



# Memorandum

**TO:** HONORABLE MAYOR  
AND CITY COUNCIL

**FROM:** Kerrie Romanow  
Matt Cano  
Jim Shannon

**SUBJECT:** SEE BELOW

**DATE:** March 29, 2021

Approved

Date

4/1/2021

**SUBJECT: CONSTRUCTION CONTINGENCY INCREASE FOR THE 7382-DIGESTER AND THICKENER FACILITIES UPGRADE PROJECT AT THE SAN JOSE-SANTA CLARA REGIONAL WASTEWATER FACILITY**

## RECOMMENDATION

- (a) Approve a \$14,000,000 increase to the construction contingency amount of \$53,490,625 for a revised total contingency amount of \$67,490,625, increasing the not-to-exceed amount from \$161,415,625 to a total revised contract amount not-to-exceed \$175,415,625 for the 7382 – Digester and Thickener Facilities Upgrade Project.
- (b) Adopt the following 2020-2021 Appropriation Ordinance Amendments in the San José-Santa Clara Treatment Plant Capital Fund:
  - (1) Decrease the Nitrification Clarifier Rehabilitation appropriation to the Environmental Services Department by \$14,000,000.
  - (2) Increase the Digester and Thickener Facilities Upgrade appropriation to the Environmental Services Department by \$14,000,000.

## OUTCOME

Approval of the recommended construction contingency increase will provide funding for the additional work and delays encountered in the last two and a half years of construction of the 7382-Digester and Thickener Facilities Upgrade Project (Project) at the San José-Santa Clara Regional Wastewater Facility (RWF). Approval of the appropriation ordinance amendments will permit the increase to the construction contingency this fiscal year.

## **EXECUTIVE SUMMARY**

In May 2016<sup>1</sup>, the City Council awarded a contract for the construction of the 7382-Digester and Thickener Facilities Upgrade Project for \$107,925,000, with a construction contingency of \$13,490,625. Construction began in July 2016 and is approximately 94% complete to date.

During the early stage of construction, the Project encountered significant unforeseen issues that necessitated adding scope to the project, resulting in a delayed schedule and increased costs. In November 2017<sup>2</sup>, City Council approved a \$15.0 million increase to the construction contingency to address a multitude of unknown conditions, utility relocations, major repairs to large diameter deteriorated piping, and delays to the Project caused by changes in regulatory conditions. Staff informed City Council then that a future contingency increase would be required to resolve seismic design and hazardous materials issues. In June 2018<sup>3</sup> City Council approved a \$25.0 million increase to the construction contingency to address those issues. Costs covered by the contract's original contingency and these increases include structural modifications to the digesters to address seismic design issues (\$14.3 million), a new reroute pumping system and repairs to the 78-inch settled sewage pipe (\$14.2 million), associated delay costs (\$10.0 million), additional work to address unexpected changes in regulatory requirements (\$3.0 million), and hazardous materials mitigation (\$2.0 million).

This memorandum describes further unforeseen conditions, additional requirements and other challenges encountered on the Project since mid-2018 and the resulting increased cost and delay anticipated as a result. The most significant reasons for additional costs are for the need of additional civil work outside the original scope, including grading, drainage, and paving; a very complex testing, start-up, and commissioning process; integration of new controls with existing legacy systems, and the discovery of digester leakage due to the age of the structure. In addition, the Project has also experienced additional costs and delays associated with new COVID-19 mandatory compliance requirements. Staff is proactively working to minimize the remaining cost impacts and will return to City Council at a later date once the analysis is completed and more information is known.

Approval of the recommended contingency increase of \$14,000,000 will allow the Project to proceed toward completion. Staff will return to the City Council in FY 2021-22 with further recommendations to increase the contingency related to the currently unnegotiated delays, potential inefficiencies, and COVID-19 claims. Staff is exercising due diligence and involving an expert project controls consultant to evaluate delay claims, minimize delays, and verify costs. Any necessary budget adjustments will be included in the 2021-2022 Proposed Capital Budget and 2022-2026 Capital Improvement Program to address these cost increases.

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<sup>1</sup> May 24, 2016: [http://sanjose.granicus.com/metaviewer.php?view\\_id=&event\\_id=2137&meta\\_id=573928](http://sanjose.granicus.com/metaviewer.php?view_id=&event_id=2137&meta_id=573928)

<sup>2</sup> November 28, 2017: <https://sanjose.legistar.com/LegislationDetail.aspx?ID=3213847&GUID=0FA9A966-5DA0-4FC3-B8F6-1B1D07A7373A>

<sup>3</sup> June 12, 2018: <https://sanjose.legistar.com/LegislationDetail.aspx?ID=3514676&GUID=B39B4EC3-4007-431C-B2A1-70C94FCBC022>

## **BACKGROUND**

This Project follows the premise of the Plant Master Plan (PMP) to rehabilitate existing infrastructure at RWF and is the most complex and extensive in the RWF's Capital Improvement Program (CIP). It includes work in underground tunnels and galleries, installations of up to ten different piping systems, expansion and renovation of existing tanks, and new electrical, mechanical and control systems. It replaces and connects new facilities and structures to others that have been in continuous operation for 30 to 60 years. Prior Council memos, linked above in the Executive Summary and attached to this report (Attachments A, B and C), provide significant and detailed information about the Project need and scope, and challenges encountered, as well as previous Council authorizations for increasing construction of the Project.

Despite the considerable amount of work performed during the planning and design stages to identify potential risks to the Project, the full amount and complexity of these challenges have been beyond those reasonably foreseen back in 2013. During construction, many issues have arisen that are reflective of the complex nature of performing rehabilitation work at an aged operational facility. Some of these impacts have been consistently encountered since the beginning of construction (missing or inaccurate record drawings, unforeseen underground conditions, etc.) and some are newly encountered as construction is completed and commissioning starts, such as unexpected leaks in the existing digesters.

The majority of the previous contingency increases were used to address issues that were unforeseen and not part of the Project's original scope (e.g. replacement of deteriorated pipe, unexpected regulatory requirements, seismic retrofits and PCB remediation). These issues have been resolved and all work is completed. Construction of the original Project scope is approximately 94% complete. Work completed to date includes the new elevated gas pipe rack; rehabilitation of four digesters and six Dissolved Air Flotation Thickener (DAFT) tanks; installation of two new flares; construction of two new electrical buildings; construction of a new sludge screening building, and odor and polymer systems. All work identified under the first and second contingency increases has been completed.

## **ANALYSIS**

As of February 1, 2021, the Contractor had given notice of approximately \$4.9 million in needed changes, which consist of \$3.2 million to address unforeseen ageing infrastructure, \$1.4 million to address startup complexity, and \$0.3 million to address additional impacts due to design changes.

*Unanticipated impacts due to aging infrastructure*

Due to the age of the facility and the extent of area that is affected by the work, staff anticipated that a full set of record drawings that depicts all details of the existing infrastructure would be lacking, however, the degree of insufficiency or inaccuracy has been much greater than expected. This has resulted in the constant need of re-design during construction to remove conflicts between the new works and existing underground infrastructure. This has increased the need for additional and reworked designs as well as additional grading, drainage and paving. The following categories cover the issues that the project has encountered associated with the age of the facility.

1. **Digester Leaks** - Two of the four digesters (Digesters 5 and 6) were recently tested with water after the completion of structural rehabilitation, prior to the introduction of sludge, and both are leaking in excess of contract specifications. Investigations are ongoing to determine the cause of the leaks and the repairs needed, but it is not apparent that the leaks are associated with new equipment installation or structural changes (i.e., contractor responsibility), and it may be related to the previous conditions of the structures (i.e., owner responsibility). The tanks being rehabilitated had been out of service for several years even before planning started in 2013. At present, \$250,000 has been paid for divers to inspect two tanks, another digester is undergoing crack sealing at locations that were not evident at the time of design and staff is working with the designer to resolve the issue. It is estimated that costs of approximately \$1.0 million may be incurred to address the leakage.
2. **Additional Civil Work** – Additional civil work was needed for the additional excavation associated with rerouting of piping, additional improvements, site grading, curbs, gutters, walkways and street paving. The area disturbed by excavation for the project has cost twice as much than originally estimated due to unforeseen buried utility conflicts that could not have been known prior to construction.
3. **Coordination With Other CIP Projects** - Coordination with other CIP projects has required this project to make additions to the original scope to respond to the needs of the program. As an example, to address future drainage conditions, the Contractor, directed by the City, increased the size of a storm drain in a street that was already being excavated to avoid re-excavation in the future and to eliminate the work from the forthcoming Storm Drain System Improvement Project (\$0.5 million). In addition, to accommodate needs for the Cogeneration Project and provide additional operational flexibility, this Project added a hot water loop to the elevated pipe rack, including necessary structural support (\$0.2 million).
4. **Additional and Redesigned Pipe Installation** - The project has consistently encountered conflicts with existing utilities underground and in the tunnels. This included multiple and complex rerouting of electrical duct banks and large piping along tunnels, roadways and buildings. The extent of this work could not have been known by the Contractor

prior to bid. As such, special construction sequences had to be developed to minimize traffic disruption and extensive research was required to minimize temporary process shutdowns during the complex installation. The original plans called for new piping to be supported or “hung” from the ceiling of the tunnels and galleries. However, once construction started, it was found that the tunnel concrete and pipe supports were more deteriorated than originally assumed, resulting in multiple pipes having to be supported from the floor instead. Each design by the Contractor, sometimes with up to 700 pages of calculations, was reviewed and approved by the designer before the Contractor could order, deliver, fabricate, and install each support.

5. Safety-Driven Changes - Several changes were required for safety reasons to the electrical and fire systems. Up to five years passed between project design and inspection. Fire Department plan checkers approved plans under earlier codes than those relied upon by inspectors even a few years later, requiring some updates.
6. Integration With Distributed Control System (DCS) - Another consequence of the age of the facility is the need to integrate new controls with the legacy DCS which was installed 30 years ago. This Project was originally scheduled to be complete before internal DCS upgrades were started and was designed to connect to the legacy units. Due to Project delays, some of the new control systems had to be reprogrammed to integrate into the new DCS system.

#### Complex Testing, Startup and Commissioning (TSC) Processes

Over 300 individual process shutdown requests have been necessary to temporarily interrupt treatment processes to connect new equipment with legacy systems. Many more are expected. To date, this category of TSC impacts amounts to almost \$1.4 million.

Multiple changes were needed to prepare for easier TSC activities, to improve process efficiency and reduce the time and cost of maintaining the new equipment. Improvements were identified which will return greater benefits during the life of the equipment. These changes created flexibility for sludge routing during startup, moved buried pipe for easier access to equipment on the ground, revised the orientation of a sampling station, increased pipe size for additional flow, and added overflow sensors.

Changes were also needed to improve DCS programming. Control strategies explain how each piece of equipment is to be controlled and integrated. In the industry, they are written generally and then the details worked out during process training and startup. Valuable information is revealed during operational testing that requires additional control programming and corrections to previously programmed controls.

New and revised programming is costly for several reasons. Operators explain how the legacy system is controlled then the designer explains differences in how the new system will be controlled, then edits the control strategies to include all details. The system integrator, as a

subcontractor to the General Contractor, programs the controls and returns multiple clarifying questions to the designer who works with the Contractor's startup coordinator and the operators to answer them. The system integrator also continues to carry out additional work under a separate contract with RWF for the DCS Upgrade Project and under contracts with every other construction project. To remedy these inefficiencies, RWF will be proposing to add specialist controls staff in 2021-2022 to assist in this effort on future projects.

Additional programming included trending for the new flare to ensure efficiency and permit compliance, flexible control options for the DAFT bottom sludge pumps, and integration of the HVAC and Fire systems in the new sludge screening building, a requirement that was not evident earlier during Fire Department plan review. The volume and complexity of these changes could not have been contemplated during design.

*Additional Impacts as a result of Design Changes during Construction*

Resolution of the seismic issue required installation of large, wide and deep concrete foundation rings around each digester. This caused significant impacts to the mechanical piping, pumps, gas compressors and their supporting concrete pads in the order of \$300,000. Some of this complex pipework had to be elevated, requiring design of additional structural supports, with other pipework moved below ground or into the tunnels. When the designer evaluated the new concrete equipment pads to ensure they met edge clearance and anchorage requirements, the pads had to be made larger further limiting the space available.

*Delay Costs since 2018*

The City issued the Notice to Proceed for construction on June 22, 2016 with an original contract duration of 790 workdays. Project duration was extended first by 140 workdays due to regulatory changes as approved by Council in November 2017. It was again extended by 133 workdays due to impacts of seismic re-design and the finding of hazardous materials (PCBs) on site and approved by Council in June 2018. The Time Related Overhead (TRO) for the 2017 and 2018 delays was approximately \$23,000 per day. TROs cover project staff, vehicles, equipment, on-site and off-site office and administrative expenses, escalation for the price, risk premiums for additional work, and subcontractor overhead.

The Contractor has since made three claims for additional time, totaling 237 delay days since 2018, which have been caused by the high number of changes that are diverting their efforts to complete the original scope of work. Three years have passed since the first delay in 2018. During this time, costs have escalated due to inflation and the overall contract time has been extended significantly. With each delay, the construction insurance carrier increases the Builder's Risk based on the new contract and contingency amounts. The Contractor has incurred more Builder's Risk costs than they have billed. At this point, the Contractor has updated TRO costs to \$38,413 per day to reflect these changes, which would be equivalent to \$9.1 million. Staff is exercising due diligence and involving expert project controls consultant to evaluate

delay claims, minimize delays and verify TRO costs. Once actual delay days and compensation are negotiated, the City will memorialize them in a contract change order.

The Contractor has continued to work in good faith pending resolution of delay claims. The effect of each change on the schedule is recorded in their monthly Time Impact Analysis (TIA) on most of the change orders executed since the 2<sup>nd</sup> contingency increase, the Contractor has reserved the right to later claim TRO. The full delay impact will not be known until construction is completed in late 2021.

In addition, the continuation of work under COVID-19 pandemic has also increased costs to the Project to address new regulatory requirements, delays in the supply chain and additional time for work due to social distancing protocols and staff screening. The City has received claims from the Contractor to address these new conditions and staff is working to ensure a consistent approach is taken for all capital projects in the City. This impact will be negotiated with the Contractor in the future.

Costs for these currently known changes are shown as Known Additional Need in Table 1, below.

Table 1 – Approved/Pending Change Orders and Known Additional Needs

<b>Reason for Contingency Use</b>	<b>Approved &amp; Pending CCOs (Previous Contingency)</b>	<b>Known Additional Need</b>	<b>Total</b>
Unanticipated impacts due to aging infrastructure	\$ 10,937,100	\$3,237,419	\$14,174,519
Complex testing, startup and commissioning processes		\$1,355,600	\$1,355,600
Additional Impacts of previous design changes		\$303,100	\$303,100
Delay Costs	\$9,991,240	\$9,103,881	\$19,095,121
Deteriorated Pipe Conditions, Seismic, Hazardous Materials	\$32,562,285		\$32,562,285
<b>Total</b>	<b>\$53,490,625</b>	<b>\$14,000,000</b>	<b>\$67,490,625</b>
Approved Contingency			\$53,490,625
<b>Additional Contingency Required</b>			<b>\$14,000,000</b>

Forecast Costs for Unknown Conditions

Three major costs impacts are not yet negotiated as they remain unknown: COVID-19, potential inefficiencies and further delays. For this reason, staff expects to return to Council later in 2021 to report and request funds for other potential impacts.

In response to the COVID-19 pandemic, each Contractor working at RWF is required to submit COVID-19 plans, hire an on-site illness prevention specialist, conduct screening, maintain cleanliness standards, and purchase necessary supplies. One Contractor has made claims of over \$650,000 for COVID-19 through January 2021. This claim is still to be negotiated and settled.

Further delays may occur, and additional construction tasks may be identified during the upgraded sludge systems start up process. Multiple piping systems, including hot water supply and return, thickened sludge, transfer sludge, recirculating sludge, digester gas and compressed air are necessary to operate the process. Industry estimates are 2 to 12 months for the new microbe population to mature until the full process is underway.

Staff will continue to research and negotiate daily delay fees and ensure that risk premiums are correctly applied. Staff will monitor yet unknown costs and mitigate them where possible. The Contractor and City leadership will continue to manage and negotiate these yet unknown conditions.

### Lessons Learned

This Project was the earliest of its size and complexity undertaken by the CIP and the Program Team has applied lessons learned on this Project to subsequent projects. This has included more extensive assessments of underground conditions, existing structures, operating equipment and the conduct of preliminary hazardous materials surveys. Additionally, given the complexity of the Project and the experience that the Program has gained on other projects, it is likely that if initiated today, the progressive design-build (PDB) delivery method would have been used. However, this delivery method was not available at time of award.

Lastly, although scope changes to projects are to be avoided, the Project Team has also recognized the potential net program value by incorporating scope additions related to other CIP projects. For example, the expenditure associated with the re-route system for this Project has saved the City up to \$3.0 million by avoiding future re-route rentals. Recently the re-route system was used in the Spring 2020 to rehabilitate two additional sections of large pipe and will be reused to rehabilitate further sections of large pipe which are planned to be done as part of the Yard Piping Improvements project.

### CONCLUSION

Staff recommends proceeding with the current contingency increase request and believes the costs to be reasonable to address the unanticipated challenges of changing laws, technological changes, deterioration, startup complexity and other difficulties encountered on the project. Council approval of this third contingency increase of \$14.0 million will allow construction and startup to continue and will ensure that the Contractor is fairly compensated for the negotiated delay caused by the necessary changes.

## **EVALUATION AND FOLLOW-UP**

Since this issue was last presented to Council, staff has continued to limit construction changes to only those necessary, review change pricing and negotiate reasonable costs. A progress report on this and other RWF capital projects is presented on a semiannual basis to the Transportation and Environment Committee, most recently on September 26, 2020. Monthly progress reports of the RWF CIP are submitted to the Treatment Plant Advisory Committee (TPAC) and posted on the City's website.

## **CLIMATE SMART SAN JOSE**

The recommendation in this memo has no effect on Climate Smart San José energy, water, or mobility goals.

## **POLICY ALTERNATIVES**

***Alternative #1: Delete remaining known Potential Change Orders (PCOs) and delay them to a future project.***

**Pros:** Cost savings and fewer time delays.

**Cons:** New Temperature-Phased Anaerobic Digestion (TPAD), primary sludge screening and co-thickening wastewater processes could not be commenced.

**Cons:** Control Programming would be inadequate to operate in compliance with permits and industry standards.

**Cons:** Drainage would be inadequate during storm events preventing Operators and Mechanics from accessing critical equipment.

**Reason for not recommending:** This alternative would prevent project goals from being realized.

## **PUBLIC OUTREACH**

This memorandum will be posted on the City's Council Agenda website for the April 20, 2021 City Council meeting.

## **COORDINATION**

This Project and memorandum have been coordinated with the City Attorney's Office and the Public Works Department.

**COMMISSION RECOMMENDATION/INPUT**

This memorandum is scheduled to be heard at the April 8, 2021 TPAC meeting.

**FISCAL/POLICY ALIGNMENT**

This Project is consistent with the Council-approved focus on improving wastewater treatment efficiency, protecting vital core services, and meeting air permit discharge requirements.

**COST SUMMARY/IMPLICATIONS**

1. AMOUNT OF RECOMMENDATION/COST OF PROJECT: \$14,000,000

2.

Original Construction Contract Amount	\$107,925,000
Original Contingency (12.5%)	\$13,490,625
<b>Original Total Contract Amount</b>	<b>\$121,415,625</b>
Contingency increase #1	\$15,000,000
Contingency increase #2	\$25,000,000
Contingency increase #3	\$14,000,000
<b>Total Contract Amount</b>	<b><u>\$175,415,625</u></b>
Current Project Delivery	\$38,851,375
<b>Total Project Costs<sup>4</sup></b>	<b>\$214,267,000</b>
Prior Year Expenditures and Encumbrances	\$194,464,570
<b>REMAINING PROJECT COSTS</b>	<b>\$19,802,430</b>

3. SOURCE OF FUNDING: 512 – San José-Santa Clara Treatment Plant Capital Fund. Funding in the Project appropriation in 2020-2021 of \$6.3 million is insufficient to increase the contingency. Budget actions are recommended in this memorandum to increase the total appropriation by \$14,000,000. To offset this increase and minimize impacts to ratepayers of San José and Santa Clara, as well as the tributary agencies, staff recommends decreasing the Nitrification Clarifier Rehabilitation appropriation by \$14,000,000. The Nitrification Clarifier Rehabilitation project is expected to end the year with approximately \$15,000,000 in savings due to a construction contract award that was significantly lower than the budgeted Engineer’s Estimate.

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<sup>4</sup> The Total Project Costs is expected to increase as a result of further refining costs related to the unknown conditions described in the Analysis section. Any necessary budget adjustments will be included in the 2021-2022 Proposed Capital Budget and 2022-2026 Capital Improvement Program, which is scheduled to be released April 29, 2021.

4. **PROJECT COST ALLOCATION:** In accordance with the recommendations set forth in the Capital Project Cost Allocations Technical Memorandum (Carollo Engineers, March 2016), the cost for the Project is allocated 40 percent to biochemical oxygen demand (BOD) and 60 percent to total suspended solids (TSS). The cost for the Nitrification Clarifier Rehabilitation appropriation is allocated 40 percent to flow and 60 percent to BOD. This results in revised cost allocations for San José, Santa Clara, and the Tributary Agencies as outlined in the table below.

Agency Name	Original Cost Allocation	Updated Cost Allocation	Change
City of San José	9,384,480	9,641,660	257,180
City of Santa Clara	2,267,580	2,329,740	62,160
West Valley Sanitation District	836,500	765,800	(70,700)
Cupertino Sanitation District	518,140	451,640	(66,500)
City of Milpitas	900,900	731,360	(169,540)
County Sanitation District 2-3	66,220	56,560	(9,660)
Burbank Sanitary District	26,180	23,240	(2,940)
<b>Total</b>	<b>14,000,000</b>	<b>14,000,000</b>	<b>-</b>

The updated cost allocations for the Project result in an increase of approximately \$257,180 to the proportional share of Project costs for San José and approximately \$62,160 for Santa Clara, with a corresponding decrease in the proportional share of Project costs for the Tributary Agencies. The 2020-2021 Adopted Capital Budget has sufficient Ending Fund Balance to offset the expected \$319,340 decrease in revenue to support the recommended cost allocation adjustments for San José. Adjustments to the 2021-2022 budgetary revenue contributions may be brought forward to the City Council at a future date based on these updated cost allocations.

### **BUDGET REFERENCE**

The table below identifies the fund and appropriations to fund the contingency increase and remaining project costs, including project delivery and construction costs.

Fund #	Appn #	Appn. Name	Total Appn.	Rec. Budget Action	2020-2021 Adopted Capital Budget Page	Last Budget Action (Date, Ord. No.)
512	4127	Digester and Thickener Facilities Upgrade	\$6,321,000	\$14,000,000	V-137	10/20/20 Ord. No. 30494
512	7074	Nitrification Clarifier Rehabilitation	\$17,926,000	(\$14,000,000)	V-147	1/26/21 Ord. No. 30521

HONORABLE MAYOR AND CITY COUNCIL

March 29, 2021

**Subject: Construction Contingency Increase for the 7382-Digester and Thickener Facilities Upgrade Project**

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**CEQA**

The San Jose-Santa Clara Regional Wastewater Facility digester and Thickener Facilities Upgrade Project Mitigated Negative Declaration, File No. PP15-055.

/s/

KERRIE ROMANOW

Director, Environmental Services Department

/s/

MATT CANO

Director of Public Works



JIM SHANNON

Budget Director

For questions, please contact Napp Fukuda, Assistant Director, Environmental Services Department at 408.793.5353.