Biosolids Project Assessment

Date: July 18, 2025
Project name: Rialto WWTP Solids Handling Project
Project no: D4001100
Company: City of Rialto, California
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1. Background

The City of Rialto, California, requested Jacobs provide an independent assessment of the biosolids facilities upgrades at the Rialto Wastewater Treatment Plant (WWTP). The plant solids-handling facilities consist of waste activated sludge (WAS) thickening, anaerobic digestion, digested sludge dewatering, and cake drying beds. The ongoing design-build (DB) project proposed to upgrade the solids-handling facilities with the following major areas:

- (New) Primary sludge screening
- Thickening upgrade
- Dewatering upgrade
- Anaerobic Digester No. 1 and No. 2 cover replacement
- Digester sludge storage tank retrofit

The main focus of this effort is on evaluating options of repairing or replacing in-kind the existing structures, equipment, and ancillary systems, in contrast to the DB project that has been based on upgrading with new technologies in new buildings. An independent cost model analysis is also provided based on the 60% Design of the proposed DB project.

This technical memorandum (TM) summarizes findings from the field investigation, engineering code evaluation, technical and cost information research, and conceptual-level cost estimating.

2. Key Assumptions

The following assumptions were made in the assessment:

1. The proposed primary sludge thickening process has been determined necessary to improve the operation of downstream equipment and processes (AECOM 2022).
2. The existing Evoqua Dystor membrane covers on the primary digesters have been determined to have reached the end of useful life. Replacing the covers in-kind is considered cost effective compared with replacing the membrane covers with other types of digester covers.
3. The new cover and mixing system for the digester sludge storage tank have been determined necessary to retrofit the tank for desired service. A membrane gas-holder cover—same as proposed for the primary digesters—is considered cost effective compared with other types of covers.

4. Considering these three assumptions, this assessment effort focuses on the thickening and dewatering facilities.

5. The capacity requirements for thickening and dewatering units should match the specifications of the DB project.

3. Existing Condition Evaluation

The existing WAS thickening facility consists of two gravity belt thickeners (GBTs) installed in 1990 and 2000, respectively. According to the *Technical Memorandum – Rialto Biosolids Study* (Biosolids Study, AECOM 2022), both GBTs are required to operate for approximately 9 hours per day, 7 days per week, at a solids loading rate of approximately 930 pounds per hour, achieving an approximate 5.0% thickened WAS concentration. The GBT units are in a common area covered by a canopy structure.

The existing dewatering facility consists of two 2-meter Alfa Laval Ashbrook Winklepress belt filter presses (BFPs). The older BFP 1 has not been functional and has been out of service for many years. The newer BFP 2 was installed in 2000 and currently operates 9 to 10 hours per day and 7 days per week at a solids loading rate of approximately 1,200 pounds per hour. The cake solids concentration is reported to be between 10% and 14% at a feed solids concentration of approximately 2.0%. The BFP units are in two separate areas, each covered by a canopy structure.

The existing facilities were visually observed in the field. The record drawings (2000) for the GBTs and BFP 2 were obtained and reviewed. Drawings for BFP 1 are unavailable. The structural evaluation follows procedures outlined in American Society of Civil Engineers (ASCE) *ASCE 41-23, Seismic Evaluation and Retrofit of Existing Buildings*. Detailed condition evaluation of each facility is described in the following subsections.

3.1 GBT Facility

3.1.1 Process Equipment and Ancillary Systems

The existing thickening facility consists of two GBTs, two thickened sludge pumps, two polymer blending units, and controls for the thickening process. The two GBTs are both Komline-Sanderson model GSC-2x4 Gravabelt Gravity Belt Thickeners. According to the manufacturer, machine number UN-520 (GBT 1) was manufactured in 1989, and machine number UN-865 (GBT 2) was manufactured in 1999. A visual inspection of the units did not reveal any significant signs of wear or corrosion on the units. The age of the equipment and the typical 20-year lifespan of this type of equipment suggest that replacing the GBTs is in order to provide a long-term, reliable thickening solution. Alternatively, these units could be rebuilt or refurbished to provide another few years of service before replacement is required. If these machines are to be rebuilt or refurbished, it is recommended that the manufacturer's service technician come to the site to conduct a more thorough examination to determine whether it would be prudent to refurbish the GBTs and the estimated costs.

In addition to the GBT units, several pieces of ancillary equipment for the thickening operation were evaluated:

- Two thickened sludge pumps transfer the thickened sludge from the GBT thickened sludge hopper to the digester.

- Two washwater booster pumps are used to provide pressurized cleaning water for the belts. These pumps showed visible signs of aging similar to the GBTs. Like the GBTs, these pumps could be refurbished by the manufacturer to provide a few more years of service, but it is recommended they be replaced to provide a long-term, reliable solution.
- Two air compressors, one Ingersoll Rand and one Schulz, provide compressed air for the belt tensioning system. These compressors showed signs of aging and are also recommended to be replaced.
- Two polymer blending systems, one for each thickener, were also visually inspected. These units were manufactured by Fluid Dynamics and are Dynablend model L4-1200-15P units. The units were inoperable and had been bypassed using a chemical metering pump to direct-inject polymer into the sludge feed line. Replacing these polymer blending units is recommended to restore proper polymer activation functionality and to reduce polymer use. While neat polymer can be dosed directly into the sludge feed pipe, there is not enough energy provided to mix the polymer with the feed sludge, greatly reducing the polymer system's efficiency. In addition, the neat polymer should be properly activated with water in a makeup system to provide a polymer solution before adding it to the sludge feed line and to reduce polymer use.

Figure 1 shows an overview of the existing GBT facility.

Figure 1. Overview of GBT Facility (Facing North)

3.1.2 Structural Components

The assessment follows the procedures outlined in *ASCE 41-23, Seismic Evaluation and Retrofit of Existing Buildings*. This report presents an ASCE 41 Tier 1 screening evaluation of the existing steel canopy structures, to assess overall structural condition and potential seismic vulnerability.

3.1.2.1 Steel Canopy Structure

The steel canopy structure was built approximately 25 years ago. Site observation identified localized areas of concern. Rust and corrosion are evident through black staining on the exposed faces of several steel beams and columns, and some connection holes also show signs of rust. Additionally, the existing steel roof panels are damaged, and the crosstie rods appear to have lost tension, potentially compromising their intended structural capacity.

This canopy measures approximately 35 feet (ft) by 45 ft, with a clear height of approximately 14 ft. Its primary structural system consists of six tapered columns and multiple rafters, forming two bays on both the eastern and western sides. While crossties are installed in one of the two bays on each of the eastern and western sides, the southern and northern bays remain open. The roof is framed with I-shape rafters, spaced approximately 4 ft on center and spanning in the north-south direction. Each end of the roof features an approximate 2 ft cantilever and overhang. Numerous in-plane crossties are also present on the roof, connecting the rafters and beams.

3.1.2.2 Foundation

The existing foundation system, as indicated by the record drawings, is a 10-inch-thick uniform concrete slab. This slab features an 18-inch thickened edge, which also serves as support for the perimeter columns. The mat slab was designed with uniform reinforcement consisting of #6 bars at 12 inches O.C. in both the top and bottom layers. This reinforcement scheme generally meets the requirements of current concrete design codes. A visual assessment of the concrete slab surface reveals it to be in generally good condition, with only minor, superficial cracking observed.

3.1.2.3 Platform

The existing platform's structural framing, as detailed in the record drawings, uses 4-inch by 4-inch by 1/4-inch tube sections for typical columns and C8 (channel steel) for beams. The design effectively stiffens the steel framing through the application of both vertical and horizontal diagonal bracings, which serve as the primary lateral resisting system.

Record drawings indicate the existing platform was designed to accommodate foot traffic. Without changes to the load criteria (designed for foot traffic only), the existing platform structure appears adequate for its intended use.

3.1.2.4 Equipment Support

The existing equipment is supported by short, circular, concrete pedestals, with a total of four pedestals under each piece of equipment. According to the record drawings, each concrete pedestal is approximately 18 inches in diameter, with well-detailed concrete ties and vertical reinforcing. The potential for reusing these pedestals should be determined based on the new equipment layout. If the new equipment supporting leg locations can match the existing concrete pedestals, and the operational weight is similar to the existing equipment, these pedestals are likely to be reusable.

3.1.2.5 Seismic Evaluation

A preliminary evaluation of the canopy structure’s lateral load resisting system reveals concerns related to the absence of dedicated lateral bracing members in the east-west direction and questionable crossties on the eastern and western sides. To verify its compliance with the current Building Code, a more detailed ASCE 41 Tier 2 evaluation is needed to assess the adequacy of the lateral load resisting system, which is, however, beyond the scope of this assessment.

Because the proposed project is not anticipated to modify or affect the existing canopy structure, for estimating purposes, no improvements are assumed for the canopy structure.

3.2 BFP 1 Facility

3.2.1 Process Equipment and Ancillary Systems

Dewatering Facility 1 consists of one BFP, three washwater booster pumps, two filtrate pumps in a wet well, and controls for the BFP. The BFP is manufactured by Alfa Laval Ashbrook Simon-Hartley and is a size 3 model KP85 Klampress. This unit was not in operation and had not been operated for several years. Visual inspection revealed significant evidence of corrosion on the structural frame of the press as well as some of the mechanical components. It is recommended this unit be replaced because of its age and disrepair.

The three washwater booster pumps feed washwater to the operable BFP (refer to BFP 2 Facility). The pressurized washwater is used to clean the equipment belts. These pumps were indicated to be operable, and only one was running at the time of inspection. Two of these pumps are manufactured by ITT Inc. and are model 600 centrifugal type 2000 pumps. The third booster pump is manufactured by G&L Pumps and is a model 4STK1 centrifugal type pump. These washwater pumps are old and could be refurbished to provide service for a few more years, but it is recommended these units be replaced to provide a long-term, reliable solution without high maintenance cost.

The BFP filtrate wet well is north of BFP 1 and receives filtrate flows from both BFPs. Two submersible solids-handling pumps service the wet well and pumping filtrate to the filtrate storage tank. Both pumps were operable at the time of inspection, but a detailed inspection was not performed. Operations reported no issues with this filtrate pump station, so no improvements are recommended at this time.

Figure 2 shows an overview of the existing BFP 1 facility.

Figure 2 Overview of BFP 1 Facility (Facing Southeast)

3.2.2 Structural Components

3.2.2.1 Steel Canopy Structure

The canopy structure measures approximately 25 ft by 40 ft, with a clear height of approximately 17 ft. The primary structural system consists of ten 6-inch by 6-inch Hollow Structural Section (HSS) steel columns arranged in a 5 by 2 grid pattern. Each column supports a wide flange beam that runs continuously over the column tops and cantilevers out on each end. The columns were designed as cantilever columns to resist lateral loads without additional bracing. The roof system consists of steel decking spanning in the north-south direction. There is no vertical bracing between columns or in-plane crossties on the roof of this steel canopy.

The exposed steel surfaces of the structure, including columns and beams, generally exhibit good condition with no apparent rust. The steel members appear to be galvanized, providing an additional layer of protection. While some areas show signs of paint deterioration, the underlying steel remains unaffected by rust. This suggests that the galvanization is effectively protecting the steel even where the paint has worn away.

3.2.2.2 Foundation

The columns appear to be embedded into individual concrete footings, approximately 20 inches square. These footings have a joint with an adjacent concrete slab. Cracks were observed on this concrete slab, particularly near the access ramp. However, no major cracks were noted directly on top of the column footings themselves.

A concern was identified on the south side of the foundation where the subgrade fill beneath the concrete slab has become exposed. This exposure could lead to localized bearing loss of the subgrade, potentially causing the concrete slab to become suspended in that area. Such a condition might induce cracking and settlement in the slab due to unsupported spans. To restore the finish grade to its designed elevation and ensure proper bearing, engineered backfill will likely be required in this area.

3.2.2.3 Platform

Based on site observations, the existing stairs and platform appear to have been designed to accommodate pedestrian traffic exclusively. Provided the design of load criteria, specifically the limitation to foot traffic, remains unchanged, the current structure is considered adequate for its specified purpose.

3.2.2.4 Equipment Support

The existing equipment is supported by six short, square concrete pedestals. The reusability of these pedestals will depend entirely on the new equipment layout and operational weight. If the new equipment support points align with the existing pedestals and its operational weight is comparable to the original equipment, these pedestals are likely suitable for reuse.

3.2.2.5 Seismic Evaluation

A Tier 1 screening of the existing structure, conducted per ASCE 41, identified several potential seismic deficiencies:

- Inadequate Roof Diaphragm Components: In the north-south direction, the roof diaphragm lacks sufficient chord and drag strut members at the beam-column joints on the top level. This deficiency may impair the diaphragm's ability to transfer lateral loads efficiently to the vertical lateral force-resisting system.
- Potential Joint Connection Weakness: The lack of detailed documentation on moment frame joints raises concerns about their ability to resist seismic forces, potentially leading to localized failures under lateral loading.
- Unverified Column Capacity: Incomplete data on column strengths hinders accurate evaluation of the structure's ability to support combined gravity and lateral loads, increasing uncertainty in its seismic performance.

Due to these deficiencies and the lack of comprehensive as-built documentation, a Tier 2 deficiency-based evaluation, as outlined in ASCE 41, is recommended. This evaluation should include detailed structural analysis and, if necessary, non-destructive testing to accurately assess the strength and stiffness of critical components, verify the adequacy of the roof diaphragm, and confirm the structure's capacity to resist prescribed seismic force.

3.3 BFP 2 Facility

3.3.1 Process Equipment and Ancillary Systems

Dewatering Facility 2 consists of one BFP, a polymer activation tank, and controls for the press. The BFP is manufactured by Alfa Laval Ashbrook Simon-Hartley and is a model WP888 Winklepress. This unit was visually inspected and revealed significant evidence of corrosion on the structural components of the press. In addition, evidence of corrosion was seen on mechanical components such as roller bearings. Rehabilitation of the equipment is not recommended, based on the visual inspection. It is recommended this unit be replaced because of the age and condition of the equipment and the significant evidence of corrosion.

The existing polymer activation system consists of a batch makedown tank with a mixer. The top of the tank is covered by grating to facilitate the mixer's removal. Following the makedown tank, a post-dilution system adds water to the neat polymer before injection into the feed sludge pipe. This style of polymer activation system is commonly used for dry polymers but not for the emulsion polymer currently being used onsite. It is recommended to replace the polymer activation system with a liquid emulsion polymer blending unit to facilitate better polymer activation and reduce polymer use.

Cake from the BFP falls onto a belt conveyor and is transported to a truck-loading station. The belt conveyor was visually inspected and showed some evidence of wear and corrosion. The belt conveyor could be refurbished as needed based on field inspection by the manufacturer to expand its useful life. For estimating purposes, however, the cost for the belt conveyor services is not included. The truck-loading station consists of a small hopper with a gate to control discharge to the truck below. Operators did not indicate any current issues or challenges with the truck-loading station. It is recommended that the truck-loading station remain in place for future use.

Figure 3 shows an overview of the existing BFP 2 Facility.

Figure 3. Overview of BFP 2 Facility (Facing East)

3.3.2 Structural Components

3.3.2.1 Steel Canopy Structure

The canopy structure measures approximately 20 ft by 40 ft, with a clear height of approximately 16 ft. Its primary structural system consists of four tapered columns, one at each corner, supporting rafters. Lateral bracing is provided by crossties (diagonal steel rods) connecting the frame top and bottom, observed only on the short bay at the facility's southern side. The other three bays remain open, lacking similar bracing.

The roof features I-shape rafters spanning in the east-west direction, spaced at approximately 4 ft on center. Each end of the roof includes a few feet of cantilever and overhang. A couple of in-plane crossties are installed on the roof to connect the rafters and beams, likely contributing to roof diaphragm action.

Widespread severe corrosion observed on the steel columns and beams. Visible rusting is present on the surfaces of these members, and the bolts, nuts, and base plates also show signs of corrosion, indicating potential section loss and compromised connections.

3.3.2.2 Foundation

Based on record drawings, each steel column is supported by a 6.5 ft x 6.5 ft x 3 ft deep footing. These footings appear to incorporate well-defined reinforcing, including #4 ties at the anchor bolts and #8 vertical dowels, designed to ensure adequate anchor capacity for the columns. The typical concrete slab is approximately 6 inches thick, reinforced with #4 bars at 10 inches on center. However, to comprehensively evaluate the adequacy of these foundations to resist current design seismic loads, a more detailed Tier 2 evaluation per ASCE 41 is recommended.

3.3.2.3 Platform

Record drawings indicate the existing platform was designed to accommodate foot traffic. Without changes to the load criteria (designed for foot traffic only), the existing platform structure appears adequate for its intended use.

3.3.2.4 Equipment Support

The existing equipment is supported by four short, circular concrete pedestals per unit. The reusability of these pedestals is contingent upon the new equipment's layout and operational weight. If the new equipment support points align with the existing pedestals and its operational weight is comparable to the original equipment, these pedestals are likely suitable for reuse.

3.3.2.5 Seismic Evaluation

A Tier 1 screening of the existing structure, conducted per ASCE 41 checklists, identified several critical seismic deficiencies:

- Inadequate and Asymmetrical Bracing: Diagonal rods, intended for lateral bracing, are present only in the short bay on the southern side of the facility. This asymmetrical configuration likely compromises the lateral bracing system's ability to ensure structural stability and resist lateral loads effectively across the entire structure.
- Weak Diagonal Rod Connections: The connections of the diagonal rods are insufficient, potentially undermining force transfer. Specifically, the rod ends at the base are anchored to the column web rather than the base plate, reducing their effectiveness in transferring lateral forces.
- Severe Corrosion of Structural Members: Significant corrosion was observed on steel columns and beams, posing a critical risk to their capacity to resist both gravity and lateral loads, thereby compromising overall structural integrity.
- Incomplete Lateral Load Path: Although the roof system includes crossties that may contribute to diaphragm action, the lateral load path from the roof to the foundation appears incomplete, likely insufficient to meet seismic demands.

The preliminary evaluation suggests the existing canopy structures may be rehabilitated to meet the current Building Code requirements following a more detailed structural analysis and engineering effort. For estimating purposes, allowances are used to account for the engineering and construction costs to rehabilitate both canopy structures at the BFP facilities.

4. Solids Technology Evaluation

The evaluation of options to replace existing thickening and dewatering systems in-kind is presented in this section. As discussed in the previous section, Jacobs recommends replacing the existing process equipment because of the equipment age and risks associated with reliability and longevity of rebuilt equipment.

Thickening Equipment

Replacement in-kind of the thickening equipment would include two 2-meter GBTs, two thickened sludge pumps, two polymer makeup units, and controls for the thickening process. Each GBT unit will be sized to process a nominal capacity of 200 to 250 gallons per minute of WAS. Komline-Sanderson is the

manufacturer of the existing thickeners and would be considered for a direct replacement. This approach would minimize changes to the thickening facility because the equipment footings and piping connections would match what already exists at the thickening facility. Although some of the existing platforms may need to be disassembled to facilitate installation, using the same size and manufacturer of the GBTs would also allow the continued use of existing platforms.

The existing thickened sludge pumps are recommended to be replaced by progressive cavity (PC) pumps. PC pumps are commonly used to pump thickened solids because of the non-Newtonian nature and thickness of the thickened solids. The existing washwater booster pumps are recommended to be replaced with new centrifugal pumps of a similar design and footprint. The polymer makeup units are recommended to be replaced by either VeloDyne or Clean 1 One liquid polymer emulsion blending units. These two polymer equipment manufacturers have similar footprint and piping to the existing fluid dynamics units onsite currently. The two existing air compressors are recommended to be replaced by similar air compressors with an airflow capacity of 35 cfm, a receiver capacity of 120 gallons and a maximum pressure of 175 pounds per square inch.

Dewatering Equipment

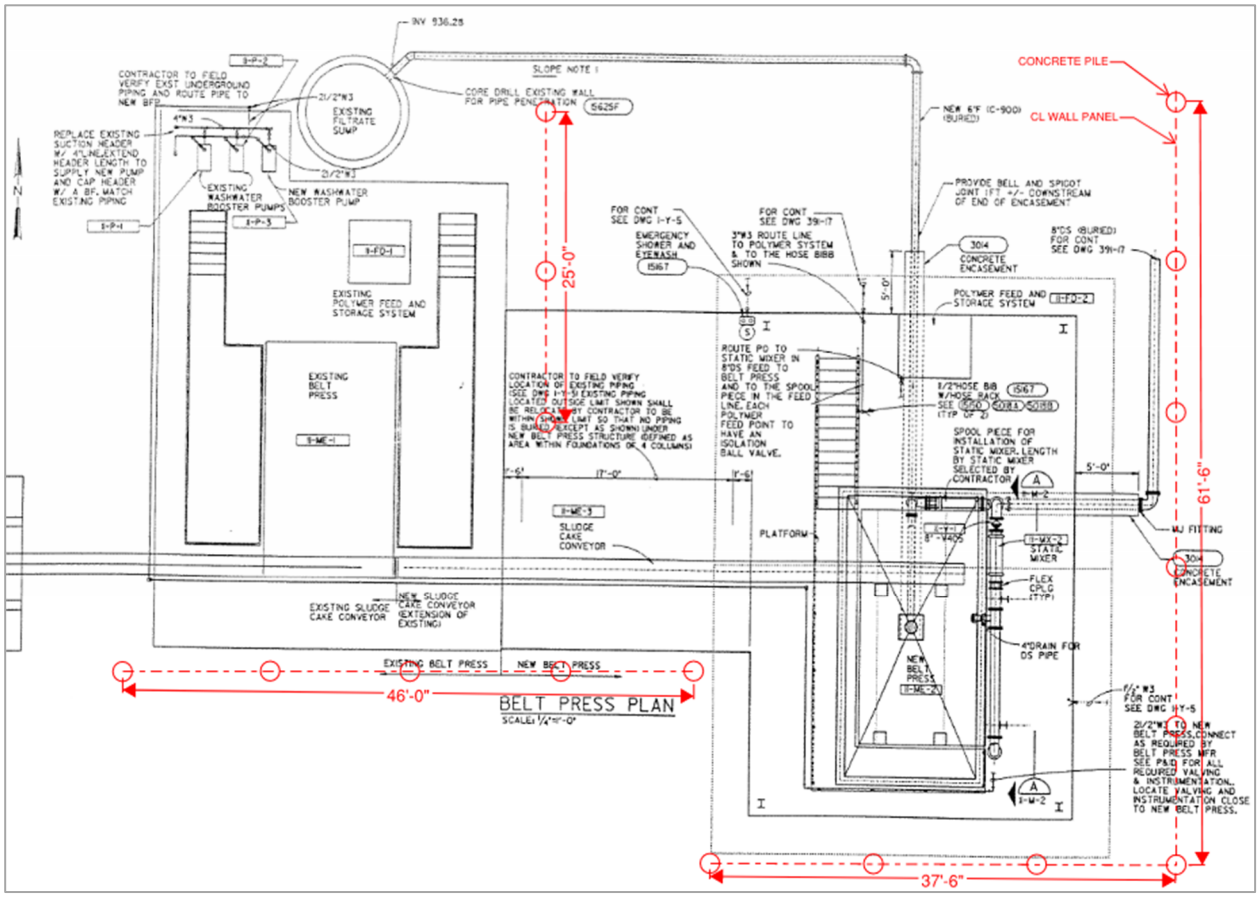
Replacement in-kind of the dewatering equipment would include two 2-meter BFPs, two polymer makeup units, and controls for the dewatering process. Each BFP unit would be sized to process approximately 150 to 200 gallons per minute of digested sludge. Alfa Laval Ashbrook Simon-Hartley is the manufacturer of the existing equipment and would be considered for a direct replacement. This approach would minimize changes to the existing dewatering facilities because the equipment footings and process connections would match the existing facilities. While some of the existing platforms may need to be disassembled to facilitate installation, using the same size BFPs would also allow for the continued use of existing platforms.

The existing polymer makeup system would be replaced by liquid emulsion makeup units manufactured by either VeloDyne or Clean Water 1. These units are designed for use with emulsion polymers and would provide more efficient polymer activation. These makeup units would also not require post-dilution of the polymer before it is added to the feed sludge piping.

The existing three washwater pumps are recommended to be replaced by two centrifugal pumps, one dedicated to each BFP unit. Because the BFPs will be operated as duty and standby, a third washwater pump as a shared standby unit is unnecessary.

According to Operations, better dust control is desired in the dewatering area. Metal wall panels are recommended on the southern and eastern side of each facility. To minimize the impact to existing structures, columns for new wall panels are assumed to be supported on individual concrete piles outside existing slab areas. Figure 4 shows the assumed wall panel layouts (marked up in red) used in this assessment.

Figure 4. New Wall Panels at Dewatering Facilities



The impact on operating costs was analyzed related to replacing existing BFPs with centrifuges for dewatering (as proposed in the DB project). It is generally reported in the industry that centrifuges can achieve 1-2% higher cake solids than belt filter presses. This is not true for all sludges and site-specific testing is required to confirm the actual cake solids improvement, if any. This analysis was performed with the following assumptions:

- A centrifuge can produce 2% higher cake solids than a BFP for the Rialto sludge;
- Solids production was based on one dewatering unit in operation for 10 hours/day, 7 days/week;
- The potential that cakes get wet again (e.g., by rains) on drying beds is not considered;
- The hauling cost of dewatered cake away from the site is $300/wet ton;
- The electricity cost onsite is $0.18/kWh;
- Electricity and hauling costs are the significantly different costs associated with dewatering operation.

The results showed that centrifuges would provide operational savings of approximately $500,000 per year. In conjunction with capital costs for each option, this number could be used to determine the difference in net present values of the BFP and centrifuge replacements or calculate the payback period if the centrifuge option costs more in capital.

5. Project Summary and Opinion of Probable Construction Cost

Following the evaluations described in this TM, the project scope for the thickening and dewatering facilities is summarized as follows:

- Replace existing two GBT units with new 2-meter GBT units
- Replace existing two thickened WAS pumps with new progressive cavity pumps
- Replace existing two GBT washwater pumps with new end-suction centrifugal pumps
- Replace existing two air compressors with new compressor assemblies
- Replace existing two thickening polymer makeup units with two new polymer makeup units
- Replace existing exposed process piping, including valves, in the thickening area
- Construct new containment for thickening polymer feed area
- Replace existing two BFP units with new 2-meter BFP units
- Replace existing three BFP washwater pumps with two new end-suction centrifugal pumps
- Replace existing dewatering polymer makeup unit with two new polymer makeup units
- Construct new wall panels, 10 ft high, on eastern and southern sides of the dewatering facilities
- Repair and rehabilitate two existing canopy structures over the dewatering facilities
- Replace existing exposed process piping, including valves, in the dewatering areas

The following list states the assumptions used to develop the conceptual-level opinion of probable construction cost (OPCC).

- Direct costs are estimated based on the recommended project with Jacobs' estimating model.
- Indirect costs and other project costs are marked up using the same structure and rates as used in the Biosolids Study (AECOM 2022), including:
  - 25% for General Conditions, including mobilization and demobilization, and Prime Contractor overhead and profit (OH&P)
  - 30% for design and engineering services during construction (ESDC)
  - Escalation of 5% per year to the midpoint of construction, August 2026.
  - 40% for project contingency
- The existing equipment platforms and supporting pedestals are assumed not to require modifications to fit the new GBT and BFP units.
- No changes are assumed to be required in existing motor control centers servicing the facilities.
- No odor control facilities are to be added to the thickening or dewatering facilities.
- Permitting cost is not included.
- Owner's costs, such as project management and special inspections, are not included.

In accordance with the recommended project as described above, Class 5 OPCC was performed by Jacobs resulting in a total of approximately $13.2 million and is summarized in Table 1. Details of the OPCC are included in Attachment A.

Table 1. OPCC for the Thickening and Dewatering Repairing and Replacing In-Kind Project

Description	Amount	Totals
Thickening Process Upgrade		
Material, labor, equipment, and subcontractor	$ 1,394,000	
Taxes	$ 78,000	
Subcontractor OH&P	$ 368,000	
Subtotal – direct cost		$ 1,800,000
25% GC, Prime Contractor OH&P	$ 460,000	
30% Final Design & ESDC	$ 690,000	
5% Escalation	$ 150,000	
40% Contingency	$ 1,256,000	
Grand Total – Thickening Process Upgrade		**$ 4,400,000**
Dewatering Process Upgrade		
Material, labor, equipment, and subcontractor	$ 2,795,000	
Taxes	$ 167,000	
Subcontractor OH&P	$ 708,000	
Subtotal – direct cost		$ 3,670,000
25% GC, Prime Contractor OH&P	$ 918,000	
30% Final Design & ESDC	$ 1,376,000	
5% Escalation	$ 298,000	
40% Contingency	$ 2,505,000	
Grand Total – Dewatering Process Upgrade		**$ 8,770,000**
Subtotal Costs[1]		**$ 13,200,000**

1. For AACE International Class 5 estimate, the accuracy range is -50% to +100%.

6. Cost Model Analysis of Design-Build Project

As described in the **Background**, Jacobs developed a cost model for the ongoing Solids Handling DB Project, as defined in the 60% Submittal for *City of Rialto Wastewater Treatment Plant Solids Handling DB Project* (AECOM/Lyles JV 2024). The following assumptions were made in Jacobs' cost model:

- Project scope and quantities are taken from *Rialto Solids Handling – 60_Plan Set_26Sept24* (AECOM/Lyles JV 2024).
- Equipment, subcontractor, and design costs are taken from *Rialto Biosolids – GMP@60_Design1* (AECOM/Lyles, JV 2024).
- Contingency and overhead and profit percentages are taken from *Rialto Biosolids – GMP@60_Design1* (AECOM/Lyles, JV 2024).
- Exclusions and clarifications are taken from *Rialto Biosolids – GMP@60_Design1* (AECOM/Lyles, JV 2024).
- Costs assume an 18-month construction duration, with Notice to Proceed in June 2026.
- AECOM/Lyles JV deliverables were not reviewed for technical accuracy or quality.

A summary of the cost model results is provided in Attachment B. The total cost from the model is approximately $29.9 million.

7. Conclusions

A comparison was made among the repairing and replacing in-kind project OPCC being evaluated, the 60% cost model results for the DB Project, and the GMP proposed by the Concessionaire team. The comparison is summarized in Table 2.

Table 2. Comparison of Project Costs

Description	Jacobs Estimate of Costs from this TM		Concessionaire Proposed Costs
	R&R Project	DB Project	DB Project
Total incurring to bring Project to completion	$ 13,200,000 [a] + $ 13,890,000 [b] = $ 27,090,000	$ 29,860,000 [c]	$ 36,063,185 [d]
Owner Construction Management [e]	$ 1,730,250	$ 1,730,250	Included in GMP above
Subtotal	**$ 28,820,250**	**$ 31,590,250**	**$ 36,063,185**
Total authorized to date [f]	$ 2,006,034	$ 2,006,034	$ 2,006,034
Project Total [g]	**$ 30,800,000**	**$ 33,600,000**	**$ 38,070,000**

R&R = repairing and replacing in-kind

[a] From OPCC Cost Estimate in Table 1.

[b] Repairing and replacing in-kind project assumes the same scope for primary sludge screening, anaerobic digesters upgrade, and digester sludge storage tank retrofit as proposed in the DB Project. Full project costs for these facilities were estimated from the Jacobs 60% cost model estimate, by scaling the total project cost in proportion to the direct cost for those facilities.

[c] Details provided in Attachment B.

[d] Proposed GMP number from Concessionaire as of July 10, 2025, including approximately $4.4 million in concession/Veolia related fees, as shown in Attachment C.

[e] Estimated based on Concessionaire proposed CPM cost for the DB Project (dated July 10, 2025).

[f] Authorized costs to date include Biosolids Study (AECOM 2022) and development of the 60% design package.

[g] All totals were rounded to $10,000.

Key conclusions from this TM include:

- The repairing and replacing in-kind option is anticipated to have a capital saving of approximately $2.8 million compared to the proposed DB Project, based on Jacobs' cost model on the 60% design.
- To maximize the cost benefit of the advanced dewatered biosolids, it is best practice to prevent potential rainwater from accumulating in the cake by storing it in a covered area prior to hauling and disposal offsite. The covering could be greenhouse-type, to maximize solar radiation and evaporation.

8. References

AECOM. 2022. Rialto Biosolids Study Technical Memorandum.

AECOM/Lyles Joint Venture (JV). 2024. *City of Rialto Wastewater Treatment Plant Solids Handling DB Project.*

Attachment A
Class 5 Opinion of Probable Construction Cost

Rialto WWTP Biosolids
Schematic Estimate
Rev. 3

Project name	Rialto WWTP Biosolids Estimate
Estimator	KS
Labor rate table	L 25 Union 2025
Equipment rate table	E_EqRates_2025_100%
Job size	1 LS
Project	Municipal
Project Number	D4001100
Estimate Class 1-5	5
Project Manager	Ted Couch
QC Reviewer	Augustus Tweneboa-Kodua
Rev No. / Date	R3/07-17-2025
Report format	Sorted by 'Facility/Work Pkg' 'Work Pkg' summary Allocate addons Paginate
Factor table	California-San Bernardino
Alternates	(none)

Facility	Work Pkg	Description	Takeoff Quantity	Grand Total Price	Grand Total with Markups
01		Thickening Process Area			
	02.0	Existing Conditions	9.00 EA	18,510.19 /EA	166,592
	26.0	Electrical Work	10.00 EA	54,343.08 /EA	543,431
	40.0	Process Pipe	163.00 LF	604.02 /LF	98,454
	40.9	Instrumentation & Controls	27.00 EA	18,162.64 /EA	490,391
	44.0	Pollution and Waste Control Equipment	9.00 EA	266,668.62 /EA	2,400,018
		01 Thickening Process Area	*1.00* LS	3,698,885.96 /LS	3,698,886
02		Dewatering Process Area			
	02.0	Existing Conditions	8.00 EA	16,509.26 /EA	132,074
	03.0	Concrete Work	*1.00* LS	88,950.64 /LS	88,951
	05.0	Metals	*1.00* LS	850,999.74 /LS	851,000
	07.0	Thermal and Moisture Protection	*1.00* SF	730,828.45 /SF	730,828
	26.0	Electrical Work	5.00 EA	59,517.88 /EA	297,589
	31.0	Earthwork	*1.00* LS	176,768.49 /LS	176,768
	40.0	Process Pipe	202.00 LF	868.57 /LF	175,451
	40.9	Instrumentation & Controls	13.00 EA	13,006.48 /EA	169,084
	43.0	Process Gas and Liquid Handling Equipment	2.00 EA	1,899,630.44 /EA	3,799,261
	44.0	Pollution and Waste Control Equipment	6.00 EA	162,432.18 /EA	974,593
		02 Dewatering Process Area	*1.00* LS	7,395,599.73 /LS	7,395,600

Estimate Totals

Description	Rate	Amount	Totals
Labor		2,399,692	
Material		8,204,506	
Subcontract		287,125	
Equipment		203,163	
Other			
Subtotal OH&P		**11,094,486**	**11,094,486**
Final Design & Engineering Services During Construction	30.000 %	2,066,012	
Total Construction Cost			**13,160,498**

Facility	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Price	Grand Total Amount
01				**Thickening Process Area**										
	02.0			**Existing Conditions**										
		02.00		**Existing Conditions / Demolition**										
			02.01.05.00	**Process Equipment Demolition**										
				Demolish Polymer Blending Unit	1.00 EA	2,500	-	-	-	-	2,499.97 /EA	2,500	6,457.96 /EA	6,458
				Demolish Existing Gravity Thickners	2.00 EA	36,000	-	-	-	-	17,999.99 /EA	36,000	46,497.88 /EA	92,996
				Demolish Misc Pipes	1.00 ls	3,590	0	-	-	-	3,590.00 /ls	3,590	9,273.75 /ls	9,274
				Demolish Misc Electrical	1.00 ls	3,000		-	-	-	3,000.01 /ls	3,000	7,749.68 /ls	7,750
				Demolish Existing Pumps	6.00 EA	14,400					2,400.01 /EA	14,400	6,199.74 /EA	37,198
				Haul and Dispose Demolished Items	1.00 ls	5,000					5,000.02 /ls	5,000	12,916.15 /ls	12,916
				02.01.05.00 Process Equipment Demolition	**9.00 EA**	**64,490**					**7,165.56 /EA**	**64,490**	**18,510.19 /EA**	**166,592**
				02.00 Existing Conditions / Demolition	**9.00 EA**	**64,490**					**7,165.56 /EA**	**64,490**	**18,510.19 /EA**	**166,592**
				02.0 Existing Conditions	**9.00 EA**	**64,490**					**7,165.56 /EA**	**64,490**	**18,510.19 /EA**	**166,592**
	26.0			**Electrical Work**										
		26.15		**Process Electrical**										
			26.00.99.00	**Electrical, Other**										
				Electrical Conduit & Wire	640.00 lf	15,159	10,441	-	-	-	40.00 /lf	25,600	106.59 /lf	68,220
				VFD 25 HP NEMA-1	4.00 EA	24,100	15,900	-	-	-	10,000.00 /EA	40,000	26,640.24 /EA	106,561
				MCC's	6.00 EA	90,000		-	-	-	15,000.00 /EA	90,000	39,498.26 /EA	236,990
				Misc. Electrical Allowance	1.00 ls	50,000		-	-	-	50,000.01 /ls	50,000	131,660.86 /ls	131,661
				26.00.99.00 Electrical, Other	**10.00 EA**	**179,259**	**26,341**				**20,560.00 /EA**	**205,600**	**54,343.08 /EA**	**543,431**
				26.15 Process Electrical	**10.00 EA**	**179,259**	**26,341**				**20,560.00 /EA**	**205,600**	**54,343.08 /EA**	**543,431**
				26.0 Electrical Work	**10.00 EA**	**179,259**	**26,341**				**20,560.00 /EA**	**205,600**	**54,343.08 /EA**	**543,431**
	40.0			**Process Pipe**										
		40.10		**Exposed Process Pipe**										
			40.00.99.01	**Process Pipe, Other**										
				4" DI pipe	10.00 LF	642	358	-	-	-	100.00 /LF	1,000	261.08 /LF	2,611
				4" DI, bellows	4.00 ea	762	2,638	-	-	-	850.01 /ea	3,400	2,246.87 /ea	8,987
				6" DI pipe	41.00 LF	3,352	2,183	-	-	-	135.00 /LF	5,535	352.86 /LF	14,467
				6" DI, bellows	2.00 ea	525	1,675	-	-	-	1,100.02 /ea	2,200	2,906.47 /ea	5,813
				1.5" black steel pipe, sched 40	112.00 LF	4,675	2,605	-	-	-	65.00 /LF	7,280	169.71 /LF	19,008
				1.5" DI Elbows	23.00 ea	7,955	95	-	-	-	350.00 /ea	8,050	904.45 /ea	20,802
				40.00.99.01 Process Pipe, Other	**163.00 LF**	**17,911**	**9,554**				**168.50 /LF**	**27,465**	**439.81 /LF**	**71,688**
			40.20.20.01	**Other Valves**										
				Install check valve, threaded, 1 1/2"	6.00 ea	1,616	-	-	-	-	269.25 /ea	1,616	695.53 /ea	4,173
				Install check valve, Flgd, DIP, 4"	4.00 ea	2,154	-	-	-	-	538.50 /ea	2,154	1,391.06 /ea	5,564
				FURNISH Check valve, bronze, threaded, 150#, lever oper., 1 1/2"	6.00 EA	-	3,000	-	-	-	500.00 /EA	3,000	1,330.36 /EA	7,982
				FURNISH Check valve, iron body, cushioned, Flgd, 150#, 4"	4.00 EA	-	3,400	-	-	-	850.00 /EA	3,400	2,261.61 /EA	9,046
				40.20.20.01 Other Valves	**10.00 EA**	**3,770**	**6,400**				**1,016.95 /EA**	**10,170**	**2,676.60 /EA**	**26,766**
				40.10 Exposed Process Pipe	**163.00 LF**	**21,680**	**15,954**				**230.89 /LF**	**37,634**	**604.02 /LF**	**98,454**
				40.0 Process Pipe	**163.00 LF**	**21,680**	**15,954**				**230.89 /LF**	**37,634**	**604.02 /LF**	**98,454**
	40.9			**Instrumentation & Controls**										
		40.90		**Instrumentation & Controls**										
			40.90.06.01	**I&C, Programming**										
				Local panel	2.00 EA	7,368	24,332	-	-	-	15,850.00 /EA	31,700	42,679.33 /EA	85,359
				Transmitters Level	2.00 EA	1,091	1,909	-	-	-	1,499.99 /EA	3,000	4,023.77 /EA	8,048
				Combined Washwater Flowmeter	1.00 EA	545	955	-	-	-	1,500.01 /EA	1,500	4,023.82 /EA	4,024
				Analog, I/O	6.00 EA	5,850		-	-	-	975.00 /EA	5,850	2,567.39 /EA	15,404
				Digital, I/O	10.00 EA	11,000		-	-	-	1,100.00 /EA	11,000	2,896.55 /EA	28,965
				PLC Cabinet	1.00 EA	15,000		-	-	-	15,000.03 /EA	15,000	39,498.33 /EA	39,498
				PI - Pressure Indicator	5.00 EA	180	3,570	-	-	-	750.00 /EA	3,750	2,030.25 /EA	10,151
				I&C Conduit & Wire	800.00 lf	9,651	26,349	-	-	-	45.00 /lf	36,000	121.05 /lf	96,838
				Allow for Misc Items	1.00 ls	15,480	59,520	-	-	-	74,999.99 /ls	75,000	202,104.04 /ls	202,104
				40.90.06.01 I&C, Programming	**27.00 EA**	**66,165**	**116,635**				**6,770.37 /EA**	**182,800**	**18,162.64 /EA**	**490,391**
				40.90 Instrumentation & Controls	**27.00 EA**	**66,165**	**116,635**				**6,770.37 /EA**	**182,800**	**18,162.64 /EA**	**490,391**
				40.9 Instrumentation & Controls	**27.00 EA**	**66,165**	**116,635**				**6,770.37 /EA**	**182,800**	**18,162.64 /EA**	**490,391**
	44.0			**Pollution and Waste Control Equipment**										
		44.40		**Process Equipment - Pumps**										
			44.05.49.02	**Submersible Pump: 21hp-50hp**										
				Thickened sludge pumps (progressive cavity), 25 Hp	2.00 EA	-	80,000	-	-	-	40,000.00 /EA	80,000	106,428.66 /EA	212,857
				Set base elbow / pump assembly, 21 - 50 hp	2.00 ea	9,084	100	-	-	-	4,592.24 /ea	9,184	11,866.63 /ea	23,733
				Washwater Pump, 3hp	2.00 EA	6,056	30,000	-	-	-	18,028.16 /EA	36,056	47,733.14 /EA	95,466
				Polymer Feed Pumps	2.00 EA	3,028	19,000	0	0	0	11,014.08 /EA	22,028	29,188.01 /EA	58,376

Facility	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Price	Grand Total Amount
				44.05.49.02 Submersible Pump: 21hp-50hp	6.00 EA	18,169	129,100				24,544.83 /EA	147,269	65,072.15 /EA	390,433
				44.40 Process Equipment - Pumps	6.00 EA	18,169	129,100				24,544.83 /EA	147,269	65,072.15 /EA	390,433
		44.48		Process Equipment - Thickeners										
			44.05.71.00	Gravity Belt Thickener										
				FURNISH Gravity Belt Thickner, 2 Meter, 200-250 gpm	2.00 EA	-	670,000	-	-	-	335,000.00 /EA	670,000	891,340.07 /EA	1,782,680
				Install Gravity Belt Thickner	2.00 ea	33,310	-	-	-	-	16,654.88 /ea	33,310	43,023.17 /ea	86,046
				44.05.71.00 Gravity Belt Thickener	2.00 EA	33,310	670,000				351,654.88 /EA	703,310	934,363.23 /EA	1,868,726
				44.48 Process Equipment - Thickeners	2.00 EA	33,310	670,000				351,654.88 /EA	703,310	934,363.23 /EA	1,868,726
		44.69		Process Equipment - Mixers										
			44.05.75.00	Liquid Chemical Feed Equipment										
				FURNISH Polymer Blending 10 gph polymer feed, 1,200 gph dilution water	1.00 EA	-	50,000	-	-	-	50,000.00 /EA	50,000	133,035.82 /EA	133,036
				Install Polymer Blending Unit, Skid	1.00 ea	3,028	-	-	-	-	3,028.16 /ea	3,028	7,822.39 /ea	7,822
				44.05.75.00 Liquid Chemical Feed Equipment	1.00 EA	3,028	50,000				53,028.16 /EA	53,028	140,858.21 /EA	140,858
				44.69 Process Equipment - Mixers	1.00 EA	3,028	50,000				53,028.16 /EA	53,028	140,858.21 /EA	140,858
				44.0 Pollution and Waste Control Equipment	9.00 EA	54,507	849,100				100,400.76 /EA	903,607	266,668.62 /EA	2,400,018
				01 Thickening Process Area	*1.00* LS	386,102	1,008,030				1,394,131.49 /LS	1,394,131	3,698,885.96 /LS	3,698,886
02				Dewatering Process Area										
	02.0			Existing Conditions										
		02.00		Existing Conditions / Demolition										
			02.01.05.00	Process Equipment Demolition										
				Demolish Polymer Blending Unit	2.00 EA	9,000	-	-	-	-	4,500.00 /EA	9,000	11,624.47 /EA	23,249
				Demolish Belt Filter Press	2.00 EA	17,000	-	-	-	-	8,500.01 /EA	17,000	21,957.35 /EA	43,915
				Demolish Misc Pipes	1.00 ls	5,385		-	-	-	5,385.00 /ls	5,385	13,910.62 /ls	13,911
				Demolish Misc Electrical	1.00 ls	5,143	0	-	-	-	5,142.72 /ls	5,143	13,284.77 /ls	13,285
				Demolish Existing Pumps	4.00 EA	9,600	0	0	0	0	2,400.01 /EA	9,600	6,199.73 /EA	24,799
				Haul and Dispose Demolished Items	1.00 ls	5,000					5,000.02 /ls	5,000	12,916.14 /ls	12,916
				02.01.05.00 Process Equipment Demolition	8.00 EA	51,128					6,390.97 /EA	51,128	16,509.26 /EA	132,074
				02.00 Existing Conditions / Demolition	8.00 EA	51,128					6,390.97 /EA	51,128	16,509.26 /EA	132,074
				02.0 Existing Conditions	8.00 EA	51,128					6,390.97 /EA	51,128	16,509.26 /EA	132,074
	03.0			Concrete Work										
		03.15		Cast-In-Place Concrete, Grade Beams										
			03.10.03.18	Cast-In-Place Concrete, Grade Beams										
				Grade Beams, 18"x18"	17.00 CY	19,530	13,970	-	499	-	2,000.00 /CY	34,000	5,232.39 /CY	88,951
				03.10.03.18 Cast-In-Place Concrete, Grade Beams	17.00 CY	19,530	13,970		499		2,000.00 /CY	34,000	5,232.39 /CY	88,951
				03.15 Cast-In-Place Concrete, Grade Beams	17.00 CY	19,530	13,970		499		2,000.00 /CY	34,000	5,232.39 /CY	88,951
				03.0 Concrete Work	*1.00* LS	19,530	13,970		499		33,999.95 /LS	34,000	88,950.64 /LS	88,951
	05.0			Metals										
		05.00		Metals										
			05.10.01.00	Metals, Structural Steel										
				Misc. Repairs to Existing Steel Member	2,944.00 sf	22,399	65,921	-	-	-	30.00 /sf	88,320	79.23 /sf	233,258
				Add Steel to Existing Members for Reinforcement	1.00 ls	3,683	29,503	-	16,814	-	50,000.08 /ls	50,000	132,750.57 /ls	132,751
				Structural Analysis of Existing Canopies and Fence Wall	120.00 mh	24,000	0	-	0	-	200.00 /mh	24,000	516.64 /mh	61,997
				Steel Support Framing for Metal Panels (Assume 8lb/sf)	9.00 TN	20,612	81,298	-	33,091	-	15,000.00 /TN	135,000	39,733.25 /TN	357,599
				05.10.01.00 Metals, Structural Steel	9.00 TN	70,694	176,721		49,904		33,035.56 /TN	297,320	87,289.50 /TN	785,605
				05.00 Metals	*1.00* LS	70,694	176,721		49,904		297,320.01 /LS	297,320	785,605.49 /LS	785,605
		05.50		Metal Fabrications										
			05.50.05.00	Metal Stairs and Platforms										
				Misc. Repairs to Stairs and Platforms	1.00 ls	14,498	10,502	-	-	-	24,999.97 /ls	25,000	65,394.25 /ls	65,394
				05.50.05.00 Metal Stairs and Platforms	0.00	14,498	10,502				/SF	25,000	/SF	65,394
				05.50 Metal Fabrications	*1.00* LS	14,498	10,502				24,999.97 /LS	25,000	65,394.25 /LS	65,394
				05.0 Metals	*1.00* LS	85,192	187,223		49,904		322,319.98 /LS	322,320	850,999.74 /LS	851,000
	07.0			Thermal and Moisture Protection										
		07.00		Thermal & Moisture Protection										
			07.60.02.00	Thermal & Moisture Protection, Metal Roofing										
				New Steel Canopy Roof	2,944.00 sf	64,401	82,799	-	-	-	50.00 /sf	147,200	131.34 /sf	386,667
				Remove Existing Roof	2,944.00 sf	22,080	0	-	-	-	7.50 /sf	22,080	19.37 /sf	57,037
				07.60.02.00 Thermal & Moisture Protection, Metal Roofing	0.00	86,481	82,799				/SF	169,280	/SF	443,704
			07.70.11.00	Thermal & Moisture Protection, Siding, Soffits & Fascias										
				Steel Metal Panel Enclosure	1,710.00 sf	-	-	111,150	-	-	65.00 /sf	111,150	167.91 /sf	287,125
				07.70.11.00 Thermal & Moisture Protection, Siding, Soffits & Fascias	0.00			111,150			/SF	111,150	/SF	287,125
				07.00 Thermal & Moisture Protection	0.00	86,481	82,799	111,150			/SF	280,430	/SF	730,828
				07.0 Thermal and Moisture Protection	*1.00* SF	86,481	82,799	111,150			280,430.02 /SF	280,430	730,828.45 /SF	730,828
	26.0			Electrical Work										

Facility	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Price	Grand Total Amount
		26.15		Process Electrical										
			26.00.99.00	Electrical, Other										
				Electrical Conduit & Wire	445.00 lf	10,540	7,260	-	-	-	40.00 /lf	17,800	106.59 /lf	47,434
				MCC's	5.00 EA	75,000	0	-	-	-	14,999.99 /EA	75,000	39,498.23 /EA	197,491
				Misc. Electrical Allowance	1.00 ls	20,000	0	-	-	-	20,000.04 /ls	20,000	52,664.44 /ls	52,664
				26.00.99.00 Electrical, Other	5.00 EA	105,540	7,260				22,560.00 /EA	112,800	59,517.88 /EA	297,589
				26.15 Process Electrical	5.00 EA	105,540	7,260				22,560.00 /EA	112,800	59,517.88 /EA	297,589
				26.0 Electrical Work	5.00 EA	105,540	7,260				22,560.00 /EA	112,800	59,517.88 /EA	297,589
	31.0			Earthwork										
		31.17		Piling and Caissons										
			31.17.02.00	Earthworks, Caissons										
				Piles, mobilization & Demob	1.00 ls	20,490	-	-	24,510	-	45,000.04 /ls	45,000	118,144.38 /ls	118,144
				Predrilled Concrete piles, 18" diameter,	340.00 VLF	2,290	18,367	-	1,443	-	65.00 /VLF	22,100	172.42 /VLF	58,624
				31.17.02.00 Earthworks, Caissons	340.00 VLF	22,780	18,367		25,953		197.35 /VLF	67,100	519.91 /VLF	176,768
				31.17 Piling and Caissons	340.00 VLF	22,780	18,367		25,953		197.35 /VLF	67,100	519.91 /VLF	176,768
				31.0 Earthwork	*1.00* LS	22,780	18,367		25,953		67,099.96 /LS	67,100	176,768.49 /LS	176,768
	40.0			Process Pipe										
		40.10		Exposed Process Pipe										
			40.00.99.01	Process Pipe, Other										
				3" DI pipe	102.00 LF	6,223	3,467	-	-	-	95.00 /LF	9,690	248.04 /LF	25,300
				3" DI, bellows	23.00 ea	4,123	14,277	-	-	-	800.00 /ea	18,400	2,114.68 /ea	48,638
				6" DI pipe	100.00 LF	8,175	5,325	-	-	-	135.00 /LF	13,500	352.86 /LF	35,286
				6" DI, bellows	12.00 ea	3,152	10,048	-	-	-	1,100.00 /ea	13,200	2,906.42 /ea	34,877
				40.00.99.01 Process Pipe, Other	202.00 LF	21,673	33,117				271.24 /LF	54,790	713.37 /LF	144,101
			40.20.20.01	Other Valves										
				Install check valve, Flgd, DIP, 3"	8.00 ea	2,872	-	-	-	-	359.00 /ea	2,872	927.37 /ea	7,419
				Install check valve, Flgd, DIP, 6"	2.00 ea	1,436	-	-	-	-	718.00 /ea	1,436	1,854.76 /ea	3,710
				FURNISH Check valve, iron body, cushioned, Flgd, 150#, 3"	8.00 EA	-	5,600	-	-	-	700.00 /EA	5,600	1,862.50 /EA	14,900
				FURNISH Check valve, iron body, cushioned, Flgd, 150#, 6"	2.00 EA	-	2,000	-	-	-	1,000.00 /EA	2,000	2,660.71 /EA	5,321
				40.20.20.01 Other Valves	10.00 EA	4,308	7,600				1,190.80 /EA	11,908	3,134.99 /EA	31,350
				40.10 Exposed Process Pipe	202.00 LF	25,981	40,717				330.19 /LF	66,698	868.57 /LF	175,451
				40.0 Process Pipe	202.00 LF	25,981	40,717				330.19 /LF	66,698	868.57 /LF	175,451
	40.9			Instrumentation & Controls										
		40.90		Instrumentation & Controls										
			40.90.06.01	I&C, Programming										
				Feed Sludge Flowmeters	2.00 EA	1,091	1,909	-	-	-	1,500.00 /EA	3,000	4,023.79 /EA	8,048
				Combined Washwater Flowmeter	1.00 EA	545	955	-	-	-	1,500.02 /EA	1,500	4,023.87 /EA	4,024
				Analog, I/O	6.00 EA	5,850	0	-	-	-	975.00 /EA	5,850	2,567.39 /EA	15,404
				Digital, I/O	2.00 EA	2,200	0	-	-	-	1,099.99 /EA	2,200	2,896.50 /EA	5,793
				PLC Cabinet	1.00 EA	15,000	0	-	-	-	15,000.03 /EA	15,000	39,498.34 /EA	39,498
				Washwater Pump Discharge Pressure Indicator	1.00 EA	36	714	-	-	-	750.00 /EA	750	2,030.25 /EA	2,030
				I&C Conduit & Wire	445.00 lf	5,369	14,656	-	-	-	45.00 /lf	20,025	121.05 /lf	53,866
				Allow for Misc Items	1.00 ls	3,096	11,904	-	-	-	15,000.00 /ls	15,000	40,420.81 /ls	40,421
				40.90.06.01 I&C, Programming	13.00 EA	33,187	30,138				4,871.16 /EA	63,325	13,006.48 /EA	169,084
				40.90 Instrumentation & Controls	13.00 EA	33,187	30,138				4,871.16 /EA	63,325	13,006.48 /EA	169,084
				40.9 Instrumentation & Controls	13.00 EA	33,187	30,138				4,871.16 /EA	63,325	13,006.48 /EA	169,084
	43.0			Process Gas and Liquid Handling Equipment										
		43.05		Process Equipment - Dewatering										
			43.05.16.02	Belt Filter Press										
				FURNISH Belt Filter Press 2-meter, 150-200 gpm	2.00 EA	-	1,350,000	-	-	-	675,000.00 /EA	1,350,000	1,795,983.73 /EA	3,591,967
				Install Belt Filter Press	2.00 ea	80,246	-	-	-	-	40,123.12 /ea	80,246	103,646.71 /ea	207,293
				43.05.16.02 Belt Filter Press	2.00 EA	80,246	1,350,000				715,123.12 /EA	1,430,246	1,899,630.44 /EA	3,799,261
				43.05 Process Equipment - Dewatering	2.00 EA	80,246	1,350,000				715,123.12 /EA	1,430,246	1,899,630.44 /EA	3,799,261
				43.0 Process Gas and Liquid Handling Equipment	2.00 EA	80,246	1,350,000				715,123.12 /EA	1,430,246	1,899,630.44 /EA	3,799,261
	44.0			Pollution and Waste Control Equipment										
		44.40		Process Equipment - Pumps										
			44.05.49.02	Submersible Pump: 21hp-50hp										
				Washwater Pump, 90 gpm @ 138 ft head	2.00 EA	7,324	22,676	-	-	-	15,000.00 /EA	30,000	39,626.93 /EA	79,254
				Polymer Feed Pumps	2.00 EA	3,028	19,000	0	0	0	11,014.08 /EA	22,028	29,188.01 /EA	58,376
				44.05.49.02 Submersible Pump: 21hp-50hp	4.00 EA	10,353	41,676				13,007.04 /EA	52,028	34,407.47 /EA	137,630
				44.40 Process Equipment - Pumps	4.00 EA	10,353	41,676				13,007.04 /EA	52,028	34,407.47 /EA	137,630
		44.69		Process Equipment - Mixers										
			44.05.75.00	Liquid Chemical Feed Equipment										
				FURNISH Polymer Blending Unit 60 gph polymer feed, 12,000 gph dilution water	2.00 EA	-	300,000	-	-	-	150,000.00 /EA	300,000	399,107.49 /EA	798,215

Facility	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Price	Grand Total Amount
			44.05.75.00	Liquid Chemical Feed Equipment										
				Install Polymer Blending Unit, Skid	2.00 ea	15,000	-	-	-	-	7,500.00 /ea	15,000	19,374.12 /ea	38,748
				44.05.75.00 Liquid Chemical Feed Equipment	2.00 EA	15,000	300,000				157,499.99 /EA	315,000	418,481.61 /EA	836,963
				44.69 Process Equipment - Mixers	2.00 EA	15,000	300,000				157,499.99 /EA	315,000	418,481.61 /EA	836,963
				44.0 Pollution and Waste Control Equipment	6.00 EA	25,353	341,676				61,171.36 /EA	367,028	162,432.18 /EA	974,593
				02 Dewatering Process Area	*1.00* LS	535,418	2,072,150	111,150	76,357		2,795,074.97 /LS	2,795,075	7,395,599.73 /LS	7,395,600

Estimate Totals

Description	Rate	Amount	Totals
Labor		921,520	
Material		3,080,180	
Subcontract		111,150	
Equipment		76,357	
Other			
Subtotal Raw Costs		**4,189,207**	**4,189,207**
Material Sales & Use Tax	7.750 %	238,714	
Construction Equip Tax	7.750 %	5,918	
Total Taxes		**244,632**	**4,433,839**
Existing Conditions I,OH&P	25.000 %	28,904	
Concrete Work I,OH&P	25.000 %	8,500	
Masonry Work I,OH&P	25.000 %		
Metals Work I,OH&P	25.000 %	80,580	
Architectural (Div 6-12)I,OH&P	25.000 %	70,108	
Special Construction I,OH&P	25.000 %		
Conveying Equipment I,OH&P	25.000 %		
Mechanical Work I,OH&P	25.000 %		
Electrical Work I,OH&P	30.000 %	95,520	
Site/Civil I,OH&P	25.000 %	16,775	
Buried Piping I,OH&P	25.000 %		
Tank Construction I,OH&P	25.000 %		
Process Piping I,OH&P	25.000 %	26,083	
Instruments & Controls I,OH&P	30.000 %	73,838	
Material Handling I,OH&P	25.000 %		
Process Equipment I,OH&P	25.000 %	675,220	
Subtotal Subcontractor I,OH&P		**1,075,528**	**5,509,367**
General Conditions/Prime Contractor OH&P	25.000 %	1,377,341	
Subtotal OH&P		**1,377,341**	**6,886,708**
Final Design & Engineering Services During Construction	30.000 %	2,066,012	
Subtotal Final Design & Engineering Services		**2,066,012**	**8,952,720**
Escalation	5.000 %	447,636	
Subtotal Escalation		**447,636**	**9,400,356**
Contingency	40.000 %	3,760,142	
Subtotal Contingency		**3,760,142**	**13,160,498**
Total Construction Cost			**13,160,498**

Attachment B
Cost Model Results

ESTIMATE SUMMARY SHEET

GENERAL PROJECT INFORMATION

DESCRIPTION	DESCRIPTION
Project Name	Solids Handling DB
Owner Name	City of Rialto
Owner Contact	Stephen Dopudja
Owner Contact Telephone No.	
Owners Engineer	
Owners Construction Manager	
Project Location	Rialto, CA
Bidding Entity	
Estimator	
Estimate Number	
Bid Date	
Award Date	
Mobilization Date	
Mechanical Completion Date	
Substantial Completion Date	
Final Acceptance Date	
Demobilization Date	
Hours Worked per Day Estimated	8.00
Days per Week Estimated	5.00
Weeks per Month Estimated	4.33
Hours per Week Estimated	40.00
Hours per Month Estimated	173.33
OT Hours per Week	0.00
DT Hours per Week	0.00
Completion Time in Months	18

MANHOUR INFORMATION

DESCRIPTION	MANHOURS
Direct Labor Manhours	20,943
Support Labor Manhours	688
Staff Manhours	8,489
Subcontractor Manhours	
TOTALS	**30,120**

COST INFORMATION

DESCRIPTION	COST
Direct Labor	$1,372,599
Support Labor	$36,340
Staff	$885,665
General Conditions	$112,364
Construction Equipment	$498,904
Subcontractors	$13,191,553
Other	$9,470
Materials & Equipment Procurement	$7,349,447
Labor Escalation	$68,794
Material Escalation	$367,472
Performance & Payment Bond	$118,275
Insurance	$295,566
Sales Taxes	$598,061
Use Taxes	$0
Contingency	$1,194,630
Overhead (G&A)	$1,254,362
Profit	$2,508,724
TOTALS	**$29,862,228**

PROJECT FACTS

DESCRIPTION	YES / NO
Union Labor	
Davis Bacon	
Prevailing Wage	
Project Labor Agreement	
Owner Furnished Equipment	
Firm Lump Sum	
Time and Material	
Target Price	
Other Contract Methodology	
EPC Contract	
Bid Build Contract	
Unusual Risks	
Wage Escalation Required	
Materials Escalatioin Required	
Sales Taxes Required	
Use Taxes Required	
Other Taxes Required	
Per Diem Required	
Travel Costs Required	
Relocation Costs Required.	

BONDS-INSURANCE-TAXES

DESCRIPTION	YES / NO
Liquidated Damages	
P&P Bond	
Letter of Credit	
Builders Risk	
Builders Risk Deducatable	
Professional Liability	
Longshoreman Insurance	
Sales Tax	
Use Tax	
Other Tax	
Performance Guarantees	
Noise Guarantees	
Other Guarantees	
Builders Risk Deductable Value	$0.00
Letter of Credit Percentage	0.00%
Sales Tax Percentage	7.75%
Use Tax Percentage	0.00%
Other Taxes	$0.00
Liquidated Damages Value	$0.00

SUMMARY SHEET

DETAIL TAB ID		DIRECT CRAFT MAN HOURS	SUPPORT LABOR MAN HOURS	STAFF MANHOURS	SUBCONTRACT MANHOURS	DIRECT LABOR $	MATERIAL $	CONSTRUCTION EQUIPMENT $	SUBCONTRACT $	OTHER $	GC'S $	SUPPORT LABOR $	STAFF $	TOTAL COST
	ESTIMATE DESCRIPTION	**20,943**	**688**	**8,489**	**0**	**$1,372,599**	**$7,349,447**	**$498,904**	**$13,191,553**	**$9,470**	**$112,364**	**$36,340**	**$885,665**	**$23,456,342**
1	**SITEWORK**	1,340	44	543	0	$87,704	$36,499	$31,912	$154,416	$0	$7,187	$2,324	$56,651	$376,694
2	**SITE PIPING**	784	26	318	0	$51,318	$300,500	$18,673	$19,057	$0	$4,205	$1,360	$33,148	$428,262
3	**PRIMARY SLUDGE SCREENING**	1,767	58	716	0	$115,599	$1,042,341	$42,092	$172,205	$0	$9,480	$3,066	$74,722	$1,459,506
4	**THICKENING PROCESS AREA**	3,653	120	1,481	0	$239,142	$1,873,701	$87,014	$183,354	$161	$19,597	$6,338	$154,469	$2,563,777
5	**DEWATERING PROCESS AREA**	7,362	242	2,984	0	$483,525	$1,875,123	$175,376	$1,384,207	$8,707	$39,499	$12,774	$311,332	$4,290,543
6	**ANAEROBIC DIGESTER NO. 1 & NO. 2 UPGRADE**	1,477	49	599	0	$96,686	$974,132	$35,180	$0	$0	$7,923	$2,563	$62,453	$1,178,937
7	**RETREFIT EXISTING DIGESTER SLUDGE STORAGE TANK**	4,561	150	1,849	0	$298,624	$1,247,150	$108,657	$1,462,572	$602	$24,472	$7,915	$192,890	$3,342,882
8	**ELECTRICAL & INSTRUMENTATION**	0	0	0	0	$0	$0	$0	$5,514,167	$0	$0	$0	$0	$5,514,167
9	**DESIGN COST**	0	0	0	0	$0	$0	$0	$4,301,575	$0	$0	$0	$0	$4,301,575

Attachment C
Rialto Solids Upgrades Project Cost Calculations (Veolia)

RIALTO SOLIDS UPGRADES PROJECT COST CALCULATIONS:

Category	Category	Cost	% of Fixed Project Cost	Explanation
Direct Project Cost	Contractor Guaranteed Maximum Price	$31,614,908	93.74%	This is the GMP Price from AECOM
Direct Project Cost	Construction Insurance (1.2%)	$379,379	1.12%	be incurred by Veolia. This is part of
Direct Veolia CPM Labor	Veolia CPM Labor	$1,730,250	5.13%	with the CPM team to deliver the
O&M Compliance, Risk Costs	O&M Risk+Labor+Compliance (2.5%)	$790,373	2.34%	Included in Markup
Veolia Corp. Overhead	Veolia Corp. Overhead	$926,400	2.75%	Included in Markup
Veolia Profit	Veolia Profit	$621,875	1.84%	Included in Markup
		$36,063,185		

			Market Value
Veolia Project Management Cost	$2,109,629	6.26%	4% to 8%
O&M Risk+Labor+Compliance (2.5%)	$790,373	2.34%	?
Veolia Corp. Overhead	$926,400	2.75%	
Veolia Profit	$621,875	1.84%	
	$4,448,277	13.19%	