Eastern Washington Phase II Permit Appendix 1, and the Spokane jurisdictions have been working to update the equivalency to meet requirements of the 2019–2024 MS4 Permit and beyond. The SRSM was reviewed as part of the gap analysis and was used to support the development of the SWMP.

4.3 Aquifer Protection

The geology of the Liberty Lake area results in a unique landscape that influences the hydrology, stormwater runoff characteristics, and the groundwater. The NRCS Web Soil Survey identified soil mapping units within the City are mainly soils with moderate to high rates of infiltration and water transmission. The City is dominated by relatively low runoff and poorly defined natural drainage paths, which are a direct result of the high-infiltration properties and the lack of year-round rainfall to form drainage patterns and provide perennial streams. A substantial proportion (if not all) of the rain that falls and the stormwater that is generated infiltrates and is discharged into the ground. The principal aquifer underlying a majority of the City is the SVRP Aquifer (See Figure 2). The SVRP Aquifer and its overlying soils are permeable to the extent that streams running off the adjacent uplands completely infiltrate into the subsurface at the margins of the aquifer. Virtually all of the stormwater that runs off of developed and impervious surfaces in the City discharges to the SVRP Aquifer. The potential for pollutants in stormwater to enter the aquifer is well-established. Consideration of these conditions will inform approaches to stormwater management that the City develops as part of their SWMP.

The protection of the SVRP Aquifer from pollution, depletion, or degradation is an important aspect of stormwater planning for the City. Specifically, preparing and implementing measures to protect the aquifer from potential stormwater quality impacts are a consideration for the selection and application of stormwater control measures and their maintenance. The City will continue to use stormwater discharge to the ground as its primary disposition due to the advantages in doing so for groundwater supply, flood management and control, system costs, and low-impact design. Stormwater control measures identified in the *Eastern Washington Stormwater Manual* will continue to be applied to minimize the potential for adverse effects. The City will also continue to engage in regional planning, protection, and education efforts to protect this resource.

4.4 APA Fee

Additionally, the City participates in the Spokane County Regional APA Program along with the City of Spokane Valley, Town of Millwood, and parts of unincorporated Spokane County (Figure 6). This program was approved by voters in 1988 and was renewed in 2004 for another 20 years.

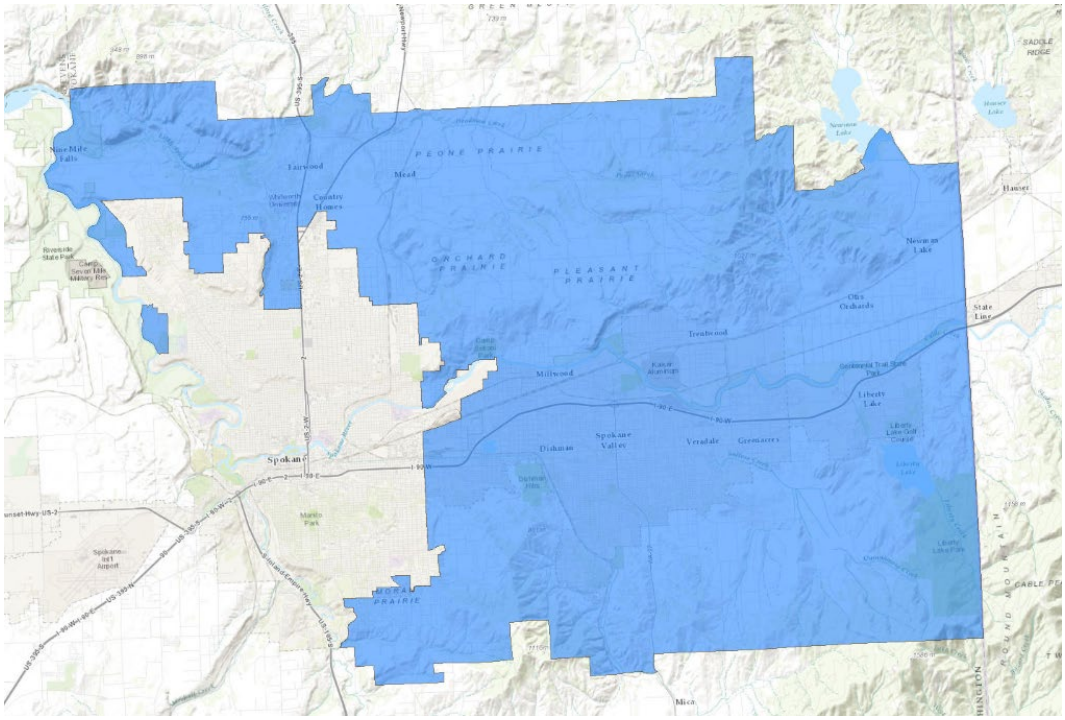


Figure 6. Spokane County Regional Aquifer Protection Area (Spokane County 2024)

Spokane County Regional APA fee is an important secondary source of funding for the City. Currently, household units are charged $15 annually per connection for water and sewer. Non-household units are imposed a fee for withdrawal of water based on water meter size. The current APA establishment and imposed fees sunset December 31, 2025. Reauthorization of the APA will likely be placed before regional voters for another 20-year term in 2025 but is not expected to be renewed.

The City participates in the APA educational program, funded by the fee, which includes classroom visits at Liberty Lake schools for kindergarten through 12th grade. The City may also use these funds for the following program activities consistent with approved Resolution No 4-0785:

- To develop a comprehensive plan that focuses on the protection, preservation, and rehabilitation of groundwater sources.
- To construct facilities providing collection, disposal, or treatment for:
  - → Water quality improvement.
  - → Sanitary sewage.
  - → Stormwater or surface water drainage.
  - → Public water systems.
- The cost of monitoring and inspecting on-site sewage systems.
- Surface water quality monitoring.

- Ongoing implementation of elements of the comprehensive planning actions.
- Relevant enforcement and compliance actions.
- Public education related to APA topics.

The City will continue to participate in the APA educational program for as long as the program exists but recognizes that the program may not be renewed. In response, the City will seek to increase awareness surrounding stormwater topics, reduce pollution associated with stormwater, and protect the Spokane Valley-Rathdrum Prairie Aquifer and will therefore create a stormwater page on the City's website upon adoption of the SWMP. The website will provide links to information and educational resources related to stormwater and aquifer protection topics from Ecology, Spokane County, and related area programs relevant to the City of Liberty Lake's system. This would include, but is not limited to, protection of the system from illicit discharges (e.g. car washing, illicit dumping), maintenance of grassy bioinfiltration systems, and good housekeeping practices for aquifer protection.

4.5 Underground Injection Control Program

Within its city limits, the City is responsible for managing stormwater runoff in its existing systems and establishing measures to control stormwater from new development. As described in previous sections, virtually all stormwater in the City discharges to the ground, and stormwater runoff from developed areas is collected and discharged in controlled areas, including dry wells and infiltration swales and areas.

4.5.1 UIC Definition

As described in the Ecology UIC Guidance (Ecology 2006) and SWMMEW (Ecology 2019), a UIC well is a human-made subsurface fluid distribution system designed to discharge fluids into the ground and consists of an assemblage of perforated pipes, drain tiles, or other similar mechanisms or a dug hole that is deeper than the largest surface dimension (WAC 173-218- 030).

The following are considered UIC wells that meet Ecology's definition (Ecology 2019):

- Drywells.
- Drain Fields.
- Infiltration trenches with perforated pipe
- Storm chamber systems with the intent to infiltrate.
- French drains.
- Bioretention systems intending to infiltrate water from a perforated pipe below the treatment soil.
- Other similar devices that discharge to ground.

The following are not considered UIC wells (Ecology 2019):

- Buried pipe and/or tile networks that serve to collect water and discharge that water to a drainage system or to a receiving water.
- Surface infiltration basins and flow dispersion stormwater facilities.
- Infiltration trenches designed without perforated pipe or a similar mechanism.
- Bioretention systems transporting water via a perforated pipe to a drainage system or to a receiving water.

The UIC rule encompasses six classes of UIC wells. Among these, Class V UIC wells receive stormwater discharges and must adhere to the specifications outlined in Section 5.6 of the SWMMEW regarding their siting, design, construction, management, operation, and maintenance (Ecology 2019).

4.5.2 Regulatory Background

In Washington state, all groundwater is protected equally under Chapter 90.48 RCW and Chapter 173-200 WAC Water Quality Standards for Groundwaters of the State of Washington. The UIC program is administered by Ecology under the UIC rule (Chapter 173-218 WAC) and serves to protect underground sources of drinking water from discharges of fluids to the ground (Ecology, Guidance for UIC Wells that Manage Stormwater 2006). The two requirements of the UIC program are:

- Register UIC wells with Ecology. Wells located on tribal land should be registered with the EPA.
- Meet non-endangerment standards by protecting current and future underground sources of groundwater from polluted discharge. This standard is usually met by complying with the *Ecology Manual*.

In areas of Washington state where stormwater is not managed by municipal or industrial stormwater permits where stormwater is discharged to surface waters, stormwater is typically managed by the UIC program and discharged directly to the ground. As stormwater is conveyed across impervious surfaces, pollutants are picked up and can contaminate groundwater once infiltrated. UIC well design and effective operation and maintenance (O&M) programs can help prevent stormwater pollution to groundwater.

4.5.3 How UIC Wells are Regulated

The City is tasked with fulfilling stormwater regulatory obligations and adhering to standards as well as managing and upkeeping stormwater structures, including UICs. For this section, the UIC Rule, Guidance for UIC Wells that Manage Stormwater (Ecology 2006) and the SWMMEW (Ecology 2019) were used as guidance for the development, implementation, and management of UIC structures.

In areas of Washington state where stormwater is not managed by municipal or industrial stormwater permits where stormwater is discharged to surface waters, stormwater is typically managed by the UIC program and discharged directly to the ground. As stormwater is conveyed across impervious surfaces, pollutants are picked up and can contaminate groundwater once infiltrated. UIC well design and effective O&M programs can help prevent stormwater pollution to groundwater.

4.5.3.1 Rule Authorization or Permit

UIC wells are required to have either rule authorization granted by Ecology, or coverage under a state waste discharge permit for operation. While rule authorization eliminates the necessity for a permit, it is subject to revocation if the well fails to meet non-endangerment standards. In instances of noncompliance, Ecology reserves the right to mandate corrective measures or the closure of the UIC well.

4.5.3.2 Registration

All UIC wells must be registered with Ecology, except for those on tribal land or those at single-family homes or duplexes that only collect rainwater from their roofs or are used to manage basement flooding (Ecology, 2006).

UIC wells can be registered using Ecology's online registration process, found here:

https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Undergroundinjection-control-program/Register-UIC-wells-online

4.5.3.3 New UIC Wells

Ecology considers UIC wells constructed on or after February 3, 2006, to be new. The registration process provides Ecology with information needed to determine whether the new UIC well meets the conditions to be rule authorized. Registration forms must be submitted prior to construction and must meet the non-endangerment standard (Ecology 2006).

4.5.3.4 Existing UIC Wells

Ecology considers UIC wells constructed prior to February 3, 2006, to be "existing." Owners of 50 wells or fewer must register their wells by February 3, 2009, and complete their well assessment by February 3, 2011. Owners of more than 50 wells must register their wells by February 3, 2011, and complete their well assessment by February 3, 2013, (Ecology 2006). Section 2.6 of the Ecology UIC Guidance, Chapter 5, Section 5.6.5 of the SWMMEW, and Chapter 173-218-090(2) WAC outline well assessment rules.

4.5.3.5 Non-Endangerment Standard

Ecology determines whether a UIC well is rule authorized or requires a permit based on its compliance with the non-endangerment standard. New UIC well registrants have two options to prove compliance and avoid needing an individual permit: following the *Ecology UIC Guidance,* which presumes compliance (presumptive approach), or demonstrating compliance through alternative means (demonstrative approach). Both approaches aim to ensure that the UIC well meets the non-endangerment standard and can be rule authorized (Ecology 2006, 2019).

4.5.4 Discharge Prohibitions

In accordance with Chapter 5, Section 5.6.12 of the SWMMEW, UIC wells may not receive stormwater from the activities and conditions listed below and which the City adheres to:

- Vehicle maintenance, repair, and service.
- Commercial or fleet vehicle washing.
- Airport/airplane de-icing.
- Storage of treated lumber.
- Storage or handling of hazardous materials.
- Generation, storage, transfer, treatment, or disposal of hazardous wastes.
- Handling of radioactive materials.
- Solid waste handling facilities, including compost and biosolid facilities, except for those that recycle only glass, paper, plastic, or cardboard.

- Concrete recycling facilities that generate, store, or handle crushed concrete.
- Asphalt recycling facilities that generate, store, or handle crushed asphalt.
- Industrial or commercial areas that have outdoor processing, handling, or storage of raw solid materials or finished products unless the facility has specific management plans for proper storage and spill prevention, control, and containment appropriate to the types of materials handled at the facility.
- Contaminated sites when the stormwater would increase the mobility of the contaminants at the site. For example, a drywell could not be used upgradient of or over the contaminant plume at a leaking underground storage tank site. The stormwater could increase the movement of the contaminants.
- Process water from the production area of an animal feeding operation.
- Land use, activity, or infiltration determined to be a significant contributor of pollutants to waters of the State or a site release of hazardous substances from historical or current activities resulting in contamination of soil, ground water, surface water, if the ground water is in direct communication with surface water, or sediment, which is prohibited under the Model Toxics Control Act (Chapter 173-340 WAC) and Sediment Management Standards (Chapter 173-204 WAC).

4.5.5 Operation and Maintenance

The UIC Rule mandates proper O&M of UIC wells to safeguard groundwater quality. Regular maintenance prevents clogging and contamination accumulation, ensuring effective functionality. Key preventive measures include treating solids, conducting frequent inspections, removing debris, and repairing structural damage. The following activities promote long-term well performance and reduce the risk of groundwater contamination.

- Implement treatment for solids or install a catch basin upstream to boost infiltration capacity and minimize maintenance needs, reducing contaminant accumulation.
- Conduct regular inspections and maintenance to improve long-term UIC well performance.
- Periodically remove debris from the drywell to prevent material buildup hindering infiltration.
- Check for and repair structural damage as required.

4.5.5.1 Ecology Recommended UIC Operation and Maintenance Guidance

Ecology provides recommendations in Appendix 6-A, Table 6.19 of the SWMMEW for the O&M of UIC structures (Ecology, 2019). These recommendations are not requirements; however, the structural life of a UIC drywell is approximately 20 years, and performance is dependent on proper installation and regular O&M of UIC structures. UIC O&M for the City will depend on funding and availability of resources. Table 3 outlines the recommendations.

Table 3. Recommended O&M Criteria for UIC structures

Maintenance Interval	Description of Maintenance to be Performed
Every 3 months	Visually Inspect
Every 6 months	Remove debris and sediment
Annually	Check for structural damage
Whichever is More Frequent: Above Schedule or Below Observed Events	
Following substantial (> 24-hour) rainfall event	If possible, observe drywells in operation during rainfall event. Aim to identify and correct prior to failure.
Following intense but short-duration rainfall event	
Following snowmelt event	It is especially important to observe the drywells if the melt occurred concurrently with frozen ground conditions.

Source: Appendix 6-A, Table 6.19 of the SWMMEW, (Ecology 2019). Descriptions of how to perform each task are provided in this section.

4.5.6 Source Control Best Management Practices for UIC

The UIC rule sets source control best management practices (BMPs) for managing pollutants in storm runoff that may flow into the UIC well, based on the expected types and amounts of pollutants from the proposed land use. If the designer follows the guidelines in the UIC rule, then Ecology assumes the UIC well meets non-endangerment standard and can operate under the rules (Ecology, 2006). This involves:

- Using source control methods to reduce pollutants that are hard to filter or treat from stormwater.
- Treating runoff to remove pollutants before it enters the UIC well.
- Ensuring there's enough capacity in the vadose zone to filter and absorb solid pollutants from stormwater.
- Careful attention to the product label application rates.
- Targeted product use to avoid contamination of stormwater runoff.
- Careful management of the storage and use of products.
- Separation of areas where products are used from contributing areas that discharge to a UIC well.
- Spill response planning.
- The operational and structural source control BMPs that are also required to meet the non-endangerment standard for various land uses are described in Chapter 8 of the SWMMEW. Targeted education and outreach may also be a necessary source control measure.

4.5.7 GIS Mapping and Stormwater Structural Asset Management

The City is performing ongoing GIS mapping updates. Stormwater structure assets, such as UIC wells, are mapped for future tracking of condition status and ongoing management of these facilities (e.g., O&M) as mentioned in section 6.5.

4.5.8 UIC Asset Management Recommendations

Table 4 outlines the current procedures for UIC asset management in the City and recommendations based on the UIC Rule.

Table 4. UIC Asset Management Recommendations

Current Procedures	Recommendations
Registration	
▪ New UIC wells (post-February 2006) are evaluated by the City engineer and registered with Ecology. UIC well construction is permitted after Ecology acceptance. ▪ Existing UIC wells (prior to February 2006), all known 490 existing UIC wells have been registered with Ecology.	▪ If any unregistered legacy UIC wells are discovered during O&M activities, continue to register with Ecology per the Ecology requirements. ▪ Establish a recordkeeping system for registration documents, which include information regarding unregistered UIC wells. ▪ Update the GIS mapping system as UIC wells are registered.
Operations and Maintenance	
▪ City staff spend on average 80 hours per year inspecting UICs and 80 hours inspecting catch basin structures. ▪ City staff spend approximately 320 hours cleaning UICs and 140 hours cleaning catch basins. ▪ On average the City repairs 2 to 4 UIC structures per year.	▪ Establish a recordkeeping system for O&M inspections and forms. ▪ Develop an inspections template to document problems encountered, including when they emerged. ▪ Establish the frequency and schedule for maintenance of catch basins, BMPs, culverts, and storm drains for area served by UICs
Prohibitions	
The UIC SWMP does not mention prohibitions or how the City enforces them. To rectify this, include language on the City's approach to prohibiting and enforcing prohibitions. This may include references to ordinances addressing illicit discharges and spill response.	

4.6 Illicit Discharge Detection and Elimination

Currently City staff responds to illicit discharge and detection needs on a complaint or on a case-by-case basis. The City's website instructs citizens to report activities, which must be stopped immediately to prevent irreparable harm, by contacting City Hall at 509-755-6700 during business hours or by contacting the Liberty Lake Police Department at 509-218-4899. It is recommended that the City update the website to recommend 911 or Ecology be called for spills to the ground that pose an immediate threat to health or the environment. Additionally, it is recommended that the City develop a formal documentation of procedures for City staff to follow for eliminating discharges, including technical assistance, follow-up inspections, and a strategy for coordination with Ecology and for enforcement. It should be noted that the City is already responding to known illicit discharge detection and elimination (IDDE) needs, but formal documentation of the procedures and/or a method to track the work is missing.

4.7 Temporary Erosion and Sediment Control

Temporary Erosion and Sediment Control (TESC) Plans for construction protect waters of the state from degradation due to sediment transport or water pollution. While the City has no persistent surface waters, sediment and pollutants caused by soil disturbance can impact UICs and pose a risk to the aquifer. The Stormwater Management Manual for Eastern Washington provides guidance for the development of TESC plans, implementation, and inspection of construction sites. The manual TESC controls focus on sites with discharges to surface waters, although protection of infiltration areas is included. Due to the complete reliance for projects in the City on discharges to ground and the ongoing need to protect the aquifer, it is recommended that the City develop specific TESC procedures and a checklist for contractor and planning submissions that address the unique nature of stormwater control in the City.

The proposed guidance will outline measures to minimize erosion and sediment transport during the entire construction process. The required TESC plan will cover aspects such as design, implementation, BMPs, spill prevention control and countermeasures plans, discharge sampling, site management, and documentation. The planning will focus on controlling discharges to future drywells and infiltration sites.

5. Stormwater Capital Improvement Plan

5.1 Drainage Improvement Projects

Four site-specific stormwater program-led CIPs were evaluated to address known drainage issues. Preliminary engineering plans have been developed to plan for resources and implement under the SWMP schedule. Table 3 provides a summary of these capital projects. The CIP fact sheets, including maps and planning-level cost estimates, can be found in Appendix B.

Table 5. 6-Year Stormwater Capital Improvement Projects

Stormwater Capital Improvement Project	Retrofit Type	6-Year CIP Cost ($2024)	Schedule
East Sprague Avenue and Molter Road Intersection	Addition of SW Infrastructure (CBs, UIC/drywell)	$312,000	2029-2030
Sprague Avenue	Addition of SW Infrastructure (UIC/drywell)	$480,000	2024-2025
Neyland Avenue	Addition of SW Infrastructure (CBs, inlets UIC/drywell)	$355,000	2024-2025
East Country Vista North Swale	Rehabilitation and addition of SW Infrastructure (UIC/drywells)	$233,000	2027-2028
TP-14 – Appleway Overlay*		$150,000*	2024
	Total	$1,345,000	-

CBs = catch basins, UIC = underground injection control.

*This project is a stormwater program contribution towards a transportation project from the Capital Facilities Plan (CFP) and not a stormwater CIP.

5.2 Programmatic Capital Needs

Routine and re-occurring capital projects to repair, upgrade, or replace the existing stormwater system are included in the programmatic capital improvement program. Two programmatic CIPs were developed to plan and budget for maintaining existing stormwater infrastructure. The goal of these programmatic approaches for the first SWMP cycle was to set annual goals for facility improvements and to develop a schedule for implementation. Concept plans have been developed to execute them under the SWMP, with planning level estimates provided in Table 3. Concept-level programmatic fact sheets for these projects can be found in Appendix B.

Table 6. Programmatic Stormwater Capital Improvement Projects

Stormwater Capital Improvement Project	Programmatic Approach	Annual Cost ($2023)	Schedule
Swale Improvements	Restore the stormwater benefit of an existing swale through excavation, structure enhancement, grade modification, or updates to landscape or irrigation features	$20,000	Assumes two swale improvements at $10,00 each per year
Stormwater Structure Maintenance Planning	Development of a routine schedule for preventative maintenance to prolong lifespan and improve functionality	$7,000	Assumes two assets replaced at $3,500 each per year

6. Operation and Maintenance

The City operates and maintains a stormwater program, which includes City staff roles and responsibilities to operate the drainage system and manage the funds collected by the stormwater utility. The program elements typically include but are not limited to establishing service levels and operating policies, adopting and applying a stormwater manual for development review, overseeing stormwater capital improvement projects, complying with Ecology permits (which is not applicable here) and programs (e.g., the UIC registrations), inspecting and maintaining the drainage system, keeping and managing system maps, and responding to citizen complaints and keeping records. The activities described above are the basis for the resource needs of the stormwater utility described in Section 7. The following sections provide additional detail regarding the City's stormwater program elements, resources needed to deliver them, and the source of funding.

6.1 Organizational Structure and Staffing

The stormwater system operations and maintenance activities are performed under the Public Works department, which includes a Public Works director, project manager and street maintenance crews. Additional program coordination is provided by the City's director of planning and engineering, the City engineer, and the City's finance administrator. They are responsible for overseeing and directing staff in the program and providing the workflow to execute stormwater utility activities. The stormwater operations staff include an O&M supervisor, O&M field crew, with support from a GIS technician. A portion of these staff members' time is funded by the stormwater utility as described in Table 7. The Public Works director and City engineer positions are not funded by the stormwater utility nor are contributions made for the City planning director or finance administrators coordination efforts.

6.2 Routine Operations Performed by Operations and Maintenance Staff

The Street Operations Staff provide routine services to inspect, repair, and maintain the stormwater system, which include ditches, stormwater control and infiltration facilities, UIC/drywells systems, and street sweeping (a pollution source control activity). System maintenance is funded by the stormwater utility; however, due to the relatively small size of the stormwater program and the fact that many of these activities can also be attributed to other City programs, street operations staff support multiple departments within the City organizational structure. Street sweeping is part of the street operations or road management system. A cost has been projected for the disposal of vactor and sweeping waste, which is included in the ongoing programmatic costs (see Table 8). These resources also provide for response and citizen interaction related to stormwater and drainage complaints. Table 7

provides a summary of the activities and services performed by street operations staff when they provide maintenance and stormwater services on behalf of the stormwater utility.

Table 7. Stormwater Program Staffing Resources

Category	Activities	Total Annual Hours	Total Annual Cost
Catch Basin and Manholes	Inspections, Sediment Removal/Cleaning, Repair	396	$12,978.00
Drainage Ditches	Mowing	480	$15,542.40
UICs: Drywells and infiltration systems	Inspections, Cleaning	416	$13,625.60
Stormwater Ponds and Swales	Sediment Management/Removal	168	$5,517.60
Street Sweeping	Sweeping	644	$21,474.80
General Facility Maintenance and Other Field Tasks	Complaint Response	242	$8,263.64
		Total	**$77,402.04**

UIC = underground injection control. Costs reflect a blended rate of $42.10 per hour for the foreman and $32.38 per hour for staff/field crew. Labor costs include salary and benefits. All costs are presented in 2024 dollars.

6.3 Stormwater Capital Improvement Projects and Program

The stormwater CIP has identified specific project areas and systems for high-priority improvements or construction in a capital projects plan. The staff and oversight for delivery of these projects are funded by the stormwater utility as well as the capital costs associated with construction and construction oversite. The site-specific stormwater projects are described in Section 5.1.

In addition to the large capital projects, the City undertakes other capital road and system improvements. When these projects include stormwater systems or areas in need of upgrades or replacement, the City would opportunistically add stormwater capital elements, funded by the stormwater utility. These projects and budget are shown in the City of Liberty Lake Adopted 2024–2029 Capital Facilities Plan. There is no additional cost for project staffing by the stormwater utility.

The stormwater utility has also identified routine asset repair and replacements needed in the systems as failures occur or performance is diminished when the useful life is exceeded. These programmatic stormwater projects and staffing are described in Sections 5.2 and 6.6, respectively.

6.4 Data Collection and Record Keeping

The city has recently developed a Stormwater Asset Database in ArcGIS, which will be used for collection of maintenance and system repair data and status tracking. The data will be stored in the form of asset layers. Staff resources are used to collect and manage these data, as described in Table 8. The resources for data collection and management are not included in the stormwater utility.

6.5 Geographic Information System and Mapping

The City collects and maintains stormwater system data in its GIS system. This is operated and maintained at no additional staff resource cost to the stormwater utility.

6.6 Stormwater Program Delivery

The City Public Works and Engineering staff leads are responsible for managing and delivering the elements funded by the stormwater utility, including stormwater capital plans, establishing service levels and operating policies, adopting and applying stormwater standards, and complying with Ecology permits. Stormwater master plans such as this provide action plans and policies to guide program delivery. Currently, the City is not required to have an NPDES MS4 Permit for its system and under current policy is not likely to require one in the future (the permits are on 5-year cycles, with the current one starting in 2024). Regular stormwater master plan updates are on a 5- to 10-year schedule. The resources for a plan update are included in the summary of the ongoing programmatic costs provided in Table 8.

Table 8. Summary of Ongoing Programmatic Costs

Ongoing Programmatic Costs	Annual Cost
Waste Disposal	$10,000
Swale Improvements	$20,000
Stormwater Structure Maintenance (Asset Replacement)	$7,000
Total	$37,000

All costs are presented in 2024 dollars.

7. Financing and Rates

7.1 Background

This section describes the process and outcomes of a Stormwater Utility rate study performed for the City. The objective of the rate study was to develop a funding plan ("revenue requirement") for the City's Stormwater Utility for the 2025 to 2035 study period and projections for beyond. The report identified the total rate revenue needed to fully fund the Stormwater Utility on a stand-alone basis, which considered staffing (Section 6), O&M expenditures (Section 6), programmatic elements (Section 4), and capital funding needs identified in the City's Stormwater Capital Improvement Program (Section 5). Furthermore, this chapter provides a review of the Utility's current rate structure with respect to rate adequacy and customer affordability.

The methods used to establish user rates are based on principles that are generally accepted and widely followed throughout the industry. In 1992, the current annual Stormwater Utility fee of $10 per equivalent residential unit (ERU) was implemented by the County, which has not increased since that time. Three rate study alternative scenarios were designed for funding the Stormwater Utility. The details of these scenarios are included in Appendix C as the Stormwater Fee Memo.

7.2 Results

Based on the capital plan discussed in Chapter 5 and the programmatic plans and staffing discussed in Chapter 4 and Chapter 6, the following annual rate plan scenario was supported by City Council for progression.

The Scenario One rate would require no annual increase per ERU until 2026, and instead requires $500,000 from other funding sources in 2025 to reduce Stormwater Fee Revenue Requirements and limit rate increase. In 2026, the fee would increase to $20 per year under Scenario One (Table 9), which is an increase of roughly $0.83 per month. All scenarios analyzed under the rate study assume the APA Fee will sunset in 2024, resulting in no revenue to the program starting in 2026. Details of all scenarios presented at the Council Meetings as part of the rate study are included in Appendix C.

Table 9. Proposed Rate Increase — Scenario One

	2024	2025	2026	2027	2028	2029	2030
Annual Rate per ERU	$10.00	$10.00	$20.00	$23.00	$28.00	$30.00	$32.00
Annual Increase	$0.00	$0.00	$10.00	$13.00	$18.00	$20.00	$22.00
Equivalent Monthly Increase	$0.00	$0.00	$0.83	$1.08	$1.50	$1.67	$1.83

ERU = equivalent residential unit

7.3 Council Action and Next Steps

In August 2024, the City Council is tentatively scheduled to review and determine if they will approve a motion to adopt the proposed funding scenario. At these meetings they will perform a first and second read of the SWMP and Utility Rate increase and determine whether they will adopt the approaches and scenarios presented therein.

8. Implementation

This section presents the implementation plan, which brings together information from the preceding chapters in this SWMP to form a work plan of near- and long-term activities for the Stormwater Utility. The information in this chapter serves as a road map to the Storm Drainage Utility staff. This work plan outlines the critical elements of program implementation (e.g., capital improvement plan implementation, future operations and maintenance staffing, ArcGIS mapping and asset management, UIC registration and maintenance program, aquifer protection, etc.) and lays them out as a schedule of utility activities. A summary of the implementation schedule and plan is discussed in the following sections.

8.1 Capital Plan and Priorities

The 6-year CIP contains near-term capital improvement projects focused on mitigating existing drainage problems that have been observed and are well understood by the City's staff. These projects are described in Section 5, and additional details about these projects can be found in Appendix B. Table 10 lists the short-term site-specific capital improvement projects and establishes a proposed order of implementation for the near-term time frame. Project priority is ranked based on project opportunities and risks that have been weighed with budgetary availability as part of the Stormwater Utility Rate study discussed in Section 7. Table 11 lists the ongoing, near- and long-term programmatic capital improvement projects, and the staff activities needed to meet the annual goal.

Table 10. Site-Specific Stormwater Capital Projects Rankings and Priority

Project Name	Opportunity or Risk	Rank
TP-14 – Appleway Overlay (SW only)	▪ Project is currently under construction. ▪ Opportunity to upgrade SW features while associated impervious surface is already disturbed. ▪ Risk of not incorporating SW elements into overlay project, resulting in a delay of over 5 years due to moratorium per City Code (Regional Pavement Cut Policy).	1
Sprague Avenue (Addition of UICs)	▪ Opportunity to build on the momentum of existing street repairs (economy of scale). ▪ Opportunity created by upgrading the SW features along this stretch that could delay the need to address the E Sprague and S Molter Intersection project by reducing impacts. ▪ Reduces risk of impacts to adjacent properties. ▪ Risk that failure to include SW elements would shorten life of replaced pavement. ▪ Risk of not incorporating SW elements into existing transportation project, resulting in a delay of over 5 years due to moratorium per City Code (Regional Pavement Cut Policy).	2
Neyland Avenue (Addition of CBs, Inlets, and UICs)	▪ Opportunity to address drainage complaints and build on momentum of related work being done in adjacent area. ▪ Risk of not incorporating SW elements into existing transportation project, resulting in 5-year moratorium per City Code (Regional Pavement Cut Policy).	3
East Country Vista North Swale (Rehabilitation/Addition of UICs)	▪ Risk of damage to street infrastructure from failure to address current drainage issues, resulting in higher repair costs.	4
East Sprague Avenue and Molter Road Intersection (Addition of CBs and UICs)	▪ Opportunity created by upgrading the SW features along Sprague Ave that could allow the City to address the E Sprague and S Molter Intersection further along in the budget timeline by reducing impacts.	5

Table ranking is defined by order of anticipated completion.

Table 11. Programmatic Stormwater Capital Projects

Project Name	Work Activity	Frequency	Cost Assumptions
Swale Improvements	▪ Inspect swales annually and prepare enhancement priority list. ▪ Rehabilitate two swales a year to restore the stormwater benefit of existing swales.	Annually	Assumes two swale improvements at $10,000 each per year
Stormwater Structure Maintenance Planning	▪ Inspect infiltration systems annually and prepare enhancement priority list. ▪ Develop a schedule for routine preventative maintenance to prolong lifespan and improve functionality. ▪ Rehabilitate two facilities a year.	Annually	Assumes two assets replaced at $3,500 each per year

8.2 Stormwater Planning Activities

The City of Liberty Lake was granted an exemption from inclusion in the Eastern Washington Phase II Municipal Stormwater Permit. However, a regulatory-driven improvements investigation was performed on behalf of this Plan, as discussed in section 4-6. The summary below includes the recommended program and policy updates for the stormwater utility coverage area. Table 12 summarizes the recommended program actions for the stormwater program and policy updates outlined in this SWMP.

Table 12. Stormwater Program Planning Activity Recommendations

Section Number	Action
Stormwater Program	
4.2	Adoption of Stormwater manual preferences and update approaches
4.3	Participate in regional aquifer protection strategies.
4.5	Develop ownership and maintenance policies for UICs/drywells.
4.6	Develop a process for documentation of IDDE by City staff, including technical assistance and follow-up inspections.
4.7	Develop temporary erosion and sediment control procedures and a checklist for planning submissions.
6.2	Develop a decant waste management plan for vactor and sweeping waste.
Capital Projects	
5.1	Continue to log drainage complaints and SW program needs for consideration in future plan updates.
5.2	Update programmatic CIPs in the SWMP in the next plan.
Additional Services	
3.1/6.5	Ongoing development of ArcGIS application and general mapping support.
6.6	Update Stormwater Master Plan every 10 years.

IDDE = illicit discharge detection and elimination; UIC = underground injection control; CIPs= Capital Improvement Projects; SWMP = Stormwater Management Program; UIC = underground injection control.

8.3 Stormwater Utility Fee Planning Activities

The summary below includes the recommended finance and rate study-related planning activities for the stormwater utility and City staff to develop. Table 13 summarizes the recommended program actions for the stormwater utility rate program and policy updates outlined in the Stormwater Utility Rate Study Memo included at Appendix C.

Table 13. Stormwater Utility Fee Schedule Activity Recommendations

Section Number	Action
7.3	Update SW Utility Fee schedule and adopt by ordinance.
Appendix C	Build in escalation factor to account for inflation, supply and demand, and macroeconomic factors.
Appendix C	Review rate schedule every 5 years for ongoing feasibility.
9	Develop a database of potential grant funding sources the City could pursue to continue supporting the development of their SWMP.
Appendix C	Develop a system for the City to track staff resources and direct costs (e.g., irrigation) associated with maintaining HOA infrastructure under the drainage annual service charge.

GIS = geographic information system; IDDE = illicit discharge detection and elimination; SWMP = Stormwater Management Program; UIC = underground injection control.

8.4 Operation and Maintenance Planning Activities

The evaluation of O&M staffing for operating, managing, and maintaining the storm drainage system in Section 6 indicated that additional staff and equipment may be necessary to anticipate future work and program service goals. Although no immediate staffing additions are planned, program goals include establishing standard operation procedures and recordkeeping and maintenance service tracking to better inform future assessment of need surrounding staffing levels and program assets (Table 14).

Table 14. Operation and Maintenance Planning Activity Recommendations

Section Number	Action
3.2	Continue to develop ArcGIS Stormwater Asset Database; filling needed attribute gaps.
3.2	Track program maintenance activities and workflow.
6.2	Develop an updated sweeping plan.
6.4	Expand the system inspection process and develop recordkeeping standard operating procedures for consistent data capture.
6.5	Develop database attributes to track drainage complaints.

8.5 Implementation Work Plan and Schedule

The proposed work plan and priority schedule is provided below in Table 15 for capital projects, programmatic projects, and planning activities to deliver the capital plan based on the available staff resources and funding stream.

Table 15. Implementation Plan Activities Timeline

Implementation Plan Activities Timeline		2024	2025				2026				2027				2028				2029				2030				2031–2035	2036 & beyond
Section	Action	Q1-4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
Stormwater Capital Improvement Projects																												
Site Specific																												
5.1	TP-14 – Appleway Overlay (stormwater features only)																											
5.1	Neyland Avenue (addition of CBs, inlets, and UICs)																											
5.1	Sprague Avenue (addition of UICs)																											
5.1	East Country Vista North Swale (rehabilitation/addition of UICs)																											
5.1	East Sprague Avenue and S Molter Road Intersection (addition of CBs and UICs)																											
Programmatic																												
5.2	Swale improvements (inspect and prioritize project list)																											
5.2	Swale improvements (rehabilitation/replacement projects)																											
5.2	SW Structure Maintenance Planning (inspect and prioritize project list)																											
5.2	SW Structure Maintenance Planning (develop routine activities schedule)																											
5.2	SW Structure Maintenance Planning (rehabilitation/replacement projects)																											
Stormwater Program Planning Activities																												
Stormwater Program																												
4.2	Adoption of Stormwater Manual preferences and update approaches																											
4.3	Participate in regional aquifer protection strategies																											
4.5	Develop ownership and maintenance policies for UICs/drywells																											
4.6	Develop IDDE protocols (records, inspection, technical assistance)																											
4.7	Develop temporary erosion and sediment control procedures/ checklist																											
6.2	Develop a decant waste management plan (vactor/sweeping waste)																											
Stormwater Capital Projects																												
5.1[a]	Log drainage complaints/program needs for future SWMP CIP consideration																											
5.2	Update programmatic CIPs in the 2035 SWMP update																											
Stormwater Utility Funding																												
7.3	Update SW Utility Fee schedule and adopt by ordinance.																											
Appendix C	Build in escalation factor (inflation, supply and demand, macroeconomics)																											
Appendix C	Review rate schedule every 5 years for ongoing feasibility																											
9	Develop a database of grant funding sources to support the SWMP																											
Appendix C	Develop a system to track resources/costs for HOA properties maintenance																											
Operation and Maintenance																												
3.2	Continue filling attribute data gaps in ArcGIS Stormwater Asset Database																											
3.2	Track program maintenance activities and workflow																											
6.2	Develop an updated sweeping plan																											
6.4	Expand system inspection process and develop recordkeeping SOP																											
6.5[a,b]	Develop database attributes in ArcGIS to track drainage complaints																											
Additional Services																												
3.1/6.5[b]	Ongoing development of ArcGIS application and mapped SW Assets																											
Appendix C	Update Stormwater Master Plan every 10 years																											

CIP= capital improvement projects, HOA= homeowners association, IDDE= illicit discharge detection and elimination, SOP= standard operating procedure, SW= stormwater, SWMP= stormwater master plan, UICs= underground injection control.

Legend
- Completed
- Project Design
- Recommended Start
- Duration
- Finish
- Depends on APA Renewal
- Ongoing Action

[a,b] represents related actions

9. Grant Opportunities

The following sections provides a brief outline of considerations for the types of grants that could be used for the development of stormwater infrastructure and programs.

9.1 Water Quality Combined Funding Program

Ecology's Water Quality Program awards grants and loans on a competitive basis for high-priority water quality projects throughout Washington state. Ecology administers five funding programs that make up the Water Quality Combined Funding Program (WQC) through an integrated annual funding cycle (Ecology 2023). A sampling of current WQC includes the following five funding programs:

- Clean Water State Revolving Fund (CWSRF).

Provided by the federal CWA, the CWSRF program is funded through an annual EPA capitalization grant, state matching funds, and principal and interest repayments on past program loans. The CWSRF program provides low-interest and forgivable principal loan funding for wastewater treatment construction projects, eligible nonpoint source pollution control projects, and eligible "green" projects

- Stormwater Financial Assistance Program (SFAP).

The SFAP is designed to fund stormwater projects and activities that have proven effective at reducing impacts from existing infrastructure and development and enhancing existing stormwater programs. Stormwater facility projects and a limited set of stormwater activities project types are eligible for SFAP funding.

- The Centennial Clean Water Program.

The Centennial Clean Water Program in Washington provides grants for water quality infrastructure and nonpoint source pollution projects. Eligible infrastructure projects are limited to wastewater treatment construction projects for financially distressed communities.

- The Clean Water Act Section 319 Nonpoint Source Grant Program (Section 319).

The EPA provides grants to Washington under Section 319 of the federal Clean Water Act. The Section 319 grant program offers funding to eligible nonpoint source pollution control projects

- Sewer Overflow and Stormwater Reuse Municipal Grants Program (OSG)

The OSG Program provides funds that can be used for planning, designing, and construction of combined sewer overflows, sanitary sewer overflows, and stormwater management projects. This program aims to address critical stormwater infrastructure needs in communities that can impact water quality and public health. Applications are reviewed by the appropriate EPA Regional Office and, if approved, are awarded by the Region.

Eligible project categories for grant and/or loan funding that could apply to the City may include:

- Stormwater facilities.
  - → Construction of facilities for stormwater treatment and flow control.
  - → Low-impact development or green retrofit projects.
  - → Planning and design.

- Stormwater activity.
  - → Stormwater pollutant management program plans.
  - → Stormwater pollutant source control planning and implementation.
- Nonpoint source activity.
  - → Groundwater, aquifer, wellhead planning and implementation.
  - → Public outreach and education.
  - → Water quality monitoring.

In general, projects or project components that do not have a direct water quality benefit are not eligible for funding through WQC. Additional information about projects and project components that are ineligible can be found in section 1.3 of Ecology Publication 23-10-020 (Ecology 2023).

10. References

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Appendix A

GIS Stormwater Asset Database Technical Memorandum

Parametrix
let's create tomorrow, together

Technical Memorandum

DATE:	February 9, 2024
TO:	Lisa Key, Director of Planning and Engineering, City of Liberty Lake
FROM:	Paul Fendt, P.E., Parametrix, K.J. Hanley, P.E., Parametrix; Arianna Frender, Parametrix; Chad Tinsley, Parametrix
SUBJECT:	GIS Stormwater Asset Database Memorandum
PROJECT NUMBER:	376-7878-014
PROJECT NAME:	City of Liberty Lake Stormwater Management Plan

Purpose

This memorandum will describe the development process for a geographic information system (GIS) Stormwater Asset Database and will include steps the City of Liberty Lake (City) may pursue for further additions and refinement in the process of advancing their stormwater program. This GIS product will include stormwater assets owned and maintained by the City. When completed, the system will provide a baseline for stormwater management activities. It will not be used for modeling or design at this time.

The GIS database of the City of Liberty Lake's stormwater system will be developed using the following information:

- Soils.
- Topography.
- Water resources.
- Existing stormwater system, public and private.
- Land use.
- Permeable/impermeable areas.
- Utilities.
- Existing built environment.

Web Map Link

To view the City's ArcGIS web map, use the following public link:

https://coll.maps.arcgis.com/CoLLSWMP

System Mapping Elements

Geospatial Data

The City has acquired a license for ArcGIS online from ESRI to support of City's geographic-based approach to management of water resources. Maintaining compatibility with established agency standards, as well as with a variety of users both public and private, will be a priority of this effort.

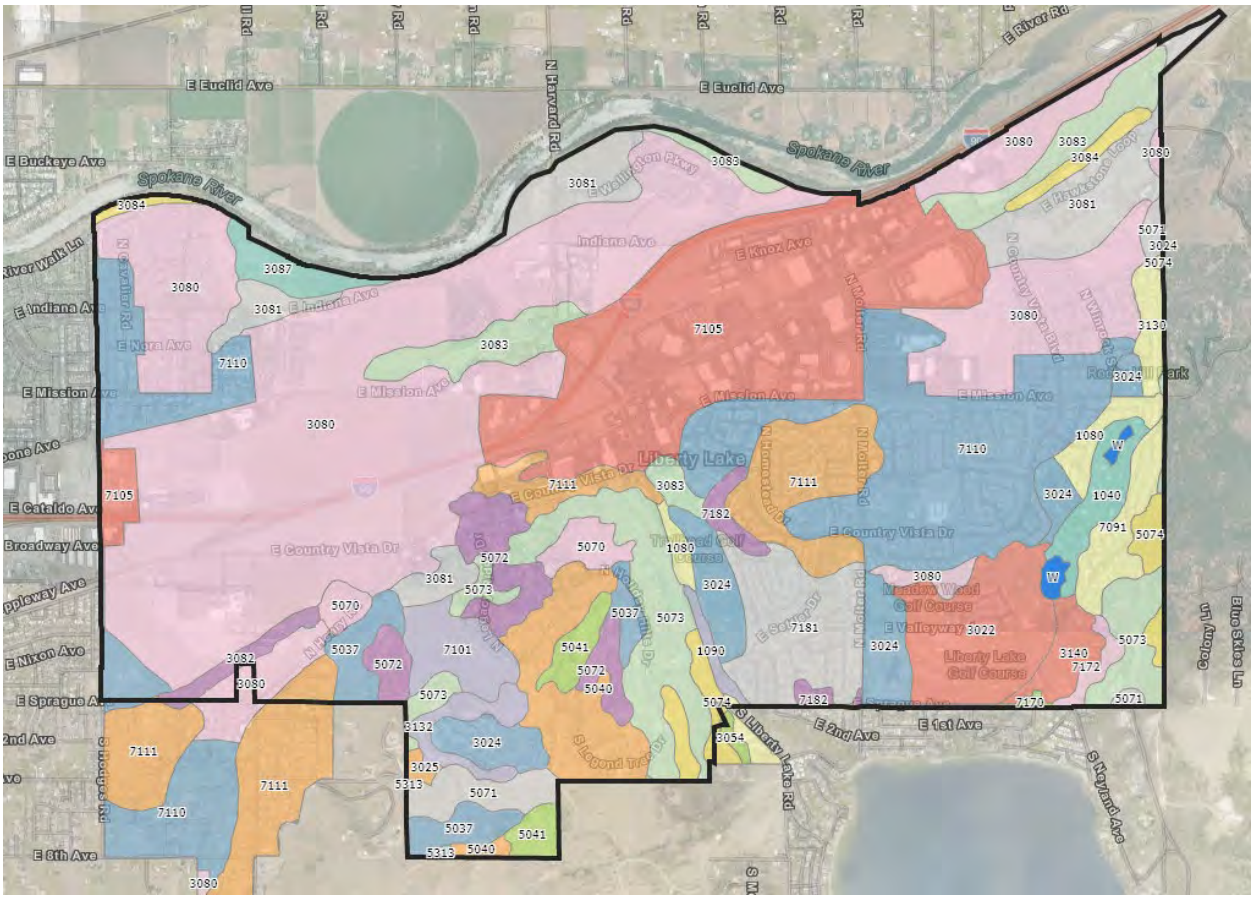
The following data storage and import standards will be used for desktop GIS:

- Horizontal datum: NAD 83 HARN.
- Vertical datum: NAVD-88.
- Project system: Lambert Conic Conformal.
- Coordinate system: Washington State Plane Coordinates.
- Coordinate zone: South (or zone-appropriate is not statewide).
- Coordinate units: U.S. Survey Feet.
- Accuracy standard: +/-40 feet or better.
- Vector import format: ArcExport E00 file, Shapefile, File Geodatabase, Personal Geodatabase.
- Raster import format: TIFF, BIL/BIP/BSQ, ESRI Grid, ERDAS Imagine.
- Metadata: Federal Geographic Data Committee (FGDC), Metadata Content Standards.

* Data displayed in web maps and other web-based applications are reprojected into Web Mercator Coordinate System rather than State Plane Coordinates as required by web mapping applications.

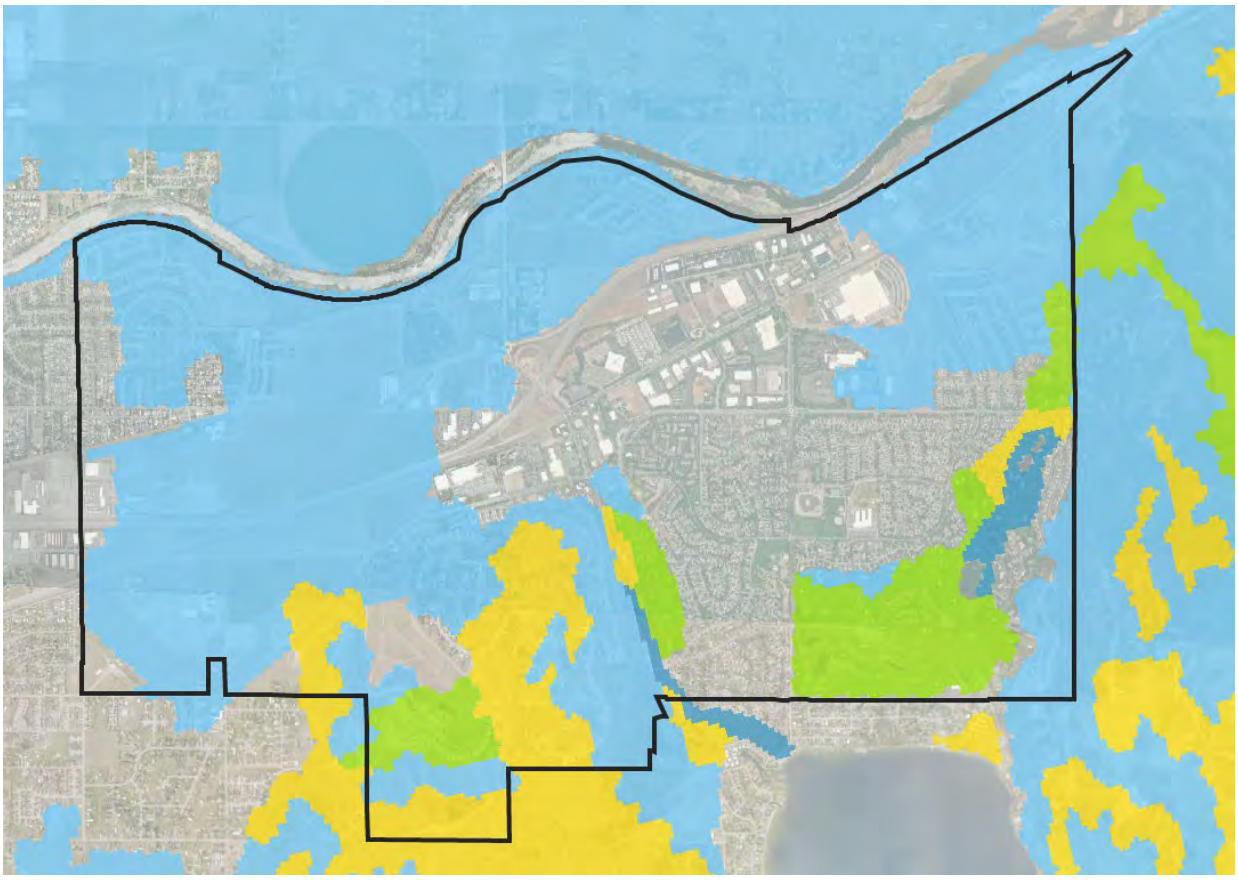
Soils

Soil data was imported into the City's GIS inventory from the U.S. Department of Agriculture/Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database Soil Database. The NRCS Web Soil Survey identified soil mapping units (Figure 1) and hydrologic soil groups (Figure 2), which have been added to the City's map. The soils in the area are primarily classified as well draining outwash soils, which in general can be indicators for feasibility of infiltration facilities and the use of low impact development (LID) in stormwater management. The City may conduct evaluations to determine LID feasibility as part of the development of the solid waste management plan (SWMP). Soil type is likely to be a criterion for certain land use planning decisions regarding preferences for locating development in proximity to well-drained soils that can use LID. Conversely, poorly drained soils may have more limited development opportunity and require more extensive area for stormwater management facilities. No additional soil information is needed for the SWMP planning evaluation.



Source: NRCS SSURGO 2023.

Figure 1. NRCS City of Liberty Lake Soils by Type



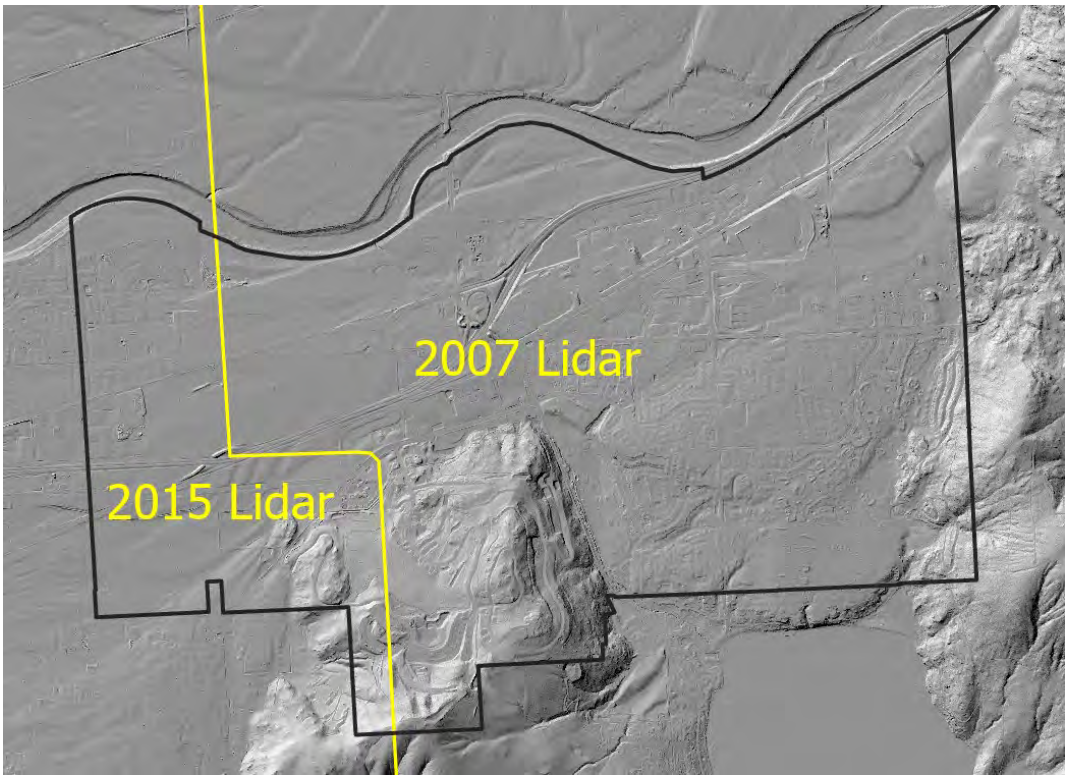
Source: NRCS SSURGO 2023.

Figure 2. Hydrologic Soil Groups in the City of Liberty Lake

Topography

Topography data imported into the City's ArcGIS web map was sourced from Washington Department of Natural Resources (DNR) light detection and ranging (LiDAR) dataset, which draws from lidar acquisitions surveyed in 2007 and 2015. The LiDAR data was sufficiently detailed in most areas to support refinement of catchment delineations and an initial desktop review that generated a base map of existing stormwater facilities. There are some areas with developments that occurred after the lidar acquisition, so those topographic changes are not reflected. Field survey or use of other City

data will be required in these areas to support topographic mapping updates in these areas. Figure 3 demonstrates the LiDAR coverage areas by associated survey date.



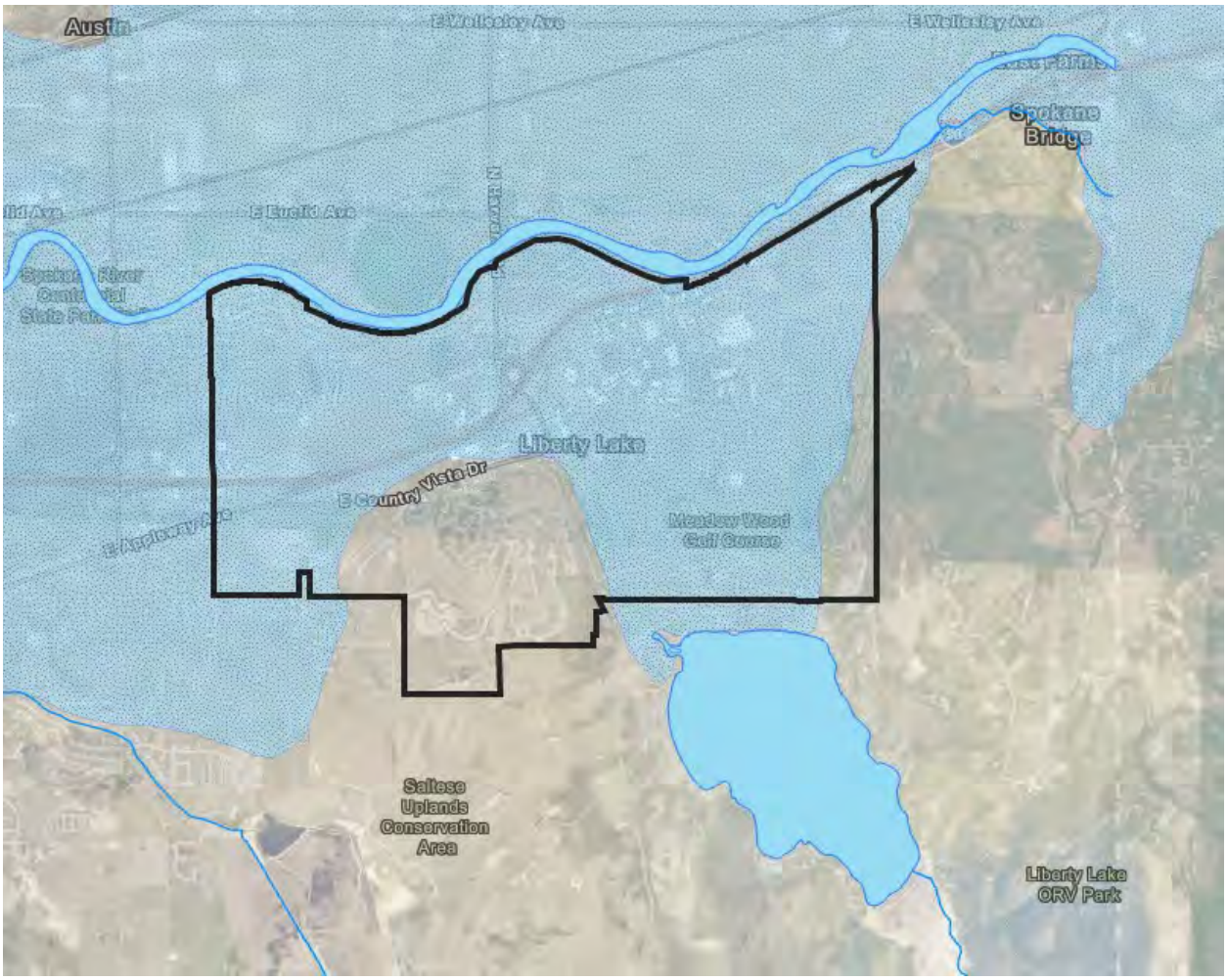
Source: WA DNR 2007 and 2015. Parametrix 2023.

Figure 3. LiDAR Data Coverage Areas by Survey Collection Date

Water Resources

Groundwater

The principal aquifer that underlies the majority of the City is the Rathdrum Prairie Aquifer (SVRP), (Figure 4). There is a high degree of hydraulic continuity between the Spokane River and the SVRP Aquifer that affects seasonal and annual flows. The SVRP Aquifer and its overlying soils are permeable to the extent that streams running off the adjacent uplands completely infiltrate into the subsurface at the margins of the aquifer. As a result, there are no perennial tributaries to the Spokane River in the City or anywhere in water resource inventory area (WRIA) 57 between the state line and Hangman Creek, west of downtown Spokane (RWIT 2018).



Source: Spokane County GIS 2023

Figure 4. Rathdrum Prairie Aquifer underlying the City of Liberty Lake

Surface Waters

The geology of the Spokane River watershed and Liberty Lake area results in a unique landscape that influences characteristics of the hydrology and hydraulics of the area. The City is located within WRIA 57, which is located on the eastern edge of the Columbia River Basalt Plateau in the foothills of the Rocky Mountain Range (see Figure 5). The major drainage of WRIA 57 is the Spokane River, which forms the northern border of the City, receiving flows from Lake Coeur d'Alene that are regulated by the Post Falls Dam for roughly half the year (RWIT 2018). The Spokane River also receives flows from a number of tributaries, including the Little Spokane and Hangman Creek, and has several dams along the mainstem that affect its hydrograph. The Spokane River terminates in WRIA 54 where the Long Lake Dam creates the Spokane River reservoir (also known as Long Lake).

Surface waters and water sources (other than ground) were imported to the map from Washington DNR Streams and Waterbodies layers. Data from the Spokane River Watersheds Hydrogeologic Data Portal was also imported, which includes aquifer boundaries and depth to water, nitrate data, geologic cross sections, and primary water bearing units. This data is not needed for the program at this time but will be catalogued as available for future program applications. Based on the review of the hydrologic data, there are no persistent surface waters within the city limits.

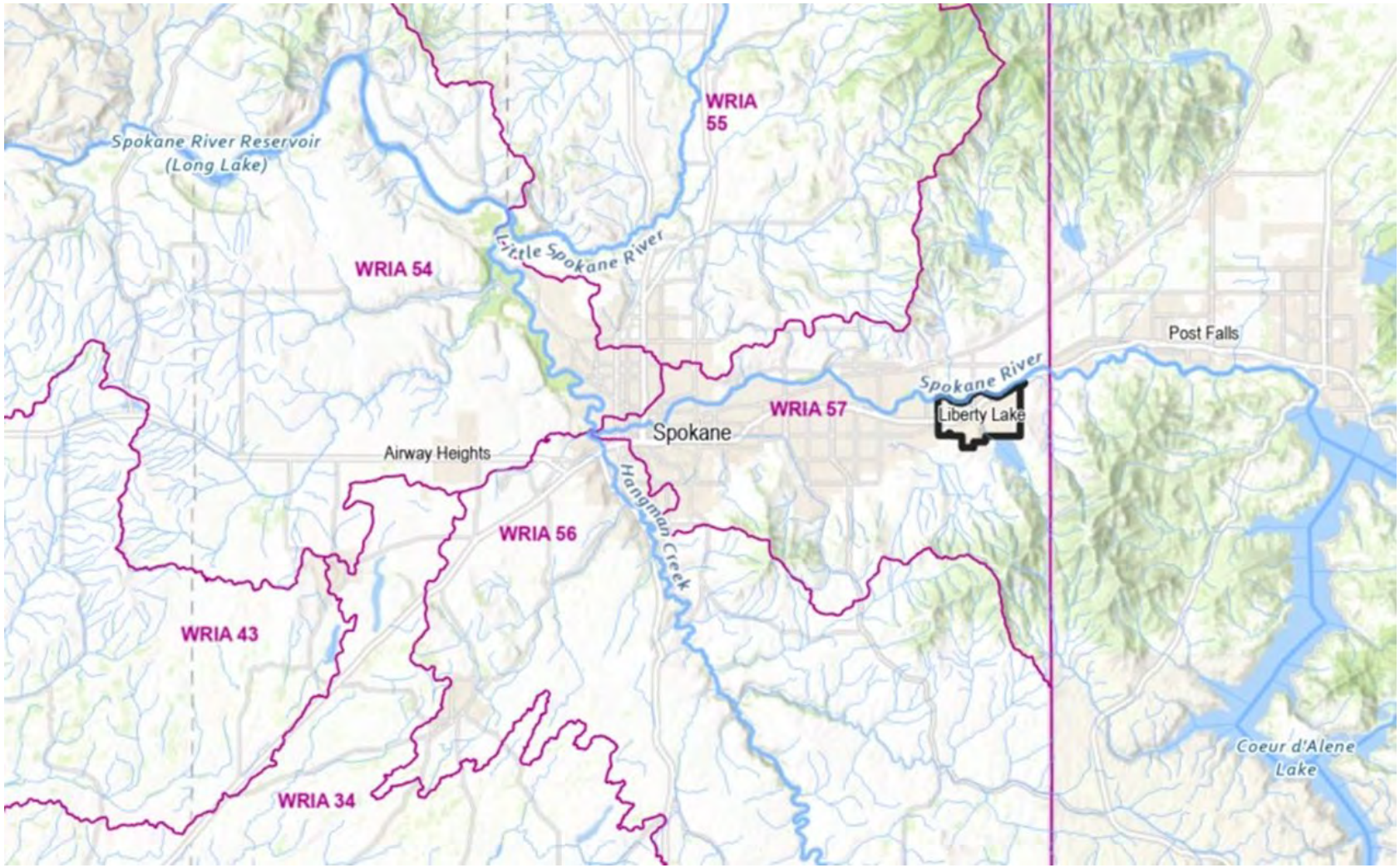


Figure 5. Spokane River Watersheds

Drainage and Stormwater Disposition of the City of Liberty Lake

In general, stormwater runoff from the City could flow to one of three potential discharge points or receiving waters: discharge directly to the ground, Spokane River, and Liberty Lake. These drainage pathways were identified through the collection and review of existing data sources. A map layer was created delineating the approximate drainage disposition for all areas within the limits of the City of Liberty Lake (Figure 6).

Discharges to Ground

The City is dominated by relatively low runoff and poorly defined natural drainage paths, which are a direct result of the lack of year-round rainfall to form drainage patterns and provide perennial streams. As a result, there is little to no known or observable hydrography for which an aerial interpretation can serve as the basis for mapping efforts. Additional information for specific drywell catchment areas has not been included and may be delineated if needed.

Spokane River

There are no known or reported outfalls discharging directly to the Spokane River originating from City-operated or City-maintained drainage systems. Field investigations found no known or reported outfalls to the Spokane River; however, the existing map data sourced from Washington DNR indicates a pipe originating from the drainage sump adjacent to County Vista Drive connecting to the Spokane River.

Liberty Lake

Liberty Lake may receive seasonal flows from intermittent streams, mainly originating outside of City boundaries. Stormwater originating from within the City boundary has been observed to sheet flow south toward the lake during large storm and snow melt events, generally in response to storm melt events and drainage functions of the built environment. However, there are no known discharges from the City's system draining directly into Liberty Lake.

Liberty Lake Overflow Channel

The Liberty Lake overflow channel (mapped as a canal/ditch) is located on the northwest end of the lake, sloping northward along Liberty Lake Road toward the Spokane River, ending in two drainage sumps. The overflow channel, which is an engineered channel and pipe controlled by an outlet structure, can provide a path for water from Liberty Lake to the Spokane River as indicated by the Washington DNR mapped data. This path could not be confirmed through field observation during the mapping efforts. Additionally, City staff has not observed any flows, the lake would have to rise several feet to reach the outlet profile, and there is no apparent persistent surface drainage that leaves the overflow channel.

Stormwater that enters the drainage overflow channel infiltrates into one of the two drainage sumps along the channel. The slope of the channel has been confirmed by the Liberty Lake Sewer and Water District; however, details of specific system features (physical attributes including flow capacity, sump dimensions and functionality, and elevation) are unknown. The system is managed by the Sewer and Water District.

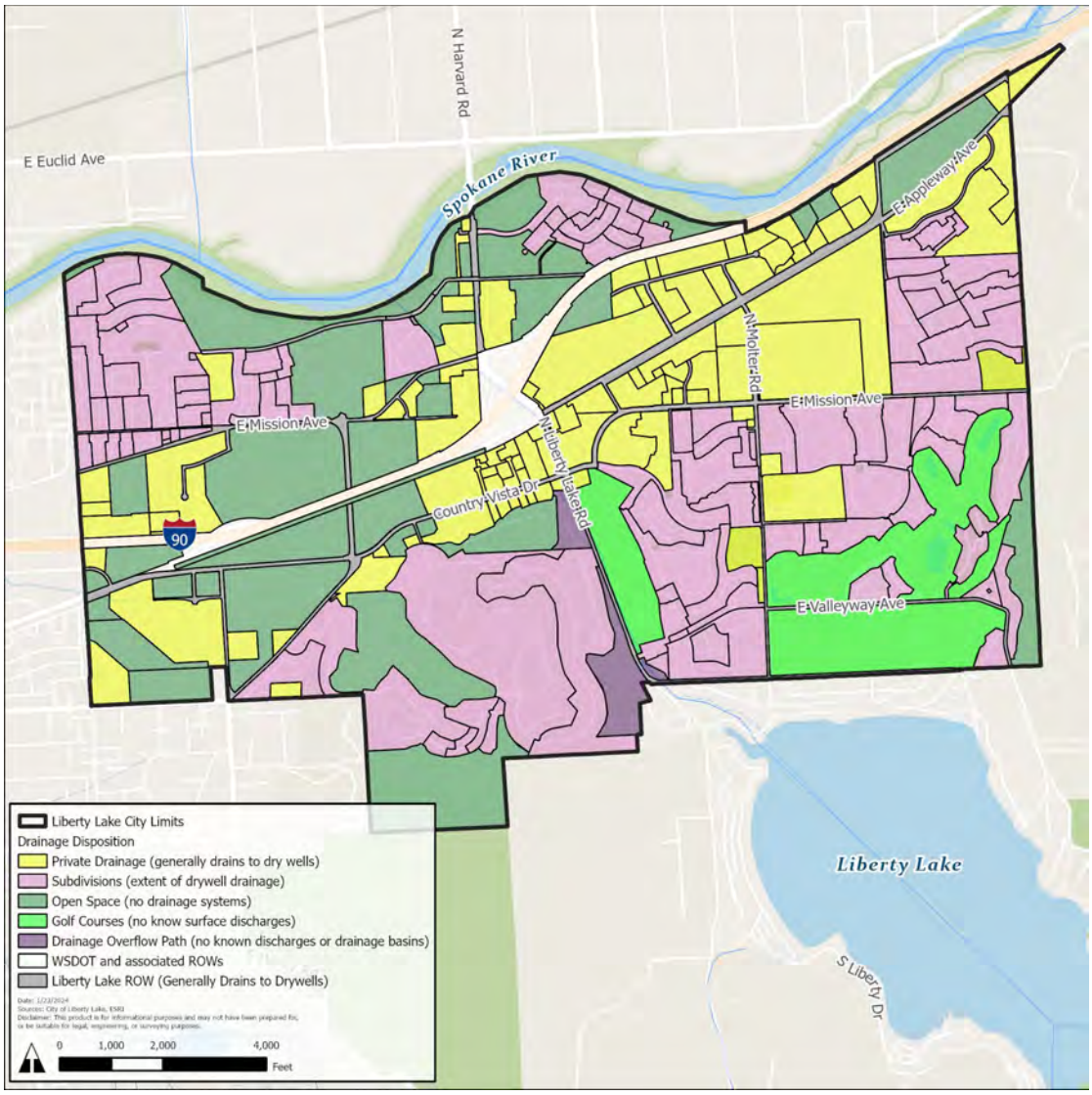


Figure 6. City of Liberty Lake Drainage Disposition

Existing Stormwater System, Public and Private

The goal of the stormwater mapping was to develop a database and maps in GIS representative of the City's existing stormwater infrastructure using available data and resources to provide a baseline for planning future operations and maintenance. The effort captured the location and attributes of systems and structures to develop the resource and implementation plans, inform rate study efforts, and allow the city to identify data gaps that could be completed over time if needed.

The City of Liberty Lake has no municipal separate storm sewer (MS4) system. Stormwater is collected on city streets or gutters and conveyed to drywells or infiltration facilities. There are currently no storm sewers in the City that do not discharge to the ground. Subsequently, there are no private systems connected to the public system, and therefore no private systems were mapped as part of this effort. Mapped stormwater system features are displayed on Figure 7.

The following types of stormwater systems were evaluated for inclusion during the mapping process:

- Areas served by the MS4 that discharge to ground (drywells and swales).
- Permanent stormwater facilities owned or maintained by the City.
- MS4 connections to a private system (not applicable).
- Connections between the MS4 and another public entity (not applicable).

Drywells

The vast majority of the City drains to dry wells, including private drainage, most subdivisions, and most of the Liberty Lake right-of-way. The locations of the mapped drywells were sourced from the Department of Ecology Underground Injection Control Well (UIC) registration database. The City mapped and field confirmed the registered drywells from the database in the City limits. The registered locations of the municipal UICs (infiltration points) were georeferenced using the latitude and longitude coordinates, then further refined first through desktop review, and then verified and adjusted as necessary in the field using the ArcGIS Field Maps App. Drywells are represented as points in the map data.

In the undeveloped open spaces, generally there are no well-defined natural drainage paths, and the developed open spaces (such as golf courses) do not have apparent outfalls or outlets to surface waters. Within that layer, private systems and subdivisions have been identified that drain to drywells.

Catch Basins

The City had previously maintained a small dataset of catch basins locations mapped using Google Earth, which included maintenance notes. This data was used as a starting point for the catch basin mapping effort. Additional catch basins were located, and the locations of existing catch basins were refined through a combination of desktop mapping (using high-resolution aerials) and field mapping using the ArcGIS Field Maps App. For some catch basin locations, the direction of the inward and outward pipe were noted. This information can be used in the future to assist in digitizing pipes connecting to catch basins and swales. Catch basins are represented as points in the map data.

Curb Cuts

The locations of curb cuts were captured when these features were associated with drywells or storm facilities (ponds and swales) during the field mapping process. The locations of these features were mapped in the field using the ArcGIS Field Maps App by navigating to the exact feature location, dropping a pin to create the feature, and adding the relevant attributes. Curb Cuts are represented as points in the map data.

Ponds and Swales

The location of ponds and swales were first located using a combination of LiDAR (detailed contours and hillshades) and aerial imagery and then represented on the desktop application by drawing them as a polygon shape. The location and shape of these structures was then refined in the field using the ArcGIS Field Maps App by navigating to the exact feature location and adjusting the feature as needed.

The Liberty Lake drainage overflow channel (owned by Lakehaven Water District) was imported to the map using data from Washington DNR. The disposition of stormwater to ponds and swales in some areas was located through a combination of the review of as-built plan sets (when available) and field confirmation. Additional field work was performed to supplement the findings of the desktop stormwater disposition review in this area.

Pipes

The location of the limited amount of known pipe structures was collected and mapped through a review of as-built plan sets (as available and relevant) and field location/verification. Pipe features were only mapped when they could be located from above ground in the field, from desktop mapping using CAD linework, or from aerials and lidar. The pipes that were found and encountered in the field are shown on the figure. All the known pipes are connected to catch basins that discharge to the ground into sumps. Additional mapping of pipes, if discovered, would be updated as needed.

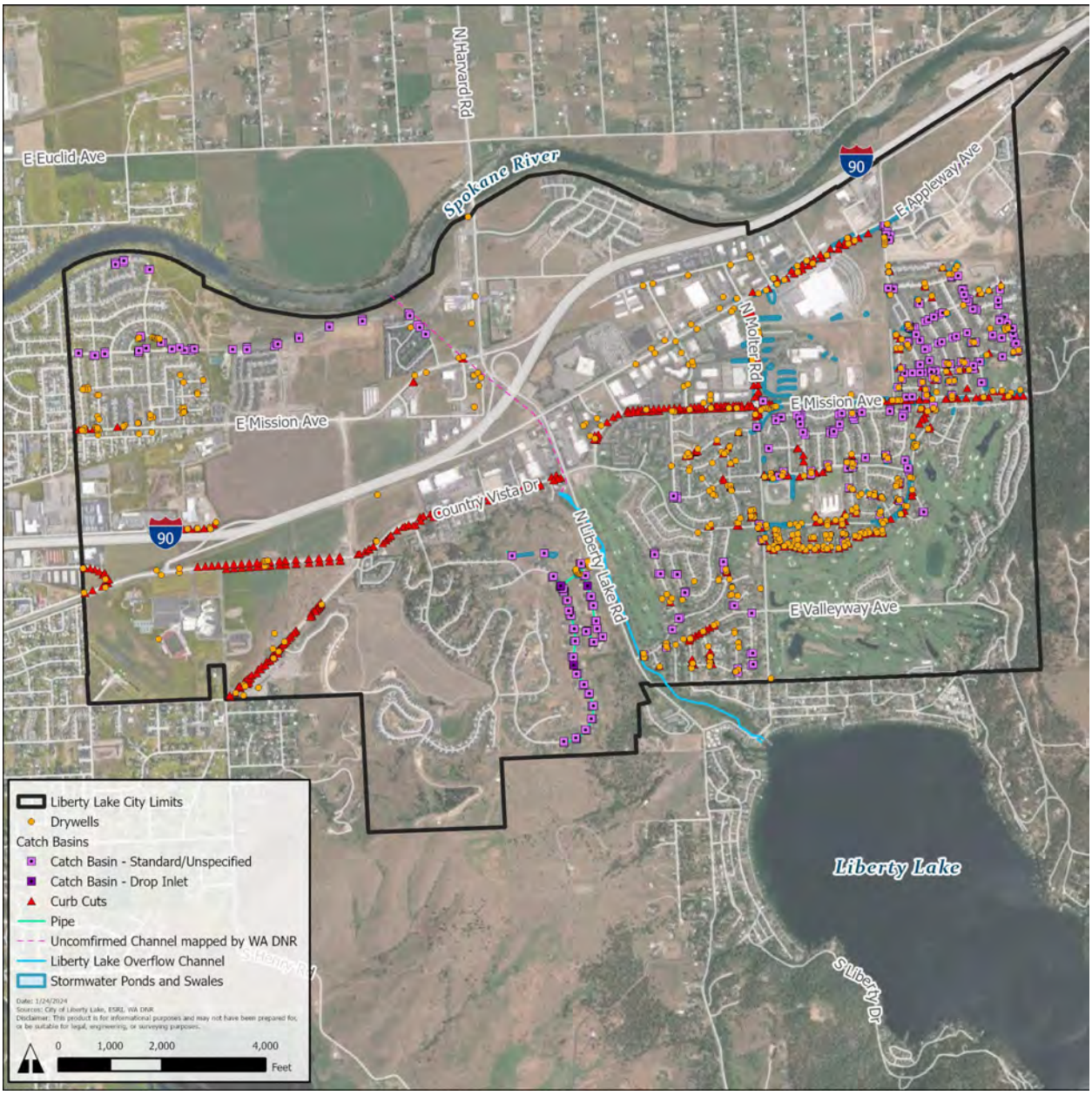


Figure 7. Mapped Stormwater System Features

Land Use

Land Use planning is reflected in the City's zoning layer. The zoning data is maintained by the City and was imported into the City's ArcGIS web map. The zoning data is complete, and no further refinement is needed. Data could be updated periodically if zoning changes occur. See Figure 8 for the City's current zoning layer.

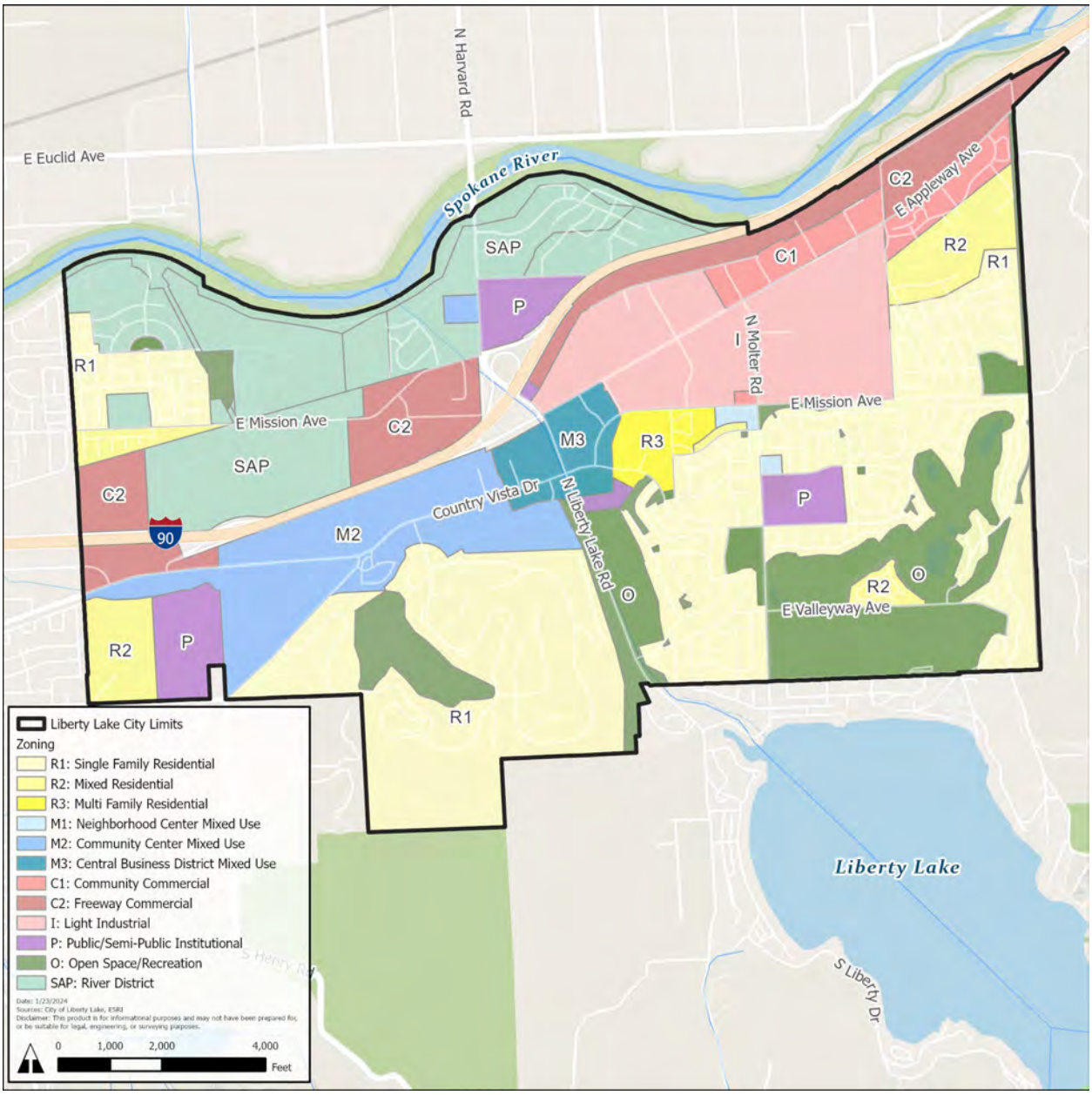


Figure 8. City of Liberty Lake Zoning Map

Characteristics of the Built Environment

A land cover layer was developed that groups characteristics of the built environment into the following land cover types: roads, buildings, other impervious, barren land, vegetation (grass/trees) and water. There was no manual digitization done to refine the dataset. Data could be refined manually and updated as the built environment undergoes future changes. See Figure 9 for all features of the built environment.

Roads

Road centerline data, including major arterials, minor arterials, collectors, public streets, and HOA streets, are maintained by the City and was imported into the City's ArcGIS web map. The road centerline data is complete, and no further refinement is needed.

Another aspect of road data is impervious surfaces, which are used in stormwater planning to project utility fees, to calculate pollutant loading and runoff potential, and for maintenance planning purposes. The impervious surfaces were developed as part of the land cover layer and are discussed in the permeable/impermeable areas section.

Buildings

The City's buildings layer was created by combining existing building layers from OpenStreetMap and Microsoft. These sources represent approximate building footprints and do not necessarily capture every building in the City.

Utilities

The sewer and water utilities are operated by the Liberty Lake Sewer and Water district, which is a special purpose district government operating independently of the City of Liberty Lake's planning, engineering, and building services. For this reason, the City will not map the utilities associated with these entities.

Permeable/Impermeable Areas

A land cover layer was created to distinguish impervious from pervious areas. The impervious areas were classified into roads, buildings, other impervious areas, and water. The pervious areas were defined as barren land or vegetation (including grass and trees). The layer was developed by combining available data from 2021 aerial imagery, 2007 and 2015 topography data (LiDAR), 2019 Microsoft building footprint dataset, and 2023 Open StreetMap building footprint dataset. There was no manual digitation done to refine the dataset. Data could be refined manually and updated as the built and natural environment undergoes future changes.

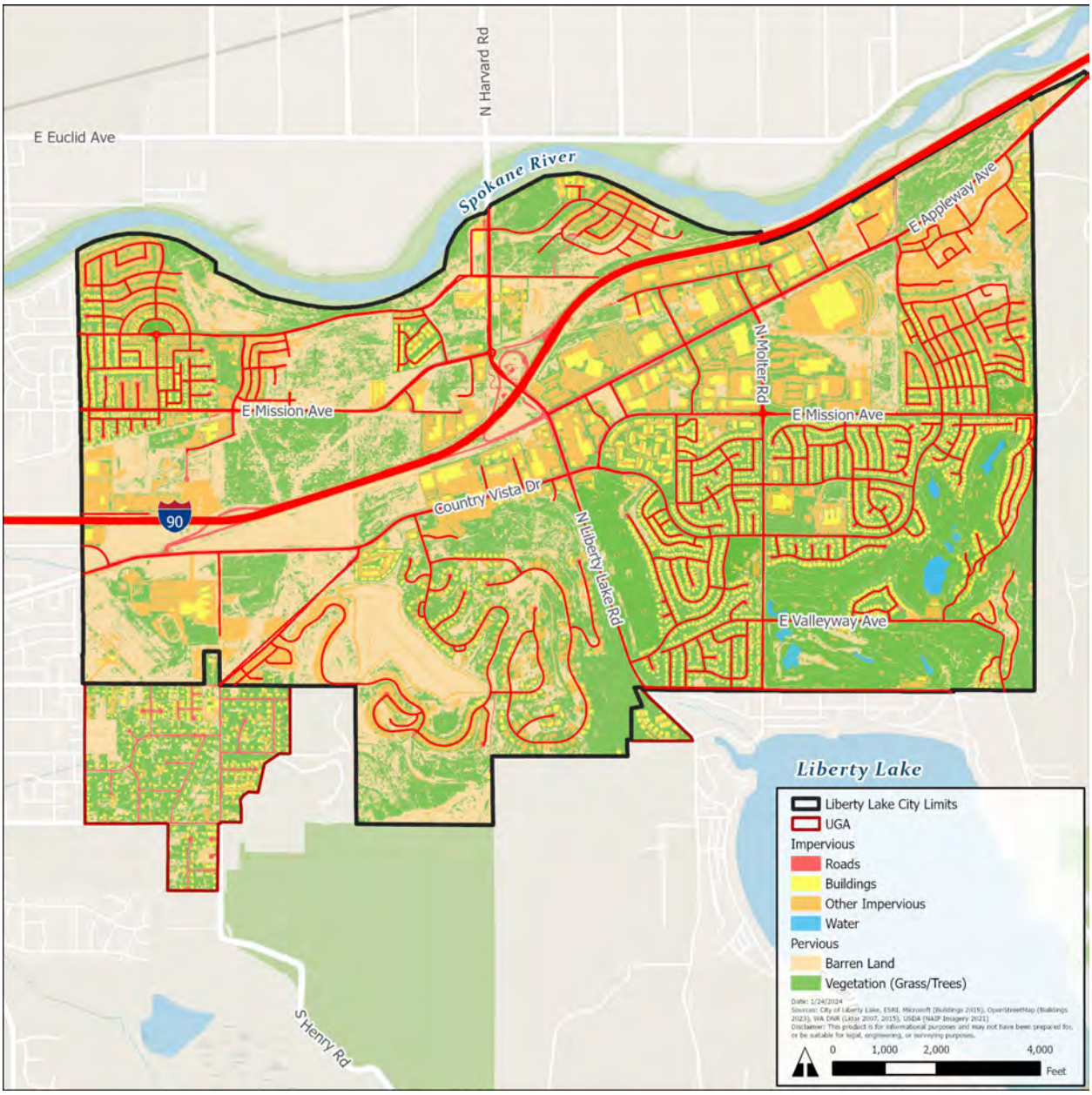


Figure 9. Features of the Built Environment in the City of Liberty Lake

Appendix B

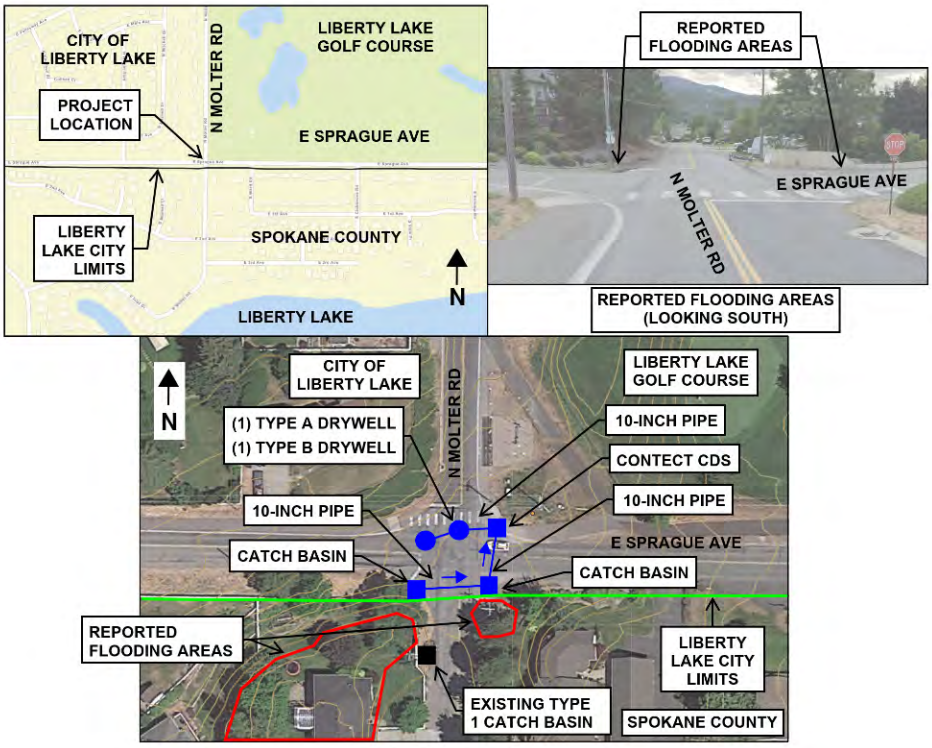
Stormwater Capital Improvement Projects

Appendix B-1

Site-Specific Projects

E Sprague Avenue and Molter Road Int

SW Goal: Flood Reduction



RETROFIT TYPE
Addition of SW Infrastructure

LOCATION
E Sprague Ave and Molter Rd

WRIA
57 - Middle Spokane Basin

EXISTING USE
Roadside Shoulder

PROPOSED USE
Drywell Infiltration System

SITING NOTES
Catch Basins would be placed based on current flow lines and ponding areas, and drywell to be placed based in gravel shoulder to reduce asphalt removal necessary.

CONSIDERATIONS
Deep Excavation
Coordination Required with Other Agencies
Impact to Residents (traffic)
Coordination with Other Utilities (gas, water, sewer)
Easement or Property Acquisition Required

COST OPINION (2023 DOLLARS)
Design and Const.
$312,000

Project Description

This project proposes to install catch basins at the SW, SE, and NE corners of the intersection of E Sprague Avenue and Molter Road to collect and convey stormwater to a drywell system for infiltration within the Liberty Lake city limits. Existing stormwater flows originating from E Sprague Avenue currently travel south along Molter Road into Spokane County. The storm collection system would collect runoff from a roughly 680-foot length of Sprague Avenue on either side of Molter Road.

Site Benefits

- Alleviate flooding of properties south of the E Sprague Avenue and Molter Road intersection along Molter Road.
- Mitigate negative effects of excess stormwater from E Sprague Avenue on Molter Road and nearby county roads.
- Reduce ponding at the SW and SE corners of the E Sprague Avenue and Molter Road intersection.

Site Constraints/Difficulties

- Local neighborhood traffic impacts during construction.
- Existing utilities within the proposed work area will have to be located prior to construction, and any conflicts found will have to be resolved.
- Coordination efforts are also likely to be required with Spokane County as the proposed work encroaches onto Spokane County property.

Preliminary Opinion of Probable Construction Cost

		Project No.	Date
		376-778-014	January 24, 2024
Project Name	Capital Improvement Projects - City of Liberty Lake		
Location	E Sprague Avenue and S Molter Road Intersection		
Owner	City of Liberty Lake		
Estimated By:	B. Roberg	**Checked By:**	**Approved By:**
Date:	1/23/2024	**Date:**	**Date:**

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL COST
	SITE PREP AND CONSTRUCTION				
1	MOBILIZATION (10%)	10%	% of lines 6-17		$13,173
2	PROJECT TEMPORARY TRAFFIC CONTROL (15%)	15%	% of lines 6-17		$19,760
3	CONTRACTOR PROVIDED SURVEY (3%)	3%	% of lines 6-17		$3,952
4	TESC (5%)	5%	% of lines 6-17		$6,587
5	GEOTECHNICAL INVESTIGATION	1	LS	$10,000.00	$10,000
6	UTILITY RELOCATION	1	LS	$15,000.00	$15,000
7	SAWCUT ASPHALT PAVEMENT	250	LF	$4.50	$1,125
8	REMOVE ASPHALT CONC. PAVEMENT	550	SY	$16.00	$8,800
9	ROADWAY EX. INLCUDING HAUL	152	CY	$100.00	$15,217
10	CRUSHED SURFACING TOP COURSE (6" DEPTH)	92	CY	$85.00	$7,792
11	HMA (4" DEPTH)	550	SY	$30.00	$16,500
12	DRYWELL TYPE A	1	EA	$4,800.00	$4,800
13	DRYWELL TYPE B	1	EA	$6,500.00	$6,500
14	STORM SEWER PIPE 10 IN. DIAM.	160	LF	$150.00	$24,000
15	CATCH BASIN TYPE 1	2	EA	$3,500.00	$7,000
16	CONTECH CDS	1	EA	$20,000.00	$20,000
17	TRENCH SAFETY SYSTEM	1	LS	$5,000.00	$5,000

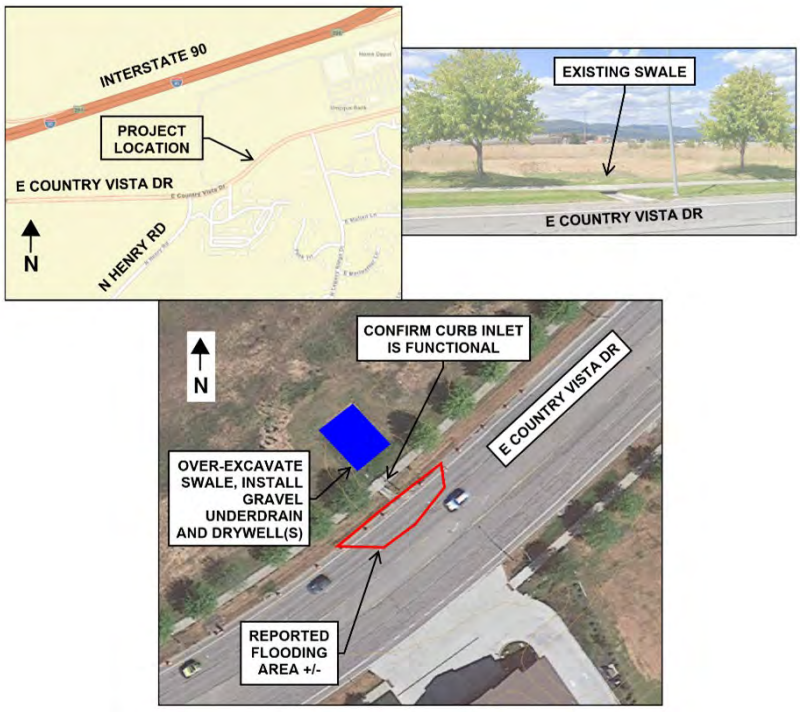
CONSTRUCTION		
Construction Cost Subtotal		$185,205
Construction Management	15%	$27,781
Project Contingency	25%	$46,301
Construction Total		**$259,287**

DESIGN		
Design Cost	10%	$25,929
City Project Management	10%	$25,929
Design Total		**$51,857**

TOTAL PROJECT COST		**$312,000**

E Country Vista North Swale

SW Goal: Flood Reduction



RETROFIT TYPE
Rehabilitation and addition of SW Infrastructure

LOCATION
Country Vista Dr near Kramer Pkwy

WRIA
57 - Middle Spokane Basin

EXISTING USE
Stormwater Swale

PROPOSED USE
208 Swale and Drywell Infiltration System

SITING NOTES
New drywells would be located based on Geotechnical input. Existing swale would be over-excavated and gravel gallery would be installed beneath the swale bottom. New treatment soil would be installed in swale.

CONSIDERATIONS
Potential Deep Excavation
Coordination with Property Owner
Potential traffic impacts
Coordination with Other Utilities (gas, power, water, sewer, irrigation)

COST OPINION (2023 DOLLARS)
Design and Const.
$233,000

Project Description

This site is a roadside swale that was previously constructed to treat and dispose of roadway runoff generated on County Vista Drive. The existing swale and drywells do not infiltrate as designed and the swale holds water. Roadway flooding has been reported at this location. The existing swale and drywells are located on private property. Spokane County GIS Mapping lists the owner as “Liberty Lake Land Co, LLC.” It is understood that the existing swale is correctly sized for treatment per local requirements.

This project begins with completing a Geotechnical investigation to determine the suitability of the existing site soils for infiltration. If the site is found to be suitable for infiltration the existing swale would be over-excavated to allow installation of a gravel gallery with perforated pipe system and new treatment soil would be installed over the gravel gallery per regional requirements. New drywells would be installed with sufficient horizontal separation. Landscape irrigation would be removed and salvaged as practical for re-installation.

Site Benefits

- At natural low point in County Vista surrounded by existing stormwater infrastructure
- Reduces potential for ponding in County Vista Drive roadway
- Existing swale access via Country Vista Drive with unimproved lot to the north

Site Constraints/Difficulties

- Swale appears to be within a permanent easement on private property. The site is accessed from Country Vista Drive via an existing sidewalk with no standard driveway approach.
- Existing utilities within the proposed work area will have to be located prior to construction, and any conflicts found will have to be resolved.

Preliminary Opinion of Probable Construction Cost

		Project No.	Date
		376-778-014	January 24, 2024
Project Name	Capital Improvement Projects - City of Liberty Lake		
Location	Country Vista Drive North Swale near Kramer Parkway		
Owner	City of Liberty Lake		
Estimated By:	Ben Roberg	**Checked By:**	**Approved By:**
Date:	1/23/2024	**Date:**	**Date:**

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL COST
	SITE PREP AND CONSTRUCTION				
1	MOBILIZATION (10%)	10%	% of lines 6-19		$9,293
2	PROJECT TEMPORARY TRAFFIC CONTROL (15%)	15%	% of lines 6-19		$13,939
3	CONTRACTOR PROVIDED SURVEY (3%)	3%	% of lines 6-19		$2,788
4	TESC (5%)	5%	% of lines 6-19		$4,646
5	GEOTECHNICAL INVESTIGATION	1	LS	$15,000.00	$15,000
6	CLEARING AND GRUBBING	1	LS	$5,000.00	$5,000
7	REMOVE, SALVAGE AND REINSTALL LANDSCAPE IRRIGATION	1	LS	$10,000.00	$10,000
8	EXCAVATION INCL. HAUL	280	CY	$40.00	$11,200
9	CONSTRUCTION GEOTEXTILE FOR SEPARATIOIN	622	SY	$3.00	$1,867
10	GRAVEL BACKFILL FOR DRYWELLS	240	CY	$110.00	$26,400
11	4-INCH PERFORATED PIPE	150	LF	$25.00	$3,750
12	CLEANOUT	4	EA	$700.00	$2,800
13	BIOINFILTRATION SWALE	278	SY	$35.00	$9,722
14	CLEAN EXISTING DRAINAGE STRUCTURE	2	EA	$500.00	$1,000
15	CRUSHED SURFACING TOP COURSE (4" DEPTH)	2	CY	$85.00	$140
16	CEMENT CONCRETE SIDEWALK	15	SY	$130.00	$1,950
17	DRYWELL TYPE A	2	EA	$4,800.00	$9,600
18	STORM SEWER PIPE 10 IN. DIAM.	30	LF	$150.00	$4,500
19	TRENCH SAFETY SYSTEM	1	LS	$5,000.00	$5,000

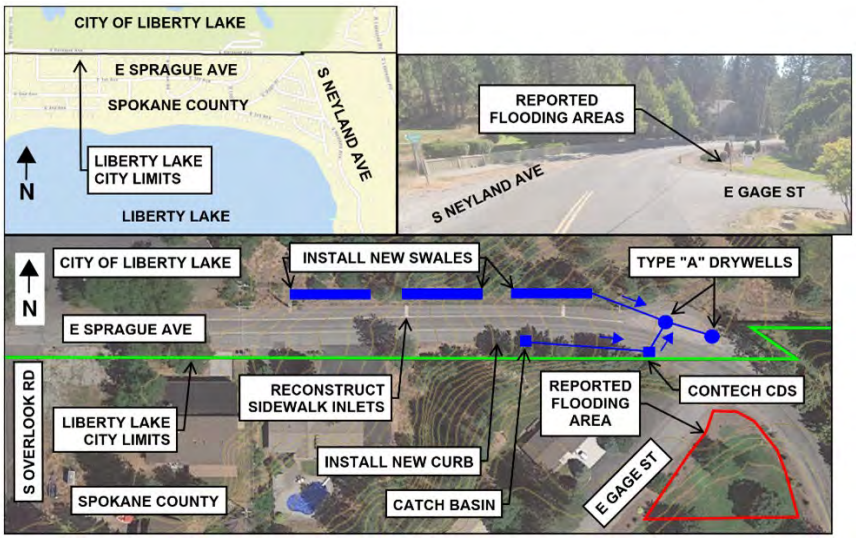
CONSTRUCTION		
Construction Cost Subtotal		$138,596
Construction Management	15%	$20,789
Project Contingency	25%	$34,649
Construction Total		**$194,034**

DESIGN		
Design Cost	10%	$19,403
City Project Management	10%	$19,403
Design Total		**$38,807**

TOTAL PROJECT COST		**$233,000**

Neyland Avenue

SW Goal: Flood Reduction



RETROFIT TYPE

Addition of SW Infrastructure

LOCATION

From 24516 E Sprague Ave to intersection of E Gage Street and S Neyland Avenue

WRIA

57 - Middle Spokane Basin

EXISTING USE

Roadside Shoulder

PROPOSED USE

Drywell Infiltration System

SITING NOTES

Catch Basins would be placed based on new curb line and ponding areas, and drywells to be placed in gravel shoulder to reduce asphalt removal necessary. Existing sidewalk inlets would be rebuilt, and new swales installed behind the sidewalk.

CONSIDERATIONS

Deep Excavation

Coordination Required with Other Agencies

Impact to Residents (traffic)

Coordination with Other Utilities (gas, water, sewer, comm, power)

Easement or Property Acquisition Required

COST OPINION (2023 DOLLARS)

Design and Const.

$355,000

Project Description

The project site is located within the Liberty Lake City Limits. Existing runoff originating from Sprague Avenue currently travels east and south into Spokane County. A goal of the project would be to capture, treat and dispose of this runoff within City Limits and largely prevent flows from going outside City Limits.

This project proposes to install curb and gutter on the southside of E Sprague Avenue from 24516 E Sprague Ave to the street's intersection with E Gage Street to collect and convey stormwater to a drywell for infiltration. Stormwater will flow into a hydrodynamic separator at the curb line before flowing into the drywell.

On the northside of E Sprague Ave, two sidewalk inlets will be replaced to collect and convey stormwater to a series of bioinfiltration swales for treatment. Includes minor regrading at inlets to facilitate runoff capture in the sidewalk inlets. Flows greater than the water quality design flow will overflow into a drywell for infiltration. Accumulated sediment will need to be trapped and removed upstream of the bioinfiltration swale with the use of check dams. A permanent easement may be required from Spokane County to locate the bioinfiltration swale(s).

Site Benefits

- Reduce flooding potential of properties south of the E Gage Street and S Neyland Avenue.
- Existing right of way behind north sidewalk – approximately 15-feet in width
- Gravel shoulder at the bottom to locate drywells.

Site Constraints/Difficulties

- Local neighborhood traffic impacts during construction.
- Existing utilities within the proposed work area will have to be located prior to construction, and any conflicts found will have to be resolved.
- Coordination efforts are also likely to be required with Spokane County as the proposed work potentially encroaches onto Spokane County property.

Preliminary Opinion of Probable Construction Cost

		Project No.	Date
		376-778-014	January 24, 2024
Project Name	Capital Improvement Projects - City of Liberty Lake		
Location	S Neyland Avenue and E Gage Street Intersection		
Owner	City of Liberty Lake		
Estimated By:	Ben Roberg	**Checked By:**	**Approved By:**
Date:	1/23/2024	**Date:**	**Date:**

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL COST
	SITE PREP AND CONSTRUCTION				
1	MOBILIZATION (10%)	10%	% of lines 8-19		$12,472
2	PROJECT TEMPORARY TRAFFIC CONTROL (15%)	15%	% of lines 8-19		$18,708
3	CONTRACTOR PROVIDED SURVEY (3%)	3%	% of lines 8-19		$3,742
4	TESC (5%)	5%	% of lines 8-19		$6,236
5	TEMPORARY CONSTRUCTION EASEMENT	1	LS	$20,000.00	$20,000
6	BOUNDARY SURVEY	1	LS	$10,000.00	$10,000
7	GEOTECHNICAL INVESTIGATION	1	LS	$15,000.00	$15,000
8	UTILITY RELOCATION	1	LS	$15,000.00	$15,000
9	SAWCUT ASPHALT PAVEMENT	400	LF	$4.50	$1,800
10	DEMOLISH AND RECONSTRUCT SIDEWALK INLETS	1	LS	$16,000.00	$16,000
11	BIOINFILTRATION SWALE	100	SY	$45.00	$4,500
12	CATCH BASIN TYPE 1	1	EA	$3,500.00	$3,500
13	CONCRETE CURB AND GUTTER	300	LF	$60.00	$18,000
14	CRUSHED SURFACING TOP COURSE (6" DEPTH)	17	CY	$85.00	$1,417
15	HMA (4" DEPTH)	100	SY	$30.00	$3,000
16	DRYWELL TYPE A	2	EA	$4,500.00	$9,000
17	STORM SEWER PIPE 10 IN. DIAM.	230	LF	$150.00	$34,500
18	CONTECH CDS	1	EA	$13,000.00	$13,000
19	TRENCH SAFETY SYSTEM	1	LS	$5,000.00	$5,000

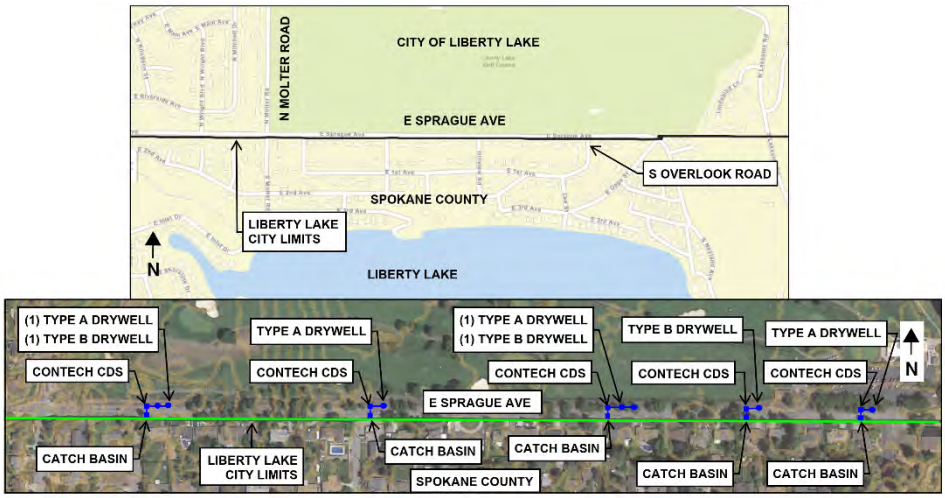
CONSTRUCTION		
Construction Cost Subtotal		$210,873
Construction Management	15%	$31,631
Project Contingency	25%	$52,718
Construction Total		**$295,222**

DESIGN		
Design Cost	10%	$29,522
City Project Management	10%	$29,522
Design Total		**$59,044**

TOTAL PROJECT COST		**$355,000**

Sprague Avenue

SW Goal: Flood Reduction



RETROFIT TYPE

Addition of SW Infrastructure

LOCATION

From intersection of E Sprague Avenue and N Molter Road east to the intersection of E Sprague Avenue and S Overlook Road

WRIA

57 - Middle Spokane Basin

EXISTING USE

Roadside Shoulder

PROPOSED USE

Contech CDS Treatment Catch Basins and Drywell Infiltration System

SITING NOTES

Catch Basins would be placed in road shoulder at low points and ponding areas, and drywells to be placed in gravel shoulder to reduce asphalt removal necessary.

CONSIDERATIONS

Deep Excavation

Coordination Required with Other Agencies

Impact to Residents (traffic)

Coordination with Other Utilities (gas, water, sewer, comm, power)

Easement or Property Acquisition Required

COST OPINION (2023 DOLLARS)

Design and Const.

$480,000

Project Description

The project site is located within the Liberty Lake City Limits. Existing runoff originating from Sprague Avenue sheds to the roadside shoulder due to the existing road crown. The profile of Sprague Avenue is a series of high points and low points between N Molter Road and S Overlook Road. The existing section of Sprague Avenue does not have curb and gutter but is more of a rural road section without roadside ditches. A goal of the project would be to capture, treat and dispose of the right of way runoff by installing stormwater structures within the City's right of way.

This project proposes to install catch basins in the roadside shoulders at low points. Catch basins on the south side of the road could be standard City of Liberty Lake catch basins. Catch basins on the north side of the road could be Contech CDS units that would provide the required treatment for the given section of roadway. The outflow from the treatment catch basin could be conveyed to a drywell system for infiltration. The drywells could be installed north of the road where there is more space available. The existing road is located in the south portion of the right of way.

Site Benefits

- Reduce flooding potential of properties south of Sprague Avenue.
- The existing roadway is not centered in the right of way which provides more space to the north for drywell installation.

Site Constraints/Difficulties

- Local neighborhood traffic impacts during construction.
- Existing utilities within the proposed work area will have to be located prior to construction, and any conflicts found will have to be resolved.
- The residential lots to the south of Sprague Avenue are not within City limits.

Preliminary Opinion of Probable Construction Cost

		Project No.	Date
		376-778-014	January 24, 2024
Project Name	Capital Improvement Projects - City of Liberty Lake		
Location	E Sprague Avenue between S Overlook Road and S Molter Rd		
Owner	City of Liberty Lake		
Estimated By:	Ben Roberg	**Checked By:**	**Approved By:**
Date:	1/23/2024	**Date:**	**Date:**

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL COST
	SITE PREP AND CONSTRUCTION				
1	MOBILIZATION (10%)	10%	% of lines 6-17		$20,340
2	PROJECT TEMPORARY TRAFFIC CONTROL (15%)	15%	% of lines 6-17		$30,511
3	CONTRACTOR PROVIDED SURVEY (3%)	3%	% of lines 6-17		$6,102
4	TESC (5%)	5%	% of lines 6-17		$10,170
5	GEOTECHNICAL EVALUATION	1	LS	$15,000.00	$15,000
6	UTILITY RELOCATION	1	LS	$15,000.00	$15,000
7	SAWCUT ASPHALT PAVEMENT	260	LF	$4.50	$1,170
8	REMOVE ASPHALT CONC. PAVEMENT	200	SY	$16.00	$3,200
9	CRUSHED SURFACING TOP COURSE (6" DEPTH)	33	CY	$85.00	$2,833
10	HMA (4" DEPTH)	200	SY	$30.00	$6,000
11	DRYWELL TYPE A	4	EA	$4,800.00	$19,200
12	DRYWELL TYPE B	3	EA	$6,500.00	$19,500
13	STORM SEWER PIPE 10 IN. DIAM.	280	LF	$150.00	$42,000
14	CATCH BASIN TYPE 1	5	EA	$3,500.00	$17,500
15	CONTECH CDS (HALF ACRE)	4	EA	$13,000.00	$52,000
16	CONTECH CDS (ONE ACRE)	1	EA	$20,000.00	$20,000
17	TRENCH SAFETY SYSTEM	1	LS	$5,000.00	$5,000

CONSTRUCTION		
Construction Cost Subtotal		$285,526
Construction Management	15%	$42,829
Project Contingency	25%	$71,382
Construction Total		**$399,737**

DESIGN		
Design Cost	10%	$39,974
City Project Management	10%	$39,974
Design Total		**$79,947**

TOTAL PROJECT COST		**$480,000**

Sprague Ave

Appendix B-2

Programmatic Projects

Parametrix

Swale Improvements

Preferred Existing Road Applicability

Arterial Roads Collector Roads Local Roads

Stormwater Benefit

Flow Control
WQ Improvement
Address Drainage Complaints

Infiltration Category

Infiltration Possible

Description of Programmatic Actions

Roadside swales collect surface water that has been conveyed away from the road, and provide temporary storage and infiltration. Swale improvements provide the opportunity to restore the stormwater benefit of an existing swale, especially where it may be underperforming. Swale improvements include rehabilitation of the existing facilities through excavation of the soil, adding or enhancing a collection structure, modifying the shape or grade of the swale, or updates to the landscaping and irrigation features of a site.

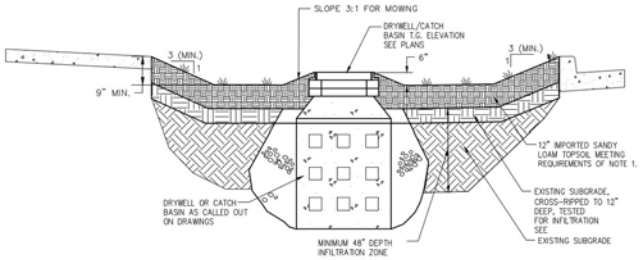


Photo: Example of a Grassy Drainage Swale – Typical Cross Section (from Liberty Lake)

Photo: Example of a Typical Grassy Drainage Swale that has Developed Drainage Issues

Program Considerations and Limitations

- Provides basic treatment.
- Soil and groundwater considerations.
- Right-of-way area may limit or prevent necessary modifications to the shape of the swale, or addition of collection structure.
- Existing utilities in the area should be reviewed and may limit swale modifications that include excavation activities.
- Potential irrigation impacts and associated costs.
- Potential need for special handling of used soil materials.
- *Any Additional*?

Stormwater Structure Maintenance

Preferred Existing Road Applicability			Stormwater Benefit
Arterial Roads	Collector Roads	Local Roads	Flow Control WQ Improvement
			Infiltration Category Infiltration Possible

Description of Programmatic Actions

Drywells, a type of underground injection control well are used to dispose of stormwater runoff from roads and parking areas and to add water to a groundwater aquifer for storage. A catch basin is a structure that collects stormwater and discharges it into a pipe, typically these structures include a sump to catch debris. These structures are designed to gather water and quickly move it away from low-lying areas. The City has mapped over 300 registered drywells and a limited number of catch basins that collect and convey flows to these structures. The City also currently owns and operates a vactor trailer suitable to perform this maintenance.

The City curently performs some maintenance and cleaning on drywells and catchbasins. Development of a routine schedule for preventative maintenace of these structures can prolong their lifespan and improve functionality. Additionally, the City will need to develop a system to track their efforts and quantify annual spending to properly inform future budget requests.

Photo: Example of a vactoring activities

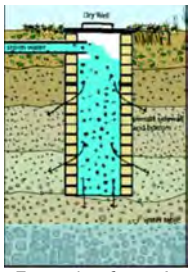


Photo: Example of a typical drywell

Photo: Example of a typical catch basin inlet

Photo: Example of a typical catch basin sump full of debris

Program Considerations and Limitations

- Would include maintenance for new enhanced treatment strategies proposed in CIP projects.
- Potential access limitations for vactor trailer equipment to reach sites.
- Potential cost to dispose of contaminated materials.
- Potential need for special handling of used soil materials.
- *Any Additional?*

Appendix C

Resource Planning and Stormwater Fee Memo

Appendix C-1

Resource Planning Inputs

Table C1-1. Short Term Stormwater Capital Improvement Projects

Action Type	Name	City Rank		Design Cost (assumed 20%)	Construction Cost (assumed 80%)		6-year						
						2024	2025	2026	2027	2028	2029	2030	2025-2030
Capital Project	E Sprague Avenue and S Molter Road Intersection	4		$ 52,000.00	$ 260,000.00						$ 52,000.00	$ 260,000.00	$ 312,000.00
Capital Project	Sprague Avenue	1		$ 80,000.00	$ 400,000.00	$ 80,000	$ 400,000						$ 400,000.00
Capital Project	E Country Vista Drive North Swale	3		$ 39,000.00	$ 194,000.00				$ 39,000	$ 194,000			$ 233,000
Capital Project	Neyland Avenue	2		$ 59,000.00	$ 296,000.00	$ 59,000	$ 296,000						$ 296,000
	Capital Projects Toal			$ 230,000.00	$ 1,150,000.00	$ 139,000	$ 696,000	$ -	$ 39,000	$ 194,000	$ 52,000	$ 260,000	$ 1,241,000
CFP	TP-14 – Appleway Overlay (SW only)	from CFP	2024			$ 150,000							$ -
CFP	**CFP Projects Total**		2024			150,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Professional Services and Vendors	Waste Disposal		Annual				$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 60,000.00
Professional Services and Vendors	Professional Services -SW Master Plan Update		2035										$ -
	Ongoing System Updates Total					$ -	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 60,000
CIP Programmatic	Swale Improvements (per swale)		2025			$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 60,000
CIP Programmatic	Stormwater Structure Maintenance (asset replacement)		2025			$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 42,000
	Resource Need Total					$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 102,000
	Overall Capital Total					$ 306,000	$ 723,000	$ 27,000	$ 66,000	$ 221,000	$ 79,000	$ 287,000	$ 1,403,000
	Average 6-Year Plan Revenue						$ 234,000	$ 234,000	$ 234,000	$ 234,000	$ 234,000	$ 234,000	$ 234,000

Table C1-2. Long Term Stormwater Capital Improvement Projects

		20-year																			
Action Type	Name	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2031-2044	20-year Project Cost
Capital Project	E Sprague Avenue and S Molter Road Intersection															$ -	$ 312,000.00
Capital Project	Sprague Avenue																
Capital Project	E Country Vista Drive North Swale															$ -	$ 233,000.00
Capital Project	Neyland Avenue															$ -	$ 296,000.00
	Capital Projects Toal	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,241,000
CFP	TP-14 – Appleway Overlay (SW only)															$ -	$ -
CFP	**CFP Projects Total**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Professional Services and Vendors	Waste Disposal	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 140,000	$ 200,000
Professional Services and Vendors	Professional Services -SW Master Plan Update					$175,000										$ 175,000	$ 175,000
	Ongoing System Updates Total	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 140,000	$ 200,000
CIP Programmatic	Swale Improvements (per swale)	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 120,000	$ 180,000
CIP Programmatic	Stormwater Structure Maintenance (asset replacement)	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 7,000	$ 84,000	$ 126,000
	Resource Need Total	$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 17,000	$ 238,000	$ 340,000
	Overall Capital Total	$ 27,000	$ 27,000	$ 27,000	$ 27,000	$ 27,000	$ 27,000	$ 27,000	$ 27,000	$ 27,000	$ 27,000	$ 27,000	$ 27,000	$ 27,000	$ 27,000	$ 378,000.00	$ 1,781,000.00
	Average 6-Year Plan Revenue																

Table C1-3. Stormwater Operation and Maintenance Staff Resources

					Activity Timeline													
Costing Element	**Work**	**Staff Role (Title)**	**# of Staff**	**Staff Fully Loaded Hourly Rate** (accounts for annual salary and benefits cost)	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Sum of hours**	**Labor Cost**
Maintenance																		
Catch Basin and Manholes	Inspections	Foreman	1	$42.10			2	2									4	$168.40
		Staff	2	$32.38			40	40									80	$2,590.40
	Sediment Removal/ Cleaning	Foreman	1	$42.10					2	2							4	$168.40
		Staff	2	$32.38					70	70							140	$4,533.20
	Repair	Foreman	1	$42.10								4	4				8	$336.80
		Staff	4	$32.38									80	80			160	$5,180.80
Drainage Ditches	Mowing	Foreman	1	$42.10													0	$0.00
		Staff	2	$32.38				40	80	80	80	80	80	40			480	$15,542.40
	Sediment Management/Removal	Foreman															0	$0.00
		Staff															0	$0.00
UICs: Drywells and infiltration systems	Inspections	Foreman	1	$42.10			2	2									4	$168.40
		Staff	2	$32.38			40	40									80	$2,590.40
	Cleaning	Foreman	1	$42.10					6	6							12	$505.20
		Staff	2	$32.38					160	160							320	$10,361.60
	Rehabilitation	Foreman															0	$0.00
		Staff															0	$0.00
Stormwater Ponds and Swales	Inspections	Foreman															0	$0.00
		Staff															0	$0.00
	Sediment Management/Removal	Foreman	1	$42.10							4	4					8	$336.80
		Staff	2	$32.38							80	80					160	$5,180.80
	Rehabilitation	Foreman															0	$0.00
		Staff															0	$0.00
Sweeping	Sweeping	Foreman	1	$42.10			8	8	8	8	8	8	8	8			64	$2,694.40
		Staff	4	$32.38			20	160	20	20	160	20	20	160			580	$18,780.40
	Targeted event sweeping	Foreman															0	$0.00
		Staff															0	$0.00
General Facility Maintenance and Other Field Tasks	On-call/Emergencies	Foreman															0	$0.00
		Staff															0	$0.00
	Complaint Response	Foreman	1	$42.10	4	4	4	4	4	4	4	4	4	4	4		44	$1,852.40
		Staff	4	$32.38	18	18	18	18	18	18	18	18	18	18	18		198	$6,411.24
	Equipment Maintenance	Foreman															0	$0.00
		Staff															0	$0.00
	Spill Response	Foreman															0	$0.00
		Staff															0	$0.00
	Mapping	Foreman															0	$0.00
		Staff															0	$0.00
																	Total	**$77,402.04**

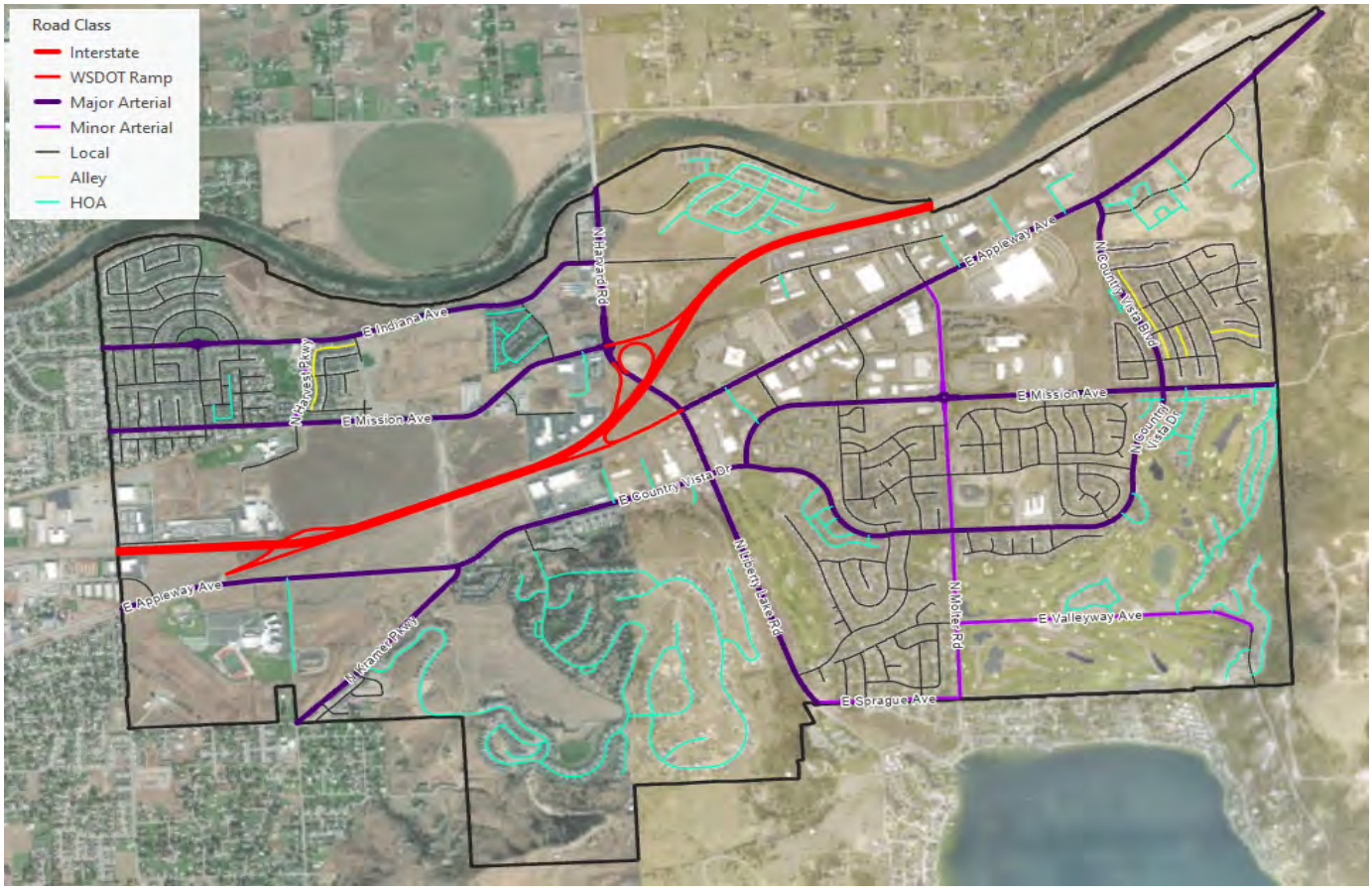
Table C1-4. Drainage Service Area Cost Estimate

Type	Citywide	in Higher Rate Areas	% in Higher Rate Areas	Unit
Total Land Area	4057	350	8.6%	Acres
Swales/Ponds Area (Mowing & Irrigation)	885355	202048	22.8%	Square Feet
Swales/Ponds Count	305	115	37.7%	Count
Drywells	490	157	32.0%	Count
Catch Basins	313	62	19.8%	Count
Irrigation (Water Cost)	NA	$8,296	NA	Annual Cost
Mowing (Labor)	15542	$3,556.10	assumed 22.8%	Annual Effort
Total Cost of HOA services	NA	**$11,852.28**	NA	**Annual Cost**

Road Class	Citywide	in Higher Rate Areas	% in Higher Rate Areas
Alley	4985	19	0.4%
HOA	93983	21827	23.2%
Interstate	29987		0.0%
Local	146561	37360	25.5%
Major Arterial	77633	7849	10.1%
Minor Arterial	16294	24	0.1%
WSDOT Ramp	12538		0.0%
Grand Total	381981	67079	17.6%

Road lengths in linear feet. Lengths are counted in only one direction unless pavement is separated (ie interstate counted both directions and circle length counted for roundabouts).

Road Class Reference Map:



Cost Estimate - Drainage Area Services Provided

Irrigation Calculations

1 ACRE = 43560 SQUARE FEET

4.64 Acres of SW grass in HOA properties
202048 Sq ft

121228.92 gallons per week
24 weeks (assume watering April through November)

2909494.08 gallons of water needed fro HOA SW facilities

1 GALLON = 0.133681 cubic ft
388944.0781 cubic ft water for HOA

$0.02133 metered cost per cubic ft

$8,296 Annual Cost for HOA SW irrigation

Sprinklers

How Much is Enough?

One of the easiest ways to save water is to make sure that you are not overwatering your lawn and plants. Most of us water more than we need to, which not only wastes water but ends up drowning our plants.

- According to numerous studies, a healthy lawn needs only about 1 inch of rain per week. When using a sprinkler system or hose, that's the equivalent of 60 gallons per 100 square feet.
- Watering a garden is a little more complicated because the amount of moisture needed by vegetables, fruits and flowers varies, and these plants are more sensitive to heat. The "one-inch-per-week" guideline generally applies with a few modifications.
- When the weather is hot, it is recommended that ½ inch is added per week for every 10 degrees that the average daily temperature exceeds 60 degrees. Always water your lawn or garden during the cool morning hours, as opposed to midday, to reduce evaporation.
- Soil type is also a factor. Since sandy soils drain faster, they require more water than other soil types. In most cases, a deep watering twice a week is sufficient once the plants are established. If the soil is moist at a depth of 6 inches, this is ideal.
- A rain sensor will allow your irrigation system to automatically shut-off if rainfall exceeds a certain amount. Afterward, the system will automatically resume its normal schedule.

Source: Outdoor Water Conservation - City of Spokane, Washington (spokanecity.org)

MONTHLY RESIDENTIAL / COMMERCIAL RATES

Type	Monthly Cost
Water, metered, base per ERU*	$20.76
Water, metered, base per ERU* Irrigation	$20.76
Usage above 976 cu.ft. per ERU*	$0.00617 per cu.ft.
Usage above 3131 cu.ft per ERU*	$0.00980 per cu.ft.
Water, metered, per cu.ft.	$0.02133
Water, Eastside Surcharge per ERU*	$22.77 per Consolidation Agreement
Water, Greenridge Surcharge per ERU*	$40.05 per Consolidation Agreement
Sewer, per ERU	$78.89
Sewer, per ERU, Dedicated Capacity (Contract)	$57.62
Sewer, per ERU, County Intertie	$26.50 + Spokane County Sewer Service Fee billed at current rate per Interlocal Agreement

**ERU=Equivalent Residential Unit = 240 gallons (32 cubic feet) of water per day*

Source: Rates – Liberty Lake Sewer and Water District

Source for watering assumption (mow = water, *except march) : Lawn-Care-Calendar.pdf (wsu.edu)

Mowing Calculations

480 Time Spent Mowing (Staff hrs annual)
$15,542.40 Total Labor Cost
$3,556.10 Cost for the 22.8% of mowing done in HOA areas

Waste Disposal Calculations

Assumptions:

City's vactor trailer capacity is 1600 gallons
A 3200 gallon truck can vactor approximately 20 CBs per load capacity; so vac trailer can do approximately 1C
The crew can perform 2-3 runs per day
Estimate does not include cost of water
1 TON = 239.65 gallons

Time

313 CBs in City
31 # of runs needed
3 runs per day (assumes travel, refill and disposal times)
10 days of labor

Volume

1600 gallons per truckload
6.68 tons per truckload
209 total load volume (tons)

Renton Cost

$81.00 per load cost
$59.00 per Ton cost

Renton Method Total Cost

$2,535 Load Cost
$12,329 Cost by weight
$14,865 Total Cost

Snohomish Cost

$326.00 per load

Snohomish Method Total Cost
$10,204 Totall cost for 31 loads

Using the Renton Decant Station

Detailed information about use of the Renton Decant Station can be found in the Regional Stormwater Decant Facility Manual:

Regional Stormwater Decant Facility Program Operations and Maintenance Manual (1MB)

Current rates

Entry fee: $81
Storm liquids: Included in the entry fee
Storm solids: $59 per ton

Source: https://kingcounty.gov/en/dept/local-services/transit-transportation-roads/roads-and-bridges/road-services/maintenance/stormwater-disposal

Vactor Waste Decant Facility

Hours of Operation

Monday thru Friday: 7 a.m. to 5 p.m.
Closed - New Year's Day, Thanksgiving Day, and Christmas Day.

About the Facility

Rate and Fees

Solid and liquids = $326 per load
Liquids only = $315 per load
Water fee = $20 each fill up - up to 1,000 gallons

Late payment fee = 1% of balance
Insufficient funds charge = $35.00

Source: https://snohomishcountywa.gov/5430/Vactor-Waste-Decant-Facility

Appendix C-2

Stormwater Fee Technical Memorandum

RAFTELIS

MEMO

To: Lisa Key, Director of Planning & Engineering; Paul Fendt, KJ Hanley, Parametrix
From: Jennifer Tavantzis, Raftelis
Date: June 12, 2024
Subject: City of Liberty Lake Stormwater Master Plan - Rate Study

Background

The City of Liberty Lake, WA (City) engaged Parametrix to conduct a Stormwater Master Plan, which included a review of the City's existing stormwater fee and funding. This financial review was started by FCS Group, as a subconsultant to Parametrix. Raftelis was brought into the project in March 2024 to complete this task. Raftelis reviewed the materials drafted by the FCS Group, which are included as Appendix C, and met with Parametrix on several occasions. This memo presents the findings of Raftelis' analysis and recommendations with respect to rate structure, rates, and financial and program policies.

The City currently charges a reasonable annual stormwater fee to customers within the City to fund the Stormwater Utility and the stormwater program elements it supports. The program has historically also been supported by the Spokane County Regional Aquifer Protection Area (APA) fee, Washington State Department of Ecology (Ecology) grants, and other one-time grants. Due to the City's location above the Spokane Valley Rathdrum Prairie Aquifer and the well-draining soils of the area, Underground Injection Control technologies, or drywells, allow groundwater recharge while managing the City's stormwater runoff. After reviewing the City's drainage disposition, in August of 2023 Ecology determined that the City meets criteria for a waiver from 2024 Permit coverage because the City's MS4 (or lack thereof) serves a population of less than 1,000 people. Therefore, the City is not subject to a Municipal Separate Storm Sewer System (MS4) permit. Even though program needs are not rapidly increasing with permit requirements, the Stormwater Master Plan effort did identify some programmatic and capital project needs, in addition to better accounting for staffing resources dedicated to stormwater management. The analysis herein is a review of appropriateness and revenue sufficiency of the current rate structure and rates within the context of this better defined and forward-looking program.

Program Costs/Revenue Requirements

As described above, the program structure and costs of Liberty Lake are unique due to the City's landscape that influences the hydrology, stormwater runoff characteristics, and the groundwater. These considerations allow the City to operate a non-traditional stormwater management system. The system still requires maintenance (generally in the form of staff time) and regular investment to function, and Parametrix has documented these program costs. While the Stormwater Utility Fund has had a steady revenue stream and balanced budget in prior years, the revised costs represent a review of the portion of staff time and other resources spent managing stormwater infrastructure. The review also considers the City's limited staff resources, where field staff support multiple City programs. In FY 2024, the program costs related to staff time were as follows:

Table 1. Staff Resources for Operating & Maintenance Activities

Category	Activities	Total Annual Hours	Total Annual Cost[1]
Catch Basin and Manholes	Inspections, Sediment Removal/Cleaning, Repair	396	$12,978.00
Drainage Ditches	Mowing	480	$15,542.40
UICs: Drywells and infiltration systems (490 facilities)	Inspections, Cleaning	416	$13,625.60
Stormwater Ponds and Swales (305 facilities)	Sediment Management/Removal	168	$5,517.60
Street Sweeping	Sweeping	644	$21,474.80
General Facility Maintenance and Other Field Tasks	Complaint Response	242	$8,263.64
		Total	***$77,402.04***

Other overhead costs, such as technology and administration, are estimated to be de minimis and are not captured separately. In addition to the above activities and costs, there are several capital projects and programmatic costs built into the Capital Improvement Plan (CIP)**.** These include:

Table 2. Capital Projects (with Total 6-Year Project Costs) Included in the CIP

Capital Project	Total Cost (6 Years)
E Sprague Avenue and S Molter Road Intersection	$312,000
Neyland Avenue	$355,000
E Country Vista Drive North Swale	$233,000
Sprague Avenue	$480,000
TP-14 – Appleway Overlay*	$150,000
Total	***$1,530,000***

*This total is the SW Program contribution towards a transportation project from the Capital Facilities Plan (CFP).

Table 3. Ongoing Programmatic Costs Included in CIP

Ongoing/Programmatic Cost	Annual Cost
Waste Disposal	$10,000
Swale Improvements (two swales per year)	$20,000
Stormwater Structure Maintenance (Asset Replacement)	$7,000
Total	***$37,000***

Apart from the Appleway Overlay (addition/improvement of SW Infrastructure.occurring in 2024), the capital projects represent new needs that are not captured in the CFP. The City and Parametrix have esthablished a schedule for designing and constructing projects, with UIC/drywell construction projects on Neyland Avenue and Sprague Avenue beginning in 2024, with construction in 2025, rehabilitation and construction of storwmater infrastructure on E Country Vista Drive North Swale occurring a few years later, and the UIC/drywell construction E Sprague Avenue and S Molter Road Intersection further in the future, as part of the flooding problem will be managed by projects occurring sooner. Beyond this set of projects, future needs are unknown at the present, but may become apparent in the future as the City grows and development patterns change. To that end, it is recommended that the City update their Stormwater Master Plan in or around 2035, with an expected one-time cost of $175,000.

[1] Costs reflect a blended rate of $42.10 per hour for Foreman and $32.38 per hour for Staff/Field Crew. Labor costs include salary and benefits.

All costs presented above are in 2024 dollars and are escalated within the model to represent projected future year costs. These documented program elements and their associated costs become the revenue requirements for the stormwater fee.

Revenue Requirement Offsets

Grant Funding

Historically, program costs have been offset by State and Federal grants and the APA Fee. As described in the approved FY2024 budget, the City received (and deposited between the Stormwater Fund and the APA Fund) approximately $128,000 in funding from a State of Washington Department of Ecology grant that is set to expire this fiscal year and has been dedicated to this stormwater master planning effort to date. Other grant funding in the past has supported capital project execution and reduced the backlog of projects requiring rate funding. This analysis does not anticipate specific future grant funding, but any funding received would offset costs to be recovered from the stormwater fee.

Aquifer Protection Area Program

The City participates in the Spokane County Regional Aquifer Protection Area Program along with the City of Spokane Valley, Town of Millwood, and parts of unincorporated Spokane County (see Figure 1, below). This program was approved by voters in 1988 and was renewed in 2004 for another 20 years. The APA fee has been an important secondary source of funding for the City, bringing in approximately $60,000 per year.

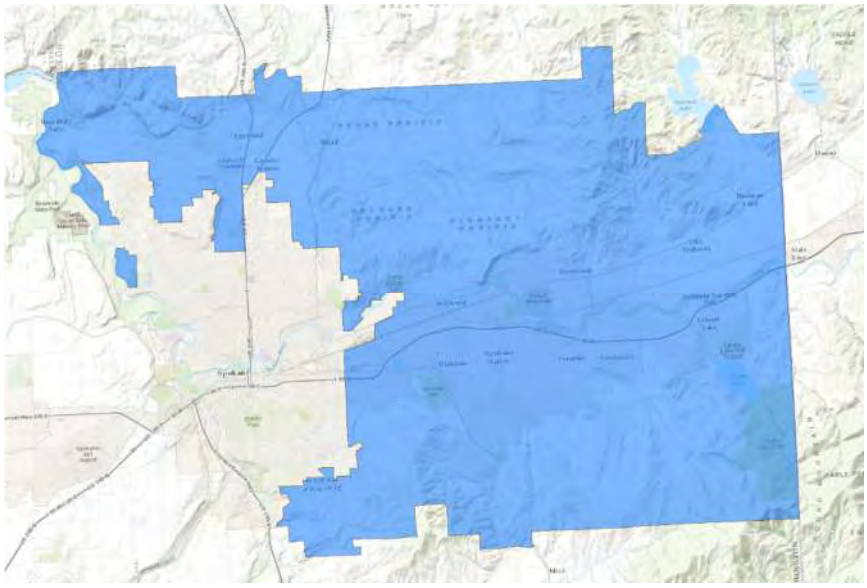


Figure 1. Spokane County Aquifer Protection Area (Source: Spokane County Website)

The Aquifer Protection Area is designed to protect the Spokane Valley Rathdrum Prairie Aquifer, the region's sole drinking water supply, from pollution that can, in part, be introduced by stormwater runoff. Spokane County resolution No 4-0785 describes the rate structure for household units and non-household units. The County collects fees, but remits most of the funding collected from customers within the City of Liberty Lake back to the City, since it does not take part in some other shared program elements, as described in the Stormwater Master Plan. The City deposits those funds within the Aquifer Protection Fund (411), where they are accounted for separately, but are generally used to support the same activities and investments as the City's stormwater fee. The current APA establishment and imposed fees sunset December 31, 2025.

Reauthorization of the APA will be placed before regional voters for another 20-year term. The current expectation is that the APA fee will *not* be renewed, even if it is approved by voters within the City. The rate study assumes no APA revenue in future years.

Revenue requirements for the stormwater fee may also be adjusted by allocating funds from other sources to projects as appropriate. By and large, the identified capital projects relate to streets and stormwater management, so cost sharing with another may be appropriate in some cases. For the modeled rate scenario with front-loaded capital investments, the stormwater fee cannot reasonably generate sufficient revenue to cover all costs, and it would be appropriate to fund a portion of those capital costs another way in 2025.

Drainage Annual Service Charge

Regarding the Drainage Annual Service Charge, private facilities responsible for the charge make up about 22.8% of the area of swales maintained by the City. Therefore, about 22.8% of the mowing costs can fairly be allocated to this set of properties. In addition, there are irrigation costs borne by the City associated with maintaining these facilities. The 4.64 acres of grass in private drainage ditches require irrigation in April through November at an estimated rate of 60 gallons per week per 100 square feet. At Liberty Lake Sewer & Water District metered water rates, this amounts to an additional $8,296 that could fairly be recovered from these customers. These costs for the subset of properties subject to the charge exceed $12 per ERU. Since the City does not otherwise pay for water service out of the stormwater fund, it is recommended that the charge rate remain steady for the remainder of the planning period, but that the City continue to track the level of effort and direct costs associated with maintaining this private infrastructure.

Rate Structure

The current base stormwater fee rate structure is described in detail in Section 8-4-5 in the City's Code of Ordinances and adopts by reference the same structure as Spokane County (adopted through resolution 93-155). The stormwater fee is a fee charged to each property based on the property's impervious area and is charged annually at a rate of $10 per 3,160 square feet of impervious area (the regional equivalent residential unit, or ERU, representing the amount of impervious area on a typical single family residential parcel). As is common in impervious area-based rate structures, residential customers are charged a standardized, flat rate of 1 ERU, while commercial properties are billed per ERU of impervious surface area on the property.

The City also charges an additional $6.11 Drainage Annual Service Charge to a set of residential properties through agreements previously established with Spokane County. These developments have approximately 115 stormwater swales and ponds (approximately 5 total acres of land) located on private developments owned by Homeowners Associations (HOAs) As shown in Table 4, below, these areas make up less than 10% of the City but contain over 30% of the swales and dry wells.

Table 4. Relative Area of Private Stormwater Infrastructure Maintained by the City

Type	Citywide	Applicable HOA Properties
Total Land Area (Ac)	4,057	350
Swales/Ponds Area (Mowing & Irrigation) (Sq Ft)	885,355	202,048
Swales/Ponds (Count)	305	115
Drywells (Count)	490	157
Catch Basins (Count)	313	62

FCS Group's Issue Paper No. 2 (within Appendix C) described alternative stormwater fee rate structures in detail. Raftelis agrees that impervious area-based fees are most appropriate here, and certainly most common in the industry. Based on the analysis done by Raftelis the current rate structure is simple, defensible, and can sufficiently meet the revenue requirements of the City. Consequently, there is no cause for adjustments to be made to the existing rate structure at this time.

Financial Policies

The stormwater fund is governed by the City's Financial Policy 1920, which aims to maintain a minimum fund balance at the end of each year equal to at least 5% of the Stormwater Utility Fund's operating revenues. Though it functions in the same way, this is not truly a reserve fund. The City could benefit from building up a stronger capital and operating reserve to ensure that the future financial needs associated with Stormwater Master Planning efforts, as well as unforeseen operating or infrastructure needs are covered. Raftelis considered potential fiscal policies to govern the stormwater utility, including operating reserves, capital reserves, and asset replacement provisions. After this consideration, Raftelis decided to recommend moving from the minimum fund balance approach to creating a stormwater reserve fund beginning with the current fund balances in the stormwater and APA funds. The goal of the stormwater reserve fund would be to equal 25% of the stormwater program's *operating and recurring (some included in the CIP) costs* (rather than revenue). This methodology is slightly different than that offered in FCS Group's Issue Paper No. 1 (within Appendix C), as we believe it is more closely tied to program needs than budgeted revenue (which can easily fall out of alignment with revenue requirements if rate updates do not occur regularly). This adjustment aims to provide a sufficient liquidity cushion to manage short-term variations in revenue and expenses, increase visibility to when the fund balance is being used to offset revenue requirements, and thereby enhance financial stability.

The City's tendency to avoid taking on debt combined with the simple fund structure averts the need to make any further changes to financial policies that relate to managing debt service coverage ratios. However, if the City plans to build debt, Issue Paper No. 1 prepared by the FCS Group (within Appendix C) can be used as a reference to evaluate different policy considerations.

Credits and Discounts

According to the Liberty Lake Code of Ordinances Section 8-4-6, the City has a partial fee exemption program in place for low-income seniors and disabled persons. The program offers partial exemptions ranging from 40% to 80% depending on the property tax exemption that the individual receives under the Revised Code of Washington (RCW) 84.36.381. It is common, except where precluded by State law, for utilities to have rate-funded customer assistance programs, as this program is structured. In the State of Washington, the City can make up for the potential lost revenue from the issued exemptions by shifting the costs to other rate-payers, but must provide notice of this shift to the ratepayers, as outlined in RCW 57.08.014. However, despite the program availability within the City code, City staff are unaware of ratepayers taking advantage of the program, and estimate the impact on revenues to be minimal.

Throughout the industry, credit programs are as or more common than customer assistance programs for stormwater utility ratepayers. Credit programs are designed to offer fee adjustments for facilities, structures, or activities that reduce the impact of stormwater runoff or otherwise improve water quality. Such programs are used to cement the charge as a fee, rather than a tax, since ratepayers can exert some control over their charge. They often serve as good tools for public engagement and interaction as well. Several common components of stormwater fee credit programs are discussed in Issue Paper No. 3 prepared by the FCS Group

(within Appendix C). The City may wish to consider such a program in the future. However, given the fact that the City does not manage stormwater conveyance, the appropriate options are limited – focused on water quality or infrastructure maintenance activities. At this point, given the scope of the stormwater program in Liberty Lake, the potential resource burden of administering a credit program outweighs the benefits of offering the credit program.

Financial Model

Maintaining revenue sufficiency is one of the most important factors in managing a successful stormwater program. Raftelis developed an Excel-based financial model based on revenue requirements and units of service provided by the City and from Parametrix. The revenue requirement and budget data were then used as inputs and combined with assumptions about a cash-funded capital program, parallel growth in units of service and level of service, reasonable cost escalation over time, and the goal of growing the fund balance for the Stormwater Utility Fund to create a meaningful financial plan for the City's stormwater utility.

The modeled stormwater program revenue requirements are summarized in Figure 2. Since the capital plan, described above, front-loads capital expenditures, there is a large revenue requirement in FY 2024 that can be managed with fee revenue and fund balance. Capital costs in 2025 are too large to be managed with rate revenue and storwmater fund balance alone, so a critical assumption is made, based on discussions with City, that another fund will offset those costs. The capital program is summarized below:

Table 5. Capital Program

Raw Capital Costs	2024	2025	2026	2027	2028	2029	2030
Master Plan	$70,000						
E Sprague Avenue and S Molter Road Intersection						$52,000	$260,000
Neyland Avenue	$59,000	$296,000					
E Country Vista Drive North Swale				$39,000	$194,000		
Sprague Avenue	$80,000	$400,000					
TP-14 – Appleway Overlay	$150,000						
Total, Raw Capital Costs (2024$)	$359,000	$696,000	$-	$39,000	$194,000	$52,000	$260,000
Capital Needs to be Covered by Streets, Grants, Capital/Other Fund	$70,000						
Additional Capital Needs to be Covered by Streets, Grants, Capital/Other Fund	-	$500,000					
Capital Needs to be Covered by Stormwater Fee* (2024$)	**$289,000**	**$196,000**	**$-**	**$39,000**	**$194,000**	**$52,000**	**$260,000**

*Including APA fee revenue, in 2024 and 2025

The revenue requirement summarized below include only those capital costs to be recovered by the stormwater fee, as well as O&M, professional services, and programmatic costs. All costs, originally in 2024$, have been escalated to represent future year costs.

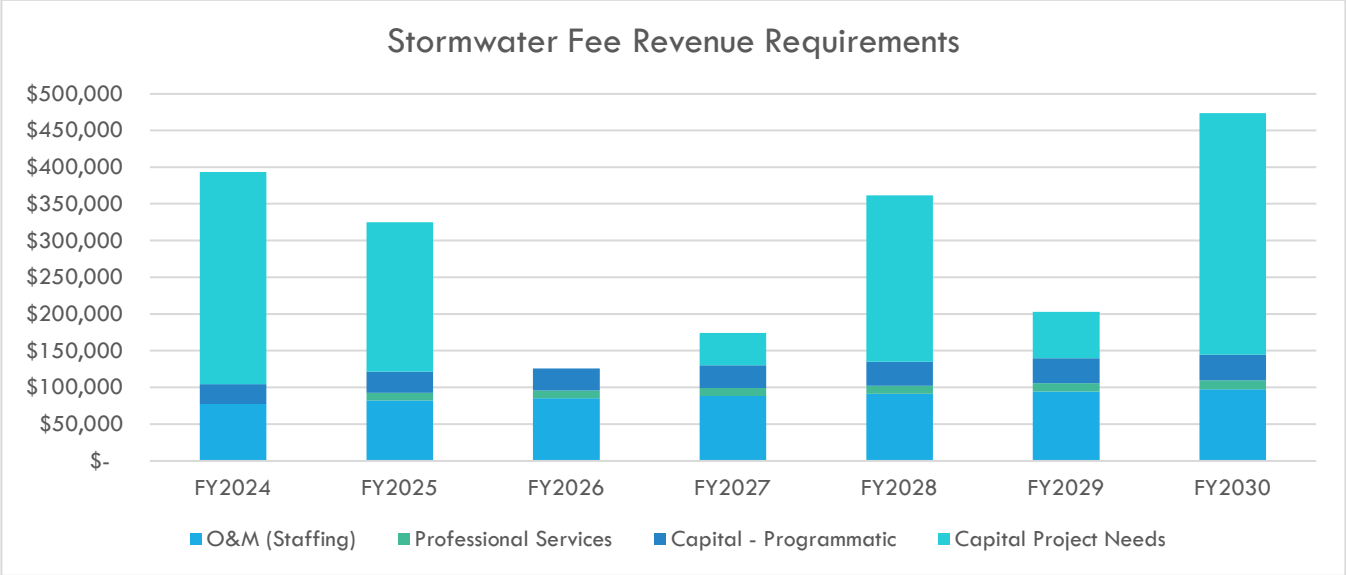


Figure 2. Stormwater Program Revenue Requirements, 2024 through 2030

Within the overall revenue requirements, a subset of O&M costs is allocable to the properties within the Drainage Annual Service Charge areas. These charges are calculated separately and offset the costs to be recovered from the general customer base.

The revenue requirements must be funded by the City's ratepayers. Per the rate structure described above, the rate is charged to each ERU of impervious area. The total units of service in 2024 are described below.

Table 6. Summary of Units of Service, 2024

	ERUs
Residential Units (1 ERU each)	3,616
Commercial	5,534
Total	***9,156***
Drainage Annual Service Charge Subset of ERUs	966

The financial model assumes an annual 2.5% growth in units of service, and a corresponding increase to O&M activities to accommodate the population growth that the city is expecting over the planning period.

Recommended Rates

Raftelis developed stormwater fee rate plans from the assumptions and inputs discussed above. The City considered other funding strategies and rate plans, which are described in the appendices, but elected to move forward with the rate plan described in detail below.

Stormwater Fee Rate Plan

The financial model allows the user to view stormwater fee rates with and without support from APA fee revenue. The most likely scenario for the city will be that regional voters decline to reauthorize the APA, resulting in the full burden of the stormwater program falling to the stormwater fee. This scenario, and recommended rates, are described in Figure 3 and Figure 4, below

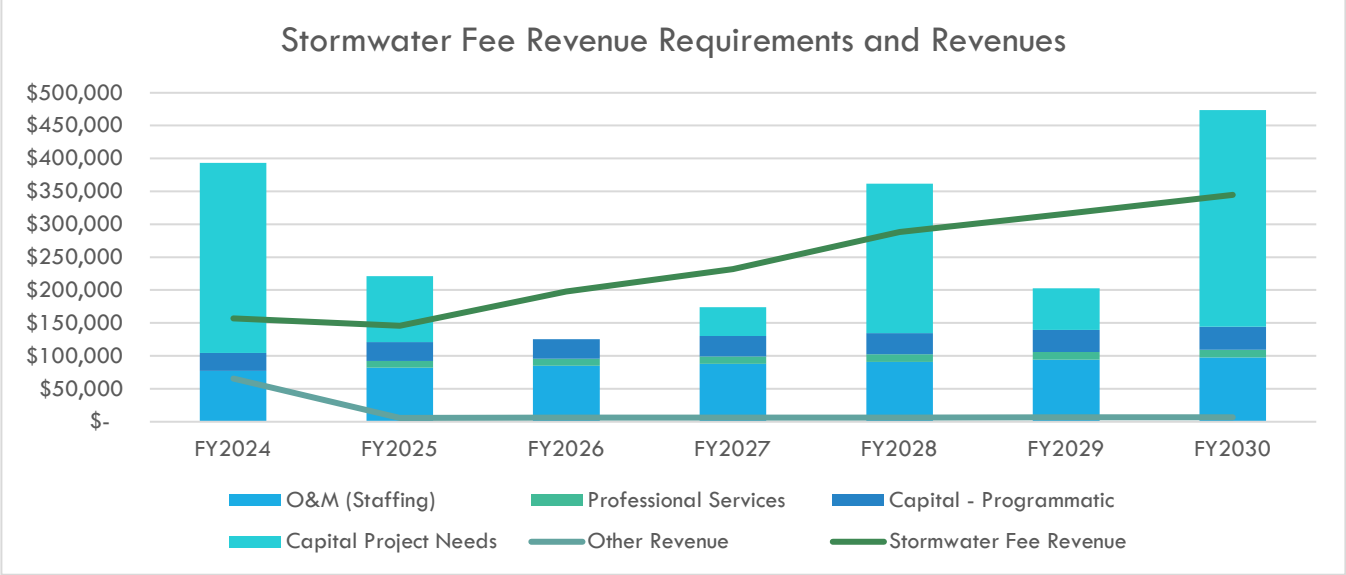


Figure 3. Stormwater Fee Revenue Requirements and Revenues

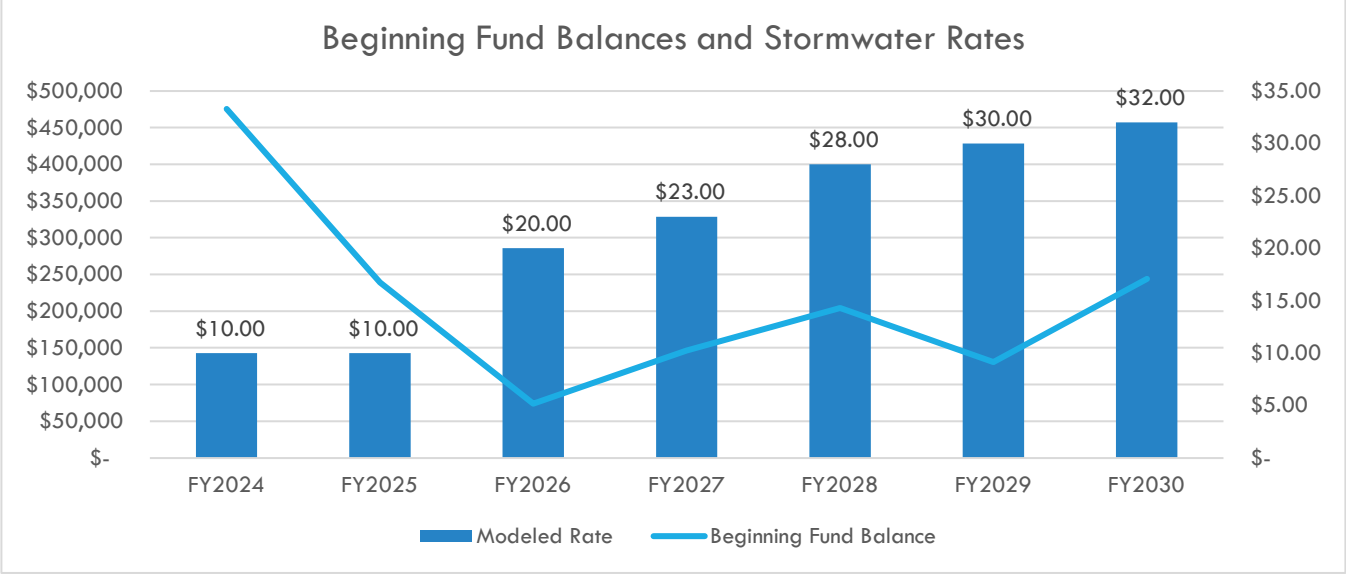


Figure 4. Program Fund Balance and Rates

As discussed above, the City's fund balance policy references the end-of-year balance. Here, beginning balances are shown to demonstrate the reduction in balance during 2024 and 2025. Under this rate scenario, the fund balance for the Stormwater Utility Fund is used (as are additional funds, as discussed above) to avoid a drastic increase in the stormwater rate. However, the fund stabilizes after a few years, being drawn down slightly to stabilize rates into the future. The fund generally maintains compliance with the recommended balance policy, which is more aggressive than the City's Policy 1920.

Ongoing Administration

Data Maintenance and Customer Service

Liberty Lake collects the fees from stormwater customers by including the charge on property tax bills. The City has administrative policies in place that allow the mayor or designee to authorize a refund, or adjustment for any charge when it is determined that an error has occurred as described in Section 8-4-7.E of the City's municipal code.

Collection and Enforcement Policies

The City has collection and enforcement policies in place that enforce an additional 8% interest rate per year on late stormwater charges that are added monthly from the date of delinquency. Additionally, the policy, outlined in RCW 35.67, allows the City to enforce a lien on the property until the debt is repaid. Raftelis does not have any recommended changes to the City's current collection and enforcement policies as they appear to be sufficient in ensuring that the stormwater fee maintains a high collection rate.

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Appendix A: Scenario 2

The City considered a second capital funding scenario, herein called "Scenario 2." In this scenario, the capital plan is spread over more years and is steadier, rather than being front-loaded. Costs associated with the capital plan are able to be supported initially by stormwater fee (and APA fee revenue through 2025). The capital program is shown in Table 7, below.

Table 7. Capital Program (Scenario 2)

Raw Capital Costs	2024	2025	2026	2027	2028	2029	2030	2031	2032
Master Plan	**$70,000**								
TP-14 – Appleway Overlay	$150,000								
E Sprague Avenue and S Molter Rd Intersection	$52,000	$260,000							
Sprague Avenue				$80,000	$400,000				
E Country Vista Drive North Swale						$39,000	$194,000		
Neyland Avenue								$59,000	$296,000
Total, Raw Capital Costs (2024$)	$272,000	$260,000	$-	$80,000	$400,000	$39,000	$196,000		
Capital Needs to be Covered by Streets, Grants, Capital/Other Fund	$70,000								
Additional Capital Needs to be Covered by Streets, Grants, Capital/Other Fund					$150,000				
Capital Needs to be Covered by Stormwater Fee* (2024$)	**$272,000**	**$260,000**	**$-**	**$80,000**	**$250,000**	**$39,000**	**$196,000**	**$59,000**	**$296,000**

The Stormwater program will be self-sufficient through 2028, but rates will still increase at a more rapid pace (when compared to Scenario) as fewer capital costs overall are anticipated to be funded by other sources. This scenario and associated rates are described in Figure 5, below.

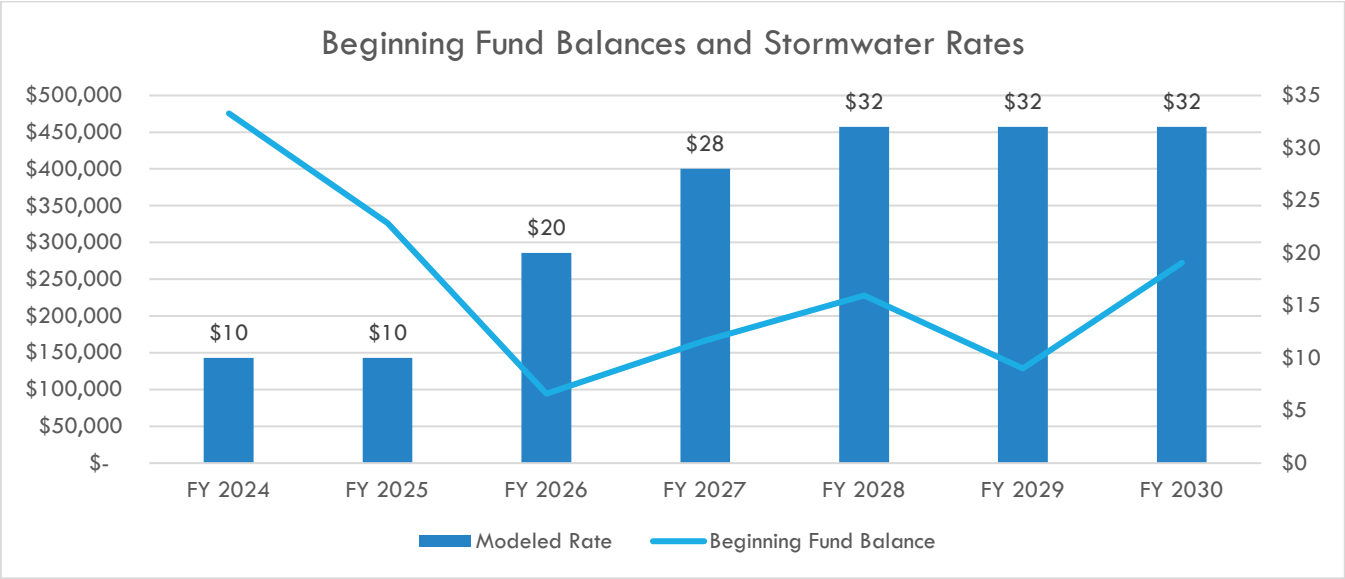

Figure 5. Program Fund Balance and Rates (Scenario 2)

In this scenario, rates by 2030 end up at $32 per ERU per year, as they are in Scenario 1, but they get to that point over a shorter period to accommodate the capital program.

Appendix B: Scenario 3

The City considered a further adjustment to Scenario 1, herein called "Scenario 3." Scenario 3 shares the same capital plan and offsets used in Scenario 1 (seeTable 5, above) but allows for a steady rate increase of $5 per year.

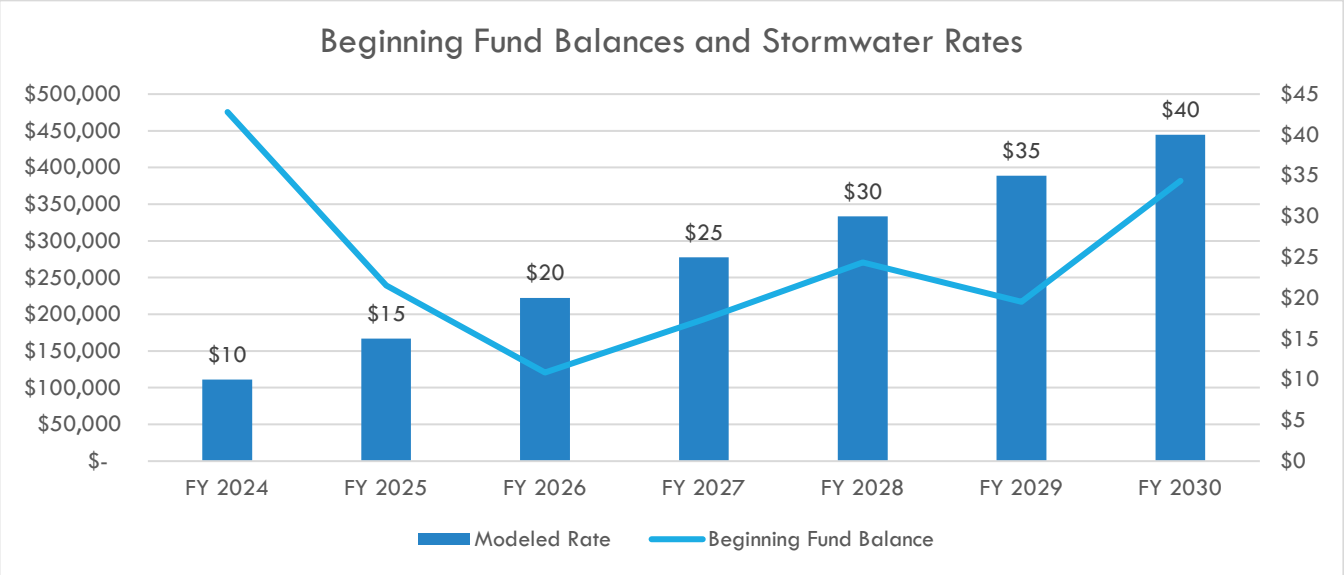

Figure 6. Program Fund Balance and Rates (Scenario 3)

The steady rate increases result in the Stormwater Utility's fund balance building back to nearly $400,000 (close to current levels) by the beginning of 2030. For comparison, Scenario 1's fund balance is approximately $250,000 at the beginning of 2030.

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Appendix C: FCS Group Issue Papers

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FCS GROUP
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Issue Paper #1

STORMWATER UTILITY FISCAL POLICIES

ISSUE

The basic framework for evaluating utility revenue needs includes sound fiscal policies. Intended to promote long-term financial viability for the utility, these policies can address a variety of topics including cash reserves, capital funding, and system reinvestment.

CASH RESERVES

Reserves are a key component of any utility's financial strategy, as they provide the flexibility to manage variations in costs and revenues that could otherwise have an adverse impact on ratepayers. When evaluating fund reserve levels and objectives, it is important to recognize that the value of reserves lies in their potential use. A reserve strategy that deliberately avoids any use of reserves negates their purpose. Fluctuation of reserve levels merely indicates that the system is working, while lack of variation over many years strongly suggests that the reserves are, in fact, unnecessary. For the purpose of rate and financial planning, resources are commonly separated into the following distinct accounts or funds:

- **Operating Reserve**: 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. Like other types of reserves, operating reserves also serve another purpose: they can help smooth rate increases over time. Target balances for an operating reserve are generally expressed as a certain number of days of operating expenses less transfers, with the minimum requirement varying with the expected revenue volatility.

  Industry practice for utility operating reserves typically ranges from 30 days (or 8 percent) to 120 days (or 33 percent) of operating expenses. The lower end is more appropriate for utilities with stable revenue streams, and the higher end is more appropriate for utilities with significant seasonal or consumption-based fluctuations. The most common operating reserve target for stormwater utilities with monthly or bimonthly billing is between 30 days and 60 days of operating expenses. For stormwater utilities that bill their customers annually, as the City does using property tax bills, the reserve target is commonly increased to account for payment timing fluctuations.

  In our rate models, we treat fund balance that is needed to meet the reserve target as unavailable for funding capital projects. Fund balance in excess of the reserve target can be used to fund capital projects.

  The City's Financial Management Policy 1920 provides for operating reserves of "at least 5 percent of the budgeted Fund's operating revenues" for "other City operating funds." We recommend, at least for the Stormwater Utility Fund, increasing this reserve level to 33 percent or 120 days of budgeted operating revenues. Based on budgeted stormwater utility revenue of

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$80,000 in 2022 (not including budgeted revenue from the State) the recommended reserve level would be $26,400.

Recommendation: Increase operating reserve for the Stormwater Utility Fund from 5 percent of budgeted revenues to 33 percent of budgeted revenues.

- **Capital Reserve**: The capital reserve consists of cash that has been set aside for capital purposes. Resources include system development charges (if applicable), grants, and debt proceeds among others. This fund also 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. For example, grants that the utility relies on to meet its capital needs may have a local cash matching requirement.

  Given these different purposes, there are a variety of potential benchmarks for setting a minimum balance for this fund. Options include a percentage (commonly one or two percent) of the original cost of fixed assets, a rolling multi-year average of capital improvement plan (CIP) costs, or an amount determined sufficient to fund an equipment failure. However, this capital reserve policy is not intended to guard against catastrophic system failure or extreme acts of nature.

  The City's Financial Management Policy 1917 provides for capital reserves associated with the General Fund, but there is no similar policy that covers the Stormwater Utility Fund. We recommend that, in addition to the operating reserve, the Stormwater Utility Fund maintain a capital reserve equal to 1 percent of the original cost of capital assets owned by the Fund. However, calculating this reserve level is not currently possible under the City's cash basis of accounting.

Recommendation: Achieve a year-end target of 1 percent of the original cost of capital assets.

- **Debt Reserve**: The debt reserve is most often required as a condition of bond issuance, though some loan programs also require a reserve. The intent of the reserve is to protect bondholders (or the agency issuing loans) from the risk of the borrower defaulting on their payments. Typically specified in the related bond or loan agreement, the minimum balance for this reserve is most often linked to either average annual debt service, maximum annual debt service, or the amount issued.
- **Debt Service Coverage**: Debt service coverage is typically a requirement associated with revenue bonds and it is an important benchmark to measure the risk of the utility's capital funding plans.

  Debt service coverage is most easily understood as a factor applied to annual debt service. In such a case, if it sells revenue bonds, the City agrees to collect enough revenue to meet operating expenses and not only pay debt service but collect an additional 25 percent increment above bonded debt service. The extra revenue is a 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 system reinvestment reserves, 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 City goes to the market for revenue bonds.

At present, the Stormwater Utility Fund does not have any outstanding debt. Therefore, debt reserves and debt service coverage are not of immediate concern.

CAPITAL FUNDING

Utilities can typically draw funds for capital improvement projects from a variety of sources, such as grants, developer extensions, system development charges, utility rates, and debt. While grants and developer contributions would logically be applied to project costs first, the next choice in the funding hierarchy is not necessarily apparent.

- Debt mitigates the financial impact of capital investment on ratepayers but comes with issuance and interest costs. A utility's ability to meet coverage and other debt-related requirements may limit the amount of additional debt that it can issue. In addition, excessive amounts of outstanding debt can affect a utility's credit rating and its ability to secure low-interest debt.
- Cash resources (e.g., revenues from rates and system development charges) can be applied to project costs directly, or they can be held in reserve and applied toward the annual debt service payments.

The specific decision regarding whether to fund projects by debt or by cash is an important policy decision that will likely be driven by several considerations. While cash funding will be cheaper in the long run because there is no interest cost, debt funding may be the more practical option since it allows for the payment of costs over an extended period of time. Using debt to spread the cost over time also promotes "intergenerational equity," and ensures that future customers pay for their fair share of system costs.

An important metric, referred to as the "debt burden," can be useful to help monitor the overall level of indebtedness of a utility. Debt burdens for municipal utilities range from 0 percent to as much as 60 percent, but in most cases fall in a range from 15 to 35 percent of fixed assets measured at book value. The debt burden is calculated with the following formula:

$$\frac{Outstanding\ Debt}{Original\ Cost\ of\ Fixed\ Assets - Accumulated\ Depreciation}$$

Other than during short periods of intense investment, long-term investment patterns show that compliance with coverage requirements and other policy standards often limits debt to 40 to 50 percent of fixed assets.

A strategy for debt can be constructed to explicitly target a level of debt usage as a maximum or target, perhaps as a defined percentage of the CIP. To be practically useful, this is often expressed as a multi-year objective (such as limiting the amount of debt funding in any five-year CIP period to 75 percent).

The City's Financial Management Policy 1510 governs the use of debt, but it is sufficiently flexible to allow the City freedom to determine the optimal mix of financing options for capital improvements.

SYSTEM REINVESTMENT

The concept of system reinvestment funding entails funding long-term infrastructure replacement needs through a regular and predictable rate provision. A system reinvestment funding program can

be structured to consider the defined funding source (rates), accumulation of funds when funding exceeds near-term needs, and augmentation of funds (e.g. through debt) when replacement needs exceed available cash resources.

Many municipal utilities incorporate a system reinvestment funding provision based on depreciation expense. Specific benchmarks for annual funding can include:

- ***Original cost depreciation expense as reported in financial records***. This approach fully funds the decline in asset value attributable to wear and tear from routine use, as measured by original construction costs. It avoids decline in system asset value (financial integrity) by replacing physical assets with cash assets.
- ***Replacement-based depreciation expense.*** This approach estimates the replacement cost of the system, and bases system reinvestment funding on this higher cost. By so doing, it more closely conforms to the true cost of replacing the system.
- ***Sinking fund approach.*** Similar to the replacement-based depreciation approach, the sinking fund approach defines an annual provision based on funding a replacement account sufficient to fund future replacements. For systems that have not previously funded system reinvestment and have a material accumulated liability, this generally results in the highest rate impacts.
- ***Targeted funding approach.*** This approach identifies a specific dollar amount of funding to be budgeted annually. While it may be set in the context of some of the above measures, it is most often set to provide a moderate level of funding while mitigating or limiting rate impacts.
- ***Directly budgeted replacement project expenditures.*** Budgeting replacement project expenditures as they occur, this approach does not attempt to anticipate or accumulate toward replacement needs and is likely to provide highly variable annual requirements.

Of these various approaches, only the sinking fund approach is designed to ensure full funding of replacement needs, contingent on the accuracy of assumptions used. All other approaches are intended to provide reasonable contributions toward meeting replacement needs, but do not ensure the adequacy of such funding.

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, either in full or net of debt principal repayment. This strategy and level of funding satisfies several standards for reasonable rates:

- It avoids decline in system asset value (financial integrity)
- It charges customers commensurate with their consumption of facility useful lives and avoids the possibility of charging customers more than the current cost to provide service (rate equity)
- It provides a substantial source of funding for replacement (capital funding adequacy)

However, it is important to recognize that funding system reinvestment based on original cost depreciation will generally not fully meet future replacement needs (especially for mature systems that are just beginning to address or fund those needs). In such cases, debt or use of other City cash resources would be required to cover the resulting funding gap.

The City's Financial Management Policy 1917 provides for reserves "to provide for the scheduled replacement of City vehicles and capital equipment at the end of their useful lives." However, there are no provisions for accumulating reserves for the replacement of infrastructure assets. We recommend that the City use the targeted funding approach to budget for asset replacement

expenditures from the Stormwater Utility Fund. The exact annual amount can be determined during the development of the stormwater master plan and then adjusted from time to time.

Recommendation: Use the targeted funding approach to budget for asset replacement.

RECOMMENDATIONS

To summarize, we recommend that the City adopt the following fiscal policies for the stormwater utility:

- Increase operating reserve for the Stormwater Utility Fund from 5 percent of budgeted revenues to 33 percent of budgeted revenues.
- Achieve a year-end target of 1 percent of the original cost of capital assets.
- Use the targeted funding approach to budget for asset replacement.

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Issue Paper #2

STORMWATER RATE STRUCTURE

ISSUE

More communities are employing utility service charges to fund their stormwater programs. Service charges provide a dependable, predictable, legally defensible, and equitable revenue stream that is dedicated to its purpose. Additionally, this revenue stream can be realized through any of several different rate structures. The City has requested an evaluation of rate structure options to determine which is optimal, given the policy objectives and availability of data.

ALTERNATIVES

There are number of stormwater rate structure options that are often considered as potential bases for recovering the costs of stormwater management. These are the five most common stormwater rate structures:

- ***Impervious Surface Area***. The most common approach is to charge customers based on impervious surface area, the hard surface area that prevents or impedes the infiltration of water into the ground. Impervious surface area is widely accepted as an appropriate measure of a property's contribution of runoff, providing a rational nexus to service received from a stormwater program. Given the diversity that exists among non-single-family residential properties, it is common to charge these customers based on actual measured impervious surface area.

  Utilities often follow a different procedure for single-family residences, as tracking parcel-specific measurements of impervious area for these customers would add considerable administrative effort and complexity to the rate structure. The more common practice is to impose a uniform rate on single-family residences based on an estimated average amount of impervious surface area. Though this approach may overcharge smaller residences and undercharge larger residences, it is widely considered to be an acceptable compromise between equity and practicality.

- ***Density of Development***. An alternative measurement of runoff contribution involves applying a "density factor" to adjust charges depending on the percentage of the parcel covered by hard surface. This approach can acknowledge that, for example, 3,000 square feet of impervious area on a 5,000 square-foot lot more directly impacts the public system than an equivalent impervious area on a one-acre lot. As with the approach based on impervious surface area, this approach is an appropriate charge basis because it adequately quantifies the relationship between the rate paid and the level of service received.

- ***Runoff Coefficients***. This approach is like the "density of development" approach in that it can be used to adjust a parcel's charge based on its runoff characteristics. However, it is more closely associated with a parcel's physical properties. When applied to lot size, runoff coefficients are generally accepted as a measure of runoff contribution (and therefore service

received). Implementing this approach requires information relating to the basic characteristics of land (e.g., slope and soil type), land use, and lot size. Depending on slope variables and soil characteristics, undeveloped parcels may also be subject to charges under this approach.

- ***Land Use***. Runoff characteristics can be linked to types of land use. For example, empirical analysis may find that an industrial land use has a more significant contribution to water quality problems from stormwater runoff than undeveloped land (justifying a proportionately higher industrial stormwater rate to equitably recover program costs).
- ***Trip Generation***. While most rate structure options focus on runoff contribution, a structure based on trip generation would attempt to relate automobile traffic to non-point-source pollution contributed by properties. *Trip Generation Manual* published by the Institute of Transportation Engineers (and currently in its 11th edition) assigns average daily trips to several specific categories of land use. This information could be used to recover the costs of water quality activities within the stormwater program. Customer land uses and the square footage of improvements would also be required in order to calculate equitable rates. We are aware of only three cities that have implemented stormwater rates based on trip generation.

CURRENT RATE STRUCTURE

The City's current rate structure, which is governed by Section 8-4-5.A of the City's municipal code, is based on impervious surface. "Every developed parcel" is charged at the rate of $10.00 per year per **3,160** square feet of impervious surface area. *Moreover, all single-family residences are assumed to have 3,160 square feet of impervious surface area*.

Section 8-4-5.A.2 of the City's municipal code also provides for a charge of $6.11 per year to "every homeowner within the drainwater service area for plats within associations of the subdivisions." It is unclear to us whether this charge is additive to—or a substitute for—the $10.00 charge imposed by Section 8-4-5.A.1.

Nevertheless, the City's current rate structure clearly stands in the tradition of charging customers based upon their impervious surface area.

ANALYSIS

Throughout the United States, impervious surface area is a widely accepted measure of runoff contribution, and it provides the basis for rates in most stormwater utilities. In addition, the functional nexus among impervious surface area, runoff contribution, and increased flooding, water quality degradation, and damage to habitat is scientifically strong and supportable.

An impervious-based rate structure defines a direct linkage between a parcel's contribution to runoff impacting the system infrastructure and the fee that parcel pays. The fee basis creates a standard of charging that quantifies how different amounts of impervious surface area cause proportionately different impacts on the environment in terms of flooding, water quality, and habitat degradation. By recognizing that relationship, the fee structure basis proportionately charges different customers their share of the system's cost burden and provides an equitable, defensible means of cost recovery for a stormwater utility.

The City could possibly enhance the impervious surface area rate structure by incorporating density factors, recognizing that more intense development may more directly impact the public stormwater

system, assuming that development at lesser density is not directly connected to the system. The runoff coefficient approach would be more difficult to administer than the impervious surface area rate structure, as it would require a relatively extensive data collection effort on the part of the City. It is also less defensible as a fee basis because it incorporates physical land characteristics over which the customer has minimal if any control.

While administratively simple compared to an impervious-area approach, an approach based on land use is typically used only when property-specific impervious area measurements are unavailable. Trip generation, while a supportable means of recovering costs related to water quality, provides little if any advantage over impervious surface area at greater administrative effort and associated cost.

RECOMMENDATION

- We recommend that the City continue to use impervious surface area as the basis for imposing utility charges related to storm drainage and surface water management.

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Issue Paper #3

STORMWATER RATE CREDITS & ADJUSTMENTS

ISSUE

We have previously argued that the most defensible charge basis for a stormwater utility fee is impervious surface area. However, several factors apart from impervious surface area dictate the stormwater impacts of a given property, and some of these factors can be controlled by the customer. These factors prompt the question, "When is it reasonable (or required) to provide rate credits to stormwater utility customers, and what is a rational basis for such credits?"

ANALYSIS AND ALTERNATIVES

When considering how to charge, or credit, customers, it is important to remember that a stormwater rate is a fee for service, not a tax. Therefore, the level of a customer's charge must substantially relate to that customer's proportionate share of the utility's costs. In terms of equity and legal defensibility, it is important to recognize the significance of that relationship when defining exemption or credit policies, because such policies could potentially move a utility away from the rational linkage between service delivered and the amount of the fee.

The following types of rate credits are often considered and sometimes offered by stormwater utilities:

- ***Low-Income, Senior Citizen***. While it may be a common policy to grant credits or exemptions to elderly and/or low-income customers, equity considerations under an impervious surface area approach do not give cause for such adjustments. Developed properties owned by senior citizens and/or low-income customers still contribute runoff that places a cost burden on the stormwater utility. If the City wishes to pursue a social policy to grant credits or exemptions, the utility's ratepayers should not bear the costs of that policy. To preserve the cost of service approach to rate design, the General Fund or other external funding source (such as grants) could be used to fund the costs of senior and/or low-income credits or exemptions.
- ***Publicly Owned Properties.*** Under a similar evaluation as senior/low-income credits, publicly owned properties do not warrant rate relief. When a cost of service approach is used as the basis for fee evaluation, exemptions and credits should only be granted when the characteristics of a parcel or improvements to that property cause runoff to differ when compared to similar parcels.

  The one common exception to this general approach has to do with charging city streets. City streets, while impervious and generating runoff, also serve as part of the stormwater conveyance system. Cities often choose to exempt their streets in recognition of this fact.
- ***Open Space***. Under an impervious rate approach, parcels qualifying as open space should be charged only for the area of impervious surface on the parcel.
- ***Tax-Exempt Properties***. Like public properties, tax-exempt properties are also subject to the general criterion for credit or exemption eligibility; that is, the specific parcel must have

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characteristics or improvements that cause runoff to differ from similar properties in order to be eligible for cost relief. As an alternative, cost relief may be granted in cases where the tax-exempt property, most often a school, provides an in-kind service such as topic-specific curriculum in lieu of paying the full utility service charge.

- ***Undeveloped Property.*** These areas by definition have no impervious area. Therefore it would make sense to exclude them from stormwater rates, as they do not contribute to increased runoff. Charging undeveloped property would be inconsistent with an impervious surface area approach.
- ***On-Site Mitigation***. Properties with on-site mitigation have a comparatively reduced effect on the public system than similar property lacking this mitigation. However, meeting City development standards does not reduce costs for the utility. It simply keeps the utility whole. Granting a credit for such activities would actually reduce the amount of resources available for basic services to the remainder of the customer base.

  Exceeding standards – that is, providing capacity in addition to that needed by the developing (or developed) property – in theory does reduce cost to the utility by, in effect, reducing the net utility service area. How much of a credit to grant can then be sized according to the extent to which on-site controls exceed the standards.

  Therefore, the two criteria for granting credits for on-site mitigation are (1) effectiveness in reducing stormwater runoff and (2) whether these on-site systems are designed to handle a greater amount stormwater than would be required as a condition of development approval.

CURRENT POLICY

Section 8-4-6 of the City's municipal code provides for partial exemption of "low income seniors and disabled persons" who qualify for the property tax exemptions defined in the Revised Code of Washington (RCW) 84.36.381. Partial exemptions range from 40 percent of the stormwater utility fee to 80 percent of the stormwater utility fee.

Section 8-4-6 contains no provision for funding these exemptions (whether from the General Fund or from any other source). We therefore conclude that the non-exempt rate-payers bear the cost of these exemptions.

RECOMMENDATIONS

- We recommend that the City either repeal Section 8-4-6 (eliminating the partial exemptions) or fund the partial exemptions from the General Fund or some source other than rate-payers. Either solution will eliminate the cross-subsidy that should be avoided in rate-funded enterprises.