



PRIORITY/ACTION TITLE: Expansion of Sewer Rehabilitation Work (2018-2023 Action Plan)

Branch/Division: DWW/System Management

Executive Sponsor: Andrew Lee/Rose Ann Lopez

Project Manage/Lead: Julie Crittenden/Caroline Barlow

Priority/Action Type:

- 2018-2023 Existing Action Plan with continued funding for 2021-2026
- 2018-2023 Existing Action Plan with increased funding for 2021-2026
- New Priority requiring new funding
- Priority with existing Funding

Summary of the Priority or Action Plan:

Original Summary of Project (2018). This action plan increased investment in the repair, rehabilitation and replacement of Seattle's aging sewer pipes, helping to prevent sewer overflows and meet regulatory requirements. The additional funding was used to complete more contractor-constructed full-dig replacement, open-cut spot repair, and full-pipe lining projects.

1. 2021-2026 Funding Recommendation

We recommend continuing, and increasing, our investment in sewer rehabilitation, based on the results of a capital investment analysis completed in 2019. The analysis modeled future system need given current pipe condition, pipe degradation, and rehabilitation funding and evaluated investment scenarios on their ability to mitigate the current backlog of pipes at high risk of failure and move towards more proactive renewal¹.

The recommendation is to:

- Gradually increase the program budget to \$32.1M by 2026 (and sustain funding of \$30-35 million from 2027 – 2040). This adds \$45M to the 2021-2026 year CIP budget, which represents a 33% increase over the baseline total of \$134.6M.
- Add staff to implement the increased work. This plan includes 3 positions in 2021 and 1 position in 2023. The positions will support pipe assessment work (DWW branch positions) and project delivery. A staffing analysis is available that provides data in support of this need.

This recommendation is summarized in the following table.

¹ For more information on that analysis, please see the Capital Investment Analysis Executive Summary, dated 1/21/2020. rev 01.27.20



Program Title	Expansion of Sewer Rehabilitation Work						
(\$ 000's)	2021	2022	2023	2024	2025	2026	Total
Baseline \$ O&M	0	0	0	0	0	0	0
Baseline \$ Capital	20,700	20,100	20,100	24,100	24,800	24,900	134,600
CIP \$ Increase	7,600	8,900	9,500	6,100	5,700	7,200	45,000
Total \$¹	28,300	29,000	29,600	30,200	30,500	32,100	179,600
FTEs Added/ Changed ²	3		1				

¹This is the proposed total Pipe Rehab capital budget, including the Lining Crew.

²These positions will be largely capital funded.

The rate impact of this proposal will be provided by Finance.

2. Alternatives Considered

Six scenarios were evaluated through the Capital Investment Analysis of the Pipe Rehabilitation Program. The scenarios changed the amount of funding available and the types of rehab used and compared how soon the backlog of high risk pipes (those needing renewal within 5 years) would be addressed and how soon proactive work could begin (pipes with more than 5 years until renewal is needed). Having a better balance of reactive and proactive work would allow SPU to reduce the risk of sewer overflows due to pipe failure and better leverage the work and needs of others (e.g., SDOT projects, capacity needs). The recommended scenario balanced the need for increased work with the ability to increase capital funding and in consideration of other capital portfolio needs.

3. Capacity plan to Deliver (Capital Only)

We will need to increase program staff to deliver more rehab projects. Our plan is to:

- Add 3 positions in 2021. The 2021 positions are for pipe assessment and contracting. The assessor positions assess pipe condition, identify rehabilitation work, develop work scopes, create work orders, assess backlog and identify/initiate new projects. This is the work that feeds the rehab project conveyor belt and will need to increase soon to support the increased spending that is coming. This staffing need was identified in the Capital Investment Analysis. A third position would be located in PDEB and support project contracting. An analysis of staff hours spent per project, when forecasted for future work in the 2021-2026 window, shows that this critical team will need one person to ensure rehab work can move through the bid process efficiently.
- Add 1 position in 2023 in project delivery. Our staffing analysis shows that project design and construction management will need additional resources to keep pace with the investment level. While our analysis shows needing more than 1 person, we are expecting that the on-call consultant or construction management contracts to be executed in 2020 will be able to assist with the work load.

In the past, we have had difficulty in delivering projects due to a shortage of project managers. Specifically, the project management group went through a staffing shortage in 2018-2019 that slowed down work. That has now been remedied and the project management staffing approach is working well.

4. Milestones/performance metrics

This program does not have any milestones due to the ongoing nature of the work. We do track and report on performance metrics.

Proposed metrics for the 2018-2023 SBP:

Targeted Commitments	Performance Metrics	Definition of Success
Reduce and eliminate backlog of high-risk pipes	Miles of pipe rehabilitated, total and by rehab method (lining, spot repair, full-dig replacement)	90% or higher achievement of annual goal
	Number of work orders completed by rehab method	90% or higher achievement of annual goal
	Dollars spent, total and by rehab method	90% or higher achievement of annual spending plan
	Number of pipes in the 1- and 5-year rehab windows	Reduce, then eliminate, pipes in 1-year rehab window Reduce # of pipes in 5-year rehab window
	Time needed to complete rehab projects, based on priority/risk	Shorter time to complete rehab projects

**Note: The narrative below was originally provided to the CRP on 12/6/2019 in the Action Item Update.*

Part 2. Targeted Commitments & Actuals (2018-19)

Our annual average work over 2018-2019 surpassed the goals for miles of pipe lined, pipe replaced and spot repairs by crews. 2018 was a high accomplishment year, while in 2019 we focused on design for 2020 construction projects. We expect to have a high accomplishment year again in 2020.

- **Pipe lining:** During 2018 two large lining contracts were in construction. For 2019, we completed one small lining project and but focused on the design for two large lining contracts that will be in construction in 2020.
- **Full-dig replacement:** Six pipes were replaced in 2018. Like pipe lining, 2019 work focused on design for six replacement projects to be constructed in 2020.
- **Spot repairs by contractor:** We did not meet the goal of 50 spot repairs by contractors in 2018 and 2019. This goal is rather high due to the complexity of the spot repairs we use contractors to complete and given that our typical number annually up to now has been 25. There was a large increase in the number of spot repairs in 2019 as we used our first Task Order Contract. The contract is based on unit pricing and does not identify sites in the bid document, but instead allows SPU to select spot repairs based on priority. This also provides us flexibility to address urgent needs. A downside of the Task Order Contract has been higher costs per site than with a traditional design-bid-build package.
- **Spot repairs by crew:** The crew's productivity increased substantially between 2013 and 2015. They continue to sustain a high level of accomplishment and exceed their goal.



Seattle Public Utilities

2018-2023 SBP Revised Action Plan Update

Metric	Annual Goal	Annual Average Completed	2018	2019 (as of 12/4)	2020 Projected
Miles of pipe lined	3	6.7	11.5	1.72	11.1
Feet of pipe replaced (full-dig replacement)	500	766	1,533	0 ^A	1,866
Spot repairs by contractor	50	27.5	11	44	25
Spot repairs by crews	160	205	208	203	160
Total miles	3.3	7	12	2	11.6

^A 2019 work focused on design for 6 full-dig replacement projects to be constructed in 2020.

Part 3. Financial Plan & Actuals for 2018-2019.

	2018	2018 Actuals	2019	2019 Actuals	2020	2021	2022	2023
O&M (Non- Labor) Budget								
Action Plan CIP Budget Add (included in totals below)	\$987,501		\$4.6M		\$2.8M	\$6.2M	\$6.2M	\$5.25M
Total Capital Budget – 2019 Adopted/Endorsed	\$23.0M	\$22.3M	\$24.1M ¹	\$22.1M	\$33.5M	\$20.8M	\$20M	\$20M

¹ Projections as of mid-November 2019

Have there been any significant changes in scope or assumptions since this action plan was approved in 2017? If so, please describe.

Several elements in the Pipe Rehab Program have changed since 2017 which include:

- Project schedules have been delayed by SDOT Right of Way permitting, especially projects that require a Traffic Control Plan in arterial streets from SDOT. SDOT has taken longer to review and issue permits because of the large amount of construction that is occurring in the city.
- Project initiation and progress was affected by the number of SPU project managers available. The project management group went through a staffing shortage in 2018-2019 that slowed down work. That has now been remedied.

Do we anticipate this investment continuing in the next strategic plan? Will funding and targets be above or below 2018-2023 levels? Why?

We anticipate sewer rehabilitation investment continuing in the next strategic plan. We see a need to increase funding based on the results of a recently completed investment analysis that modeled future system need given current pipe condition, pipe degradation, risk tolerance and rehabilitation funding. The analysis recommended increased funding to mitigate the current backlog of pipes at high-risk of failure (and/or the consequence of their failure is very high) and move towards a reinvestment strategy that more proactively plans for the renewal of gravity sewer pipes.



PRIORITY/ACTION TITLE: Wastewater Pump Stations, Force Mains, and CSO Outfall Rehabilitation

Branch/Division: DWW

Executive Sponsor: Andrew Lee/Rose Ann Lopez

Project Manage/Lead: Julie Crittenden/Caroline Barlow/Erich Fiedler

Priority/Action Type:

- 2018-2023 Existing Action Plan with continued funding for 2021-2026
- 2018-2023 Existing Action Plan with increased funding for 2021-2026
- New Priority requiring new funding
- Priority with existing Funding

Summary of the Priority or Action Plan:

This action plan update increases funding for the pump station, force main, rehabilitation capital programs and maintains current funding for the CSO Outfall Rehabilitation program 2021-2026.

SPU’s historically low investment in rehabilitation work has resulted in a significant number of facilities and pipes that are at risk of failure and need to be addressed. Facility evaluations indicate that the current investment level is not enough to support the long-term health and sustainability of the Pump Station and Force Mains in service. Under the current plan, we are likely to experience more facility failures or force main failures which lead to overflows, impacts to public health and safety, and risk SPU’s ability to meet regulatory requirements.

Original Summary of Project (2018).

This action plan increases funding for the pump station, force main, and CSO outfall capital programs 2018-2023.

Pump Station and Force Main Program: This program includes all capital spending to rehabilitate and replace assets at SPU’s 68 sewer pump stations and their associated force mains. Force mains are pipes that convey flow under pressure from the discharge side of a pump to the gravity system downstream.

Outfall Program: This program includes all capital spending to rehabilitate and replace SPU’s 86 CSO outfalls, which are the relief pipes where stormwater and sewage discharge to receiving waters during heavy rain.

1. 2021-2026 Funding Recommendation

What is the funding recommendation for this existing investment? Specify:

- Continue Program investments and increase funding.
- Impacts to rates will be presented to the CRP at a later time.



Program Title	Expansion of rehabilitation of pump stations, combined sewer outfalls						
Project name and number(s)	Formerly Action Plan #8 Pump Station, Force Main & CSO Outfall Capital Programs						
(\$M's)	2021	2022	2023	2024	2025	2026	Total
PUMP STATIONS AND FORCE MAINS							
O&M \$ Amount	-	-	-	-	-	-	-
Current Baseline Budget	3.00	3.00	3.00	3.00	3.00	3.00	18.00
Action Plan Increase (2018)	1.37	1.02	1.00	-	-	-	3.39
Action Plan Increase Request (2020)	2.78	6.16	3.37	4.24	4.39	5.60	26.54
Total Request	7.15	10.17	7.37	7.24	7.39	8.59	47.91
FTEs Added/Changed	-	-	-	-	-	-	-
CSO OUTFALLS							
O&M \$ Amount	-	-	-	-	-	-	-
Current Baseline Budget	0.50	0.50	0.50	0.50	0.50	0.50	3.00
Action Plan Increase (2018)	1.00	1.00	1.00	-	-	-	3.00
Action Plan Increase Request (2020)	-	-	-	1.00	1.00	1.00	3.00
Total Request	1.50	1.50	1.50	1.50	1.50	1.50	9.00
FTEs Added/Changed	-	-	-	-	-	-	-

2. Alternatives Considered

What alternatives were considered in addition to what is being recommended (if any)? How would these alternatives impact service levels?

- Each project proposed as part of the Sewer Pump Station and Force Main Program goes through an option analysis and collaborative scoping process to evaluate the appropriate project scope while “future proofing” the facilities to accommodate future capacity and operational needs. Generally, these projects are based on bringing the facilities up to code and replacing failing or substandard assets so that the facilities will perform effectively throughout an industry standard asset management lifecycle.
- Pump Station and Force Main Rehabilitation program work is prioritized based on risk and criticality. Lower priority work is not funded until high priority work is completed.
- Prioritization of and impacts to other programs and projects were not considered in the development of this SBP Initiative.



3. Capacity plan to Deliver (Capital Only)

What is your staffing plan for delivery? If there was difficulty in delivering in the past, what has changed?

- Utilize existing internal staff and supplement staff resource limitations through on-call consultant support.

4. Milestones/performance metrics

What are the short and long-term metrics for measuring progress? How will you measure whether the action has been successful? Note: measures may not be different than your original plan but milestones should be updated to reflect the 2026 time horizon.

Pump Stations and Force Mains

Targeted Commitments	Performance Metrics	Definition of Success
Reduce and eliminate backlog of high-risk degraded assets by 2040	Number of Pump Stations retrofitted	90% or higher achievement of annual goal
	Force Mains replaced	90% or higher achievement of annual goal
	Number of Air Lift type Pump Stations Replaced	90% or higher achievement of annual goal
	Number of non-rehabilitation critical repairs completed	90% or higher achievement of annual goal
	Program Dollars spent	90% or higher achievement of annual goal

CSO Outfalls

Targeted Commitments	Performance Metrics	Definition of Success
Reduce and eliminate increased risk of SSO's due to degraded outfalls	CSO Outfall Asset Management Plan	Complete in 2020-2021
	Number of CSO Outfall cleaned or rehabilitated	90% or higher achievement of annual goal
	Program Dollars spent	90% or higher achievement of annual goal



2018-2023 SBP Action Plan Update (Previously Presented)

Action Plan Title: Pump Station, Force Main & CSO Outfall Capital Programs (#8)

1. Short summary of the project/program

- **Part 1: Summary of Project.**

The action plan increased funding for the pump station, force main, and CSO outfall capital programs 2018-2023.

Pump Station and Force Main Program: This program includes all capital spending to rehabilitate and replace assets at SPU's 68 sewer pump stations and their associated force mains. Force mains are pipes that convey flow under pressure from the discharge side of a pump to the gravity system downstream.

Outfall Program: This program includes all capital spending to rehabilitate and replace SPU's 85 CSO outfalls, which are the relief pipes where stormwater and sewage discharge to receiving waters during heavy rain.

- **Part 2. Targeted Commitments & Actuals (2018-19).**

Pump Station and Force Main Program

Targeted commitments were identified for 2018-2023:

Essential improvements to 15 conventional pump stations (Ahead of Schedule)

- SPU will complete essential improvements at more than 15 stations by 2023
 - PS Ventilation Improvements: 25 pump stations, Completed 2019
 - Electrical Improvements: Disconnect installs at 23 pump stations, Completed 2019
 - PS 2 and 35 generator Replacements: Completed 2019
 - PS 9 Side Gate and Hatch Replacements: Completed 2019
 - PS 1 Pump and Valve Replacements: Completed 2019
 - PS 19 Drive and Pump Replacements: Completed 2019
 - PS 49 Pump Replacements: Completed 2019
 - PS 59 Pump Replacements: Completed 2019
 - PS 84 Pump and Valve Replacements: Completed 2019
 - PS 2,72,73: Full facility upgrade, PS 2 and 73 Completed 2019, PS 72 2020
 - PS 17, 20, 118 Improvements: Full facility upgrade, PS 17 and 118 in design, PS 20 in construction
 - PS 62,63,71,76 Improvements: Full facility upgrade, In design

Replacement of 5 airlift type pump stations that are old and high maintenance (On schedule for 2 stations by 2023)

- SPU will complete 2 airlift type pump station replacements by 2023 with available funding
 - Airlift PS 38 Conversion: Airlift PS replacement, In design
 - Airlift PS 56 Conversion: Airlift PS replacement, In design



- Cost per station is significantly above projections due to project complexity and public works construction bidding environment

Replacement of 4 force mains that are already more than 80 years old (On Schedule)

- SPU will complete 4 force main replacements by 2023
 - PS 43 Force Main Replacement: Completed 2019
 - PS 71: Replacement part of station rehabilitation project, In design
 - PS 38: Replacement part of station rehabilitation project, In design
 - PS 38: Replacement part of station rehabilitation project, In design
- 2 force mains will be replaced as part of the CSO Program
 - PS 13 and PS 22
- 3 force mains will be replaced as part of the SDOT Partnering Program
 - PS 62, 63, and 65: Part of SDOT RapidRide Roosevelt Project

Outfall Program

The action plan increase in funding was to complete 4 condition assessments and 4 outfall repairs/replacements by 2023. SPU completed the assessment of 18 CSO outfalls in 2019, replaced 4 outfalls as part of other CIP projects and is on track to clean or repair 4 outfalls by 2023.

• **Part 3. Financial Plan & Actuals for 2018-2019.**

		2018	2018 Actuals	2019	2019 Actuals	2020	2021	2022	2023
	O&M (Non-Labor) Budget								
Capital Budget PS and FM	Capital Budget	11,885,754	3,005,047 ⁽¹⁾	13,025,589	14,172,371	5,920,942	7,861,613	4,121,747	4,000,000
	Baseline Budget	9,452,754		7,036,347		3,440,151	6,491,613	3,101,747	3,000,000
	Action Plan Budget	2,433,000		5,989,242		2,480,791	1,370,000	1,020,000	1,000,000
Capital Budget Outfalls	Capital Budget	647,000	1,080,848	1,100,000	1,917,922	338,095 ⁽²⁾	1,509,149	1,500,000	1,500,000
	Baseline Budget	647,000		1,098,470			509,149	509,149	500,000
	Action Plan Budget			1,530		1,003,442 ⁽²⁾	1,000,000	1,000,000	1,000,000

(1) PS 43 Emergency Force Main Project (\$7.2 Mil) was delayed to 2019

(2) 2020 Outfall Action Plan Budget moved into the 2021,2022,2023 Budget to accommodate Outfall Action Plan development in 2020

2. Have there been any significant changes in scope or assumptions since this action plan was approved in 2017? If so, please describe.

Pump Station and Force Main Program

Scopes and assumptions are relatively consistent since the plan was approved. SPU has underspent relative to plan for several reasons; significant project risk events in large projects did not occur and project reserves allocated were not spent, project delays due to permitting/regulatory issues, staff resourcing limitations, and consultant contracting limitations. SPU is working to improve spending vs plan by changing practices around allocation/management of project reserves, improved project planning and resourcing integration, further developing internal staff project competencies, supporting more crew led pump station rehabilitation, and improving the availability/flexibility of consulting contracting resources.

Outfall Program

There have not been significant changes in scope since the action plan was approved. However, findings from the assessment conducted in 2019 have found that the number of outfalls that require cleaning or repairs is higher than anticipated.

3. **Do we anticipate this investment continuing in the next strategic plan? Will funding and targets be above or below 2018-2023 levels? Why?**

Pump Station and Force Main Program

This action plan will continue in the next strategic business plan. The current funding levels reflected in the 2018-2023 SBP have allowed SPU to make significant improvements to the pump station and force main assets. This funding level will allow for all non-airlift pump stations to be rehabilitated (replacing assets in kind) by 2040-2050. However, this funding level is not enough to replace airlifts on a desirable replacement rate. In addition, some larger more complex force main replacements will need additional funding in the later years (2023-2026). Therefore, we anticipate this action plan will be asked for increased funding in the next SBP update.

In addition to the 6-year CIP discussed in the SBP, SPU has performed long term investment projections for this asset class which shows we are making sustainable levels of investment to prevent a bow wave of deferred maintenance activities in the future.

Outfall Program

This action plan will continue in the next strategic business plans. Funding levels will need to increase for Outfalls in order to replace or repair 2 outfalls a year, which is anticipated to address deficient outfalls moving forward.