

# Staffing Analysis Summary



# SURFACE WATER MASTER PLAN STAFFING ANALYSIS

August 2022



**AltaTerra**

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## 1. Introduction and Background

The Kirkland Surface Water Utility (Utility) is responsible for operating and maintaining the City's stormwater infrastructure in a way that complies with its National Pollutant Discharge Elimination System (NPDES) Phase II Permit and meets other City goals to reduce flooding, improve habitat and water quality, and ensure that infrastructure is maintained and functions appropriately. Utility funds pay for City staff to accomplish these goals.

An staffing analysis of associated stormwater work tasks was conducted to evaluate the need for additional staff resources.

## 2. Current Utility Staff Distribution

Figure 1 shows a simplified Public Works organizational chart outlining the divisions where Utility funds pay for staff to accomplish surface water tasks. The primary work divisions are highlighted in bold. Surface water support in other departments is also shown for reference.

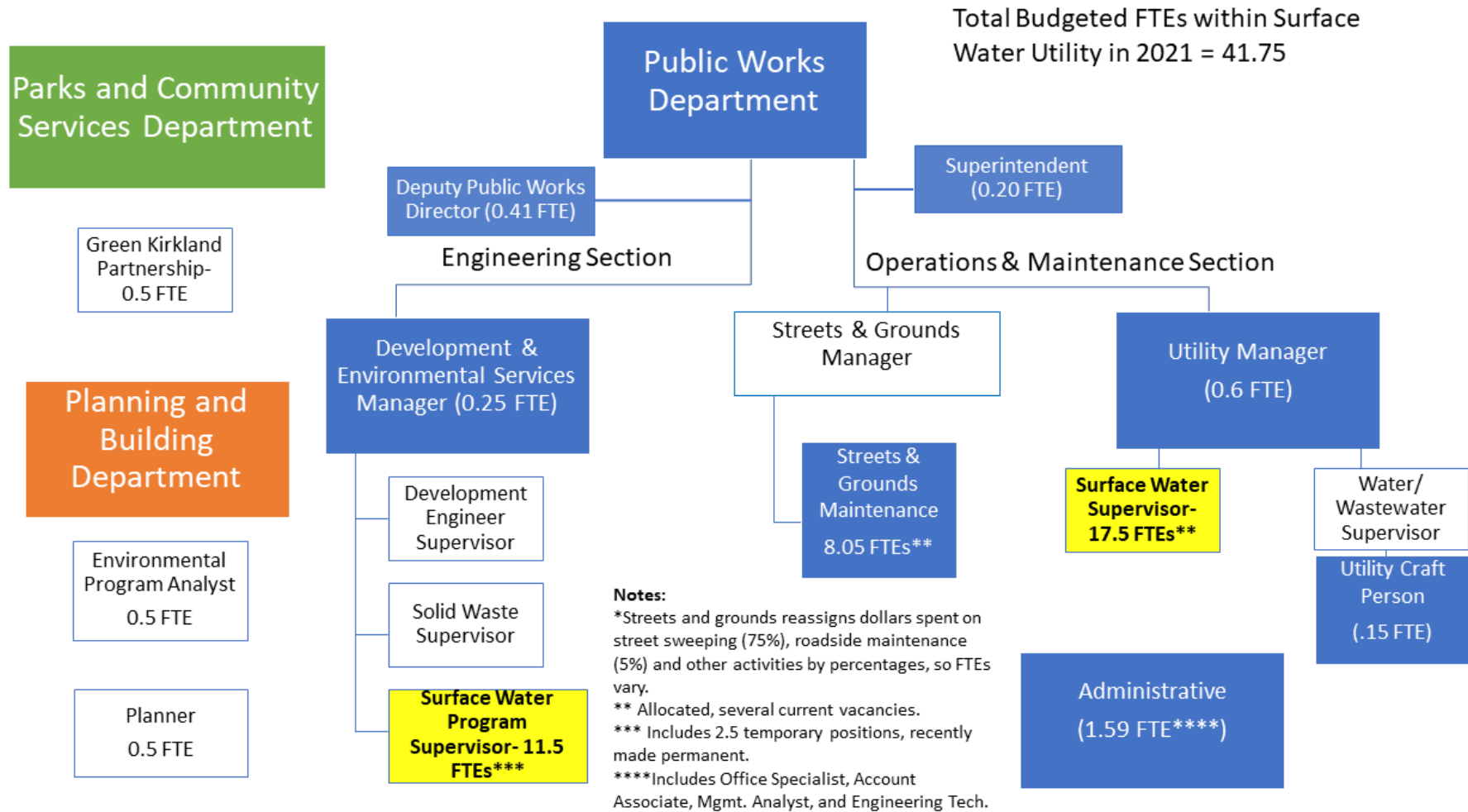


Figure 1. Simplified organizational chart showing where Utility funds city staff (2021 estimates). Bold and yellow highlight indicates primary work groups.

The primary surface water-related work is accomplished by staff in the Public Works Department within Surface Water Maintenance and Operations and Surface Water Engineering divisions. Outside of these, the Utility also funds positions in other departments and work divisions.

The most significant surface water funding outside of the Utility goes to Streets and Grounds. The Utility funds 8.05 full-time equivalents (FTE) in the Streets and Grounds Division, including:

- 0.05 Leadsperson
- 0.15 Yard Maintenance/Inventory Control
- 0.4 Utility person
- 1.0 Field Arborist
- 3.25 Senior Maintenance Persons
- 1.8 Grounds Laborers
- 1.4 Grounds Technicians
- 

The amount of actual Utility expenditure for Streets and Grounds staffing varies from year to year, as actual hours worked, by task, are charged to the Surface Water fund based on the percentages listed here.

- 75% of street sweeping and cleaning
- 28% of yard maintenance
- 15% of locating services
- 5% of road maintenance, sidewalk maintenance, and roadside and shoulder maintenance activities

The above activities account for nearly half of the FTEs funded by Surface Water in the Streets and Grounds Division. Other surface water-related activities accomplished by Streets and Grounds include retention/detention pond maintenance, Filterra™ maintenance, and street repair.

The Utility also funds positions and services outside of Public Works:

- 0.5 FTE Urban Forester (now Environmental Program Coordinator) in the Planning and Building Department
- 0.5 FTE Planner in Planning to facilitate surface-water related planning activities, and
- 0.5 FTE Program Coordinator position to coordinate Green Kirkland Partnership in the Parks and Community Services Department
- \$80,000 to support the Green Kirkland Partnership.

The total number of staff funded by the Utility between 2014 and now (2022) is shown in Figure 2. The distribution of staff is shown for comparison between 2014 and 2022.



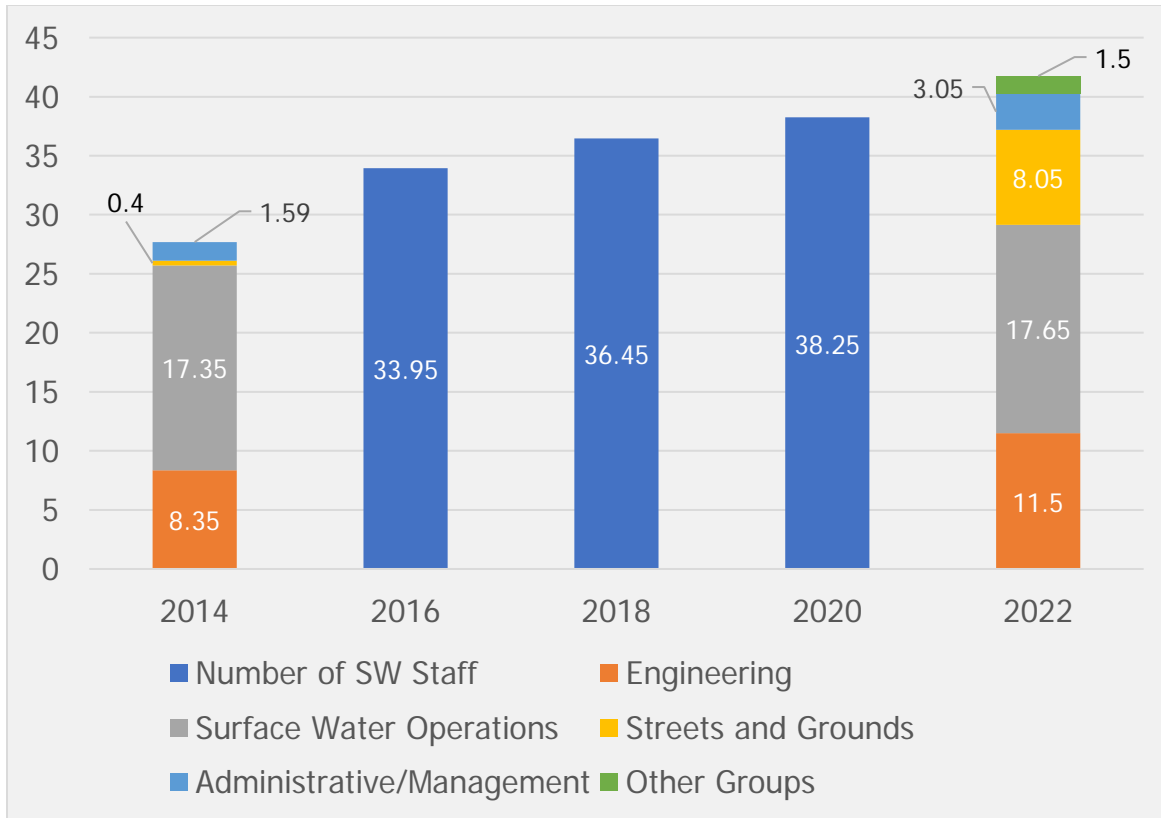


Figure 2. Surface Water Utility-funded positions (2014-2022)

Figure 2 shows how Surface Water-funded positions have changed over time since 2014. The most notable change has been in the number of Surface Water-funded positions in the Streets and Grounds. It has grown significantly while Surface Water Operations and Maintenance positions have changed little since 2014. Other groups shown in 2022 represent 0.5 FTE for the Environmental Program Coordinator that is funded within the Utility, and 1.0 FTE for the Planner and Program Coordinator as an intergovernmental transfer.

### 3. Methodology

This staffing analysis was conducted to evaluate surface water program service levels against current staffing and current workload distributions. The following data was used in this analysis:

- Information obtained from staff interviews between July and November 2021.
- 2014 Operations and Maintenance staffing estimates for anticipated work plan.
- Lucity data from 2017 through 2021, showing actual labor hours and dollars spent by activity number. Lucity is a work management software program that was purchased by the Utility after the last Surface Water Master Plan was completed in 2014. Therefore, the 2014 Surface Water Master Plan didn't have the advantage of evaluating historical work management data for trends.
- GIS extract of public and private surface water asset inventory between 2016 and 2020 (to show changes in numbers of assets and trends).
- Surface Water Engineering Work Plan and staff estimates.

## 4. Public Works Operations and Maintenance (O&M) Section

As shown above in the simplified organizational chart, surface water operations and maintenance activities are accomplished by two divisions in Public Works. The primary work group is the Surface Water Operations and Maintenance Division, and the secondary group is the Streets and Grounds Divisions. Both groups are described independently in this section, unless otherwise noted.

Several staff in the Operations and Maintenance and Streets and Grounds divisions were interviewed. They provided their perspective of what is working well and on some staffing challenges:

### What works well

- NPDES compliance obligations are always met well in advance. The Stormwater Maintenance Supervisor does a good job of understanding workload and planning for it.
- Crews are responsive to requests and assist other divisions and requests from CIP for camera work.
- Crews are very collaborative and know who to go to for what. There are great SOPs and City Specifications for the work they do.

### Challenges for Operations Crews

- Crews are short-staffed.
  - The Storm Crew felt that they could use additional staff at the time of the interviews.
  - Span of control for the current 1 Lead crew is too great at 15.5. A second lead will help spread the workload and increase effectiveness and improve crew cohesiveness.
  - At the time of the staffing interviews, Grounds crew had one vacant position.
  - Current market conditions are making recruitment efforts difficult.
  - The city has grown but the size of the labor force has not kept up.
- Equipment and space needs.
  - Additional equipment is needed for efficiency, and there is a lack of space for current equipment at the maintenance yard. A planning process has begun to address space needs including factors such as materials storage, building space, outdoor covered spaces, fuel pumps, fleet buildings, gates, fencing, lighting, card key readers, and security.
- Travel time to the north part of the City (traffic).
- % of work associated with spill response.

### 4.1 Evaluation of Storm Crew Lucity (Work Order Software) Data

To understand the extent of the staffing issues faced by the Storm Crew, an analysis was conducted on the overall Storm Crew labor hours per year based on Lucity data between 2017 and 2021. A detailed summary of the data, compiled into graphs and tables is provided in Attachment A. Figures 3 and 4 show total labor hours with and without overhead costs (e.g., vacation, sick leave, etc.), respectively. The Covid pandemic in 2020 and 2021 affected the overhead costs relative to total labor. Attachment A provides more detail on the overhead costs.

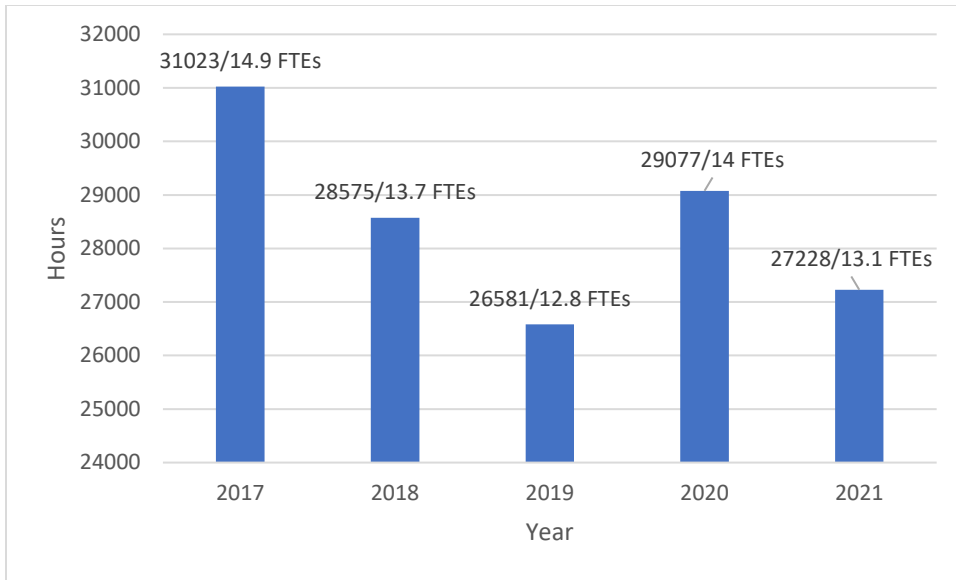


Figure 3. Total labor hours with overhead/FTEs (O&M staff)

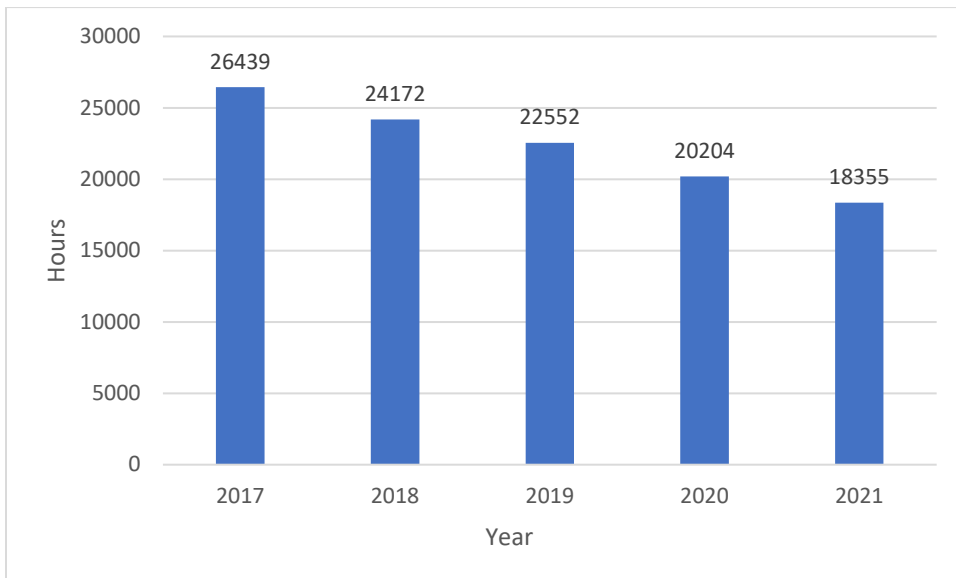


Figure 4. Labor hours (O&M) with overhead (1000 numbers) removed.

Table 1 shows a comparison of average actual labor hours from 2017 through 2021 for the bulk of the Utility’s Storm Crew tasks to the estimated labor need in 2014. Details of labor hours and codes are provided in Attachment A.

Table 1. Comparison of O&M Tasks- Actual labor hours (2017 - 2021) to Estimates (2014)

Task	Labor Hours (FTE estimate based on 1,600 hrs./FTE)			
	2014 Estimate	Avg. Actual O&M and Streets and Grounds (2017 – 2021)	Difference	% Above 2014 Estimate
Cleaning	3800	5719	1919	51%
Inspection	2200	2568	368	17%
Flood Response	1150	1568	418	36%
Repair and Maintenance	5550	6978	1,428	26%
Spill Response	100	788	688	688%
Ditch maintenance	600	1176	576	96%
Detention Pond Maintenance	1050	3413	2,363	225%
Miscellaneous, Filterra™, street sweeping, etc.	3284	6,269*	2,985	91%

\*Average streets and grounds labor hours between 2018 – 2021 funded by Surface Water Fund (see Table 2 for breakdown of tasks).

As shown in Table 1, the average actual labor hours for 2017-21 were greater than the estimated need in 2014 for all work categories. Staff were added under the Surface Water Fund to the Operations and Maintenance (Storm Crew) and the Streets and Grounds Divisions in the following budget cycles:

#### 2015-2016

- 1.0 FTE for CCTV Inspection Program
- 0.50 FTE for NPDES Field Inspection Program (this position has never been filled, there is a 0.5 FTE inspector in the Fats, Oils and Grease (FOG) Program in Sewer)
- 4.0 FTE for Ditch Maintenance Program

#### 2017-2018

- 2.0 FTE for Critical Areas Ordinance (CAO)/Surface Water Design Manual (SWDM)- Natural Areas and LID Maintenance Personnel
- 0.75 FTE for Street Sweeping Enhancements

Table 2 shows the breakdown of average Streets and Grounds Division labor hours that are funded by Surface Water from Lucity data between 2018 and 2021. The Streets and Grounds labor hours for detention pond maintenance are included with the O&M detention pond maintenance hours in Table 1.

Table 2. Summary of average Streets and Grounds labor hours for surface water activities between 2018 and 2021, except detention pond maintenance

Task	Average Labor Hours and FTEs (FTE estimate based on 1,600 hrs./FTE)	
	Average Hours Streets and Grounds Hours (2018 – 2021)	FTEs
Locating	302	0.2
Yard Maintenance	776	0.5
Street Cleaning	3059	1.9
Street Repair	1427	0.9
Roadway, roadside, and sidewalk maintenance	652	0.4
Filterra™ inspection and maintenance	53	0.03
Miscellaneous	293	0.2
<b>Total</b>	<b>6,269</b>	<b>4.13</b>

The new staff positions added in 2015-2016 and 2017-2018 were to support specific activities as described in the City’s budget documents, including CCTV inspection, ditch maintenance, and natural areas and LID maintenance. As shown in Table 1, the Lucity data indicates less than 1 FTE on average is conducting ditch maintenance. Table 2 shows that LID maintenance (Filterras™) is being conducted less than 100 hours per year. Street cleaning is a larger factor than was anticipated when 0.75 FTE was allocated to the Surface Water fund in 2017-2018. There are several factors that may be contributing to the data analysis that doesn’t capture the full picture, including how time is tracked in Lucity, which was the primary source of information for evaluating Storm Crew work activities and time allocations to different tasks. For example, Streets and Grounds does not have a code for LID maintenance, but since there is no code, maintenance on rain gardens and permeable pavements has been tracked under a different Lucity charge number. Improvements to better track time are being made in Lucity in the next budget cycle.

#### 4.1.1 Staffing to Meet Surface Water Needs and Goals

The Lucity data shows labor hour trends and illustrates where staff are spending time to address on-going surface water needs.

Spill response is one activity that continues to take more and more time every year. Spill response and cleanup helps prevent pollutants from reaching the stormwater drainage system, is also a water quality priority for the City, and a permit requirement. Cleaning of the system occurs as soon as possible after any reported spill.

Figure 5 shows a comparison of labor hours that the Storm Crew spent responding to and cleaning up spills between 2017 and 2021. The budgeted 2014 labor estimate is shown for comparison. The upward trend in labor hours is likely to continue. In addition to Storm Crew spill response labor hours, it should also be noted a portion of the street cleaning labor hours (Table 2 above) are also likely for spill cleanup since the street sweeper is often called out for spills.

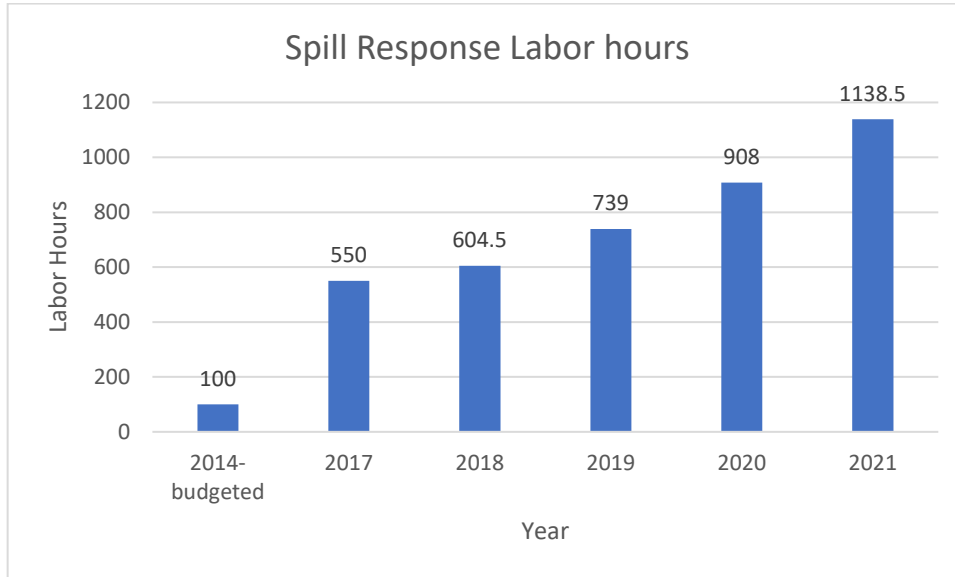


Figure 5. Comparison of spill response labor hours between 2017 and 2021 against 2014 budgeted hours

In addition to spill response, the Storm Crew also spend more time cleaning (catch basins, pipes, and culverts) than anticipated in 2014. Some of the cleaning is done for NDPEs compliance (catch basins). Other cleaning work is done in advance of pipe inspections that are completed for street overlay work. The amount of time that can be dedicated to these activities is limited by crew and equipment (vector truck) availability.

Spill response also involves Surface Water Engineering staff who document the calls, track fee and cost recovery, prepare enforcement actions, conduct education and outreach, follow up with construction inspectors and first responders, and conduct water quality sampling and analyze lab results.

Staffing challenges are shared by both Storm Crew and Surface Water Engineering, and potential solutions involve both divisions. A discussion on spill response challenges and potential staffing solutions is discussed in Section 5.

#### 4.2 Stormwater Facility Inventory Trends

One of the factors that drives Storm Crew workload is the number and complexity of stormwater facilities and infrastructure in the Utility’s inventory and the permit requirements for inspection and maintenance.

The stormwater facility inventory was evaluated for trends and to compare current and future Storm Crew workload. Table 3 shows the changes in facility numbers over time, between 2016 and 2020. Except for non-stream ditches and pond facilities, the numbers of assets increased in all categories of

public stormwater assets. Several miles of non-stream public ditches were converted to pipes, representing an increase in public stormwater pipe length.

Table 3. Change in city-owned asset inventory between 2016 and 2020

Asset	Units	Average increase per year (2016 – 2020)	Total Change between 2016 and 2020
Dry wells and infiltration tanks	Facilities	1	4
Stream Ditches	Miles	0.6	2.5
Ponds	Facilities	0.2	1
Rain Gardens and Filterras™	Facilities	7	28
Permeable Pavement	Facilities	3	10
Vaults and Tanks	Facilities	23	94
Pipes	Miles	1.3	5
CBs and MHs	Structures	382	1530

#### 4.2.1 Projection of Staffing Based on Stormwater Inventory Trends

Actual labor and cost data from 2017 through 2021 was reviewed to estimate the labor hours spent inspecting, cleaning, and maintaining several types of stormwater assets in the city inventory.

The per unit labor hours were multiplied by the average change in asset totals per year to provide an estimate of staffing increases to maintain the changing stormwater inventory.

Table 4 provides a summary of the estimated labor hours to operate and maintain individual assets on an annual basis, and the trending need for additional labor hours to operate and maintain additional public infrastructure as assets are added to the inventory. As shown in Table 4, in the period between 2016 and 2020, the stormwater asset inventory grew to the point that additional 1.2 FTE was needed to operate and maintain these assets, based on the number of assets added and the labor hours required to maintain each asset. If this trend continues, an additional FTE will be needed in another 4 years.

Table 4. Estimated change in labor hours needed for change in number of public stormwater assets.

Asset	Units	Average increase or decrease per year (2016 – 2020)	Average annual labor hours needed per individual asset or asset length in linear feet (2020)	Labor hours needed for public assets per year	Total labor hours for public assets over 4 years (2016-2020)
Dry wells and infiltration tanks	Facilities	1	No data	No data	No data
Stormfilter facilities	Facilities	21	1.5	31.5	127
Non-stream Ditches	Feet	-6,864	.05/ft (avg. hoe and hand)	-343	-1,400
Stream Ditches	Feet	3,168	.05/ft (avg. hoe and hand)	158	660
Ponds	Facilities	0.2	3	0.6	3
Rain Gardens and Filterras™	Facilities	7	~2	14	56
Permeable Pavement	Facilities	3	No data	No data	No data
Vaults and Tanks	Facilities	23	0.64	15	60
Pipes	Feet	6864	.03/ft	206	824
CBs and MHs	Structures	382	1.1 (includes inspection, cleaning (assume 50% need cleaning), rehab (assume 5% need rehab)	411	1644
<b>Total</b>				<b>493 (0.3 FTE)</b>	<b>1,974 (1.23 FTE)</b>

### 5. Surface Water Engineering Division Overview

The Surface Water Engineering Division consists of the following staff:

- Surface Water Program Supervisor
- Senior Surface Water Engineer
- Surface Water Engineer (2)
- Surface Water Planner
- Surface Water Engineering Analyst
- Surface Water Strategic Advisor
- Environmental Analyst



- Water Quality Specialist
- Water Quality Programs Coordinator
- Environmental Education and Outreach Specialist (2)

Several staff in the Surface Water Engineering Division were interviewed. They provided their perspective of what is working well and on some staffing challenges:

#### What works well

- Single hotline for spill response so that all the spill calls go to a single place.
- Education and outreach (coordination internally and externally) works really well. Outreach is the backbone of the Spill Response and IDDE Program and is integral to engaging the public for help in reaching the Utility's surface water goals. Currently, there are two education and outreach staff.
- New staff added to the Surface Water Engineering Division based off the needs identified in the last Surface Water Master Plan:
  - Environmental Analyst: The Environmental Analyst position has led Benthic Index of Biologic Integrity (B-IBI) sampling, bacteria monitoring, stream monitoring, wetland delineations, and addressing streamside issues.
  - Surface Water Planner: The Surface Water Planner position has taken the lead as the NPDES permit coordinator, providing permit assistance to maintenance crews for their work that requires HPAs, tracking rainfall for event responses, coordinating with Planning, and providing streamside property owner assistance.

#### Challenges

- The complexity of spill response and number of spill calls have increased over the last 5 years. Maintenance staff responds to every call to ensure that infrastructure is protected. Response to these calls now take a significant amount of crew time.
- Code enforcement takes a significant amount of staff time for the Water Quality Program Coordinator and crews that have responded to calls. This includes time to build a case for enforcement action and cost recovery. Tasks include documentation as well as a lot of communications, negotiations, public information requests, hearings, presentations, and ultimately collections.
- The Surface Water Program Supervisor oversees a large number of staff with diverse bodies of work and skill sets. The Supervisor does not have capacity and time to adequately provide leadership, conduct management responsibilities, and accomplish project work.
- The vegetation management aspect of surface water management is not addressed comprehensively in Kirkland. Several divisions are responsible for different aspects of publicly owned open space/landscaped right-of-way, including Parks Maintenance and Public Works Streets and Grounds, and Public Works Surface Water Operations.

### 5.1 Evaluation of Surface Water Engineering Work Plan

While Surface Water Engineering staff do not track hours for project tasks like the Storm Crew does in Lucity, they have estimated the percentage of time spent on different work elements within the program.

The 11 primary categories of work include:

- Grant Writing and Strategic Planning
- GIS Mapping and Analysis
- Regulatory Compliance
- Chemical, Physical, and Biological Monitoring
- Watershed and Retrofit Planning
- Private System Inspection and Drainage Complaints
- IDDE, Water Quality Complaints, and Source Control
- Education and Stewardship
- Maintenance Division Support
- CIP Support/Intergovernmental Review
- Development Review
- Miscellaneous

Figure 6 shows the approximate allocation of FTEs within the division based on estimated percentages of time spent devoted to each work category on an on-going basis.

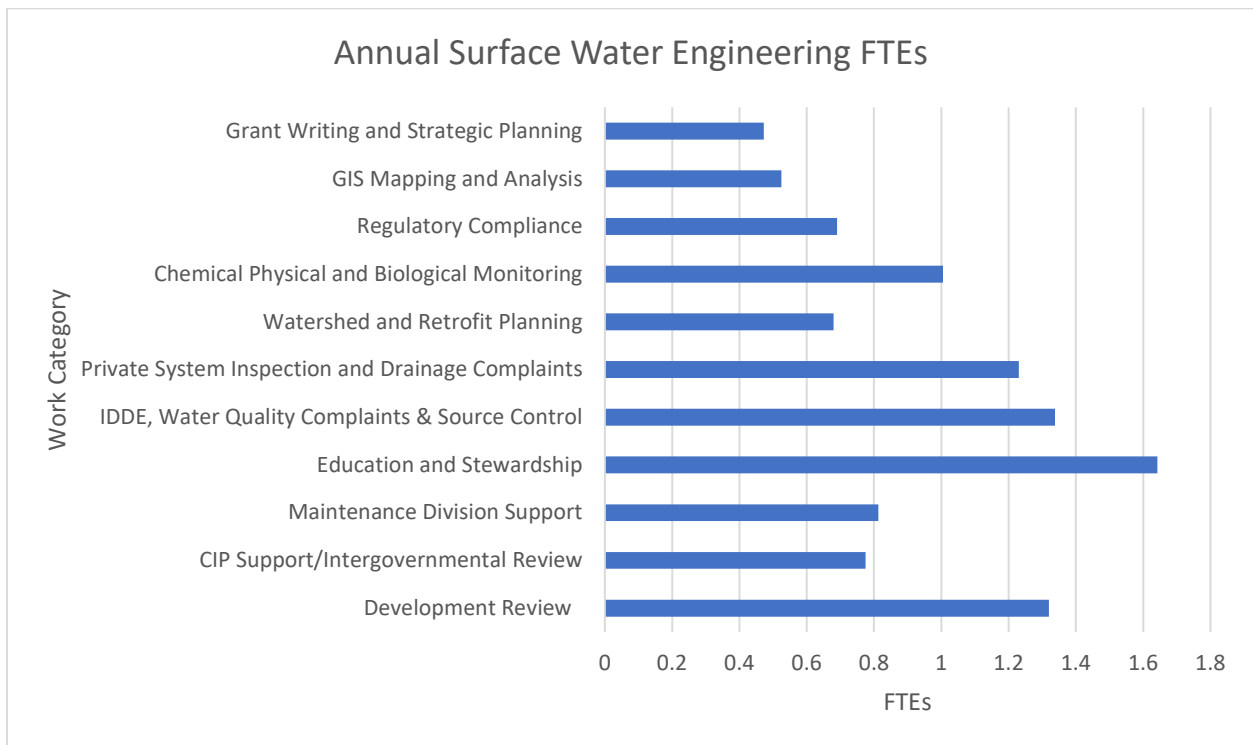


Figure 6. Summary of FTEs devoted to each work category within Surface Water Engineering (2021 Work Plan)

The percentage of Surface Water Engineering FTEs associated with Utility Goals is shown in Figure 7.

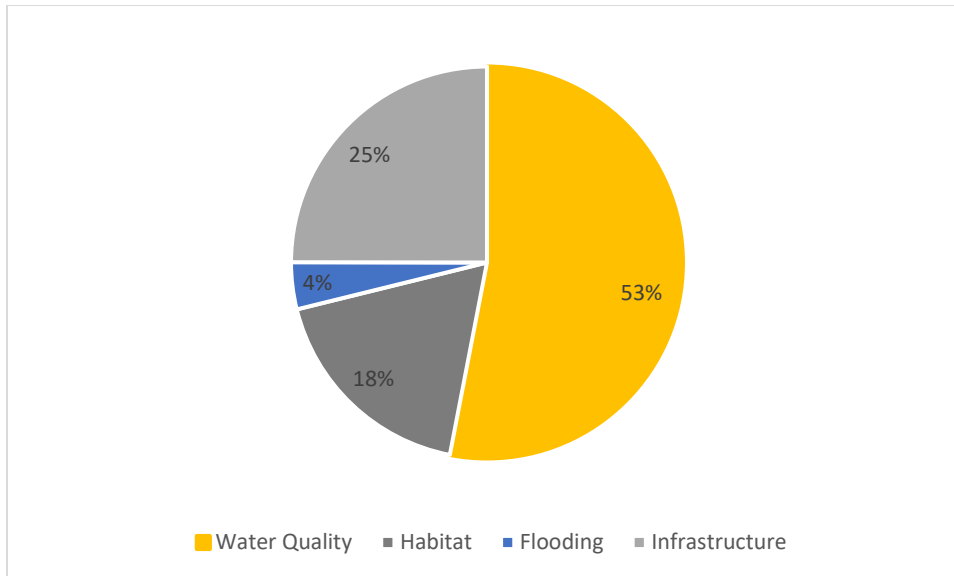


Figure 7. Approximate percent allocation of Surface Water Engineering FTEs to different Utility goals

Staff within Surface Water Engineering have roles in many of the surface water program work categories and divide their time, as needed. Table 5 summarizes staff time spent on different work categories and the allocation to Utility Goals.

Table 5. Summary of approximate Surface Water Engineering staff allocation between Utility goals

Work Categories	Annual Surface Water Engineering FTEs	Utility Goals (Approximate FTEs allocated as percentage of work element)			
		Water Quality	Habitat	Flooding	Infrastructure
Grant Writing and Strategic Planning	0.5	0.25 (50%)	0.25 (50%)		
GIS Mapping and Analysis	0.5				0.5 (100%)
Regulatory Compliance	0.7	0.7 (100%)			
Chemical, Physical, and Biological Monitoring	1	0.5 (50%)	0.5 (50%)		
Watershed and Retrofit Planning	0.7	0.34 (50%)	0.34 (50%)		
Private System Inspection and Drainage Complaints	1.2	0.6 (50%)		0.6 (50%)	
IDDE, Water Quality Complaints and Source Control	1.4	1.4 (100%)			
Education and Stewardship	1.6	0.2 (12.5%)	1.0 (62%)	0.2 (12.5%)	0.2 (12.5%)
Maintenance Division Support	0.8	0.27 (33%)		0.4 (33%)	0.27 (33%)

Work Categories	Annual Surface Water Engineering FTEs	Utility Goals (Approximate FTEs allocated as percentage of work element)			
		Water Quality	Habitat	Flooding	Infrastructure
CIP Support/Intergovernmental Review	0.8				0.8 (100%)
Development Review	1.32				1.32 (100%)
<b>Total</b>	10.5	5.6	1.9	0.4	2.6

Figure 8 illustrates the number of staff, range of skills, and breadth of the work program being managed by the Surface Water Program Supervisor.

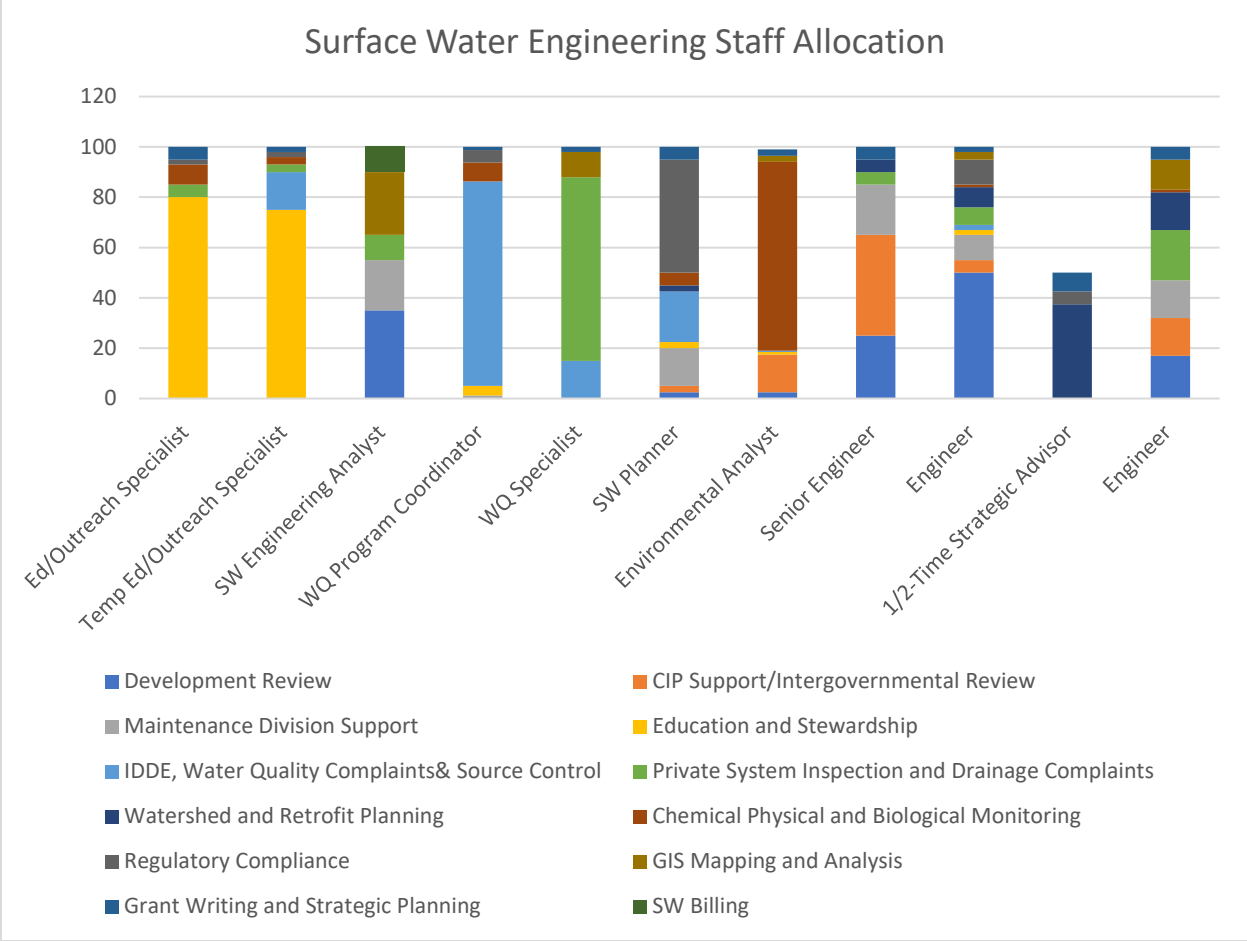


Figure 8. Surface Water Engineering staff allocation between work categories (2021 Work Plan)

Elements of the Surface Water Engineering Division’s 2021 Work Plan is provided in table B-1. This is to illustrate on-going tasks within each work category and whether the tasks are generally required (by NPDES permit) or expected to meet Utility or City Council goals.

Most of the Surface Water Engineering Division’s work is on-going and is conducted on a regular schedule. Workload increases are expected to occur in the following categories over the next 6 to 10 years due to NPDES permit requirements and observed trends:

- IDDE, Water Quality Complaints and Spill Response
- Private Facility Inspection
- Stormwater Retrofit and Structural Stormwater Controls
- Education and Stewardship

### 5.1.1 Illicit Discharge Detection and Elimination (IDDE) Program and Water Quality Complaints

The IDDE program has grown significantly over the last decade as shown in Figure 9. On average, calls have increased 32% every year since records have been kept.

This is partly due to the increase in education, outreach, and communications with internal and external customers. The success of the program is depicted by its continued growth.

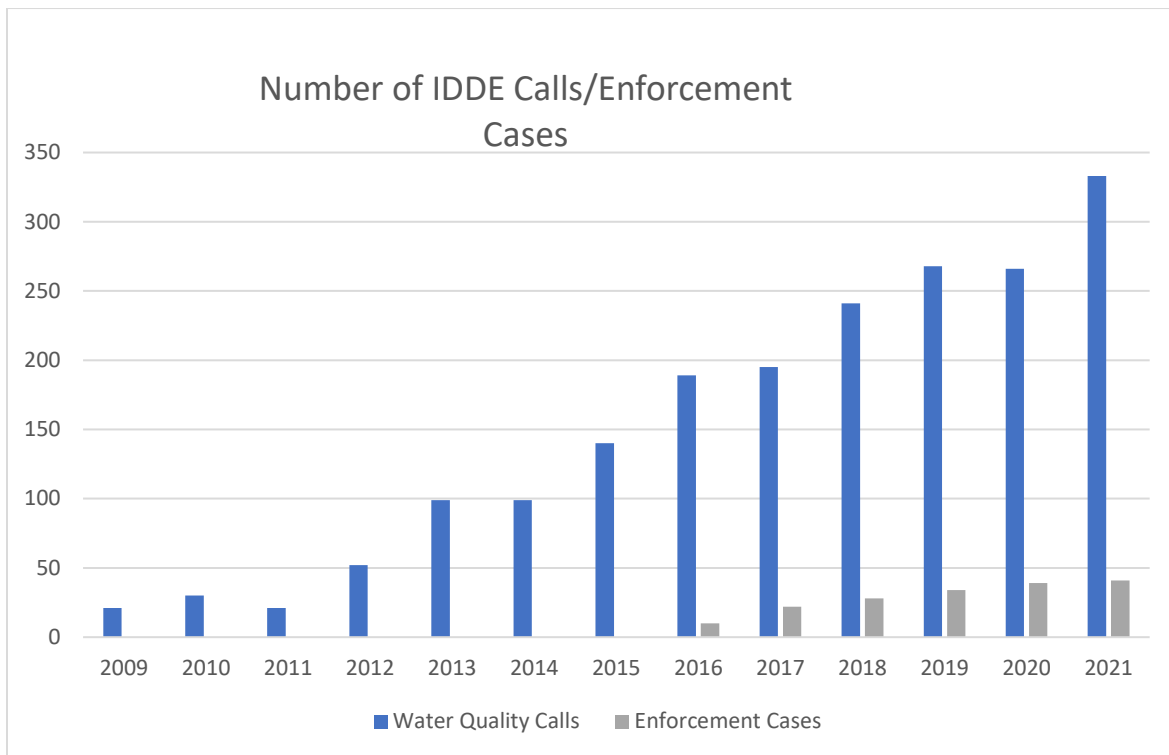


Figure 9. Summary of IDDE calls and enforcement cases, 2009 through 2021

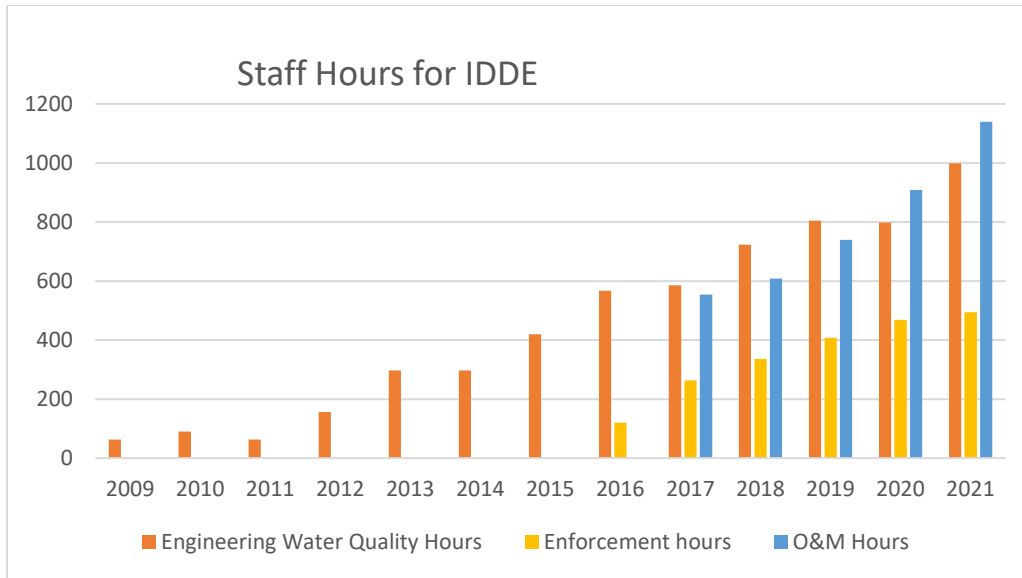


Figure 10. Summary of IDDE staff hours, 2009 through 2021. O&M hours are only shown between 2017 and 2021 as Lucity data was only reviewed for the last 5 years.

A summary of the staff hours to respond to calls and follow up with enforcement is shown in Figure 10. As shown in Figure 10, as water quality calls have increased, the staff time for response and follow-up has also increased.

A typical water quality complaint call in 2021 required the following activities:

Storm Crew:

- First response to assess situation
- Source tracing
- Clean-up

Engineering staff:

- Follow-up with construction inspectors and first responders
- Water quality sampling and results tracking
- Cost recovery activities

Figure 11 shows a summary of the full-time equivalent engineering and Storm Crew (FTE) required to respond to spills and conduct code enforcement in the IDDE program between 2009 and 2021. Approximately .15 FTE (2021 work plan estimate) is also needed for education and outreach that is not captured in Figure 11.

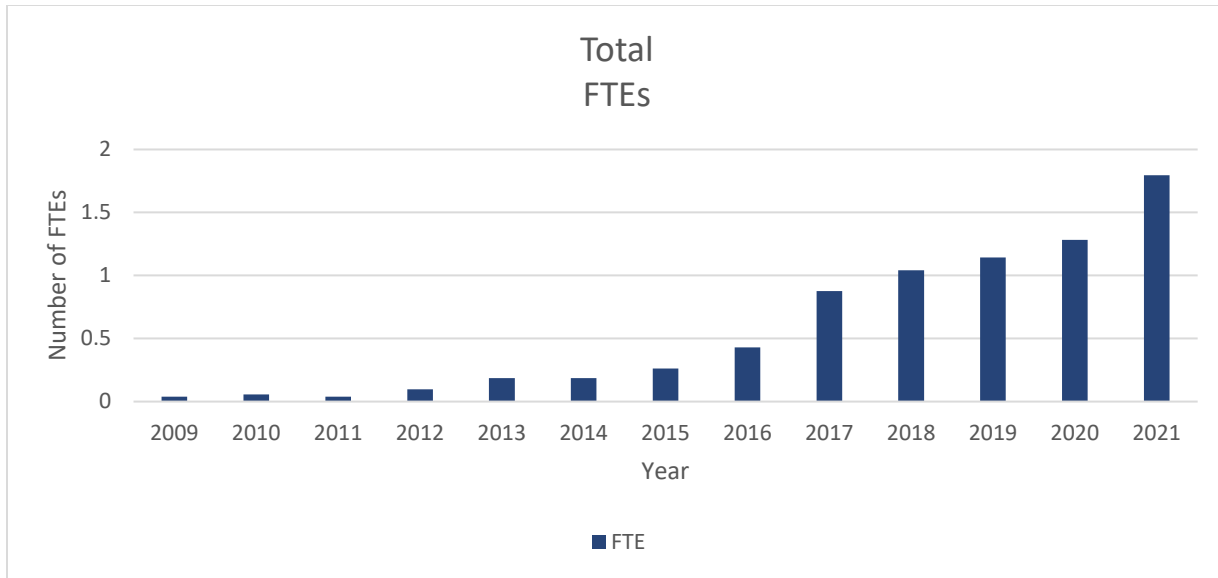


Figure 11. Summary of FTEs (Engineering and O&M) for IDDE spill response and code enforcement, 2009 through 2021

In 2016, the City started to focus on enforcement and cost recovery for water quality violations to deter repeat violators, resulting in the need for additional staff time. Approximately 12% of all water quality calls result in enforcement or cost recovery. Figure 12 shows the outcome of enforcement calls in terms of fines and/or cost recovery between 2016 and 2021.

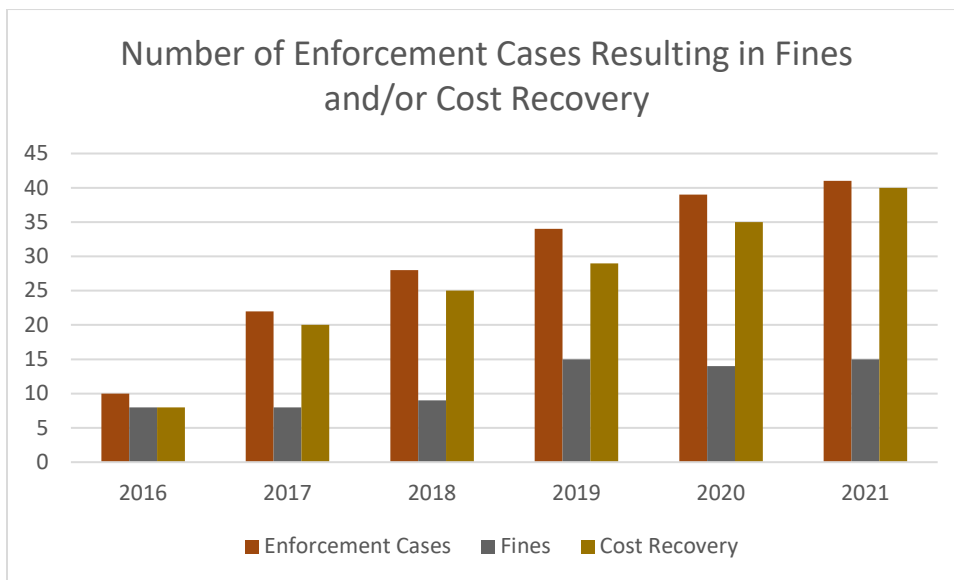


Figure 12. Summary of water quality calls that resulted in enforcement and fines or cost recovery between 2016 and 2021

### 5.1.2 IDDE Staffing Projections

Water quality complaints and the spill response program will continue to grow, based on an analysis of previous records. Assuming a conservative increase of 15% program growth per year, additional staff will be needed in the next few years to keep up with the need.

Figure 13 shows anticipated FTEs needed, assuming the spill response program continues with the same approach (Engineering, Education and Outreach, and Storm Crew) at a continued increase of 15% more calls per year with the same average time to respond per call.

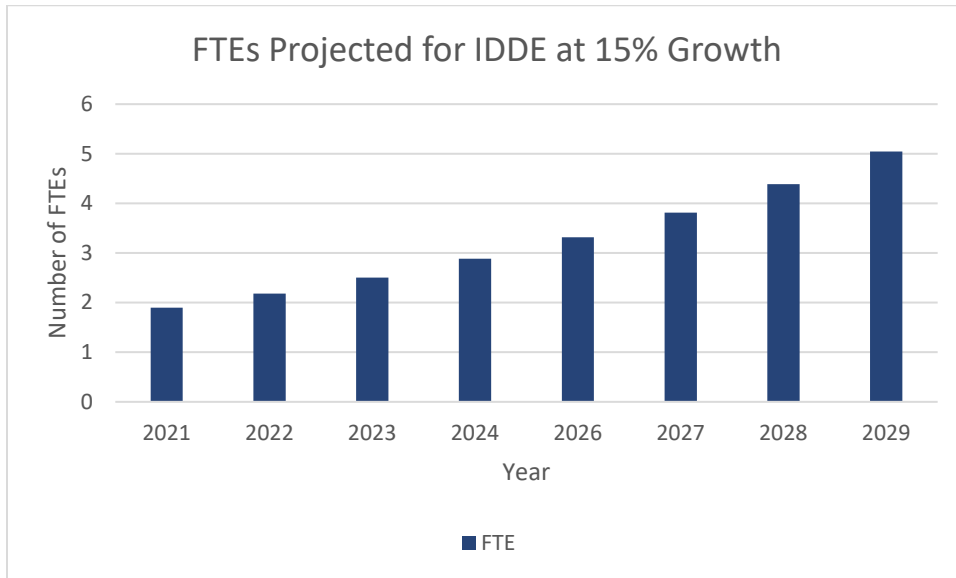


Figure 13. Projected total number of FTEs needed to support IDDE program assuming 15% program growth

Figure 14 shows the projected allocation for engineering staff versus Storm Crew if the current approach for spill response continues to be used.

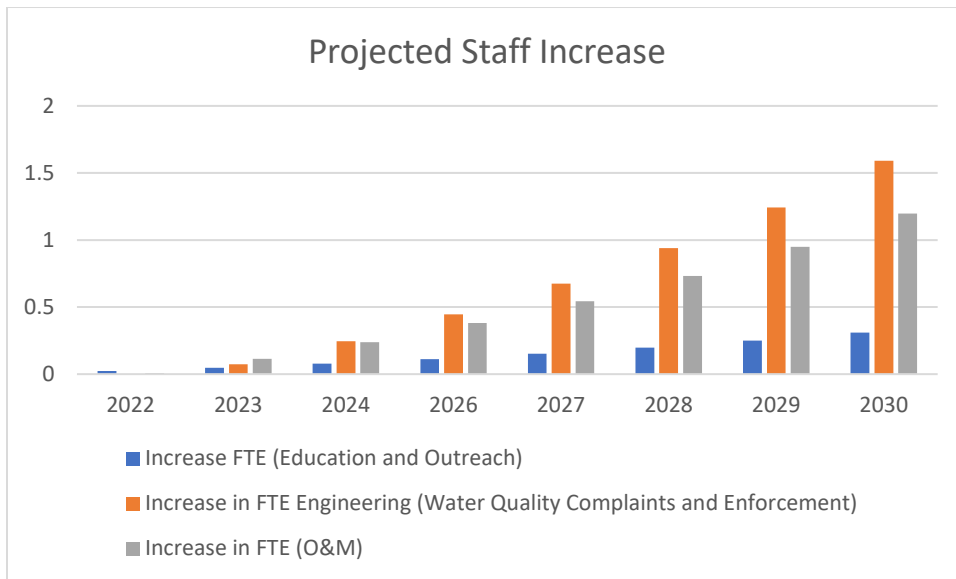


Figure 14. Projected allocation of IDDE hours for Engineering (including enforcement), O&M, and Education and Outreach assuming 15% growth rate in program

Based on these projections, the Storm Crew will require an additional 0.5 FTE by 2027 and 1.2 FTE by 2030, Surface Water Engineering will require an additional 0.5 FTE by 2026 and 1.6 FTE by 2030, and Education and Outreach will require an additional 0.3 FTE by 2030 to address program growth. These



projections are in addition to the current need (recorded labor hours indicate that needs were under-projected in 2014 and are requiring greater staff time than was estimated). These projections were based off of the IDDE processes in place in 2021.

#### 5.1.3 IDDE Staffing and Equipment Challenges

Spill response is challenging to staff because the nature of the work is un-planned and the magnitude of the problems that staff respond to are unknown. There is not enough volume of work to have a dedicated crew for only spill response. This means staff are interrupted from other planned work activities when needed to provide clean-up or pollution prevention. When cleanup is needed, a vector truck may need to be called off from another job to clean out the stormwater system, interrupting workflow of the staff and equipment.

#### 5.1.4 Source Control Program

In addition to the baseline changes in the maturity of the City's Water Quality program with IDDE and Spill Response, the City will begin implementing a new Source Control program in order to comply with Section S5.C.8 Source Control Program for Existing Development of the NPDES Phase II Permit. This effort will take additional time to get up and running and continue to implement.

The City participates in the Washington State Department of Ecology's Pollution Prevention Assistance (PPA) program that funds business outreach and inspection for 375 businesses over an 18-month period. Some of these inspections may be credited toward compliance with permit requirements, depending on the type of business and inspection conducted. It is estimated that an additional 1440 hours (0.9 FTE) will be needed for the Source Control program long-term to conduct up to 180 site visits per year (20% of all qualifying businesses), assuming 8 hours per visit.

One expected outcome of the expanding Source Control program is more water quality issues and spills that require action on the part of the City for clean-up, follow-up education and outreach, and potentially enforcement. Assuming that 10% of all visits result in additional action by IDDE staff, this would result in 12 additional calls per year, and a fractional increase in workload for Storm Crew, Engineering, and Education and Outreach staff.

#### 5.1.5 Private Facility Inspection

Private stormwater facility inventory trends are useful to project future staffing needs associated with facility inspection, education and outreach, and code enforcement. These are activities that the Surface Water Engineering Division does to ensure that private stormwater infrastructure functions in a way that is complementary of the public system and does not negatively impact public investments or the environment. In 2021, approximately 14,000 cubic feet of sediment was removed through the private drainage inspection program. The City's NPDES Phase II Permit requires annual inspections of all stormwater treatment and flow control BMPs and facilities that discharge to the storm system.

Table 6 shows the changes in the private stormwater facility inventory between 2016 and 2020.

Table 6. Summary of Private Stormwater Facilities (2016 --2020)

Asset	Units	Average increase per year (2016 – 2020), except where noted	Total Change between 2016 and 2020
		Private	Private
Dry wells and infiltration tanks <sup>1</sup>	Facilities	87	261
Stormfilter facilities, including modular wetlands, etc.	Facilities	31	126
Ponds <sup>2</sup>	Facilities	-9	-38
Rain Gardens and Filterrras	Facilities	26	104
Permeable Pavement <sup>1</sup>	Facilities	80	240
Vaults and Tanks	Facilities	47	189
Pipes	Miles	9	36
CBs and MHs	Structures	588	2355

<sup>1</sup>Number for these assets are for years 2017 – 2020.

<sup>2</sup>The reduction in pond asset is because several stormwater ponds were re-classified as swales and rain gardens between 2016 and 2020.

The number of private stormwater infrastructure facilities have increased over time, impacting Surface Water Utility staff needed to inspect the facilities and follow-up to ensure that they are maintained appropriately. Excluding pipes and ditches, an average of 850 new facilities per year came on-line between 2016 and 2020. This represents a significant workload for Surface Water Engineering inspection staff, even with staff discretion and ability to reduce inspection frequency based on previous results.

#### 5.1.5 Stormwater Retrofit and Structural Stormwater Controls

The City has been at the forefront of watershed and retrofit planning for several years and has identified structural stormwater projects that are in various stages of concept, design, construction, and implementation. Some of the projects already constructed may be grandfathered into a structural stormwater control program that may be part of the next Phase II NPDES Permit Cycle. Additionally, Ecology’s recent requirement for a Stormwater Management Action Plan (SMAP), and potential future permit requirements for additional SMAPs and on-going implementation, may lead to required retrofit planning and implementation. The City is well-positioned for these requirements, particularly with experienced staff such as the Senior Strategic Stormwater Advisor that can navigate easily through Permit and Grant requirements.

The City will likely need to continue its current strategy of retrofit planning.

#### 5.1.6 Education and Stewardship

In addition to Utility objectives for public education and outreach, the Phase II NPDES Permit has multiple education and outreach and public engagement requirements. These are achieved through the Education and Outreach staff within Surface Water Engineering. The trend for public engagement and outreach on all projects, large and small, is increasing and getting more complex as there is additional emphasis on engagement with traditionally underserved communities. The program is now able to provide better on-going consistency and confidence through the transition of 1 temporary staff position to 2 full time staff positions.

# Attachment A- Evaluation of O&M Lucity Data

## A.1 Evaluation of O&M Lucity Data

To understand the extent of the staffing issues faced by the operations crew, an analysis was conducted on the overall labor hours per year based on Lucity data between 2017 and 2021. Lucity data was also evaluated for Streets and Grounds crews for the surface water tasks that they charge time. Streets and grounds crews are not dedicated entirely to Surface Water, so only surface water tasks for that division were evaluated and is presented with the Storm Crew data in graphs and tables below in the appropriate categories. Figure A-1 shows the fluctuation each year that could be because of staffing differences. Figure A-2 shows total labor hours with overhead costs (e.g., vacation, sick leave, etc.) removed. The covid pandemic in 2020 and 2021 affected the overhead costs relative to total labor.

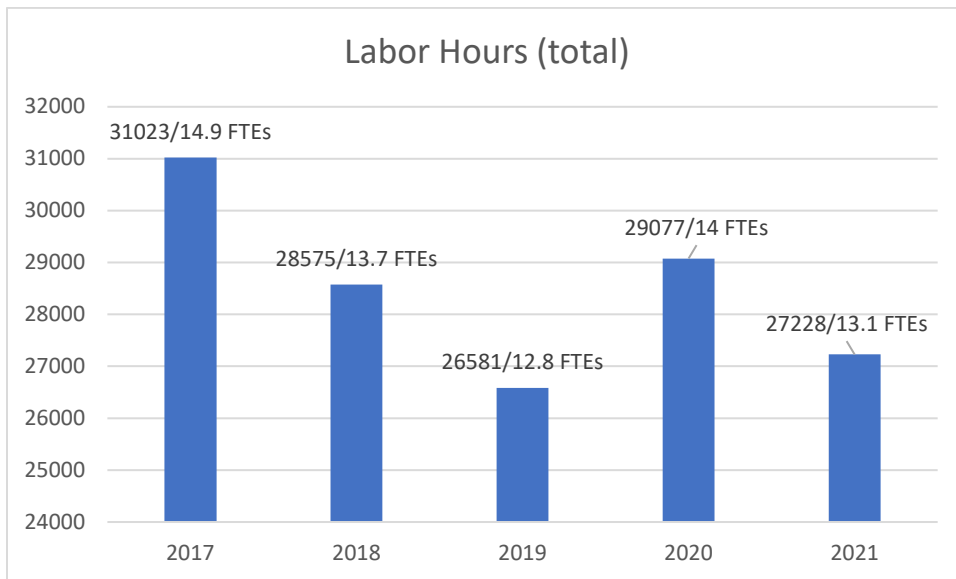


Figure A- 1. Total labor hours/FTEs (O&M Staff)

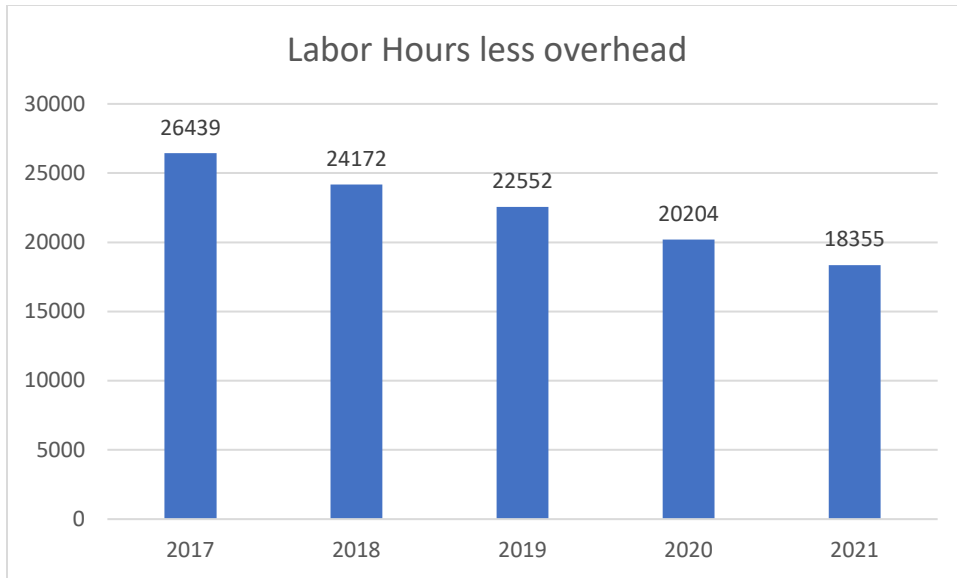


Figure A- 2. Labor hours (O&M) with overhead (1000 numbers) removed.

Table A-1 shows overhead labor categories removed from total labor hours in Figure 3.

Table A- 1. O&M overhead labor hour summary detail (2017- 2021)

Overhead Category (Labor Code)	Labor Hours				
	2017	2018	2019	2020	2021
Vacation (1000)	1,424	1,608	1,254	1,094	1,462
Sick Leave (1001)	1,257	1,205	1,100	963	1284
Floating Holiday (1002)	144	112	80	104	112
Comp Time Used (1003)	265	175	164	480	471
Holiday (1004)	1,384	1,288	1,256	1288	1,344
Jury Duty (1005)		16			
Bereavement (1006)	56			104	56
Leave without Pay (1007)	49		119	169	88
Leave without Pay unprotected (1007-u)					261
Wellness Hours (1011)	4		12		19
Comp Time Payout (1012)			43	89	119
Shared Leave (1013)					31
Pandemic Leave (1014)				586	45
Ready Pay (1015)				3,691	
All- Emergency Paid (1016)				24	
All-Paid Family & Medical Leave (1019)				184	1,176
<b>Total</b>	<b>4,584</b>	<b>4,404</b>	<b>4,029</b>	<b>8,873</b>	<b>6,461</b>

Table A-2 shows the administrative category of hours associated with Storm Crew that were not included in the analysis of specific work tasks in the figures and tables below.

Table A- 2. Summary of administrative hours (2017- 2021)

Administrative Category (Labor Code)	Labor Hours				
	2017	2018	2019	2020	2021
General service requests (101)	36				
Training (102)	695	561	737	37	363
Meetings (103)	707	559	671	394	613
Union Meeting (104)	6				
CDL/Test (105)	521	184	196	355	176
Equipment Maintenance/Cleaning (107)	400	237	395	252	321
Equipment downtime (108)	182	130	231	82	75
Maintenance Shop (111)	61	179	101	138	57
Inventory (114)	16	12	5	10	62
Flail Mowing (129)				230	16
Work for Others- CIP (185)	3				
Work for Others-Signs (187)	7				
Work for Others- Streets/Grounds (189)	273				
Work for Others-Water (190)	3.5				
Work for Others- Sewer (191)	7				
Work for Others- Engineering (193)	18				
Work for Others-Parks (195)	5				11
Work for Others-Police (198)					8
Work for Others-Private (199)			9		
<b>Total</b>	<b>2,939</b>	<b>1,861</b>	<b>2,344</b>	<b>1,496</b>	<b>1,701</b>

Administrative hours associated with Storm Crew, including equipment maintenance and cleaning, inventory, training, meetings, and CDL licensing are shown in Figure A-4 in blue. The portion of the

administrative hours for training and CDL licensing are shown in orange. This comparison could give a general idea of when newer staff joined the crew, requiring training and CDL licensing.

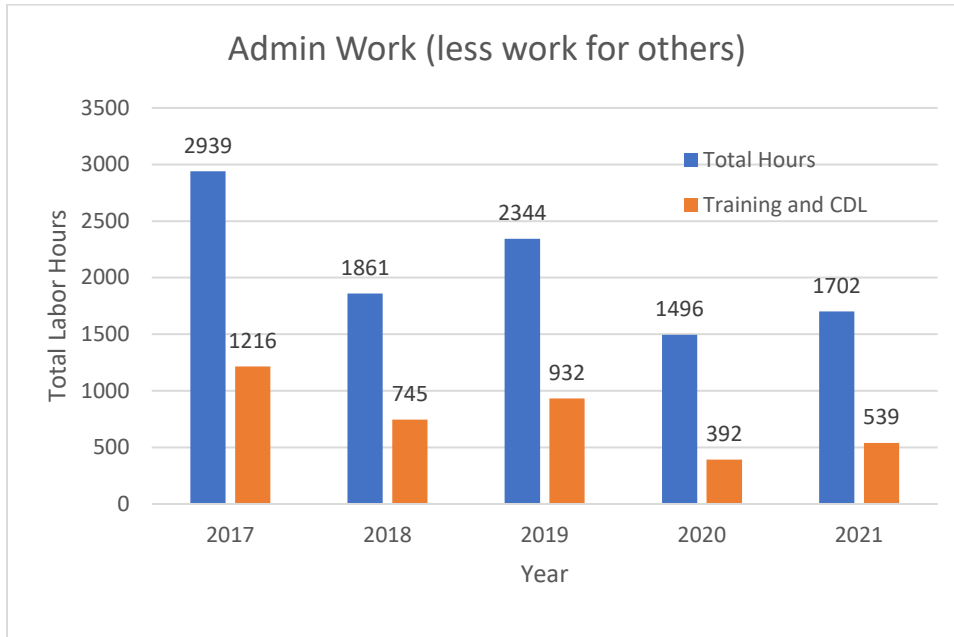


Figure A- 3. Administrative hours (O&M)

In 2014, because of the annexation, Storm Crew identified hours needed to conduct certain types of work to determine additional staffing and/or equipment needs. As a result of the analysis, a service package was approved in the 2015- 2016 budget for 5.5 FTEs to accomplish necessary Storm Crew tasks associated with ditch maintenance, closed-circuit television (CCTV) inspection of stormwater pipes, and National Pollutant Discharge Elimination System field inspection. The staff increase in 2015 for Storm Crew has been the only staffing increase in this division since 2015. Currently, there are 3.5 vacant FTE positions resulting in the crew operating at only slightly over 2014 staffing levels (plus 2 FTEs).

The 2014 labor hour estimate are shown as a comparison to actual hours spent on the tasks for the years 2017 through 2021 to illustrate how the workload has changed (i.e., flood response and spill response), and distribution of work changes with the staff available to do the tasks. Figures A-5 through A-9 show comparisons for cleaning, inspection, flood response, repair and maintenance, and spill response. Tables A-3 through A-7 show details of labor codes and hours for the same categories of work for years 2017 through 2021.

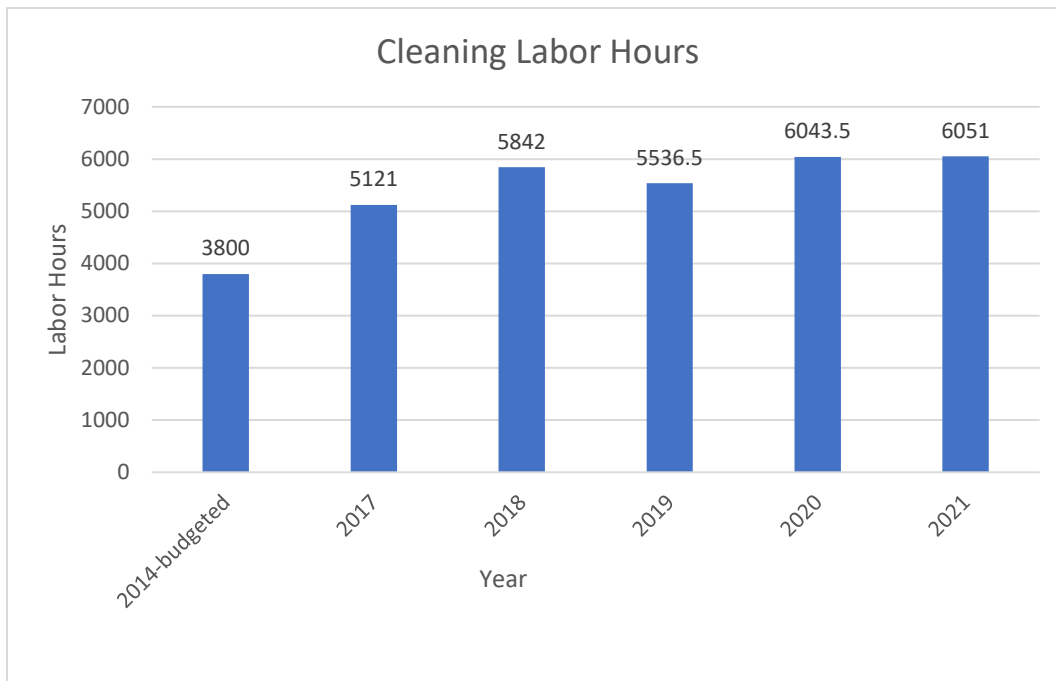


Figure A- 4. Comparison of labor hours for cleaning (O&M), 2017 - 2021

Table A- 3. Summary detail of cleaning labor hours (O&M) and labor codes, 2017 - 2021

O&M Cleaning (Labor Code)	Labor Hours				
	2017	2018	2019	2020	2021
SW CLEANING LAYOUT (705)	531.5	389.5	420.5	681.5	663.5
MH SEDIMENT INSPECTION (709)	11	33	0	0	0
MANHOLE CLEANING (710)	312	391	234	125.5	288.5
CATCH BASIN CLEANING -EDUCTOR (712)	1003	1613.5	1073.5	617	575.5
PIPE CLEANING (714)	1050	1297	1633	2260	2433.5
CATCH BASIN CLEANING -HAND (720)	184.5	43.5	53	33	118
CB/MH SEDIMENT INSPECTION (728)	1160	858	996	905.5	855
CULVERT ROOTS (734)	515	1032.5	777.5	1098	1038
ST SYSTEM INVEST - CLEAN (762-C)	354	184	323	323	79
<b>Total</b>	<b>5,121</b>	<b>5,842</b>	<b>5,536.5</b>	<b>6,043.5</b>	<b>6,051</b>



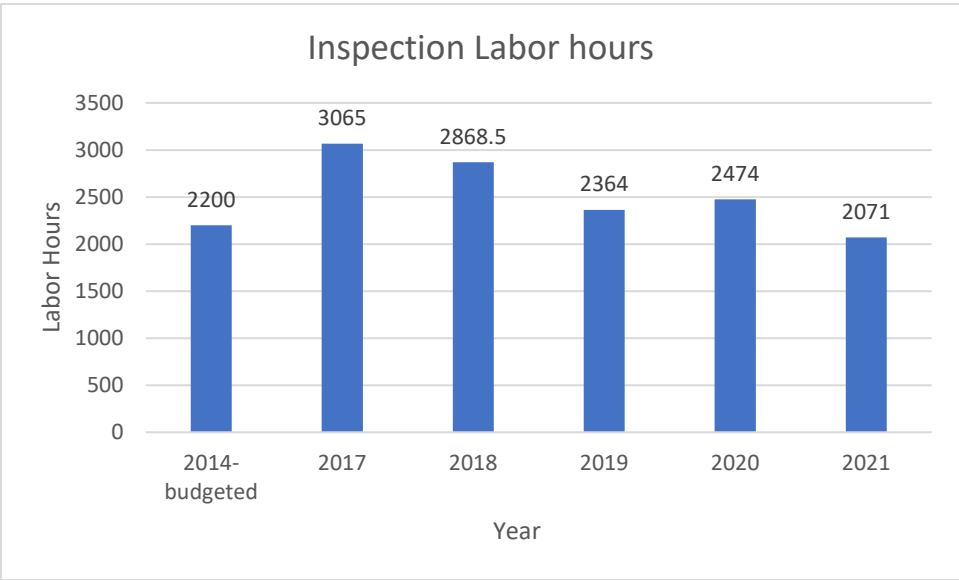


Figure A- 5. Comparison of labor hours for inspection (O&M), 2017 through 2021

Table A- 4. Summary of inspection labor hour detail (O&M) and labor codes, 2017 - 2021

O&M Inspection (Labor Code)	Labor Hours				
	2017	2018	2019	2020	2021
STORM VIDEO INSPECTION (716)	2754	2670.5	2286	2407	1945.5
STORM VIDEO REPAIR (718)	150	29	78	67	118.5
UNDERGROUND FACILITY INSP (759)	161	169	0	0	7
<b>Total</b>	<b>3,065</b>	<b>2,868.5</b>	<b>2,364</b>	<b>2,474</b>	<b>2,071</b>

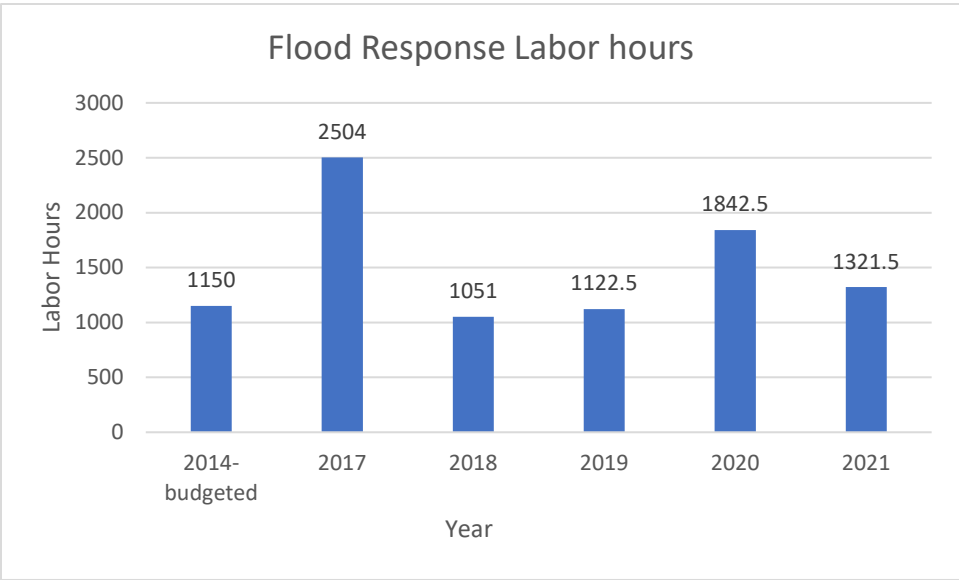


Figure A- 6. Comparison of labor hours for flood response (O&M), 2017 through 2021

Table A- 5. Summary of flood response labor hours (O&M) and labor codes, 2017- 2021

O&M Flood Response (Labor Code)	Labor Hours				
	2017	2018	2019	2020	2021
CULVERT CLEANING - HAND (730)	3	1	45.5	67.5	16
CREEK & CULVERT LIST (760)	2501	1050	1077	1775	1305.5
<b>Total</b>	<b>2,504</b>	<b>1,051</b>	<b>1,122.5</b>	<b>1,842.5</b>	<b>1,321.5</b>

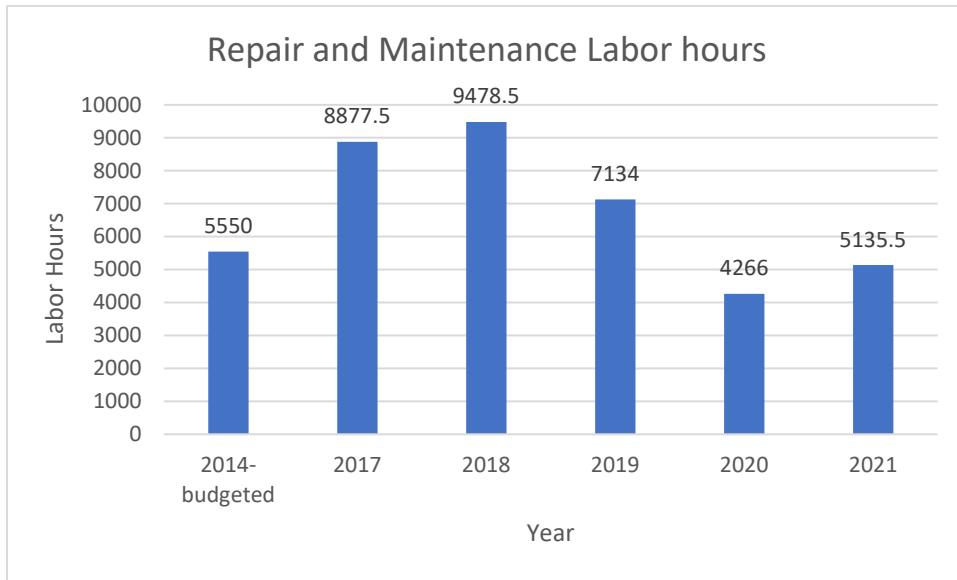


Figure A- 7. Comparison of repair and maintenance labor hours (O&M), 2017 through 2021

Table A- 6. Summary of repair and maintenance labor hours (O&M) and labor codes, 2017 - 2021

O&M Repair and Maintenance (Labor Code)	Labor Hours				
	2017	2018	2019	2020	2021
CATCH BASIN REHAB (722)	3970.5	3871.5	1742	1277	1247
CATCH BASIN R&R (724)	518	416.5	467	84.5	326.5
CATCH BASIN LID R&R (726)	48	83	34.5	55.5	20
CULVERT R&R (732)	1863.5	2729.5	2679	1258	1639.5
MANHOLE -REHAB (742)	494	479.5	356.5	407.5	377.5
NEW MANHOLE INSTALL (790)	43.5	0	0	0	1
NEW CATCH BASIN INSTALL (792)	519.5	181.5	323	74.5	175
NEW PIPE INSTALL (794)	482.5	185	156.5	163	388
SW REHAB LAYOUT (705-R)	275.5	799.5	828.5	742	580.5
ST SYSTEM INVEST - MAPPING (762-M)	346.5	416	285.5	87.5	363.5
ST SYSTEM INVEST - REHAB (762-R)	316	316.5	261.5	116.5	17
<b>Total</b>	<b>8,877.5</b>	<b>9,478.5</b>	<b>7,134</b>	<b>4,266</b>	<b>5,135.5</b>

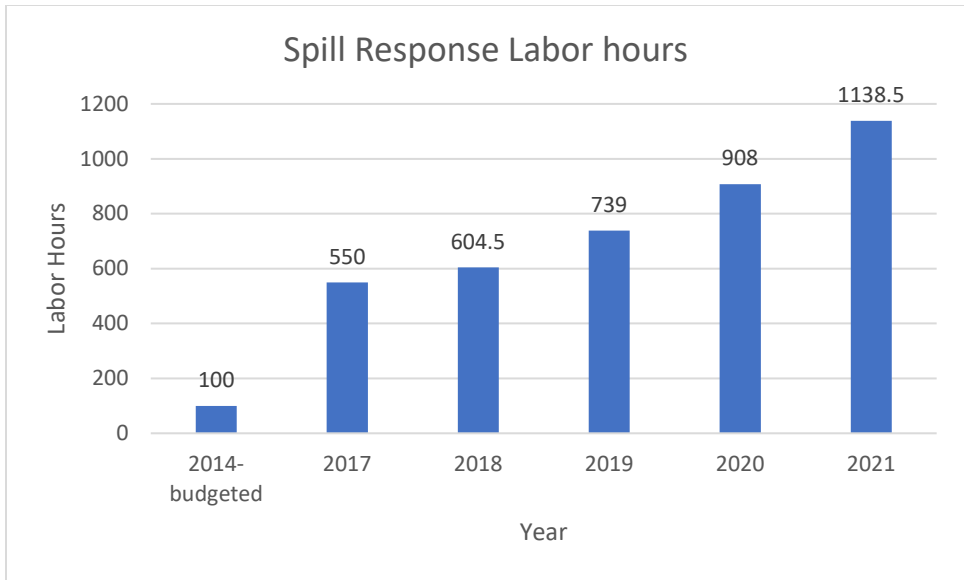


Figure A- 8. Comparison of labor hours for spill response (O&M), 2017 through 2021

Table A- 7. Summary of spill response labor hours (O&M) and labor code, 2017 - 2021

O&M Spill Response (Labor Code)	Labor Hours				
	2017	2018	2019	2020	2021
SPILL RESPONSE (781)	550	604.5	739	908	1138.5
<b>Total</b>	<b>550</b>	<b>604.5</b>	<b>739</b>	<b>908</b>	<b>1,138.5</b>

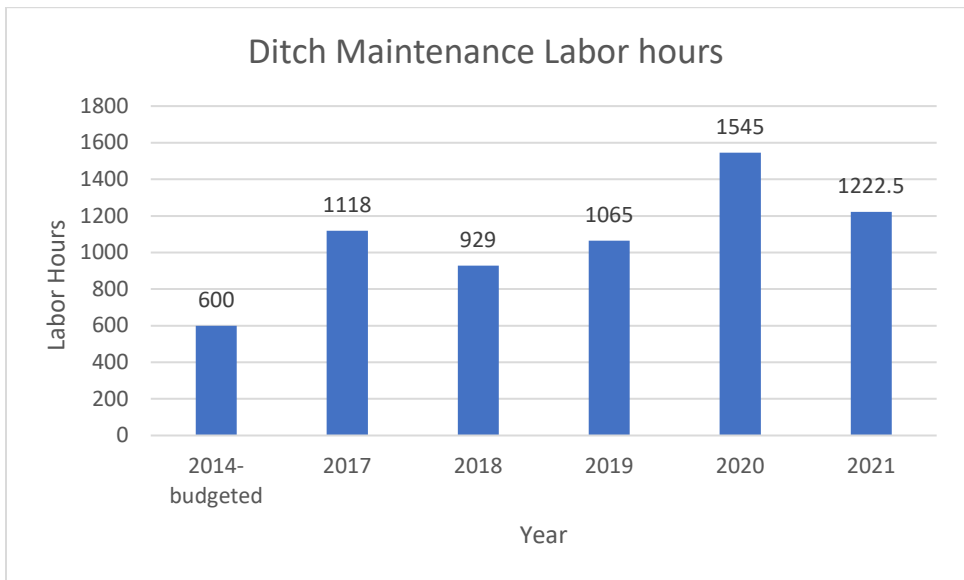


Figure A- 9. Comparison of ditch maintenance labor hours (O&M), 2017 through 2021

Table A- 8. Summary of ditch maintenance labor hours (O&M) and labor codes, 2017 - 2021

O&M Ditch Maintenance (Labor Code)	Labor Hours				
	2017	2018	2019	2020	2021
DITCH CLEAN -HOE (770)	337	409	353.5	811.5	825.5
DITCH CLEAN -HAND (772)	385.5	186	286.5	362.5	209.5
BEAVER DAM MANAGEMENT (773)	0	69.5	131	13.5	8
DITCH/STREAM BANK PROTECTION (774)	53	12	0	0	0
DITCH INSPECTIONS (775)	275.5	176	275.5	260	176.5
LARGE WOODY MATERIAL MOVED (776)	0	0	3	41	0
ST SYSTEM INVEST - DITCH (762-D)	67	76.5	15.5	56.5	3
<b>Total</b>	<b>1,118</b>	<b>929</b>	<b>1,065</b>	<b>1,545</b>	<b>1,222.5</b>

As described above, streets and grounds conduct some work activities that overlap with work conducted by the Surface Water Storm Crews. One of those activities is detention pond maintenance. Figure A-11 shows a comparison summary and breakdown of labor hours between O&M and grounds crews on detention pond maintenance between 2018 and 2021.

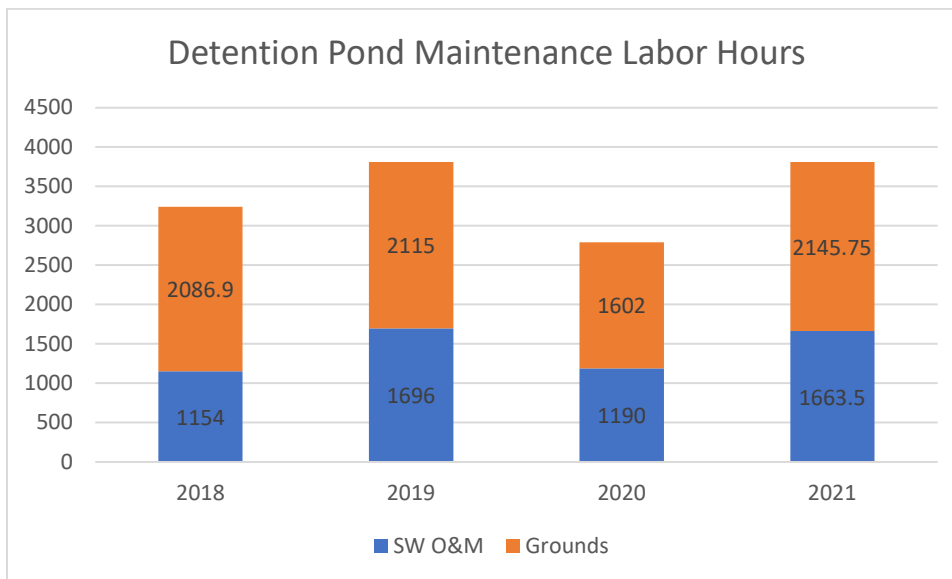


Figure A- 10. Comparison of labor hours for detention pond maintenance (O&M and Grounds), 2018 through 2021

In addition to detention pond maintenance, the streets and grounds crew also conducts other activities that are funded by Surface Water, including the following:

- Street repair, including hotpatch, patch sealing, and saw cutting for stormwater infrastructure maintenance and repair activities.
- Street cleaning (75% of street cleaning is charged to the Surface Water Fund)
- Yard maintenance (28% of yard maintenance within Public Works is charged to Surface Water)
- Locating (15% of utility locate activities in Public Works is charged to Surface Water)
- Roadway and shoulder, roadside maintenance, and sidewalk maintenance (5% is charged to Surface Water)

Figure A-12 shows a comparison summary of labor hours spent on these activities between 2018 and 2021.

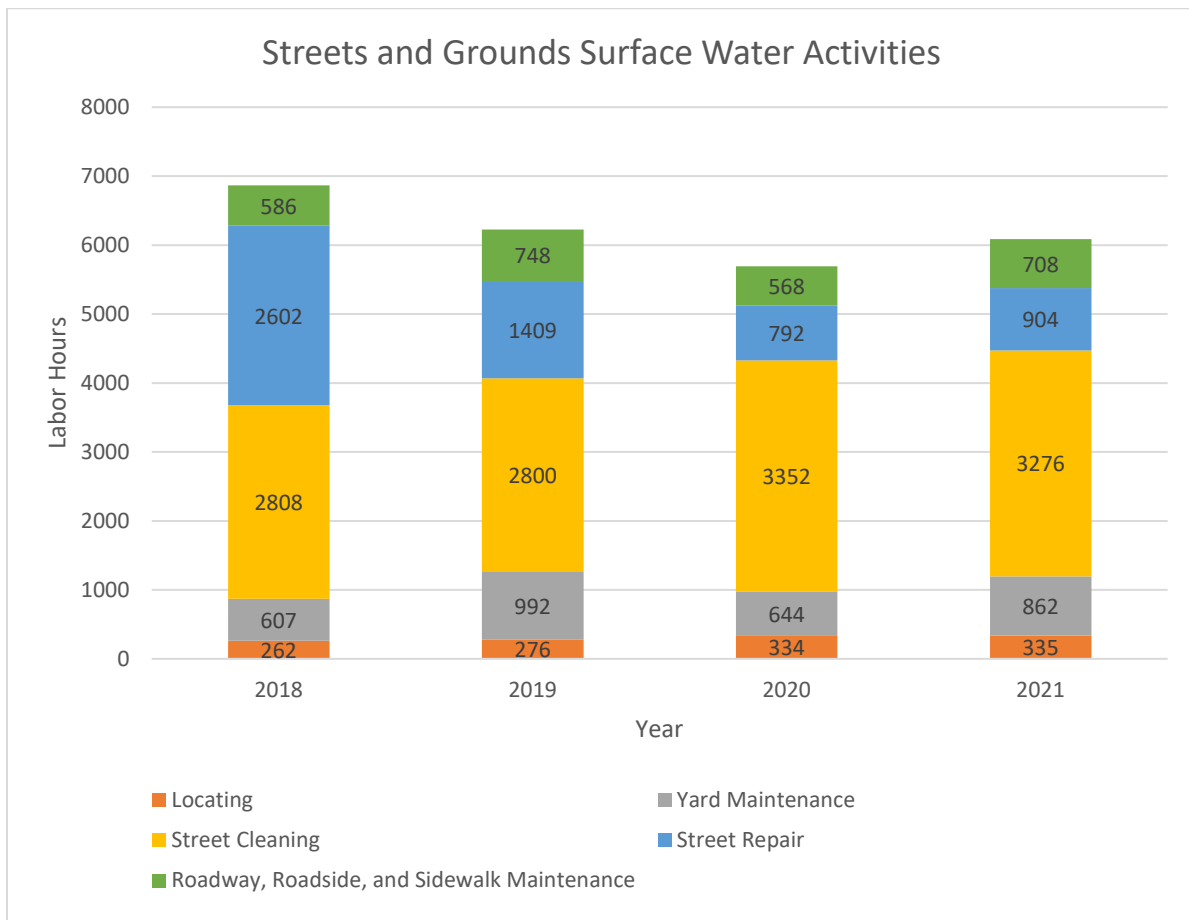


Figure A- 11. Comparison of streets and grounds labor hours for surface water activities, except detention pond maintenance.

## Attachment B- Summary of Surface Water Engineering Division 2021 Work Plan

Table B-1 provides details of the Surface Water Engineering Division’s 2021 Work Plan that illustrates on-going work program needs.

Table B- 1. Summary of Surface Water Engineering 2021 Work Plan Detail

Surface Water Engineering Work Category	Permit Required?	On-going?	Estimated Level of Effort (FTEs)
<b>Development Review</b>			<b>1.3</b>
Customer Inquiries		Yes	
Pipe Capacity Analysis		Yes	
Private Development Review	Yes	Yes	
NGRA Program Management and Site Monitoring	Yes	Yes	
Private Development Administration	Yes	Yes	
Update Pre-Approved Plans and Policies	Yes	Yes	
Design Manual and NPDES Training and Review Tools	Yes	Yes	
Fee-in-Lieu Evaluation			
Storm Drain Marking		Yes	
Feasibility study associated with Design Manual Update		2022	
<b>CIP Support/Intergovernmental Review</b>			<b>0.8</b>
Review for compliance with standards	Yes	Yes	
Design assistance/value engineering		Yes	
Alternatives analysis		Yes	
Environmental permitting assistance and coordination	Yes	As needed	
Advance mitigation planning		Project-based	
Surface Water Master Plan/CIP Integration Coordination		2022	
<b>Maintenance Division Support</b>			<b>0.8</b>
Environmental Permitting Assistance and Coordination	Yes	Yes	

Surface Water Engineering Work Category	Permit Required?	On-going?	Estimated Level of Effort (FTEs)
Critical Infrastructure ID/Prioritization/Aging and Failing		Yes	
NPDES Annual Facilities List	Yes	Yes	
Assistance with BMP implementation in streams/wetlands	Yes	Yes	
Assistance with BMP implementation - In non-critical areas such as row		Yes	
City Facility SWPPP Coordination	Yes	Yes	
Bond/Off Bond public/private		Yes	
Engineering Support		Yes	
LID Maintenance Support	Yes	Yes	
NPDES requirements - coordination and assistance	Yes	Yes	
Education and Stewardship			1.6
Tree Rebates and Yard Smart Rain Rewards		2022	
Streamside property owner outreach		Yes	
Spill Hotline Outreach	Yes	Yes	
Toxics Use and Storage	Yes	Yes	
Flooding/fall leaves		Yes	
STORM Steering Committee	Yes	Yes	
Stream Restoration/Volunteer Stewardship (storm drain markings)	Yes	Yes	
LID/Rain Garden Outreach (signs, maintenance materials)	Yes	Yes	
School and Community Outreach - Nature Vision & special events	Yes	Yes	
Neighborhood Association Meetings		Yes	
Natural Yard Care	Yes	Yes	
Vehicle Maintenance	Yes	Yes	
Pet Waste	Yes	Yes	
Blog/Newsletter/email newsletters	Yes	Yes	
Outreach Associated with Retrofit Planning		Yes	



Surface Water Engineering Work Category	Permit Required?	On-going?	Estimated Level of Effort (FTEs)
Dumpster Management Behavior Change Campaign	Yes	Yes	
Ecology Spill Shed Grant		2022	
Paint Disposal Outreach			
Business outreach program and materials - new permit requirements for business source control visits	Yes	Yes	
IDDE, Water Quality Complaints & Source Control			1.3
Water Quality Complaint Response	Yes	Yes	
Spill Response Field Work and Coordination/Procedures	Yes	Yes	
Coordination of illicit discharge screening	Yes	Yes	
Code Enforcement	Yes	Yes	
Ecology Local Source Control Contract		Yes	
Source Control per 19-24 NPDES Permit	Yes	Beginning	
Coordination of NPDES Permit schema and requirements into Energov/Lucity	Yes	Yes	
NPDES Training - spill identification and response	Yes	Yes	
Private System Inspection and Drainage Complaints			1.2
LID notification process	Yes	Yes	
Private system inspection process	Yes	Yes	
LID Inspection process	Yes	Yes	
Drainage Complaint Research Process and Mapping		Yes	
Drainage Complaints		Yes	
Watershed and Retrofit Planning			0.7
Policy/Permit discussions re. Retrofit Planning		Yes	
Retrofit planning in support of CIP mitigation		On-hold	
Juanita (High Woodlands and Cedar Creek Subbasins) Retrofit Planning		2022	
Chemical, Physical and Biological Monitoring			1.0
Tree Fencing Inspection		Yes	

Surface Water Engineering Work Category	Permit Required?	On-going?	Estimated Level of Effort (FTEs)
BIBI		Yes	
Tracking of water quality listings (303(d) and data (pro-actively avoid TMDL)		Yes	
Water Level Monitoring - Totem and Forbes Lakes		Yes	
Juanita Creek Bacteria Tracing		Yes	
Volunteer WQ Monitoring - Forbes Lake and Water Watchers		Yes	
Stream and Storm System Flow Monitoring		Yes	
Integrated Pest Management		Yes	
Property Acquisition Policy and Priority Areas		2023	
Coordination of Streamside Restoration Maintenance (coordination with GKP)		Yes	
Noxious Weeds and Invasive Plants		Yes	
Climate Change Response and Evaluation		Yes	
City Specific WQ Monitoring		Yes	
Stream Habitat and Fish Monitoring		Yes	
<b>Regulatory Compliance</b>			<b>0.7</b>
NPDES Annual Report	Yes	Yes	
NPDES SW Program Plan	Yes	Yes	
LID Code Reviewing and Reporting	Yes	Yes	
NPDES Compliance Coordination	Yes	Yes	
Administer NPDES Capacity Grant	Yes	2021	
ESA compliance and WRIA 8 participation	Yes	Yes	
Internal Audit		2021	
Participation in Re-issuance, ROADMAP and NPDES Coordinators, SIDIR SAM Groups		Yes	
<b>GIS Mapping and Analysis</b>			<b>0.5</b>
Field map storm systems	Yes	Yes	
Map areas of treatment for existing stormwater facilities		Yes	

Surface Water Engineering Work Category	Permit Required?	On-going?	Estimated Level of Effort (FTEs)
Map potential mitigation areas		Yes	
Mapping support for group/reporting/analysis		Yes	
Map LID facilities (public and private)	Yes	Yes	
Grant Writing and Strategic Planning			0.4
KC Flood District - grant admin and participation in basin advisory committees			
Green Team			
Tree Team/Urban Forestry Coordination		Yes	
Web Page Redesign and Updates		2021	
Grant Writing/Grant Development Strategy		Yes	
SW Billing			0.1
<b>Total</b>			<b>10.4</b>