Attachment A

STORM SEWER SYSTEM ANNUAL REPORT
FY 2020-2021

Large Trash Capture Device Retrofit Project at Sonora

December 2021

City of San José
Storm Sewer System Annual Report
FY 2020-2021

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I HISTORY AND BACKGROUND

The City of San José drains into two main watershed/drainage basin areas: Coyote Creek and Guadalupe River. Within the tributary areas of these two watersheds, most of the City's storm sewer collection system benefits from the uniform topography of the Santa Clara Valley, allowing most of the water to be conveyed into the waterways using gravity lines with minimal use of pump stations.

The City's storm sewer network is a stormwater collection system that includes more than 1,100 miles of storm sewer pipelines, 35,500 storm sewer drain inlets, 31 pump stations, 1,712 storm sewer outfalls, and over 4,500 miles of curb and gutter. Various channels, culverts, ditches, detention, and debris basins make up the remainder of the system; as well as 32 large trash capture devices that support the City's compliance with the Municipal Regional Stormwater Permit (Stormwater Permit). The current 5-year Stormwater Permit that became effective January 1, 2016 was administratively extended and the next Stormwater Permit is anticipated to be reissued in July 2022. The Tentative Order, recently released in September 2021, proposed changes to the Stormwater Permit requirements that could affect many provisions related to new and redevelopments, trash load reduction, polychlorinated biphenyls (PCBs) controls, and green stormwater infrastructure implementation. The storm sewer system is currently designed to convey stormwater away from developed areas to local creeks and rivers, and ultimately, to San Francisco Bay. An estimated 67 percent of the City's storm sewer drainage system was constructed between 1950 and 1990. The incorporation of green stormwater infrastructure will allow urban stormwater runoff to be slowed, infiltrated, and/or treated prior to discharging into the City's local waterways.

The Santa Clara Valley Water District (Valley Water) constructed levees in north San Jose along Coyote Creek and the Guadalupe River to convey flood flows from upstream areas. These levees cause water levels in both waterways to rise to elevations higher than adjacent surface elevation of the lands in North San José. In those instances, storm sewer pump stations are needed to discharge stormwater runoff into the waterways. In the absence of storm sewer pump stations, internal flooding would likely occur in various portions of North San José. The City owns and operates 31 storm sewer pump stations with various capacities, including the Alviso Pump Station completed in 2019. The larger storm sewer pump stations drain areas located north of Highway 101 into the Guadalupe River. The smaller storm sewer pump stations typically drain street underpasses. The construction dates of the smaller pumps range from 1928 to 1975, many of which are over 40 years of age.

Since the mid 1980s, the City's design standard has required storm sewer systems to be designed to convey a 10-year storm event (a storm event large enough to have a 10 percent chance of occurring in any year) instead of the previous design standard of conveying a 3-year event (a storm event that has a 33 percent chance of occurring in any year; typically, this storm will be smaller than a 10-year storm). The 10-year event standard is widely recognized as reasonable and safe, and is employed by numerous jurisdictions nation-wide. Prior to 1990, approximately 67 percent of the storm sewer drains were designed to the 3-year storm event standard. In many areas that have been annexed to the City, the capacity is even less than a 3-year event. While all new developments are required to design their on-site storm sewer system to accommodate a 10-year

event, they are not required to address downstream deficiencies in the storm sewer system to which the development connects.

The Department of Public Works designs and builds storm sewer infrastructure funded through the City's Capital Improvement Program. Public Works also reviews and inspects storm sewer improvements constructed by private developers and other public agencies. The Storm Section is part of the Transportation & Hydraulics Services Division in Public Works. The Storm Section is tasked with:

- Design and construction of improvements that maximize the efficiency of the existing storm sewer system to meet current and future needs,
- Design and construction of improvements that rehabilitate older deteriorated storm sewers and storm sewer pump stations to extend useful life,
- Design and construction of green stormwater infrastructure and trash reduction projects for stormwater quality improvements,
- Master-planning the storm sewer system to meet the future demands for conveyance,
- Identifying and prioritizing the City's storm sewer capital investments,
- Rehabilitation program and corrective maintenance activities.

The Department of Transportation performs day-to-day operation and maintenance of the storm sewer collection system, debris basins, storm inlets, storm pump stations and regulated facilities such as bioretention and full trash capture (FTC) devices.

The Environmental Services Department manages regulatory programs and oversees Citywide activities that help reduce or prevent pollution from entering the storm sewer system and waterways, ensuring the health of the South Bay watershed.

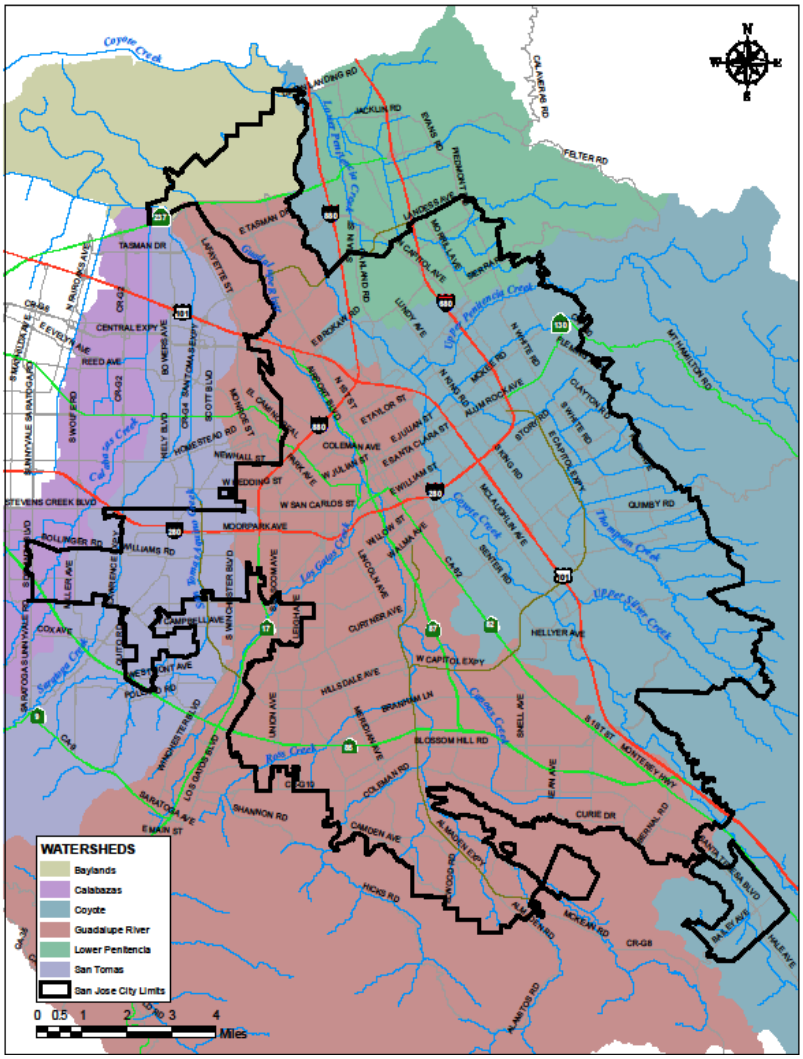


Figure 1: Citywide Watershed Map

II. PROGRAM FUNDING

A. Adopted FY 2020-2021 CIP Budget Revenue

Primary sources of funding include transfers from the Storm Sewer Operating Fund, the Storm Drainage Fee, grants, interest earnings, and joint participation revenues. The Storm Sewer Operating Fund provides funding for capital improvement projects and the federally mandated National Pollutant Discharge Elimination System requirements through Storm Sewer Service Charge fees.

Storm Drainage Fee (Fund 413 – $1.7M; 5-Year CIP) - Storm Drainage Fees are charged to developers for the privilege and benefit of land directly or indirectly discharging into the storm drainage system, and also for the benefits accruing to said land because of the existence of a city storm drainage system which collects and disposes of waters from other lands in the city. The fees collected may only be used for the construction, reconstruction and maintenance of the storm drainage system for the City of San José, and for acquisition of land for such system. The fee is based on land use and acreage.

Storm Sewer Capital Fund (Fund 469 - $65.5M; 5-Year CIP) - Funds for capital improvement projects consist of a transfer from the Storm Sewer Operating Fund (Fund 446) in the average amount of $10M annually, and $200K annually from Local Agencies. These funds are used for new or rehabilitated pump stations, storm drain system improvements, new or replacement laterals, pipes, storm drain inlets, outfall rehabilitation, outfall flap gate installation, Coyote Creek invasive plant removal, and projects that address water quality issues.

Joint Participation Annual Revenues ($4,000) - This revenue comes from the City of Cupertino, when, in the late 1970s, City boundaries were redrawn and a portion of Cupertino's storm sewers system was connected into San Jose's system before being conveyed downstream. This revenue covers maintenance and operations expenses for Cupertino's share of the system.

Public Safety and Infrastructure Bond Fund – Storm Sewer (Fund 498 - $52.5M; 5-Year CIP) – These funds, provided through the financing proceeds under the Measure T Bond, are used to build clean water projects and construct high priority capacity improvement projects, including the one for the Charcot sub-drainage area.

B. Adopted FY 2020-2021 CIP Budget Expenditures

The Storm CIP Program had a $119.7M, 5-year budget, including $67.2M from Storm Sewer Capital Fund, and $52.5M from Public Safety and Infrastructure Bond Fund. The level of Storm Sewer Capital funding allows development and implementation of the initial phase of the citywide outfall improvement program, rehabilitation of storm pump stations, and one to two neighborhood urgent storm drain improvement projects to be completed each year. It is important to note that the current level of funding in the Storm CIP program only addresses immediate needs to reduce or minimize drainage issues. It does not address long-term, system-wide needs stemming from significant development activities that have occurred over the past few decades and those planned for future years. The Measure T bond funding allows one-time funding for the construction of a

limited number of Green Stormwater Infrastructure and high priority storm capacity improvement projects. The on-going Master Planning effort will provide a working document that establishes city-wide long-term solutions for any deficiencies or lack of efficiency. Master Planning will incorporate appropriate findings of green stormwater infrastructure recommendations identified in the Green Stormwater Infrastructure Plan, approved in September 2019, wherever feasible within the storm sewer system.

C. Adopted FY 2020-2021 Operations and Maintenance Budget Expenditures

(Fund 446) – The annual ongoing operating and maintenance budget is approximately $8.2 million which provides funding for administration, engineering, and maintenance.

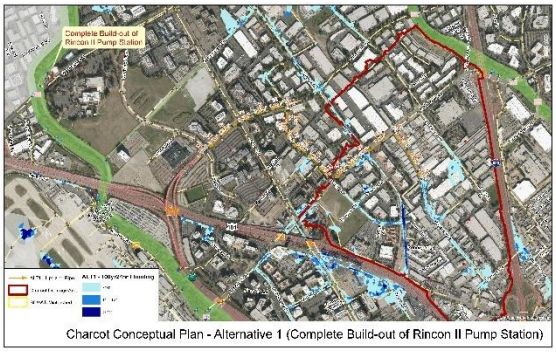
III. PROGRAM ACTIVITY

A. Storm Sewer Improvement Program

The Storm Sewer Improvement Program includes large capital improvement projects to address drainage issues and to maintain the storm drain capacity of existing systems. The Storm CIP also includes other Storm Sewer system improvements mandated by the Municipal Regional Stormwater NPDES Permit. The Federal Clean Water Act requires stormwater discharges to surface waters from municipal separate stormwater systems (MS4s) to be regulated under a municipal separate storm sewer system NPDES permit. The City's current NPDES permit became effective January 1, 2016. A portion of the Storm CIP is for resolution of localized drainage problems, primarily in residential neighborhoods, neighborhood business districts and school zones. These projects typically address localized ponding and neighborhood drainage issues that can be corrected by extending or enhancing the existing storm sewer system. Improvement projects for fiscal year 2020-2021, besides improving drainage capacity and water quality, also addressed trash load reduction requirements in the NPDES Permit and included the following:

Charcot Area Storm Drain Improvements – Measure T (CPMS ID 9220)

This Project will improve the drainage for the Charcot sub-drainage area and reduce the floodplains under the 3-, 10-, and 100-year storm events. The Charcot sub-drainage area, bounded by Freeway I-880 to the east, Highway 101 to the south, Coyote Creek to the north, and Zanker Road and East Brokaw Road to the west, primarily collects runoff from industrial land use and discharges through a 72" storm sewer outfall with a flap gate to Coyote Creek near Charcot Avenue.



Charcot Conceptual Plan - Alternative 1 (Complete Build-out of Rincon II Pump Station)

The Project will divert high flows from the Charcot sub-drainage area to the Rincon II pump station at Guadalupe River, including a complete build-out of the Rincon II pump station. The improvements include installation of more than 7,000 feet of 54"

to 96” diameter pipes along segments of Rogers Avenue, E. Brokaw Road, Bering Drive, Charcot Avenue, and Orchard Parkway.

The City has completed the Project’s preliminary design and utility investigation and is proceeding with the Project’s final design.

Large Trash Capture Device Retrofits at Sonora and Oswego – (CPMS ID 9478)

This Project will retrofit the large trash capture devices (LTC) at Sonora Avenue and Oswego Drive locations to improve safety and efficiency in operating and maintaining the devices. The Oswego location includes constructing a concrete diversion structure to improve trash capture. The Sonora location includes installing removable flow control bulkheads to ensure site safety, safe access, and the safety of O&M staff working at the location.

The project design was completed in June 2020, and the construction is anticipated to be completed in December 2021.

Large Trash Capture Device Installation Project Phase VII – (CPMS ID 9703)

The Municipal Regional Stormwater Permit (MRP 3) requires the City to continue implementing measures to reduce trash entering our creeks and the Bay. To comply with this requirement, the City will be installing additional large trash capture underground devices at several locations throughout the City, designed to catch trash and prevent it from entering the waterways. The LTC Phase VII Project includes a feasibility study, preliminary design, final design, and construction of six additional LTC devices. The project is currently in the design phase.

Charcot Storm Pump Rental (CPMS ID 6518)

This project allocates $300,000 per year for the rental of a temporary storm pump system to alleviate flooding in the area near Charcot Avenue. The annual budget allocation for temporary storm pump system will end when the permanent storm drain improvements for the area have been constructed.

B. Regional Green Stormwater Infrastructure Projects

The City of San José has developed the Green Stormwater Infrastructure Plan (GSI Plan) to lay out the approach, strategies, targets, and tasks needed to transition traditional “gray” infrastructure to include green stormwater infrastructure over the long term. The Regional Green Stormwater Infrastructure Projects are large-scale stormwater capture and treatment measures that are intended to collect and treat runoff from a large drainage area, including runoff from on-site and off-site areas. Off-site surface runoff can come from diversions from storm drains, channels, culverts, and streams. These types of projects include aboveground or underground runoff capture facilities or subsurface infiltration galleries located in large open space areas or under existing uses (such as parking lots or parks) to which runoff from large areas of impervious surface can be directed.

Benefits of regional stormwater capture projects include flood risk reduction, stormwater treatment and use, groundwater recharge, and the potential to augment alternative water supplies.

The City, with consultant support, is currently performing a feasibility evaluation of five potential GSI sites, and will proceed to the preliminary design of up to three sites that are determined to be feasible. Sites being considered include Sycamore Terrace, Kelly Park Horse Stables, and Monterey Road at Umbarger (a green street project).

River Oaks Regional Stormwater Capture Project – Measure T (CPMS ID 9128)

The purpose of this Project is to convert the existing facility into a regional large-scale stormwater capture and treatment project. The project will be planned, designed, and constructed to deliver a cost effective and functional multi-benefit stormwater capture system that:

a. Meets the performance goals in water treatment quality and water captured and retained; and
b. Transforms the project area into a recreational amenity linked to the Guadalupe River Trail, including park-like setting enhancements as deemed appropriate.

The River Oaks Regional Stormwater Capture Project will establish a new diversion structure inside the pump station and redirect flows into the detention basin at the beginning of a storm event (as opposed to solely providing flood control at the peak of a storm event). The new diversion structure and sedimentation basin forebay will be designed to capture large trash and debris. Allowing the system to divert flows at the beginning of a storm provides hydromodification benefits by delaying the discharge from the pump station, and the proposed improvements result in an overall increase in flood storage capacity above the current 100-year standard.

With additional grading, planting, and soil amendments, the detention basin will be converted into a large bioretention facility. Bioretention soil will be added to the site to enable stormwater treatment, and additional grading will occur to create a sedimentation forebay near the inlet. Changes to the profile of the basin will account for the existing flood control function of the facility as well as excavation constraints posed by the shallow depth to groundwater. A portion of the facility may be designed to accommodate dry weather flows, functioning more as a wetland, with the vast majority of the facility continuing to function as bioretention. An overflow structure will be added to the basin to redirect flows back to the pump station during large storm events. Following a storm, detained flows will drain back to baseline conditions within 24 hours.

Recreational use of the site, which is currently fenced off with no public access, will be activated by restoring the perimeter pathway around the basin that connects to the adjacent park along Riverview Parkway. These paths will provide access for maintenance of the treatment facilities.

The City has completed the Planning Study and CEQA documentation for the Project, identifying the Project's preferred alternative based on stakeholder and public input. The Project is currently in design phase.

C. Citywide Outfall Rehabilitation/Improvement Program

Rehabilitation of Six Outfalls (CPMS ID 7699)

This Project entails the rehabilitation of six deteriorated storm sewer outfalls located along four creeks throughout the City. Scour has resulted in the erosion of the creek banks that has undermined the existing concrete sack rip-rap and outfalls infrastructure.

The City obtained Section 401 Water Quality Certification from the Regional Water Quality Control Board, Section 404 Permit and Regional General Permit 18 from the U.S. Army Corps of Engineers, California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement, and Valley Water's encroachment permit. The project is in the construction phase, and construction is anticipated to be completed in the summer of 2022.

Autumn Street Outfall 67F & Empire Street Outfall 509 Rehabilitation (CPMS ID 7700)

This Project will replace the existing 27-inch storm main, manhole, and outfall facilities near Autumn Street with a new manhole, a 72-inch reinforced concrete pipe RCP storm drain outfall pipe and a new concrete headwall with wing walls. The existing outfall 509 near Empire Street will also be replaced.

The City has obtained Section 401 Water Quality Certification from the Regional Water Quality Control Board, and Section 404 Permit and Regional General Permit 18 from the U.S. Army Corps of Engineers, and California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement. The City is still waiting for Valley Water's encroachment permit and the U.S. Army Corps of Engineer Section 408 Permit. Staff is in the process of packaging a final set of plans and specifications, and getting ready to advertise the Project for construction upon the receipt of these last two permits.

Citywide Outfall Improvements – Other Locations (CPMS ID 8143) &
Coyote Creek Flap Gate Improvements (CPMS ID 9447)

The City operates several storm drain outfalls that discharge runoff collected form urban areas to the creeks and channels, and staff has identified at least 335 outfalls that are in different stages of deterioration. There are 31 outfall locations that have been identified by staff to be in worst conditions that must be fixed in a timely manner, including the six locations currently under construction, and two locations expected to start construction in 2022. Of the remaining 22 outfalls, there are 5 on Coyote Creek, 4 on Los Gatos Creek, 7 on Guadalupe River and 6 on various other smaller reaches.

In addition to the 5 outfalls on Coyote Creek that need repair, there are 16 outfalls on Coyote Creek that may need a flap gate.

Due to limited funding and the protracted regulatory permitting process, the City is prioritizing the outfall improvement work. This process includes developing an implementation plan prioritizing outfall rehabilitation and improvements based on several criteria, including:

a) severity of damage and/or impending channel embankment failure,
b) protection of property and critical infrastructures,
c) opportunity to incorporate work with channel improvements by Valley Water,
d) outfall tributary area,
e) regulatory permitting requirements.

D. Coyote Creek Invasive Species Removal (CPMS ID 8864)

The D2 Partnership grant established by the Santa Clara Valley Water District under their Safe, Clean Water and Natural Flood Protection Program will be used to establish an invasive species identification and removal program on City-owned properties located along the Coyote Creek watershed.

In July 2020, the City obtained the regulatory permits required for the invasive species removal on Coyote Creek. These included a Lake and Streambed Alteration Agreement from the California Department of Fish and Wildlife, the Statewide NPDES Permit for Residual Aquatic Pesticides Discharges from Algae and Aquatic Weed Control Application, and the Santa Clara Valley Habitat Plan Implementation's Certificate of Approval.

The annual contract to remove the invasive plant on Coyote Creek was awarded to Ecological Concerns Incorporated (ECI) in August 2019, and the Contractor has proceeded with the invasive plant removal work since July 2020. The invasive plant removal effort is expected to conclude in 2022.

E. Existing Storm Pump Stations

The average age of the City's 31 storm sewer pump stations is approximately over 44 years. These facilities are listed in Table 1 shown below. The existing major pump stations at Oakmead, River Oaks, Rincon I, Rincon II and Gateway were determined to have adequate capacity for the 10-year storm event. Pump stations are generally considered adequate if there is sufficient pump capacity to discharge design runoff into the receiving waters or if excess flows can be stored without causing property damage.

The Master Plan recommended existing pump station improvements to increase reliability and redundancy, and to comply with FEMA flood hazard mapping requirements. These projects include installation of on-site backup power at the major pump stations at Rincon I, Rincon II, and Gateway.

The Park Avenue Pump Station is located within the City's land acquired by Google, and may need to be relocated pending Google's development for this parcel. Google will be responsible for any pump station relocation and the City will help facilitate the process as needed.

Table 1: Stormwater Pump Stations

Name	Built	Upgraded	Q, Peak[1] (mgd)	Backup Power
Hester	1928	N/A	0.2	Portable pumps
Hope 1	2008	N/A	0.2	Portable pumps
Hope 2	1992	N/A	0.4	Portable pumps
Liberty	1973	1990	0.1	Portable pumps
Rincon 1	1998	N/A	288	Portable pumps
Rincon 2	2004	N/A	388.8	Portable pumps
Alma	1955	2008	5	Portable generator
Almaden	1935	1994	2.9	Portable generator
Bascom	1958	1990	4	Portable generator
Berryessa	2015	N/A	7.5	Portable generator
Bird	1969	2008	9.4	Portable generator
Capital	1990	N/A	2.9	Portable generator
Delmas	1934	1990	1.2	Portable generator
Forest	1961	1993	2	Portable generator
Gateway	1960	2016	3.3	Portable generator
Golden Wheel	2001	N/A	60.5	Portable generator
Hedding	1960	1990	2.7	Portable generator

Julian	1975	1990	1.3	Portable generator
Skyport	1966	2002	2.2	Portable generator
Taylor	1939	1990	2.9	Portable generator
Taylor 87	2002	N/A	4.9	Portable generator
Willow	1934	2005	3.8	Portable generator
Park	1966	1990	2.9	On-site generator
Chynoweth	1988	N/A	20.7	On-site generator
Communication Hill	2008	N/A	0.7	On-site generator
Gold Street	1979	2003	20.2	On-site generator
River Oaks	1979	2011	43.2	On-site generator
Alviso	2019	N/A	110	On-site generator
Cahill	1939	2017	2.4	Diesel pumps
Oakmead	1982	2013	475.2	Diesel pumps
Rocky Pond (Airport)	1990	N/A	41.3	N/A

mgd = million gallons per day
N/A = not applicable
Unk = unknown
[1] - Peak stormwater pump station (SPS) effluent capacity (from hydrologic and hydraulic (H&H) model).

F. Non-Construction Activities

Non-construction activities for the Storm Sewer Section include oversight of storm sewer program management, Preliminary and Final Engineering design, construction management, updating GIS information, Storm Sewer Master Planning, Storm Sewer Permit Review and Inspection for Development and Outside Agencies, Public Art, Fee Administration, and plan review for other sections and divisions of Public Works.

G. System Management and Planning

1. Master Planning

a. Citywide Storm Drain System Master Planning

The preliminary citywide storm drain system's dynamic hydrologic and hydraulic (H&H) model was developed and prepared prior to the February 2017 flood event. The InfoWorks ICM (Integrated Catchment Model) computer model included pipes of 24 inches and larger in diameter using the City's GIS datasets, as-built plans, and survey data, and incorporated boundary information from Valley Water's HEC-RAS model files, and was calibrated using 2013-2014 and 2015-2016 flow data of the storm drain and creek/river channel systems. At the end of this phase of modeling effort, a preliminary list of 22 high priority capacity improvement projects were identified, with estimated approximately $215 million in total capital cost.

Since the completion of the preliminary model, Valley Water collected high water mark and channel flow/stage data during and immediately after the February 2017 flood event. The City's model was calibrated to the February 2017 flood event to reflect the flooding along Coyote Creek. The calibrated model was then used to simulate design storms for the preparation of the joint Emergency Action Plan with Valley Water. Subsequent to the 2017 storms, vegetation growth in channels has increased the channel roughness significantly at some locations. To assess the latest channel conditions, Valley Water collected extensive high-water mark and river flow/stage data along Guadalupe River and its tributaries during the January 2019 high channel level event. The collected data for the 2019 storms are instrumental in modeling the current channel conditions that serve as the tailwater for the City storm drain outfalls.

In order to calibrate the ICM model to the 2019 high water marks and channel flow/stage gauge data, Valley Water's latest HEC-RAS model details were incorporated to ensure a proper boundary condition for storm drain system modeling analysis. This has been a time-consuming effort and close coordination with the Valley Water has been necessary for the storm drain modeling effort.

b. Storm Drain Model Results

North San Jose (NSJ) and Stockton-Taylor-Diridon-Downtown Areas:

The NSJ model area includes NSJ Development Policy and Alviso areas. The Stockton/Taylor, Diridon and Downtown Area model includes the Diridon Station Area Development Policy area. The drainage areas and the results of the improvement project alternative modeling analysis for these areas are included in Figure 2.

Approximately 17,400 feet of trunk system pipeline improvements with total CIP costs of over $78M were identified in the NSJ area. The CIP project team for the Charcot Area Storm Drain Improvement Project selected the diversion alternative that would take the majority of the flow from upstream of the Zanker/Brokaw intersection to the Rincon II Pump Station. This alternative will alleviate the flooding condition at Zanker/Brokaw and nearby areas caused by the undersized Charcot system. Valley Water requested the hydraulic impact analysis on the Guadalupe River for the diversion alternative under Rincon II PS existing operation and emergency operation scenarios. The City's model found that the diversion project would have little impact to the Guadalupe system with various PS operations.

There are six locations in the Stockton-Taylor-Diridon-Downtown model area identified as not having adequate capacity in the 10-year design storm for improvements. Approximately 24,100 feet of pipeline improvements and three upsized outfalls with flapgates were identified for the Stockton-Taylor-Diridon Area. The CIP cost of these projects is estimated to be over $55M. Funding is currently unavailable for projects in this area.

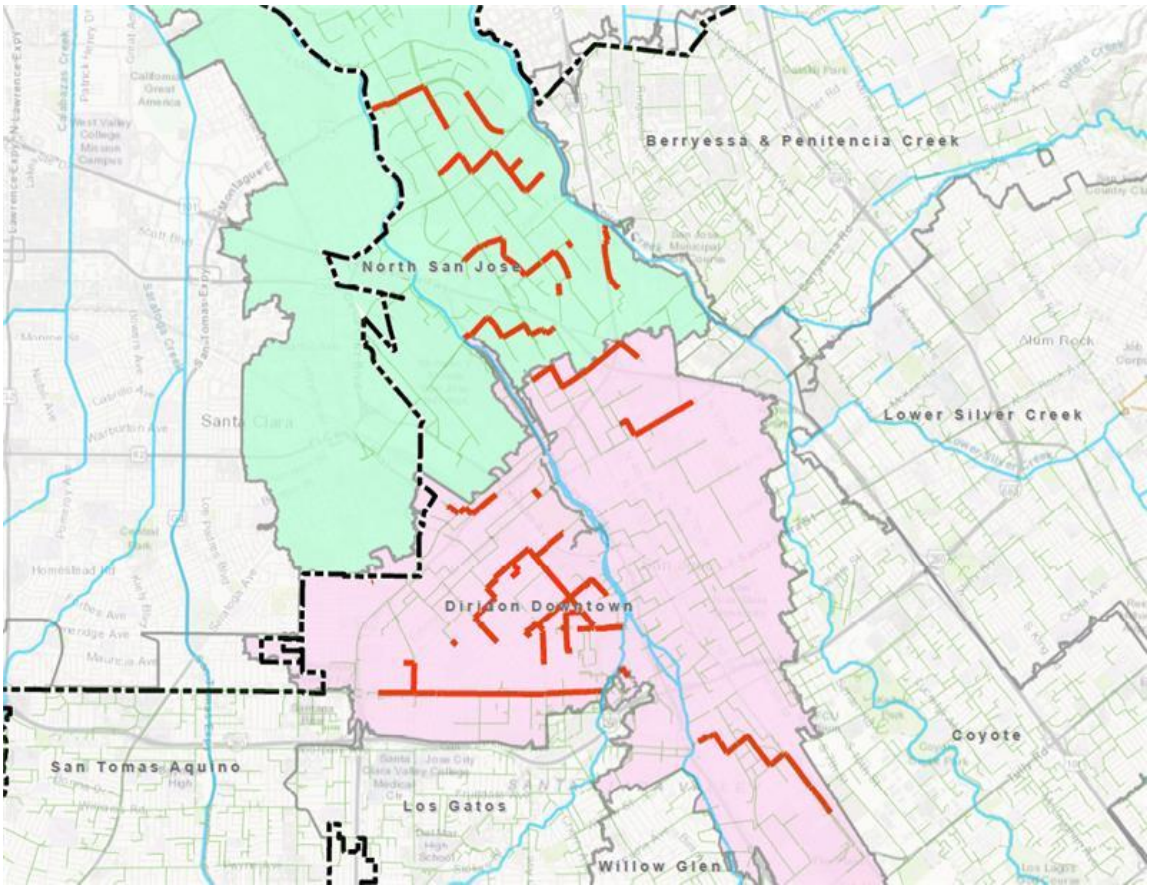


Figure 2: Preferred Storm Drain Project Alternatives in NSJ and Stockton-Taylor-Diridon-Downtown Areas

The preliminary storm drain improvement within DSAP Area includes approximately 24,100 feet of pipeline improvements and three upsized outfalls with flapgates. The CIP cost of these projects is estimated over $55M.

Willow Glen and Lower Silver Creek Drainage Areas:

The modeling results of storm drain deficiencies for the Willow Glen, and Lower Silver Creek drainage areas are presented in Figure 3. These two areas are identified as two of the high priority modeling analysis areas by Valley Water due to the limited channel capacity. The master plan study identified approximately 57,504 feet of undersized pipes that contribute to storm drain flooding for the 10-year storm event. Capacity improvement project alternatives will be conducted in the coming months, and preferred alternative and CIP cost estimates will be reported in next FY's annual CIP report.

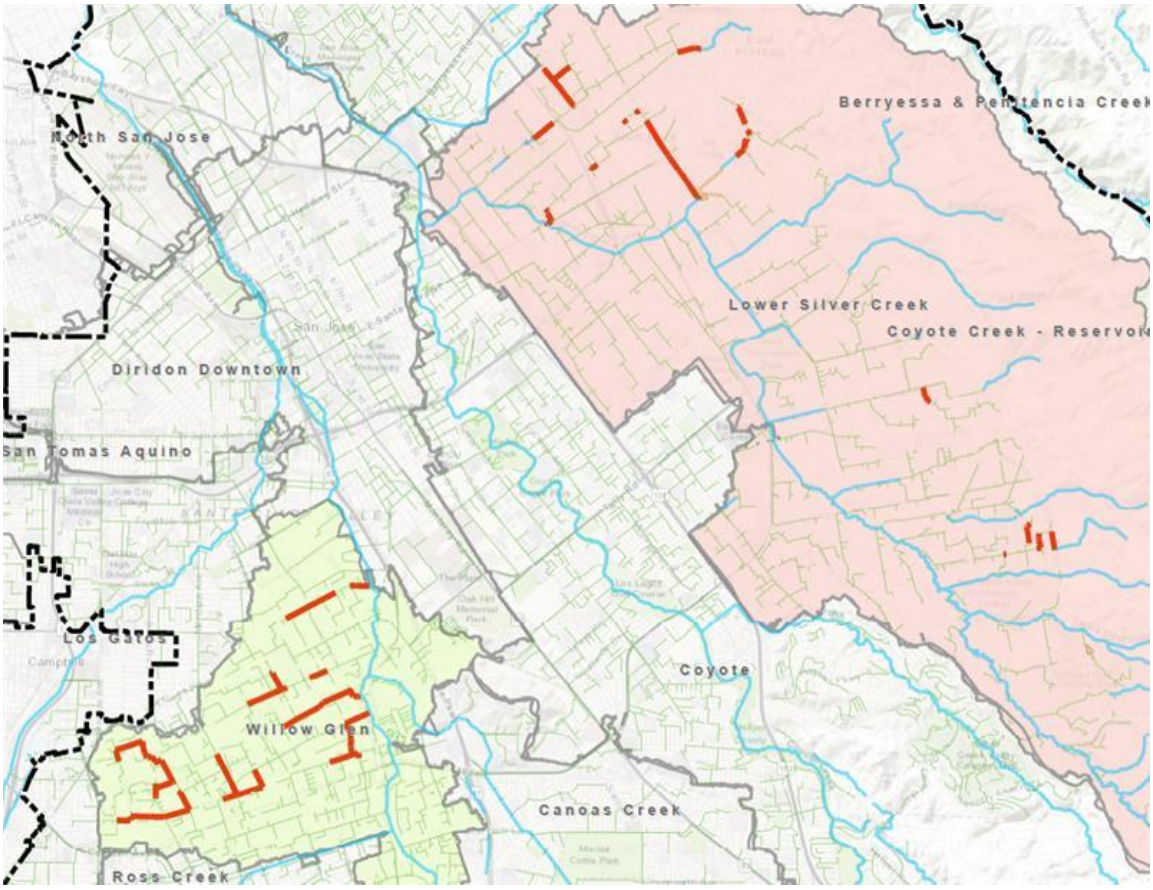


Figure 3: Capacity Improvements Identified in Willow Glen and Lower Silver Creek Areas

Modeling of Other Areas, Mid-Coyote Creek Project, Flow Monitoring, and Support for DOT:

Storm drain model in other areas continues to be refined and re-calibrated using the latest Valley Water high water marks and channel flow/stage data. Storm drain system deficiencies and the capacity improvement project alternatives will be evaluated in the coming months. However, it's anticipated that changes will continue to evolve with Valley Water's on-going effort to bring their riverine model up to date and the planning/design effort of the Anderson project, the Mid-Coyote Creek Improvement Project, bridge projects, as well as the channel and storm drain system improvement for development projects. With that, the City's storm drain model will need to be updated accordingly.

Valley Water has been coordinating with the City's Parks, DOT and PW departments for the Mid-Coyote Flood Protection Improvement Project. Alterations at William Street, Selma Olinder, Watson and Rock Springs Parks were expected. In order to evaluate the project's hydraulic impacts on the storm drain system, the City's storm drain master plan staff has coordinated with Valley Water for the mid-Coyote project HEC-RAS model and to understand the appropriate design scenarios to be used for City's modeling analysis.

In support of the master planning and computer modeling, four long-term storm drain flow meters at strategic locations were installed in late 2020. Long-term storm drain flow and depth data will be used to establish the flow curves for future calibration of the model, design storm refinement, and green infrastructure flood control benefit assessment.

DOT has requested PW to investigate a few recurring hot spot locations, including Park/Hester Avenues, Hillsdale/Gardendale, and 12th and Williams Streets areas' flooding. Both Park/Hester and Hillsdale/Gardendale systems required a larger CIP project to upgrade a long stretch of the systems to provide the needed capacity for the areas.

The flooding at 12th and Williams Streets area in 2017 was due to the high flow in channel from the Anderson Reservoir spill that shut the flap gate at the outfall on Williams so local storm water runoff couldn't get out. The existing system needs to be improved, and the upcoming mid-Coyote improvement project will likely have a higher design stage. Collaboration between the City and Valley Water will be necessary to identify storm drain and mid-Coyote improvements that will benefit both agencies. Due to the potential high channel design stage with the mid-Coyote Project, other storm drain systems discharging into Coyote Creek should also be investigated.

2. Support Economic Development

Working with Development Services Division, DOT, VTA, and the Planning Department, the Master Plan staff reviewed the storm drain capacity for over 25 transportation and land use development projects. Some of development projects that staff conducted capacity reviews on included BART Phase II, Montague/Seely Avenue development, DuPont/Park Avenue development, and Boston Properties (Almaden/Woz).

3. Coordination with Valley Water

Approximately 20 percent (or 335) of the storm outfalls need rehabilitation in order to maximize operational capacity and minimize maintenance requirements. The range of improvements needed include flap gate repair, vegetation removal, sediment removal, riprap repair, bank erosion repair, channel dredging, and/or outfall structure and pipe reconstruction.

The City is working to develop a comprehensive outfall program to address the widespread planning and funding needs, environmental and regulatory permitting requirements, and mitigation and monitoring plans that would be necessary to implement a robust and long-term program without which many more outfalls could fall into significant disrepair or fail. Currently, repairs to existing outfalls are considered on a case-by-case basis. When possible, the City will collaborate with Valley Water to implement select projects through their Stream Maintenance Program or Five-Year Capital Improvement Program. This approach will continue to be used to rehabilitate outfalls in conjunction with ongoing Valley Water river and creek channel improvement projects (Coyote Creek, Guadalupe River, Los Gatos Creek, Lower Silver Creek, Thompson Creek, etc.)

City staff has closely coordinated with Valley Water on the progress of the City's storm master plan development. City staff has obtained Valley Water's latest HEC-RAS and has planned to

keep the City storm drain model's riverine boundary condition up to date. For the Charcot area storm drain improvement project, City staff has prepared H&H modeling analysis reports at Valley Water's requests. For RWF floodplain study, City staff has coordinated with Valley Water for them to conduct the HEC-RAS modeling analysis. Both the City and Valley Water want to be able to efficiently exchange their respective models for use by each agency. In recent years, the City has prepared the InfoWorks ICM storm drain system model and provided it to Valley Water for their floodplain studies of Lower Silver Creek, Ross Creek, Upper Penitencia Creek, and Canoas Creek watersheds. Valley Water also shared with the City their ICM models of Ross Creek and Canoas Creek with riverine boundaries incorporated. During flood watch season, City staff and Valley Water have coordinated for info/data exchange and latest findings from modeling analysis.

4. Condition Assessment Storm Sewer Repairs

This is a new program that was initiated in 2015 and models the Sanitary Sewer Condition Assessment program. The purpose of this program is to identify and repair damaged pipes in the storm sewer system in areas that are prone to flooding. The results from these identified projects will focus on areas with significant groundwater infiltration and structural defects will be corrected immediately.

5. Storm Sewer Improvements/Urgent Storm Drain Repair projects

The Storm Sewer Improvement program consolidated two previous programs (Minor Neighborhood and Special Corridor). This program will continue to address minor storm drain projects, such as construction of new inlets and laterals (storm pipe connections from the inlet to the main), and the establishment of flow-lines in various neighborhoods. Future projects will provide relief for minor drainage problems on neighborhood streets and improve water quality in the runoff conducted by the system.

The citywide master planning effort is expected to yield the data necessary to plan and estimate Storm Capital Projects. Currently, most storm system improvement projects are identified and selected for implementation based on public complaints and City staff observation, as well as historical knowledge of chronic/re-occurring drainage problems. These improvement projects are funded by the Storm Sewer Capital Improvement Program (CIP). Priority for funding of storm improvement projects through Neighborhood/Special Corridors funding is based on proximity to public gathering centers, such as schools, community centers, libraries, etc.

6. Green Stormwater Infrastructure Plan

This is a new program initiated in 2016, as required by the Municipal Regional Permit, to allocate funding to implement green stormwater infrastructure projects. During its early phase, the goal of this program was to complete pilot projects to reduce impervious surfaces by utilizing low impact development (i.e. bioretention, pervious pavement, regional facilities). These pilot projects aimed to reduce the amount of flow and improve water quality by treating urban stormwater runoff before it enters into waterways in San José.

In addition, City staff worked collaboratively with consultants to develop a Green Stormwater Infrastructure (GSI) Plan which was approved by City Council in September 2019. The GSI Plan describes how the City will shift from directing stormwater flows from impervious surfaces such as streets, parking lots, and buildings directly into existing storm drain infrastructure to a system where stormwater runoff is slowed, infiltrated, and/or treated prior to discharge into storm drain systems and receiving waterbodies. The GSI Plan provides a comprehensive overview of the citywide strategy, describes implementation steps, and identifies potential projects, including regional stormwater capture projects. City staff will now implement the plan by further prioritizing locations for potential projects utilizing the approaches laid out in the GSI Plan, beginning planning of projects, developing planning level cost estimates, and identifying potential funding sources to support the program which is currently largely unfunded.

7. Outfall Rehabilitation

This program focuses on the construction or rehabilitation of storm drain outfalls at various locations throughout the City. The Department of Transportation (DOT) has identified more than 335 outfalls that are missing, deteriorated, or in need of improvement to bring them to current design standards. This ongoing allocation funds the most critical outfall construction based on priorities jointly established by DOT, the Department of Public Works, Valley Water and other regulatory agencies.

8. Rehabilitation of Pump Stations

As noted above, the City owns and operates 31 storm pump stations with various capacities. The majority of the City's 31 pump stations are over 40 years old. Although most of the storm pump stations have been rehabilitated within the last 20 years, Public Works continues coordination with the Department of Transportation to develop and implement a plan for prioritizing the rehabilitation of the City's storm pump stations, including identifying funding needs to rehabilitate and/or repair station facilities (e.g. a roof repair).

9. Improving Annexation Areas

In April 2006, the San José City Council launched a three to five-year program in which the City of San José will annex the remaining "islands" (or "pockets") of less than 150 acres of unincorporated County of Santa Clara land. Unincorporated islands are governed by and receive services from the County even though they are completely or substantially surrounded by incorporated, or City lands. Upon annexation, the land use and general governing responsibility changes from the County of Santa Clara to the City of San José. This change enables residents in these County islands to receive urban services from the City rather than the County.

The addition of these pockets to the City service area increases the demand on existing City storm infrastructure. The total impact of the annexation to the storm program is unknown, but County pockets typically lack underground storm sewer pipes and tend to experience various problems related to ponding. In addition, the lack of curbs and gutters does not address the current standards for protection from overland release (streets are designed to capture the effects of the 100-year

storm or failure of the storm sewer system). The city-wide master planning effort is expected to identify any deficiencies or improvement needs within the recently annexed County pockets.

10. San Jose-Santa Clara Regional Wastewater Facility

Storm Drain System Model

A dynamic H&H model using Infoworks ICM software was developed for the Regional Wastewater Facility's (RWF) internal drainage system as part of the RWF's CIP effort. The RWF site is located within the Citywide Storm Sewer Master Plan currently under development, but the RWF model was developed separately to allow analysis to a higher level of detail. The goals of the modeling effort were to create a H&H model, evaluate the performance of the existing drainage network and to identify deficiencies and potential solutions. The stormwater analysis was completed in December 2015. Model results confirmed RWF staff observations of areas within the stormwater system that do not meet level of service criteria. Potential solutions were developed to address the identified deficiencies. Eighteen individual deficiencies were identified and prioritized to allow RWF staff to split the recommended solutions into phases to spread the implementation over a period of time. Two alternative packages of projects were developed to resolve these stormwater deficiencies, either alternative costing an estimated $9 million. A new project has been approved in the current CIP budget. The project was initiated in Fall 2017 and construction is scheduled for completion in 2021.

Flooding Study

In addition to stormwater modeling, a flooding study was conducted during 2015-16 to better understand impacts associated with regional flooding at the RWF. Completed in April 2016, the study analyzed numerous 100-year and 500-year flooding scenarios, coupled with the cumulative impacts of projected sea-level rise. However, further analysis is required to estimate the potential flooding impacts at the RWF due to riverine flooding should Coyote Creek or Guadalupe River overflow their banks or levee systems during a 500-year event. In 2018, staff initiated a Flood Risk Analysis project to assess the flood threats and better understand regional flooding at the RWF. Data developed in the Flood Risk Analysis effort led CIP staff to initiate negotiations with Valley Water staff to identify the potential for flooding at the RWF during a 500-year river flooding event. In addition to CIP staff working with Valley Water staff, the Shoreline Levee project has begun, which will provide the RWF and surrounding community with 100-year flood protection when it is completed. Understanding the risks of 100-year and 500-year events is important due to the critical nature of the facility, the unique topography of the South Bay (North San Jose area) and recognized design standards for critical infrastructure.

H. Permit Compliance/Sustainability

The Federal Clean Water Act requires the City to operate under a National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit for the discharge of stormwater to surface waters via the City's storm sewer collection system. On November 19, 2015, the Water Board adopted the second Municipal Regional Stormwater NPDES Permit for the San Francisco Bay Region that became effective January 1, 2016. It regulates 76 municipalities, counties, and

flood control agencies in the Bay Area and specifies actions necessary to reduce the discharge of pollutants in stormwater to the maximum extent practicable and to effectively prohibit non-stormwater discharges into the municipal storm sewer system to protect local creeks and the Bay.

On February 11, 2015, San Francisco Baykeeper (Baykeeper) filed a complaint against the City of San José based on alleged Clean Water Act violations of the City's Stormwater Permit, including alleged unlawful discharges of pollutants from the San Jose stormwater system and alleged sewage discharges to the San Jose stormwater collection system from the San Jose sanitary collection system. The parties reached a voluntary agreement for resolution of the lawsuit and the Baykeeper Consent Decree (CD) was approved by the court on August 11, 2016. The general terms of the CD include the following:

- Reduce trash levels by 70% by 2017 and 80% by 2019
- Conduct Fecal Indicator Bacteria monitoring in waterways
- Develop a Comprehensive Load Reduction Plan (CLRP) (i.e., Green Stormwater Infrastructure Plan) by July 2020
- Appropriate at least $100M over the 10-year period to implement the CLRP
- Replace or Rehab an annual average of 6.5 miles over 10 years of "high risk" sanitary collection system pipes
- Provide $200,000 per year for 5 years to for creek cleanup and improvement grants (this settlement term was modified on August 2, 2017 to directly fund $100,000 for four years each to South Bay Clean Creeks Coalition and Keep Coyote Creek Beautiful)

The settlement terms are generally consistent with the Stormwater Permit requirements, with the development and implementation of some terms being accelerated or more comprehensive than Permit requirements.

The City complies with the stormwater NPDES permit and Baykeeper CD requirements by administering a comprehensive Stormwater Management Program, led by the Environmental Services Department. Other City Departments such as Public Works, Planning, and Transportation ensure adherence to permit requirements for private development and municipal projects through plan preparation, review and inspection. The Departments of Transportation, Public Works, and Parks, Recreation and Neighborhood Services are responsible for operation and maintenance of City stormwater facilities.

The City's Stormwater Program is comprised of a variety of program elements, including inspection and enforcement; outreach and education; municipal maintenance activities; controls on new development projects (private and public); and activities to address specific pollutants such as trash, mercury, and polychlorinated biphenyls (PCBs). Public Works is actively involved in the following elements of the Stormwater Program:

1. Green Streets Pilot Projects

Provision C.3 (New Development and Redevelopment) of the MRP requires development projects to address both soluble and insoluble stormwater runoff pollutant discharges and prevent increases in runoff flows to local waterbodies through the implementation of low impact development (LID)

techniques. The goal of LID is to reduce runoff and mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating stormwater runoff close to its source.

As part of the Storm Sewer Master Plan study, the City will evaluate stormwater conveyance and water quality impacts on downstream waterbodies due to the City's discharges and actions under normal and peak flooding conditions. ESD, Public Works, and PRNS coordinated to develop, and continued to improve, regional stormwater capture project prioritization and selection processes that resulted in concept project designs for potential project locations. The GSI Plan also includes green street prioritization maps that were developed by ranking elements of GIS layers that would impact performance, constructability, and have potential synergistic opportunities with other City efforts (e.g. bike lanes). The City will now use those GIS maps to select high priority project locations while including other considerations such as City goals, neighborhood needs, transportation programs, grant requirements, and proximity to potential regional stormwater capture projects.

In an effort to support compliance with the MRP and gain experience in designing and constructing green stormwater infrastructure, the City secured grant funding and completed four green street retrofit pilot projects: Martha Gardens Green Alleys Pilot Project, Park Avenue Green Avenue Pilot Project, Chynoweth Avenue Green Street Project, and Horace Mann and Washington Neighborhood Green Alleyway Improvements Project.

The City continues to look for opportunities to incorporate green street projects into other City's projects where appropriate and funding is available.

2. Trash Load Reduction

Provision C.10 of the current MRP requires that trash loads from separate storm sewer systems be reduced by 70 percent by 2017, 80 percent by 2019, and 100 percent by 2022. From 2011 to 2017, the City installed a total of 26 large trash capture devices (hydrodynamic separator devices) at 21 locations within the Coyote Creek and Guadalupe River watersheds. Though this accomplishment, the City achieved the 70% reduction target for July 1, 2017, meeting the MRP requirement. In FY 2017-18 and FY 2018-19, the Storm Section, in collaboration with the Environmental Services Department and the Department of Transportation, completed the planning, design, and installation of six additional large trash capture devices, respectively for the total of 32 devices at 27 locations and achieved the 80% trash load reduction goal meeting the mandated July 1, 2019 deadline. Provision C.10 of the new MRP, expected to be reissued in July 2022, proposes several changes to the trash load reduction goals, and certain trash offsets counted toward the reduction goal credits may no longer be available. Pending this latest development, the City may need to install many additional large trash capture devices and inlet-based systems to meet the new permit requirements.

IV. OPERATIONS AND MAINTENANCE

Funded directly from the Storm Sewer Operating Fund, the day-to-day maintenance and operations of the 1,250 miles of storm sewer collection system is primarily the responsibility of the

Department of Transportation (DOT). Functions performed by DOT generally include the following:

- Cleaning and removing debris from the City's storm drain inlets at least once per year
- Inspecting and repairing localized failures and deficiencies in the City's storm sewer mains, laterals, and inlets
- Inspecting and performing minor routine maintenance at City outfalls
- Inspecting and maintaining 31 storm pump stations, which include the annual cleaning of wet wells and the repairing of pumps
- Inspecting and maintaining stormwater quality devices within the City's right-of-way, which include Connector Pipe Screens (CPS), Hydrodynamic Separators, (HDS) and GSI facilities
- Sweeping more than 67,000 curb miles of streets to minimize contaminants from entering into the storm system and waterways
- Responding to and resolving more than 775 storm related calls every year

The Department of Transportation DOT created and follows a device-specific plan updated annually based on wet season observations and experiences to ensure the operation and maintenance of full trash capture systems complies with MRP and Baykeeper CD requirements. In addition, DOT prepared for the storm season with increased maintenance activities and planning as follows:

- Coordinating a Storm Season Preparation kickoff meeting with interdepartmental and interagency staff;
- Updating the Storm Response Handbook and all hot spot contingency plans;
- Organizing field trips to critical storm hots spots to review contingency plans upon request this year due to the need for social distancing to protect against the COVID-19 pandemic;
- Installing temporary portable pumps for the Alviso area, Charcot Avenue area, and identifying potential need for portable pumps at other hot spot locations;
- Cleaning and removing debris from all storm pump stations, large trash caption (LTC) units, and connector pipe screen (CPS) units;
- Cleaning and removing debris from the City's storm mains (less than or equal to 24" in diameter) in the Alviso area;
- Sweeping problematic debris hotspots when greater than 0.25" of rain is forecast prior the rain's arrival; and
- Cleaning and removing debris from all the City's storm drain inlets.

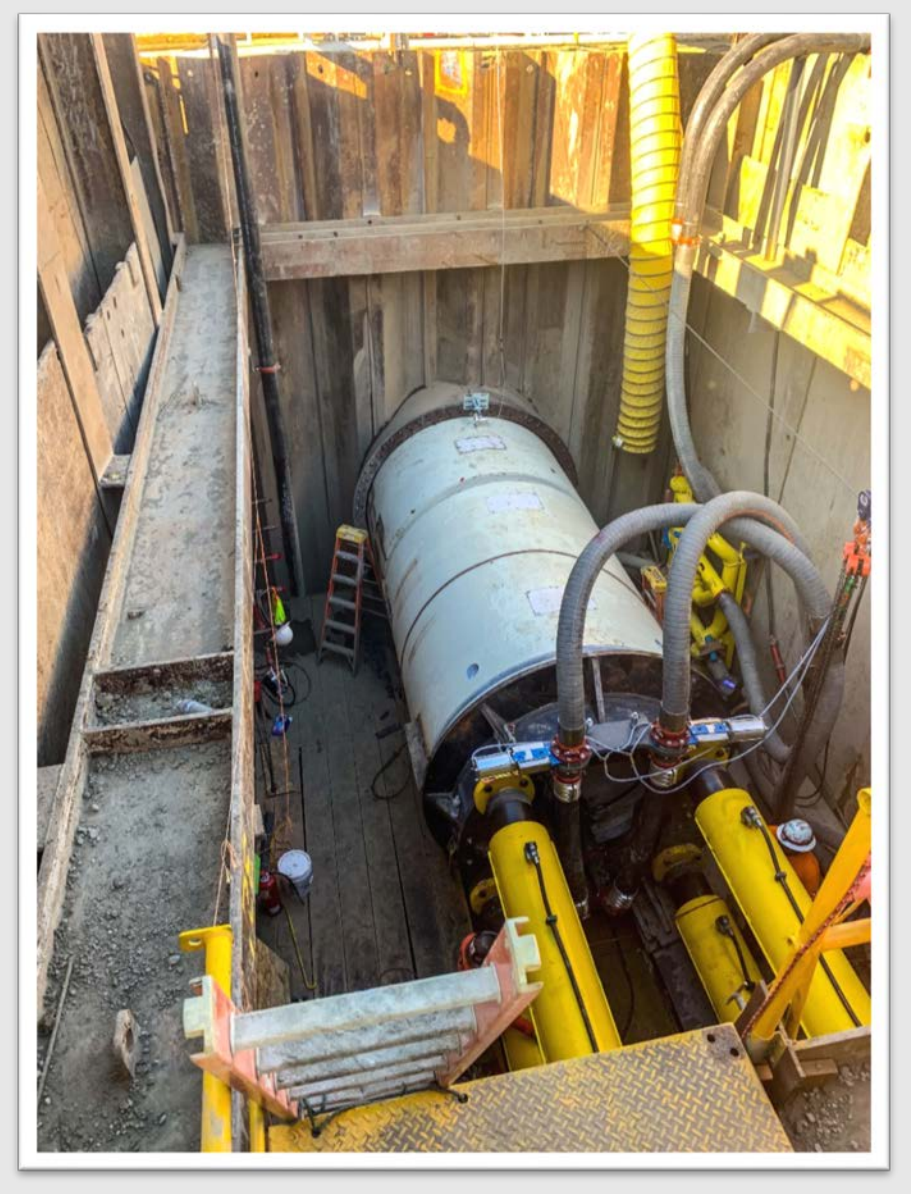
V. CONCLUSION

The City's Storm Sewer System is a significant infrastructure asset that has taken more than a century to construct. The overall system provides effective drainage for the protection of life and property, and is increasingly becoming a mechanism for treating polluted runoff and protecting local creeks, rivers, and the San Francisco Bay. However, as with any long-term asset, routine maintenance and rehabilitation are required to keep the system performing efficiently. Funding levels in recent years have been adequate for addressing small, nuisance issues, but the investment

required to rehabilitate aging facilities and address chronic flooding issues is significant. The master planning effort will assess the condition and investment needs for the entire system and will develop the funding strategies to keep the system functioning efficiently.

Attachment B

SANITARY SEWER SYSTEM ANNUAL REPORT
FY 2020-2021



Fourth Street 84-inch Interceptor Phase VI-A – TBM Pipe Installation

December 2021

City of San José
Sanitary Sewer System Annual Report
FY 2020-2021

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I. HISTORY AND BACKGROUND

The City provides sanitary sewer service for the residents and businesses of San José and surrounding areas. The City owns and operates the sewer collection system consisting of approximately 2,030 miles[1] of pipes (which vary in size from 6 inches to 90 inches in diameter), including 12 miles of force mains, 17 pump stations and 39,469 manholes. There are over 202,000 lateral connections to the system. The collected wastewater is conveyed to the San José - Santa Clara Regional Wastewater Facility (RWF) by major interceptor pipelines located in the northern part of San José. This system conveys an average flow of 76 million gallons per day. The City's sanitary sewer collection system benefits from the generally uniform topography of the Santa Clara Valley which allows the majority of the wastewater flows to be conveyed to the RWF using gravity sewer lines with minimal use of lift or pump stations.

The sewer system dates back to the late 1800's which consisted of a main outfall sewer constructed of brick. This system conveyed combined sanitary and storm flows directly into the San Francisco Bay. In the 1950's this combined system was separated, and sanitary flows were directed through the wastewater treatment facility (currently known as the RWF) prior discharging into the bay. Approximately 85 percent of the system, which was constructed between 1950 and 1980, is local collector pipes that are 10 inches or less in diameter.

In general, the sanitary sewer system is overseen and managed by the following departments:

- The Department of Public Works (DPW) designs and builds sanitary sewer infrastructure funded through the City's Capital Improvement Program. Public Works also reviews and inspects sanitary sewer improvements constructed by private developers and other public agencies. The Sanitary Capital and Master Planning Sections are part of the Transportation & Hydraulics Services Division in Public Works. The primary goal of these sections is to plan, design and construct improvements to sanitary sewer system, in an effort to provide safe and reliable sewer service to the current and future residents/ businesses of San José and contributing agencies.

- The Department of Transportation's Infrastructure Maintenance Division (DOT) performs day-to-day operation and maintenance of the system.

- The Environmental Services Department (ESD) manages the wastewater from the collection system to suitable treatment and discharge into the San Francisco Bay and for beneficial reuse to protect the environment and public health.

[1] Total length was updated in 2019 based on the latest GIS data to exclude sewer mains that were abandoned or owned by adjacent agencies or private developers.

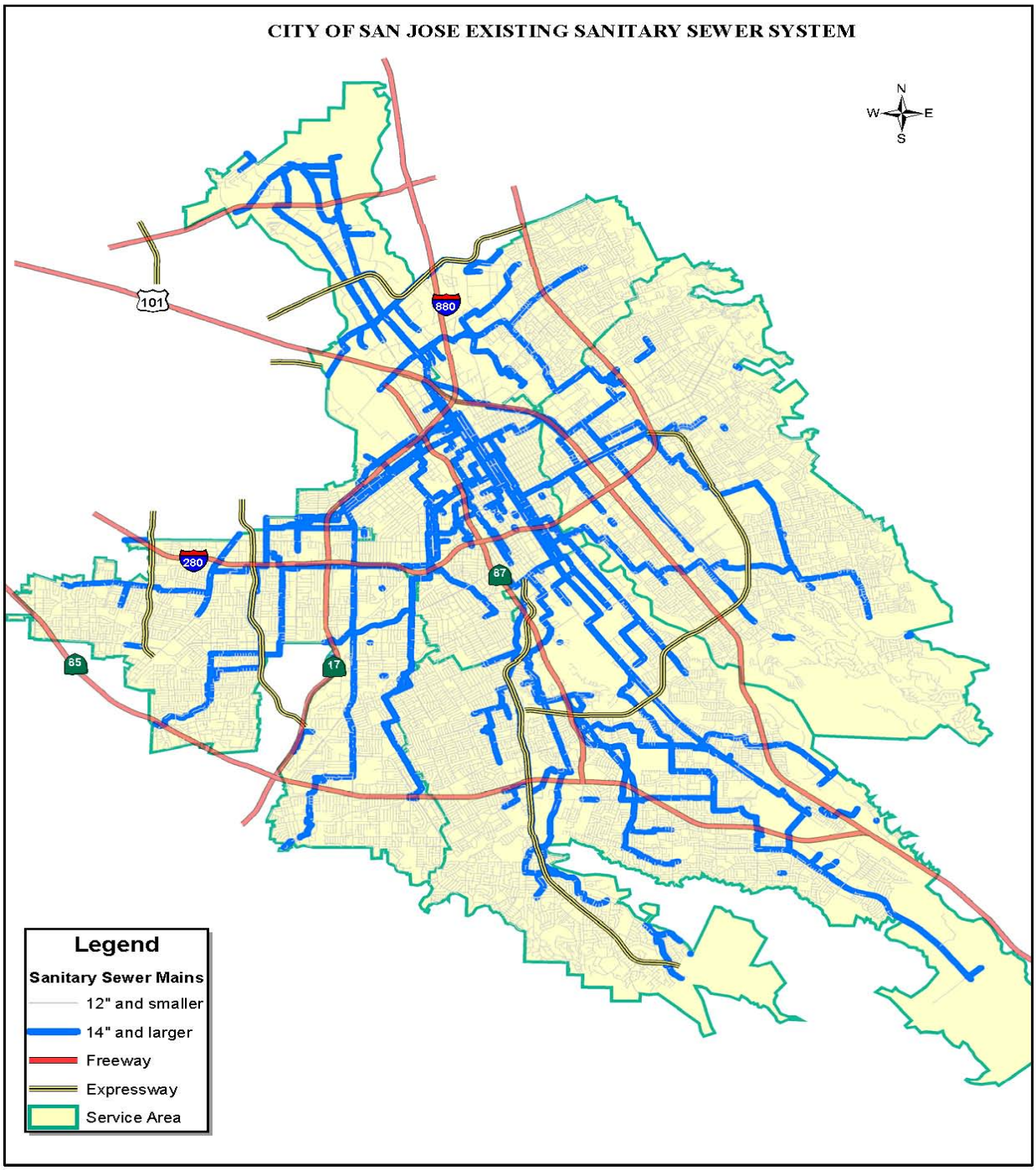


Figure 1 - City of San Jose Sanitary Sewer System

II. PROGRAM FUNDING

A. Adopted FY 2020-21 CIP Budget Revenue

Primary sources of funding include an annual transfer from the Sewer Service and Use Charge Fund, the Sanitary Sewer Connection Fee, and joint participation revenues. The Sewer Service and Use Charge Fund provides funding for capital improvement projects through the Sewer Service and Use Charge Capital Improvement Fund.

Sanitary Sewer Connection Fee Fund (Fund 540 - $2,670,262; 5-Year CIP) – Connection fees are charged to developers for connecting to the City's sanitary sewer system. Funds are restricted to the construction and reconstruction of the sewer system.

Sewer Service and Use Charge Capital Improvement Fund (Fund 545 - $51,055,270; 5-Year CIP) Sewer service and use charges are collected from existing property owners of the City. This funding accounts for the majority of the construction and rehabilitation of the sanitary sewer collection system.

Joint Participation Revenues ($2,930,000) – A portion of West Valley Sanitation District's, County Sanitation District 2-3, and Cupertino Sanitation District's sewage flows through the City's collection system. This revenue consists of the respective agencies' fair share contribution for the City's expenditures on capital improvements on the shared system.

B. Adopted FY 2020-21 CIP Budget Expenditures

The Sanitary CIP Program consists of a $198.2 million, 5-year budget. This funding is allocated between three broad categories which include capacity improvements, rehabilitation and non-construction activities.

Capacity improvements are identified through the on-going collection of flow monitoring data which is input into the computerized hydraulic model of the sewer network. Improvements are based on existing capacity needs projected with the build out of the Envision 2040 General Plan. Projects in this category generally consist of upsizing of existing sewers or installation of new sewers designed to reroute sewage flows from under capacity sewers to sewers with more capacity.

Rehabilitation projects originate from on-going maintenance history and results of the closed-circuit television inspection and condition assessment programs. Projects typically consist of removal and replacement or rehabilitation of structurally compromised and root/grease prone sewers. Also included in this category is the rehabilitation of pump stations which typically involves upgrading of electrical and mechanical components. Public Works continues to coordinate with the Department of Transportation to identify funding needs to rehabilitate and/or repair pump station facilities (e.g. a roof repair).

The primary expenditures for non-construction activities are for the flow monitoring/ master planning and closed-circuit television inspection/condition assessment programs. Each of these

programs is essential to the planning and prioritization of capital improvements within the sanitary sewer system.

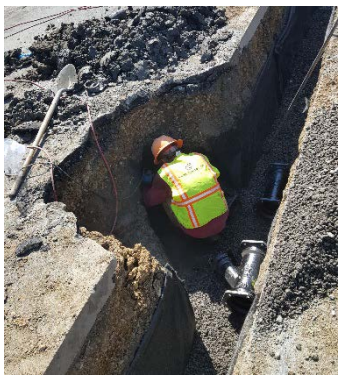
C. Adopted FY 2020-21 Operations and Maintenance Budget Expenditures

The annual ongoing sanitary sewer operating and maintenance budget is approximately $20.7 million, which provides funding for the Department of Transportation administration, engineering, and maintenance.

III. PROGRAM ACTIVITY

A. Neighborhood Sewer Rehabilitation

Approximately 1,750 miles or 85 percent of the City's sanitary sewer system is considered neighborhood sewers. The average age of the neighborhood sewer system is approximately 45 years. These sewers generally consist of smaller diameter (6 to 10 inches) pipes constructed of vitrified clay or cast iron and buried three to six feet deep. These characteristics result in a variety of operational and maintenance issues including root intrusion, grease accumulation, corrosion (of the cast iron sewers), structural damage due to the depth of cover and the array of other utilities common at similar depths as the sewers. For these reasons, the vast majority of sanitary sewer overflows (SSOs) occur in these types of sewers.



During FY 2020-21, twenty-three (23) separate contracts were either awarded and/or completed to address issues in neighborhood sewers. The total value of these contracts was $24.2 million. In order to address these issues in a timely and cost-effective manner, a variety of types of construction contracts and methods were implemented. Traditional remove and replace contracts were utilized for cast iron sewer replacements and for system replacements which required changes in horizontal or vertical alignment. Changes in alignment are typically necessary to improve flow and prevent grease accumulation. Rehabilitation contracts, which consist of insertion of a liner into the existing sewer or pulling in a new polyethylene pipe while breaking the old pipes, were utilized to repair sewers with mild to moderate damage and prevent root intrusion. Point repair contracts, which consist of multiple locations under a single contract, were utilized to repair sewers which had severe localized structural damage.

Capital projects on neighborhood sewers are often developed to address on-going, repeated maintenance activities by the Department of Transportation. Despite the previous year's delays caused by the COVID-19 pandemic and support staff shortages, one Cast Iron Replacement project was awarded and four projects were completed in FY 2020-21. The completed projects replaced 16,380 feet of old and corroded 6-inch and 8-inch cast iron sewer pipes with a more corrosion resistant ceramic-lined ductile iron pipe at a total cost of $5.6 million. In addition, several Sewer Rehabilitation and Replacement projects were completed in FY 2020-21 at a total cost of $7.9 million to address structural defects found in the system at various locations throughout the City

in an effort to reduce SSOs. In addition to the capital projects mentioned, city crews from the DOT Sewer Repair section completed 747 sanitary sewer point repairs.

Prior to these projects, the sewer systems in many of these areas required regular cleaning by DOT maintenance staff on a monthly to weekly basis due to heavy grease accumulation, corrosion, and root intrusion in the sewer main pipes. Each cleaning effort consisted of an average of four hours with a two-person crew with a combination of vactor/flushing truck.

The combined effort of capital improvements and the Department of Transportation's cleaning and maintenance program has resulted in a continued reduction in the number of SSOs, down from 192 in FY 2011-12 to 35 in FY 2020-21, as shown in Figure 2.

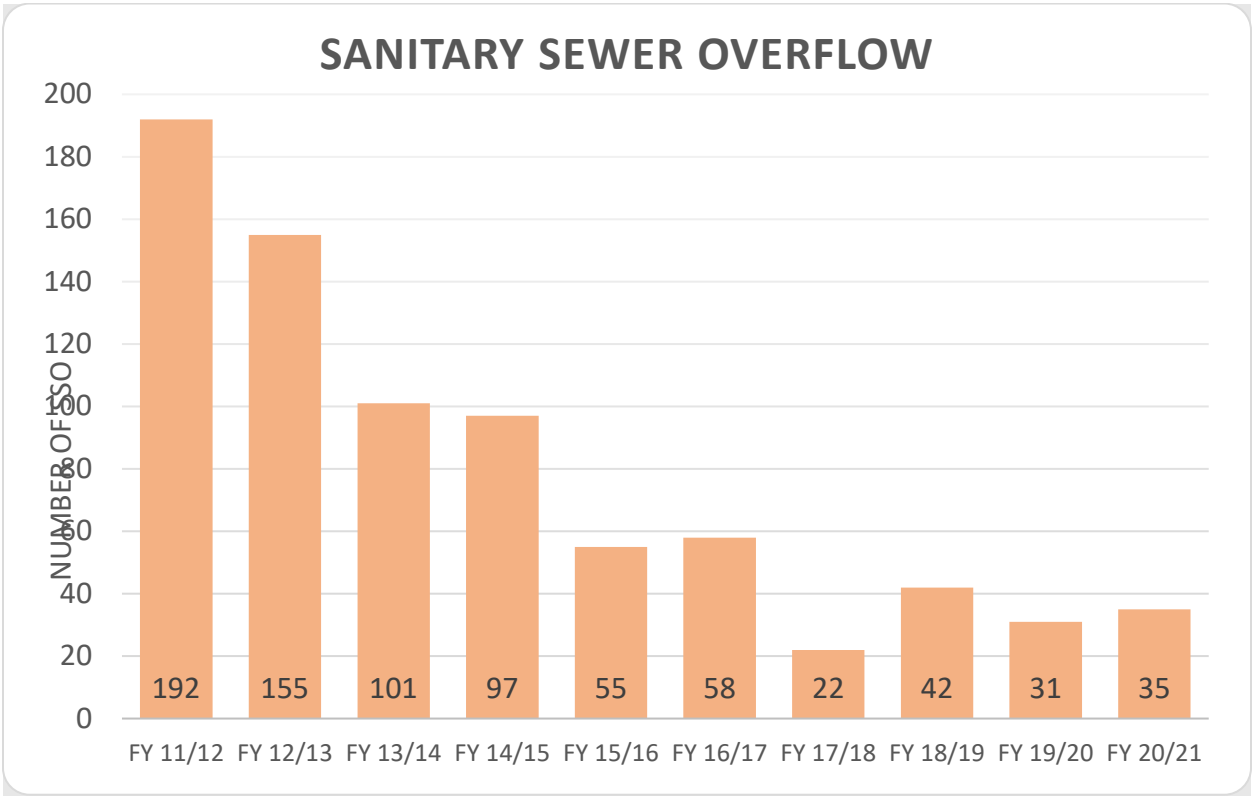


Figure 2 – Sanitary Sewer Overflow Summary

B. Exfiltration Abatement Program

In mid-2016, to resolve a lawsuit brought by San Francisco Baykeeper ("Baykeeper"), a California non-profit corporation, and with neither party admitting liability, the City and Baykeeper entered into a Consent Decree to resolve any potential Clean Water Act claims. The City agreed to develop and implement an Exfiltration Abatement Program in order to minimize the risk of wastewater leaking out of the sanitary sewer pipes and entering into an adjacent storm sewer system. The Consent Decree requires the City to identify all High-Risk sanitary sewer pipes and repair or rehabilitate these pipes within the next ten (10) years. High-Risk pipes are sewer segments that meet all of the following conditions:

1. Sewer segments that are constructed of vitrified clay or reinforced concrete,
2. Sewer segments that cross above a storm pipe, or are above and within ten (10) feet horizontally of storm pipes,
3. Sewer segments that are fifty years or older with a condition assessment that identifies that the segment has a medium to severe crack, offset joint, or some other high grade structural defect per the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certificate Program (PACP) standards, and,
4. Sewer segments that are above the water table.

Sanitary sewer segments that are considered High-Risk will be repaired/rehabilitated by the City at an average rate of 6.5 miles annually and totaling 65 miles over the 10-year term of the Consent Decree. To ensure that the City of San Jose addresses as many High-Risk pipes as possible in FY 2020-21, seven Sanitary Sewer Repair projects were completed. The High-Risk sanitary sewer pipe segments on these projects were either replaced, repaired, or rehabilitated for a total of approximately 12.7 miles and a total cost of 7.9 million. This commitment exceeds the minimum requirements of the existing Consent Decree.

C. Pump Stations

The average age of the City's 17 sanitary sewer pump stations is approximately 33 years. These facilities are listed in Table 1. The standard design-life of the mechanical and electrical components of pump stations are 10 to 25 years. Due to the wide range of pumping capacity for each station, the total cost to rehabilitate and/or replace these pump stations can range between $2 million and $10 million each.

Generally, the structural rehabilitation of a pump station would prolong the life and improve the reliability of the system; similarly, the upgrades of the electrical, mechanical and data communication components will allow staff to monitor and operate these pumps remotely and also reduce the maintenance effort required to keep these pump stations operating effectively.

Table 1 – Sanitary Pump Stations

Sanitary Pump Stations and Other Facilities (Alphabetical Order)		
Name	Year Built	Year Rehabilitated/Status
Pump Stations		

1. Basking Ridge	2006	Pumps replaced by DOT in 2011
2. Brookside	2013	New pump station
3. Communications Hill	2007	To be abandoned with Communications Hill Phase 3 public improvements in 2021.
4. Gateway	1988	Initial assessment in progress; possible abandonment/rehabilitation
5. Happy Hollow Zoo	1967	Pump replaced in 2009
6. Junction	1979	*
7. Lamplighter	1984	Force main condition assessment completed in 2008
8. Margaret	1952	*
9. Montague	1978	Design for replacement completed and pending easement acquisition
10. Nordale	1960	Rehabilitated in 2018
11. Nortech	1983	Condition assessment in progress
12. Padres	2012	New pump station constructed in August 2012
13. Ridder Park	1982	*
14. Spreckles	1975	Rehabilitated in 2014
15. Tea Garden	1986	Rehabilitated in 1997
16. Willow	2003	Rehabilitated in June 2019
17. Zero Waste (Los Esteros)	2014	*
Other Facilities (Odor Control Stations)		
18. Canoas Ferrous Chloride Injection	1962	Tank replacement in 2018
19. Canoas Soil Bed Filter	1994	Planned for assessment
20. Zanker Soil Bed Filter	1995	Condition assessed in 2008; planned for re-assessment

** No information on status*
San Felipe Pump Station was removed from service in 2019

In FY 2020-21, approximately $1.8 million was allocated to complete the rehabilitation and upgrade of various pump station projects.

Montague Sanitary Pump Station - This station is located at the southeast corner of the intersection of Montague Expressway and North First Street. Built in 1978, the pump station has been offline since the mid-1980s as the pumping capacity of this station has been accommodated by the Lamplighter pump station to the north. The upgrade of Montague Sanitary Pump Station is necessary to accommodate anticipated future development in the area. Staff completed the design, and along with the City's Real Estate Division, they are in negotiations with the new property owner adjacent to the existing pump station to acquire a larger easement for the pump station expansion. The project will be advertised for bid and award as soon as negotiations to acquire larger easement is finalized.

D. Interceptor and Capacity Improvements

The interceptor system between the RWF and approximately Empire Street consists of four parallel large diameter (60 to 90-inch) sewers. The locations of various reaches of the system are designated by Phases I through VII, with Phase I located furthest to the north entering the RWF and Phase VII located near Empire Street, accepting flows from major trunk sewers. This system conveys approximately 80 percent of the total wastewater flows to the RWF. A schematic diagram of the interceptor system is shown in Figure 3 below.

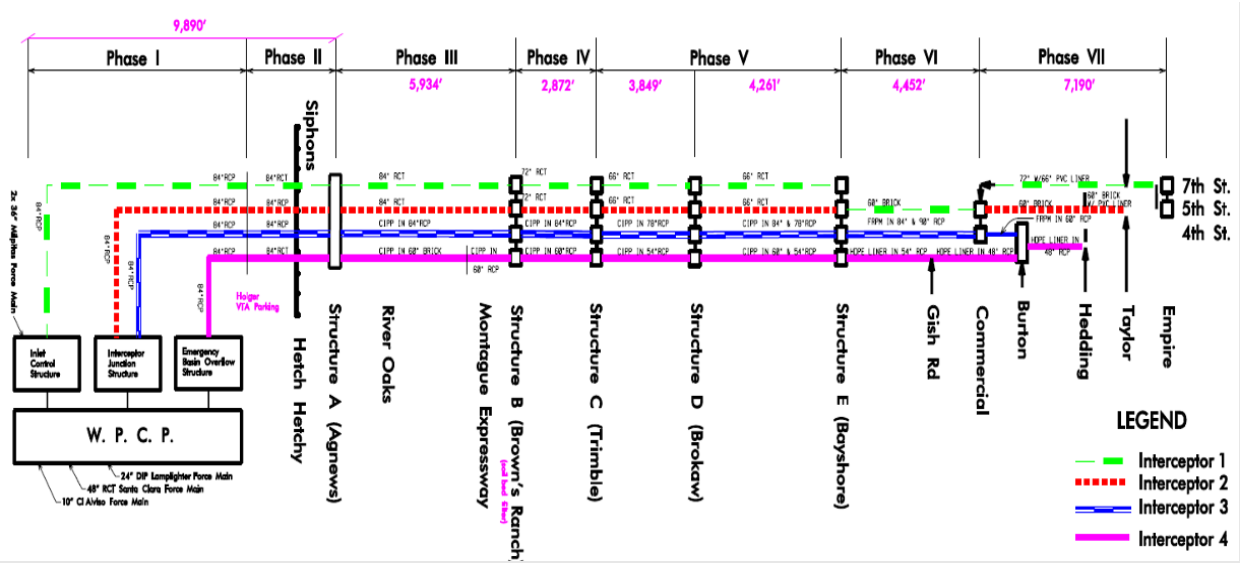


Figure 3 - Sanitary Sewer Interceptor System

Capacity improvements to the interceptor system between the RWF and U.S. Highway 101 (Phases I through V) have been completed over the last two decades. Phase VI has the primary focus on improvements along North Fourth Street between U.S. Highway 101 and Commercial Street. This phase consists of upsizing approximately 5,000 feet of 54-inch diameter sewer to 84-inch. A design-build contract in the amount of $42.5 million was awarded in May 2018 to complete the design and construction of the project. Construction of the Phase VI project had started and the tunneling operation to construct the interceptor crossing under U.S. Highway 101 has been successfully completed. The project is anticipated to be completed in Spring 2022.

Initiation of design for the Phase VII capacity improvements is scheduled in the next few years. When completed, the interceptor system will maintain enough capacity to allow any one of the parallel interceptors to be taken out of service during dry weather for maintenance and/or rehabilitation. The project will also review and evaluate potential odor concerns, if any, and address appropriately.

During the FY 2020-21, 3 capacity improvement projects were completed including the Forest-Rosa 5 - Westmont Avenue and Harriet Avenue Sanitary Sewer Improvement, the Bollinger Road - Blaney Avenue Sanitary Sewer Improvement, and a Miscellaneous Capacity Improvement project that included 9 specific locations identified to be in need of capacity improvements. These projects cost a total of $13.3 million. In addition, one capacity improvement project was awarded in FY 20-21 and is currently under construction at an estimated cost of $1.6 million. These improvement projects were developed to upsize the existing sanitary sewer system to improve capacity in the system.

E. Sanitary Sewer Condition Assessment Program

The Sanitary Sewer Condition Assessment (SSCA) Pilot Program was initiated by DPW in 2010. The original pilot project utilized closed circuit television (CCTV) to video inspect and collect data on a 46-mile representative sample of the City's 2,030-mile sanitary sewer system. The results from this study were used to determine the funding need and develop a road map for the comprehensive SSCA program. Likewise, DOT had made investments for additional equipment and personnel in conjunction with its operations and maintenance program which contributes to the SSCA program.

In 2013, the City procured a sanitary sewer asset management software program to develop risk assessments based on an array of the sewer's physical properties and consequence of failure. Since early 2014, City staff utilized the software, along with available CCTV data and maintenance records, to analyze collected data and determine the risk level of the City's sanitary sewer system. Based on the risk levels, staff has developed a priority list of the sanitary sewer basin areas to assess with a goal to inspect all small diameter pipes in ten years. The City of San Jose currently has approximately 1,705 miles of small diameter (10 inch or smaller) sanitary sewer pipes.

Table 2 – CCTV Inspection

Year	Fiscal Year	Miles of Pipeline (from SSCA and CIP)	Miles of Pipeline (from DOT)
0	2010 Pilot and Prior to 2011	123.5	No data
1	2011-2012	26.4	No data
2	2012-2013	222.4	45.2
3	2013-2014	40.8	43.8
4	2014-2015	79.1	67.7
5	2015-2016	91.9	80.7

6	2016-2017	179.7	71.0
7	2017-2018	216.4	84.0
8	2018-2019	130.2	98.0
9	2019-2020	123.4	82.0
10	2020-2021	258.1	118
	Total	**1,491.6 (73.5%)**	**690.4 (34.0%)**

***** *Chart numbers have been revised to reflect actual inspection information in the InfoMaster database. Previous reports were based on funding and contract award period.*

Five CCTV projects totaling an estimated contract cost of $4.1 million were awarded in FY 2020-21. Data for these projects have not been received nor entered in the InfoMaster database as of this report. The miles will be adjusted accordingly in the next report after these projects are completed.

In an effort to minimize sanitary sewer repairs which would necessitate dig outs on a newly paved roadway, DOT video inspected sanitary sewer lines on roads scheduled to be resurfaced as part of the Pavement Maintenance Program. Repair of sewer defects identified on these roadways were coordinated so they were completed prior to paving. To ensure that the new pavement is preserved as long as possible, these segments would be CCTV'd if they were last inspected more than 5 years ago. Therefore, there may be some duplicate inspection miles resulting in the sum of the percentages to exceeding 100%.

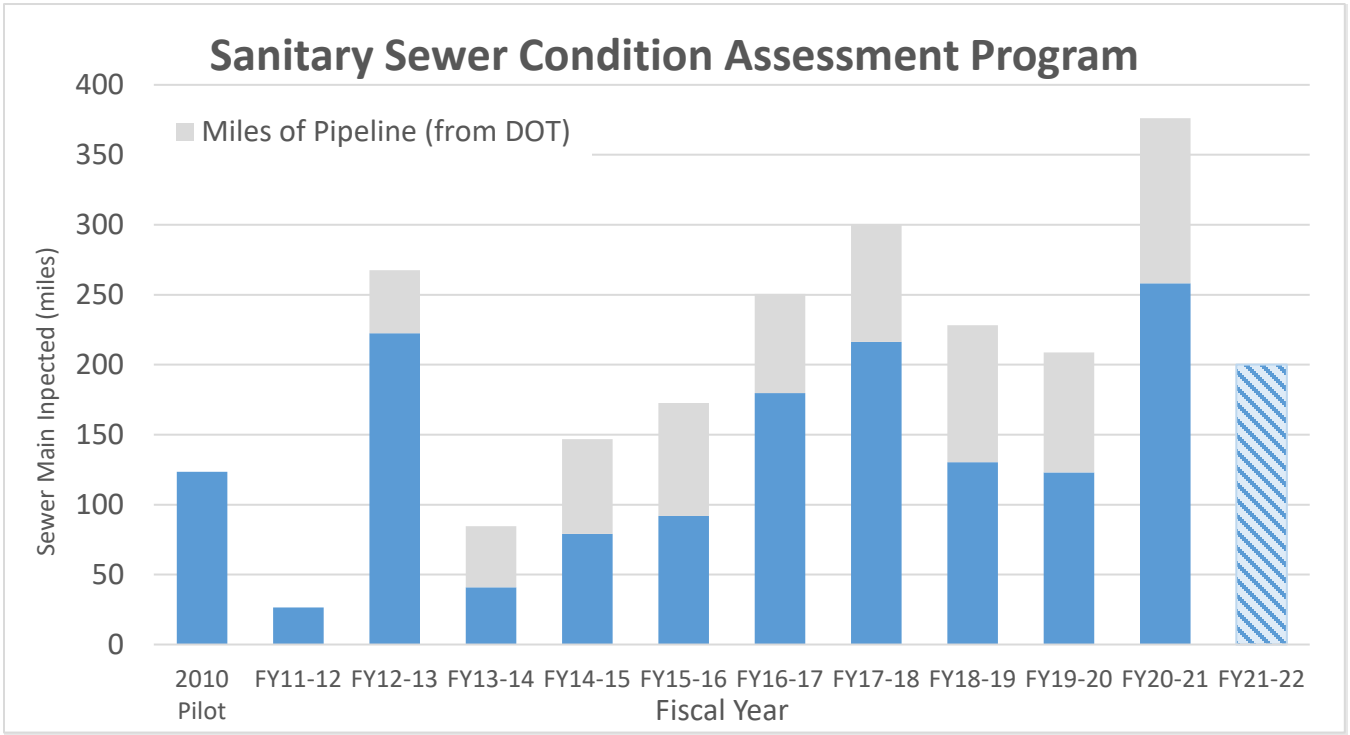


Figure 4 - Sanitary Sewer Condition Assessment

Data collected through PW's CCTV contracts and DOT's cleaning and CCTV inspection program will be used in developing the City's Sanitary CIP program to proactively repair or rehabilitate these pipelines before they fail. A decision tree model has been created to determine the most appropriate repair or rehabilitation techniques for each pipeline. The model will be used to forecast and determine the total cost to repair and rehabilitate the City's sanitary sewer system. As larger data sets are gathered through each year's CCTV contracts, more analysis can be performed to better adjust the decision tree model.

As of the end of FY 2020-21, the City had video inspected 100% of the system's small diameter pipes and is in the process of migrating to an upgraded sewer management system. A cleanup process for some of the older assessment data is ongoing and a longer-term strategy to address larger diameter pipes is forthcoming in FY 21-22.

F. Master Planning

1. Capacity Management

a. Sanitary Sewer Master Plan Studies (Capacity Assessments)

Sanitary sewer collection systems are designed to convey anticipated peak flows, based on current and predicted/planned future demands under both dry weather and design storm conditions. The State Water Resources Control Board (SWRCB) requires sewer agencies to prepare System Evaluation and Capacity Assurance Plans to evaluate the capacity of key system components and hydraulic deficiencies and to develop capacity enhancement measures.

To evaluate the sewer system's hydraulic performance and plan for capacity improvements, the City completed the *Sanitary Sewer Master Plan Capacity Assessment – Phase II and Update of Phase I* (Phase II) study in April 2013. And based on the Phase II Master Plan, the Capacity Assurance Plan was completed in 2017. The Phase II Master Plan evaluated sewer system pipes of 10-inch and larger in diameter. This master plan along with the subsequent detailed master plan study of North San Jose Development Policy Area incorporated Census 2000 population, non-residential water use, latest development and General Plan 2040 land uses, and metered flow information. The Master Plans recommended a CIP program that included 105 cost-effective capacity assurance pipeline improvement projects comprised of the installation of 200,000 feet of relief sewer mains totaling approximately $188 million (2013 dollars). The program level CEQA of the citywide Trunk Sewer Master Plan was approved as an Addendum to the Envision San Jose 2040 General Plan in June 2015.

Since the completion of the Phase II study , the City has begun the Phase III study, which is to expand the Phase II trunk system model to include all smaller diameter (6-inch and 8-inch) pipes of the City's sewer system. As part of the Phase III project, City staff has collected hundreds of manhole survey reports, incorporated both 2000 census population and 2017-2019 water building data into the model, as well as collected flow and rainfall data through the City's ongoing temporary and long-term flow monitoring programs to use for model calibration. Staff also coordinated with the Department of Transportation (DOT) to collect pump station operation parameters in order to build all pump stations into the model.

To date, City staff has completed the all-pipe model development in its entirety. The model now includes all sanitary sewer pipes in the system and all pump stations, and has also been carefully calibrated for both dry and wet weather conditions. By end of this reporting period, City staff has completed a thorough capacity evaluation using the calibrated model, and identified approximately 60,000 feet of sewer piping that, under existing land use conditions, should be prioritized to improve capacity and serviceability in the system. The locations of these pipe segments are shown in Figure 5. Staff will conduct improvement project alternative analysis to find cost-effective solutions to addressing these pipe segments in coming months

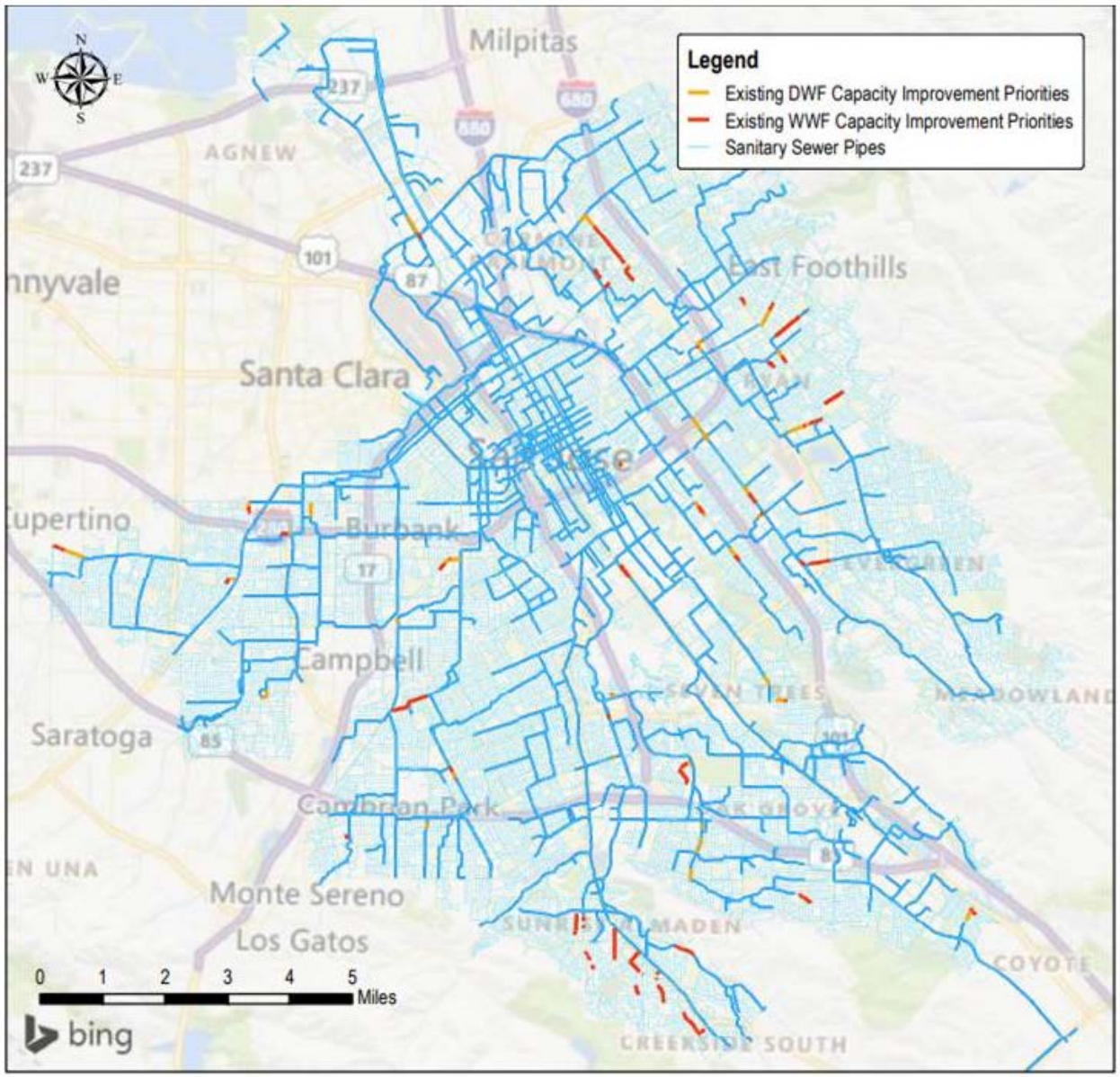


Figure 5 - Sanitary Sewer Capacity Assessment (Phase III All-Pipe Model)

Staff has also built future scenarios to reflect planned growth and land use intensifications per the *Envision San Jose 2040 General Plan*, and will review capacity performance for future land use conditions and identify improvement needs in early 2022.

b. Master Plan Project Confirmation and Implementation

Prior to implementation, each master-plan recommended capacity project will be confirmed by available and/or additional flow monitoring data and by additional modeling. Ideally, flow data should include a period of rainy weather to verify the wet weather deficiencies. If a wet season does not have a large enough storm, additional flow monitoring in another wet season will be needed. This process is repeated until sufficient data is collected and the model shows whether the recommended improvement project is needed or not.

Staff has prioritized master plan projects into a 20-year plan for CIP project implementation. The 20-year plan is updated annually with the results from on-going project confirmation activities. The color-coded map in Figure 6 provides master plan projects implementation schedules and status. To date, the City's CIP has implemented 50 master plan projects, including the Interceptor Phase VII Improvement Project. Out of the 50 projects, nine (9) of them were constructed by private developments. Projects in the "Next 6 to 20 Years" category are improvements needed for near-term and future land use developments and will be re-evaluated for project construction schedule as development projects are built.

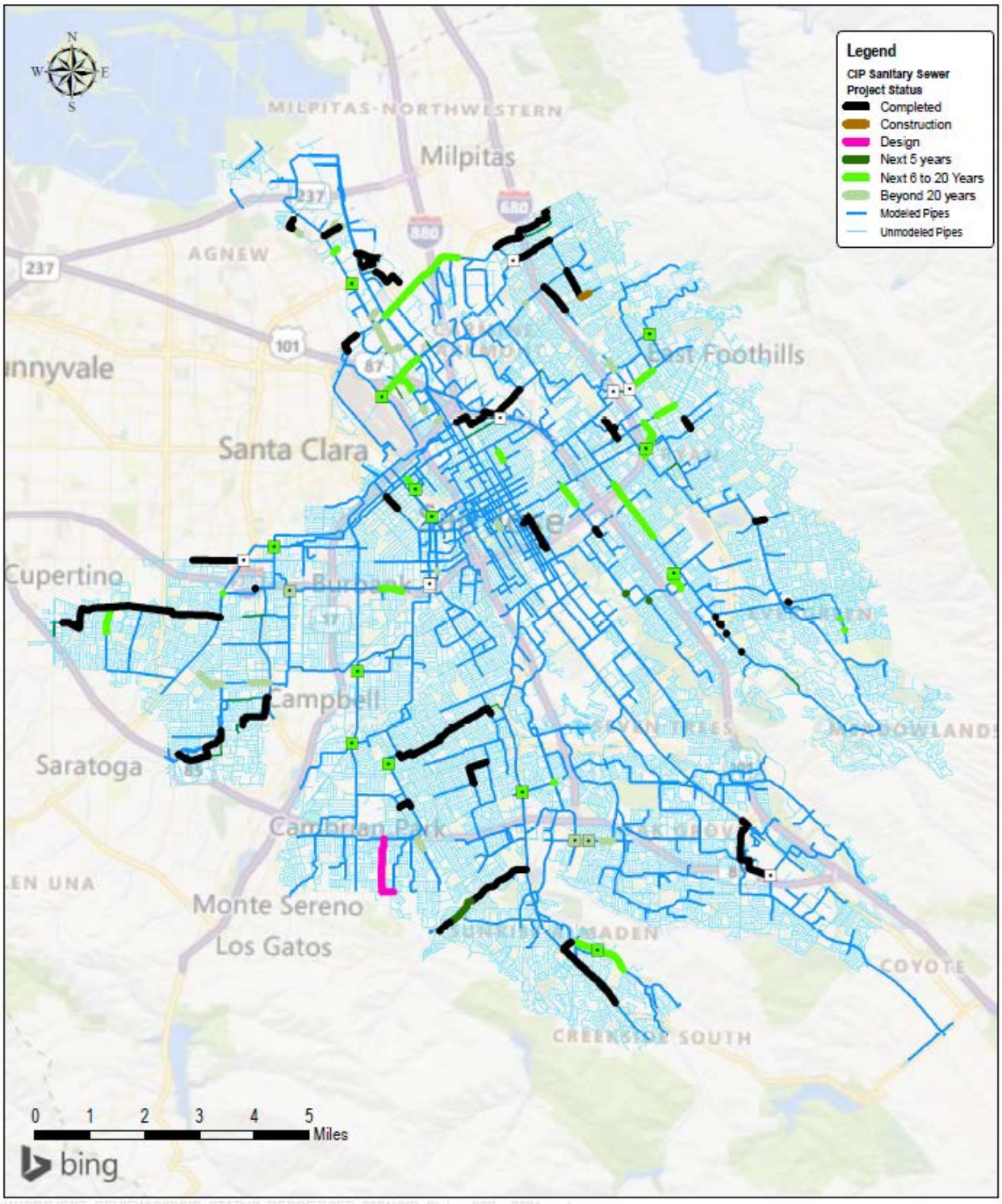


Figure 6 - Master Plan Sanitary Sewer Improvement Project Status

c. Flow Monitoring Program

The City has an ongoing long-term flow/rainfall monitoring program that tracks wastewater flow and groundwater infiltration trends, monitor rain-dependent inflow and infiltration rates, and quantify flows from tributary agencies in key sewer basins. The program currently consists of 36 flow meters and 16 rain gauges. Flow meters in this program are also equipped with alarm devices, which would alert City staff of abnormal flow conditions or potential sanitary sewer overflows.

In addition to the long-term program, the City also conducts temporary flow monitoring on an as-needed basis for various purposes, such as for capacity project confirmations and verifications, review for land use developments and capital improvement projects, sewer operation and maintenance activities, and/or for ongoing model refinement

Staff recently completed a procurement process to retain two engineering firms to provide both long-term and temporary flow monitoring services for the City until the end of 2023. With the completion of key CIP projects that improved existing systems identified in Phase II and the completion of model calibration for Phase III, staff was also able to strategically reduce the number of long-term monitoring sites from 54 locations to 36 locations in 2020.

2. Support for Economic Development

City staff has coordinated with PW Development Services Division, DOT, ESD and Planning Department on an ongoing basis to review and analyze potential sewer capacity impacts for proposed development projects.

Development projects add sanitary flows to the system and may require improving or upsizing an existing sewer system. When requested, City staff would perform capacity analysis using the latest model and recommend improvements as necessary.

During FY 2020-2021, a majority of the proposed downtown and mid-town development projects resulted in the need to improve and upsize the interceptor system between 7th/Empire Streets and Commercial Street. In particular, the Diridon Station Area Development and Downtown West projects would result in the need to improve the interceptor downstream of 7th and Empire Streets.

IV. OPERATIONS AND MAINTENANCE

Funded directly from the Sewer Service and Use Charge Fund, the day-to-day maintenance and operation of the sanitary sewer collection system is primarily the responsibility of DOT. Functions performed by DOT generally include the following:

- Video inspection, cleaning, and removal of grease, rags, roots, and other debris from the City's sewer lines with a focus on local collector lines.
- Repairing localized failures and restored capacity in the City's sewer mains and lower lateral pipes with City-approved cleanouts.
- Inspecting, maintaining, and repairing pumps at pump station facilities.

- Responding to and resolving reported sewer problems.

The primary goal of DOT's maintenance functions is to reduce or eliminate occurrences of Sanitary Sewer Overflows (SSOs) in which untreated sewage escapes the sewer system due to a sewer line blockage or other system malfunction. DOT has invested in and implemented a multi-year plan which has greatly reduced the number and severity of SSOs that occur in the City each year. Specific elements of this plan include the following:

- Assigning specific cleaning frequencies (e.g. weekly, monthly, annually, etc.) to sewer line segments to prevent stoppages in known problematic areas.
- Performing sewer line inspections to identify needed cleaning, root control, and repairs.
- Managing the First Responder Program to ensure timely response to reported sewer problems and prevent and reduce the impact of SSOs.
- Optimizing the Computerized Maintenance Management System (CMMS) and analyzing the performance of the sewer system, identifying and planning effective maintenance strategies, and evaluating and managing the maintenance operations.
- Replacing obsolete and unreliable maintenance equipment and purchasing additional equipment to maximize the efficiency of the maintenance operations.
- Providing training for the sewer line cleaning crews.

Performance data and information indicate that DOT's SSO reduction plan has been successful in reducing SSOs. Table 3 below highlights some of the results achieved by DOT over the past six years.

Table 3 – Performance Improvement Result

Key Indicator	FY 13-14	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Number of SSOs	101	97	55	58	22	42	31	35
SSOs per 100 miles of pipe per year	4.6	4.3	2.4	2.5	1.1	2.1	1.6	1.7
Gallons of sewage spilled to surface water	22,266	49,188	35,018	19,318	3,920	19,823	78,166	64,872
Percent of reported sewer problems responded to within 30 minutes	74%	71%	68%	69%	66%	57%	48%	46%
Percent of SSOs responded to within 30 minutes	86%	89%	81%	91%	86%	83%	87%	94%

Miles of sewer lines cleaned	984	1035	993	936	942	1,021	752	819

Note: Prior to FY 2012-13, DOT's timeliness standard for responding to reported sewer problems was 4 hours.

From FY 15-16 to the present, the results show a consistent downward trend in the number of SSOs, indicating that the investments and improvements made by DOT to reduce SSOs have paid off. The most significant contributor to the year to year variance in the total SSO number appears to be the amount of rainfall. The amount of rainfall during FY 17-18, was about half the normal amount of a typical storm season. The rainfall during FY 15-16, FY 16-17, and FY 18-19 was consistent with a typical storm season while the rainfall in FY 19-20 and FY 20-21 was light which shows the consistent trend. The number of gallons of sewage lost to surface water increased in FY 2020-2021 due to one large overflow. DOT restarted the Root Control program in FY 2018-2019, and continued it in FY 2020-2021, applying treatment to more than 21,000 linear feet of pipe in each fiscal year. The rate of response to reported sewer problems within 30 minutes has continued to decrease slightly from a high in FY 2013-14 because of various factors, such as the reduction in staff hours during shelter-in-place (SIP), and increase in traffic congestion during rush hours, which may be attributed to recent economic growth in the region.

Currently, DOT receives approximately $20 million in on-going funding each year to maintain and operate the sanitary sewer collection system. In FY 2015-2016, DOT was funded as a result of the River Watch Consent Decree with $300,000 for creation of a sewer lateral repair grant. The program launched in October of 2018 and will continue until the funds are exhausted. Going forward, DOT expects the performance of the sanitary sewer system and the productivity of maintenance staff will be sustained with continuous investments in equipment, training, and personnel. Most notably, DOT is migrating the existing CMMS to a more advanced and capable Unity system and investing in additional technology. Staffing alignments will continue to be analyzed to optimize field productivity, data collection and overall sewer system management.

V. CONCLUSION

The Sanitary Sewer Capital Improvement Program continues to utilize strategic planning tools such as the Sanitary Master Plan and Condition Assessment program, in addition to input from our Operations and Maintenance partners in the Department of Transportation, to prioritize and implement improvements to the sanitary sewer system. Construction of these improvements will ensure safe and reliable sewer service to current and future residents/businesses of San José and tributary agencies. Increasing regulatory oversight, reducing SSOs, and supporting economic development all require continued investment in active management, maintenance, and improvement of the City's 2,030 miles of sanitary sewer system. Increased capital funding for the sanitary capital program has increased our ability to maintain and enhance the system. The $32 million annual transfer which began in FY 2015-16, while still being short of the targeted revenue of $37 million per year, has allowed staff to deliver projects and clear up most of the backlogged repairs. The ending fund balance was reduced significantly after the award of the Phase VI interceptor project of over $42 million in FY 2017-2018, and the accumulated ending fund balance has been further reduced.

- Thirteen (13) capital projects were awarded and nineteen (19) capital projects were completed to improve the capacity, restore the integrity and conveyance of the system, and/or reducing maintenance costs and the probability of SSOs and/or blockages. As a result of the recent pandemic some projects were delayed but, they are currently scheduled to be completed this upcoming fiscal year.
- The Master Plan program has helped reduce the cost of development by providing efficiency in the sewer capacity review process and finding cost-effective measures to improve sewer capacity needed for land use development.
- 30,818 linear feet of structurally inadequate sewer were removed and replaced.
- 76,013 linear feet of moderately deteriorated sewers were rehabilitated.
- 376 miles of sewers were inspected by closed circuit television inspection.
- The Sanitary Sewer Master Plan was continually updated and calibrated to develop and prioritize sanitary sewer capacity projects.
- The Condition Assessment program was developed and assists with development of a prioritized and proactive rehabilitation program.
- More than 810 miles of sewer lines were cleaned.
- The continued development of the Computerized Maintenance Management System and technology enhancements have contributed to planning effective maintenance strategies in order to maximize efficiency.