



CITY OF MORRO BAY CITY COUNCIL Agenda

The City of Morro Bay provides essential public services and infrastructure to maintain a safe, clean and healthy place for residents and visitors to live, work and play.

Notice of Special Meeting **Wednesday, May 24, 2023 @ 5:30 PM** **Veterans Memorial Hall** **209 Surf St., Morro Bay, CA**

Public Participation:

Public participation is allowed in the following ways:

- Community members may attend the meeting in person at the Morro Bay Community Center.
- Alternatively, members of the public may watch the meeting and speak during general Public Comment or on a specific agenda item by logging in to the Zoom webinar using the information provided below. Please use the "raise hand" feature to indicate your desire to provide public comment.

Please click the link below to join the webinar:

➤ <https://us02web.zoom.us/j/82722747698?pwd=aWZpTzcwTHlRTk9xaTlmWVNWRFUQT09>

Password: 135692

➤ Or Telephone Attendee: 1 (408) 638-0968 or 1 (669) 900 6833 or 1 (346) 248 7799; Webinar ID: 827 2274 7698; Password: 135692; Press * 9 to "Raise Hand" for Public Comment

- Members of the public may watch the meeting either on cable Channel 20 or as streamed on the City [website](#).
- Community members are encouraged to submit agenda correspondence in advance of the meeting via email to the City Council at council@morrobayca.gov prior to the meeting. Agenda Correspondence received at council@morrobayca.gov by 10 a.m. on the meeting day will be posted on the City website.

ESTABLISH QUORUM AND CALL TO ORDER

PUBLIC COMMENT FOR ITEMS ON THE AGENDA

SPECIAL MEETING AGENDA:

- I. BUDGET STUDY SESSION – REVIEW OF FISCAL YEAR 2023-24 DRAFT PROPOSED BUDGET; (INTERIM CITY MANAGER/ASSISTANT CITY MANAGER/ADMIN SERVICES DIRECTOR/PUBLIC WORKS DEPARTMENT)

RECOMMENDATION: Receive the Proposed Fiscal Year (FY) 2023-24 Citywide Operating and Capital Budget and provide feedback prior to budget adoption, scheduled for June 13, 2023.

- II. APPROVE WRF CONTRACT AMENDMENTS AND REVIEW AND COMMENT ON FISCAL YEAR 2023 QUARTER 3 WRF QUARTERLY REPORT; (PUBLIC WORKS DEPARTMENT)

RECOMMENDATION: Staff recommends the City Council review and provide input on the Fiscal Year (FY) 2023 Quarter 3 WRF Program Quarterly Report. Staff also recommends the City Council authorize the City Manager to execute the following WRF Program contract and budget amendments:

1. Amendment No. 8 to the agreement with Anvil Builders, Inc. (Anvil) for the WRC Lift Stations and Offsite Pipelines construction for \$1,416,292, which results in a total not to exceed contract amount of \$36,384,606.
2. Amendment No. 9 to the agreement with Filanc, Black & Veatch (FBV) for the Water Reclamation Facility Construction project for \$409,028 which increases the Guaranteed Maximum Price (GMP) to \$78,424,326, to extend the Final Completion Date to August 31, 2023.
3. Amendment No. 4 to the agreement with Cogstone Resource Management (Cogstone) for cultural resources monitoring services during construction of the WRC Lift Station and Offsite Pipelines for a total amount of \$31,033.52, resulting in a total not to exceed amount of \$1,524,560.64.
4. Amendment No. 8 to the agreement with Carollo Engineers, inc. (Carollo) to extend their contract expiration date to June 30, 2024. This is a non-compensable contract extension.
5. Amendment No. 2 to the agreement with Confluence Engineering Solutions (Confluence) to extend their contract expiration date to June 30, 2024. This is a non-compensable contract extension.

ADJOURNMENT

DATED: May 19, 2023

Carla Wixom

Carla Wixom (May 19, 2023 12:53 PDT)

Carla Wixom, Mayor

IN COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT, IF YOU NEED SPECIAL ASSISTANCE TO PARTICIPATE IN A CITY MEETING, PLEASE CONTACT THE CITY CLERK'S OFFICE AT LEAST 24 HOURS PRIOR TO THE MEETING TO INSURE THAT REASONABLE ARRANGEMENTS CAN BE MADE TO PROVIDE ACCESSIBILITY TO THE MEETING.



AGENDA NO: I

MEETING DATE: May 24, 2023

Staff Report

TO: Honorable Mayor and City Council

DATE: May 19, 2023

FROM: Greg Carpenter, Interim City Manager
Sarah Johnson-Rios, Assistant City Manager/Admin Services Director
Greg Kwolek, Public Works Director

SUBJECT: Budget Study Session – Review of Fiscal Year 2023-24 Draft Proposed Budget

RECOMMENDATION

Receive the Proposed Fiscal Year (FY) 2023-24 Citywide Operating and Capital Budget and provide feedback prior to budget adoption, scheduled for June 13, 2023.

BACKGROUND

The May 24th meeting is the second Budget Study Session in a two-part series, following the first May 23rd Budget Study Session. The discussion on May 24th is intended to focus on the Capital Improvement Program portion of the budget, while the May 23rd session focused on the Proposed Operating Budget, fiscal forecasts, reserves, and broader budget takeaways. The staff report for the May 23rd budget study session is linked as Attachment 1 for background and the broader budget context.

DISCUSSION

The FY 2023-24 Proposed Operating and Capital Budget is available online in both a web-based format and a printable PDF format (links listed under “Attachments”).

FY 2023-24 Proposed Capital Budget

The capital budget allows the City to invest in critical infrastructure improvements by allocating \$19.5 million to 31 capital projects. This robust investment in capital needs represents approximately 35% of the City’s total Proposed FY 2023-24 Budget of \$56.1 million.

Below is a summary of the investments and supporting initiatives included in the budget for FY 2023-24 and an outlook for funding opportunities moving forward. Please note the projects are discussed in detail in the "Capital Improvements" section of the budget document.

- **Water and Sewer Projects:** The FY 2023-24 capital plan budget includes \$6.8 million for the Water Reclamation Facility, primarily to continue to advance the recycled water component of the project. The budget includes contract amendments for Conveyance Facilities construction, descopeing two planned capital projects from the Water Resources Center and Conveyance Construction budgets due to funding incompatibility. Funding for the Recycled Water Facilities

Prepared By: SJR

Dept Review: SJR

City Manager Review: GC

City Attorney Review:

has been maintained from the adopted FY 2022-23 budget. The Program Management budget has also been adjusted to anticipate for potential construction contractor claims.

This budget also includes \$3.4 million for the first portion of the Main Street and Atascadero Sewer Main Replacement project.

Finally, the budget includes continued funding for the OneWater Plan Update in the amount of \$190,000. The original OneWater Plan reviewed and prioritized capital needs within the water, sewer and stormwater systems in 2018 and the FY 2023-24 OneWater funding continues to build upon that original plan and continued progress.

- **City Streets and Roadway Improvements:** The City is investing \$2.1 million in the Annual Pavement Management program FY 2023-24, which is in addition to any FY 22-23 total carry-forward funding for paving projects currently underway through a budget approved by Council in the prior two fiscal years. This represents a continued effort towards the recommended annual investment. In addition, this budget includes \$400,000 for storm-related pavement repair and an additional \$826,000 toward improvements to the HWY 1/41/Main Street intersection for efforts to complete the planning and permitting portion of that project.
- **Harbor:** This capital plan budget includes \$200,000 for dock repairs related to storm recovery, \$40,000 for a Harbor annual vehicle replacement contribution, and \$40,000 for North T-Pier repairs.
- **Americans with Disabilities Act (ADA) and Miscellaneous Projects:** The FY 2023-24 budget includes additional new funding of \$80,000 to continue Lila Kaiser parking lot rehabilitation and necessary ADA Upgrades.
- **Storm Recovery:** Finally, the Proposed Budget includes approximately \$1.9 million for storm recovery and mitigation efforts, in addition to the \$1.8 million added with FY 22-23 Midyear Budget Amendments. Staff is applying for reimbursement funding from FEMA, insurance payments where eligible, and hazard mitigation funding to help the City mitigate the impacts of future storms. As more is known regarding actual repair costs and reimbursement potential, budget amendments will be taken to Council if needed. If reimbursements are received in FY 23-24 or in future fiscal years, they will fall to the fund balance of the fund that made each expenditure, and will be available for Council to appropriate to other projects or needs in future budget cycles.

There are roughly a dozen funding sources for the 31 capital projects proposed, with the majority of the funds coming from Water and Sewer to address utilities capital needs.

| | |
|--------------------------------------|------------------------|
| ● Bike Path Fund (0%) | \$13,000.00 |
| ● Development Impact Fees (DIF) (5%) | \$1,017,250.00 |
| ● General Fund (6%) | \$1,106,865.00 |
| ● Grant (0%) | \$60,000.00 |
| ● Harbor Fund (1%) | \$280,000.00 |
| ● Measure Q & E (12%) | \$2,267,000.00 |
| ● Other (2%) | \$413,023.00 |
| ● Reallocated Prior Year Budget (2%) | \$308,162.00 |
| ● RMRA Funding (1%) | \$260,000.00 |
| ● Sewer Fund (50%) | \$9,764,468.00 |
| ● Water Fund (20%) | \$3,977,470.00 |
| TOTAL | \$19,467,238.00 |

Multi-Year Capital Plan

The multi-year Capital Improvements Plan identifies projects and future funding beyond the current fiscal year. This is intended to provide an outlook of what future projects are anticipated to cost in the next five years. For FY 23-24, these are the known projects that are identified at this point in time during budget development. The capital needs assessments that are underway will create a more complete picture of the City’s future capital needs. Capital projects are approved and funded on an annual basis as part of the budget development in single year increments. The five-year plan is updated annually with each year’s budget. The numbers in this plan are included in the five-year forecasts for the City’s major funds.

The multi-year capital plan presented in the budget document includes a total estimated cost of approximately \$85 million for over 30 capital projects in all funds. The City does not have adequate resources to cover these needs, or additional needs that the pending capital needs assessments will identify. The five-year forecast in each of the City’s major funds outlines the projected funding gap given these five-year capital plans. When the capital needs assessments are complete, the City will need to prioritize capital projects evaluate various funding options, likely including debt financing for projects beyond the Water Reclamation Facility. Currently, for all other projects the City is paying for projects as revenues come in with resources on hand.

Carry Forward Funding

As part of budget adoption each year, Council typically approves by resolution the carry forward of any unspent capital funds appropriated in prior year budgets. Since capital projects often take more than one year to complete, this allows projects to proceed as intended by the original budget appropriation. The preliminary estimated carry forward funding as of the writing of this staff report is approximately \$22-26 million citywide. That figure will change as the fiscal year wraps up and final billing is processed. The carry forward amount plus the proposed FY 23-24 \$19.5 million provides a more complete picture of the volume of work underway.

CONCLUSION

While the City’s contribution to addressed a backlog of deferred capital needs has increased in the last few years, significant unfunded capital needs remain. The Proposed FY 23-24 Capital Budget represents \$19.5 million of additional investment in the City’s aging infrastructure, which is a critical step forward.

ATTACHMENTS

1. May 23, 2023 Budget Study Session Staff Report –
Item C-2 <https://www.morrobayca.gov/ArchiveCenter/ViewFile/Item/6179>
2. FY 2023-24 Proposed Capital Budget – <https://www.morrobayca.gov/827/Budget>
 - a. One-Year Capital Budget: <https://city-morro-bay-ca-budget-book.cleargov.com/8736/capital-improvements/capital-improvements-one-year>
 - b. Multi-Year Capital Plan: <https://city-morro-bay-ca-budget-book.cleargov.com/8736/capital-improvements/capital-improvements-multi-year>



AGENDA NO: II

MEETING DATE: May 24, 2023

Staff Report

TO: Honorable Mayor and City Council **DATE:** May 18, 2023

FROM: Greg Kwolek – Public Works Director
Paul Amico, PE – Water Reclamation Facility (WRF) Program Manager

SUBJECT: Approve WRF Contract Amendments and Review and Comment on Fiscal Year 2023 Quarter 3 WRF Quarterly Report

RECOMMENDATION

Staff recommends the City Council review and provide input on the Fiscal Year (FY) 2023 Quarter 3 WRF Program Quarterly Report. Staff also recommends the City Council authorize the City Manager to execute the following WRF Program contract and budget amendments:

1. Amendment No. 8 to the agreement with Anvil Builders, Inc. (Anvil) for the WRC Lift Stations and Offsite Pipelines construction for \$1,416,292, which results in a total not to exceed contract amount of \$36,384,606.
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4. Amendment No. 8 to the agreement with Carollo Engineers, inc. (Carollo) to extend their contract expiration date to June 30, 2024. This is a non-compensable contract extension.
5. Amendment No. 2 to the agreement with Confluence Engineering Solutions (Confluence) to extend their contract expiration date to June 30, 2024. This is a non-compensable contract extension.

FISCAL IMPACT

Anvil Builders, inc.

The potential change orders (PCOs) included in Amendment No. 8 are listed in the following table. As the WRF Program Team has been pushing the Offsite Pipelines and Pump Stations project to completion, Anvil submitted 33 PCOs that total approximately \$2.0 million for extra work, and two PCOs that total approximately \$2.1M for material price escalation and a claim that the work needed to be accelerated to meet the City’s deadline to start up the Water Resources Center (WRC).

The total PCOs submitted by Anvil considered by the Program Team totaled over \$4.1M. The Program Team and Anvil spent several months negotiating the PCOs and claims, and the PCOs

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|--------------------------------|----------------------------------|
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| Prepared By: <u>AC</u> | Dept Review: <u>GK</u> |
| City Manager Review: <u>GC</u> | City Attorney Review: <u>JWP</u> |

included in Amendment 8 have been assessed for merit and entitlement, and the overall pricing for each PCO has been evaluated and negotiated to determine the recommended amounts. Council is being asked to consider (with a credit from Anvil) payment of PCOs totaling approximately \$1.42M. The City has disputed the remaining PCOs and claims, and the contract between Anvil and the City outlines a dispute resolution process that will need to be followed should Anvil decide to pursue compensation through that process. If the amendment is approved, then the total not to exceed amount for the Anvil Agreement and budget will increase from \$34,968,314.00 to \$36,384,606.

| PCO # | DESCRIPTION | Amount |
|--------------|---|--------------------|
| 30.1 | Bike Path Joint Trench and Waterline Re-Designs | \$5,635 |
| 33.1.1 | Paving Limit Revisions | \$537,118 |
| 47 | Utility Bridge Pipe Casing Revisions | \$99,587 |
| 52.2 | High Level Switch Alarm Termination at Utility Bridge | \$28,627 |
| 56 | Fiber Optic Design Revisions and Upgrades | \$134,605 |
| 64 | Existing Lift Station 3 Connection and Utility Conflicts | \$71,000 |
| 65 | Relocate New Diversion Manhole and Replace Existing Manhole | \$296,404 |
| 67 | Waterline Replacement Conflicts near Mortuary | \$86,171 |
| 69 | Tie-in HDPE Lines at WRC | \$18,705 |
| 71 | Reroute Sewage Back to the Old Plant on 10/11 | \$59,642 |
| 73 | Guide Rail Modifications at Wet Wells | \$32,756 |
| 82.2 | Additional Flatwork Concrete (Quantity Overruns) | \$62,920 |
| 83 | Existing Waterline Replacement at Pump Station A | \$117,664 |
| 84 | Disputed Caltrans R/W Restoration Costs | \$10,885 |
| 86 | Transport FPVC Pipe to WRC Site | \$1,770 |
| 89.1 | Fencing Modifications | \$33,980 |
| 90 | PS-A & PS-B VFD Auto-Reset due to Power Voltage Drops | \$12,392 |
| 94 | Standby Excavator at Morro Creek for Rain Event | \$8,402 |
| 96 | Raise F.O. Box at FBV Paving Error | \$5,029 |
| 98 | Credit for Deleting 36-inch Storm Drain relocation | \$(207,000) |
| | Total | \$1,416,292 |

FBV

The PCOs included in Amendment No. 9 are listed in the following table. As the WRF Program Team has been pushing the WRC project to completion, FBV submitted 19 PCOs that total approximately \$797,000 for work claimed not to have been included in the original scope of work and priced under the GMP. The Program Team and FBV spent several months negotiating the PCOs and claims, and the PCOs included in Amendment 9 have been assessed for merit and entitlement, and the overall pricing for each PCO has been evaluated and negotiated to determine the recommended amounts. Council is being asked to consider payment of PCOs totaling approximately \$409,028. The City has disputed the remaining PCOs and claims, and the contract between the City and FBV outlines a dispute resolution process that will need to be followed should FBV decide to pursue compensation through that process. If the amendment is approved, then the guaranteed maximum price will increase from \$78,015,298 to \$78,424,326.

| PCO # | DESCRIPTION | Amount |
|--------------|--|---------------|
| 104.2 | CMMS Software Scope and Implementation | \$71,567 |

| | | |
|-------|--|------------------|
| 120 | Seed Sludge Maintenance Period | \$133,784 |
| 125 | Add Total Chlorine Analyzer at Dechlorination Facility | \$46,146 |
| 128 | Granite Material Escalation | \$63,432 |
| 132.2 | Additional Paving at WRC Entrance | \$53,929 |
| 133 | Rancher Gate | \$2,825 |
| 134 | DC-044 UV Sample Line and UVT Analyzer | \$37,345 |
| | Total | \$409,028 |

Cogstone Resource Management

The cost for Amendment No. 4 is \$31,033.52. If the amendment is approved, then the total not to exceed amount for the WWE agreement will increase from \$1,493,527.12 to \$1,524,560.64.

Carollo Engineers, Inc.

There will be no fiscal impact to Amendment No. 8 to the Agreement with Carollo. This is a non-compensable time extension to their existing contract.

Confluence Engineering Solutions

There will be no fiscal impact to Amendment No. 2 to the Agreement with Confluence. This is a non-compensable time extension to their existing contract.

Overall Fiscal Impact

Acceptance of all three contract amendments would not result in an increase in the overall WRF Program baseline budget, as adopted in the FY23 City Budget (\$159.84 Million). The following table connects the proposed contract amendments to each individual budget item included in the overall WRF Program Budget. The Conveyance Facilities Construction Budget overage will be covered by using the Program Contingency budget included in the WRF City Costs Budget and reallocating WRF General Project budget in the proposed FY24 WRF Program budget.

| | |
|---|----------------------|
| Approved Conveyance Facilities Construction Budget | \$34,701,121 |
| Original Contract Amount | \$31,493,675 |
| Total Approved Amendments | \$3,474,639 |
| Amendment No. 8 | \$1,416,292 |
| Proposed Contract Amount | \$36,384,606 |
| Conveyance Facilities Construction Budget Remaining | (\$1,683,485) |
| | |
| Approved WRC Budget | \$79,643,216 |
| Original Guaranteed Maximum Price (GMP) | \$67,234,512 |
| Total Approved Amendments | \$10,780,786 |
| Amendment No. 9 | \$409,028 |
| Proposed Contract Amount | \$78,424,326 |
| WRC Budget Remaining | \$1,218,890 |
| | |
| Approved Conveyance Facilities Design, ESDC and Permitting Budget | \$5,073,603 |
| Approved Cogstone Budget | \$1,405,721 |
| Original Contract Amount | \$264,918 |

| | |
|---|--------------------|
| Total Approved Amendments | \$1,228,609 |
| Amendment No. 4 | \$31,033 |
| Proposed Contract Amount | \$1,524,560 |
| | |
| Total of All Approved Conveyance Facilities Design, ESDC and Permitting Contracts | \$4,956,035 |
| Conveyance Facilities Design, ESDC and Permitting Budget Remaining | \$117,568 |
| | |
| Approved Total WRF General Project Budget (includes WRF City Costs, WRF Program Management, and WRF Other Consulting Costs Budgets) | \$30,998,235 |
| Total WRF General Project Costs Through Q3 FY2023 | \$22,492,373 |
| WRF General Project Budget Remaining | \$8,505,862 |

DISCUSSION

Anvil Builders, Inc.

Amendment No. 8 consists of 18 potential change orders (PCO) that were negotiated between Anvil and the construction management team and reviewed by City Staff. Each PCO is described below.

PCO 30.1 – Bike Path Joint Trench and Waterline Re-Designs

At the City's request and direction, Anvil subcontracted with Firma Consultants to undertake several landscaping design tasks associated with restoring landscaping along the City's Bike Path from Morro Creek to Camp Willow Creek. This task included preparing a 50% design plan to revegetate the area, add possible decomposed granite path, add bench areas, add rural fencing, add irrigation systems, and other possible improvements.

PCO 33.1.1 – Paving Limit Revisions

This item includes paving quantities paid under Bid Items 60 through 65 in excess of the quantities included in the original contract documents. It also includes grinding existing pavement and placing new pavement on the north side of Quintana between Las Tunas and La Loma, digging out and replacing saturated subgrade at Quintana and Kings Ave, and paving the LS-2 force main alignment in the City's easement on the Vistra property.

PCO 47 – Utility Bridge Pipe Casing Revisions

The Design Engineer inadvertently specified a casing size too small to fit the carrier pipe joint restraints, and to address the situation Anvil was directed to delete the Brine Line D.I.P. carrier pipe and accommodate flow in the field-coated steel casing pipe, and the FM1 and FM2 carrier pipes were downsized to fit in the casing. Anvil provided a credit for deleting and downsizing carrier pipes, and increased costs for added necessary fittings at each bridge abutment. This PCO also includes additional costs for changing the casing lining system in the field after the utility bridge was constructed.

PCO 52.2 – High Level Switch Alarm Termination at Utility Bridge

Change initiated by City to change from solar powered telemetry to direct PLC wiring to PS-A. The costs under PCO 52 (previously approved) and PCO 52.1 (current item) appear to be reasonable. The original PLC and solar power equipment have been provided to the City.

PCO 56 – Fiber Optic Design Revisions and Upgrades

The City's SCADA integrator JSP Automation recommended the City implement multiple fiber option network revisions and upgrades beyond what was included in the original contract, and the City agreed with the recommendations. The changes encompassed multiple equipment components and communication protocols at essentially all locations on the project, including the WRC, Pump Station A, Pump Station B, existing Lift Stations, and at the City's point of connection with City existing network.

PCO 64 – Existing Lift Station 3 Connection and Utility Conflicts

Several existing utility conflicts were identified after Anvil potholed existing utilities near the existing Lift Station 3 (LS-3) to confirm the utility locations shown on the drawings. These conflicts were due to inaccurate record drawing information or the discovery of unmapped utilities and resulted in the need for the original LS-3 connection design to be modified to route the connections over existing pipes, causing hydraulic high points in the parallel branch connection lines. These high points required the addition of extra pipe fittings, two sewer-rated combination air/vacuum release (CAV) valves, and a vault to house the added CAVs. Approximately \$50K in standby equipment was removed from Anvil's original request.

PCO 65 – Relocate New Diversion Manhole and Replace Existing Manhole

Several existing utility conflicts were identified after Anvil potholed existing utilities at the location of the Pump Station A diversion manhole to confirm the utility locations shown on the drawings. These conflicts included existing electrical and communications conduits and were due to inaccurate record drawing information or the discovery of unmapped utilities. An existing adjacent manhole that was designed to remain in place was also discovered to be in substandard and failing condition. Consequently, the City and designer concluded it would be beneficial to relocate the new diversion manhole to the location of the existing failing manhole and replace it. Constructing the new diversion manhole in this location was valuable for the long-term even though it complicated construction and included constructing a cast-in-place concrete manhole base rather than utilizing the pre-cast base specified in the original design, because it allowed the City to replace a failing manhole on a critical sewer line. Approximately \$41K was removed from Anvil's original request.

PCO 67 – Waterline Replacement Conflicts near Mortuary

Several existing utility conflicts and a buried concrete wing wall were identified after Anvil potholed existing utilities near 1401 Quintana Road to confirm the utility locations shown on the drawings. These conflicts included a communications conduit and the wing wall associated with the State-owned arched culvert at Station 144+00 and were due to inaccurate record drawing information or the discovery of unmapped utilities. Anvil needed to excavate carefully around these conflicts and re-route the new 10" waterline replacement in this area to avoid the existing conflicts. The majority of extra costs are associated with potholing and discovering the limits of the buried unknown wing wall.

PCO 69 – Tie-in HDPE Lines at WRC

Anvil's contract included making the pipeline and fiber optic connections between the Conveyance Facilities and WRC projects near the WRC entrance on Theresa Dr. While Anvil was attempting to connect pipelines, small quantities of test water continued to flow from the WRC on-site piping, and making the connections requires the pipelines to be completely dry. It took several days for FBV to identify and close valves and stop the nuisance water from flowing into the connections, and Anvil incurred additional costs for the delay and to deal with the water before it was stopped.

PCO 71 – Reroute Sewage Back to the Old Plant on October 11, 2022

During WRC startup, FBV determined that the new WRC treatment process was at risk for failure and wastewater flow needed to be routed back to the City's existing WWTP so the treatment biology could be re-seeded and wastewater flow introduced at a slower rate. Consequently, Anvil needed to reinstall the plug in the diversion manhole near Pump Station A and reestablish the sewer bypass at that location. This item includes the costs for standby equipment rental, trench shoring rental, crash barriers, fencing, and road plates, and it also includes labor and materials for plugging the diversion manhole and reinstating the bypass.

PCO 73 – Guide Rail Modifications at Wet Wells

The Design Engineer issued Design Clarification No. 32 to modify submersible pump guide rails at both Pump Station A and Pump Station B wet wells. Due to space constraints in the pump station wet wells, the 3 submersible pumps needed to be re-positioned in each wet well, and the pump guide rails no longer aligned with the edge of the hatch opening above (as designed). Consequently, it was necessary to re-design and modify the guide rail top mounting bracket using off-set knee bracing and other added structural supports. This item includes labor and materials to implement the design change.

PCO 82.2 – Additional Flatwork Concrete

The Contract Drawings specifically indicate the removal and replacement of existing concrete flatwork (sidewalks, curb, gutters, etc.) in multiple locations adjacent to the new work associated with the project. Additional areas of adjacent concrete was identified during punchlist development to have been impacted by Anvil's work, but wasn't specifically identified in the contract drawings. There are also quantities included in this PCO for sidewalks adjacent to prior-approved changes in contract work that required repair or replacement due to changes in the scope of work.

PCO 83 – Existing Waterline Replacement at Pump Station A

The construction of Pump Station A required an extensive shoring and groundwater dewatering system. The large, shored area was directly adjacent to an existing 6" transite City water main. During the project, the City was concerned that the shoring and dewatering operation would undermine and impact the existing water line, so the City added isolation valves on each side of the shoring, and closed those valves to isolate the segment of water main for over a year. Recently the City re-pressurized the line and found it to be leaking in several locations. Consequently, Anvil was directed to replace about 210' of waterline, which was more extensive than the portion that Anvil would have otherwise been responsible for.

PCO 84 – Disputed Caltrans Right-of-Way Restoration Costs

Anvil issued Request for Information (RFI) #305 regarding Caltrans requested/directed restoration work that Anvil believes is beyond the Contract scope. These items include (1) additional 2' wide strip of aggregate shoulder backing along the Atascadero Road S/B on-ramp; (2) additional fiber roll erosion control for the slope along the Atascadero Road S/B on-ramp; and (3) additional compost sock or fiber roll be added to the bottom (toe) of the slope along the Atascadero Road S/B on-ramp.

PCO 86 – Transport FPVC to WRC Site

The City directed Anvil to transport unused FPVC pipe to be stored at the WRC site for further use. The contract did not specifically require this and Anvil incurred labor and fuel costs to transport and unload the pipe at the new WRC.

PCO 89.1 – Fencing Modifications

This item includes Anvil labor, equipment, and material cost to replace existing fencing that was necessary to be removed to complete project work, but not specifically identified on the contract drawings. It is paid under a contract bid item and is for additional quantity beyond what was included in the bid.

PCO 90 – PS-A and PS-B VFD Auto-Reset due to Power Voltage Drops

After commissioning both PS-A and PS-B, PG&E power voltage drops during inclement weather caused several pump motor VFD faults. After attempting to adjust VFD settings, the City directed Anvil to add a remote auto-resets for the VFDs, including adding programming by the City's SCADA integrator and the required field wiring so City operations staff do not have to physically respond to the faults as shutdown emergencies.

PCO 94 – Standby Excavator at Morro Creek for Rain Event

Not related to the project work, and as an emergency standby during a forecasted major storm event on March 9 and 10, the City requested Anvil to provide a Cat 315 excavator and operator on standby to clear debris from under the Main St bridge should it be determined that the debris could cause or contribute to flooding in this area. This item includes equipment mobilization and demobilization costs, daily standby costs, and equipment and labor cost.

PCO 96 – Raise Fiber Optic Box at FBV Paving Error

This work includes demolishing existing asphalt concrete around a newly installed fiber optic box and raising the fiber optic box lid to the appropriate grade. The asphalt was removed due in part to FBV laying asphalt at the incorrect grade at the WRC entrance. Work also included pouring a concrete collar around the fiber optic box.

PCO 98 – Credit for Deleting 36-inch Storm Drain

Bid Item 44 was to be used for relocating a 36-inch storm drain in the property to the northeast of the roundabout that was used during construction for Anvil's field office. This work was removed from Anvil's contract because the City deemed it wasn't necessary at this time.

FBV

Amendment No. 9 consists of seven potential change orders (PCO) that were negotiated between FBV and the construction management team and reviewed by City Staff. Each PCO is described below.

PCO 104 – CMMS Software Scope and Implementation

Section 9.2.1-8 in Exhibit B of the DB Agreement requires FBV to provide and implement a Computerized Maintenance Management System (CMMS) for tracking preventative maintenance and repairs on equipment, devices, and instruments at the WRC (650+ individual items), but the specific software was not specified in the Agreement. During the project, FBV was directed by the City to provide a specific software package that was different and more expensive than the software that was included in their original proposal. Costs for PCO 104 include additional implementation costs required by the City-selected vendor, and annual software subscription costs for the period beginning October 1, 2022.

PCO 120 – Seed Sludge Maintenance Period

After all the WRF Program's schedule restrictions had been cleared, the City, contractors, and program team worked toward a full-system (WRC, pump stations, and pipelines) startup date of

October 4, 2022. The pump stations and pipelines project was not fully ready to send wastewater to the WRC until October 6, 2022. Because startup of wastewater plants includes “seeding” the plant with “activated sludge” from an operating wastewater plant to get the biological treatment process started, the City determined that starting the WRC immediately after a long week could stress and overwork the operations staff and risk a successful startup. Consequently, the City made the decision to postpone the WRC “seeding” process until the following week. FBV is being compensated for hauling additional truckloads of activated sludge from the Paso Robles Wastewater Treatment Plant and wastewater from the City’s existing wastewater treatment plant, and staffing the WRC to keep the “seed sludge” alive and viable to be ready for startup.

PCO 128 – Granite Material Escalation

FBV has received a claim letter from Granite Construction in the amount of \$55,966 for material and labor price escalation. The claim includes the Granite claim amount plus normal FBV mark-ups. The claim includes the Granite claim amount plus normal FBV mark-ups as indicated in the DB Agreement.

PCO 132 – Additional Paving at WRC Entrance

PCO 117 included additional utility work in Theresa Dr that extended paving limits, which were not known at the time PCO 117 was approved. Also, in a previous amendment FBV provided a \$16K credit for deleted paving that Anvil would complete including a 4" thick zone & 1.5" overlay zone, and FBV ended up performing that paving, entitling them to a return on the credit.

PCO 133 – Rancher Gate

The work was requested by City to allow for the land owner between the nearby stream south of the WRC and the site boundary to access this site. This gate was added near the entrance to the WRC.

PCO 134 – DC-044 UV Sample Line and UVT Analyzer

The added UV sample line and UVT analyzer were required by the California Division of Drinking Water (DDW) for startup and testing of the reverse osmosis/ultraviolet disinfection process and was not originally included in the DB Agreement.

Cogstone Resource Management

Amendment No. 4 for Cogstone includes the additional scope of work from the end of December 2022 to the completion of ground disturbing activities in February 2023. This extended scope of work included additional project team coordination meetings, archeological monitoring, responses to inadvertent finds, Native American monitoring between December 2022 and February 2023.

Carollo Engineers

The contract amendment (No. 7) for Carollo, was executed on October 14, 2022 and has a contract expiration date of June 30, 2023. Amendment No. 8 to Carollo’s current contract extends the contract expiration date to June 30, 2024.

Confluence Engineering Solutions

The contract amendment (No. 1) for Confluence, was executed on August 23, 2022 and has a contract expiration date of June 30, 2023. Amendment No. 2 to Confluence’s current contract extends the contract expiration date to June 30, 2024.

QUARTERLY REPORT DISCUSSION

The quarterly report is designed to provide City Council and the community status updates on

schedule, budget, contract management, cashflow, key activities, and critical path items as they relate to the WRF Program. Staff is requesting that the City Council review and provide feedback on the FY23 Quarter 3 (Q3) WRF Program Quarterly Report and provide feedback on the information presented in this report.

The FY23 Q3 WRF Program Quarterly Report covers the period from January 1, 2023, to March 31, 2023, and the major highlights from this period include the following:

- The City took full occupancy of the WRC on January 1, 2023.
- The City met the February 28, 2023 Time Schedule Order deadline.
- The City held a completion event for the WRC and Conveyance Facilities Project on February 23, 2023 and to introduce the public to the future of the Recycled Water component of Water Reclamation Facility Program.
- All roadway paving was complete for the Conveyance Facilities project.
- The Pilot Injection Well extended period injection testing was completed on January 4, 2023.

Wet weather and flooding in various parts of the City were the biggest challenges the City experienced during this quarter. Consequently, the WRC experienced flows that met or exceeded the design capacity of the WRC, which allowed the City to operate the WRC at full capacity and test the treatment processes at the peak flow rates.

The WRC and Conveyance Facilities contractors continue to close out of the major construction projects and focus on completing punch list work items, with the goal of achieving final completion of the contracts in the fourth quarter (Q4).

There are no significant challenges on the RWF portion of the project. Upcoming activities include the development of the engineering report for the injection wells and the final groundwater modeling results of the proposed indirect potable reuse (IPR) system. GSI Water Solutions, Inc. (GSI) (hydrogeologist) is expected to submit a draft engineering report to the RWF program manager (Confluence Engineering Solutions) in Q4.

The current program budget was approved by City Council on June 28, 2022 at \$159.84M and \$133.1M has been spent to-date as of Q3.

At their meeting on Wednesday, May 17th, the Public Works Advisory Board reviewed the FY 2023 Quarter 3 WRF Program Quarterly Report, PCOs, and contract amendments. The PWAB asked questions that project staff answered. PWAB expressed satisfaction with the quarterly report and verbal consensus on City Council approval of the contract amendments.

CONCLUSION

The requested contract amendments for Anvil, FBV and Cogstone and the FY 2022-2023 Q3 Quarterly Report have been thoroughly reviewed by the project management team and City staff. With the addition of these Contract modifications, the Water Resources Center, Conveyance Facilities, Recycled Water Facilities, and General Project components will continue to meet the timing and regulatory agency requirements of the entire WRF Program.

ATTACHMENTS

1. Amendment No. 8 to the Agreement with Anvil Builders, Inc.
2. Amendment No. 9 to the Agreement with FBV
3. Amendment No. 4 to the agreement with Cogstone Resource Management

4. Amendment No. 8 to the agreement with Carollo Engineers, Inc.
5. Amendment No. 2 to the agreement with Confluence Engineering Solutions
6. FY23 Quarter 3 Quarterly Report

CITY OF MORRO BAY

AMENDMENT NO. 8 TO THE AGREEMENT
FOR CONSTRUCTION SERVICES
BETWEEN THE CITY OF MORRO BAY
AND ANVIL BUILDERS, INC.

This Amendment No. 8 is entered by and between the City of Morro Bay, a municipal corporation (“City”) and Anvil Builders, Inc., a California corporation (“Contractor”).

RECITALS

WHEREAS, City and Contractor (collectively, the “Parties”) entered into an agreement as of November 10, 2020, for construction services for Contractor to complete the work for the Water Reclamation Facility Lift Station and Offsite Pipelines Project, (the “Project”) which was approved by the City Council for a not to exceed amount of \$31,493,675 (the “Agreement”).

WHEREAS, the Parties amended the Agreement, as of October 12, 2021, to expand the tasks to be provided by Contractor and to increase the compensation payable in the amount of \$674,485 (Amendment No. 1), increasing the total compensation payable pursuant to the Agreement to \$32,168,160;

WHEREAS, the Parties amended the Agreement, as of January 11, 2022, to expand the tasks to be provided by Contractor and to increase the compensation payable in the amount of \$587,502 (Amendment No. 2), increasing the total compensation payable pursuant to the Agreement to \$32,755,662;

WHEREAS, the Parties amended the Agreement, as of March 22, 2022, to expand the tasks to be provided by Contractor and to increase the compensation payable in the amount of \$241,317 (Amendment No. 3), increasing the total compensation payable pursuant to the Agreement to \$32,996,979;

WHEREAS, the Parties amended the Agreement, as of June 14, 2022, to expand the tasks to be provided by Contractor which resulted in a reduction to the total contract in the amount of \$54,065 (Amendment No. 4), therefore decreasing the total compensation payable pursuant to the Agreement to \$32,942,914;

WHEREAS, the Parties amended the Agreement, as of August 23, 2022, to expand the tasks to be provided by Contractor, which resulted in an increase to the total contract in the amount of \$1,253,667 (Amendment No. 5), therefore increasing the total compensation payable pursuant to the Agreement to \$34,196,581;

WHEREAS, the Parties amended the Agreement, as of November 22, 2022, to expand the tasks to be provided by Contractor, which resulted in an increase to the total contract in the amount of

\$646,763 (Amendment No. 6), therefore increasing the total compensation payable pursuant to the Agreement to \$34,843,344;

WHEREAS, the Parties amended the Agreement, as of February 28, 2023, to expand the tasks to be provided by Contractor, which resulted in an increase to the total contract in the amount of \$124,970 (Amendment No. 7), therefore increasing the total compensation payable pursuant to the Agreement to \$34,968,314.

WHEREAS, the Agreement, Amendment No. 1, Amendment No. 2, Amendment No. 3, and Amendment No. 4, Amendment No. 5, Amendment No. 6, and Amendment No. 7 are referred to collectively as the "Amended Agreement;"

WHEREAS, the Parties again agree to amend the Amended Agreement because the construction services for the Project require an expansion and removal of some of the tasks to be provided by Contractor pursuant to the Amended Agreement;

WHEREAS, due to the expansion and reduction of tasks to be provided, the compensation payable pursuant to the Amended Agreement must be increased.

NOW THEREFORE, City and Contractor mutually agree to amend the Amended Agreement as follows:

1. The additional services to be provided by Contractor, pursuant to the Amended Agreement, as hereby further amended, shall include Change Orders 30.1, 33.1.1, 47, 52.2, 56, 64, 65, 67, 69, 71, 73, 82.2, 83, 84, 86, 89.1, 90, 94, 96, and 98 for the out-of-scope items, as set forth in Exhibit A, attached hereto and incorporated herein by this reference (the "Change Order No. 8"). The Change Order No. 8 activities shall have been completed no later than May 24, 2023.

2. The total compensation to be paid for the Amended Agreement, as a result of Change Order No. 8 is increased by \$1,416,292. The activities for Change Order No. 8 shall be paid in accordance with (i) the amounts set forth in Exhibit A, and (ii) the process established by the Amended Agreement on a lump sum basis. With the amounts added for the Additional Work, the total compensation paid pursuant to the Amended Agreement shall be reduced to a not exceed amount of \$36,384,606.

3. Contractor shall not be compensated for any services rendered in connection with its performance of the Amended Agreement, which are in addition to those set forth in previous amendments and Change Order No. 8.

4. Except as expressly stated herein, all terms and conditions in the Amended Agreement shall remain in full force and effect.

5. The effective date of this Amendment No. 8 shall be deemed to be May 24, 2023.

IN WITNESS WHEREOF, the parties have caused this Amendment No. 8 to be executed by their duly authorized representatives as of the day first written above.

CITY OF MORRO BAY

CONTRACTOR

By: _____

Greg Carpenter,
Interim-City Manager

By: _____

Its _____

Attest:

By: _____

Dana Swanson, City Clerk

Its _____

Approved As To Form:

Chris Neumeyer, City Attorney



City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 008

Project: WRF Lift Stations and OffSite Pipelines Project **Contractor:** Anvil Builders, Inc.
Date: **Project Manager:** Chris Fassari

Upon mutual acceptance and execution of this document by the City of Morro Bay (City) and Anvil Builders, Inc. (Contractor), Contractor is hereby directed to make the following changes for the consideration set forth below:

See following page(s) for Descriptions and Reasons for Change

| PCO # | DESCRIPTION | Reason For Change | Amount | Contract Time (Calendar Days) |
|--------|---|-------------------|-----------------|-------------------------------|
| 30.1 | Bike Path Joint Trench and Waterline Re-Design | | \$ 5,635.00 | Days |
| 33.1.1 | Paving Limit Revisions | | \$ 537,118.00 | Days |
| 47 | Steel Casings on the Morro Creek Pipe Bridge | | \$ 99,587.00 | Days |
| 52.2 | High Level Switch Alarm Termination at Utility Bridge | | \$ 28,627.00 | Days |
| 56 | Fiber Optic Design Revisions and Upgrades | | \$ 134,605.00 | Days |
| 64 | Existing Lift Station 3 Connection and Utility Conflicts | | \$ 71,000.00 | Days |
| 65 | Relocate New Diversion Manhole and Replace Existing Manhole | | \$ 296,404.00 | Days |
| 67 | Waterline Replacement Conflicts near Mortuary | | \$ 86,171.00 | Days |
| 69 | Tie-in HDPE Lines at WRC | | \$ 18,705.00 | Days |
| 71 | Reroute Sewage Back to the Old Plant on 10/11 | | \$ 59,642.00 | Days |
| 73 | Guide Rail Modifications at Wet Wells | | \$ 32,756.00 | Days |
| 82.2 | Additional Flatwork Concrete (Quantity Overruns) | | \$ 62,920.00 | Days |
| 83 | Existing Waterline Replacement at Pump Station A | | \$ 117,664.00 | Days |
| 84 | Disputed Caltrans R/W Restoration Costs | | \$ 10,885.00 | Days |
| 86 | Transport FPVC Pipe to WRC Site | | \$ 1,770.00 | Days |
| 89.1 | Fencing Modifications | | \$ 33,980.00 | Days |
| 90 | PS-A & PS-B VFD Auto-Reset due to Power Voltage Drops | | \$ 12,392.00 | Days |
| 94 | Standby Excavator at Morro Creek for Rain Event | | \$ 8,402.00 | Days |
| 96 | Raise F.O. Box at FBV Paving Error | | \$ 5,029.00 | Days |
| 98 | Credit for Deleting 36-inch Storm Drain relocation | | \$ (207,000.00) | Days |
| | | | \$ 1,416,292.00 | 0 Days |

| | |
|----------------------------------|------------------|
| ORIGINAL CONTRACT AMOUNT | \$ 31,493,675.00 |
| Previous Change Orders | \$ 3,474,639.00 |
| Previous Contract Amount | \$ 34,968,314.00 |
| Adjustments by this Change Order | \$ 1,416,292.00 |
| Change Order to Date | \$ 4,890,931.00 |
| New Contract Amount | \$ 36,384,606.00 |

| | |
|-------------------------------|-----------|
| CURRENT FINAL COMPLETION DATE | 12/1/2022 |
| Extension Days (Calendar) | 0 Days |
| NEW FINAL COMPLETION | 12/1/2022 |

Acceptance of this Change Order constitutes an agreement between the City and Contractor, and the work is to be performed subject to the same terms and conditions as are contained in the Agreement with Contractor and for work on the above-mentioned project.

By signature of this Change Order, the Contractor acknowledges that the adjustments to the Contract Cost and Time contained in the Change Order are in full satisfaction and accord and so waives any right to claim any further cost and time impacts at any time during and after completion of the Contract for the changes encompassed by this Change Order (EXCEPT AS NOTED IN ITEM 13.1 HEREIN WHEREIN DELAY IMPACTS ARE ON-GOING).

ACCEPTED

Anvil Builders Inc.

Contractor (Company Name)

(Authorized Signature) (Date)

Chris Fassari

(Print Name and Title)

When signed by the Construction Manager, and upon execution of source document Amendment by City Council, this document becomes effective IMMEDIATELY, and Contractor shall proceed with the change(s) described above.

APPROVED

Carollo Engineers Inc / MEG Inc.

Construction Manager

Authorized Signature (Date)

Steve Mimiaga - Construction Mngr.

(Print Name and Title)



**City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 008**

Project: WRF Lift Stations and OffSite Pipelines Project

Contractor: Anvil Builders, Inc.

Date:

| PCO | TILE | DESCRIPTION OF CHANGE | Reason For Change |
|--------|---|---|-------------------|
| 30 | Bike Path Joint Trench and Waterline Re-Designs | At the City's request and direction, Anvil subcontracted with Firma Consultants to undertake several landscaping design tasks associated with restoring landscaping along the City's Bike Path from Morro Creek to Camp Willow Creek. These task included preparing a 50% design plan to revegetate the area, add possible decomposed granite path, add bench areas, add rural fencing, add irrigation systems, and other possible improvements. | |
| 33.1.1 | Paving Limit Restrictions | This item includes paving quantities paid under Bid Items 61, 62, and 63 in excess of the quantities included in the original contract documents. It also includes grinding existing pavement and placing new pavement on the north side of Quintana between Las Tunas and La Loma, digging out and replacing saturated subgrade at Quintana and Kings Ave, and paving the LS-2 force main alignment in the City's easement on the Vistra property. | |
| 47 | Steel Casing on Morro Creek Pipe Bridge | The Design Engineer inadvertently specified a casing size too small to fit the carrier pipe joint restraints, to address the situation Anvil was directed to delete the Brine Line D.I.P. carrier pipe and accommodate flow in the field coated steel casing pipe, and the FM1 and FM2 carrier pipes were downsized to fit in the casing. This resulted in Anvil reduced costs for deleted and downsized carrier pipes, and increased costs for added necessary fittings at each bridge abutment. Carollo has rejected costs and consider cost items to be offsetting due to the reduced cost for carrier pipes and Anvil's initial error in failing to factory coat the interior of casing pipes. | |
| 52.2 | High Level Switch Alarm Termination at Utility Bridge | Change initiated by City to change from solar powered telemetry to direct PLC wiring to PS-A. The costs under PCO 52 (previously approved) and PCO 52.1 (current item) appear to be reasonable. The original PLC and solar power equipment have been provided to the City. | |
| 56 | Fiber Optic Design Revisions and Upgrades | The City's SCADA integrator JSP Automation recommended the City implement multiple fiber option network revisions and upgrades beyond what was included in the original contract, and the City agreed with the recommendations. The changes encompassed multiple equipment components and communication protocols at essentially all locations on the project, including the WRC, Pump Station A, Pump Station B, existing Lift Stations, and at the City's point of connection with City existing network. | |
| 64 | Existing Lift Station 3 Connection and Utility Conflicts | Several existing utility conflicts were identified after Anvil potholed existing utilities near the existing Lift Station 3 (LS-3) to confirm the utility locations shown on the drawings. These conflicts were due to inaccurate record drawing information or the discovery of unmapped utilities and resulted in the need for the original LS-3 connection design to be modified to route the connections over existing pipes, causing hydraulic high points in the parallel branch connection lines. These high points required the addition of extra pipe fittings, two sewer-rated combination air/vacuum release (CAV) valves, and a vault to house the added CAVs. Approximately \$50K in standby equipment was removed from Anvil's original request. | |
| 65 | Relocate New Diversion Manhole and Replace Existing Manhole | Several existing utility conflicts were identified after Anvil potholed existing utilities at the location of the Pump Station A diversion manhole to confirm the utility locations shown on the drawings. These conflicts included existing electrical and communications conduits and were due to inaccurate record drawing information or the discovery of unmapped utilities. An existing adjacent manhole that was designed to remain in place was also discovered to be in substandard and failing condition. Consequently, the City and designer concluded it would be beneficial to relocate the new diversion manhole to the location of the existing failing manhole and replace it. Constructing the new diversion manhole in this location was valuable for the long-term even though it complicated construction and included constructing a cast-in-place concrete manhole base rather than utilizing the pre-cast base specified in the original design, because it allowed the City to replace a failing manhole on a critical sewer line. Approximately \$41K was removed from Anvil's original request. | |

| | | | |
|------|---|--|--|
| 67 | Waterline Replacement Conflicts near Mortuary | Several existing utility conflicts and a buried concrete wing wall were identified after Anvil potholed existing utilities near 1401 Quintana Road to confirm the utility locations shown on the drawings. These conflicts included a communications conduit and the wing wall associated with the State-owned arched culvert at Station 144+00 and were due to inaccurate record drawing information or the discovery of unmapped utilities. Anvil needed to excavate carefully around these conflicts and re-route the new 10" waterline replacement in this area to avoid the existing conflicts. The majority of extra costs are associated with potholing and discovering the limits of the buried unknown wing wall. | |
| 69 | Tie-in HDPE Lines at WRC | Anvil's contract included making the pipeline and fiber optic connections between the Conveyance Facilities and WRC projects near the WRC entrance on Theresa Dr. While Anvil was attempting to connect pipelines, small quantities of test water continued to flow from the WRC on-site piping, and making the connections requires the pipelines to be completely dry. It took several days for FBV to identify and close valves and stop the nuisance water from flowing into the connections, and Anvil incurred additional costs for the delay and to deal with the water before it was stopped. | |
| 71 | Reroute Sewage Back to the Old Plant on November 11, 2022 | During WRC startup, FBV determined that the new WRC treatment process was at risk for failure and wastewater flow needed to be routed back to the City's existing WWTP so the treatment biology could be re-seeded and wastewater flow introduced at a slower rate. Consequently, Anvil needed to reinstall the plug in the diversion manhole near Pump Station A and reestablish the sewer bypass at that location. This item includes the costs for standby equipment rental, trench shoring rental, crash barriers, fencing, and road plates, and it also includes labor and materials for plugging the diversion manhole and reinstating the bypass. | |
| 73 | Guide Rail Modifications at Wet Wells | The Design Engineer issued Design Clarification No. 32 to modify submersible pump guide rails at both Pump Station A and Pump Station B wet wells. Due to space constraints in the pump station wet wells, the 3 submersible pumps needed to be re-positioned in each wet well, and the pump guide rails no longer aligned with the edge of the hatch opening above (as designed). Consequently, it was necessary to re-design and modify the guide rail top mounting bracket using off-set knee bracing and other added structural supports. This item includes labor and materials to implement the design change. | |
| 82.2 | Additional Flatworks Concrete | The Contract Drawings specifically indicate the removal and replacement of existing concrete flatwork (sidewalks, curb, gutters, etc.) in multiple locations adjacent to the new work associated with the project. Additional areas of adjacent concrete was identified during punchlist development to have been impacted by Anvil's work, but wasn't specifically identified in the contract drawings. There are also quantities included in this PCO for sidewalks adjacent to prior-approved changes in contract work that required repair or replacement due to changes in the scope of work. | |
| 83 | Existing Waterline Replacement at Pump Station A | The construction of Pump Station A required an extensive shoring and groundwater dewatering system. The large, shored area was directly adjacent to an existing 6" transite City water main. During the project, the City was concerned that the shoring and dewatering operation would undermine and impact the existing water line, so the City added isolation valves on each side of the shoring, and closed those valves to isolate the segment of water main for over a year. Recently the City re-pressurized the line and found it to be leaking in several locations. Anvil has been directed to replace about 210' of waterline at their expense including various fittings and appurtenances, and Anvil has disputed that they are responsible for this water main replacement. | |
| 84 | Disputed Caltrans Right-of-Way Restoration Costs | Anvil issued Request for Information (RFI) #305 regarding Caltrans requested/directed restoration work that Anvil believes is beyond the Contract scope. These items include (1) additional 2' wide strip of aggregate shoulder backing along the Atascadero Road S/B on-ramp; (2) additional fiber roll erosion control for the slope along the Atascadero Road S/B on-ramp; and (3) additional compost sock or fiber roll be added to the bottom (toe) of the slope along the Atascadero Road S/B on-ramp. | |
| 86 | Transport FPVC to WRC Site | The City directed Anvil to transport unused FPVC pipe to be stored at the WRC site for futher use. The contract did not specifically require this and Anvil incurred labor and fuel costs to transport and unload the pipe at the new WRC. | |
| 89.1 | Fencing Modifications | This item includes Anvil labor, equipment, and material cost to replace existing fencing that was necessary to be removed to complete project work, but not specifically identified on the contract drawings. It is paid under a contract bid item and is for additional quantity beyond what was included in the bid. | |

| | | | |
|----|---|--|--|
| 90 | PS-A and PS-B VFD Auto-Reset due to Power Voltage Drops | After commissioning both PS-A and PS-B, PG&E power voltage drops during inclement weather caused several pump motor VFD faults. After attempting to adjust VFD settings, the City directed Anvil to add a remote auto-resets for the VFDs, including adding programming by the City's SCADA integrator and the required field wiring so City operations staff do not have to physically respond to the faults as shutdown emergencies. | |
| 94 | Standby Excavator at Morro Creek for Rain Event | Not related to the project work, and as an emergency standby during a forecasted major storm event on March 9 and 10, the City requested Anvil to provide a Cat 315 excavator and operator on standby to clear debris from under the Main St bridge should it be determined that the debris could cause or contribute to flooding in this area. This item includes equipment mobilization and demobilization costs, daily standby costs, and equipment and labor cost. | |
| 96 | Raise Fiber Optic Box at FBV Paving Error | This work includes demolishing existing asphalt concrete around a newly installed fiber optic box and raising the fiber optic box lid to the appropriate grade. The asphalt was removed due in part to FBV laying asphalt at the incorrect grade at the WRC entrance. Work also included pouring a concrete collar around the fiber optic box. | |
| 98 | Credit for Deleting 36-inch Storm Drain relocation | Bid Item 44 calls for the relocation of a 36-inch storm drain property to the northeast of the roundabout. Currently at the location of Anvil's field office. This work was removed from Anvil's contract at the direction of the City. | |

REASON FOR CHANGE CODES

CR1: City requested (required)

CR2: City requested (Optional)

E&O: Design Error or Omission

ABI: Anvil request / claim item

DSC: Differing Site Conditions

REG: Regulatory Agency Item

**AMENDMENT NO. 9 TO THE
AGREEMENT FOR DESIGN/BUILD SERVICES
AMONG THE CITY OF MORRO BAY AND
OVERLAND CONTRACTING INC. AND
J.R. FILANC CONSTRUCTION COMPANY, INC.**

This Amendment No. 9 is entered by and among the CITY OF MORRO BAY, a municipal corporation (City) and OVERLAND CONTRACTING INC., a Delaware corporation, dba KS OVERLAND CONTRACTING, INC. (OCI) and J.R. FILANC CONSTRUCTION COMPANY, INC., a California corporation (JRF), the latter two acting as FBV Morro Bay Joint Venture (collectively, OCI and JRF are referred to as the “Design Build Entity”). City and Design Build Entity are sometimes referred to individually as “Party” and collectively “Parties.”

RECITALS

WHEREAS, City and the Design Build Entity entered into an agreement as of October 23, 2018, to design and construct a new Water Reclamation Facility (Project), which was approved by the City Council for a Cost Plus with Guaranteed Not to Exceed Amount of \$67,234,512 (Agreement);

WHEREAS, the Parties amended the Agreement, as of May 14, 2019, to provide for design and construction of additional elements for the Project and to increase the Cost Plus with Guaranteed Not to Exceed Amount for the construction of the Project to \$68,870,571 (Amendment No. 1);

WHEREAS, the Parties amended the Agreement, as of April 21, 2020, to provide for updated Davis Bacon Wage Requirements for the Project and to increase the Cost Plus with Not to Exceed Amount for the construction of the Project to \$68,934,508 (Amendment No. 2);

WHEREAS, the Parties amended the Agreement, as of May 20, 2020, to provide design and construction of additional elements for the Project and to increase the Cost Plus with Not to Exceed Amount for the construction of the Project to \$74,926,725 (Amendment No. 3);

WHEREAS, the Parties amended the Agreement, as of November 17, 2020, to provide design and construction of additional elements for the Project and to increase the Cost Plus with Not to Exceed Amount for the construction of the Project to \$75,761,822 (Amendment No. 4);

WHEREAS, the Parties amended the Agreement, as of March 9, 2021, to provide changes and adjustments to the design and construction of the Project and to decrease the Cost Plus with Not to Exceed Amount for the construction of the Project to \$75,565,877 (Amendment No. 5);

WHEREAS, the Parties amended the Agreement, as of August 24, 2021, to provide changes and adjustments to the design and construction of the Project and to increase the Cost Plus with Not to Exceed Amount for the construction of the Project to \$76,697,994 (Amendment No. 6);

WHEREAS, the Parties amended the Agreement, as of August 23, 2022, to provide changes and adjustments to the design and construction of the Project and to increase the Cost Plus with Not to Exceed Amount for the construction of the Project to \$77,057,879 (Amendment No. 7);

WHEREAS, the Parties amended the Agreement, as of November 22, 2022, to provide changes and adjustments to the design and construction of the Project and to increase the Cost Plus with Not to Exceed Amount for the construction of the Project to \$78,015,298 (Amendment No. 8);

WHEREAS, the Agreement, Amendment No. 1, Amendment No. 2, Amendment No. 3, Amendment No. 4, Amendment No. 5, Amendment No. 6, Amendment No. 7, and Amendment No. 8 are collectively referred to as the Amended Agreement.

NOW, THEREFORE, City and Design Build Entity mutually agree to further amend the Amended Agreement as follows:

1. The revised scope of services to be provided by the Design Built Entity, pursuant to the Amended Agreement, as hereby amended, shall include the Scope of Work, as set forth in Exhibit B, dated May 24, 2023, attached hereto and incorporated herein by this reference with the Required Changes (together the original Scope of Work and the Required Changes referred to as the “New Scope of Work”). At the direction of the City, the design of the New Scope of Work, including without limitation the Required Changes, has already commenced and shall continue.
2. The compensation to be paid for the New Scope of Work shall be paid in accordance with the terms of the Agreement on a cost-plus basis and shall increase the Original Cost Plus with Guaranteed Not to Exceed Amount by a total of \$409,028, for a revised Cost Plus Guaranteed Not to Exceed Amount of \$78,424,326 for the Amended Agreement, as herein amended.
3. The Exhibit A, attached to the Amended Agreement, shall be replaced in its entirety with the new Exhibit A dated May 24, 2023, attached hereto and incorporated herein, as well as into the Amended Agreement as amended herein.
4. Except as expressly stated herein, all terms and conditions in the Amended Agreement shall remain in full force and effect.
5. The effective date of this Amendment No. 9 shall be deemed to be May 24, 2023.

IN WITNESS WHEREOF, the Parties have caused this Amendment No. 9 to be executed by their duly authorized representatives.

CITY OF MORRO BAY
a municipal corporation

DESIGN BUILD ENTITY

OVERLAND CONTRACTING INC.

By: _____
Greg Carpenter
Interim City Manager

By: _____
Charles B. Mitchell,
Its Attorney in Fact

Dated: _____, 2022

Dated: _____, 2022

J.R. FILANC CONSTRUCTION
COMPANY, INC.

Attest:

By: _____
Omar Rodea,
Its President

Dana Swanson, City Clerk

Dated: _____, 2022

Approved As To Form:

Acting together as FBV Morro Bay Joint
Venture, PWCR #947773 – Classification A

Chris F. Neumeyer, City Attorney

Exhibit A (Revised)
(Revision thru Amendment No. 9)
Project Milestone Schedule

The Project Milestones for the Water Reclamation Facility Project (Project) are defined below. The Project is composed of two (2) phases: Design Phase and Construction Phase

Separate Notices to Proceed (NTPs) will be issued for each phase of the Project. If the NTP dates change, the subsequent dates may change accordingly.

Project Milestones

| Project Milestones | Milestone Date |
|---|------------------|
| Design NTP | November 5, 2018 |
| Construction NTP | March 20, 2020 |
| Original Calendar Days to Substantial Completion | 829 |
| Original Substantial Completion (as of NTP) | June 27, 2022 |
| Original Calendar Days to Final Completion | 886 |
| Original Final Completion (as of NTP) | August 23, 2022 |
| Amendment 4 Calendar Day Time Extension* | 8 |
| Amendment 6 Calendar Day Time Extension* | 7 |
| Amendment 7 Calendar Day Time Extension | 0 |
| Amendment 8 Calendar Day Time Extension* | 187 |
| Amendment 9 Calendar Day Time Extension | 172 |
| Total Added Calendar Days | 202 |
| Revised Calendar Days to Substantial Completion | 1031 |
| Revised Substantial Completion (thru Amendment 9) | January 15, 2023 |
| Revised Calendar Days to Final Completion | 1260 |
| Revised Final Completion (thru Amendment 9) | August 31, 2023 |

***Notes:**

1. Potential Change Order No. 41 - Add Perimeter Barbed Wire Fence (Amend 4)
2. Environmental Allowance 1B - Temporary Wildlife Exclusionary Fencing (Amend 4)
3. Potential Change Order No. 96 - January 2021 Storm Event & Texas Ice Storm (Amend 6)
4. Potential Change Order No. 108 - Defer SEED PLANT Milestone and WRF Commission (Amend 8)

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(Previous Version Attachments Encompassed by Reference)

ATTACHMENT 1 – IFC Drawings with PCO Revisions

ATTACHMENT 2 – Anticipated Mitigation Measures

ATTACHMENT 3 – SCADA Master Plan Compliance [PCO 018]

ATTACHMENT 4 – DC-017 [PCO 89]

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List of Acronyms and Abbreviations

| | | | |
|------------------|--|-------|---|
| AABC | Associated Air Balance Council | DB | Design Build Entity |
| AAF | Average Annual Flow | DC | Direct Current |
| AC | Air Conditioning | DDW | Department of Drinking Water |
| AF | Acre-Foot | DHS | Department of Homeland Security |
| AFY | Acre-Feet per Year | DO | Dissolved Oxygen |
| AHRI | Air Conditioning, Heating, and Refrigeration Institute | EQ | Equalization |
| AMCA | Air Moving and Conditioning Association | ESA | Environmental Science Associates |
| ANSI | American National Standards Institute | FAT | Full Advanced Treatment |
| AOP | Advanced Oxidation Process | FMP | Facility Master Plan |
| ASCE | American Society of Civil Engineers | FRP | Fiber-Reinforced Plastic |
| ASHRAE | American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc. | GFCI | Ground Fault Circuit Interrupter |
| ASME | American Society of Mechanical Engineers | GFD | Gallon per Square Foot per Day |
| ASTM | American Society for Testing and Materials | GRRP | Groundwater Replenishment Reuse Project |
| AWS | American Welding Society | H2S | Hydrogen Sulfide |
| AWWA | American Water Works Association | HID | Host Intrusion Detector |
| BMP | Best Management Practice | HMI | Human Machine Interface |
| BOD | Biochemical Oxygen Demand | HVAC | Heating, Ventilation, and Air Conditioning |
| BOD ₅ | 5-Day Biochemical Oxygen Demand | IES | Illumination Engineers Society |
| CBC | California Building Code | IPR | Indirect Potable Reuse |
| CCR | California Code of Regulations | LAN | Local Area Network |
| CDP | Coastal Development Permit | LCP | Local Control Panel |
| CEnC | California Energy Code | LEL | Lower Explosive Limit |
| CEQA | California Environmental Quality Act | MBCSD | City of Morro Bay & Cayucos Sanitary District |
| CF | Cartridge Filter | MBR | Membrane Bioreactor |
| CFC | California Fire Code | MCP | Master Control Panel |
| CL2 | Chlorine | MFR | Manufacturer |
| CMC | California Mechanical Code | mg/L | Milligrams per liter |
| CMMS | Computerized Maintenance Management System | MGD | Million Gallons per Day |
| CMU | Cement Mortar Unit | mL | Milliliter |
| CPVC | Chlorinated Polyvinyl Chloride | mm | Millimeter |
| CSD | Cayucos Sanitary District | MMF | Maximum Monthly Flow |
| CWI | Certified Welding Inspector | MSS | Manufacturer's Standardization Society |
| | | NEMA | National Electrical Manufacturers Association |
| | | NFPA | National Fire Protection Association |
| | | NOV | Notice of Violation |
| | | NPDES | National Pollution Discharge Elimination System |
| | | O&M | Operation and Maintenance |

| | | | |
|--------|---|-------|---|
| OEM | Original Equipment Manufacturer | SS | Stainless Steel |
| OIT | Operator Interface Terminal | SSRV | Solid State Reduced Voltage |
| OSHA | Occupational Safety and Health Administration | SWRCB | State Water Resources Control Board |
| PDF | Peak Daily Flow | TOC | Total Organic Carbon |
| PFD | Process Flow Diagram | TKN | Total Kjeldahl Nitrogen |
| PG&E | Pacific Gas and Electric | TMP | Trans-Membrane Pressure |
| PHF | Peak Hour Flow | TSS | Total Suspended Solids |
| PID | Proportional, Integral, Derivative | TVSS | Transient Voltage Surge Suppression |
| PLC | Programmable Logic Controller | UL | Underwriters Laboratories, Inc. |
| ppm | Parts per million | UPS | Uninterruptible Power Supply |
| psf | Pounds per Square Foot | UV | Ultraviolet |
| psi | Pounds per Square Inch | UVAOP | Ultraviolet Advanced Oxidation Process |
| PVC | Polyvinyl Chloride | UVT | Ultraviolet Transmissivity |
| RO | Reverse Osmosis | VFD | Variable Frequency Drive |
| RWQCB | Regional Water Quality Control Board | WAN | Wide Area Network |
| SBB | South Bay Boulevard | wc | Water Column |
| SCADA | Supervisory Control and Data Acquisition | WDR | Waste Discharge Requirements |
| SMACNA | Sheet Metal and Air Conditioning Contractors National Association | WRF | Water Reclamation Facility |
| | | WWE | Waterworks Engineers |
| | | WWTP | Wastewater Treatment Plant |

SECTION 1 INTRODUCTION

This document defines the scope of work for the Design Build delivery of the Morro Bay WRF Project. This document was created from the Performance Criteria Report, as modified to conform to the latest design and Amendment 3. The design development process yielded 17 Potential Change Orders (PCOs) that were approved by City Council on May 14, 2019. There are an additional 26 PCOs included in this latest document and design set. The scope changes associated with the original 17 PCOs are still reflected in this document but are no longer in red text. The newest 26 PCOs are highlighted in this document by red text. Section numbers have been maintained from the PCR. This document includes the following scope definition attachments:

1. Annotated IFC Design Drawings. [clarification]
2. Anticipated EIR Mitigation Measures
3. Performance Guarantees

1.1 Background and Project Goals

Section not used.

1.2 Overview

The City of Morro Bay WRF will be designed to treat an annual average flow of 0.97 million gallons per day (MGD) of wastewater through full advanced treatment. The WRF will provide preliminary, secondary, tertiary, and advanced treatment, and will produce recycled water meeting indirect potable reuse (IPR) standards for a groundwater replenishment reuse project (GRRP) using subsurface application, as defined in California Code of Regulations (CCR) Title 22 recycled water requirements. The WRF will be located at the South Bay Boulevard (SBB) site. IPR recycled water will be conveyed to injection wells in the Morro Valley (conveyance by others). An effluent pipeline (by others) will convey advanced treatment waste streams, including brine, to the existing Morro Bay Cayucos Sanitary District (MBCSD) jointly-owned ocean outfall at the site of the existing wastewater treatment plant (WWTP).

A new lift station (by others) near the existing WWTP will convey raw wastewater through force main(s) (by others) to the WRF. The WRF, access road to the WRF, and all design and construction within the South Bay Boulevard (SBB) site and adjacent area north of Highway 1 right-of-way (ROW) are collectively referred to herein as the WRF Onsite Improvements Project (Project).

Figure 1-1: South Bay Boulevard WRF Site

The following table summarizes the current and anticipated WRF Project efforts and coordination of work. Additional details on the division of responsibilities are provided in the following Sections of this Report.

| Work Effort | Responsible Party | Comments |
|---|--|--|
| Environmental Documents: CEQA plus | Environmental Science Associates (ESA) | Draft EIR scheduled for March 2018; Certification anticipated in June 2018 |
| WRF Lift Station and Offsite Pipeline Improvements Design | Waterworks Engineers (WWE) | |
| Program Management Support, Design-Build Owner’s Representative, and Construction Administration/Management | City and City’s Consultants | |
| WRF Lift Station and Offsite Pipelines Construction | TBD (by others) | |
| Injection Well Pilot Study, Design, and Construction | TBD (by others) | |
| Land Use Permitting and Planning Agency Coordination | City and City’s Consultants | |

The WRF Onsite Improvements will consist of the following main components within the SBB site and adjacent access easement:

- Influent Screening
- Grit Removal
- SAFE System (auxiliary treatment of peak flows including the SAFE Settle tank and the SAFE Filter) [PCO 017]
- Fine Screening
- Membrane Bioreactor
- Sludge Holding Tanks
- Sludge Dewatering
- Reverse Osmosis
- Ultraviolet Advanced Oxidation Process
- Odor Control (only to be furnish for headworks and SAFE Diversion Box) [PCO 004]
- Effluent Pump Station and Connection to offsite pipeline (by others)
- Calcite Contactors, Product Water Tank, IPR Pump Station, and Connection to offsite pipeline (by others)
- Influent Dual Force Main Connections (forcemains by others) [PCO 022]
- Operations and Maintenance Buildings
- Access Road and Site Access

- Utility Extension into Site (all utilities assumed available at entrance road connection point, see figure herein)

The City plans to provide full onsite WRF staffing 40 hours per week with remote and on-call operations on nights and weekends.

1.3 Design-Build Entity & City Responsibilities

The table below identifies responsibilities for main components of the Project. If there is a conflict between this table and the interpretation of responsibilities in the text within this document, the responsibility defined on this table shall govern.

| | DB | City |
|--|---------|---------|
| Project Management/Administration | | |
| Project Management | Lead | |
| Report of Waste Discharge and Title 22 Report | Support | Lead |
| Air Pollution Control District permit application for temporary and permanent facilities | Lead | Support |
| Reporting/correspondence with 3rd parties (stakeholders) | Support | Lead |
| Environmental Impact Report | | Lead |
| Progress reporting to Owner | Lead | |
| Conditional Use Permit/Coastal Development Permit | Support | Lead |
| SAFE System permitting | Support | Lead |
| Engineering and Design Activities | | |
| Civil sitework | Lead | |
| Site layout | Lead | |
| Highway 1/South Bay Boulevard access | Lead | Support |
| Entrance road | Lead | Support |
| Building Permit | Lead | Support |
| Geotechnical investigations | Lead | |
| Utility connections | Lead | |
| Connections to influent force main, recycled water pipeline, dedicated City fiber optic line, and effluent pipe 20 feet north of access easement boundary at Highway 1 ROW | Lead | |
| All process systems and all support/ancillary systems, including components identified below (unless specifically identified as "Support") | Lead | |
| SAFE System (auxiliary treatment of peak flows) | Lead | |
| Odor control | Lead | |
| Screening and grit removal | Lead | |
| Membrane bioreactor | Lead | |
| Reverse osmosis | Lead | |
| Chemical feed systems | Lead | |
| Chemical clean in place system and chemical storage | Lead | |
| UVAOP system | Lead | |
| Dewatering | Lead | |
| Sludge Holding Tanks | Lead | |
| Post treatment | Lead | |
| Recycled water pump station | Lead | |
| Effluent pump station | Lead | |

| | DB | City |
|--|--|------|
| On-site reclaimed water system | Lead | |
| Site ingress from Highway 1 | Lead | |
| Product water storage [clarification] | Lead | |
| Stormwater facilities including compliance with applicable City, County, State Requirements, Local Ordinances, and local development standards | Lead | |
| Structural | Lead | |
| Building plumbing | Lead | |
| Fire protection/detection/alarm systems and Fire Department compliance | Lead | |
| Standby emergency power | Lead | |
| HVAC | Lead | |
| Electrical/electrical building(s) | Lead | |
| Instrumentation and controls | Lead | |
| Valves | Lead | |
| Process and field piping | Lead | |
| Pumping | Lead | |
| Electrical metering equipment | Lead | |
| Electrical control panels | Lead | |
| Cables, conduits & trays | Lead | |
| Power and control wiring | Lead | |
| Transformers | Lead | |
| Switchgear | Lead | |
| PG&E Electrical Service Application and Handout | Support | Lead |
| Southern California Natural Gas Service Application | Support | Lead |
| Communications on site and with remote lift station PLC via fiber optic | Lead | |
| Communication service (internet/phone) from offsite to the access easement boundary at Highway 1 ROW | Support | Lead |
| Communication with lift station/outfall/injection well sites | Support (lead for WRF site components) | Lead |
| Process equipment layout | Lead | |
| System integration | Lead | |
| Security | Lead | |
| Operation building | Lead | |
| Maintenance building | Lead | |
| Equipment and vehicle storage | Lead | |
| Outdoor storage areas | Lead | |
| Covered and uncovered parking | Lead | |
| Existing facility demolition, IF ALTERNATIVE IS EXERCISED | | Lead |
| Indoor/outdoor lighting | Lead | |
| Grounding/earthing | Lead | |
| Cathodic protection | Lead | |
| Lightning protection systems | Lead | |
| Specifications | Lead | |
| Project drawings | Lead | |
| As-built drawings | Lead | |
| Operations and maintenance equipment (cranes, hoist, etc.) | Lead | |

| | DB | City |
|---|---------|---------|
| Spare parts development | Lead | |
| Asset management program, Computerized Management and Maintenance System (CMMS), and development and implementation of proposed system(s) | Lead | |
| Operations and maintenance manuals | Lead | |
| Operations and Maintenance Buildings | | |
| Operations Building equipment - DB to coordinate requirements with City | Lead | Support |
| Office equipment – DB to coordinate requirements with City | Lead | Support |
| Furnishing laboratory equipment | Support | Lead |
| Design, fit-out & permitting of laboratory | Lead | Support |
| Conference/training/break room – DB to coordinate requirements with City | Lead | Support |
| General Construction Activities | | |
| Supply of power, water and other utilities, services, chemicals and all consumables necessary during the time of plant construction through to acceptance testing | Lead | |
| Equipment installation | Lead | |
| Temporary site access | Lead | |
| Outdoor lighting | Lead | |
| Fencing | Lead | |
| Equipment Procurement | | |
| Specification development, equipment selection, procurement documentation development, purchase, delivery and installation | Lead | Support |
| Review and analysis for compliance with specifications | Lead | |
| Placement of purchase orders and issuance of subcontracts | Lead | |
| Critical item factory inspections and testing | Lead | Support |
| Equipment inspection upon arrival | Lead | |
| Processing of invoices for payment | Lead | |
| Spare parts list development and inventory | Lead | |
| Site Construction Work | | |
| Site preparation | Lead | |
| Site security, signage, safety items | Lead | |
| South Bay Boulevard access improvements | Lead | |
| Access roadway improvements | Lead | |
| Civil sitework (grading, paving, drainage, fencing) | Lead | |
| On-site utility installations and connections | Lead | |
| Foundation and slab installation | Lead | |
| Building construction and installation | Lead | |
| Plumbing installation | Lead | |
| HVAC installation | Lead | |
| Fire protection equipment installation | Lead | |
| All process equipment installation | Lead | |
| Non-process equipment installation | Lead | |
| Connections to influent force main, recycled water pipeline, and treated effluent pipe at 20 feet inside site boundary | Lead | |
| Landscaping and Irrigation | Lead | |

| | DB | City |
|---|---------|---------------|
| Perimeter fencing | Lead | |
| Signage and installation of signage | Lead | |
| Systems testing and approvals | Lead | |
| Site cleanup | Lead | |
| Stormwater management and SWPPP | Lead | |
| Construction Management | | |
| Construction supervision | Lead | Support |
| Construction inspection* [PCO 069] | Lead | Support |
| Project quality control | Lead | |
| City interface/communication | Lead | Support |
| Public communication | Support | Lead |
| Permit support and adherence (construction) | Lead | |
| Permit support and adherence (occupancy and operation) | Lead | |
| Field generated Request for Information | Lead | |
| Shop drawing reviews | Lead | |
| Punch listing | Lead | Support |
| Commissioning and Acceptance Testing | | |
| Startup/commissioning plan | Lead | Support |
| Factory acceptance tests | Lead | Support |
| Manufacturers' Certificate of Proper Installation | Lead | |
| Functional tests | Lead | Support |
| 14-day Acceptance test | Lead | Support |
| Training of operations staff | Lead | Support |
| Operations plan | Lead | Support |
| Operations manual | Lead | Support |
| CMMS development and implementation | Lead | Support |
| Asset management program | Lead | Support |
| Spare parts inventory and management | Lead | Support |
| Supply of consumables during functional testing; acceptance testing; and performance and operation testing: power, water, chemicals, etc. | Support | Lead [PCO119] |
| Final acceptance | Lead | Support |
| Final project documentation | Lead | Support |
| Initial fill and all first oil changes on equipment | Lead | |
| 7 Month Performance and Operational Testing [PCO 064] | | |
| Plant operations | | Lead |
| Plant staffing | | Lead |
| City personnel equipment training | | Lead |
| CMMS usage | | Lead |
| Plant maintenance activities, including costing & documenting | | Lead |
| Warranty repair items (1 st year) | Lead | |
| Asset management implementation | | Lead |
| Chemical deliveries | | Lead |
| Electrical/mechanical/process/civil and environmental support | | |
| Permit regulatory compliance | | Lead |
| Plant tours | | Lead |
| Existing WWTP Decommissioning/Demolition (only included if alternative is exercised) | | |

| | DB | City |
|--|----|------|
| Existing WWTP shutdown/decommissioning | | Lead |
| Tank cleaning (if alternative is exercised) | | Lead |
| Plant demolition (if alternative is exercised) | | Lead |

*Note that all 3rd party testing and inspection shall be provided by FBV up to \$200,000. Anything in excess of \$343,120 in regards to 3rd party testing and inspection shall be borne by the City. [PCO 069] [PCO 98]

1.4 Influent Flows and Water Quality

Influent flow, water quality, and loads the plant shall be designed to treat are summarized on Table 1-1.

Table 1-1: Morro Bay WRF Influent Flow and Water Quality Basis of Design

| Parameter | Unit of Measure ¹⁻⁷ | Annual Average ⁹ | Minimum Monthly Average ^{10,11} | Maximum Monthly Average ^{10,12} | Maximum ¹⁴ | Peak Hour |
|-----------------------------------|--------------------------------|-----------------------------|--|--|-----------------------|-------------|
| Flow | MGD | 0.97 | | 1.16 | 2.74 | 8.14 |
| BOD ₅ | mg/L | 354 | | 374 | | |
| | lb/d | 2,864 | | 3,618 | 4,845 | |
| TSS | mg/L | 392 | | 437 | | |
| | lb/d | 3,171 | | 4,228 | 6,193 | |
| TKN | mg-N/L | 57 | | 60 | | |
| | lb-N/d | 461 | | 580 | 777 | |
| NH _x -N | mg-N/L | 46 | | 48 | | |
| | lb-N/d | 369 | | 464 | 622 | |
| Total Phosphorus | mg-P/L | 6 | | 8 | | |
| | lb-P/d | 49 | | 77 | 183 | |
| Ortho Phosphorus | mg-P/L | 4 | | 5 | | |
| | lb-P/d | 32 | | 48 | 114 | |
| Total Fats, Oils and Grease | mg/L | 80 | | 90 | 120 | |
| Free Oils | mg/L | 1 | | 1 | 1 | |
| Mineral or Non-Biodegradable Oils | mg/L | 5 | | 5 | 5 | |
| pH | S.U | range: 6.7 - 8.5 | | | | |
| Temperature | °C | 20 | 17 | | 24 | |
| Total Dissolved Solids | mg/L | | | 920 | 1400 | |
| Conductivity | µS/cm | | | 1767 | 2110 | |
| Chloride | mg/L | | | 250 | 460 | |
| Fluoride | mg/L | | | 0.36 | 1 | |

| Parameter | Unit of Measure ¹⁻⁷ | Annual Average ⁹ | Minimum Monthly Average ^{10,11} | Maximum Monthly Average ^{10,12} | Maximum ¹⁴ | Peak Hour |
|--|--------------------------------|-----------------------------|--|--|-----------------------|-----------|
| Sulfate | mg/L | | | 125 | 165 | |
| Calcium | mg/L | | | 169 | 186 | |
| Total Recoverable Iron | mg/L | | | 5.1 | 9.4 | |
| Magnesium | mg/L | | | 74 | 81 | |
| Potassium | mg/L | | | 19 | 26 | |
| Silica | mg/L | | | 12 | 24 | |
| Sodium | mg/L | | | 170 | 250 | |
| Aluminum | mg/L | | | 0.41 | 0.75 | |
| Barium | mg/L | | | 0.01 | 0.02 | |
| Manganese | mg/L | | | 0.04 | 0.05 | |
| Strontium | mg/L | | | 0.34 | 0.42 | |
| Total Organic Carbon | mg/L | | | 99 | 140 | |
| Dissolved Organic Carbon | mg/L | | | 7 | 9 | |
| N-Nitrosodimethylamine (NDMA) | mg/L | | | | 6.5x10 ⁻⁵ | |
| N-Nitrosodiethylamine (NDEA) | mg/L | | | | 5.0x10 ⁻⁵ | |
| N-Nitrosodi-n-propylamine (NDPA) | mg/L | | | | 8.3x10 ⁻⁵ | |
| 1,4-Dioxane | mg/L | | | | 1.3x10 ⁻³ | |
| Copper | mg/L | | | | 13.00000 | |
| Lead | mg/L | | | | 0.15000 | |
| Antimony | mg/L | | | | 0.00600 | |
| Arsenic | mg/L | | | | 0.01000 | |
| Asbestos (for fibers >10 microns long) | MFL | | | | 7.00000 | |
| Barium | mg/L | | | | 1.00000 | |
| Beryllium | mg/L | | | | 0.00400 | |
| Cadmium | mg/L | | | | 0.00500 | |
| Chromium, Total | mg/L | | | | 0.05000 | |
| Chromium, Hexavalent | mg/L | | | | 0.01000 | |
| Cyanide | mg/L | | | | 0.15000 | |
| Fluoride | mg/L | | | | 2.00000 | |
| Mercury (inorganic) | mg/L | | | | 0.00500 | |
| Nickel | mg/L | | | | 0.10000 | |
| Perchlorate | mg/L | | | | 0.00600 | |
| Selenium | mg/L | | | | 0.05000 | |
| Thallium | mg/L | | | | 0.00200 | |

| Parameter | Unit of Measure ¹⁻⁷ | Annual Average ⁹ | Minimum Monthly Average ^{10,11} | Maximum Monthly Average ^{10,12} | Maximum ¹⁴ | Peak Hour |
|------------------------------------|--------------------------------|-----------------------------|--|--|-----------------------|-----------|
| Boron | mg/L | | | | 0.39000 | |
| n-Butylbenzene | mg/L | | | | 0.26000 | |
| sec-Butylbenzene | mg/L | | | | 0.26000 | |
| tert-Butylbenzene | mg/L | | | | 0.26000 | |
| Carbon disulfide | mg/L | | | | 0.16000 | |
| Chlorate | mg/L | | | | 0.80000 | |
| 2-Chlorotoluene | mg/L | | | | 0.14000 | |
| 4-Chlorotoluene | mg/L | | | | 0.14000 | |
| Diazinon | mg/L | | | | 0.00120 | |
| Dichlorodifluoromethane (Freon 12) | mg/L | | | | 1.00000 | |
| Ethylene glycol | mg/L | | | | 14.00000 | |
| Formaldehyde | mg/L | | | | 0.10000 | |
| HMX | mg/L | | | | 0.35000 | |
| Isopropylbenzene | mg/L | | | | 0.77000 | |
| Manganese | mg/L | | | | 0.50000 | |
| Methyl isobutyl ketone (MIBK) | mg/L | | | | 0.12000 | |
| Naphthalene | mg/L | | | | 0.01700 | |
| Propachlor** | mg/L | | | | 0.09000 | |
| n-Propylbenzene | mg/L | | | | 0.26000 | |
| RDX | mg/L | | | | 0.00030 | |
| Tertiary butyl alcohol (TBA) | mg/L | | | | 0.01200 | |
| 1,2,3-Trichloropropane (1,2,3-TCP) | mg/L | | | | 0.00001 | |
| 1,2,4-Trimethylbenzene | mg/L | | | | 0.33000 | |
| 1,3,5-Trimethylbenzene | mg/L | | | | 0.33000 | |
| 2,4,6-Trinitrotoluene (TNT) | mg/L | | | | 0.00100 | |
| Vanadium | mg/L | | | | 0.05000 | |
| Alachlor | mg/L | | | | 0.00200 | |
| Atrazine | mg/L | | | | 0.00100 | |
| Bentazon | mg/L | | | | 0.01800 | |
| Benzo(a)pyrene | mg/L | | | | 0.00020 | |
| Carbofuran | mg/L | | | | 0.01800 | |
| Chlordane | mg/L | | | | 0.00010 | |
| Dalapon | mg/L | | | | 0.20000 | |
| 1,2-Dibromo-3-chloropropane (DBCP) | mg/L | | | | 0.00020 | |

| Parameter | Unit of Measure ¹⁻⁷ | Annual Average ⁹ | Minimum Monthly Average ^{10,11} | Maximum Monthly Average ^{10,12} | Maximum ¹⁴ | Peak Hour |
|--|--------------------------------|-----------------------------|--|--|-----------------------|-----------|
| 2,4-Dichlorophenoxyacetic acid (2,4-D) | mg/L | | | | 0.07000 | |
| Di(2-ethylhexyl)adipate | mg/L | | | | 0.40000 | |
| Di(2-ethylhexyl)phthalate (DEHP) | mg/L | | | | 0.00400 | |
| Dinoseb | mg/L | | | | 0.00700 | |
| Diquat | mg/L | | | | 0.02000 | |
| Endrin | mg/L | | | | 0.00200 | |
| Endothal | mg/L | | | | 0.10000 | |
| Ethylene dibromide (EDB) | mg/L | | | | 0.00005 | |
| Glyphosate | mg/L | | | | 0.70000 | |
| Heptachlor | mg/L | | | | 0.00001 | |
| Heptachlor epoxide | mg/L | | | | 0.00001 | |
| Hexachlorobenzene | mg/L | | | | 0.00100 | |
| Hexachlorocyclopentadiene | mg/L | | | | 0.05000 | |
| Lindane | mg/L | | | | 0.00020 | |
| Methoxychlor | mg/L | | | | 0.03000 | |
| Molinate | mg/L | | | | 0.02000 | |
| Oxamyl | mg/L | | | | 0.05000 | |
| Pentachlorophenol | mg/L | | | | 0.00100 | |
| Picloram | mg/L | | | | 0.50000 | |
| Polychlorinated biphenyls (PCBs) | mg/L | | | | 0.00050 | |
| Simazine | mg/L | | | | 0.00400 | |
| 2,4,5-TP (Silvex) | mg/L | | | | 0.05000 | |
| 2,3,7,8-TCDD (dioxin) | mg/L | | | | 3x10 ⁻⁸ | |
| Thiobencarb | mg/L | | | | 0.07000 | |
| Toxaphene | mg/L | | | | 0.00300 | |
| Total Trihalomethanes | mg/L | | | | 0.08000 | |
| Bromodichloromethane | mg/L | | | | 0.0010 | |
| Bromoform | mg/L | | | | 0.0010 | |
| Chloroform | mg/L | | | | 0.0010 | |
| Dibromochloromethane | mg/L | | | | 0.0010 | |
| Haloacetic Acids (five) (HAA5) | mg/L | | | | 0.06000 | |
| Monochloroacetic Acid | mg/L | | | | 0.0020 | |
| Dichloroacetic Acid | mg/L | | | | 0.0055 | |
| Trichloroacetic Acid | mg/L | | | | 0.0073 | |
| Monobromoacetic Acid | mg/L | | | | 0.0010 | |

| Parameter | Unit of Measure ¹⁻⁷ | Annual Average ⁹ | Minimum Monthly Average ^{10,11} | Maximum Monthly Average ^{10,12} | Maximum ¹⁴ | Peak Hour |
|--------------------------------------|--------------------------------|-----------------------------|--|--|-----------------------|-----------|
| Dibromoacetic Acid | mg/L | | | | 0.0010 | |
| Bromate | mg/L | | | | 0.01000 | |
| Chlorite | mg/L | | | | 1.00000 | |
| Gross alpha particle activity | pCi/L | | | | 15.00000 | |
| Gross beta particle activity | pCi/L | | | | 4.00000 | |
| Radium-226 | pCi/L | | | | 0.05000 | |
| Radium-228 | pCi/L | | | | 0.01900 | |
| Radium-226 + Radium-228 | pCi/L | | | | 5.00000 | |
| Strontium-90 | pCi/L | | | | 8.00000 | |
| Tritium | pCi/L | | | | 20000 | |
| Uranium | pCi/L | | | | 20.00 | |
| Benzene | mg/L | | | | 0.001 | |
| Carbon tetrachloride | mg/L | | | | 0.0005 | |
| 1,2-Dichlorobenzene | mg/L | | | | 0.6 | |
| 1,4-Dichlorobenzene (p-DCB) | mg/L | | | | 0.005 | |
| 1,1-Dichloroethane (1,1-DCA) | mg/L | | | | 0.005 | |
| 1,2-Dichloroethane (1,2-DCA) | mg/L | | | | 0.0005 | |
| 1,1-Dichloroethylene (1,1-DCE) | mg/L | | | | 0.006 | |
| cis-1,2-Dichloroethylene | mg/L | | | | 0.006 | |
| trans-1,2-Dichloroethylene | mg/L | | | | 0.01 | |
| Dichloromethane (Methylene chloride) | mg/L | | | | 0.005 | |
| 1,2-Dichloropropane | mg/L | | | | 0.005 | |
| 1,3-Dichloropropene | mg/L | | | | 0.0005 | |
| Ethylbenzene | mg/L | | | | 0.3 | |
| Methyl tertiary butyl ether (MTBE) | mg/L | | | | 0.013 | |
| Monochlorobenzene | mg/L | | | | 0.07 | |
| Styrene | mg/L | | | | 0.1 | |
| 1,1,2,2-Tetrachloroethane | mg/L | | | | 0.001 | |
| Tetrachloroethylene (PCE) | mg/L | | | | 0.005 | |
| Toluene | mg/L | | | | 0.15 | |

| Parameter | Unit of Measure ¹⁻⁷ | Annual Average ⁹ | Minimum Monthly Average ^{10,11} | Maximum Monthly Average ^{10,12} | Maximum ¹⁴ | Peak Hour |
|---|--------------------------------|-----------------------------|--|--|-----------------------|-----------|
| 1,2,4-Trichlorobenzene | mg/L | | | | 0.005 | |
| 1,1,1-Trichloroethane (1,1,1-TCA) | mg/L | | | | 0.2 | |
| 1,1,2-Trichloroethane (1,1,2-TCA) | mg/L | | | | 0.005 | |
| Trichloroethylene (TCE) | mg/L | | | | 0.005 | |
| Trichlorofluoromethane (Freon 11) | mg/L | | | | 0.15 | |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113) | mg/L | | | | 1.2 | |
| Vinyl chloride | mg/L | | | | 0.0005 | |
| Xylenes | mg/L | | | | 1.75 | |
| Bromide | mg/L | 0.34 | | | 0.50 | |

[PCO 056]

Footnotes:

1. Flow units:
 - a. MGD = million gallons per day
2. Concentration units:
 - a. mg/L = milligrams per liter;
 - b. mg-N/L = milligrams per liter as Nitrogen;
 - c. mg-P/L = milligrams per liter as Phosphorus
3. Mass Load Units:
 - a. lb/d = pounds per day (calculated using on concentration and flow);
 - b. lb-N/d = pounds nitrogen per day;
 - c. lb-P/d = pounds phosphorus per day.
4. S.U. = standard units
5. °C = degrees centigrade
6. μS/cm = microsiemens per centimeter
7. pCi/L = picocuries per liter
8. Influent samples shall be collected as composite samples. A composite sample is a flow-weighted combination of no fewer than eight (8) individual samples obtained at equal time intervals over a 24-hour period. The volume of each individual sample collected is proportional to the flowrate at the time of sampling.
9. Annual average is the arithmetic average of the total number of data collected in a calendar year.
10. The monthly average is the arithmetic mean of the daily concentrations over a calendar month.
11. Minimum Monthly Average is the minimum value of the monthly average in a calendar year.
12. Maximum Monthly Average is the maximum value of the monthly average in a calendar year.
13. Maximum day flow and load incorporates a maximum day flow and a maximum day load. The maximum day flow is the maximum daily total flow in a calendar year. The maximum day load for a particular parameter is the largest amount received in the influent during a continuous 24-hour period expressed as a weight per day.

14. Maximum is the maximum concentration value of any composite sample in a calendar year.

1.5 General Requirements

1.5.1 Overarching Requirements

DB to submit written results from all testing, analyses, and studies required in this Scope of Work or in Contract Documents.

| Item | Parameter | Criteria | Notes |
|------|-------------------------------------|---|-------|
| 1 | Integrated Design | The WRF must meet all requirements as an integrated facility and as a whole | |
| 2 | Overall Guarantees | <ul style="list-style-type: none"> See Performance Guarantees Section | |
| 3 | Equipment Warranty Period | <ul style="list-style-type: none"> Unless longer warranty requirements are specified in the contract documents, all equipment warranties shall be valid and in effect for 1 year after project substantial completion regardless of manufacturer’s stated warranty start date | |
| 4 | Confined Spaces | <ul style="list-style-type: none"> Minimize confined spaces in design Identify all confined spaces and provide three sets of necessary gear for entry by O&M staff | |
| 6 | Transitional Operation Period | <ul style="list-style-type: none"> Operate and maintain the WRF to: <ul style="list-style-type: none"> Maximize the amount of recycled water produced Minimize costs, and in any case keep power use, chemical use, operator attendance and other costs and inputs to below guaranteed values | |
| 7 | Material of Construction/Durability | <ul style="list-style-type: none"> Select material of construction to meet the life cycle performance criteria Include corrosion as a main criterion in detailed design | |

1.6 Effluent Quality Requirements

This section summarizes the effluent quality requirements for the project.

1.6.1 Ocean Discharge Requirements

The effluent from the WRF discharged to the Ocean will meet the requirements for Effluent Limitations – Discharge Point No. 001 set forth in National Pollution Discharge Elimination System (NPDES) No. CA0047881, Draft Order No. R3-2017-0050 adopted by the Central Coast Water Board on December 7, 2017 with compliance measured utilizing the effluent composite sample collected at the Morro Bay WRF site.

1.6.2 Potable Reuse Requirements

Finished water quality for the new potable reuse facility must meet all Maximum Contaminant Level (MCL) and secondary MCL values found in SWRCB (2015) and notification level (NL) requirements from the State of California

(https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/notificationlevels/notification_levels_response_levels_overview.pdf)

Specifically excluded is compliance with the MCL value for Bromate, which may not be met at all times depending on incoming water quality. The City directed operational method for the UV system with only one UV reactor, there will be operational periods when the optimum UV dose will be less than the minimum dose of the UV reactor (i.e., below the maximum turn down of the reactor). As a result, over dosing will occur. BV has determined that the potential levels of bromide in the source water could result in the creation of bromate in the product water, potentially exacerbated by UV overdosing, at concentrations which exceed the regulatory MCL. To address this concern the City has directed BV to include a shutdown interlock based on the conductivity reading in instrument 51-RO-AIT-0001 located on the common RO influent line. The City is conducting a study to determine the trigger conductivity level on this instrument that if exceeded the control system will automatically shut down the AWT system and divert flows to the outfall. The AWT system will not be permitted to restart until conductivity falls below a reset level determined by the City. The City will solely be responsible for determination of an appropriate level and monitoring of the system both during start up and normal operation to ensure bromate concentrations do not exceed the allowable MCL.

Bromate formation can be mitigated with the addition of ammonia in the UV reactor influent, as demonstrated at the Terminal Island project. Therefore, BV has recommended that an ammonia feed point be added upstream of the UV reactor. The City has determined not to add the ammonia feed system to this location at this time; however, a spare chemical feed duct is being provided that will run from the chemical building to upstream of the UV reactor. If at a later date the City should decide to add this feed system in then, this duct will facilitate the addition of a chemical dosing line and a chemical feed pump (the same pump size as the ones used for other chemicals) to reduce bromate formation at the UV reactor. [PCO 042] [PCO 056]

FBV will provide the City with a Table summarizing the virus, giardia and cryptosporidium log removal performance expectations for the three key treatment processes (i.e., MBR, RO, and UV as part of the Basis of Design (30%) deliverable.

1.7 Treatment Capacity

The WRF shall be designed to receive and treat the full influent wastewater flows from the City of Morro Bay in accordance with the effluent requirements described above. Available information on the anticipated influent wastewater flows and water quality characteristics is provided herein.

1.8 Plant Production Requirements

The WRF shall be designed and constructed to produce a volume of recycled water for indirect potable reuse groundwater injection equal to 76% of the influent flow based on the annual average flow in Section 1.4, assuming continuous operation of the IPR system. This production percentage does not account for down time due to maintenance of the UV system or periods of diversion when the Bromate MCL cannot be maintained. These periods of AWT downtime will reduce the production capacity. [PCO 042] [PCO 056]

1.9 Durability Requirements

The objective design life requirements for the different project components are listed below. The DB shall consider the location of the project in the coastal environment when selecting materials, coatings and equipment. The DB may consider the project components and facilities will be operated and maintained by qualified staff. The necessary maintenance, repair and replacement will also occur in accordance with warranty requirements and other procedures specified by the DB and equipment manufacturers.

| Item | Parameter | Criteria | Notes |
|------|-------------------------|---|---|
| 1 | Overall WRF Design Life | 30 Years | |
| 2 | Civil Component | <ul style="list-style-type: none"> • Pavement: 15 years • Site Fencing: 15 years • Concrete Structures, Tanks, etc.: 75 years • Chemical Storage Tanks: 20 years | |
| 3 | Mechanical Components | <ul style="list-style-type: none"> • Yard/Buried Piping: 50 years • In-Plant/Aboveground Piping: 30 years • Chemical Piping: 10 years • Chemical Pumps: 10 years • Pumps: 30 years • Control Valves: 25 years • Blowers: 25 years • Pressure Vessels: 30 years • Cartridge Filter Vessels: 30 years • Cartridge Filters: DB to define • Pressure Vessels: 30 years • UV Reactors: 30 years • UV System Components i.e., lamps, ballasts, etc.: DB to define • RO System: 30 years • AOP System: 20 years • HVAC Systems: 25 years | <ul style="list-style-type: none"> • Durations assume regular maintenance, calibration, testing and certification per manufacturer’s recommendations • Unless longer warranty requirements are specified in the contract documents, all equipment warranties shall be valid and in effect for 1 year after project substantial completion regardless of manufacturer’s stated warranty start date |
| 4 | Structural | <ul style="list-style-type: none"> • Building Structure: 50 years • Structural Steelwork: 50 years • Membrane Skid Frame: 50 years • Pre-treatment System Structures: 50 years | |

| Item | Parameter | Criteria | Notes |
|------|-------------------------------|--|---|
| | | <ul style="list-style-type: none"> RO Skid Frame: 50 years AO Skid Frame: 50 years Metalwork, i.e. ladders, stairs and walkways: 25 years | |
| 5 | Electrical and I&C Components | <ul style="list-style-type: none"> Motor Control Center: 30 years Switchgear: 30 years Dry-Type Transformer(s): 30 years Instruments: 15 years (or as customarily available for standard industry instrumentation) PLC System: 15 years SCADA Hardware: 15 years Electrical, general: 25 years Telemetry: 25 years Power electronics i.e. VFDs, UPS, etc.: 15 years | <ul style="list-style-type: none"> Durations assume regular maintenance, calibration, testing and certification per manufacturer recommendations. Assumes all firmware and software updates are implemented when released. All systems with battery-backup batteries will be replaced as necessary All equipment warranties will be in effect for 1 year after project substantial completion regardless of manufacturer's warranty to the DB |

1.10 Anticipated Environmental Mitigation Measures

The environmental analysis and CEQA documents are currently being prepared. The Draft Environmental Impact Report (EIR) is anticipated to be available in March 2018, with certification of the final EIR was finalized in June 2018. Refer to Attachments for additional information and anticipated mitigation measures.

1.11 Process Performance Guarantees

This section presents the process systems design envelope and process treatment performance guarantees for the Morro Bay WRF designed and constructed by the FBV JV. The verification period is defined under Acceptance Testing in Section 12.5.

1.11.1 Conditions of the Process Treatment Performance Guarantee

The Process Treatment Performance Guarantees presented in this section are subject to the following:

- The influent water quality shall fall within the design envelope listed in Table 1-1.
- The influent shall contain no constituents, listed or unlisted, regulated or unregulated, which are deleterious or harmful to, inhibit, alter or interfere with any of the treatment processes of the Morro Bay WRF.
- Development, completion, implementation or reporting of any occurrence studies related to the presence of regulated, unregulated, indicator or surrogate compounds in the collection or sewer system is not included the scope of FBV and shall not form any part of the Work under the Contract.

Any such efforts required for regulatory or permit compliance are to be completed by the City of Morro Bay.

- Operation and maintenance of all systems, equipment, and components of the Morro Bay WRF must be in accordance with FBV Operations and Maintenance manuals and/or guidelines and/or requirements and/or recommendations and manufacturer system/equipment manufacturers' manuals and recommendations.
- The City of Morro Bay is responsible for implementing an effective Enhanced Source Control Program in accordance with 22 CCR § 60320.206, 22 CA ADC § 60320.206. The Enhanced Source Control program shall be developed by the City of Morro Bay and approved by California State Water Resources Control Board Division of Drinking Water prior to the startup and commissioning of the Morro Bay WRF.

1.11.2 Water Quality Guarantees

1.11.2.1 Ocean Discharge Effluent Quality

Ocean Discharge Effluent Quality will be demonstrated to meet the quality set forth in Section 1.6.1 during the 14-day Acceptance Testing period . In the event that any of the Ocean Discharge Effluent Quality criteria are not met during the 14-day Acceptance Testing period due to:

1. Failure of the City to provide influent water which meets the conditions specified in Table 1-1 of Section 1.4; or
2. Failure of the City to operate and maintain the Morro Bay WRF in accordance with FBV Operations and Maintenance manuals and/or guidelines and/or requirements and/or recommendations and manufacturer system/equipment manufacturers' manuals and recommendations,

FBV shall demonstrate that one or both of the above conditions resulted in the failure. If neither of these reasons were the cause of the failure then the 14-day Acceptance Testing shall be redone at no cost to the City in accordance with Section 12.5. If it is determined either of these conditions were the cause of the failure, then the City shall be responsible for all costs associated with the additional 14-day Acceptance Testing period. If the City cannot meet these conditions during the retest, then FBV shall be deemed to have met all water quality guarantees as of the date the Acceptance Testing period began.

1.11.2.2 Groundwater Recharge Effluent Quality

Groundwater Recharge Effluent Quality will be demonstrated to meet the limits expressly set forth in Section 1.5.2 during the 14-day Acceptance Testing period. In the event that any of the Groundwater Recharge Effluent Quality criteria are not met during the 14-day Acceptance Testing period due to:

1. Failure of the City of Morro Bay to provide influent water which meets the conditions specified in Table 1-1 of Section 1.4;
2. Failure of the City of Morro Bay to operate and maintain the Morro Bay WRF in accordance with FBV Operations and Maintenance manuals and/or guidelines and/or requirements and/or recommendations and manufacturer system/equipment manufacturers' manuals and recommendations,

FBV shall demonstrate that one or both of these conditions were the cause of the failure. If neither of these conditions were the cause of the failure, then the 14-day Acceptance Testing shall be recompleted at no cost to the City in accordance with Section 12.5. If it is determined that either of these conditions were the cause of the failure, then the City shall be responsible for all costs associated with the additional 14-day Acceptance Testing period. If the City cannot meet these conditions during the retest, then FBV shall be deemed to have met all water quality guarantees as of the date the Acceptance Testing period began.

1.11.3 Dewatered Solids Guarantees**1.11.3.1 Dewatered Sludge Solids Concentration Guarantee**

Dewatered sludge dry solids quality will meet a minimum monthly average solids concentration of 16%. In the event that any of the Dewatered Sludge Dry Solids criteria are not met during the 14-day Acceptance Testing period due to:

1. Failure of the City of Morro Bay to provide influent water which meets the conditions specified in Table 1-1 of section 1.4;
2. Failure of the City of Morro Bay to operate and maintain the Morro Bay WRF in accordance with FBV Operations and Maintenance manuals and/or guidelines and/or requirements and/or recommendations and manufacturer system/equipment manufacturers' manuals and recommendations,

FBV shall demonstrate that one or both of these conditions were the cause of the failure. If neither of these conditions were the cause of the failure, then the 14-day Acceptance Testing shall be recompleted at no cost to the City in accordance with Section 12.5. If it is determined that either of these conditions were the cause of the failure, then the City shall be responsible for all costs associated with the additional 14-day Acceptance Testing period. If the City cannot meet these conditions during the retest, shall be deemed to have met all solids concentration guarantees as of the date the Acceptance Testing period began.

1.11.3.2 Dewatering Process Solids Capture Efficiency

The Dewatering process solids capture efficiency will meet a minimum monthly average of 95%. In the event that the Dewatering Process Solids Capture Efficiency criteria is not met during the 14-day Acceptance Testing period due to:

1. Failure of the City of Morro Bay to provide influent water which meets the conditions specified in Table 1-1 of Section 1.4;
2. Failure of the City of Morro Bay to meet all the stipulations noted in "Conditions of the Process Treatment Performance Guarantee"; or
3. Failure of the City of Morro Bay to operate and maintain the Morro Bay WRF in accordance with FBV Operations and Maintenance manuals and/or guidelines and/or requirements and/or recommendations and manufacturer system/equipment manufacturers' manuals and recommendations,

FBV shall demonstrate that one or both of these conditions were the cause of the failure. If neither of these conditions were the cause of the failure, then the 14-day Acceptance Testing shall be recompleted at no cost to the City in accordance with Section 12.5. If it is determined that either of these conditions were the cause of the failure, then the City shall be responsible for all costs associated with the additional 14-day Acceptance Testing period, if the City cannot meet these conditions during the retest, shall be deemed to have met all process solids capture efficiency guarantees as of the date the Acceptance Testing period began.

1.12 [PCO 064]

SECTION 2 TREATMENT PROCESS CRITERIA

2.1 General

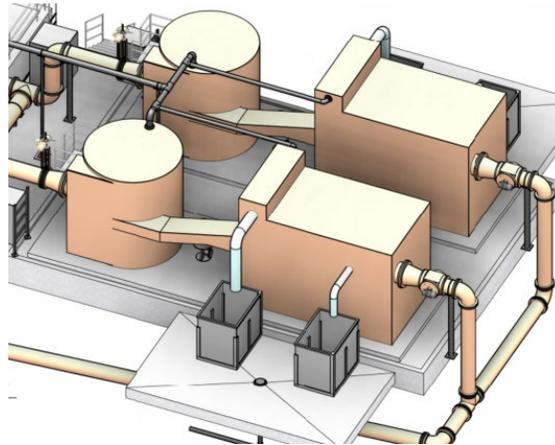
The WRF shall provide preliminary, secondary, tertiary, and full advanced treatment, with processes integrated to work as a whole and with operational flexibility to provide efficient treatment. The main treatment processes are summarized in the table below. Ancillary support facilities will also be required. A basic process flow diagram (PFD) is included in the drawings.

| Item | Process | Notes |
|------|--|-------|
| 1 | Influent (Coarse) Screening | |
| 2 | Grit Removal | |
| 3 | SAFE System (auxiliary peak flow treatment) | |
| 4 | Fine Screening | |
| 5 | Membrane Bioreactor (MBR) | |
| 6 | Sludge Holding Tanks (formerly referred to as Aerobic Sludge Digester) | |
| 7 | Sludge Dewatering | |
| 8 | Reverse Osmosis (RO) | |
| 9 | Ultraviolet Advanced Oxidation Process (UVAOP) | |
| 10 | Chemical Storage and Feed Facilities | |
| 11 | Odor Control | |

The WRF treatment processes shall be integrated to work as a whole. Control systems throughout the WRF Treatment Processes shall be compatible with the overall site control system. Process monitoring shall be provided to allow for full regulatory compliance, monitoring, and recording of water quality and flow trends, evaluation of unit process performance, and evaluation of equipment condition.

2.2 Influent (Coarse) Screening

The Influent (Coarse) Screening System shall collect, wash, dewater, compress, convey, bag, and discharge solids to a rolling dumpster. Discharge area is to be paved with curbs and drainage to the WRF plant drain system. Two packaged headworks units shall be provided. This section covers the coarse screen components of the packages. The packaged headworks shall utilize OEM packaged equipment as detailed below and on the P&IDs.



Key Overall Facility Features

- Two Packaged Headworks Systems shall be furnished, each rated at full plant peak hour capacity of 8.14 mgd. 1 duty / 1 standby.
- Each package headworks includes mechanically cleaned coarse screening and grit removal.
- Coarse screening includes screens, washer/compactors, conveyor to dumpster, and odor control.
- Skid mounted metal channels and tank construction. 316 stainless steel construction of wetted components or tankage [clarification].
- Automated isolation valves for each Packaged Headworks System. [PCO 040.1]
- 2 feet of freeboard.
- Built-in bypass/overflow around the coarse screens directly to the grit removal system.
- Fully covered channels and tanks for odor control in compliance with section 2.12 Odor Control.
- Galvanized ship's ladder to access units in lieu of ladders offered with package. [PCO 031] [clarification]
- Curb surrounding Packaged Headworks Systems and floor drain [PCO 046]
- Manufacturer: Kusters Zima, Huber, Lakeside Equipment, Vulcan, Headworks Inc., Westech, Parkson, Duperon, Hydrodyne, or equal if approved.

Equipment (Package Headworks)- Coarse Screens

- 2 screens @ 8.14 mgd each, one in each package. 1 duty / 1 standby at peak hour flow.
- ¼" (6 mm) bar spacing, 316 stainless steel.
- Furnished by packaged headworks manufacturer as part of the package.

Equipment (Package Headworks)- Washer/Compactor/Conveyor

- 2 washer/compactors, one for each package, integrated into each coarse screen.
- 316 stainless steel wetted components.
- Integrated Screw-auger conveyor included for each package.

- Discharge to dumpster. Bagging attachment included on chute. A 4-yard is anticipated for weekly disposal based on published debris loading rates. Dumpster to be provided by hauling company.
- Furnished by packaged headworks manufacturer as part of the package.

Control Features

- Local control panel by Packaged Headworks System manufacturer with Plant PLC start/stop and monitoring.
- Operators shall manually select which unit(s) operate and leave them running continuously.
- Local control panel for each Packaged Headworks System initiates operation of rake, washer/compactor, and conveyor.
- No operator intervention required for bypass or overflow of coarse screens. Operator intervention required for bypass or overflow of the Packaged Headworks System.

Operations Purpose

The coarse screens collect and remove suspended debris and solid material from the plant influent flow stream to protect the plant equipment. Screenings are delivered to a washer compactor. Plant water is used to wash the screenings which removed soluble organics from the screenings which are utilized in the MBR. The unit compacts the screenings and deposits the material into a screenings container.

Operations Description

The plant influent includes flow from the influent main and the plant drain system. Plant drain flow is metered separately.

Coarse Screens

Wastewater enters the headworks and can be directed to Coarse Screen No. 1 or No. 2. Wastewater passes through the bar rack while solids are captured in the rack. Automatic screen operation is based on differential level and time. The cleaning rakes are driven by the chains and travel upwards transporting the screenings upwards along the apron which comes after the bar rack. A hinged wiper pushes the screenings from the rake shelf over the discharge chute and directs them to the washer compactor.

Screen control is set through the local control panel (LCP). With the control selector switch in the Auto position the screen will be operate based on level control and/or time control. In Hand screen operation is controlled locally using the Forward and Reverse switches. Rake speed can be adjusted locally and speed viewed on the LCP. The screen will shut down on high toque, motor overload and if the E-Stop is pressed. Screen status, operating mode and alarms are transmitted to SCADA thru the PLC.

Level Control

Water level is measured upstream and downstream of the screens. When a preset differential level is reached a raking event starts at a preset low speed setpoint. In the event a high-high level is reached the screen speed will increase to the high speed setpoint. The rake high speed control has an adjustable delay timer.

Timer Control

A programmable timer is used to initiate raking events. During periods of low flow the rake may not reach levels high enough to trigger an event. A 24 hour programmable timer can be set to periodically operate the rake to make sure that screenings stay fresh.

Washer Compactor

Washer compactor operation is interlocked with the screen rake. Compactor control is set locally. With the control selector switch in the Auto position the compactor starts when a screening event is initiated. The spray water solenoid valves opens and the compactor starts and runs forward for a preset time period. Compacted material is discharged into a screenings discharge chute that holds a screenings bag. When full the bag is dropped into the screenings container. In Hand the washer compactor operation is controlled locally using the Forward and Reverse switches. The unit will shut down on low spray water pressure and when the E-Stop is pressed. Compactor status, operating mode and alarms are transmitted to SCADA thru the PLC.

Normal Operation

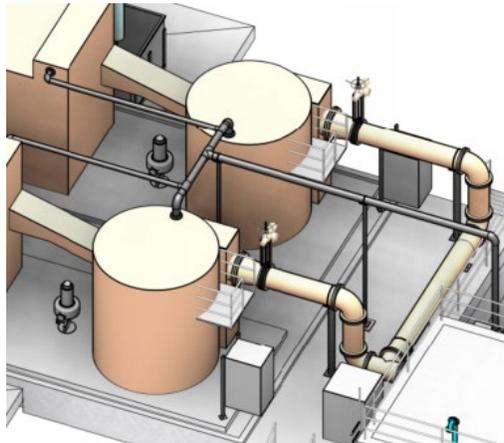
Normally one screen is selected for use in Remote Auto control.

Alternate Operations

1. If Coarse Screen No. 1 fails in Remote Auto Manual the unit may be operated from SCADA by selecting Remote Manual and cycling the screen. This option requires manual operation of the compactor.
2. If Coarse Screen No. 1 fails in Remote Auto the unit may be operated locally using the local control selector switch.
3. If Coarse Screen No. 1 should fail the Operator can open the influent valve from SCADA to the Coarse Screen No. 2 and close the valves to Coarse Screen No. 1. Coarse Screen No. 2 controls will be placed in Remote Automatic. [PCO 040.1]

2.3 Grit Removal

The Grit Removal System shall remove grit from influent wastewater and discharge collected grit via automated valve(s) or pumps to a grit dewatering and conveyance system. Grit discharge area is to be paved with curbs and drainage to the WRF plant drain system. The distance from grit removal system to dumpsters shall be minimized to minimize conveyance system failures. Two packaged headworks units shall be provided. This section covers the vortex grit removal components of the packages. The packaged headworks shall utilize OEM packaged equipment as detailed below and on the P&IDs.



Key Overall Facility Features

- Two Packaged Headworks Systems, 1 duty / 1 standby. Shall include coarse screening and grit removal.
- Grit removal shall include vortex grit removal, washer/classifiers, conveyor to dumpster, and odor control.
- Channels and tanks shall be skid mounted, 316 stainless steel construction.
- Electrically actuated isolation valves for each Packaged Headworks System. [PCO 040.1]
- 2 feet of freeboard.
- Bypass/Overflow around both Packaged Headworks Systems by isolating both headwork systems to cause flow to flow directly to the flow splitter box.
- Fully covered channels and tanks for odor control per Section 2.12.
- Galvanized stairs to access units in lieu of ladders offered with package. [PCO 031]
- Manufacturer: Kusters Zima, Huber, Lakeside Equipment, Westech, Fluidyne, Smith and Loveless, Hydro International, or equal if approved.

Equipment (Package Headworks)- Vortex Grit Removal

- 2 vortex grit units @ 8.14 mgd each. One per Packaged Headworks System. 1 duty / 1 standby at peak hour flow.
- 316 stainless steel tank and components.
- Removal Rate @ 0.97 MGD: ≥ 50 Mesh = 95%; 50-70 Mesh = 95%; 80-100 Mesh = 65%.
- Furnished by packaged headworks manufacturer as part of the package.

Equipment (Package Headworks)- Grit Pump

- 2 pumps total, one integrated into each Packaged Headworks System. 1 duty/1 standby.
- Flow per Packaged Headworks System Supplier
- Shall discharge into grit removal washer/classifier.

- Shall be furnished by packaged headworks manufacturer as part of the package.

Equipment (Package Headworks)- Washer/Classifier/Conveyor

- 2 units total, one integrated into each Packaged Headworks System. 1 duty/1 standby.
- 316 stainless steel wetted components.
- Screw-auger conveyor.
- Discharge to dumpster. A 4-yard is anticipated for weekly disposal based on published debris loading rates. Dumpster shall be provided by hauling company.
- Furnished by packaged headworks manufacturer.

Control Features

- Local control panel by Packaged Headworks System manufacturer with Plant PLC start/stop and monitoring.
- Operators shall manually select which unit(s) operate and leave them running continuously.
- Local control panel for each Packaged Headworks System shall initiate operation of paddle, grit pump, washer/classifier, and conveyor.
- Operator intervention shall be required for bypass or overflow of the Packaged Headworks System.

Operations Purpose

Grit consists of inorganic material, such as sand, silt, and gravel. The grit removal system consists of a vortex grit basin, two grit pumps and a grit separator and classifier. Grit is removed from the wastewater to prevent damage to equipment and piping and the reduction of tank volume.

Operations Description

Grit Basin

The grit basin inlet flume produces a straight laminar flow that minimizes turbulence at the inlet of the basin. Grit already at the bottom of the flume follows a ramp at the end of the inlet flume to the floor of the basin. The inlet baffle at the end of the flume helps the incoming flow to properly merge with the circular flow already inside the grit basin. The configuration of inlet flume, inlet baffle, and rotating paddle generates the toroidal flow pattern required for proper operation of the flat floored vortex grit basin.

The toroidal flow pattern moves water upward through the vortex at the center of the basin, across the surface of the water toward the outer wall, down the outside wall toward the floor, and across the floor back to the center again. Wastewater is also flowing simultaneously with the toroidal flow around the basin in a circular flow pattern. The combined effect of the two flow patterns retains grit in the basin for more than one circular rotation around the basin, effectively increasing the amount of time grit is retained in the basin, thus increasing the opportunity for grit to be captured on the floor.

The settled grit migrates toward the center of the hopper and falls into the grit storage hopper. The shaft on which the rotating paddles are attached extends only to the bottom of the separation basin.

Grit Pumps

One centrifugal pump operates periodically to remove grit slurry from the hopper.

Grit Separator and Classifier

The grit separator separates the pumped grit from the carrier water. The separator works on the principal of centrifugal force. The grit pump discharges settled grit slurry and some organics into the separator at a controlled rate. The slurry enters the separator tangentially near its upper perimeter. The round shape of the separator imparts a circular motion inside the unit. The heavier grit is forced to the outside of the cone and moves down the sides, falling into the grit classifier below the separator. The carrier water and lighter organics exits the separator at the top of the cone to return to the grit basins.

The grit classifier separates the grit from the organics and consists of an inclined tank with an inclined screw. The grit and organics fall from the grit concentrator into the tank, where it is washed using plant effluent water. The water flow rate through the tank is sufficient to carry the lighter organics out the settling basin overflow weirs to return to the in-plant drain while permitting the heavier grit to settle to the bottom of the tank. The grit is carried up the inclined screw allowing the grit to dewater before falling into a grit hopper for offsite disposal.

Normal Operation

Grit Basin: On-line

Grit Basin Paddle: Run continuously.

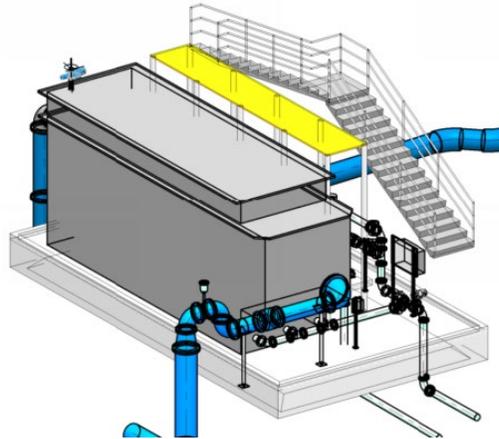
Grit Pump: Runs periodically based on preset timer.

Grit Separator and Classifier: Starts 5 minutes before grit pump runs and continues running for a preset time period after the grit pump stops.

Grit Container: Manual

2.4 SAFE System (section was formerly titled Flow Equalization Basin)

Peak flows shall be treated with a peak flow auxiliary treatment system, referred to in the proposal as the SAFE system. The SAFE System is comprised of a diversion box which sends flows in excess of the MBR capacity to the SAFE Settle Tank. When the SAFE Settle Tank fills, the effluent passes over a weir to the SAFE Filter. Effluent from SAFE Filter system shall be routed to the Outfall Balancing Tank. The SAFE Settle Tank can be pumped back to the SAFE Box for treatment through the MBR System after the peak flow event ends. This system replaces the functionality of a flow equalization basin by treating peak flows at their influent rate, rather than requiring them to be stored for treatment at a lower rate later. [PCO 017] [clarification]



Key Overall Facility Features

- SAFE System Box included at headworks to divert any flows in excess of the MBR capacity to the SAFE system for treatment. [clarification]
- Odor control, cover, ladder and handrail for SAFE Box. [PCO 004] [PCO 026] [clarification]
- SAFE Settle Tank, a 100,000-gallon concrete basin adjacent to the Sludge Holding Tanks, provides equalization of peak flows so that the SAFE Filter only treats storm flows. [PCO 017]
- Dedicated Piping to drain the SAFE Settle Tank and use the solids dewatering pump to drain manually [PCO 017] [PCO 068]
- 1 SAFE System Unit
 - o 1 disk backwash pump
 - o 1 sludge pump
 - o Backwash and sludge pumps intertied for shared manual redundancy
 - o Cloth media disks for BOD removal and filtration
 - o Scum box for scum removal
 - o Access platform and staircase to the top of the SAFE Filter in lieu of a ladder. [PCO 044.1]
- Peak flows shall be treated through the SAFE system and routed to the Outfall Pump Station.
- Manufacturer: Aqua-Aerobic Systems Inc., Veolia, or equal if approved.

Equipment – SAFE System

- 1 @ 6.26 mgd each (plant peak hour flow of 8.14 mgd less MBR capacity of 1.88 mgd).
- Stainless Steel tank to house disks and appurtenances.
- 1 backwash pump, approx. 51 ft TDH
- 1 solids pump, approx. 51 ft TDH
- Backwash and solids pumps will be interconnected to allow either to be used for either operation in event one pump is out of service.

- Electrically actuated plug valves to control sludge, scum and backwash operations and control appurtenances on the SAFE Filter [clarification]
 - o Pressure transducer
 - o Float Switch
 - o Vacuum transmitters
- Provide removable cover system over the Cloth media disc tank for UV/weather protection. Control Features
- Local control panel by SAFE System manufacturer with Plant PLC start/stop and monitoring.
- Flow from headworks through influent flow meter shall automatically trigger the startup of the SAFE system.

Operations Purpose

Flows in excess of the treatment plant design capacity are diverted to the SAFE system for treatment.

Operations Description

The SAFE facility is a cloth media filtration system that provides primary treatment for wet weather applications. The disks are constructed of a pile cloth filtration media to effectively filter high solids waste streams without the use of chemicals under varying influent conditions.

Normal Operation

As needed. Flow from headworks through influent flow meter initiates the SAFE system startup.

Filtration Mode

Screened wastewater flow enters the filter by gravity and fill basin that contains stationary cloth media disks that are completely submerged. Solids deposit on the outside of the cloth media forming a mat as filtrate flows through the media. The tank liquid level rises as headloss builds due to the collection of solids. Filtrate is collected in the hollow center tube and discharged over an effluent weir. The heavier solids settle into a hopper located in the bottom of the tank.

Backwash Mode

Solids are backwashed at a preset liquid level or time. Backwash shoes directly contact the cloth media and solids are removed by vacuum pressure using a backwash pump. The disks rotate slowly and two disks are backwashed at a time. Filtration is not interrupted. Backwash water is directed the plant drain.

Solids Wasting Mode

Heavier solids are removed from the collection on an intermittent basis. Filter Solids Waste Pump.

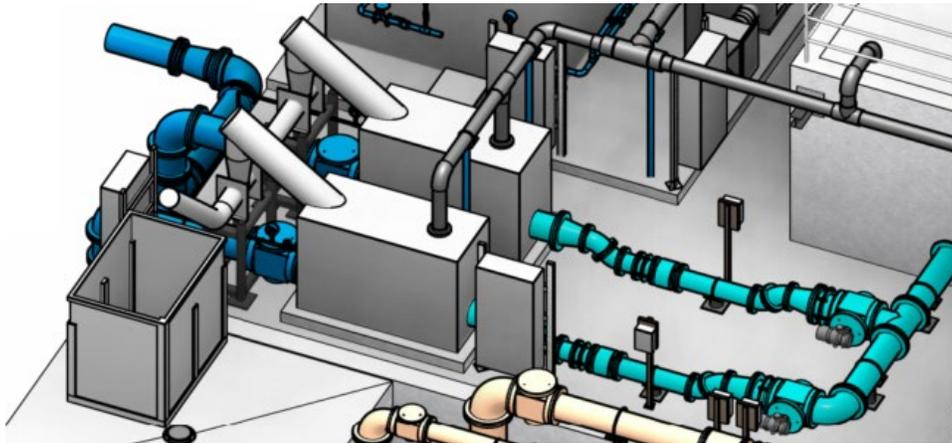
Solids are pumped back to the Headworks Splitter Box.

Floatable Wasting Mode

Floatable scum is allowed to collect on the water surface. After a preset number of backwashes, the water level is allowed to rise above the preset high level and the scum flows over the scum removal weir. Scum wasting water is directed to the plant drain.

2.5 Fine Screening

The Fine Screening System shall collect, wash, dewater, compress, convey, and discharge solids to a rolling dumpster. Discharge area is to be paved with curbs and drainage to the WRF plant drain system. The distance and lift from screens to dumpsters shall be minimized to prevent conveyance system failures. Two packaged fine drum screen units shall be furnished in the Headworks Area to screen wastewater influent ahead of the MBR process. The packaged fine screens shall utilize OEM packaged equipment as detailed below and on the P&IDs.



Key Overall Facility Features

- Fine screens shall be supplied from the SAFE System Diversion Box. An automated flow control valve and meter shall be included to regulate flow to the fine screens to the MBR treatment rate. [PCO 040.1]
- Two Packaged Fine screens with integrated washer/compactors and odor control. [PCO 004]
- Conveyor to convey screenings to dumpster.
- Manufacturer: Kusters Zima, Huber, Smith & Loveless, Vulcan, Headworks Inc, Westech, Parkson, Duperon, Hydrodyne, or equal if approved.

Equipment - Fine Screens

- Perforated plate drum screens in stainless steel tank with packaged washer/compactors.
- 2 unit @ 1.88 mgd each. 1 duty / 1 standby.
- 2 mm openings, 316 stainless steel.
- Furnished by fine screen manufacturer as part of package unit.

Equipment - Washer/Compactor

- 2 units total, one integrated into each fine screen package.
- 316 stainless steel wetted components.
- Furnished by fine screen manufacturer as part of package unit.

Equipment - Conveyor

- 1 unit, shared between both screening and washer/compactor units.
- Screw-auger conveyor
- 316 stainless steel wetted components.

- Discharge to dumpster. A 4-yard is anticipated for weekly disposal based on published debris loading rates. Dumpster to be provided by hauling company.
- Furnished by fine screen manufacturer as separately installed equipment.

Control Features

- Local control panel by screen manufacturer with Plant PLC start/stop and monitoring.
- Operators select which unit(s) operate and leave them running continuously. [PCO 040.1]
- Local control panel initiates operation of screen drum, washer/compactor, and conveyor.
- Control valve utilizes flow meter to maintain the MBR treatment flow capacity, maximum flow of 1.88 mgd through the fine screens. The valve is controlled directly by the Plant PLC and can be remotely or manually set to a position. [PCO 040.1]

Operations Purpose

Splitter Box flow is discharged to the fine screens through two lines. Trash and fibrous materials such as hair and paper found in domestic wastewater can hinder membrane performance and shorten membrane life. Fine screening captures these materials to prevent them from accumulating on the membranes and transfers the material to the conveyor and discharge chute and into the screenings container.

Operations Description

The fine screen is comprised of perforated plate with an integrated screenings press and screenings washing. Floating and suspended materials are retained by the screen basket.

The screenings and compactor local control panel (LCP) is energized from the MCC. With the control selector switch in the Hand position the screen runs continuously; in the Off position the screen does not rotate; in Auto control is passed to PLC and operation set through SCADA. Screen operation is set on the SCADA configuration screen including control mode (Remote Manual | Remote Auto), screen out of service and screen high level setpoint. Selecting a screen has out of service removes the equipment from the control loop and suppresses any alarms.

Water level is measured upstream and downstream of each screen. The basket starts to rotate when a preset upstream water level is exceeded due to screen surface blinding. The rotating screen drum lifts the screenings and drops them into the centrally arranged trough. Screenings removal from the drum is supported by a scraper brush and a spray nozzle bar. Plant effluent water (PEW) is supplied by a solenoid valves. In the event PEW pressure is low a pressure switch generates an alarm. A screw conveyor in the trough rotates with the drum and transports the screenings through a closed and inclined pipe. The conveying screw transports, dewateres and compacts the screenings, without any odor nuisance, and discharges them into the dumpster. Screened wastewater is combined in a pipeline that discharges to the MBR. Sodium hydroxide is added to the line for pH control and monitored for TSS and pH. An E-stop is located locally and the LCP. Energizing the E-Stop shuts down the equipment immediately and generates an alarm.

Specifics on the sodium hydroxide feed system are located in Section 2.11-Chemical Storage and Feed.

Normal Operation

One fine screen runs in Remote Auto. One unit shall be operated when the MBR is in service.

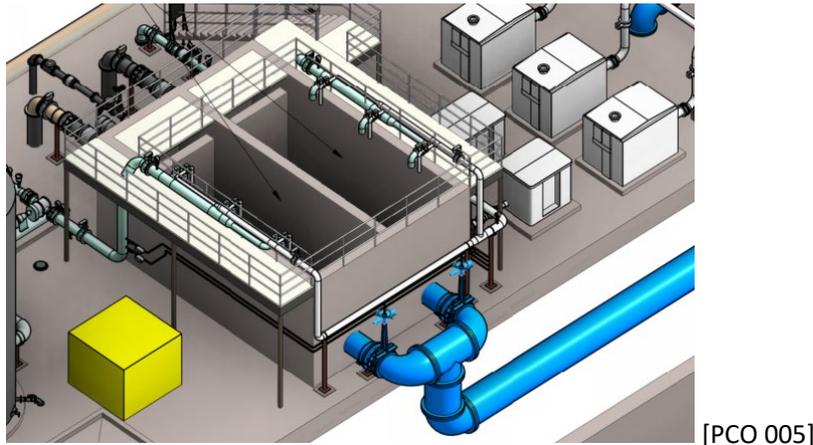
Abnormal Operation

- Fine Screen No. 1 shall be operated in Remote Manual.

- Fine Screen No. 1 shall be operated in Hand.
- Fine Screen No. 2 shall be placed in service. Open the manual supply and out let valves to Screen No. 2. Energize the LCP and place controls in in Auto. Inlet and outlet valves to Screen No. 1 should be shut. If possible run the screen to remove as much material as possible. Place Screen No. 1 controls in Off.

2.6 Membrane Bioreactor

A Membrane Bioreactor system shall be furnished to receive water from the Fine Screens and provide biological treatment and filtration to supply downstream IPR treatment system and produce effluent suitable of ocean discharge. This system shall be furnished as detailed below and as shown on the drawings and P&IDs. The MBR Filtration System shall utilize OEM packaged equipment as detailed in the table below and on the P&IDs.



Key Overall Facility Features

- Two BNR process trains each with ability to treat max month flow of 1.16 mgd of screened and dewatered wastewater with full redundancy. Max day flow of 1.88 mgd shall utilize both basins.
- MLSS shall be less than 8,000 mg/l in BNR basins and less than 10,000 mg/l in MBR tanks.
- MBR Filtrate shall have a turbidity of 0.5 NTU or lower.
- BNR basins shall utilize cast-in-place concrete construction.
- Staircases at the north and south ends of the BNR basins. [PCO 044.1]
- Total anoxic volume of 60,000 gallons. 30,000 gallons per train. [clarification]
- Total aerobic volume of 360,000 gallons. 180,000 gallons per train. Aerobic volume in each train shall be served by two diffuser grids. [clarification and PCO 067]
- 1.5 ft of in-basin equalization volume (aerobic) for a total volume of 26,670 gallons.
- BNR process air shall be supplied by positive displacement dry screw blowers. [PCO 23] Blowers are on Adjustable Frequency Drives to allow optimization of air flow.
- Manual isolation gates shall be provided for each treatment train.
- RAS deox volume of 12,500 gallons total furnished in the RAS pipe Deox Tank upstream of BNR inlet splitter. [clarification]
- Membrane Bioreactor System including:
 - o Membrane cassettes and supporting structures.
 - o Membrane filtrate pumps.
 [clarification]
 - o Membrane filtrate collection / backpulse distribution headers.
 - o Membrane tank drain pumps. (if required by system supplier)
 - o Membrane scour air blowers.
 - o Membrane scour air distribution headers.
 - o Valves, instrumentation, magnetic flowmeters, and controls equipment for operation of MBR system.
 - o Compressed air system for operation of MBR equipment (if required by system supplier)

- o Clean-in-place system via injection of citric acid or sodium hypochlorite into back pulse line. (not within MBR Supplier scope)
- Access staircase and catwalks on both sides of the MBR train in lieu of a ladder. [PCO 044.1]
- Surface wasting in BNR basins and post-MBR WAS collection with common WAS pumping wetwell. Selectively removes filamentous bacteria to optimize BNR operation.
- CIP provisions shall be furnished to perform maintenance and recovery cleanings at typical frequencies.
- Curbed washdown area to place a single dirty cassette and hose off and send drainage to sanitary sewer [PCO 046]
- BNR/MBR system designed to minimize FOG reaching MBR membranes.
- Manufacturer: Fibracast, Suez, Evoqua, Koch, or equal if approved.
- Regulatory Compliance: DDW approval letter for pathogen reduction credit is required.

Equipment – Anoxic Mixers

- 2 @ 2.5 hp each (to be optimized in design).
- Submersible, mast mounted or pumped mixing equipment
- Manufacturer: Sulzer, Flow Systems, or equal if approved.

Equipment – RAS Deox Mixer

- 1 @ 1 to 2.5 hp each (to be optimized in design).
- Submersible, mast mounted.
- Manufacturer: Sulzer, Flow Systems, or equal if approved.

Equipment – Fine Bubble Diffused Aeration

- Two aeration zones per train.
- 1,040 scfm maximum Zone 1 airflow (per train). Minimum 220 diffusers (per train). [PCO 067]
- 650 scfm maximum Zone 2 airflow (per train). Minimum 160 diffusers (per train). [PCO 067]
- EPDM membrane discs with PVC components, fittings, manifolds, and laterals.
- Manufacturer: Xylem, Environmental Dynamics, Sanitaire, or equal if approved.

Equipment – BNR Process Blowers

- 3 @ 1,300 scfm each, 24.9 psia discharge pressure. 2 duty / 1 standby. [PCO 067]
- Target efficiency 75% or greater.
- Dry screw blower w/ weather enclosure and VFD/AFD. [PCO 023]
- Supplying air to fine bubble diffuser system. Air control, metering equipment, and logic included to control and optimize aeration.
- Manufacturer: Aerzen [PCO 023] [PCO30]

Equipment –MBR Feed Pumps

- 2 @ 4.85 mgd each, 2.5 ft TDH. [clarification]
- Horizontal, submersible propeller pump.
- Manufacturer: Sulzer, Flow Systems, or equal if approved.

Equipment – Mixed Liquor Collection Channel Scum Collection Weirs and Valves

- Concrete weir at the end of each BNR train to collect scum in a box
- Motorized plug valve to each box opens on timer to pull scum out

Equipment – BNR WAS and Scum Pumps

- 2 @ 40 gpm each, 25 ft TDH. 1 duty / 1 standby.
- Vertical, submersible centrifugal pump.
- Manufacturer: DXP, Xylem, Flygt, or equal if approved.

Equipment – Membrane Filtration System (specific equipment package subject to change based on MBR System Supplier requirements)

- 1.0 mgd annual average, 1.16 mgd max month, and 1.88 mgd max day treatment capacity. 10 gfd at annual average flow and 17 gfd at max month flow.
- Two minimum membrane trains. 805 gpm each.
- Membrane Cassettes
 - o Integrated scour air distribution.
- Membrane Filtrate Pumps
 - o 2 @ 830 gpm, 30ft TDH, to be confirmed by MBR System Supplier (MSS).
 - o Vertical centrifugal pumps
 - o Manufacturer selection by MBR Supplier.
- Membrane Tank Drain Pumps
 - o 1 @ 250 gpm, 15ft TDH to be confirmed by MSS.
 - o Vertical centrifugal pumps
 - o Manufacturer selection by MBR Supplier.
- Membrane Scour Air Blowers
 - o 4 @ 270 scfm, 6 psi. 3 duty / 1 standby, to be confirmed by MSS.
 - o Target efficiency 75% or greater.
 - o Rotary lobe blowers w/ weather enclosure.
 - o Manufacturer:Aerzen [PCO 30]
- Compressed Air System
 - o Complete with dryers, receiver tank, and control equipment.
 - o Capacity requirements by MBR Supplier.
- Connections on MBR Supplier provided piping to accommodate CIP chemicals.

Control Features

- BNR Process Blowers
 - o Local Control panels with Blower Master Control panel communication to SCADA.
 - o System supplies/controls air based on DO control within aeration zones.
- MBR System
 - o Local Control panels with MBR Master Control panel communication to SCADA.
 - o Control of all MBR Supplier provided equipment is within the scope of Supplier.
- Anoxic/Deox Mixers
 - o Operators manually select which unit(s) operate and leave them running continuously.
- MBR Feed Pumps
 - o Operators manually select which unit(s) operate and leave them running continuously.
 - o Pump speed to be varied based on filtrate and RAS flow. [clarification]
- WAS and Scum Pumps
 - o Wetwell level control. Lead/lag selectable by Operator.
 - o Scum Collection Control Valves
 - o Operator definable duration and frequency in SCADA.

Operations Purpose

The MBR Area contains processes that accomplish secondary treatment and filtration. The purpose of the area is to convert dissolved and colloidal material to a product that can be separated from the liquid stream and to create an effluent (called permeate) suitable for the RO Facility.

Air is drawn through a set of filters to remove particulate matter.

Operations Description

Biological Reactor

Wastewater that has passed through the fine screens and return activated sludge (RAS) flows are combined at the Bioreactor Splitter Box. An oxygen reduction probe (ORP) is located in the Anoxic Basins and provides an indication of the environmental condition of the biomass (aerobic, anoxic, and anaerobic). Using manually operated gates the flow can be directed to either activated sludge (AS) train. Flow is directed into the anoxic (AN) zone. The anoxic zone is mixed gently to encourage contact between food and the biomass. In an anoxic environment the biomass uses combined oxygen (nitrate) as an energy source. This is an effective way to convert nitrate to nitrogen gas and reduce overall nitrogen. The anoxic zone denitrifies the RAS before the mixed liquor (ML) flows into the aerobic zone. The AS system is configured for nitrification and denitrification. The aerobic system is sized to target a dissolved oxygen level of 2.0 mg/L. [PCO 067] Solids are held in the aeration basins for a period of time that allows carbonaceous BOD removal as well as conversion of ammonia to nitrate. A ML probe is located at the end of the aeration basin to monitor suspended solids concentration. The filtered wastewater, called permeate, is transferred to the RO Feed Tank.

Aeration Blower

The blowers will be used to compress air for injection into the aeration basins to maintain aerobic biological activity. Each blower will be equipped to optimize efficiency. Temperature detection will be provided for each blower. Pressure will be monitored on both the suction and blower discharge lines with pressure switches. A discharge isolation valve will be provided for each blower. Aeration air pressure is measured at the blower aeration air manifold and is used in blower control. Meters are provided on each aeration basin dropleg to the fine bubble diffusers. Dissolved oxygen (DO) are located in the aerobic zone. The DO probes are also used as a control element blower operation to maintain a DO setpoint. [PCO 023]

Scum/Foam Control

Floating solids are periodically removed from the aeration basin surface using the scum collection boxes and valves located at the end of the basin. The material will be transferred to the WAS Wetwell. This prevents foam from accumulating in the system.

WAS

The Scum/WAS Wetwell receives scum from the aeration basins and a portion of RAS that is diverted to the WAS to control sludge retention time (SRT). One rotary lobe pump transfers WAS sludge to the sludge holding tanks. Another rotary lobe pump transfers Scum to the sludge holding tanks. WAS pump flowrate is adjusted as needed to maintain the require SRT. Scum pump flow rate is operated based on level in the Scum/WAS Wetwell. Pressure gauges are located on the discharge of each pump. The pumps discharge to a common manifold that is metered.

MBR

Mixed liquor effluent flows from the AS plant to the ML Collection Channel which is equipped with a MBR Feed Pump to transfer biomass into the MBR. The biomass flows into the MBR where the membranes are located. The membranes filter the inorganics and organics larger than the membrane pore size and provide a degree of pathogen removal. The membranes are used to provide a portion of the disinfection and aid in removing some organics that contribute to disinfection byproducts.

Scour Air Blower

Each MBR cassette receives a continuous air flow to maintain an aerobic environment. Air is supplied by membrane scour blowers. Ambient air is compressed through the blowers and then discharged through piping to each MBR cassette. MBR level is continuously monitored, displayed locally and transmitted to SCADA. Discrete level sensors are used to generate alarms for high-high and low-low levels. Operating outside of these levels could adversely impact MBR operation.

Solids that slough off the membranes are drawn from the aeration basins. A portion of the solids are removed from the system through the WAS pumps and transferred to the solids area for storage and subsequent dewatering. Most of the MBR solids are returned to the AS system via the DeOx Tank. The tank is mixed gently without the addition of any food. The purpose of the tank is to remove free oxygen from the biomass. The deoxygenated biomass is discharged into the AN basin influent where it is blended with screened and degrittled wastewater.

Membrane Cleaning Options

Biological fouling occurs when aerobic and anaerobic bacteria, fungus, and algae colonize on the membrane surface and begin growing. Precipitative fouling is the scale formation when compounds in the wastewater are concentrated beyond their solubility. Precipitative fouling usually does not occur in the membranes unless the wastewater has a high pH combined with hard water. Adsorptive fouling occurs when oil, polymers, surfactant, and hydrocarbons adhere to the membrane surface and clog the membrane pores. Cake formation (sludging) occurs when the membranes accumulate solids between the membrane fibers that do not allow wastewater to reach the membrane surfaces. Cleaning options are described below

Membrane Backwash System

The filtrate pump that runs in reverse supplies water forced through the lumen (inside) of the membrane fiber to the outside surface. [clarification] The water flushes any material (foulant) that has accumulated on the membrane surface, and flushes it into the membrane basin. A backpulse pressure of 10 psi and a flow rate one and a half times the production flow are applied to the membranes every 15 minutes for 15 seconds (these times are Operator adjustable). The backpulse water remains in the basin and is filtered as ML.

Clean in Place (CIP)

Two types of CIP cleans are used on the membranes to deep clean the membranes when the TMP increases to 12 psi or the membrane recovery is lower than a predetermined value.

Maintenance CIP Clean

The maintenance clean uses a low dosage (100 mg/L, which dilutes to 10 mg/L in the basin) of sodium hypochlorite, and the chemical is backpulsed through the membranes (inside to outside) into the basin. The membrane basin remains full during the maintenance clean. The membrane control system then cycles to a relaxation mode to soak the membranes for 1 to 5 minutes (Operator preset time). The membranes then

cycle into the production mode, and the basin content is filtered as normal. The maintenance clean is performed every 24 hours, and is completed with the membrane basin full of water

Recovery CIP Clean

The recovery clean is run every 3 weeks or at determined intervals based on operational experience. The recovery clean can use either sodium hypochlorite or citric acid. The sodium hypochlorite dissolves and removes organic materials and citric acid dissolves and removes inorganics that have fouled or blocked the membranes. Sodium hypochlorite is fed at 10,000 mg/L or 1 percent solution concentration; citric acid is fed at 1,000 mg/L. Softened water is used and the water is heated prior to the CIP clean to increase the efficiency of the chemical if needed in the cleaning process.

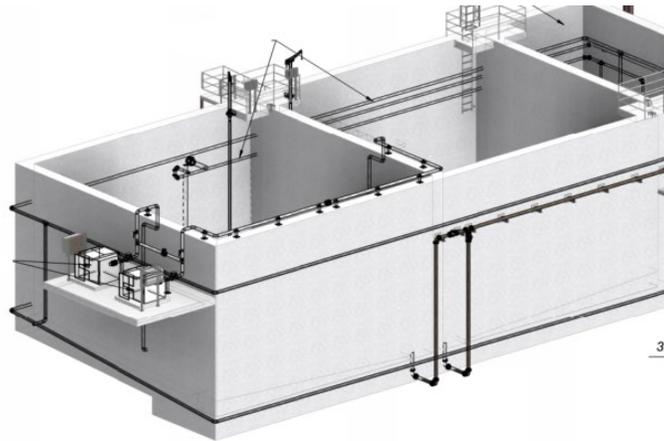
The recovery clean is performed with the membrane basin empty. The CIP pump draws water from the softened water storage tank. As the water is drawn from the softened water tank, sodium hypochlorite or citric acid is fed into the CIP pump discharge and backpulsed into the membranes. The backpulse carries the specified chemical from the inside of the membrane fiber to the outside at the full concentration. The backwash pumps then fill the membrane train/basin with potable water from the finished water reservoir; the water is then transferred through the membrane fill line to the specified train. The water in the basin dilutes the chemical concentration; the membranes soak in the chemical water in the basin for 4 hours before the water goes to the next train or ends the clean. The membrane train/basin water is drained and sent to the CIP disposal basin or transferred to the next membrane train that undergoes the following cycled recovery clean. The membrane train/basin water may be transferred and used in four recovery cleans before being diverted to the CIP disposal basin. Operational experience determines the recovery clean basin water recycle.

Normal Operation

The MBR equipment is normally operated in Remote Auto. The ML will be less than 8,000 mg/l in BNR basins and less than 10,000 mg/l in MBR tanks.

2.7 Sludge Holding Tanks

The Sludge Holding Tanks will receive, store, and aerate activated sludge wasted from the MBR process. The process is not designed to digest the sludge. A two-cell WAS sludge holding tank shall be provided to store and aerate WAS sludge. Each zone shall be designed to operate independently, and it is expected that normally only one zone will be in use to minimize sludge age for optimization of dewatering system performance. Each zone shall include a mixer to mix the WAS sludge and coarse bubble diffusers to aerate it.



Key Overall Facility Features

- Two cell concrete tank with ability to store approximately 14 days of sludge at AAF conditions [PCO 067]
- Tank shall be divided into two cells to allow operators to use half the volume for normal operations. In general, it is recommended to minimize sludge storage time.
- Access platform at the top of the tank for mixer maintenance.
- One staircase to the top of the Sludge Holding Tank platform in lieu of a ladder. [PCO 044.1]
- Influent and effluent isolation to tank.
- Isolation valves above ground to bypass tank and send straight to dewatering system.
- Two aeration blowers are included directly adjacent to tank to improve blower efficiency.

Equipment – Blowers

- 2 @ 320 scfm each. 1 per storage cell. Only one storage cell needed for operation. [design development]
- Blowers shall have VFDs
- Target blower efficiency 75% or greater.
- Supplies air to coarse bubble diffuser grids
- Blowers to be Positive Displacement type.
- Blower manufacturer shall utilize OEM packaged equipment as detailed on the P&IDs.
- Manufacturer: Aerzen [PCO 30]

Equipment – Coarse Bubble Diffusers

- 2 grids, one per cell of sludge holding tank
- 304L stainless steel
- Manufacturer: EDI, Sanitaire, or equal if approved.

Equipment – Mixers

- 2 provided, one in each cell, to alternate with aeration in order to keep solids mixed.
- 10 hp each
- Manufacturer: Sulzer, Flow Systems, Flygt, or equal if approved.

Control Features

- Local control panel by blower manufacturer with PLC start/stop and monitoring.
- Plant PLC turns blowers on/off are based off time and level to promote denitrification and alkalinity management.
- Plant PLC turns mixers on/off to provide sludge mixing when blowers are off or continuously if operators select.
- Operators manually select which unit(s) and tank(s) operate and leave them running continuously.

Operations Purpose

The sludge holding tanks are aerated tanks holding sludge wasted from the MBR. The tanks act as a reservoir for feed sludge to the belt press and provide some stabilization of biomass.

Operations Description

The facility is designed to operate the belt press two days a week. The sludge holding tanks act as a reservoir for sludge that feeds the belt press. The tank is aerated using diffusers to keep the environment oxic for aerobic and facultative bacteria. The microorganisms use the oxygen and obtain energy from incoming organic matter in the WAS. When the food supply is limited the microorganisms consume their own protoplasm to satisfy their energy requirements. Eventually the cells undergo lysis and release degradable organic matter which is then available for other microorganisms and biologically destroys volatile solids. The digester freeboard/head space will be minimized to reduce potential for odor accumulation. A mixer is located in the tanks and can be used to lift solids from the bottom of the tank.

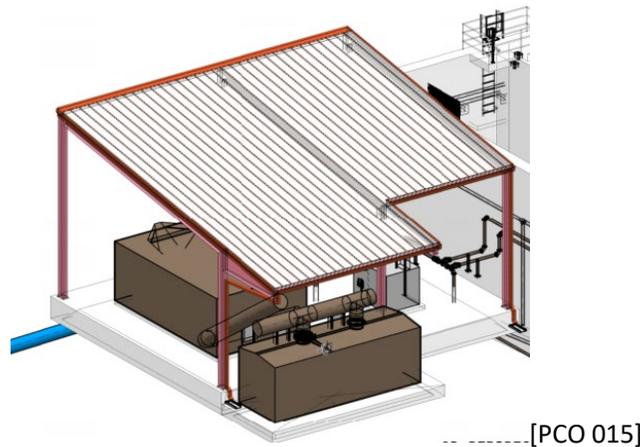
Normal Operation

MBR waste activated sludge is continuously sent to the sludge holding tanks. The blower runs as required to maintain an aerobic environment in the tanks. The mixer can be operated only when the aeration is off, or continuously as required to keep WAS sludge mixed.

2.8 Sludge Dewatering

The Sludge Dewatering System will pump waste sludge from the Sludge Holding Tanks, or directly from the MBR system, and perform dewatering to remove water and increase total solids concentration. Design the pumping, conveyance, and dewatering system to convey solids from dewatering equipment to rolloff container with minimal exposure for odor release. The distance and lift between the Sludge Holding Tanks, dewatering equipment, and rolloff container shall be minimized. Design shall achieve distribution of dewatered sludge from conveyor into dumpster. The canopy shall be sized to accommodate working space around the equipment for future wind barriers to be added between columns. [PCO 028] A polymer storage and feed system shall be furnished to achieve required solids concentration (described in Section 2.11).

A belt filter press sludge dewatering system shall be furnished to dewater aerated WAS sludge down to a water content suitable for hauling and disposal. Belt filter press supplier shall utilize OEM packaged equipment as detailed in the table below and on the P&IDs.



Key Overall Facility Features

- 1 Belt Filter Press to be operated 2 days per week, 8 hours per day.
- 1 Conveyance System to convey dewatered solids to a 40 yard roll-off container (container provided by hauling company).
- Curbed washdown around the polymer injection location at the belt filter press [PCO 046]
- 1 dual-port dumpster conveyor system to selectively distribute dewatered solids in the dumpster. [PCO 015]
- Dumpster is uncovered but under a canopy. [PCO 015]
- 2 rotary lobe pumps to feed the belt filter press either from the sludge holding tank or directly from the WAS pipe.
- Polymer storage and feed equipment provided directly adjacent to belt filter press.

Equipment – Belt Filter Press

- 1 unit
- Minimum guaranteed dry solids concentration: 17%
- Minimum capture efficiency 95%
- Solids flow: 1,313 lbs/hour.
- Liquid flow: 305 gal/min.
- Polymer system provided in Chemical Storage and Feed Form.
- Manufacturer: Komline-Sanderson, BDP, Charter Machine Company, Ashbrook, or equal if approved.

Equipment – Rotary Lobe Feed Pumps

- 2 (1 duty, 1 standby).
- Capacity: 305 gal/min ea.
- Ability to operate in local manual mode and drain the SAFE Settle Tank [PCO 068]
- Manufacturer: Borger, Netzsch, or equal if approved.

Equipment - Conveyor

- 1 angled conveyor to lift solids from belt filter press up to dumpster distribution conveyor.
- 1 horizontal conveyor with 2 electric knife gate valves above dumpster to distribute dewatered solids evenly.
- Manufacturer: JDV, Custom Conveyor Corporation, or equal if approved.

Control Features

- Local control panel by dewatering equipment manufacturer with Plant PLC start/stop and monitoring.
- Dewatering equipment local control panel will communicate for coordinated operation with polymer feed system and sludge feed pumps.
- Knife gate valve on dumpster conveyor are motorized with operators manually selecting which to open in order to distribute dewatered solids.

Operations Purpose

The dewatering system dewateres sludge to reduce the moisture content so that it can be handled as a dry cake instead of a liquid. Cake is dropped onto a conveyor which transports the cake to a dumpster for temporary storage. Water removed from the sludge is called filtrate and drains to the sewer. The dewatered sludge product weighs less which reduces transport and ultimate disposal costs to reuse sites.

Operations Description

Belt Press Feed Pumps

Two dewatering sludge pumps each equipped with variable frequency drive (VFD) drives transfer stabilized sludge from the sludge holding tanks to the belt press. Pressure is displayed locally on the pump suction and discharge. In the event of low suction pressure or high discharge pressure the dewater pump shuts down. Prior to pump start up the seal water low pressure switch must not be energized. The pumps discharge to common discharge line where the flowrate is measured, displayed locally and transmitted to the PLC. Polymer is added to the sludge feed as a coagulant to enhance coagulation. Dosage is based on the sludge feed rate and is set through SCADA.

Once pumps and VFDs are energized the pumps are controlled using the local control panel (LCP). With the control selector switch in the Hand position the pumps run continuously with the speed set manually at the VFD. In the Off position the pumps do not run. In the Remote position power is transferred to the PLC and the SCADA interface used to set controls. In Remote Auto the BFP LCP controls pump operation.

Polymer Feed System

Refer to Section 2.11-Chemical Storage and Feed for details on the Polymer Feed System.

Belt Filter Press

Sludge is transferred from the sludge holding tanks to the belt press using rotary lobe pumps. The belt press consists of a drive, gear reducer, a set of two continuously moving permeable belts, hydraulic system, belt wash system, and associated controls. Polymer is used as a coagulating agent to help release water from the sludge. Polymer is added to the feed pump discharge line prior to discharge onto the press.

The dewatering LCP controls dewatering operating using a control selector switch. In the On position the dewatering system starts by starting the cake conveyors and opening the dumpster gates. The plant service water solenoid valve opens to supply the two belt press washwater boxes. The drive motors start which moves the belts through the wash boxes to wet the belt. The plant service water line has a low pressure switch that shuts down the belt press in the event there is insufficient water pressure to clean the belts. The polymer feed system is then called to operate (the polymer metering pump must be in Auto control). The conditioned sludge is discharged onto the upper belt in the gravity drainage section. The sludge is evenly distributed onto the belt through an inlet distribution assembly. The sludge is retained in this section by rubber-edged guide plates. A series of plows promotes sludge dewatering by constantly turning over the sludge to expedite water drainage and ensure even distribution across the entire width of the belt filter. The belt over this section is supported on a fixed plastic grid. Initial dewatering takes place by the water draining through the sludge mass and belt. The drainage is collected in a separate trough, located under the belt. The dewatering system does not run if the control selector switch is in the Off position. An Estop is also located on the Dewatering LCP and will stop the dewatering option if the button is pushed.

The partially-dewatered sludge is transported to the vertical dewatering zone. The tapered V-shaped vertical chamber, which has a variable opening, is formed by the two downward-moving belts. The end walls are formed by two flexible seals, covered by a low friction plastic strip and fixed to the frame of the press. In this vertical zone, each band is supported by rigid perforated plastic grids over which the belts slide. The two belts move from the vertical zone and pass around a large perforated drum fitted with internal scoops which carry the filtrate outwardly. The filtrate passes from the inner surface of the belt/sludge sandwich to discharge ports on one end of the drum.

The sludge is contained between the two belts and travels between a series of shear-producing rollers where additional water is released due to increasing pressures. The water is drained into a collection trough. All of the rollers are of the freely rotating type, except the last one which is the drive roller. After passing over this roller, the belts separate. Spring-loaded scraper blades are provided to separate the cake from the belt at the point of cake discharge. The cake drops onto the inclines conveyor

Cake Conveyance

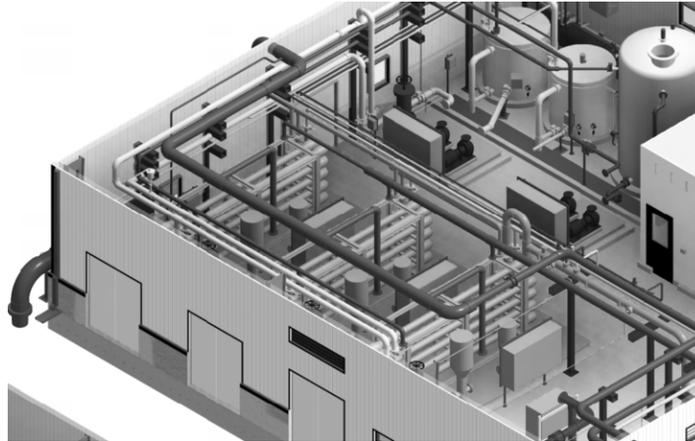
An inclined screw conveyor transports cake to the dual-port dumpster distribution screw conveyor. Motorized gates are located on the bottom of the shaftless conveyor that permits the cake to fall into the dumpster. Each conveyor is controlled from a LCP using a control selector switch. In the Local position the conveyors are controlled using Start and Stop switches; in Off the conveyors do not run; in Remote position control is passed to the PLC and operation set through the SCADA interface. In Remote Auto the conveyors are controlled as part of the dewatering start and stop sequence.

Normal Operation

The belt press runs continuously for the duration of the sludge processing event. The belt press, sludge feed and polymer feed system operate in Remote Auto through the Master Control Panel. The automated startup and shutdown sequences for the components are managed by the MCP. The polymer dosage and belt speed are adjusted by the Plant Operator.

2.9 Reverse Osmosis

The Reverse Osmosis (RO) System will receive filtrate from the MBR System and produce treated water as part of the IPR system. RO concentrate shall be routed directly to the ocean outfall using residual pressure without additional pumping. The RO System shall be housed within a building, together with its CIP and flushing systems and the UVAOP System.



Key Overall Facility Features

- RO Feed Tanks 30,000 gallons
- Three duty, 2 stage RO units sized with a permeate capacity of 215 gpm per unit to produce a total RO permeate volume of 825 AFY.
- Average element flux < 12 gfd; single element flux < 16 gfd
- Recovery: Design = 80%, Minimum 75%, Maximum 85%
- RO System including:
 - o RO high pressure feed pumps, motors, and AFD's dedicated to each unit
 - o RO units
 - o RO sampling lines and sample collection points
 - o Clean in place (CIP) system and flushing system including tanks, pumps, motors,
 - o Neutralization system.
 - o RO Inter-stage booster pumps, motors and AFDs.
 - o Instrumentation and control system
 - o Cartridge filters and cartridge filter elements.
- Calcite remineralization is covered in the RO Product Water Tank Section 2.15.
- Manufacturer / System Supplier: H2O Innovation USA, Inc.

Equipment – RO Units

- 3 duty @ 215 gpm design permeate flow rate per unit.
- Number of Stages per Unit = 2
- Number of RO elements per pressure vessel = 7.
- Number of Stage 1 pressure vessels = 7
- Number of Stage 2 pressure vessels = 3
- Manufacturer: Selected by System Supplier.

Equipment – RO High Pressure Pumps

- 1 duty dedicated per RO unit.

- Vertical multistage.
- VFD drive.
- Operating capacity 202 gpm to 287 gpm
- NPSHa = 30 ft
- Motor Power (to be provided by ROSS)
- Manufacturer: Selected by System Supplier.

Equipment – RO Inter-Stage Booster Pump

- 1 duty dedicated per RO unit.
- Minimum rated head = 50 psi.
- Vertical multistage.
- AFD drive.
- Manufacturer: Selected by System Supplier.

Equipment – RO CIP Tank

- 1 tank, vertical cylindrical, dome top, flat bottom, FRP or PE, minimum usable storage volume 900 gallons
- 1 immersion type heater, sized to heat the temperature of the CIP solution 10 °C in 3 hours.
- Manufacturer: Selected by System Supplier.

Equipment – RO Neutralization Tank

- 1 tank, vertical cylindrical, dome top, flat bottom, FRP or PE, minimum usable storage volume 1,800 gallons.
- Manufacturer: Selected by System Supplier.

Equipment – CIP Recirculation Pumps

- 2 @ 350 gpm, 140 ft TDH (final sizing by System Supplier). 1 duty / 1 standby.
- Horizontal end suction centrifugal pump or vertical multistage.
- Manufacturer: Selected by System Supplier.

Equipment – RO Flush Tank

- 1 tank, vertical cylindrical, dome top, flat bottom, FRP or PE, minimum usable storage volume 2,300 gallons sufficient for sequential flushing of all three trains
- Manufacturer: Selected by System Supplier.

Equipment – RO Flush Pumps

- 2 @ 210 gpm each, 140 ft TDH (final sizing by System Supplier). 1 duty / 1 standby.
- Horizontal end suction centrifugal pump or vertical multistage.
- Manufacturer: Selected by System Supplier.

Equipment – RO Feed Cartridge Filter Vessels

- 3 cartridge filter vessels, 300 gpm design capacity, 316 SS (1 per RO unit).
- Horizontal or vertical vessel orientation per ASME Code with stamp
- Maximum loading rate @ design flow rate = 3.5 gpm per 10 inch equivalent length
- Maximum clean element head loss @ design flow rate < 3 psi
- Maximum dirty element head loss @ design flow rate = 15 psi

- Maximum 10 micron polypropylene
- Manufacturer: Selected by System Supplier.

Equipment – RO CIP Cartridge Filters

- 3 cartridge filter vessels, 300 gpm design capacity, 316 SS (1 per RO unit).
- Horizontal or vertical vessel orientation per ASME Code with stamp
- Maximum loading rate @ design flow rate = 3.5 gpm per 10 inch equivalent length
- Maximum clean element head loss @ design flow rate < 3 psi
- Maximum dirty element head loss @ design flow rate = 15 psi
- Maximum 10 micron polypropylene
- Manufacturer Parker Hannifin Corp., 3M, Pall or equal.
- Manufacturer: Selected by System Supplier.

Equipment – RO elements

- 8 inch by 40", thin film composite, spiral wound
- Manufacturer: Selected by System Supplier. Anticipated to be Toray.

Equipment – RO pressure vessels

- Fiber glass reinforced plastic
- ASME stamped
- Minimum pressure rating = 300 psi for operating temperatures (4.4 to 88 °C)
- Manufacturer: Selected by System Supplier.

Control Features

- The RO system shall be controlled by a PLC that is integrated into a Plant Control System.
- RO High Pressure Feed Pumps
 - o Each high pressure pump (with VFD) shall be controlled to achieve a permeate flow set point of that RO unit (sum of the permeate flow from each stage of the RO unit).
- RO Units
 - o RO units shall automatically be brought into and out of service to maintain a minimum level set point in the RO feed tank.
- Concentrate Control Valves
 - o Each concentrate control valve shall be controlled to achieve a set recovery of that unit.
- Booster Pumps
 - o Each booster pump shall be boost the pressure of the second stage feed to balance the flux between first stage and second stage by controlling the permeate flow of the first stage.
- Pre-Operative Feed Water RO Unit Bypass
 - o Controls shall include a pre-operative bypass executed when the first unit is brought into service with all other units remaining offline. During this procedure cartridge filter effluent shall bypass all the RO units, allowing feed water parameters to stabilize at a set point and chemical flows to stabilize before feed water is admitted to the membranes.
- Off spec water handling as shown on P&IDs. In off spec event, flow shall be stopped and automatically diverted to ocean outfall via overflow at RO feed tanks. Manual diversion of RO permeate shall also be furnished.
- Post-Operative Feed Water RO Unit Flush
 - o Controls shall include an automatic post-operative feed water flush cycle which shall be initiated automatically upon shutdown of the plant, unless the operator selected no feed flush option.

- The purpose of the post-operative feed water flush cycle is to ensure that concentrate is flushed from the membranes to prevent fouling of the membranes, corrosion and scale accumulation.
- Post-Operative Permeate RO Unit Flush
 - o Controls shall include an automatic post-operative permeate flush cycle which shall be initiated automatically upon shutdown of the unit following a post-operative feed water flush cycle as selected by the operator. no feed flush option. The purpose of the post-operative permeate flush is to ensure that concentrate is flushed from the membranes to prevent fouling of the membranes during shutdown for extended periods of time.

Operations Purpose

The RO system is fed from the MBRs. Flow is received at the RO Feed Tank which stores MBR permeate.

RO removes dissolved constituents from the influent water, which achieves permeate salinity control and additional pathogen log removal credits. The RO feed water is pretreated with cartridge filters to protect the RO membranes against damage from large particles. Finally, the water is pressurized and passed through the RO membrane elements before permeate (ROP) is discharged to the UVAOP for disinfection.

Operations Description

The RO system shall be controlled by a PLC that is integrated into a plant control system that operates the RO high pressure feed pumps, concentrate control valves, booster pumps, cartridge filters, Flush system, CIP makeup and neutralization systems.

RO Feed System

The MBR permeate pumps discharge to the two RO feed tanks. The tank level is measured, displayed locally and transmitted to PLC. The tank has switches that are used to activate the High-High and Low-Low Levels.

Pump controls are set locally. With the control selector switch in the Local position the pump are operated using Start and Stop pushbuttons and the speed adjusted using a potentiometer; in the Off position the pumps to not run; in the Remote position control is passed to PLC. Pump pressure is displayed locally. Pump duty selection (lead, lag or set a put to be out of service) is set from the configuration screen. In the event the lead pump fails the lag pump is promoted to the lead pump role; the third pump is used as a standby pump. When a pump is selected as out of service the pump is taken out of the control loop. In Remote Auto the pump(s) start or stop and adjusts speed uniformly to maintain set distribution pressure. If distribution pressure continues to rise with one pump in operation at minimum speed, that pump will cycle off and allow the air-bladder tank to supply those low demands. The pump will automatically restart when distribution pressure dips indicating the air-bladder tank is not keeping up with demands. The pumps discharge to a common manifold where flow, discharge pressure and pH are measured, displayed locally and transmitted to PLC.

Liquid ammonia sulfate [PCO 67], sodium hypochlorite, sulfuric acid and antiscalent are added to the RO feed supply line. [PCO 67] [PCO 032.1] A locally mounted flow meter measures, displays and transmits to PLC. After chemical has been added a sample pump pulls a portion of the flow from the feed line and discharges it to the RO Feed Analytical Panel where conductivity, turbidity, ORP, chlorine, pH and sodium hypochlorite concentrations are measured, displayed and transmitted to the PLC.

RO Membranes

The RO high pressure feed pumps (with AFD) shall be controlled to achieve a permeate flow set point of that RO unit (sum of the permeate flow from each stage of the RO unit). One feed pump is dedicated to Stage 1 of

each RO unit. The RO units shall automatically be brought into and out of service to maintain a minimum level set point in the RO feed tank. Concentrate control valves shall be controlled to achieve a set recovery of that unit. A booster pump is used to increase second stage feed flow to balance the flux between first stage and second stage by controlling the permeate flow of the first stage. Pressure is measured on the RO permeate (ROP) and RO concentrate (ROC). Conductivity is measured on the ROP of each stage, displayed locally and transmitted to PLC. The ROP flow rate is measured locally displayed and transmitted to PLC. Pressure is monitored locally, displayed and transmitted to PLC.

ROP pressure is monitored, displayed locally and transmitted to the PLC. In the event of high pressure, a pressure switch generates an alarm at the PLC and an air vent release valve opens. A flow meter measures, displays and transmits the RO Unit ROP to PLC. ROP outlet piping three locations. During a normal operation ROP is directed to the UV system for disinfection through a flow control valve. Valve controls are set locally. In Local valve position is set using the Open and Close selector switch; in Remote control is passed to the PLC that controls the RO System. Flow not directed to the UV system is a split between the OPS and the RO CIP System. Note that RO train ROP to the outfall is combined in a single line to the OPS.

ROC pressure is monitored, displayed locally and transmitted to the PLC. In the event of high pressure an air vent release valve opens. A flow meter measures, displays and transmits the RO Unit flow to the PLC. During a normal operation ROC flows through the line at a preset flow rate that is set through a flow control valve. Valve controls are set locally. In Local valve position is set using the Open and Close selector switch; in Remote control is passed to the PLC that controls the RO System. Flow not directed to the UV system is split between the OPS and the RO CIP System. Conductivity and pressure are locally measured, displayed and transmitted to the PLC.

RO Sequencing

Pre-Operative Feed Water RO Unit Bypass

A pre-operative bypass shall be executed when the first unit is brought into service with all other units remaining offline. During this procedure, flow shall bypass all the RO units, allowing feed water parameters to stabilize at a set point and chemical flows to stabilize before feed water is admitted to the membranes.

Post-Operative Feed Water RO Unit Flush

An automatic post-operative feed water flush cycle which shall be initiated automatically upon shutdown of the plant, unless the Operator selected no feed flush option. The purpose of the post-operative feed water flush cycle is to ensure that concentrate is flushed from the membranes to prevent fouling of the membranes, corrosion and scale accumulation.

Post-Operative Permeate Water RO Unit Flush

The membrane flush system is used to remove salt and scale buildup at the RO membrane surface that normally occurs during the membrane permeation process upon normal shutdown of the RO train. By flushing the membranes with RO permeate, any concentrated salts are washed from the membranes, minimizing possible scaling during system shutdown time periods. The flushing system is automatically energized during the normal RO system shutdown cycle or can be manually started by the facility operator.

RO Flushing System

A portion of the ROP is directed to the RO Flush Tank for use in flushing the membranes. A valve is located on the flushing feed to admit solution during the flushing cycle.

The tank level is measured, displayed locally and transmitted to PLC. The tank has switches that are used to activate the High-High and Low-Low Levels.

The tanks supply the RO flush pumps which discharge the ROP through the cartridge filter. The filtered ROP is divided between the CIP Makeup Tank and each RO feed line. Pump controls are set locally. In the On position the pump runs continuously; in the Off position the pumps does not run. Pump duty selection (duty, standby, or out of service) and pump start and stop levels are set from the configuration screen. In the event the Duty pump fails the Standby pump runs. When a pump is selected as out of service the pump is taken out of the control loop. The Duty pump starts at a preset low tank level and stops when the high level setpoint is reached. Discharge pressure is shown locally on the pump discharge. Pressure is monitored on the cartridge filter supply and is displayed locally and transmitted to PLC.

RO CIP Makeup Tank

RO CIP solution is formulated in the RO CIP Makeup Tank. Citric acid, ROP and sodium hydroxide are combined. The tank includes a site gauge to determine CIP level, a low level switch and a high level switch. On low level an alarm is generated to notify the Operator. The high level switch signals that an overflow event is imminent. Increase flows to the tank overflows to the RO CIP Containment Area.

The CIP Pumps draw from the CIP Makeup Tank discharge flow through the membrane and return the flow to the CIP Makeup Tank.

RO Neutralization Tank

The Neutralization Tank contains a solution of citric acid and sodium hydroxide that is blended together using a mixer. Mixer controls are located at the MCC and include a control selectors switch (Local-Off-Remote [LOR]), and reset pushbutton. In the Local position the pump runs continuously when the local control switch is in Start and stops when the switch is in Stop. Placing the local control switch in LO locks out the mixer. The neutralization solution returns to the Neutralization Tank through the RO Cleaning line. The tank includes a site gauge to determine, a low level switch and a high level switch. On low level an alarm is generated to notify the Operator. The high level switch signals that an overflow event is imminent. Increase flows to the tank overflows to the RO CIP Containment Area. A pH analyzer and level sensor are located on the overflow line. Both are displayed locally and transmitted to PLC.

Chemical Feed Systems

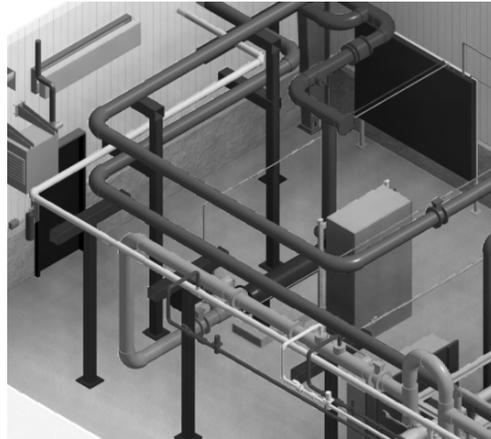
Refer to Section 2.11-Chemical Storage and Feed for details.

Normal Operation

Normally the system operates in Remote Auto.

2.10 Ultraviolet Advanced Oxidation Process (UVAOP)

The Ultraviolet Advanced Oxidation Process (UVAOP) System shall receive water from the Reverse Osmosis (RO) system and treat it to create IPR water. 4 month modeled and 2 month actual wellfield travel time shall be assumed for system sizing. The UVAOP system shall be provided by a single system supplier and shall be installed in the same building as the RO System.



Key Overall Facility Features

- Located indoors in the RO building
- Power & Control Panel included with equipment
- UV lamps: Low-pressure high output (LPHO)
- Shall be designed based on 96% UVT.
- Oxidant: Chlorine (delivered as 12.5% sodium hypochlorite solution)
- UV AOP System including:
 - UV Reactors / lamps
 - Cleaning system (portable cart or automatic mechanical/chemical wiping system)
 - Power / Control Panels
 - Master Control Panel
 - Meters and Instrumentation
 - Safety Equipment
 - Special tools /spare parts
 - UV sampling lines and sample collection points
 - Oxidant storage and injection system.
- Treatment Requirements:
 - 1,4 Dioxane target log reduction 0.5 (DDW requirements for IPR)
- UV System Manufacturer/Supplier: Xylem (Wedeco), Trojan, Calgon Carbon, or equal if approved

Equipment – UV Reactors

- Required UV Dose (TBD by UV system suppliers)
- 1 @ 0.31 – 0.93 MGD each, 1 duty. [PCO 042]
- 316L stainless steel

Equipment – Power & Control Panel

- Located adjacent to UV reactor in the UV reactor room [PCO 042]
- NEMA Rating 4

- Power Supply 480 V, 60 hz, 3-phase.

Equipment – Cleaning Equipment

- Due to the low pH and mineral content of the RO permeate cleaning of UV lamp sleeves is not required for AWT applications such as Morro Bay WRF. Provisions will be included to allow the UV lamps to be cleaned manually as needed for proper operation.

Equipment – Oxidant and Storage Injection

- Required chlorine dose (2-4 mg/L)
- See Section 2-11 – Chemical Storage and Feed Facilities – Sodium Hypochlorite. [clarification]

Control Features

- The UV AOP system will be controlled by a vendor furnished Master Control Panel that is integrated into a Plant Control System.
- UV power
 - o The UV power will be adjusted automatically via the reactor control panel based on changes in influent flow, temperature, pH, UVT, oxidant residual, and lamp age to achieve the desired target treatment requirements.
- Offspec water shall be handled by stopping process flow and/or diverting flow to the Outfall Balancing Tank. MBR Filtrate will accumulate in the Feed Tanks and overflow by design to the outfall. Manual diversion on the permeate side of each RO train shall be furnished.
- A UVT analyzer shall be added downstream of the UV reactor to monitor UVT per DDW request. Analyzer will not be used for control. [PCO 134]

Operations Purpose

The UVAOP receives permeate water from the RO system. The UVAOP provides two mechanisms for treating organic contaminants – direct photolysis and oxidation with sodium hypochlorite. Hypochlorite is fed ahead of the UV units. Using the combined technology RO permeate is disinfected prior to indirect potable reuse.

Operations Description

The UV system receives permeate from the RO units and discharges disinfected water to the Product Water Storage Tank. The UV system is an enclosed system that functions to provide specific wavelengths of electromagnetic radiation to inactivate microorganisms by damaging their DNA and rendering them unable to replicate.

The single UV unit has a reactor vessel that contains its own individual enclosure to control the vessel which is connected to the Master Control Panel. [PCO 042] The control panel sends and receives signals to and from the Plant Control System for remotely monitoring and operating the system. The system will be operated in a Local Manual/Auto mode through the UV Control Panel or, in a Remote Manual/Auto mode through SCADA. The UV power will be adjusted automatically based on changes in influent flow, temperature, pH, UVT, oxidant dose, and lamp age to achieve the desired target treatment requirements.

Sodium hypochlorite operation is described in Section 2.11-Chemical Storage and Feed.

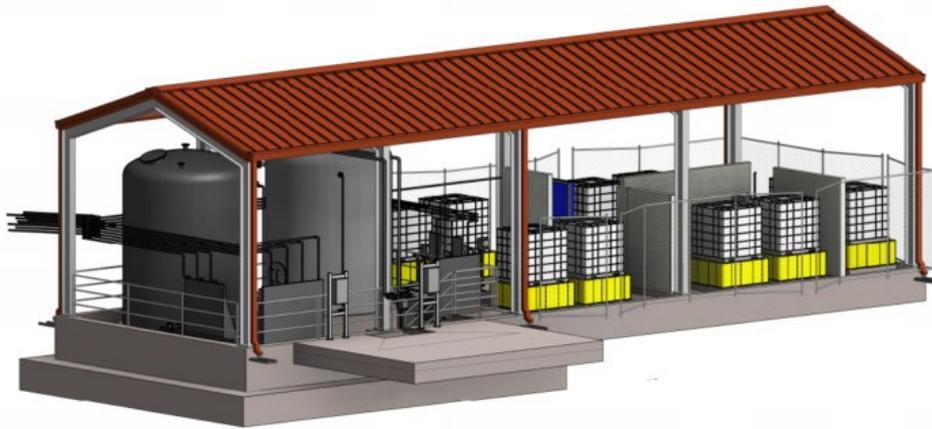
Normal Operation

The UVAOP system operates in Remote Auto. The UV power will be adjusted automatically via the PLC based on changes in influent flow, temperature, pH, UVT, oxidant dose, and lamp age to achieve the desired target treatment requirements.

2.11 Chemical Storage and Feed Facilities

The following section includes the performance criteria associated with chemical storage and feed facilities of the WRF. Chemicals shall be stored on site and dosed into the main process flows at the desired points. The facilities shall be designed with safety in mind to avoid potential harm or spill to the environment.

[PCO 009]



Key Overall Facility Features

- Central Chemical Storage and Feed Facility shall house sodium hypochlorite, sodium hydroxide, citric acid, antiscalant, liquid ammonium sulfate, sulfuric acid and sodium bisulfite either in tanks or totes. [PCO 009] [PCO 032.1] [PCO 067]
- The solids dewatering facility shall contain a polymer feeder / blender skid for dosing upstream of the sludge press equipment.
- Dosing pump skids shall feature peristaltic pumps for metering and transferring chemicals.
- All facilities shall have secondary containment of bulk stored chemicals or secondary tubs for tote stored chemicals to ensure any chemical spills are kept from the environment. Pumps shall be provided to discharge tested/neutralized fluid to plant drain system.
- At least one pump shall be furnished for each injection point.
- Two pumps shall be provided for the sodium bisulfite feed. [PCO-76]
- A shelf-spare of each pump type shall be furnished.
- Chemical piping between locations shall be buried using materials compatible with the specific chemical system. Double contained pipe shall primarily utilize a CPVC containment pipe with flexible polyethylene or Teflon tubing, as required for chemical compatibility. [PCO 010]
- Double-contained chemical lines. Leakage detection via liquid sensors at containment sumps with containment piping routed to direct leakage to sumps, or leakage collection point(s) with liquid sensors if required by layout constraints. Liquid sensors shall be connected to the plant control system to generate an alarm.
- Safety shower and eyewash per OSHA requirements.

Equipment – Storage Tanks

- Sodium hypochlorite (12.5%) and sodium hydroxide (25%) shall be stored onsite in FRP storage tanks.
- The tanks shall be approximately 10ft diameter by 10ft usable depth, or sufficient to contain a bulk truck delivery.
- These storage tanks shall be located within a coated concrete secondary containment area to ensure any chemical spills are kept from the environment.

Equipment – Storage IBCs

- All other chemicals shall be stored within 330 gallon Intermediate Bulk Containers, or IBCs.
- This size of tote shall be sufficient for more than 15 days of average plant use.
- The totes shall sit upon secondary containment tubs so that any spills will be contained and protected from the environment.
- Tote heater and electrical outlet receptacle shall be provided at the sodium bisulfite area. [PCO 76]

Equipment – Pumping Skids

- Chemical pumps shall be skidded and prewired, to reduce complicated small bore piping and termination of wiring done in the field.
- Pumps shall be designed to have flow rate safety factor of 1.25 over maximum required feed rate.
- The pumps shall be peristaltic type, check valve free, with compression rollers, retractable tubing, and on board controllers.
- Furnish with discharge pulsation dampeners, flush connections, pressure indicator/switch, and calibration column.
- Furnish with disconnects for piping, electrical and control.
- Provide 2 spare tubes for each continuously operating pump, furnished in durable case.
- Pumping skids shall have integral drip pan.
- Manufacturer: Prominent, Lutz-JESCO, Watson Marlow, Milton Roy, Blue-White, or equal if approved.

Equipment – Polymer Feeder / Blender Skid

- The chemical pump shall be skidded and prewired, to reduce complicated small bore piping and termination of wiring done in the field.
- The blender shall feature a mixing chamber to properly blend the emulsion polymer to aid in dewatering the sludge.
- The pump shall be peristaltic type, with on board controllers.

Truck Unloading Station

- The chemical facility shall be located adjacent to the road to allow chemical delivery trucks access for unloading.
- The location where trucks shall park to offload chemicals shall be depressed such that any large spills shall be contained. The depressed area shall drain into the secondary storage area so that it can be properly neutralized and disposed of without the risk of damage to the environment.

Control Features

- The truck unloading area shall have audible alarms that alert the driver in the event of overfilling.
- Chemical tanks shall be furnished with level transmitters as shown on P&IDs.

- All pumps shall have the ability to be remotely controlled via the plant PLC, or locally for operator testing or manual feeding.

Operations Purpose

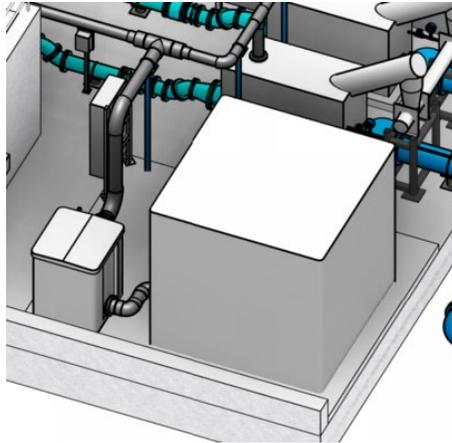
The chemical feed systems are operated to treatment chemicals at the required dose to various places in the process. Each chemical injection point has at least one pump dedicated to it for direct control of chemical dosage.

Operations Description

All chemical systems will normally be operated in Remote-Auto. The systems will be designed to operate in dose control. Operators will periodically perform draw-down calibrations to input the correlation between pump speed and volume pumped into the Plant PLC system. For each injection point, operators will set a required chemical dose. The Plant PLC systems will vary the pump speed as required to deliver the required dose. The calibrated chemical metering pump is used to monitor the delivered chemical flow rate.

2.12 Odor Control

Odor control shall be provided for the headworks, fine screens and SAFE Diversion Box. [PCO 004] Odorous air shall be contained and treated onsite.



Key Overall Facility Features

- 1 packaged biofilter system with centrifugal fan for headworks odor control (See Proposal Form 1 and 2 for headworks equipment).
- Biofilter system vessel includes humidification chamber (Stage 1) followed by engineered media biofilter for odorant removal (Stage 2)
- Recirculation pump for Stage 1
- Irrigation system to distribute reclaimed water to Stage 2
- Nutrient tank and feed pump
- Standard instrumentation, control panel, and water panel

Equipment – Biofilter System

- 1 FRP tower with corrosion resistant components.
- Media: Stage 1 = Synthetic, structured; Stage 2 = Engineered, inorganic.
- Empty Bed Residence Time: Stage 1 = 2 seconds; Stage 2 = 30 seconds.
- 99% H₂S removal efficiency or 0.1 ppm discharge.
- Manufacturer: Integrity Municipal Systems, ECS, BioAir, or equal if approved.

Equipment - Fan

- 1 centrifugal fan with sound attenuating enclosure.
- 830 cfm airflow for headworks odor control. [PCO 004]
- Manufacturer: Furnished by packaged biofilter manufacturer.

Equipment – Nutrient Storage and Feed System

- 1 nutrient tank and feed system.
- Tank material and capacity: linear or cross-linked polyethylene resin, <100 gal. Furnished by biofilter manufacturer.
- Manufacturer: Furnished by packaged biofilter manufacturer.

Control Features

- Local control and water panel by packaged biofilter manufacturer with Plant PLC start/stop and monitoring.
- Operators manually select which unit(s) operate and leave them running continuously.
- Local control panel initiates operation of fan, irrigation system, and nutrient feed system.

Operations Purpose

The Odor Control shall draw foul air from the Headworks and discharged the air to the biological Odor Scrubber.

Operations Description

The odor control system uses microorganisms to metabolize odorous. An odor control fan draws odorous air from the head works through a fan pre-filter to capture particulates and discharges it to the once through scrubber. Treated air vents from the top of the scrubber to atmosphere.

A differential pressure switch monitors the pressure drop across the prefilter. If the pressure drop is excessive the filter should be inspected for water accumulation or a dirty filter. Fan controls are set at the Local Control Station (LCS). Placing the control selector switch in Local pump operation is set using the Start or Stop switch; in Off the fan does not run; in Remote control is passed to the PLC and controlled through the SCADA screen. Fan status and control mode are passed from the LCP to the Odor Control Panel.

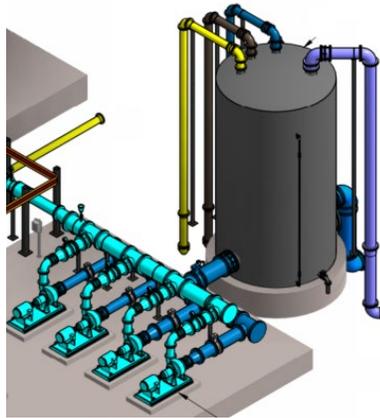
The filter media is highly porous with a special coating of nutrients and buffering agents to provide an optimal surface for biofilm growth without media degradation. The hydrogen sulfide reducing bacteria grow due to the nutrients and use the hydrogen sulfide as a food source. As long as nutrients are present, hydrogen sulfide is present in the incoming air flow, and enough water is being recirculated to help with sloughing of the bioslime, hydrogen sulfide reduction takes place. A differential pressure switch monitors the pressure drop across the media. If the pressure drop is excessive the filter should be inspected for excessive bioslime growth.

Normal Operation

The odor control system runs continuously in Remote Auto.

2.13 Outfall Pump Station (Effluent Pump Station)

The Effluent Pump Station shall convey treated flows, treated effluent that exceeds well-field injection capacity, or water that does not meet specification for groundwater injection to the ocean outfall. RO Reject shall also go to the outfall, but residual pressure will be used to drive it to the outfall without additional pumping or passing through the Outfall Balancing Tank. [clarification] A disinfection pipeline contactor shall be located downstream of the Outfall Pump Station to disinfect outfall flows with sodium hypochlorite. Sodium bisulfite shall be injected at the end of the contactor on site to reduce chlorine residual to necessary value for ocean discharge.



Key Overall Facility Features

- Outfall Balancing Tank to receive flows from MBR system, SAFE System, or RO train effluent bypass. Balancing Tank allows three identical size pumps to be used over a wide flow range.
- Ocean Outfall pumps to deliver water to the Outfall Disinfection Contactor Pipeline and on to the Ocean Outfall.
- Outfall Disinfection Contactor Pipeline located on-site to provide required disinfection volume without requiring a tank to maintain. Dechlorination feed facility and point of compliance are located onsite for ease of operation.
- Pump type and materials selected for good efficiency and operating life.
- Flow meter for delivered flow monitoring.
- Pump station design and pump head are dependent on outfall pipeline size and design by others. It is assumed outfall pipeline design will be such that discharge HGL at the pump station will be 168 feet, or lower, above sea level at 5,006 gpm and 187 feet, or lower, above sea level at 5,652 gpm.
- System shall include vacuum relief valve and VFD slow start to mitigate surge. It shall be assumed pipeline design shall be coordinated and equipped by others such that no additional facilities are needed at this pump station for surge mitigation.

Equipment – Outfall Pumps

- 3 duty / 1 standby rated to deliver peak hour WRF influent flow rate.
 - 2 @ 2.1 mgd @ 61 ft TDH each.
 - 2 @ 4.1 mgd @ 61 ft TDH each. [PCO 016.1]

[PCO 016.1]

[PCO 016.1]

- All four pumps shall be on VFD to allow direct control of pumping rate to maintain Outfall Balancing Tank level and required outfall flow. VFDs shall be furnished on all four pumps to simplify operation

instead of having to juggle operation of constant-speed pumps with variable-speed pumps. [PCO 016.1]

- End-suction centrifugal pumps with epoxy lined casing, stainless steel impellers, and mechanical seals for corrosion resistance and long service-life.
- Manufacturer: Fairbanks Morse/Pentair, Grundfos, Xylem, or equal if approved.

Control Features

- Operated directly by plant PLC system.
- Operators select lead, lag, and lag-lag pumps, or set a pump to be out of service.
- PLC starts or stops pumps and adjusts speed uniformly to maintain low level in Outfall Balancing Tank. In lower flow scenarios, the system will cycle a pump on and off at minimum speed and use the Balancing Tank to equalize the flow as needed to have less than 6 starts on each pump per hour.
- Pumps can be manually operated in the PLC to start/stop and set operating speed if needed.

Operations Purpose

The Outfall Balancing Tank will receive flows from MBR system, SAFE system, or RO train effluent bypass. The ocean outfall pumps deliver water to the Outfall Disinfection Contactor Pipeline for where sodium hypochlorite is added for disinfection. Disinfection requirements are met without including the tank volume. The flow is dechlorinated with sodium bisulfite prior to ocean outfall.

Operations Description

Outfall Balancing Tank

The Outfall Balancing Tank acts as a reservoir for flows from MBR system, SAFE system, or RO train effluent bypass. The tank level is measured continuously, displayed locally and transmitted to SCADA. In the event inflow to the tank is greater than outflow an overflow line directs flow to the ground.

Outfall Pumps

Four VFD driven centrifugal pumps operate periodically to transfer the contents of the Outfall Balancing Tank to the ocean outfall. With the pumps energized control is set locally using the control selector switch (Hand-Off-Remote). In the Hand position the pump runs continuously; in Off the pump does not run; in Remote control is transferred to SCADA. In Remote Auto the pump duty roles are selected lead, lag, and lag-lag pumps, or out of service) are set at SCADA. Selecting Out of Service removes the pump from the control scheme which inhibits associated alarms. At a preset high tank level the pumps start and run continuously. Pump speed is adjusted to maintain a preset flow rate from the outfall pumps. Pump operation stops at a preset low level. In lower flow scenarios, the system will cycle a pump on and off at minimum speed and use the Balancing Tank to equalize the flow as needed to have less than 6 starts on each pump per hour. A flow meter is located on the pump discharge manifold and is used to control the outfall pump speed as well as the sodium hypochlorite feed pumps. [PCO 016.1] **A total chlorine analyzer will be added to the dichlorination station prior to sodium bisulfite injection point to monitor chlorine residual downstream of the chlorine contactor. [PCO 125]**

Chemical Feed Systems

Refer to Section 2.11-Chemical Storage and Feed for details on the sodium hypochlorite and sodium bisulfite chemical systems.

Normal Operation

The Outfall Balancing Tank is in continuous operations. The pumps normally operate in Remote Auto as required to meet an adjustable outfall pump flow rate.

Alternative Operation

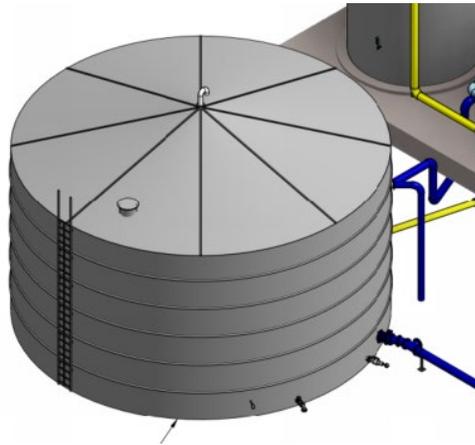
- The pumps normally operate in Remote Manual through SCADA.
- The pumps may be run locally from the VFDs.

2.14 IPR Product Water Pump Station

The IPR Product Water Pump Station shall convey recycled water to injection wells located in the Morro Valley. Sodium hypochlorite addition for use in IPR treatment credits and pipeline maintenance shall be included.

A large tank shall be provided to store finished IPR (Product) water on-site. IPR Pumps shall be furnished to pump this water to the Morro Wellfield. The IPR (Product) Water Tank shall also be used as flushing water for the Calcite Remineralization System (see below) to clean new deliveries of media. [PCO 001]

A calcite remineralization system shall be provided to buffer IPR water upstream of the Product Water Storage Tank to reduce corrosion potential of the water. The IPR effluent shall pass through a vessel containing calcite which shall dissolve into the water to add hardness, alkalinity and increase the pH in order to reduce corrosion potential for downstream tanks, equipment, and piping.



Key Overall Facility Features – Product Water Storage Tank

- 200,000 gallon tank for on-site storage of IPR Product Water. [PCO 019.1]
- IPR Pumps to pump IPR Product Water for indirect potable reuse via groundwater injection at the Morro Wellfield.
- Pump type and materials selected for good efficiency and operating life.
- Pump station design and pump head are dependent on outfall pipeline size and design by others. It is assumed outfall pipeline design will be such that discharge HGL at the pump station will be 166 feet, or lower, above sea level at 646 gpm.
- System shall include vacuum relief valve and VFD slow start to mitigate surge. It shall be assumed pipeline design shall be such that no additional facilities are needed at this pump station for surge mitigation.
- Flow meter for delivered flow monitoring and control.
- Sodium Hypochlorite (chlorine) Injection to maintain residual for transmission and obtain virus reduction credits.

Equipment – Product Water Storage Tank

- 200,000 gallon glass-lined bolted steel tank. [PCO 019.1]
- Vent with bug-screen.
- Low and high level switches.
- Access manway furnished.
- Manufacturer/Fabricator: California Aquastore-CST, Engineering America, or equal if approved

Equipment – IPR Product Water Pumps

- 3 @ 323 gpm @ 63 ft TDH (166 feet HGL) each. 2 duty / 1 standby. Rated to deliver up to full RO production capacity of 0.93 mgd. All three pumps shall be the same size for ease of operation and equipment maintenance.
- All three pumps shall be the same size for ease of operation and equipment maintenance.
- All three pumps shall be on VFD to allow direct control of pumping flow or pressure.
- VFDs shall be furnished on all three pumps to simplify operation instead of having to juggle operation of constant-speed pumps with variable-speed pumps.
- End-suction centrifugal pumps with epoxy lined casing, stainless steel impellers, and mechanical seals.
- Manufacturer: Fairbanks Morse/Pentair, Grundfos, Xylem, or equal if approved

Control Features – IPR Pumps

- Operated directly by plant PLC system.
- Operators select lead, lag, and lag-lag pumps, or set a pump to be out of service.
- PLC starts or stops pumps and adjusts speed uniformly to maintain either operator input flow setpoint or pressure setpoint.
- Pumps can be manually operated in the PLC to start/stop and set operating speed if needed.

Operations Purpose

The IPR Product Water Storage system provides operational storage and pumping of the disinfected product water. The storage tank supplies the recycled water pumps, on-site reclaimed water pumped. In the event the tank level reaches the overflow pipe product water overflows onto the ground. [clarification] Chemicals are added before flow enters the tank to stabilize the water. Sodium hydroxide is added to lower the pH to reduce the corrosive nature as water is conveyed distribution areas. Sodium hypochlorite is added to maintain chlorine residual in the distribution system.

Operations Description

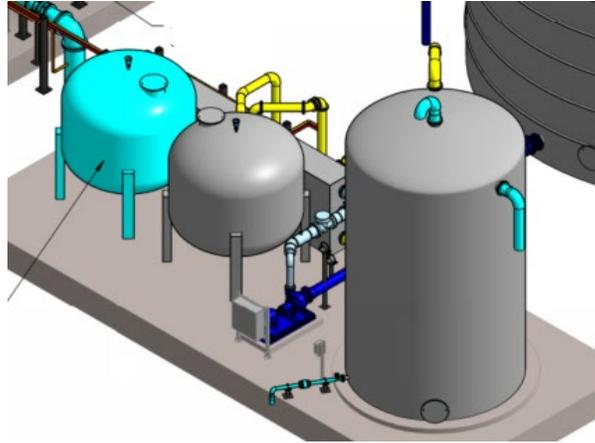
The Product Water Storage Tank level is measured, displayed locally and transmitted to SCADA. The tank has switches that are used to activate the High-High and Low-Low Levels. Tank discharge water is monitored for chlorine residual, conductivity and pH. Values are transmitted to SCADA.

The tanks supply the product water pumps which transfer product water to the groundwater discharge. Pump controls are set locally. In the Hand position the pumps are operated locally using Start and Stop pushbuttons and the speed adjusted using a potentiometer; in the Off position the pumps do not run; in the Remote position control is passed to SCADA. Pump pressure is displayed locally. Pump duty selection (lead, lag, and lag-lag pumps, or set a pump to be out of service) is set from the configuration screen. In the event the lead pump fails the lag pump is promoted to the lead pump role; should the lag pump fail the lag-lag pump is promoted to the lag pump role. When a pump is selected as out of service the pump is taken out of the control loop. The pump starts, stops and adjusts speed to maintain the input flow setpoint or pressure setpoint. A pressure switch located on the pump discharge generates an alarm to SCADA and shuts down a pump.

The product water pump discharges to a common manifold. Flow, discharge pressure and pH are measured, displayed locally and transmitted to SCADA.

Normal Operation

Normally the system operates in Remote Auto with all pumps in service and each pump selected for a duty role (lead, lag and lag-lag).



Key Overall Facility Features – Calcite Contactor System

- Upflow pressure vessels containing calcite to stabilize the RO effluent.
- Flush pump to remove fines when media is periodically loaded.
- Flush Tank to receive the calcite vessel flush flow before disposal to not overwhelm the drain system.
- Manual isolation valves for operation.

Equipment – Calcite Contactor Vessels

- Two vessels provided, sized to allow for the entire flow to pass through a single vessel so that the other can be taken offline for service or media loading.
- Painted carbon steel construction with epoxy interior coating.
- Manufacturer: Wigen Water Technologies, Tonka Water, or equal if approved.

Equipment – Calcite Contactor System Flush Pump

- One flush pump provided due to infrequency of washing.
- End suction centrifugal pump to be supplied as part of Calcite Contactor System Package.
- Manufacturer: To be determined by Calcite Contactor System Manufacturer.

Control Features – Calcite Contactor System

- Manual device, with alarms provided to indicate high differential pressure.
- Backwash sequence is manually initiated and executed.

Operations Purpose

The remineralization system adds minerals that were taken out during the RO process back into the UV effluent to stabilize the water.

Operations Description

Calcite Vessels

UV effluent shall pass through a vessel containing calcite which will dissolve into the water and add hardness, alkalinity and increase the pH to protect downstream equipment from corrosion. The system is designed to permit full plant flow through the online (duty) vessel. A second vessel is used in a standby role when the duty vessel requires while cleaning. UV effluent flowing through the online vessel dissolves some of the media to a neutral pH (about 7.0) and delivers stabilized water to the Product Water Tank (PWT). Manually operated valves are used to position one tank for duty and one for standby. Pressure is monitored locally on the vessel inlet and out. The differential pressure is measured across the media bed in each vessel. At a preset high differential pressure a switch is energized which generates an alarm to SCADA. The Operator then switches vessels to maintain UV effluent remineralization. The offline vessel is configured to discharge to the BHT and the Flush Pump is energized.

It takes around 20 minutes at 15 gpm/ft² to clear fines out of new calcite. The BHT has a small pipe that contains a motor operated valve that bleeds the contents out over 24 hours to the plant sewer and thus to the head of the plant. Regulating the rate in this manner insures that the plant is not upset.

Flush Pump

The Flush Pump is controlled locally from the local control panel (LCP). With the control selector switch in the Local position the pump is controlled using the Start/Stop handswitch. In the Start position the pump runs continuously; in the Off position the pump does not run. In the Stop position the pump does not run. With the control selector switch in the Off position the pump does not run; in the Remote position pump control is transferred to the PLC and operation set through SCADA. Pump speed can be adjusted locally or through SCADA. Pump discharge pressure is displayed locally. The pump will shut down on high temperature or motor overload. Pump status, operating mode and alarms are transmitted to SCADA thru the PLC.

Backwash Holding Tank (BHT)

BHT level is measured and displayed locally and the level transmitted to SCADA. In the event of a high tank level an overflow directs the water to the ground. A motorized tank drain is used to drain the tank contents to the sewer or storm drain. Controls are mounted on the valve actuator. With the control selector switch in the Local the valve is set using the position handswitch. In the Open position the valves opens; in the Off position the valve does not move; in the Closed position the valve shuts. Valve status, operating mode and alarms are transmitted to SCADA thru the PLC. In the Remote position control is transferred to SCADA where the valve can be opened or closed. A flow meter is located on the drain line and measures, displays locally and transmits the flowrate to SCADA.

Normal Operation

One vessel is normally on line and the Flush Pump is Off. Vessel discharge is directed to the PWT.

Abnormal Operation.

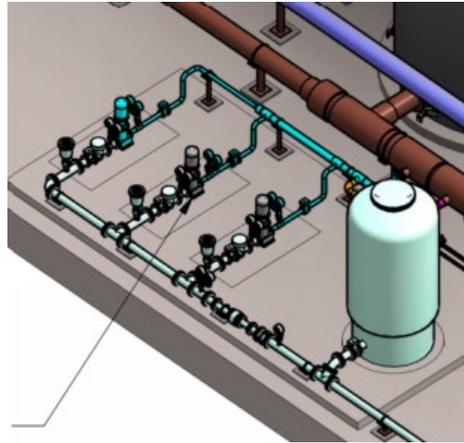
On high differential pressure the offline vessel shall be placed online and the originally online vessel shall be have the inlet and PWT outlet line shut. The BHT outlet line shall be opened and the Flush Pump run for a period of 20 minutes

2.15 Product Water Storage Tank

The Product Water Storage Tank shall provide operational storage for the recycled water. Tank information is provided in Section 2.14.

2.16 On-site Reclaimed Water System

The On-site Reclaimed Water System shall be designed and constructed to provide water for washdown, foam and scum control, screening/grit washing, landscape irrigation and other suitable applications. The on-Site Reclaimed Water System shall be designed to operate between 60 and 80 psi.



[PCO 001]

Key Overall Facility Features

- Pumps to deliver IPR water from the RO Feed Tanks [PCO 001] into a plant-wide recycled water distribution system.
- 500 gallon air-bladder tank to supply low demands below minimum pump flow rates.
- Pump type and materials shall be selected for good efficiency and operating life.
- Hydraulic calculations demonstrating system sizing shall be furnished during design.
- On-site reclaimed water shall be used for appropriate plant water uses such as scum spray and washdown where appropriate. Washdown bibs shall be provided with hoses, racks and appropriate signage.
- Flow meter for delivered flow monitoring.
- NaOCl feed, including new feed pump in chemical area [PCO 001]

Equipment – Onsite Recycled Water Pumps

- 3 pumps rated for 75 gpm @ 175 ft TDH each. lead/lag for normal plant demands. 2 duty for higher demand periods such as large washdown demands or irrigation with normal plant demands. [design development]
- Pumps are the same size for ease of operation and equipment maintenance. [design development]
- Pumps on VFD to allow direct control of distribution pressure. VFDs shall be furnished on both pumps to simplify operation instead of having to juggle operation of one constant-speed pump and one variable-speed pump. [design development]
- Manufacturer: Fairbanks Morse/Pentair, Grundfos, Xylem or equal

Equipment – Air Bladder Tank

- One 500 gallon air-bladder tank to supply low demands between pump operation cycles.
- Manual charging of the air-bladder is done semi-annually with a portable compressor.
- Steel vessel with EPDM or similar bladder. All wetted steel components are epoxy lined.
- Manufacturer: Amtrol WellXTroll, or similar.

Control Features

- Shall be operated directly by plant PLC system.
- Operators shall select lead and lag pumps, or set a pump to be out of service.
- PLC shall start or stop pumps and adjusts speed uniformly to maintain set distribution pressure. If distribution pressure continues to rise with one pump in operation at minimum speed, that pump shall cycle off and allow the air-bladder tank to supply those low demands. The pump shall automatically restart when distribution pressure dips indicating the air-bladder tank is not keeping up with demands.

Operations Purpose

The Onsite Recycled Water Pump Station supplies water from the Product Water Tank to various non-potable water demands on the site such as irrigation, process sprays, and washdown.

Operations Description

Pump controls are set locally. With the control selector switch in the Local position the pump are operated using Start and Stop pushbuttons and the speed adjusted using a potentiometer; in the Off position the pumps to not run; in the Remote position control is passed to SCADA. Pump pressure is displayed locally. Pump duty selection (lead, lag or set a put to be out of service) is set from the configuration screen. In the event the lead pump fails the lag pump is promoted to the lead pump role; the third pump is used as a standby pump. When a pump is selected as out of service the pump is taken out of the control loop. In Remote Auto the pump(s) start or stop and adjusts speed uniformly to maintain set distribution pressure. If distribution pressure continues to rise with one pump in operation at minimum speed, that pump will cycle off and allow the air-bladder tank to supply those low demands. The pump will automatically restart when distribution pressure dips indicating the air-bladder tank is not keeping up with demands. The pumps discharge to a common manifold where flow, discharge pressure and pH are measured, displayed locally and transmitted to SCADA.

Normal Operation

Normally the system operates in Remote Auto with two pumps selected for service and pump duty roles selected (lead | lag). The air bladder tank equalizes differences between the pump output and the system demand without operator intervention.

2.17 Vactor Washdown Area

The Vactor Washdown Area shall be designed and constructed to provide a location for dumping sewage from the City's vactor trucks. The Vactor Washdown Area shall be paved with curbs, and include two areas, each sized to allow washdown of a full vactor truck, with sloping concrete floors draining to a sump. The sump shall transport materials to the headworks. Hoses and hose racks shall be furnished for washdown. At owners request the Vactor Washdown Area will also have a K-rail barrier in front of the grating, a isolation gate on the drain, and a weir in the first Manhole downstream of the Area. [PCO 107]

SECTION 3 ARCHITECTURAL AND LANDSCAPING CRITERIA**3.1 General**

Provide a facility that is durable, low maintenance, and aesthetically compatible with the community. Provide buildings that meet the space needs as described herein. Architectural finishes are specified to provide an example of the quality and durability that the City desires.

Architectural and Landscaping Features/Scope are summarized in the table below and detailed further within Section 3. The summary table shall govern in event of a disagreement with content in Section 3.



[PCO 002]

Key Overall Architectural Features

- Buildings for the Operations Facility, Maintenance Facility, and RO/UV (Advanced Treatment) Building
- Various canopies for parking areas, outdoor process equipment, and general storage
- Landscaping and Screening in strategic locations around the WRF site to enhance the visual presentation of the site to the public and adjacent property owners

Architectural Purpose

To provide an overall aesthetic scheme for the WRF including conceptual building and canopy exteriors, landscaping plans which present the WRF as an agricultural facility consistent with current property use. Also, provide durable, low maintenance facilities in conformance to controlling structural criteria and considering the intended use of each facility within the WRF process scheme.

Architectural Description

- The Operations Building will be the focal point of the WRF aesthetic presentation to the community as this building will be located at the “front” of the plant relative to the site entrance and the nearby scenic Highway 1. The facility is planned as a metal building with non-ferrous and coated metal wall panels, 4-ft tall burnished CMU wainscoting and non-ferrous, metal roof panels. Since it is at the front of the site, it will also have two cupolas for architectural appeal, which will also aid in ventilation of the building. [PCO 002]
- The Maintenance Building and RO/UV Building are planned adjacent to one another in the middle part of the plant. These buildings are planned with similar finishes to the Operations Building but without the cupolas. [PCO 002]

- Various covered parking canopies and canopies covering outdoor process equipment in the MBR and Dewatering Areas are also planned. Roofing materials for the canopies are planned to generally match those of the buildings.
- Landscaping will generally be a mix of larger, stand-alone trees such as California sycamores and live oaks. Where screenings areas are needed adjacent to the visitors parking area, next to the MBR facility, and in the area across the 2-lane plant road near the Maintenance Building, decorative grasses and small bushes are planned. Finally, stormwater basins are planned as grass-lined with some internal planting such as tall grasses. These basins are planned with overflow outlets to help promote infiltration into the soil and improve water quality of runoff.

3.2 Applicable Codes

All facilities provided shall comply with all the current building, fire, or other health and safety codes and regulations applicable to the project site including:

- California Building Code
- California Plumbing Code
- California Mechanical Code
- California Fire Code
- California Electrical Code
- California Building Energy Efficiency Standards
- California Green Building Standards Code
- California Coastal Zone Management Act

Note that the project site is currently located within a Moderate Fire Hazard Severity Zone in a State Responsibility Area and the provisions of CBC Chapter 7A apply. The project site is also located within a Coastal Zone and is located off of a designated State Scenic Highway. The provisions of the Coastal Zone Management Act and the local Coastal Zone Land Use Ordinance also apply.

3.3 Buildings

3.3.1 Operations Building

The Operations Building will serve as the administrative hub for the facility. It will be the location at which visitors to the facility check in when arriving at the facility. The entrance to the building should be apparent when approaching the facility. The rear entry to the building should be approachable by vehicles for staff and for pick up and return of samples to the sample storage rooms. The break room should be adjacent to an outdoor patio area of similar size for use by staff. The patio area should be shielded from view by an enclosure. The Operations Building shall be fully ADA accessible throughout.

3.3.2 Maintenance Building

The Maintenance Building will have a drive through bay for service vehicles. The Maintenance Building will also have one additional bay to provide more work space [PCO 021]. All roll up door jambs to be protected by concrete filled steel pipe bollards on the exterior. One motorized rollup door shall be provided on the drive through bay. [PCO 045] The bottom 48 inches of the shop and storage area walls shall be solid grout CMU or

concrete on the interior. The lab should incorporate the City's existing lab equipment and provide sufficient counter top work surfaces to support the function of the lab. City will provide DB with list of existing equipment.

3.4 Aesthetic Design

The building site will be visible from Highway 1, which is designated as a Scenic Corridor. Building forms and exterior materials shall be consistent with the character and themes described herein. Generally, the building forms used should be recognizably agricultural, using simple rectangular floor plates and gable roofs of varying slopes that reflect the use of the enclosed volumes. These building shapes are articulated where appropriate with clerestories or roof vents, again in familiar proportions.

While individual buildings should reflect their use, the overall impression of the complex from the public right of way should be of a dairy farm or ranch. Colors should be muted off whites and earth tones on the buildings and roofs should be a soft terra cotta red or similar color.

Architectural design themes shall be approved by the City.

3.5 Exterior Materials

3.5.1 Walls

Exterior wall finishes are to be durable, noncombustible, and perform well in the coastal environment such as exposed concrete, exposed CMU, metal siding, fiber cement siding, or plaster. There shall be no ferrous metal siding or wood exposed on the exterior of the structures.

Exposed concrete walls are to have reveals at control joints and at cold joints. See Structural requirements below for additional requirements for exposed concrete walls.

Masonry walls or veneer shall generally be integral colored split face where exposed to view. Precision block is not allowed where it is exposed to view. Control and expansion joints shall be located to control cracking. CMU walls or veneer shall conform to ACI 530. See also Structural requirements below for CMU walls.

Metal siding shall be aluminum shall have a minimum thickness of 0.040 inches and shall conform to ASTM B209. Siding shall have a high performance organic coating finish such as Kynar 500 and shall come with a manufacturer's 20-year warranty for watertightness, color fading, and chalking. Metal siding shall not be used within 48 inches of the finished grade.

Fiber cement siding, trim, and soffit materials shall be conform to ASTM C1186 and shall be covered by a manufacturer's 30-year warranty. If panel siding is used it shall be finished with fiber cement battens at no more than 12 inches on center. If lap siding is used it shall have a maximum exposure of 7 inches. All trim is to be fiber cement.

Plaster shall conform to ASTM C296 and shall be installed over metal lath as part of a three coat system and shall have a smooth troweled 100% acrylic based finish. Lath shall conform to ASTM C847 and ASTM C1063. Casing beads, corner beads, expansion joints, control joints and other exposed lath accessories shall be aluminum or PVC. Control joints and reveals shall be located to minimize cracking. Fiber reinforced plaster systems may be used to reduce or minimize control and expansion joints following manufacturer's recommendations.

Weather barrier provided under any siding shall be a vapor permeable membrane, either spun polyolefin fabric or liquid applied. Weather barrier shall be approved by manufacturer for up to 210 days of weather exposure. All window, door, and other openings shall be flashed with a compatible system as recommended

by the weather barrier manufacturer. Grade D building paper is only acceptable as the second layer under a lath and plaster system.

3.5.2 Roof

The roof is to be low maintenance and long lasting. The preferred roofing would be metal standing seam roofing where exposed to view. In other areas where a flat roof is not visible a single ply roof membrane would be acceptable.

Metal roofing shall be aluminum, shall have a minimum thickness of 0.040 inches, and shall conform to ASTM B209. Roofing shall have a high performance organic coating finish such as Kynar 500 and shall come with a manufacturer's 20-year warranty for water tightness, color fading, and chalking. Roof panels shall have a minimum seam height of 2 inches and installation shall follow manufacturer's recommendations to obtain the specified warranty.

Thermoplastic membrane roofing shall be a minimum of 80 mil and shall be UL Class A and shall conform with FM DS 1-28. Installation, including deck sheathing and insulation shall conform to manufacturer's recommendations. Provide a 20-year non-prorated warranty including materials and labor and not excluding ponding water or wind speeds less than 90 mph for the roof.

Roof accessories such as roof hatches, flashings, and gutters shall be aluminum. Roof hatches shall be thermally broken and shall be provided with a minimum of a 5-year warranty. Gutters shall be provided with means to prevent the accumulation of leaves and debris as required by CBC chapter 7A. Flashings and gutters shall have the same finish as the roofing.

3.5.3 Windows

Windows shall comply with the requirements of the California's Title 24 and may be aluminum or fiberglass. Clear or minimally tinted glazing is preferred. Tempered glazing shall be provided where required. Windows shall comply with the performance requirements of AAMA and shall include a system for internal weep drainage and shall be thermally broken. Windows shall be fixed or operable hopper windows and shall not project past the inside face of the wall more than 4 inches. The On-Call room shall be provided with a window that complies with CBC 1030. A security window shall be provided to the interior wall of the Operations Building. See Attachment 1. [PCO75] All operable windows shall be provided with non-ferrous insect screens.

3.5.4 Louvers and Vents

Louvers and vents shall comply with CBC chapter 7A and shall comply with ASTM E2886. Louvers and vents shall be aluminum or fiberglass.

3.5.5 Doors

Exterior doors shall be molded fiberglass reinforced plastic and shall have fiberglass reinforced plastic frames with no metal or wood components. Accessories such as glazing stops and louvers shall be fiberglass. Doors and frames shall have an ultraviolet stabilized polyester, marine grade NPG-isophthalic, with low luster unpatterned final finish a minimum of 25 mils thick. Doors and frames shall have a manufacturer's standard 10-year warranty covering degradation or failure due to chemical attack.

Overhead coiling doors shall be capable of withstanding maximum positive and maximum negative wind loads as described in the California Building Code design criteria without undue deflection or damage to components. Doors shall be of standard construction for normal use of up to 20 cycles a day and an expected lifetime of a minimum of 50,000 operating cycles. Where placed on air-conditioned spaces, roll-up doors shall be insulated with a minimum R value of 8.0 and a STC rating of 22 for the entire door assembly. The

steel curtain shall be minimum of 18 gauge on the exterior face. Guides and other exposed components shall be galvanized steel. Operation shall be manual via a chain and shall lock with a slide bolt from the inside. Installation shall comply with manufacturer's recommendations. In the Water and Collections Supply Storage Shed, provide two 12-foot wide overhead coiling doors. [PCO 79]

3.5.6 Exterior Steel [Clarification]

Exterior steel items are generally to be avoided due to the highly corrosive coastal atmosphere however there are times when there is no suitable alternative, such as bollards to protect roll up door openings. When used in exterior applications all steel shall be hot dip galvanized, coated with an epoxy paint and then a finish paint. Assemblies shall be fabricated such that components can be joined together with slip jointed fittings or bolted together. Field welding of assemblies is to be avoided. If provided, exterior barrier and handrails shall be hot dip galvanized but are not generally required to be painted.

3.6 Interior Materials and Building Elements

3.6.1 Walls

Gypsum board walls shall be constructed following GA-216 with 5/8 inch board. Interior finishes, per ASTM C840, shall be level 3 in service areas and areas to receive a wall covering, level 4 in areas to receive a light textured finish and egg shell or matt paint (typical), and level 5 in areas to receive a semi-gloss finish. Mold resistant gypsum products shall be used within 10 feet of a sink or other plumbing fixture. Textured surfaces should receive a light to medium orange peel finish. Walls at offices shall be acoustically sealed at the floor and at penetrations in the wall. Where possible penetrations shall be staggered.

Tile on walls shall follow the Tile Council of North America (TCNA) recommended procedures for each application and substrate. Wall tiles shall be standard 4x4 ANSI A137.1 semi-gloss glazed wall tile. Tile on walls in toilet and shower rooms shall be a minimum of 7 feet tall and shall run continuously behind any applied fixtures such as mirrors. Utilize tiles with matching bead, bullnose, cove, and base shapes. Grout shall be polymer modified cement per ANSI A118.7. Provide waterproof membrane at all showers and within 24 inches of sinks.

Fiberglass reinforced paneling shall comply with ASTM D5319. Trim should be PVC in a color to match panel. Panels to be installed as per manufacturer's recommendations.

Insulation shall be installed at all interior partition walls for acoustics. Insulation shall fill the cavity space and shall comply with ASTM C665. Insulation shall be formaldehyde free.

Corner guards shall be provided on outside corners of walls unless covered in tile. Corner guards shall be stainless steel or vulcanized rubber consistent with ASTM F1861.

3.6.2 Ceilings

Gypsum board ceilings shall be constructed following GA-216 with 5/8-inch board. Interior finishes, per ASTM C840, shall be level 3 in service areas and areas to receive a wall covering, level 4 in areas to receive a light textured finish and egg shell or matt paint (soffits), and level 5 in areas to receive a semi-gloss finish (toilets and showers). Mold resistant gypsum products shall be used within 10 feet of a shower. Textured surfaces should receive a light to medium orange-peel finish.

Acoustic tile ceilings and suspension systems shall comply with ASTM C635, ASTM 636, and ASTM E1264. Installation of grid shall conform to ASTM E580 for areas subject to earthquake ground motions and shall be heavy duty. Ceiling tiles shall be regular and shall have minimum NRC of 0.75 and a CAC of at least 35.

3.6.3 Floors

Polished concrete floors shall be consistent with the Retroplate system as a level of quality. Concrete floors shall be stained, utilizing a minimum of two colors. Concrete after treatment for polishing shall exhibit a uniform level of grind in each space or area. Final polish shall have a hard-shell satin finish (400 grit).

Sealed concrete shall be achieved with a liquid densifier hardener that penetrates into the concrete and reacts with the concrete to create a dustproof sealed finish.

Tile on floors shall follow TCNA recommended procedures for a full mortar bed application in a wet location. Floor tiles shall be ANSI A137.1 standard grade ceramic mosaic tile. Grout shall be polymer modified cement per ANSI A118.7 and shall be sealed with a water based colorless silicone. Provide waterproof cleavage membrane at all floors.

Wall base shall be consistent with ASTM F1861, Type TS vulcanized rubber a minimum of 4 inches tall and shall have a satin finish.

Underslab vapor barrier shall be provided continuously under all floor slabs for enclosed buildings and shall comply with ASTM E1745 Class A with a minimum thickness of 15 mils and a water vapor permeance of not more than 0.010 perms.

3.6.4 Doors

Interior doors and frames shall be hollow metal and shall conform to SDI-100 standards for Level 2 heavy duty doors. Doors shall be full flush with a face gage of at least 18 and shall have an A60/ZF180 galvanized coating. Hollow metal door frames shall be full profile, continuously welded type with a minimum of 16-gauge steel. Doors and frames shall be rated as required by code.

At shower room provide removable fixed door and frame capable of being relocated without the use of any special tools to adjust the ratio of men's and women's shower stalls.

Access doors shall be provided where required to access plumbing or attic spaces. The minimum size of an access door shall be 12 inches by 12 inches. Access doors in drywall or plaster shall use a bead type frame. Access doors shall be factory fabricated doors and frame units with welded corners, filled and ground flush. Minimum thickness of frames shall be 16 gauge and of doors shall be 14 gauge. Doors located in wet areas or in tile shall be stainless steel. Doors shall be equipped with a latch with a screw driver slot to operate. Doors that are intended for the passage of a person shall have a latch that is operable from an interior space.

3.6.5 Casework

Cabinets shall be constructed per AWI/WI standards for premium grade with Style A frameless construction with flush overlay door and drawer fronts. Millwork supplier shall furnish a W.I. certificate of compliance. Installer shall provide a Certified Seismic Installation Report confirming that acceptable backing is provided in all locations. Cabinet faces, doors, and exposed surfaces shall have NEMA LD 3 type high pressure laminate faces. Interior surface shall have a melamine finish. Doors and drawer fronts shall have a 3mm PVC edge. Pulls shall be closed wire loop type with a stainless steel finish. Drawer sides shall be commercial grade, side mounted. Drawer slides for drawers deeper than 6 inches shall be side mounted self-closing type with full extension. Hinges shall be stainless steel 5 knuckle 270-degree swing hospital type. Clear silencers shall be installed at each cabinet door.

Countertops

Plastic laminate countertops shall be NEMA LD 3 type high pressure laminate with a minimum nominal thickness of 0.048 inches. Countertops shall have a front edge laminate built up to 1 ¼ inch thick with a raised radiused edge, integral coved backsplash and radiused top edge. The back and end splashes shall be of the same construction. Backsplash shall be a minimum of 4 inches tall. Exterior grade plywood backing shall be used at all wet locations. Provide backer sheet on underside of countertop substrate. No seams shall occur within 18 inches of a sink and sink cut outs shall be sealed.

Lab Countertops

Solid epoxy resin countertops shall be used in the lab. The physical properties of the lab surface shall be consistent with Durcon epoxy resin countertops as a standard of quality. Countertops shall have a marine edge and shall be a minimum of 1 inches deep. Material shall be covered by a manufacturer's standard 10-year warranty to repair or replace any defective material at no cost to the City.

3.6.6 Hardware

Provide each type of door hardware from only one manufacturer. All hardware shall comply with provisions of CBC chapter 11B for accessibility. All doors to be commissioned prior to occupancy to assure that all the aforementioned requirements are met in the installed doors. All door hardware shall be satin finish stainless steel.

Locks and latches shall be provided for each door with appropriate function for the space. Locks shall be standard interchangeable core and shall utilize Schlage Everest 29 7 pin cylinders.

Hinges shall be stainless steel five-knuckle full mortise butt hinges. Provide non-removable pins and security studs at all exterior out-swinging doors. Hinges shall allow doors to open to maximum width. Provide ball-bearing hinges at all doors having closers.

Exit devices shall be push-through push-pad design and shall be independent lab tested to 1,000,000 cycles. No exposed push-pad fasteners, no exposed cavities when operated. Lever shall be breakaway type.

Closers shall be full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body and shall be independent lab tested to 1,000,000 cycles. Closer to have double heat-treated pinion shaft, single piece forged piston, and chrome-silicon steel spring. Closer to have separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where required. Exterior door closers shall have been tested to 100 hours of ASTM B117 salt spray test. Pressure Relief Valves (PRV) not permitted. Closers to be installed on each door that leads to the exterior. Doors from break room to exterior and from shop to exterior are to be equipped with a hold open function.

Gaskets are to be provided at each exterior door at top, sides, and meeting stile or pairs. At each exterior door provide door bottom sweep.

Protection plates are to be provided on the push side of each door equipped with a closer.

Floor stop, overhead stop, or wall protection bumper are to be provided for each door.

Thresholds shall be provided at all exterior doors and shall comply with CBC Chapter 11B.

Door silencers are to be provided at all doors not otherwise provided with gasketing.

3.6.7 Stretched Fabric Wall Panels

Stretched fabric wall panels are to be provided in the break room and the conference room. Field installed, fabric is stretched and set into framework and laid over acoustic material anchored to substrate. Framework consists of continuous perimeter and intermediate mounting frames anchored to substrate, and designed to permit removal and replacement of fabric within framed areas without affecting adjacent areas. Installed system shall have a NRC of 0.70 minimum, when tested in accordance with ASTM C423, Type A mounting. Prefabricated, fabric covered and individually framed panels are not permitted. Fabric to be installed over acoustic material and into framework without use of adhesives, tapes, or fasteners. Seams in fabric are not permitted; base the frame layout dimensions on fabric at least 66-inch-wide. Fabric shall be class I per ASTM E84. Acoustic material shall be 100% polyester with zero volatile organic compounds or formaldehyde.

3.6.8 Marker Boards

Marker boards shall be provided as indicated on the room forms. Marker boards to be porcelain enamel on minimum 24 gauge steel, laminated to core. Frame to be extruded aluminum with concealed fasteners and corner guards. Each markerboard shall include a full-length aluminum tray. Markerboard to be covered by manufacturer's 20-year warranty against discoloration due to cleaning, crazing or cracking, and staining.

3.6.9 Signage

Signage for identification and wayfinding shall be provided. Signage shall be visible at the entrance road to the facility and another sign shall be visible at the exterior of the building. Entry and building identification signage shall be free standing.

Signage for room identification shall be provided at the facility to identify each space at each door. Space identification signage shall comply with CBC Chapter 11B, Division 7. Signs shall be of engraved construction on fiberglass (exterior) or melamine (interior) plastic. Acrylic and photopolymer substrate are not acceptable.

Signage for parking stalls as required by CBC Chapter 11B shall conform to the requirements of the code.

3.6.10 Toilet Compartments

Toilet compartments shall be provided as described on plans or as required. Partition configurations shall comply with the requirements of CBC Chapter 11B. Partitions may be HDPE or solid phenolic. All hardware shall be aluminum or stainless steel. Partitions shall be overhead braced.

3.6.11 Toilet, Bath, and Laundry Accessories

Toilet, bath, and laundry accessories shall be manufactured by a company specializing in the manufacture of such accessories with a minimum of 10 years' experience. All accessories shall be ASTM A666 type 304 stainless steel with a number 4 brushed finish.

Accessories to be provided include:

Toilet Paper Dispensers: Two roll capacity

Paper Towel Dispensers: Fan fold

Electric Hand Dryers: High velocity capable or drying hands in 12 seconds

Soap Dispensers: liquid

Mirrors: Stainless steel framed, full height at locker rooms, 18 by 36 inches at each lavatory.

Seat Cover Dispensers

Grab Bars: Satin finish, concealed fasteners

Sanitary Napkin Disposal Units

- Utility Shelf with Mop and Broom Holder
- Shower Rods
- Shower Curtains
- Robe Hooks
- Flip up Shower Seat at Fully Accessible Shower Stalls

3.6.12 Lockers

Lockers at shower rooms shall be metal. [PCO 47.1] Lockers shall be single tier a minimum of 15 inches wide by 18 inches deep and 72 inches tall. Lockers shall have sloped tops, shall be fully ventilated, standard hasps, and shall include a stainless steel coat rod. Lockers shall be placed on a raised concrete curb with a tiled face.

Lockers for gear and personal equipment storage shall be HDPE with antimicrobial additive tested per JIS Z2801 to be greater than 4.0 efficacy rating. Lockers shall be single tier a minimum of 24 inches wide by 24 inches deep and 72 inches tall. Lockers shall have sloped tops, shall be fully ventilated, standard hasps, and shall include a stainless steel coat rod.

3.6.13 Fire Protection Specialties

Fire extinguishers shall be provided as required by code and shall comply with NFPA 10. Extinguishers may be surface mounted.

3.6.14 Residential Equipment

Residential equipment shall be provided as shown on conceptual layouts and described herein. Finishes shall be stainless steel or similar color painted finish at washer and dryer.

Microwaves

- Countertop style
- 1000 watt minimum
- 1.1 cubic foot minimum

Range

- Size: 30 inches
- Capacity: Minimum of 5.0 cubic foot
- Type: Electric radiant heat elements with porcelain top
- Controls to be mounted on front surface of range

Refrigerator

- Energy Star rated
- Bottom freezer
- Ice maker
- LED lighting
- Ice/water filter
- Interior filtered water dispenser no higher than 48 inches to controls
- Minimum capacity 24.5 cubic feet
- [PCO 47.1]

Dishwasher

- Energy Star rated
- Internal water heater

Washer

- Energy Star qualified
- Front loading
- Minimum capacity of 4.5 cubic feet

Dryer

Electric

Controls located on the front face

Dryer and Washer to be a matched set by the same manufacturer

3.6.15 Furnishings

Furnishings shall be provided in all spaces to support the intended use of the room. Including desks, tables, chairs, work benches, lab benches, and other office furnishings equipment to support the intended use of the room and as described.

Shop and storage areas shall be provided with work benches, storage cabinets, storage shelves, a work sink, and permanently mounted compressed air lines with quick connect couplings compatible with the City's existing tools and equipment. [PCO 47.1] The DB shall coordinate with City for relocation and reuse of any existing equipment.

Lab area shall be furnished with all cabinetry and ventilation systems to provide an efficient and effective working area. The DB shall coordinate the relocation and reuse of existing City laboratory equipment necessary to perform the on-site sample analysis required for compliance with all applicable agencies and process control. An eyewash/shower station shall be provided near the Lab and Shop.

3.6.16 Fire Protection System

Fire Sprinkler system shall be provided where required by CBC and shall include everything required for a complete system including underground supply lines, backflow preventer, fire department connection, and valve tamper switches tied into fire alarm system. All equipment shall be in compliance with NFPA #13 standards. Furnish and install signs as required. Sprinkler heads shall be aligned with ceiling components.

Where sprinklers are required in electrical supply rooms the fire sprinkler system provided shall be a double interlocking preaction system. This system shall consist of a dry pipe valve and a pre-action valve. To activate water flow, both the preaction valve must be activated by the supplemental detection system and the sprinklers must activate. The system shall be NFPA approved.

Where sprinklers are required in computer and communication rooms the fire protection system must be a waterless system approved for use with sensitive computer equipment. The system shall be fully self-contained with cylinders and control panel located within the room. The system must include a warning alarm that the system is pending activation. The system shall be NFPA approved.

The fire alarm shall simultaneously contact the fire department and annunciate in the operations control room when any alarm is activated.

3.6.17 Domestic Plumbing

Plumbing systems shall be complete as required by CBC. Toilet and restroom fixtures (toilets, lavatories, urinals) shall be vitreous china. Sinks shall be stainless steel. Showers shall be furnished with single piece terrazzo shower receptors including at fully ADA compliant shower provided for each locker room. Water in recessed box shall be provided for ice maker at break room. Floor drains with automatic trap primers shall be provided in all restrooms and locker rooms. Provide water hammer arrestors as needed. Provide key operated hose bibs on each accessible face of buildings. Provide hot water supply sufficient for each building's needs including lab and shop sinks. Provide telephone shower near staff entry to Operations Building for wash down of boots or protective clothing. Wash down shower to be connected to the sanitary sewer and protected from storm water.

Waste, vent, sewer and storm lines shall be of cast iron soil pipe and fittings and shall conform to the requirements of CISPI Standard 301, ASTM A-888 or ASTM A-74 for all pipe and fittings.

Domestic Water Service

Below grade (water service) shall be as follows:

- 3" NPS and smaller: Schedule 40 PVC Plastic Pipe and fittings. ASTM D1785, D2466, with Solvent Cement Joints ASTM D2564.
- 2" NPS and smaller: Type K Soft Annealed Temper Copper Tube ASTM B88 with wrought copper pressure fittings, ANSI B16.22. SIL-FOS - High Temperature Brazing Metal Filler.

Above grade (distribution system) shall be as follows:

- Pipe: For soldered, brazed and mechanical joints, 4" and smaller Copper Water Tube Type L Annealed Temper (Hard Drawn) ASTM B75 or ASTM B88. All underground water piping within the building boundaries shall be ASTM B88-93a Type "L" annealed (soft) copper tube made up without fittings below the floor level.
- Fittings: Wrought copper pressure solder fittings, ASME B16.22 or ASME B16-25,95-5 Tin-Antimony Filler Metal.

3.6.18 Heating Ventilation and Air Conditioning

Heating ventilation and air conditioning systems shall be in conformance with CBC/Title 24 requirements. All regularly occupied spaces in the Operations Building shall be provided with both heat and air conditioning. Shop support spaces and Lab shall be provided with heat and ventilation. Shop shall be provided with provision for radiant heaters to be installed at some time in the future at work areas.

Sheet Metal Ductwork including Rectangular supply, return, outside air and exhaust ducts, single leaf dampers and plenums shall be fabricated from prime grade galvanized steel sheets of lock form quality and shall be constructed in accordance with appropriate tables of the latest ASHRAE "Guide and Data Book" and SMACNA "HVAC Duct Construction Standards" handbook and Chapter 6 of the California Mechanical Code, current edition. Each duct or plenum shall be diagonally cross-broken for rigidity.

3.6.18.1 Flexible Ductwork

Flexible ductwork shall consist of an inner core having two layers of polyester film encapsulating a steel wire helix surrounded by a blanket of fiberglass insulation and sheathed in a metalized polyester vapor barrier reinforced with fiberglass scrim. All air ducts shall be UL listed under the UL-181 standard as a Class 1 Air Duct also conforming to NFPA standards 90A and 90B. This air duct shall have a certified thermal resistance rating of R-8 in accordance with ASTM C518 at 75 degrees F and carry the ADC "Thermal Performance" seal. Use only the minimum length required to make the connection. In no case shall any section of flexible duct exceed 7 feet in length. The number of bends shall not exceed a combined total of 90 degrees. 90-degree bends will not be allowed at diffuser connections.

3.6.18.2 Damper Regulators and Bearings

Lever type with matching end bearing. Regulator set shall include rubber gasket between regulator and duct, spring washer between core and housing, wedge pin, dial indicator and handle. Matching end bearing shall be closed end with rubber gasket.

3.6.18.3 Access Panels

Access panels shall be located at all points where adjustable mechanisms are installed internal to or on the surfaces of the ductwork. Where adjustable mechanisms are concealed by walls or ceilings, access doors shall be installed. Size shall be suitable for convenient servicing.

3.6.18.4 Fire Dampers

Fire dampers shall be installed where required, and shall be of a type approved by the U.L. Laboratories, Inc. and the State of California Fire Marshal. Dampers shall be installed per manufacturer's instructions. Provide access door in duct at each fire damper such that damper is easily accessible.

3.6.18.5 Volume Dampers

- Rectangular ducts greater than 1.5 sq. ft.: Provide factory fabricated opposed blade damper, 16 gauge blades, and brass bearings. Blade width shall not exceed six inches.
- Rectangular ducts 1.5 sq. ft. and less: Provide single leaf dampers as described.
- Round ducts 15" in diameter and less: Provide shop fabricated galvanized sheet metal plate dampers. Plate shall be 18 gauge or shall be two even gauges heavier than duct; minimum thickness 22 gauge. Provide stiffening beads at 1/3 points in dampers lighter than 18 gauge.
- Round ducts 16" and greater: Provide opposed blade damper.
- Round ducts 4" – 24" in diameter above "hard" ceilings: Provide cable operated damper. Cable length to be between 3 and 15 FT long.

3.6.18.6 Flexible Connections

Provide fireproof, insulated, non-porous, flexible connections between fans and ducts or casings and where ducts are of dissimilar metals. For round ducts, securely fasten flexible connections by zinc coated steel clinch-type drawbands. Provide a duct support next to each flex connector to prevent any strain on connection.

3.6.18.7 Condensate Drains and Drain Pans

- Air conditioning cooling coils shall have a condensate drain pipe, type "M" copper, to drain the condensate.
- Fan coils or DX cooling coils located in an attic or furred space shall have a secondary drain pan constructed of 20 gauge galvanized steel sheet metal. This pan shall have a drain line discharging to a conspicuous location. This pan and drain is in addition to the normal condensate drain line from the coil.

3.6.18.8 Motor Starters

Motor starters shall be provided complete with properly sized thermal overload protection and other appurtenances necessary for motor control. Mount starter adjacent to equipment. Maintain minimum of 3' clearance to front of devices. Motor starters shall be NEMA I or III as appropriate, general purpose, weather-resistant, with watertight enclosure where required.

3.6.18.9 Insulation

Insulation of heating and cooling ducts shall conform to requirements of CMC. Insulation shall be installed after the required tests have been applied to the piping and duct systems, and the systems have been inspected and approved.

3.6.18.10 Temperature Controls

Temperature controls shall be provided for zones with similar use, loads and exposure. Thermostats shall be capable of 7 day programming and shall incorporate a minimum 5 degree deadband.

3.6.18.11 Labeling

Labels shall be provided for all equipment and switches. Labels shall be 2" x 1" x 1/8" thick plastic engraving stock beveled on both sides and with two 3/16" diameter holes near the top uppermost tag corners. Labels shall be white with 3/8" high red engraved letters. Labels shall be attached to the equipment with adhesive or screws.

3.6.18.12 Mechanical Systems Balancing

Mechanical systems balancing shall be performed by an independent balancing company certified by Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB). Testing and balancing shall be performed by a company other than the mechanical system installers/contractor. Upon completion of the balancing operation and prior to final acceptance of the systems, the balancing firm shall submit an Air Side Report certifying to the proper performance of the system for approval by the City.

Air Side Report

The following information shall be included in the Air Side Report:

- Fan speeds.
- Motor current readings and voltage readings.
- Air quantities in CFM at supply, return, exhaust terminals, and outside air intakes, both at design value and actual measured value. Test and adjust each terminal to within +10% of design requirements.
- Air velocities in FPM at supply, return, and exhaust terminals at design value and actual measured value.
- Positive static pressure, negative and total pressures and total air quantities for each fan system.
- Equipment nameplate data.

3.6.19 Electrical and Lighting

Electrical and Lighting systems shall be in conformance with CBC/Title 24 requirements.

Lighting shall meet IES recommended levels for each space and use. All lighting fixtures to be manufactured by a company with a minimum of 10 years' experience. Interior lighting controls (daylighting and occupancy sensors) shall be produced by the same manufacturer as light fixtures. All light fixtures shall be independently tested to verify manufacturer's listed light levels. All exterior light fixtures shall be housed in non-ferrous housings with stainless steel fittings. All exterior light fixtures shall be full cut off. Exterior lighting shall be

provided with dual light levels and controls to allow light levels to be dropped to minimum levels when the facility is not actively occupied.

Power shall be provided as required for the intended use of each space and as required by code. Power outlets controlled by switches shall be identified with permanent labels or color-coded outlets. Three phase power shall be provided in shop area for anticipated service equipment. Power outlets shall be provided for wall mounted display screens.

3.6.20 Telecommunication Systems

Telecommunication system shall be provided as required for the anticipated use of each space including voice and data communications. Each workstation or office shall be provided with a minimum of four data outlets. Data outlets shall also be provided for provision of Wi-Fi access points, printers, security cameras, and the SCADA system. All materials shall be UL Listed and shall be marked as such. If UL has no published standards for a particular item, then other national independent testing standards shall apply and such items shall bear those labels. Where UL has an applicable system listing and label, the entire system shall be so labeled. All modular jacks, patch cords, consolidation point, and patch cords performance shall be verified (not just tested) by a third party to be category 6 component and channel compliant. All data outlets shall be permanently labeled with a printed label identifying the outlet.

Telecommunications cabling shall adhere to the current version of the following standards

- ANSI/TIA/EIA - 568-C.0, Generic Telecommunications Cabling for Customer Premises
- ANSI/TIA/EIA - 568-C.1, Commercial Building Telecommunications Cabling Standard.
- ANSI/TIA/EIA - 568-C.2, Balanced Twisted Pair Cabling Components, Addendum 1 –
- ANSI/TIA/EIA - 568-C.3, Optical Fiber Cabling Components
- ANSI/TIA/EIA – 569-A, Commercial Building Standard for Telecommunications Pathways and Spaces
- ANSI/TIA/EIA – 606-A, Administration Standard for Telecommunications Infrastructure of Commercial Buildings
- ANSI/TIA/EIA – 607-A, Commercial Building Grounding and Bonding Requirements for Telecommunications
- ANSI/ TIA/EIA – 758, Customer-Owned Outside Plant Telecommunications Cabling Standard
- BICSI - TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual (TDMM)
- National Fire Protection Agency (NFPA – 70)
- California Electrical Code

3.7 Plantings

Planting shall be provided to enhance the visual appeal of the entrance to the facility and around the public areas of the Operations building and to provide a screening buffer for the neighboring property to the east.

3.7.1 Visual Aesthetic

The project landscaping shall generally serve to enhance the visual corridor of the entrance to the site and provide a screening buffer for the neighboring property to the east. Plants shall be grouped in masses to appeal to the aesthetics as viewed at vehicular speeds. The overall plant palette does not require more than 10 to 15 plant species to convey the aesthetic.

3.7.2 Drought Tolerance

Landscaping shall primarily comprise of heavily drought tolerant species suitable for the coastal exposure. A good target percentage for the landscape palette is 80% drought tolerant low water using plants (based on WUCOLS standards), and 20% moderate water using plant material.

3.7.3 Plant Sizes

As a general rule of thumb, the following guidelines are provided for container sizes:

- Shrub: 1-gallon size minimum. 40% of plant material shall be upsized to a minimum of 5 gallon.
- Trees: 15-gallon size minimum. 50% of plant material shall be upsized to a minimum of 24" box. Trees intended to provide shade, or with slow growing habits shall be considered for upsizing first.
- Ground cover: 1-gallon size minimum. Large spreading groundcovers (5-6 ft on center spacing minimum) shall be 5-gallon size minimum.

3.7.4 Planter Mulch

All landscape areas shall be dressed with a non-combustive, weed free, organic mulch. No eucalyptus material is acceptable. The mulch shall be installed in a 3" minimum layer.

3.7.5 Plant Layout

Plant material shall be designed and located such that larger/taller plant material creates a backdrop for shorter lower growing plant material in the foreground. Accent plant material is encouraged at focal points like street intersections, and entry ways. Plant material shall be spaced at $\frac{3}{4}$ of anticipated full spread. This will avoid large void spaces between plant material and allow plants to fill in quicker.

3.7.6 Soil Preparation

Soils shall be amended per the requirements of the State or local Model Water Efficient Landscape Ordinance. Soil samples shall be taken and tested for fertility. Soil amendments shall conform to the requirements obtained through this testing. Where soils are non-conductive to plant life, due to heavy thick clay, contaminants or rock, the top 6" of existing soils in planted areas shall be exported off site and topsoil imported. Topsoil shall conform to SSPWC standards for Grade A topsoil.

3.7.7 Plant Establishment

An establishment period of 90 days (minimum) shall be required for initial maintenance and warranty of plant material. Site observation meetings shall be scheduled at 30-day intervals to observe plant material. Repairs shall be provided on an ongoing basis.

3.7.8 Plant Warranty

The installer shall warranty all trees for a minimum of 1 year. All shrubs shall be warrantied for a minimum of 30 days beyond the completion of the establishment period.

3.8 Irrigation

Irrigation System shall comprise of equipment selected from manufacturer's having been in the business a minimum of 15 years and have a good track record of long lasting equipment. Equipment shall be comprised of components designed to perform with high water efficiency.

3.8.1 Irrigation Emission Devices

- The following guidelines are provided for the design/implementation of the irrigation system.
- Large slopes – Low flow rotors or rotary nozzles shall be utilized to keep runoff down. Dripline is discouraged in this application.
- Large landscape areas – Low flow rotors or rotary nozzles shall be utilized. Drip may be utilized if approved by City.
- Small and Linear planters – Low flow rotary nozzles or drip irrigation shall be utilized. Drip may be required when parkway planter sizes are less than 10 ft in width.

3.8.2 Piping

PVC pipe shall be SCH 40 minimum. Do not use pipe sizes less than ¾” for laterals. Mainlines should have a minimum size of 1½”.

3.8.3 Remote Control Valves

Utilize brass globe valves intended for dirty water use.

3.8.4 Ball Valves

Bronze or brass, not plastic. Locate along mainline periodically and at crossings to allow for mainline shut off for maintenance.

3.8.5 Valve Boxes

Shall be locking. Purple where dirty water is in use.

3.8.6 Controller

Weather based controller capable of adjusting runtimes based on live input data and historical data. Shall have ports for a master valve, flow sensor, rain sensor/moisture sensor. Shall have 20% spare capacity to allow for future expansion. 2 wire is acceptable.

3.8.7 Flow Sensor

Manufactured by same company as the controller. Shall be able to read high and low flows of the design system.

3.8.8 Master Valve

Brass normally closed valve intended for dirty water use.

3.8.9 Quick Couplers

Locate periodically for maintenance purposes. Dirty water compatible.

3.9 Fences and Gates

Permanent exclusion fencing shall be provided along the eastern border of the WRF site, consisting of a 5-foot concrete wall (3-foot embedment) with a 5-inch lip and a 6 foot tall chain link fence with privacy slats

and 3 strands of barbed wire on the top. The remaining fencing around the WRF site shall be 6 foot tall chain link fence with privacy slats and 3 strands of barbed wire on the top. [PCO 058]

Add 1, 4-foot wide walk gate per Caltrans Standard Detail A85A. Add a sidewalk and steps down to the southern man gate. Include handrail on both sides of staircase. Update fence location. Add a 4-foot wide walk gate with a locking door handle to match the fence height. See Attachment 1. [PCO 73]

~~Wildlife exclusion fencing~~ A concrete barrier wall for wildlife exclusion shall be provided around the Eastern Perimeter of the site from Teresa Road to the plant entrance gate. The remainder of the Eastern Perimeter barrier shall be a HDPE bracket attached to fencing. [PCO 84] [PCO 84.1]

3.10 Space Needs

Drawings define scope.

3.11 Space Needs Identification Forms

Drawings define scope.

3.12 Equipment and Furniture List

Operations Building: Offices

- Computer Workstations – Quantity: 5
- Telephones – Quantity: 0 [PCO 47.1]
- Office Workstation Furniture – Quantity: 5
- Desk Chairs with arms – Quantity: 5
- Guest Chair without arms – Quantity: 5
- Lateral File Cabinet – Quantity: 5
- Bookcase – Quantity: 5

Operations Building: Control Room – Operations Center

- Control Workstations – Quantity: 3
- Computer Workstations – Quantity: 3 [PCO 47.1]
- Telephones – Quantity: 0 [PCO 47.1]
- 50" Diagonal Wall-mounted Monitors – Quantity: 3
- Control Console – Quantity: 3
- Work Station Counters – Quantity: 8
- Desk Chairs with Arms – Quantity: 3
- Desk Chairs without Arms – Quantity: 8

Operations Building: Map Room

- Whiteboards – Quantity: 2
- Layout Tables – Quantity: 4
- Flat Files-Map Cases – Quantity: 0 [PCO 47.1]
- Stools – Quantity: 4 [PCO 47.1]
- Bookshelf – Quantity: 1 [PCO 47.1]

Operations Building: Sample Storage

- Exposed Shelving – Quantity: 1
- 18"x42" Counter
- 1 Horizontal Freezer
- 2 Refrigerators [PCO 47.1]

Operations Building: Training-Break Room

- Computer workstation – Quantity: 1
- Large Monitor – Quantity: 3 [PCO 47.1]
- Whiteboards – Quantity: 2
- Refrigerator – Quantity: 1
- [PCO 47.1]
- [PCO 47.1]
- Tables – Quantity: 5 [PCO 47.1]
- Chairs without arms – Quantity: 20 [PCO 47.1]
- Stovetop hood and microwave combo – Quantity: 1 [PCO 47.1]

Operations Building: Table and Chair Storage

- Chair Storage Dolly – Quantity: tbd
- Table Storage Dolly – Quantity: tbd

Operations Building: Conference Room

- TV-Monitor – Quantity: 1
- Whiteboards – Quantity: 1 [PCO 47.1]
- Conference Table – Quantity: 1
- Conference Chairs with arms – Quantity: 8

Operations Building: Copier-Work Alcove

- [PCO 47.1]

Operations Building: Reception Area / Lobby

- [PCO 47.1]
- Lobby Seating - Visitor Chairs – Quantity: 3

Operations Building: Men's, Women's Restrooms and Shower + Locker Room

- No furniture or equipment

Operations Building: On-Call Room

- [PCO 47.1]

Operations Building: Uniform Storage + Wash Room

- 24"x60" Bench and Boot Storage
- 25' single side clothes hanging racks

- 20' double side hanging racks [PCO 47.1]

Operations Building: Server Room

- Equipment Racks – Quantity: tbd
- Radio system, alarm, CCTV – Quantity: tbd

Operations Building: Janitor-Mechanical Room

- Exposed Shelving – Quantity: 1

Operations Building: Electrical Room

- No equipment or furniture

Shop Building: Shop and Storage

- City to Relocate Existing City Equipment
- Pallet Racking [PCO 47.1]
- Teletruck [PCO 109]
- [PCO 47.1]

Shop Building: I + C Workshop

- City to Relocate Existing City Equipment
- Lab hood [PCO 47.1]
- [PCO 47.1]

Shop Building: Bathroom

- No furniture or equipment – Quantity:

Shop Building: Lab

- City to Relocate Existing City Equipment
- Central Island
- 2 large sinks [PCO 47.1]
- 2 Refrigerators [PCO 47.1]
- [PCO 47.1]
- City to Relocate Existing City Furniture

Shop Building: Operations

- City to Relocate Existing City Equipment
- Closed Bookcase
- Adjustable Workstation
- TV Monitor [PCO 47.1]
- [PCO 47.1]
- City to Relocate Existing City Furniture

3.13 Landscape Plan

Drawings define scope of landscape areas. Minor landscaping along entrance road shall be included.

SECTION 4 STRUCTURAL CRITERIA

4.1 General

All structural design shall be prepared under the direct supervision of a Structural Engineer licensed by the State of California. Design all structures for a service life of not less than 50 years, in accordance with the most current applicable codes and standards.

Structural Features/Scope are summarized in the table below and detailed further within Section 4. The summary table shall govern in event of a disagreement with content in Section 4.

Key Overall Structural Features

- Foundations for various Process and General (Administration, Operation, and Maintenance) Facilities
- Buildings for the Operations Facility, Maintenance Facility, and RO/UV Building
- Various canopies for parking areas, outdoor process equipment, and general storage
- Miscellaneous concrete yard structures (e.g. manholes, vaults, etc.)
- Tanks including the large volume Product Water Tank

4.2 Load and Deflection

| Item | Parameter | Criteria | Notes |
|------|------------|---|-------|
| 1 | Loads | All loads to structures and components shall be developed with the latest version of the ASCE 7 referenced by the CBC | |
| 2 | Live Loads | <ul style="list-style-type: none"> • Conform to ASCE-7 with traffic loads per AASHTO. • Use minimum live loads for structures that will allow equipment to be moved to other locations or additional equipment to be added. • Floor live loads in equipment rooms, pump rooms, electrical rooms and areas where equipment may be moved to various locations shall be not less than those given in ASCE-7 for light manufacturing: 150 pounds per square foot uniform load and 2,000 pound concentrated load. • Where the loads of specific equipment give higher design | |

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| | | <p>forces and stress for a specific area, the higher loading shall be used. No live load reduction may be used.</p> <ul style="list-style-type: none"> For heavy equipment greater than five tons, floor live loads shall be designed for the greater of 250 pounds per square foot uniform load or the load of the specific equipment. | |
| 3 | Wind Loads | ASCE-7 wind load design forces and wind load detailing requirements shall apply for all buildings, equipment anchorage, and hydraulic or water-holding structures. | |
| 4 | Seismic Loads | <ul style="list-style-type: none"> ASCE 7 seismic load design forces and seismic load detailing requirements shall apply for all buildings, equipment anchorage, and hydraulic or water-holding structures All structures and components shall be designed with the values below: <ul style="list-style-type: none"> Latitude = 35.3707 Longitude = -120.8217 Site Class = C S_s = 1.135 S₁ = 0.421 Importance Factor = 1.25 Component Importance = 1.0 to 1.5 | Refer to Geotechnical Baseline Report |
| 5 | Deflection | Serviceability design shall ensure against deflections causing adverse functional or aesthetic effects over the life of the plant. The live load and total load deflections criteria given in the CBC for general loading combination and specific to the various design material (concrete, steel, CMU, timber, etc.) shall be the minimum for buildings, building-like structures, and for structural and material types not specifically covered elsewhere. | |

4.3 Building Structure Types

All buildings and canopies may be either pre-engineered metal buildings, or custom designed.

| Item | Parameter | Criteria | Notes |
|------|-----------------------------------|---|--|
| 1 | Operations Building | <ul style="list-style-type: none"> • Steel-framed with no internal columns • Provide a CMU wainscot exterior, to a height of 4 feet from top of slab • Concrete slab on grade shall be 4 inches, minimum • If a Pre-Engineered Metal Building system is used, it shall be designed for the following dead loads: <ul style="list-style-type: none"> ○ Self-weight ○ Weight of steel framing and deck ○ Collateral Load made up of: <ul style="list-style-type: none"> ○ 5-PSF partition wall load ○ mechanical, electrical, and plumbing load ○ ceiling and ceiling support system load ○ insulation load ○ 4 pounds per square foot solar panels ○ 5 pounds per square foot additional load | |
| 2 | Maintenance Building | <ul style="list-style-type: none"> • Steel-framed with no internal columns. CMU wainscot exterior, to a height of 4 feet from top of slab | |
| 3 | Advanced Treatment Building | Steel framing on a concrete slab on grade. Structure shall be one story. | |
| 4 | Miscellaneous Covered Structures | <ul style="list-style-type: none"> • Steel-framed and consistent with architectural features and structural elements of other facilities on the site • Where adjacent to other structures, covered structures shall be separated by 6 inches or seismic separation required by the ASCE 7, whichever is greater | |
| 5 | Miscellaneous Building Structures | Constructed in a style consistent with architectural features and structural elements of other facilities on the site | Unless otherwise specified, all other structures shall be consistent with performance criteria |

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| | | | stated for Operations Building |
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4.4 Tanks and Basins

| Item | Parameter | Criteria | Notes |
|------|------------------|---|-------|
| 1 | Material | <ul style="list-style-type: none"> • Glass-lined bolted steel tank for Product Water tank. • Process tanks and facilities shall be of reinforced concrete, FRP, HDPE, or stainless steel. • Process chemical tanks may be of FRP or similar materials. | |
| 2 | Tank Wall Design | <ul style="list-style-type: none"> • The walls of water-containing structures, including tanks and basins, shall be designed for the following conditions: <ul style="list-style-type: none"> ○ Tank or basin at full liquid level without soil backfill. ○ Empty tank or basin with soil backfill and maximum ground water. ○ Basin or tank cells in any combination of empty and full. ○ Increased soil backfill pressures and liquid pressures due to seismic conditions. ○ Foundation subdrains in the two deep, water-containing structures to mitigate changes in soil lateral earth pressure [PCO 057] ○ Seismic impulsive and convective loading under operating conditions. ○ Operational level shall include maximum flooded condition unless passive methods are provided to prevent flooding. Passive methods include overflow weirs, upstream or downstream hydraulic controls not dependent on pumps, monitors, electronic controlled valves, or operators. ○ If passive level controls are present, then the | |

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| | | maximum operational level is defined as the liquid elevation when those controls are in effect. | |
| 3 | Backfilling | Water-containing structures shall not be backfilled until the basin passes the watertightness testing | |
| 4 | Uplift Loads | <ul style="list-style-type: none"> • Tanks and basins shall be designed for uplift based on the following safety factors and groundwater conditions: <ul style="list-style-type: none"> ○ Maximum groundwater levels expected during a 100-year storm and/or 199-year flood events in the structure area, as a minimum, with basins at normal minimum operating levels and a minimum safety factor of 1.1. Groundwater elevation: 10 feet below existing grade. ○ Groundwater at normal levels with basins empty and a minimum safety factor of 1.5. ○ In all cases side friction shall not be considered as resisting uplift. | <ul style="list-style-type: none"> • These conditions only apply to the uplift calculations. • Maximum ground water level is the level that can be obtained adjacent to the structure being evaluated. Drain systems, external to the structure, may be provided to reduce the maximum ground water level. The reduced level shall only be used in uplift calculation when the drain system is entirely passive, i.e. relying only on gravity. The reduced ground water levels from drain systems that rely on pumping, monitoring, or operator intervention shall not be substituted for the maximum ground water level obtainable if components of such a drains system did not operate. |

4.5 Non-Building and Miscellaneous Structural Elements

| Item | Parameter | Criteria | Notes |
|------|----------------------------------|---|---|
| 1 | Headworks and Equalization Basin | The Headworks shall be concrete or packaged stainless steel units. | |
| 2 | Site Retaining Walls | <ul style="list-style-type: none"> • Walls shall be at least 8-inch thick cast-in-place concrete construction, or segmental block for walls 3 feet and shorter (Versa-Lok or similar quality) • Where grade behind wall exceeds 1:1 slope, retaining wall shall be designed and detailed for 1.5 feet in additional retained height, in anticipation of erosion that will occur over the service life of the site | Reference Geotechnical Baseline Report for preliminary soils design values. DB may find it necessary to update and expand on current Geotechnical Baseline Report for values that fit each specific retained condition. |
| 3 | Anchorage for Equipment | Anchorage shall be designed in accordance with ASCE 7, Chapters 13 and 15. Slab and housekeeping pad thicknesses must be coordinated with anchorage depth during design of the structure. All supporting concrete edges must be at least 8 inches from any anchor location. | |
| 4 | Equipment Pads | <ul style="list-style-type: none"> • All equipment and associated panels and cabinets shall be installed on reinforced concrete equipment pads, a minimum of 6 inches above grade, or 3.5 inches above adjacent floor or slab • All pads shall extend a minimum three inches outside the equipment, panels or cabinets, while also meeting the anchor edge distance specified above | |
| 5 | Vehicle and Equipment Wash Rack | <ul style="list-style-type: none"> • Concrete slab on grade, with a CMU wall on three sides with a grease and sand separator. [PCO 106] • Slab on grade shall be 8 inches thick minimum and capable of withstanding maintenance vehicle and equipment loads. • CMU wall shall be capable of withstanding 2,000-pound point load at 2 feet from top of slab at any location along the wall | |

4.6 Foundations

| Item | Parameter | Criteria | Notes |
|------|-----------|--|---|
| 1 | Design | <ul style="list-style-type: none"> Foundations shall be designed in accordance with the Geotechnical Baseline Report Structures shall be located on the site such that foundations for each structure are of the same type If it is necessary to locate foundation partially in rock, the design of the foundation shall be such that the expected settlement of the portion founded in soil is equivalent to the portion founded in rock | The DB may need to update and expand on current Geotechnical Baseline Report for values that fit each specific foundation condition |

4.7 Structural Materials

| Item | Parameter | Criteria | Notes |
|------|------------------|---|-------|
| 1 | Concrete Design | Concrete structures, including tanks and buildings, shall be designed and constructed in accordance with all applicable codes. The concrete mix design shall meet the requirements of ACI 318 and ACI 350. Ground water shall be sampled and tested for salinity and sulfate levels. The concrete mix design shall be adjusted to provide appropriate sulfate resistance per ACI 318 and ACI 350. | |
| 2 | Structural Steel | Structural steel shall be designed, fabricated and erected according to the latest applicable CBC Chapter 22 as modified by ESP 550.1. | |
| 3 | Connections | <ul style="list-style-type: none"> Structural connections shall be shop welded and field bolted. Welds shall be designed and executed in accordance to ANSI/AWS D1.1 Structural Welding Code — Steel. Welding procedures shall be qualified in accordance to ANSI/AWS D1.1 Section 5. Welders, Welding Operators and Tack Welders shall be currently qualified in accordance to ANSI/AWS D1.1 Section 5. Welders' certifications should be made available to City. Welding inspectors shall have current certification as an AWS Certified Welding Inspector (CWI) in accordance | |

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| | | <p>with AWS QCI Standard and Guide for Qualification and Certification of Welding Inspectors.</p> <ul style="list-style-type: none"> Bolted connections for steel buildings, building-like structures and platforms that enclose or support process equipment, shall be designed as snug-tightened connections with the threads included in the shear plane. The actual bolts provided for the connection shall have the threads excluded from the shear plane. Bolted connections shall conform to AISC Specifications for Structural Joints Using ASTM A325 or A490 Bolts. | |
| 4 | Metal Roof Deck | <p>Design and fabrication of metal roof deck shall be in accordance with the latest specifications of the Steel Deck Institute. Steel used in the fabrication of deck units shall conform to the requirements of the AISI Light Gage Cold-Formed Steel Design Manual.</p> | |
| 5 | Miscellaneous Metals | <ul style="list-style-type: none"> Miscellaneous metals shall include such items as gratings, metal floor plates, railings and toe plates, loose lintels and miscellaneous framing and ladders. Materials of construction shall be selected to provide maximum service life for the expected environmental conditions, including exposure to corrosive atmospheres and marine conditions. Any metal item that is submerged shall be 316 stainless steel unless the corrosivity of the environment requires different. Any metal item located in a corrosive atmosphere shall be 316 stainless steel, unless noted otherwise or if aluminum or another material is suitable and complies with the reference standards. No dissimilar metal items what would result in corrosion if in contact shall be used. Aluminum shall be insulated from direct contact with concrete. Miscellaneous metal shall be fabricated in accordance with the most recent applicable CBC, OSHA, or ASTM standards. All metal fabrications exposed in the finished construction, | |

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|---|-----------|---|--|
| | | <p>both interior and exterior, whether painted or not, shall be hot-dip galvanized (heavy duty type coating) except in aluminum only for railings, toe plates and stairways. Galvanizing of miscellaneous metal after fabrication shall be in conformance with ASTM A123 and A153.</p> <ul style="list-style-type: none"> • Cadmium plating of miscellaneous metals shall be in accordance with ASTM A165, Type TS. • All anchor bolts shall be stainless steel Type 316. • Cages, ladders, and fall protection devices shall conform to applicable OSHA regulations. | |
| 6 | Aggregate | <p>Structural concrete materials shall have certification of compliance for meeting ASTM specifications and test reports certifying that no material contains asbestos and that all aggregates are non-reactive to alkalinity. All certifications, submittals, and reports shall be current within three months of use and shall be identifiable to the materials supplied for both fine and coarse aggregate. Provide reports for aggregate tests performed specifically for this project, for each source of aggregate including chemical tests (ASTM 289) and accelerated mortar bar expansion tests (ASTM C1260).</p> | |
| 7 | Cement | <ul style="list-style-type: none"> • The Geotechnical Baseline Report identified a potential for soil corrosivity towards concrete. DB shall either perform additional soils testing, to verify that corrosive soils do not exist, or shall furnish corrosion resistant concrete using Type II/V cement. • Structural Concrete Class A Concrete f'c = 4000 psi • Shall contain a mineral admixture fly ash Class F not to exceed or replace more than 15 percent of the cement material required without the mineral admixture. Mineral admixture shall conform to ASTM A618. | |

SECTION 5 CIVIL CRITERIA

5.1 General

The following section includes the performance criteria associated with site-civil elements of the WRF.

Civil Features/Scope are summarized in the table below and detailed further within Section 5. The summary table shall govern in event of a disagreement with content in Section 5.

Key Overall Civil Features

- Earthwork required to develop a graded platform for the new Water Reclamation Facility
- Access roads within the WRF plant site
- Stormwater management within the WRF plant site
- Yard piping (both process and utility) within the WRF plant site
- Chemical distribution ductbank
- Site electrical facilities including power distribution and site lighting (reference Electrical Proposal Form for information)

Equipment – Sanitary Lift Station

- 1 lift station with duplex submersible pump configuration
- Pumps appropriate for raw wastewater application
- Assumed flowrate of up to 300 gpm; assumed rated head 60-ft
- Controls based on float switch located within manhole with alarm signal sent to plant SCADA/PLC system.
- Manufacturer: DXP, Xylem, Flygt, or similar.

5.2 Site Improvements

| Item | Parameter | Criteria | Notes |
|------|---------------------------|---|---|
| 1 | Finish Surface Type | <ul style="list-style-type: none"> • Concrete: sidewalks, equipment pads, foundations, site entrance, truck stopping and parking areas • Asphalt: paved roads • Crushed rock: unpaved areas • Native material: unimproved areas | All improved areas within the site that are not concrete, asphalt, or landscaping shall be crushed rock |
| 2 | Backfill and Compaction | Refer to Geotechnical Baseline Report | See Appendix J: Geotechnical Baseline Report for additional geotechnical information |
| 3 | Existing Finished Surface | Native vegetation | Existing site has not been developed |

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|---|--------------------------------|---|---------------------------------------|
| 4 | Site Setbacks | Building and process areas shall be located to comply with San Luis Obispo County and the City of Morro Bay Building standards | Maintain setback for creeks/drainages |
| 5 | Bollards | where necessary for equipment maintenance bollards shall be removeable | |
| 6 | Perimeter Fence | The WRF perimeter shall be enclosed with a 6-foot tall galvanized chain-link fence with privacy slats and 3 strands of barbed wire on the top. The eastern edge of the site shall also have the concrete exclusion barrier underneath the chain link fence. [PCO 058] The fence around the west and east sides of the Operations Building shall be 6' chain-link without barbed wire. The parcel perimeter will have a barbed wire fence. [PCO 041] | Coordinate with Section 3.9 |
| 7 | Survey and Utility Information | The City will provide the survey files and available utility information for informational purposes. The DB is responsible for validating the information provided by the City. The DB is responsible for obtaining additional survey and utility information. | |

5.3 Site Layout

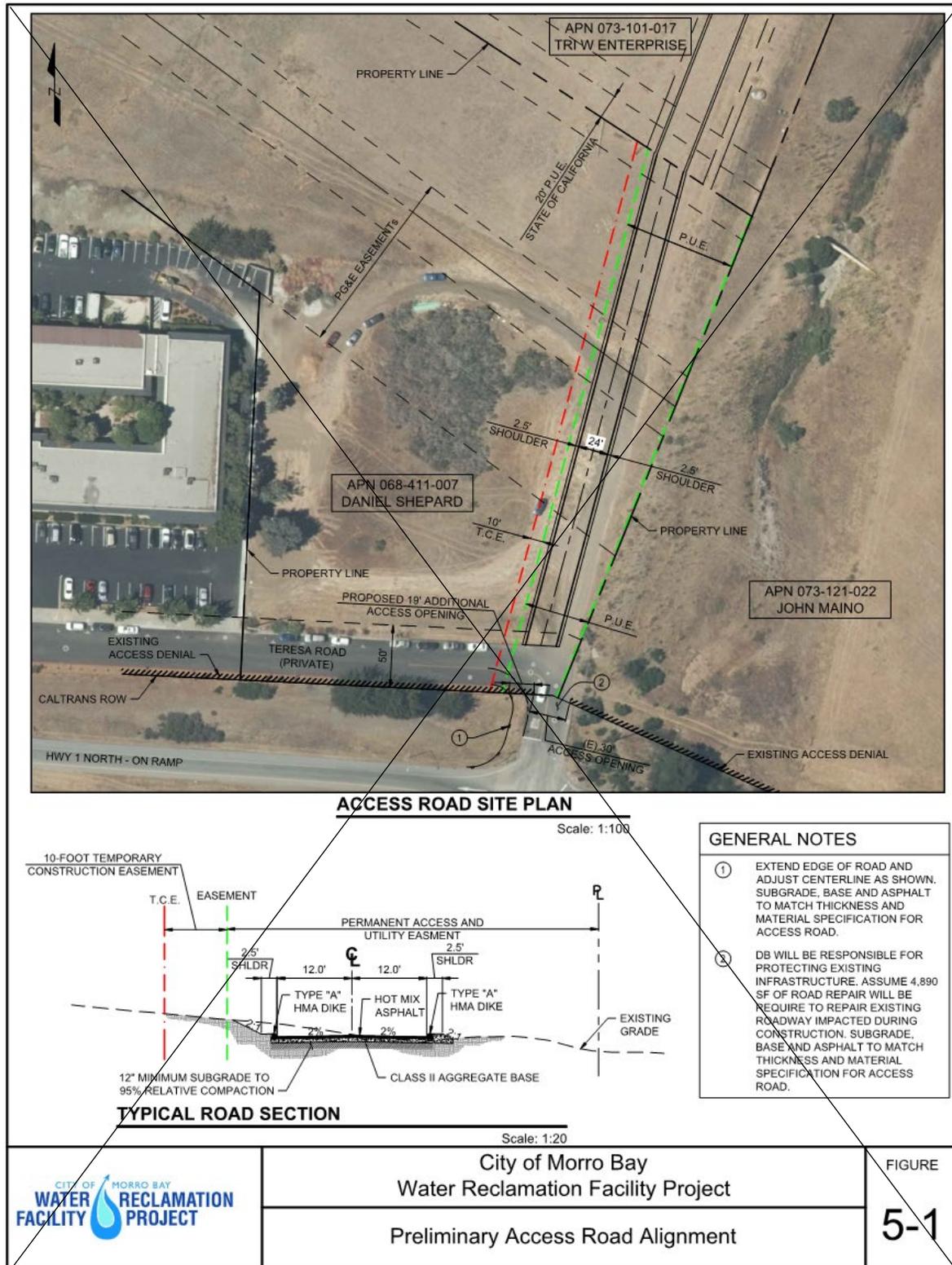
| Item | Parameter | Criteria | Notes |
|------|------------------------------|--|---|
| 1 | Building/Facility Locations | <ul style="list-style-type: none"> Proximity of buildings to Highway 1, nearest to furthest: Operations Building Storm Drainage Facilities Equipment/Vehicle Storage Material Laydown Areas Maintenance Building Treatment/Process Facilities | <ul style="list-style-type: none"> Reduce the visibility of the storage and process areas from the Highway. Locate headworks, EQ basins, and other processes subject to odor as far from the Operations Building as feasible. |
| 2 | Future 800 kW solar Facility | The site planning must include space for a future 800 kW solar facility | Provisions for a future solar facility are to be included in the site layout to facilitate future constructability and access |

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|---|--------------------------|--|--|
| 3 | Site Vehicle Circulation | <p>The WRF facility shall be designed to allow truck and service vehicle traffic to flow smoothly without creating areas of congestion and dead-ends</p> <p>The WRF facility shall be designed to minimize need to back up chemical delivery and biosolids hauling trucks.</p> | |
| 4 | Fire Equipment Access | <p>The WRF facility must be designed to allow full access for emergency responder vehicles and equipment. Emergency responder vehicles shall be able to drive continuously throughout the site without any reverse movements.</p> | |

5.4 Site Access Road

| Item | Parameter | Criteria | Notes |
|------|---------------------------|--|-------|
| 1 | Site Access Road Design | <p>Access road shall provide vehicular access to the WRF site from the Highway 1 on and off ramps. [PCO 066] The City will be responsible for permitting, including potential Cal Trans permit for widening of offramp area, with drawings furnished by the DB team.</p> | |
| 2 | Site Access Road Location | <p>The access road shall be generally located per Figure 5-1</p> | |

Figure 5-1: WRF Site Access Road – NOT USED – See 90% Drawings [PCO 066]



[PCO 066]

5.5 Offsite Pipeline Coordination

| Item | Parameter | Criteria | Notes |
|------|------------------|--|-------|
| 1 | Connection point | <ul style="list-style-type: none"> Connect to the influent 12” and 16” force mains, [PCO 022] recycled water pipeline, dedicated City fiber optic line, and effluent pipe, at approximately 20 feet north of the access and utility easement boundary at Highway 1 ROW. The exact location and connection details within the access and utility easement to the WRF site shall be determined as part of the access road improvements and provided to the City by the 60% design submittal DB to connect to City potable water main offsite and extend throughout WRF property. Connection point is to be extended further offsite to connect to existing line in Teresa Road [PCO 117] Refer to Utility Coordination Plan (Figure 5-2) | |
| 2 | Stubs | Any temporary or permanent stubs should be capped, blind-flanged, or protected in a manner to prevent foreign materials from entering the pipeline. | |

5.6 Potable Water

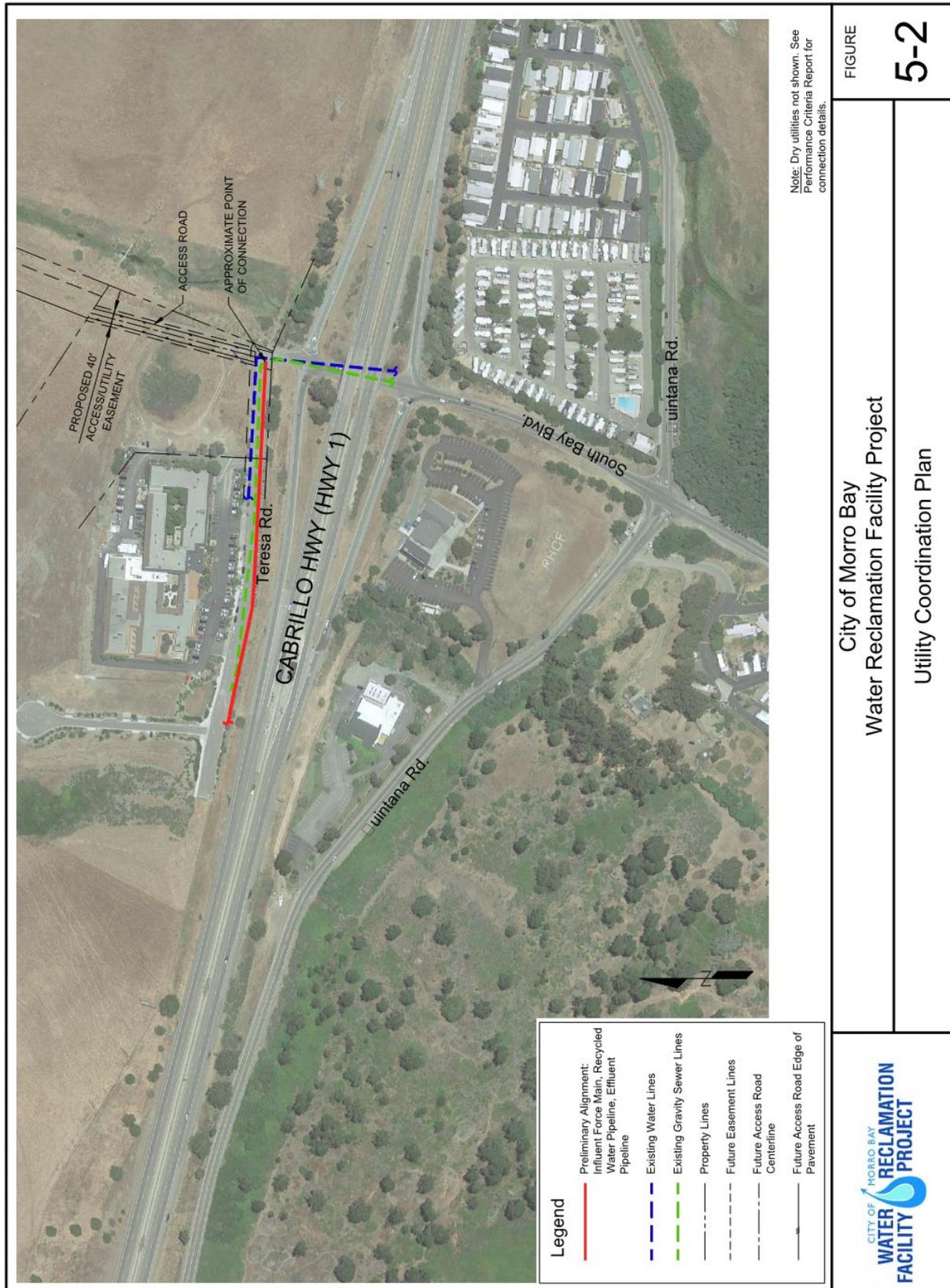
Provide on-site water distribution facilities for domestic water services at the WRF. Provide connection(s) to City water supply as shown on Figure 5-1. City will provide water meter and DB will install service and connect to City water main. System shall be completely separated and isolated from the fire water and process water systems.

| Item | Parameter | Criteria | Notes |
|------|-----------------|---|-------|
| 1 | Design Approach | <ul style="list-style-type: none"> See drawings for system configuration approach. Potable water system design shall be based on a connection to City’s water main. DB to extend water line from City water main offsite as shown on Figure 5-2, then | |

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| | | throughout WRF property as needed. | |
| 2 | Potable Water Uses | <ul style="list-style-type: none"> • Operations Building, Maintenance Building, and Fire Water System • Emergency eyewash, fire, personal hygiene, kitchen, and laboratory | DB to confirm final service uses |
| 3 | Separation of Buried Piping | Horizontal and vertical separation between potable water pipelines and non-potable water pipelines shall meet the requirements of the SWRCB Division of Drinking Water's (formerly the Department of Health Services) Criteria for the Separation of Water Mains and Non-Potable Pipelines guidance memo | |
| 4 | Backflow Prevention | <ul style="list-style-type: none"> • Provide appropriate backflow prevention systems for the potable water supply to site • Where potable water is used for landscape irrigation or process usage, provide a reduced pressure principle backflow assembly system complete with test cock and isolation valves | Backflow devices must be testable. |
| 5 | Air Release/Vacuum Valves and Blow Offs | <ul style="list-style-type: none"> • Provide air and vacuum relief valves at high points on pressure pipes • Provide drains or blow-offs at low points | Consider location of actual points of discharge/ disposal when placing drains or blow-offs. |
| 6 | Piping Layout | <ul style="list-style-type: none"> • Lay piping in utility corridors that are at least 10' wide and accessible for service or repairs. Include overhead and peripheral clearance to allow for work by excavating and lifting equipment such as backhoes. • Where feasible, align utility corridors along roadways or other corridors to avoid conflicts and future construction areas. • Utility corridors shall be placed outside the mature dripline of trees. • High and low points in the fire water system shall be minimized to reduce the need for ARVs and prevent sediment buildup. | |

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| 7 | Pipe Sizing | Prepare and provide pipe capacity hydraulic calculations to demonstrate the proposed pipe sizes are adequate | Include 20 percent spare capacity |
| 8 | Water Demand | <ul style="list-style-type: none"> • The water demand shall be determined based on the applicable building and fire codes • The potable water system shall be able to supply the determined water demands at each point of connection while meeting the minimum and maximum pressure requirements | |
| 9 | Water Meter | <ul style="list-style-type: none"> • Potable water service connection shall be metered and independent of the fire water service connection | |

Figure 5-2: Utility Coordination Plan



5.7 Fire Protection

Provide on-site water distribution facilities for fire water services at the WRF. Fire water system shall include distribution piping, fire sprinklers (where required by code), and fire department connections, capable of meeting the requirements of Cal Fire and the City Morro Bay Fire Protection requirements for isolated structures that are not served by a water utility.

| Item | Parameter | Criteria | Notes |
|------|--------------------------|--|-------|
| 1 | Code | Comply with National Fire Protection Association (NFPA) Standard 13 for a “light hazard” and local fire codes | |
| 2 | Source Water | Fire water shall be provided from the potable water supply system | |
| 3 | Fire Hydrant Locations | <ul style="list-style-type: none"> • Submit fire hydrant locations for review and approval by City and local Fire Department. • Fire hydrants shall be placed throughout the WRF Site at a distance of no more than three hundred (300) feet. • Place fire hydrants near access roads with fire truck access and where they are readily visible. Mark with reflective blue dot street markers located in the center of the access road adjacent to the fire hydrant. • Provide bollards for fire hydrants that are vulnerable to vehicular damage. | |
| 4 | Design Flow and Pressure | <ul style="list-style-type: none"> • Fire water system shall be capable of supplying 1500 gpm @ 20 psi (minimum) to any point within the fire water system for a period of 2 hours. • | |
| 5 | Pipe Velocity | Velocities in pipes shall not exceed 12 feet per second during a fire flow scenario | |
| 6 | System Layout | High and low points in the fire water system shall be minimized to reduce the need for ARVs and prevent sediment buildup | |
| 7 | Fire Alarm | <ul style="list-style-type: none"> • Design of the system shall be coordinated with the fire detection/alarm system, see | |

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| | | <p>Section 8.8 [5/29/19 Fire Marshal Meeting Decision]</p> <ul style="list-style-type: none"> The fire alarm shall simultaneously contact the fire department and annunciate in the operations control room when any alarm is activated | |
| 8 | Fire Protection for Electrical Equipment | See Section 3.6 for fire protection criteria for electrical, computer, and communication areas | |

5.8 Grading and Drainage

Provide grading improvements and a stormwater collection system consisting of gutters, swales, storm drain piping, and catch basins that collect stormwater runoff from the improved WRF Site and discharge into a detention basin. For the control of stormwater discharge from the project site the DB shall meet the requirements of the State Water Resources Control Board’s Water Quality Order 97-03-DWQ, NPDES General Permit No. CAS000001 Waste Discharge Requirements for Discharges of Stormwater Associated with Industrial Activities Excluding Construction activities.

| Item | Parameter | Criteria | Notes |
|------|---------------------|---|---|
| 1 | Code Requirements | <ul style="list-style-type: none"> Grading activities shall be in compliance with: San Luis Obispo County Code, Title 22 – Land Use Ordinance, Article 5 – Site Development Standards, Chapter 22.52 – Grading and Drainage Provisions of the latest edition of the Uniform Building Code Appendix Chapter 33 Latest edition of the California Building Code. | Any conflict with geotechnical baseline report shall be provided in a written report and presented to the City for consideration. Geotechnical Engineer Transfer of Responsibility Form will be required for any deviations from the GBR. |
| 2 | Design Requirements | Grading design shall meet the requirements of the City of Morro Bay Building Permit Application and Minimum Building Permit Submittal Requirements | Grading permits will be processed by the City |
| 3 | Design Approach | <ul style="list-style-type: none"> Grading plan shall direct runoff away from walkways, buildings, cut and fill slopes, and yard activities Slopes of unpaved areas shall not exceed 2:1 (horizontal to vertical) | |
| 4 | Gutters | Minimize use of cross gutters or ribbon gutters. | Adding catch basins and laterals shall be used in lieu of cross |

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| | | | gutters, unless an unmovable obstruction prevents the use of subsurface drainage facilities |
| 5 | Site Access Road Grades | Longitudinal grades along roadways shall generally not exceed 5%, and shall be designed to be as uniform as possible to minimize grade breaks | |
| 6 | Accessibility Requirements | All building entrances for the Operations Building shall be universally accessible | See Section 3 |
| 7 | Finished Grade | <ul style="list-style-type: none"> Finished grades around structures, slabs, and buildings shall be at least 6-inches below floor or slab elevation Grading shall be performed to accommodate process areas to maintain drainage away from all structures Water from treatment process areas should be routed to the WRF headworks The site shall be graded such that all facilities and accessible walkways and roadways are not inundated by a 100-year rainfall event | |
| 8 | Drainage Piping | Drainage piping shall be at least 6-inch nominal size for connections to roof downspouts and 12-inch or larger for main collection lines | |
| 9 | Culverts | Provide culverts where collected drainage must cross walkways | |
| 10 | Inlet Structures | <ul style="list-style-type: none"> Design inlet structures where it will not hinder facility operation Provide a design to eliminate soil or debris from entering storm drain system for large areas Drain inlet openings shall be a minimum 2 feet in length | |
| 11 | Storm Drain and Catch Basin Laterals | Storm drains and catch basin laterals shall be a minimum of 12-inches diameter | |
| 12 | Detention Basins | <ul style="list-style-type: none"> Provide a detention basin capable of retaining all on-site runoff | |

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| | | <ul style="list-style-type: none"> • Detention basin shall also serve as the emergency overflow pond storage for untreated wastewater, and provide the City the ability to evacuate the entire pond by pumping stormwater or untreated wastewater back into the headworks | |
| 13 | Hydrologic Analysis Criteria | <ul style="list-style-type: none"> • Stormwater pipes and drain inlets shall be capable of collecting and conveying a ten-year, twenty-four-hour event without causing nuisance flooding or surcharging of any pipe • The stormwater system shall be capable of conveying a 100-year, 24-hour rainfall event without flooding any facility or building • Use rainfall intensity data from the San Luis Obispo County Department of Public Works & Transportation Improvement Standards • Stormwater detention requirements shall comply with City and County development standards | |

5.9 Pavement/Roadways

Provide asphalt roadways and concrete pavement to provide vehicular access and circulation throughout the WRF Project site.

| Item | Parameter | Criteria | Notes |
|------|---------------------|---|-------|
| 1 | Type | <ul style="list-style-type: none"> • Concrete pavement may be used in lieu of asphalt pavement • Use concrete paving where truck parking, loading, washdown, or unloading is anticipated and where asphalt paving is incompatible with the materials handling requirements for the area | |
| 2 | Pedestrian Walkways | <ul style="list-style-type: none"> • Construct pedestrian walkways between structures and buildings of concrete with a minimum width of 4 feet and minimum thickness of 4 inches • All pedestrian paving shall be designed to accommodate service | |

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| | | and maintenance vehicles up to twenty-two thousand (22,000) pounds | |
| 3 | Access to Process Areas | <ul style="list-style-type: none"> Extend pavement to all process areas to provide for maintenance access by forklift and maintenance vehicles Design all hauling access, including but not limited to sludge and screenings, and chemical delivery access to minimize reverse and back and forth movements by vehicles. | |
| 4 | Equipment Areas Not Abutted by AC Paving | <ul style="list-style-type: none"> Provide 3" thick layer of ¾" crushed rock compacted to 85% relative compaction conforming to Caltrans standards in and around these areas. Unless specified otherwise, provide minimum 4-foot gravel apron adjacent to concrete areas. Native vegetation shall not abut concrete areas. | |
| 5 | Road Width | <ul style="list-style-type: none"> Use a minimum width of 24 feet for two-way traffic Use a minimum width of 14 feet for single lane roads | Include provisions for a turn-around at dead ends |
| 6 | Curb Turning Radius | <ul style="list-style-type: none"> Site access roads shall accommodate the minimum turning paths for AASHTO Intermediate Semitrailer vehicles for facilities requiring semitrailer access All other site access roads shall accommodate the minimum turning paths for AASHTO Single-Unit Trucks Fire access roads shall accommodate minimum turning paths for fire trucks | |
| 7 | Fire Truck Access | <ul style="list-style-type: none"> Design buildings to be accessible to fire department apparatus by roads with a minimum unobstructed width of 20 feet, and vertical clearance of 15 feet. Roadway design criteria and layout shall be approved by local Fire Department | To be defined during Planning Permit application |

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| 8 | Signs and Marking | Provide directional and traffic signs and markings for all roads and direct traffic to key buildings | |
| 9 | Design Approach | <ul style="list-style-type: none"> • Design pavements for a 50-year design life • R values for subgrade soils under pavement shall be determined by a State of California Registered Geotechnical Engineer • All paving shall be uniform vehicular quality paving, constructed with appropriate subgrade preparation, subbase, and base to handle all anticipated traffic demands for loading, speed, turning, stopping and starting with no rutting or buckling • All paving designs shall be based on a Traffic Index (TI) calculation determined in accordance with Caltrans Highway Design Manual (2012) • Design access roads with a maximum traffic index of 7.0 | Coordinate with Geotechnical Baseline Report |
| 10 | Curb and Gutter | Portland cement concrete curb and gutter meeting City of Morro Bay standards shall be provided on established roadways and parking areas | |

5.10 Construction Dust Control and SWPPP Stormwater Management

5.10.1 Dust Control

Prepare, obtain approval and implement all the requirements of the latest Fugitive Dust Control Plan (FDCP) in accordance with the San Luis Obispo County Air Pollution Control District Regulations. Also, the DB shall prepare, obtain approval, and implement all of the requirements of the latest State National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities Order No. 2009-0009-DWQ and industry standards according to the State Water Quality Control Board (SWQCB).

| Item | Parameter | Criteria | Notes |
|------|----------------------------|--|---|
| 1 | Fugitive Dust Control Plan | <ul style="list-style-type: none"> • Prepared using latest APCD regulations. • DB must obtain APCD Approval • After APCD approval of FDCP amend as required | Public requests to review the approved FDCP shall go to the City’s Representative |

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| | | <ul style="list-style-type: none"> Supply approval and amendments to City, DB general office and in job site construction office Approved copies and amendments shall be available for US EPA | |
| 2 | Air Pollution Control District Rules | DB shall be familiar with APCD requirements and maintain a copy at the Construction Sites | |
| 3 | Earthmoving Activity | <ul style="list-style-type: none"> DB must notify the City 48-hours in advance of activity Keep daily record of dust control measures every day earthmoving is conducted | |

5.10.2 Stormwater Management During Construction

Comply with all of the requirements of the latest NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities Order No. 2009-0009-DWQ according to SWQCB and standard industry practice. This includes, but is not limited to, preparing plans and application, maps as well as all necessary reporting on the SWQCB’s Stormwater Multiple Application and Report Tracking System (SMARTS System).

| Item | Parameter | Criteria | Notes |
|------|--|--|---|
| 1 | Stormwater Pollution Prevention Plan (SWPPP) | <ul style="list-style-type: none"> DB must have a Certified Qualified Stormwater Pollution Prevention Plan (SWPPP) Developer (QSD) prepare a SWPPP DB must submit SWPPP to City’s Construction Manager for Approval DB to submit NOI and necessary documents in SWQCB’s SMARTS system for approval by LRP DB shall implement SWPPP and start Construction activity only after written approval from SWQCB Supply SWPPP approval and amendments to City, DB general office and in job site construction office | Must comply with latest State NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities Order No. 2009-0009-DWQ |
| 2 | SWPPP Implementation | <ul style="list-style-type: none"> DB shall implement SWPPP and start Construction activity only after written approval from SWQCB During project DB shall have a Quality SWPPP Practitioner | |

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| | | <p>(QSP)conduct audits, inspections, testing, and prepare reports</p> <ul style="list-style-type: none"> • QSP shall coordinate with the QSD any updates • The SWPPP shall be made available upon request of a representative of the Flood Control District, Regional Water Quality Control Board, State Water Resources Control Board or U. S. Environmental Protection Agency. Requests by the public shall be directed to the Owner’s representative | |
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Notice of violation and/or fines for any non-compliance will be the responsibility of the DB.

5.11 Facility Stormwater Management Post-Construction Requirements

Stormwater management for the WRF shall meet the requirements of the City of Morro Bay Stormwater Management Guidance Manual for Low Impact Development & Post-Construction Requirements, Main Manual (Dated March 6, 2014 and updated July 1, 2017).

5.12 Noise Control

Incorporate noise reduction measures into the project design and construction. Retain an acoustical engineer to measure or calculate post-project operational noise levels at the nearest sensitive receptor based upon the final project design as implemented. If the project results in noise levels exceeding the City of Morro Bay or San Luis Obispo County Noise Ordinance thresholds, the DB shall develop additional sound-attenuation measures which may include additional enclosures for noise generating equipment to ensure that noise levels at nearby sensitive receptors are reduced to the acceptable noise levels as identified in the County thresholds for noise generators.

| Item | Parameter | Criteria | Notes |
|------|------------------------------------|---|-------|
| 1 | General Requirements | <ul style="list-style-type: none"> • Sound pressure level guidelines are provided by the Code of Federal Regulations Title 29, Part 1910.95 (29 CFR 1910.95) and enforced by OSHA. • These guidelines provide acceptable sound pressure levels for different frequencies and durations. Comply with City of Morro Bay Noise Ordinance regulations regarding community impacts and San Luis Obispo County Noise regulations. | |
| 2 | Construction Methods and Equipment | <ul style="list-style-type: none"> • Utilize construction methods or equipment that will meet local | |

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| | | <p>ordinances for the maximum decibel rating at the property line</p> <ul style="list-style-type: none"> • All construction vehicles and fixed or mobile equipment shall be equipped with properly operating and maintained mufflers • Schedule construction such that the minimum number equipment would be operating at the same time | |
| 3 | Portable Noise Barriers | If equipment used can cause hearing damage, portable noise barriers shall be installed to reduce noise levels below hearing damage thresholds | |
| 4 | Hearing Protection to Construction Staff | Provide all employees that will be exposed to noise levels greater than 75 dB over an extended period with adequate hearing protection devices to mitigate hearing damage | |
| 5 | Staging Areas | Locate vehicle staging areas and stockpiling as far as is practicable from the existing buildings along Teresa Road | |
| 6 | Noise Control Design | <ul style="list-style-type: none"> • Noise control shall be accomplished by a combination of isolating mechanical equipment in mechanical rooms if necessary and properly selecting equipment to meet noise criteria requirements for all equipment and components. • Blower and compressor equipment associated with the MBR system shall be located within a dedicated mechanical room or in sound enclosures to mitigate noise levels. | |
| 7 | Sound Attenuation | Exterior mechanical equipment such as air cooled condensing units shall be provided with sound attenuating features (i.e. compressor blankets). The sound power levels from mechanical equipment shall meet minimum requirements. | |
| 8 | Construction Hours | Construction shall be limited to between the hours of 07:00 AM and 04:00 PM to reduce construction generated noise. | Exceptions may be requested in writing from the City for work requiring special accommodations. See |

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| | | | Appendix M for limitations to mitigate noise impacts for hours outside of those listed. |
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SECTION 6 GEOTECHNICAL CRITERIA

A Preliminary Geotechnical Baseline Report was performed for the Project site to identify geotechnical and geologic conditions and establish design performance criteria for the new plant. The proposed design is inclusive of the recommendations of this report.

A Geotechnical Consultant shall perform a design-level geotechnical site investigation based on the conceptual site layout. It is expected that the investigation will include the following elements:

- Review of available geotechnical information developed for the site, including the results of previous field investigations
- Review of available regional geologic and seismological information in the vicinity of the site
- Perform additional subsurface borings, test pits and geophysical investigations as needed to characterize the site and to permit the development of design recommendations for the new treatment plant

The Geotechnical Consultant shall produce a Geotechnical Design Report that includes the following:

- Description of services performed
- Site conditions
- Subsurface conditions
- Groundwater conditions
- Discussion of regional geology and seismicity
- Natural hazards evaluation
- Liquefaction potential analysis
- Recommendations for seismic design parameters
- Corrosive soils evaluation
- Site preparation and earthwork recommendations, including fills, embankments and cut slopes
- Recommendations for reuse of excavated materials
- Recommendations for imported fill material
- A discussion of foundation type alternatives
- Foundation design recommendations, including performance (settlement, lateral displacement, seismic, etc.) evaluations
- Recommendations for design and construction of retaining walls, including water-proofing recommendations
- Interior and exterior slab-on-grade recommendations
- Pavement design recommendations
- Construction recommendations
- Other recommendations as appropriate for the design and construction of the facility.

SECTION 7 MECHANICAL PIPING CRITERIA

7.1 General

| Item | Parameter | Criteria | Notes |
|------|------------------------------|--|---|
| 1 | Equipment Design Approach | <ul style="list-style-type: none"> Maximize consistency and optimize spare part requirements for mechanical equipment such as valves, actuators, flowmeter and other equipment across packaged treatment systems Maximize access to mechanical equipment for O&M purposes Provide necessary isolation valves to facilitate hydro testing; taking into account different pipe pressure classes | |
| 2 | Special Tools | Provide special tools required for equipment repair | |
| 3 | Equipment Pads | Provide housekeeping/plinth pads for all equipment | |
| 4 | Pipe Mounting in Trenches | Mount pipes within pipe access trenches to trench walls, to the extent possible | No pipe trenches are currently proposed for the project. |
| 5 | Pipe Labeling/Flow Direction | Provide painted pipe labeling, and painted flow direction arrows for proper operation for all pipework | <ul style="list-style-type: none"> Labels for piping 2 inches and larger shall bear the full piping system name as shown in the Piping Schedule. Provide separate flow directional arrows next to each label. Color, size, and labeling shall conform to ANSI A13.1 and Z535.1. Labels for piping shall be painted. |
| 6 | Joint Restraint | Provide restrained fittings for all pressure piping | |
| 7 | Spare Sample Taps | Include convenient spare sample taps throughout treatment process trains | <ul style="list-style-type: none"> Sample taps shall be accessible and properly labeled Locate sample taps in common areas with drains |

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| 8 | Valve Arrangements | Provide isolation valves and bypass piping for critical mechanical equipment that require removal for routine maintenance/calibration | |
| 9 | Equipment Tagging and Labeling | Submit comprehensive tag program for all mechanical equipment and as specified in the individual sections of this Performance Criteria Report | <ul style="list-style-type: none"> • Provide a label for each pump, blower, compressor, tank, feeder, flocculator, flash mixer, clarifier mechanism, or other piece of mechanical equipment. Label shall show the equipment name and tag number. Labels shall be 1 1/2 inches (minimum) by 4 inches (minimum) brass, stainless steel, or aluminum. • Tag shall show the tag number and/or name or designation in coordination with the asset management criteria. • Provide stainless steel wire for tags. • All equipment that is designated as field painting shall be Tnemec 32R Light Gray or equal. Any factory finished equipment that was manufactured with their standard finish will be accepted as is. [PCO 91] |

7.2 Piping

| Item | Parameter | Criteria | Notes |
|------|-------------------------------|--|--|
| 1 | Piping Schedule | Submit comprehensive piping schedule in detailed design indicating size, information, type, material of construction, lining, coating, and other critical information. | See partial piping schedule below indicating minimum requirements |
| 2 | Unions | Provide unions on threaded exposed steel piping 3 inches and smaller as needed to maintain valves and equipment. | |
| 3 | Painting and Coating: General | <ul style="list-style-type: none"> • Required for the interior and exterior surfaces of ferrous pipe | <ul style="list-style-type: none"> • All pipe color shall be gray, with the exception of color-coded chemical piping. |

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| | | <ul style="list-style-type: none"> • Pipe lining shall be appropriate for the application | <ul style="list-style-type: none"> • Cement-mortar lining shall be per AWWA C104. Lining thickness shall be the double thickness listed in AWWA C104, Section 4.7. |
| | Painting and Coating: Buried Pipes | <ul style="list-style-type: none"> • Asphaltic or epoxy coated and wrapped with polyethylene encasement • Epoxy thickness: 50 mils, 100 mils on nuts, bolts, and sharp projections | <ul style="list-style-type: none"> • |
| | Painting and Coating: Above-Ground Pipes | Provide epoxy with polyurethane topcoat on exposed pipe. Follow manufacturer’s recommendations for surface prep for topcoating of fusion bonded epoxy surfaces | <ul style="list-style-type: none"> • Provide polyurethane topcoat on exposed pipe • All pipe color shall be gray, with the exception of color-coded chemical piping |
| 4 | Underground Pipe Marking | All buried non-metallic pipe must include an electronic detectable underground warning tape | <ul style="list-style-type: none"> • |

Partial Piping Schedule

See P&IDs for piping types. Pipe schedule will be included in technical specifications.

7.3 Valves

| Item | Parameter | Criteria | Notes |
|------|---------------------------|--|-------|
| 1 | Valve Location | Valves shall be accessible (i.e., not buried), unless otherwise necessary. Minimize locating valves with actuators in confined areas, when possible. | |
| 2 | Valve and Gate Automation | Provide automation on all equipment needed for remote normal operation | |
| 3 | Valve Maintenance | <ul style="list-style-type: none"> • Incorporate dismantling joints where necessary into design layout to facilitate removal of valves • Provide access hatches, building entry, and lifting devices for large and critical valves | |

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| 4 | Surge Control | Specify speed of opening and closing to avoid significant increase in pressures | |
| 5 | Labeling and Valve Tags | Label all valves with manufacturer’s name and working pressure on durable label permanently affixed to the valve. | <ul style="list-style-type: none"> • Provide each valve of size 2 inches and larger with an identification tag. Tag shall be 2-inch-square or circular aluminum or 316 SS: W. H. Brady B-60, Seton Name Plate Corp. Series SVT, or equal. Aluminum tags shall have black-filled letters. • Tag shall show the valve tag number and/or name or designation in coordination with the asset management criteria. • Provide stainless steel wire for tags. |
| 6 | Painting and Coating: General | Required for the interior and exterior surfaces of valves | All exterior pipe color shall be gray, with the exception of color-coded chemical piping |
| | Painting and Coating: Buried Valves | <ul style="list-style-type: none"> • Epoxy coated and wrapped with polyethylene encasement • Thickness: 50 mils, 100 mils on nuts, bolts, and sharp projections | |
| | Painting and Coating: Above-Ground Valves | <ul style="list-style-type: none"> • Ferrous interior surfaces: epoxy. • Provide polyurethane topcoat on exposed valves and pipe. Follow manufacturer’s recommendations for surface prep for topcoating of fusion bonded epoxy surfaces. | <ul style="list-style-type: none"> • Provide polyurethane topcoat on exposed valves and pipe • All pipe color shall be gray, with the exception of color-coded chemical piping |

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| 7 | End Connections | <ul style="list-style-type: none"> • 2.5-inch and smaller may be provided with threaded or flanged end connections • 3-inches and larger require flanged end connections • Unless otherwise shown or otherwise specified, all flanged valves shall have ends conforming to AWWA C115, 125 lb flange | All pressurized connections shall have restrained fittings |
| 8 | Manufacturer | <ul style="list-style-type: none"> • All valves shall be by a single manufacturer to the extent possible • Manufacturer shall have a successful record of not less than 5 years in the manufacture of the valves selected | |
| 9 | Acceptable Manufacturers | <ul style="list-style-type: none"> • Gate Valves: Clow, AVK, American Flow Control, Waterous, Kennedy, DeZurik, or equal • Check Valves: M&H, Clow, DeZurik, or equal • Check Valves (Chemicals): Ryan Herco, GF Plastic Systems, Asahi/America, or equal • Butterfly Valves: Pratt, DeZurik, or equal • Pressure Reducing and Pressure Relief Valves: Cla-Val Company • Diaphragm Valves: ITT Grinnel, Asahi/America, or equal • Air release, Air and Vacuum, and Combination Air Valves: DeZurik, A.R.I. Flow Control Accessories, or equal • Solenoid Valves: Hayward, ASCO, DeZurik, or equal • Gates: Rodney-Hunt, Waterman, Whipps, Golden Harvest, or equal • Plug valves – Victaulic, Clow, DeZurik, Pratt, Milliken, or equal | |

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| | | <ul style="list-style-type: none"> Telescoping Valve - Waterman Industries, Inc., Coldwell-Wilcox Company, or equal Knife Gate Valve - DeZurik, ITT Fabri-Valve, or equal | |
| 10 | Ball Valves: PVC, CPVC | <ul style="list-style-type: none"> Line size ball valve and union shall be installed upstream of each solenoid valve, in-line flow switch, or other in-line electrical device for isolation during maintenance Body, ball, stem and connector: Schedule 80 PVC Manufacturers: Hayward, Spears, Ryan Herco Products Corp, or equal | Provide vented ball for all valves in hypochlorite service |
| 11 | Ball Valves: Bronze, SS | Manufacturers: Apollo Ball Valve Division, Wall, or equal | |
| 12 | Material | <ul style="list-style-type: none"> Select corrosion resistant and chemically compatible material and maximize durability of equipment selected Gates, including body, gate, and trim, shall be 316L SS | |
| 13 | Valve Schedule | Submit comprehensive valve schedule in detailed design indicating size, tag information, type, material of construction, manufacturer, and other critical information. | |

7.4 Valve Actuators

| Item | Parameter | Criteria | Notes |
|------|--------------------------|--|--|
| 1 | Electric Actuators | <ul style="list-style-type: none"> Provide on all equipment needed for remote normal operation Manufacturers: AUMA, Rotorque, or equal | <ul style="list-style-type: none"> Provide actuators from the same manufacturer throughout the facility Must meet area classification requirements |
| 2 | Spur Gear and Hand Wheel | Required for gate valves 18-inches and larger | |

| | | | |
|---|--------------------------------|--|---------------------|
| 3 | Actuator Sizing | Oversize actuator to allow for aging, corrosion, scaling, clogging of equipment | Oversize 20 percent |
| 4 | Manual Operator: Exposed | <ul style="list-style-type: none"> Worm gear drive and nut Chain wheel, sprocket, and aluminum chain required if mounted more than 7 feet above the operating floor | |
| 5 | Manual Operator: Buried Valves | <ul style="list-style-type: none"> Provide valve box, 2-inch square operating nut, and position indicator Extension: required if top of valve nut is greater than 12-inches below the top of valve box | |
| 6 | Portable Valve Operator | Provide a portable electric non-rising stem valve operator with torque limiting adapter rated at 250 ft-lb | |

7.5 Pumps

| Item | Parameter | Criteria | Notes |
|------|---------------|--|---|
| 1 | Configuration | The pumps and pumping appurtenances shall be by a single manufacturer responsible for furnishing and functional operation of complete pump system | All pumps in plant shall be by same manufacturer to the extent possible |
| 2 | Testing | Submit non-witnessed Factory Acceptance Test data before shipment of the pump | |
| 3 | Design | Specify pump type and identify process. Specify performance curve and pump data. Specify electrical requirements and controls. Assemble drawings showing location and process. Specify pump drive and motor and provide bearing calculations, indicate points on H/Q curves, pump detailed description, installation drawings. | |
| 4 | Seals | <ul style="list-style-type: none"> Provide mechanical and double mechanical seals wherever possible | |

| | | | |
|----|--------------------------------|---|---|
| | | <ul style="list-style-type: none"> Mechanical seals shall be of the best quality, using the Manufacturer’s suggested materials best suited for the specific application | |
| 5 | Flanges: Suction and Discharge | Cast Iron (ANSI/ASME B16.1), Class 25, 125, 250, and 800. Or ANSI/ASME B16.5 | |
| 6 | Lubrication | <ul style="list-style-type: none"> Vertical pump shafts (clean water): Product water lubricated Deep-well/dry barrels: Water or oil lubricated bearings, seals, and enclosed line shafts Vertical propeller, mixed-flow, and turbine pumps or bowl sizes 10-inches and larger (other than deep well pumps): stainless steel tube attached to the column for grease lubrication of the bottom bearing | |
| 7 | Vortex Suppressors | Provide for vertical pumps with marginal submergence | |
| 8 | Pump Casing | <ul style="list-style-type: none"> Select materials based on specific application. Minimum material requirements include: Ductile Iron, Austenitic (ASTM A 439) Cast Iron, Stainless Steel or Bronze Stainless Steel, Type 416 or 316, SAE63 Bronze Hot-dipped galvanized (not buried or submerged), stainless steel (buried or submerged) | |
| 9 | Material | Select corrosion resistant and chemically compatible material and maximize durability of equipment selected | Provide duplex SS for RO concentrate pump materials |
| 10 | Pump Schedule | Submit comprehensive pump schedule indicating size, tag information, type, material of | |

| | | | |
|----|------------------------|--|---|
| | | construction, manufacturer, and other critical information | |
| 11 | Labeling and Pump Tags | Label all pumps with manufacturer’s name and working pressure cast in raised letters on valve body | <ul style="list-style-type: none"> • Provide each pump with an identification tag. Tag shall be 2-inch-square or circular aluminum or 316 SS: W. H. Brady B-60, Seton Name Plate Corp. Series SVT, or equal. Aluminum tags shall have black-filled letters. • Tag shall show the valve tag number and/or name or designation in coordination with the asset management criteria. • Provide stainless steel wire. |

7.6 Nuts and Bolts

| Item | Parameter | Criteria | Notes |
|------|--|---|---|
| 1 | Bolts and Nuts for Flanges | <ul style="list-style-type: none"> • Bolts and nuts for buried or submerged Class 125 or 150 flanges and Class 125 or 150 flanges located indoors, outdoors above ground or in vaults and structures shall be Type 316 stainless steel conforming to ASTM A193, Grade B8M for bolts and ASTM A194, Grade 8M for nuts | Bolts used in flange insulation kits shall conform to ASTM A193 (Grade B7). Nuts shall conform to ASTM A194 (Grade 2H). |
| 2 | Lubricant for Stainless Steel Bolts and Nuts | Prior to assembly, coat threaded portions of stainless steel bolts and nuts with lubricant | Lubricant shall be chloride free and shall be RAMCO TG-50, Anti-Seize by RAMCO, Specialty Lubricants Corporation Husky™ Lube O'Seal, or equal |

SECTION 8 ELECTRICAL SYSTEM CRITERIA

Electrical Features/Scope are summarized in the table below and detailed further within Section 8. The summary table shall govern in event of a disagreement with content in Section 8.

Key Overall Electrical System Features

- Onsite primary infrastructure to a utility pad-mounted transformer and for the transformer secondary lateral to the service switchboard per PG&E's requirements.
- Provide space for future PV equipment adjacent to the main service switchboard.
- A radial distribution network for both of the normal and emergency 480Y/277V, three-phase, four wire systems and the 208Y/120V, three-phase, four-wire systems within the site.
- A main electrical building housing the main service switchboard and transfer switch, 2 motor control centers for the headwork, dewatering area and chemical storage, and a transformer for serving the panel that will provide the 120V branch-circuits at and near the equipment.
- 1 motor control center located in RO electrical room to serve the RO, UV, Product Water, and **Administrative Building**.
- 1 Diesel Emergency Generator to backup the entire site.
- Site electrical facilities including power distribution and site lighting (reference Electrical Proposal Form for information)

Equipment – Utility Electrical Service

- Furnish and install 1 direct-buried PVC underground ductbank for the primary service PG&E cable as per the PG&E's requirement.
- Furnish and install the an utility transformer concrete pad as per the PG&'s requirements.
- Install the PG&E furnished utility transformer with secondary service rated at 480VAC.
- Furnish and install direct-buried PVC underground ductbanks from the utility transformer to a main service board in the Electrical Building per the PG&E's requirement.
- Furnish and install a main service board rated at 480VAC, 2000 Amp, with a utility metering package and utility cable entry compartment in the Electrical Building.

Equipment – Electrical Building

- A 40' X 12' X 10' (LXWXH) pre-engineering metal building with HVAC unit and lightings.
- The Electrical Building houses the utility main service board, an automatic transfer switch, future space for the PV equipment, 2 motor control centers, 480/280/120 dry type transformer, the main plant PLC panel, power and lighting panels.

Equipment – Main Service Switchboard

- A 480Y/277V, three-phase, four-wire, 2000A, indoor rated switchboard including pull section, distribution section, and automatic transfer section bussed together for a complete unit
- 4 X distribution breakers for 3 motor control centers and 1 future PV connection.
- Metering package for the utility power
- Surge protection device

Equipment – Site Electrical Distribution Infrastructure

- The underground direct-buried PVC ductbanks for the PG&E's cables will be per the PG&E's requirements. Manholes and handholes will be provided per the PG&E's requirements.

- All site underground duckbanks will be concrete encased Schedule 40 PVC conduits with buried depth per the City's requirements and electrical code requirements.
- All site underground conduits will be Schedule 40 PVC, concrete encased where under roads or the potential for other damage exists. PVC coated conduit for risers that penetrate concrete floors, or emerge from the ground to 6" AFF or grade. [PCO 87]
- All site interior conduits in process areas will be GRS conduits to 8' AFF, above 8' PVC SCH 40 or GRS at contractor's discretion (depending on supports) Chemical areas, GRS or PVC coated conduit depending on type of chemical within the containment areas. [PCO 87]
- All site exterior conduits, except when noted otherwise, will be GRS conduit or painted PVC SCH 40 at contractor's discretion. [PCO 87]
- PVC coated conduits in all exposed outdoor locations in Areas 20, 30, and 70 [PCO 87]
- Aluminum cable trays for different voltage classes as primary distribution raceway in non-hazardous area.
- Administration Building conduits will be EMT in walls and ceilings and MC cable in ceiling for lighting. [PCO 87]
- At the request of the City, all the exterior control panels provided by the electrical subcontractor, Packaged Headworks, Blower, Sanitary Lift Station, Belt Filter Press, and MBR Suppliers will have dead-fronts, excluding localized valve actuators or e-stops. [PCO 88]

Equipment – Motor Control Centers & VFDs

- 2 indoor rated MCC's in Electrical Building and 1 indoor rated MCC in RO Electrical Building.
- All MCC's are per IEEE and NEMA standards
- All MCC's have fully rated tin plated copper bus bar, hardwired magnetic combination starters with protection and feeder breakers.
- 18 pulse VFD's for equipment rated 100 hp or larger.
- VFD Motor Connections will be on the line side of the VFD- any NEC approved conduit/wire method Load side of VFD (VFD to motor)- if PVC conduit, VFD rated cable; if GRS conduit, standard 600V individual conductors. [PCO 87]

8.1 Utility Electrical Service

The City is coordinating the effort to obtain the electrical service from Pacific Gas & Electric (PG&E). Service voltage shall be obtained at 480Y/277V, three-phase four-wire. DB shall install the on-site infrastructure for the primary service to a utility pad-mounted transformer and for the transformer secondary lateral to the service switchboard as identified on the drawings prepared by PG&E. [PCO 055]

8.2 Data Service

The City is coordinating the effort to obtain the data service from the local utility. DB shall install the on-site infrastructure.

8.3 Alternative Solar Power

Provide sufficient floor area, headroom space, and clearances adjacent to the main service switchboard for installation of a future photovoltaic inverter, minimum 800kW, and future net energy metering switchboard for connection to the PG&E grid. Conduits of adequate sizes shall be installed between the inverter and grade

mounted handholes outside of the main electrical building, in quantities and locations as required for connection to the future photovoltaic strings. All monitor points and alarms for the proposed photovoltaic system shall be transmitted to the SCADA system.

8.4 Electrical Distribution

Provide a radial distribution network for both of the normal and emergency 480Y/277V, three-phase, four wire systems and the 208Y/120V, three-phase, four-wire systems. The main electrical building will house the main service switchboard and transfer switch, a motor control center for the dewatering area and chemical storage, and a transformer for serving the panel that will provide the 120V branch-circuits at and near the equipment. The generator shall be located in an exterior enclosure. Radial feeds from the service board distribution section shall be provided to motor control centers. The motor control centers and distribution switchboards shall include the feeders for distribution transformers and 208Y/120V, three-phase, four-wire panelboards in each electrical room.

8.5 Basic Electrical Work

8.5.1 Raceways

| Item | Parameter | Criteria | Notes |
|------|-----------|--|-------|
| 1 | Exposed | <ul style="list-style-type: none"> • PVC coated rigid steel conduit shall be used for all exposed that have a corrosive environment and coming out of the ground 6 inches above final grade (AFG). Above 6 inches AFG shall be galvanized rigid steel. [PCO 062] • Cable trays shall be ladder type construction and shall be metallic and bonded to ground. Power conductors and low voltage conductors (less than 50V) shall not occupy the same tray. Where cable tray is used for emergency system conductors, it shall be dedicated to emergency circuits only. • Wire basket cable tray may be used in office and/or in non-hazardous and non-corrosive locations for communication system conductors only. • Interior, exposed conduit in non-corrosive areas shall be rigid galvanized steel up to 8 feet above final floor (AFF). Above 8 feet AFF conduit shall be galvanized rigid steel or electric metallic tube (EMT). [PCO 062] | |

| | | | |
|---|-------------------|--|--|
| | | <ul style="list-style-type: none"> Chemical areas shall be galvanized rigid steel or PVC coated galvanized rigid steel conduit depending on the type of chemical within the containment areas. [PCO 062] | |
| 2 | Concealed | Concealed conduits shall be rigid galvanized steel except in the Operations and Maintenance Buildings, where electrical metallic tubing may be used | |
| 3 | Underground | <ul style="list-style-type: none"> Bury underground conduits containing maximum 600-volt conductor insulation a minimum depth of 24" from surface of finished grade to the top surface of the conduit. Where they run under roadways or parking areas, depth shall be 30" minimum from finished grade. Exterior, underground, direct buried and concrete-encased conduit shall be schedule 40 PVC. [PCO 062] | |
| 4 | Final Connections | Use liquid-tight non-metallic flexible conduit for final connection to equipment | |

8.5.2 Conductors

| Item | Parameter | Criteria | Notes |
|------|---|---|-------|
| 1 | Indoor Feeders and Indoor and Outdoor Branch-Circuits | Use 600V copper conductors with THWN/THHN insulation | |
| 2 | Outdoor Feeders and Load Side of VFDs | Use 600V copper conductors with XHHW insulation | |
| 3 | Terminations | Branch-circuit terminations in wet locations shall be listed for the applications. Provide insulated tap blocks for feeder splices. | |

8.5.3 Wiring Devices

Provide power to receptacles from 208Y/120V panel boards. Feed adjacent receptacles from alternate panelboard circuits. Locate separately powered receptacles adjacent to HVAC and other specialized equipment. In interior and exterior process areas locate receptacles every 50 feet, and every 12 feet of wall space in occupied areas. Ground fault circuit interrupting (GFCI) type receptacles shall be located in lavatories, outdoors, wash-down process areas, below-grade structures, rooftops and tunnels. Provide

additional outlets at canopy poles around the vehicle equipment storage area and the parking canopy and include required conduit/power. See Attachment 1 [PCO 74]

8.5.4 Grounding

Provide a maximum 2 ohm resistance earth to ground and conform to IEEE Standard 142. Structures shall have perimeter ground grid with rods in test wells. Interconnect individual structure grounding systems. Building steel, process equipment, electrical equipment and enclosures, and exposed metal which might become a current conductor shall be connected to the ground grid. Exposed ground connections shall be compression lug type. Concealed, buried, or embedded ground connections shall be made by the exothermic method, except for the connection to the ground rod which shall be compression lug type. All conduits shall contain an equipment grounding conductor.

8.5.5 Boxes

| Item | Parameter | Criteria | Notes |
|------|------------------------------------|---|--|
| 1 | Underground Manholes and Handholes | <ul style="list-style-type: none"> Provide concrete handholes with sufficient depth to accommodate the branch-circuits and/or feeders. Provide with steel lid in traffic areas and concrete lids in parkways and planters. Provide concrete manholes with a minimum size of 4'6" x 8' x 8'd, permanent galvanized ladder, and pulling rings. Provide fiberglass racks in each handhole with a footprint equal to or larger than 2'6" x 3'0" and in all manholes. | Provide H2O bridge loading in all areas with incidental or regular traffic |
| 2 | Cast-Iron Outlet Boxes | Install cast-iron outlet boxes in surface mounted applications. Provide explosion-proof boxes and fittings as required by the hazard classifications. | |
| 3 | Sheet-Metal Outlet Boxes | Provide sheet-metal outlet boxes at dry non-hazardous locations in the Operations and Maintenance buildings | |
| 4 | Pull Boxes | Provide IP-68 NEMA 7 boxes in all classified area, NEMA 4X boxes in all exterior unclassified locations, NEMA 3R boxes inside the RO/UV building and Ops building outdoor non-corrosive electrical area, and NEMA 1 boxes in the indoor electrical rooms and indoor Ops building area. Please refer to PCO #93 for quantities, sizes and locations [PCO 93] | Locate pull boxes above grade to the extent possible |

8.5.6 Identification

| Item | Parameter | Criteria | Notes |
|------|--------------------------------|---|-------|
| 1 | Conduit Identification | Where electrical conduit is exposed in spaces with exposed mechanical piping that is identified by a color-coded method, provide color-coded identification on electrical conduit in a manner similar to piping identification | |
| 2 | Cable/Conductor Identification | Provide method for cable/conductor identification including voltage, phase, and feeder number on each cable and conductor in each box/enclosure/cabinet where wires of more than one lighting or power circuit occur or where alarm conductors of communication, signal, or alarm systems are present, except where another form of identification (such as color-coded conductors) is provided | |
| 3 | Equipment Labeling | Submit comprehensive labeling schedule indicating tag information, type, material of construction, manufacturer, and other critical information | |

8.5.7 Supports and Anchors

Provide seismic anchorage for all floor, wall, and rack mounted electrical equipment. Base-specific seismic criteria shall use values determined in accordance with ASCE 7-102 as amended by the 2016 CBC, Chapter 16. Arrange for grouping of parallel runs of horizontal conduits to be supported together on seismically braced trapeze type hangers where possible.

8.6 Distribution Equipment

8.6.1 General

Certify distribution equipment for base-specific seismic criteria using values determined in accordance with ASCE 7-102 as amended by the 2016 CBC, Chapter 16. Provide withstand ratings greater than the maximum short-circuit current available at the line terminals of the equipment. Series rated systems shall not be used.

8.6.2 Switchboards

| Item | Parameter | Criteria | Notes |
|------|---------------------|--|-------|
| 1 | Service Switchboard | Provide 480Y/277V, three-phase, four-wire switchboard with adequate capacity to carry the calculated load. Include pull section, distribution section, and automatic | |

| Item | Parameter | Criteria | Notes |
|------|-------------------------|---|---|
| | | transfer section bussed together for a complete unit. | |
| 2 | Circuit Breakers | Provide main circuit breaker and distribution circuit breakers rated for the calculated load. Provide insulated case power circuit breakers with zone selective interlocking for system selectivity. | |
| 3 | Ground-Fault Protection | Provide ground-fault protection for the main circuit breaker and distribution circuit breakers immediately downstream of the main circuit breaker | |
| 4 | Bus Material | Provide fully rated tin plated copper bus bars. Tapered bus shall not be used. Provide with full rated neutral. Provide copper ground bus. | |
| 5 | Enclosure | <ul style="list-style-type: none"> All cabinetry located outdoors should be fully enclosed, no false fronts or HMI on outside doors. Provide NEMA 4X enclosure for exterior locations and in process areas. Install in a dry non-hazardous location where possible. | Any internal equipment requiring regular maintenance shall be out of arc flash area |

8.6.3 Motor Control Centers

| Item | Parameter | Criteria | Notes |
|------|-----------|---|-------|
| 1 | General | Provide grouped motor controls in a motor control center including supporting structures, bus systems, starter units, controllers, disconnects, overload protection, and motor control accessories | |
| 2 | Standards | The control centers shall be NEMA Class II, Type B, plug-in, designed, manufactured, and tested to meet the latest IEEE and NEMA standard | |
| 3 | Controls | <ul style="list-style-type: none"> Selector switches and pilot lights shall be heavy-duty, oil-tight, and have the number of positions and poles indicated Control relays shall be machine tool type with 115-volt AC coils | |

| Item | Parameter | Criteria | Notes |
|------|--------------|---|--|
| 4 | Starters | Except where VFDs are provided, magnetic starters shall be combination motor circuit protector type, full voltage, single speed or two speed, reversing or non-reversing | |
| 5 | Bus Material | Provide fully rated tin plated copper bus bars. Provide with full rated neutral. Provide copper ground bus. | |
| 6 | Enclosure | <ul style="list-style-type: none"> All cabinetry located outdoors should be fully enclosed, no false fronts or HMI on outside doors. Provide NEMA 4X enclosure for exterior locations and in process areas. Install in a dry non-hazardous location where possible. | Any internal equipment requiring regular maintenance must be out of arc flash area |

8.6.4 Distribution Transformers

Provide dry-type distribution transformers with aluminum windings and enclosures suitable for the installed environment. Transformers shall have 480V primary and 208Y/120V three-phase, four-wire secondary.

8.6.5 Panelboards

| Item | Parameter | Criteria | Notes |
|------|------------------|---|---|
| 1 | Enclosures | <ul style="list-style-type: none"> All cabinetry located outdoors should be fully enclosed, no false fronts or HMI on outside doors. Provide NEMA 4X enclosure for exterior locations and in process areas. Install in a dry non-hazardous location where possible. | Any internal equipment requiring regular maintenance shall be out of arc flash area |
| 2 | Circuit breakers | Provide bolt fastened thermal magnetic circuit breakers with ratings appropriate for the calculated loads. Provide 30% spare breakers in each panel. | |
| 3 | Bus Material | Provide fully rated tin plated copper bus bars. Provide with full rated neutral. Provide copper ground bus. | |

8.6.6 Motors

| Item | Parameter | Criteria | Notes |
|------|-----------------|---|-------|
| 1 | Motor Selection | Select motors to permit the connected load to develop its specified output continuously | |

| Item | Parameter | Criteria | Notes |
|----------|-----------------------|---|-------|
| | | without encroaching on the service factor under normal operating conditions. The service factor shall be 1.15 for motors 200 horsepower and less. Motors larger than 200 horsepower shall have a service factor of 1.0. | |
| <p>2</p> | <p>Motor Design</p> | <ul style="list-style-type: none"> • Design motors for full voltage starting and frequent starting, where required. Provide motors suitable for continuous duty in the specified ambient conditions. Intermittent duty motors will be selected where recognized and defined as standard by the equipment standards and codes. • The following design parameters shall be considered: Motor manufacturer, environment, including special enclosure requirements, voltage, frequency, and phases, running and starting requirements and, limitations and duty cycle, motor type (synchronous, induction, DC, etc.) and construction, power factor, service factor, speed and direction of rotation, insulation, bearing construction, rating life of rolling elements, and external lube oil system for sleeve or plate bearings, ambient noise level and noise level for motor and driven equipment, termination provisions for power, grounding, and accessories, installation, testing, and maintenance requirements, special features (shaft grounding, temperature and vibration monitoring, etc.), and motor space heater requirements. | |
| <p>3</p> | <p>Motor Starting</p> | <p>The torque of all induction motors will be required to accelerate inertia loads of both motor and driven equipment to full speed without damage to the motor or other equipment. Provide maximum 20 percent voltage drop from the specified motor</p> | |

| Item | Parameter | Criteria | Notes |
|------|-----------|---|-------|
| | | nameplate rating for motor starting. Provide minimum NEMA size 1 starters. | |
| 4 | VFDs | Motors connected to VFDs shall be inverter duty rated | |

8.6.7 Motor Controls

| Item | Parameter | Criteria | Notes |
|------|----------------------------------|--|-------|
| 1 | Combination Starters | <ul style="list-style-type: none"> Provide full voltage starting for all motors less than 25 HP that are not operated with a VFD. Minimum size starter shall be NEMA size 1. Unless motor is operated with a VFD, Solid State Reduced-Voltage (SSRV) soft starters shall be used for motors larger than 25 HP where appropriate. | |
| 2 | Variable Frequency Drives (VFDs) | Provide 18 pulse VFDs for drives 100 hp and larger | |
| 3 | Manual Motor Starters | Where fractional horsepower motors are not automatically started, provide manual motor starters using toggle switch mechanism and enclosure rated for the environment. Provide with or without overcurrent protection as required by the installation. | |
| 4 | Enclosures | <ul style="list-style-type: none"> All cabinetry located outdoors should be fully enclosed, no false fronts or HMI on outside doors. Provide NEMA 4X enclosure for exterior locations and in process areas. Install in a dry non-hazardous location where possible. | |
| 5 | Pilot Lights and Switches | <ul style="list-style-type: none"> Selector switches and pilot lights shall be heavy-duty, oil-tight, and have the number of positions and poles indicated Control relays shall be machine tool type with 115-volt AC coils | |

8.6.8 Standby Generator

| Item | Parameter | Criteria | Notes |
|------|----------------------|--|---------------------------|
| 1 | Capacity | Provide a standby generator rated 480Y/277V, three-phase, four-wire with capacity to carry the entire treatment plant electrical load. The generator shall be connected and operated as a separately derived system. | |
| 2 | Fuel Source | Provide diesel powered generator. The generator shall have a double containment separate aboveground double containment fuel tank, with leak detection and sufficient fuel storage to operate the plant on backup power for a minimum of 24 hours without refueling. Provide alarm contacts for reporting to the SCADA system. | |
| 3 | Main Circuit Breaker | <ul style="list-style-type: none"> Provide a main circuit breaker rated to carry the calculated load. Provide insulated case power circuit breakers with zone selective interlocking for system selectivity. The circuit breaker shall be either wall or rack mounted at a location adjacent to the generator enclosure. | |
| 4 | Enclosure | Provide a sound-attenuated weatherproof generator enclosure meeting 70dB(A) at fifty feet | |
| 5 | Accessories | Provide generator enclosure complete with battery charger, engine block heater, and generator condensation heater, battery, and exhaust silencer | |
| 6 | Engine Oil | DB to provide initial fill of oil and the first oil change, including oil filters | |
| 7 | Alarms | Provide electronic generator control panel with discrete alarm contacts for each alarm for reporting on the SCADA system. Comply with NFPA 110 for remote alarm annunciation. | Coordinate with Section 9 |

8.6.9 Automatic Transfer Switch

Provide a 480V four-pole transfer switch for connecting the plant load to the standby generator upon loss of utility company power. Transfer switch shall be solenoid operated and mounted in a busse lineup with the main service switchboard for installation in a dry non-hazardous location.

8.7 Lighting Equipment

| Item | Parameter | Criteria | Notes |
|------|--|--|---------------------------|
| 1 | Illumination Engineering Society (IES) | Comply with the IES Recommended Practice for Lighting Industrial Facilities RP-7-17. | |
| 2 | Interior Lighting | <ul style="list-style-type: none"> • Provide LED strip lighting with door switch inside control panels if the enclosure size is greater than or equal to 30" wide and greater than or equal to 12" deep. • Adequate lighting, ventilation and access for maintenance or removal of equipment and screenings shall be provided. Adequate lighting throughout the wastewater treatment facility shall be provided, particularly in areas of operation and maintenance activities. • Provide metallic or non-metallic luminaire housings appropriate for the classification of the area. • Lighting shall be included in all treatment buildings. Battery operated emergency lights shall be provided at all confined spaces. Lights shall be located in an area that is easily accessible to replace components. | |
| 3 | Exterior Lighting | <ul style="list-style-type: none"> • Provide full cutoff LED site lighting in each process area. Lighting standards adjacent to any open process structure flush or below grade shall be provided with hinged pole base. Provide poles with 316SS anchors and hardware. • Aim exterior pole and building lighting to avoid any light trespass on adjacent property lines. All pole and building luminaires shall be full | Coordinate with Section 9 |

| | | | |
|---|-------------------|--|--|
| | | cutoff and located to minimize glare. | |
| 4 | Lighting Controls | <ul style="list-style-type: none"> • Provide switches, photocells, and receptacles at all lighting poles. Provide for automated lighting control through the SCADA system so that the facility is only illuminated to the degree necessary to maintain safe operation. • Provide lighting software calculations showing compliance with California Title 24 Energy Standard requirements in all areas. | |

8.8 Fire Alarm System

Provide a plant-wide addressable fire detection and alarm system, with audible as well as visual alarm signals, conforming to the requirements of the local fire marshal, NFPA, and Factory Mutual requirements. Fire alarm system master control panel will provide dry contact outputs to SCADA for general alarm, supervisory, and trouble signals. Since the facility is not constantly occupied, master fire alarm control panel shall simultaneously contact the fire department and annunciate in the operations control room when any alarm is activated. [5/29/19 Meeting Decision]

8.9 Hazardous and Environmental Locations

| Item | Parameter | Criteria | Notes |
|------|----------------------|---|-------|
| 1 | Classified Locations | Classify areas where flammable and combustible liquids, gases, and dusts are handled and stored for determining the minimum criteria for design and installation of electrical equipment to minimize the possibility of ignition. Use the latest edition of NFPA 820 and Article 500 of the latest California Electrical Code for determining the appropriate classification. | |
| 2 | NFPA 820 | Enclosed areas with exposure to raw wastewater, wastewater sludges, and corrosive or hazardous atmospheres will require that the lighting and electrical systems be of the appropriate hazard classification as defined in NFPA 820 | |
| 3 | Electrical Code | Install electrical equipment in areas classified as hazardous in accordance with the requirements of Articles 501 and 502 of the California Electrical Code (latest edition) | |

| Item | Parameter | Criteria | Notes |
|------|-------------------------|---|-------|
| 4 | Drawing Notations | Identify classified locations in all process areas on the construction drawings | |
| 5 | Confined Spaces | The design shall minimize confined spaces to the extent possible. | |
| 6 | Environmental Locations | All electrical equipment shall be rated for the environment in the installed locations. Outdoor installations shall include equipment rated for wet locations. Identify all other indoor wet, damp, and dry locations on the drawings. All cabinetry installed outdoors or in damp or wet locations shall be fully enclosed, with no false fronts or HMI on outside doors. Only lights are allowed on top of cabinetry. | |

8.10 Electrical System Studies

| Item | Parameter | Criteria | Notes |
|------|---------------------------------|---|-------|
| 1 | Preliminary Short-Circuit Study | During the design phase, prepare a preliminary short-circuit study based on maximum available fault current provided by the utility. The results of this study will determine the minimum withstand and interrupting ratings of the electrical equipment. | |
| 2 | Final Short-Circuit Study | Prepare a final short-circuit study using the as installed feeder lengths. The results of this study will be used to complete the Coordination Study. | |
| 3 | Coordination Study | Prepare a Coordination Study showing required selective coordination between the installed overcurrent devices. The results of this study will be used to complete the Arc-Flash Study. | |
| 4 | Arc-Flash Study | Prepare an Arc-Flash Study to determine the incident energy levels, protection boundaries and personnel protective equipment | |
| 5 | Computer Program | Perform each electrical system study using software purchased from industry | |

| Item | Parameter | Criteria | Notes |
|------|-----------|--|-------|
| | | recognized organizations. Provide for submittal of the project specific software results for each electrical system study. | |

8.11 Electrical Testing

| Item | Parameter | Criteria | Notes |
|------|---------------------------|---|-------|
| 1 | Manufacturer Requirements | Perform all field testing per manufacturer's instructions. Submit results of testing. | |
| 2 | ANSI/NETA | Provide electrical system testing as identified in Standard for Acceptance Testing Specifications ANSI/NETA ATS, Latest Edition. Submit results of testing. | |
| 3 | NFPA 110 | Test generator and generator alarms per the requirements of Standard for Emergency and Standby Power System NFPA-110-2016. Submit results of testing. | |
| 4 | NFPA 72 | Test fire alarm system per the requirements of National Fire Alarm and Signaling Code NFPA 72 (latest edition). Submit results of testing. | |

SECTION 9 INSTRUMENTATION AND CONTROLS

Instrumentation and Control Features/Scope are summarized in the table below and detailed further within Section 9. The summary table shall govern in event of a disagreement with content in Section 9. Attachment 3 to Exhibit B documents changes made to comply with portions of the SCADA Masterplan as agreed. Where there is a discrepancy, Attachment 3 shall govern over both Section 9 and the summary table below. [PCO 018]

Key Overall I&C Features

- A self-healing fiber optic ring configuration for the plant control network.
- Ethernet based communications between the Plant PLCs and the SCADA I/O servers.
- Ethernet based communications between Plant PLC's and vendor PLC's.
- Distributed Remote I/O panels in RO area, Chemical area, MBR area, Solids area, and Headwork area to minimize hardwired cabling.
- Dual firewall DMZ (demilitarized zone) design to separate the Plant Control Network and the Office Network.
- Redundant Historian Servers and I/O Servers to increase the reliability of the SCADA network.
- CMMS Package for maintenance purpose.
- Wireless network within the site facilities for the ease of access of the plant control network.
- Multiple SCADA HMI licenses for on-site and off-site accesses.
- UPS for main Plant PLC, SCADA servers and operation computers.

Equipment – PLC, SCADA

- The main Plant PLC's make and model will be in accordance to the SCADA Master Plan requirement.
- Redundant processors, communication modules and power supply modules for the main Plant OLC.
- The main Plant PLC located indoor in the Electrical Building.
- Redundant I/O servers and Historian servers will be provided.
- 1 X Operator PC with full SCADA HMI run-time license, 1 X Engineering Workstation with full SCADA development license will be provided.
- 3 additional SCADA HMI run-time licenses will be installed on the City's remote computer and tablet PC's. 1 additional SCADA Thin client license will be provided for the Maintenance Building Work Station[PCO 100].
- At the request of the City, all the exterior control panels provided by the electrical subcontractor, Packaged Headworks, Blower, Sanitary Lift Station, Belt Filter Press, and MBR Suppliers will have dead-fronts, excluding localized valve actuators or e-stops. [PCO 88]
- 24VDC Digital Output Circuits will be used for the plant control system [PCO 90]

9.1 General

The following scope is not inclusive of scope changes necessary to comply with the newly developed SCADA Master Plan or City requests such as PLC uniformity, replication of vendor PLC controls in main PLC, and remote operation of the plant. A separate scope process is working out that scope for inclusion into this document. Currently PLC uniformity has been provided for the MBR package, packaged headworks system and the RO system. At this time, all other vendor-supplied PLCs are the vendor standards and are pending future changes. [PCO 037] [PCO 082]

9.2 System Description

9.2.1 Plant Architecture and Software

This section describes the plant architecture, from the Wide Area Network (WAN), through the Plant Local Area Network (LAN) and the PLC network to the instrumentation networking.

| Item | Parameter | Criteria | Notes |
|---------------------------------|--|--|---|
| City Wide Area Network | | | |
| 1 | Communications Medium | <ul style="list-style-type: none"> Data transmission to be via encrypted packet-switched network communications over the telecommunications provider network City will provide phone/internet service facilities and connection point at the front gate of the WRF site for connection to plant by DB. | |
| 2 | Bandwidth | Sufficient bandwidth will be provided by City for ultimate plant capacity | |
| 3 | Transitional Operation and Commissioning | <ul style="list-style-type: none"> Remote monitoring shall be integrated into the design as necessary for the DB to monitor the plant during the Transitional Operation period Any licenses purchased for Transitional Operation period shall be transferred to the City when the Transitional Operation period is completed | For example, a View Client license on a nominated, dedicated machine in another operations facility may be required |
| Plant Local Area Network | | | |
| 1 | Server Hardware | <ul style="list-style-type: none"> Two (2) local redundant servers with secondary network cards and Redundant Message Channel between the two servers installed in a server rack Hot standby required for backup server Server operational status to be rotated monthly | |
| 2 | Human Machine Interface (HMI) | <ul style="list-style-type: none"> Workstations with full control and monitoring of the WRF. Wireless access points throughout the plant to enable full coverage to the perimeter of the facility. Operators shall be able to access | |

| Item | Parameter | Criteria | Notes |
|------|----------------------------|--|-------|
| | | <p>the full software HMI system via tablet computers.</p> <ul style="list-style-type: none"> • Tablet computers to be provided by the City. DB to install software and integrate tablet computers. • Wireless network shall be a fully encrypted, secure network. • Application Objects Servers running on primary and redundant server hardware. | |
| 3 | Historian | <ul style="list-style-type: none"> • Historian by manufacturer of HMI Software. • License shall include sufficient tags for the entire plant and 20% spare at the end of the Transitional Operation period. • Redundant arrangement, with a historian running on each of the two (2) local servers (main and backup). The primary historian will be a full historian and the backup will be a local (7-day) historian. • Historian client shall run on each of the workstations. | |
| 4 | Interface with PLC Network | A data access server and device communication drivers shall run on each of the primary and backup servers to communicate with the PLC network | |
| 5 | Dial-out Alarms | Alarm notification software shall be installed on both servers, only running on the active server | |
| 6 | Licensing | <ul style="list-style-type: none"> • All licensing required for the local Historian, Alarming and SCADA system software shall be furnished by the DB • During the operations period the City shall cover the update costs for the local equipment as new versions of the software are released, however the DB Transitional Operation staff shall be responsible for coordinating and scheduling the installation of updates | |

| Item | Parameter | Criteria | Notes |
|--|--|---|--|
| | | <ul style="list-style-type: none"> • The DB shall be responsible for costs associated with any upgrade required to the software licenses arising from incorrect specification, or changes initiated by the DB during the Transitional Operation period • At the end of the Transitional Operation period all software shall be fully updated to the latest version | |
| 7 | Business Network | Provide access to City Business Network in all offices in Operations Building | <ul style="list-style-type: none"> • City utilizes Cityworks at City Hall • Fiber-optic service to WRF site will be provided by others |
| 8 | Computerized Maintenance Management System (CMMS) and Implementation | <ul style="list-style-type: none"> • The DB is required to provide a CMMS to allow the City to manage its resources, work orders, delivery of services, and monthly costings for payment purposes to manage and report its operational, minor maintenance, and major maintenance works. • The DB shall be responsible for providing a CMMS from NEXGEN. [PCO 104.2] • The DB shall be responsible for inputting all asset data into the CMMS. <ul style="list-style-type: none"> ○ ○ Provide 1 year of NEXGEN annual license fee commencing on October 1, 2022. [PCO 104.2] | Asset ID to align with SCADA and asset labeling/tagging program by DB |
| Programmable Logic Controller (PLC) Network | | | |
| 1 | Communications | <ul style="list-style-type: none"> • Ethernet shall be used for communications between PLCs and the SCADA server. • A self-healing Ethernet fiber optic ring shall be installed for Ethernet communications around the plant. Convergence time after failure of a single component or switch shall be adequate to prevent plant shutdown. | |

| Item | Parameter | Criteria | Notes |
|---------------------------------|------------------------------------|--|---|
| | | <ul style="list-style-type: none"> Ensure bandwidth is suitable for ultimate data requirements. | |
| 2 | Locations of PLCs and Remote IO | <ul style="list-style-type: none"> Consolidate operation of multiple HMIs by providing operator access nodes located throughout the plant utilizing simple computer workstations Remote IO and PLCs shall be installed in a manner that minimizes hardwire and field network cabling to instruments. Install in locations with a high density of I/O | |
| 3 | Vendor Packages | <ul style="list-style-type: none"> Vendor PLCs for each package system shall communicate via Ethernet with a local area PLC | DB shall ensure fully integrated and tested communications with all vendor systems. |
| 4 | Access to PLC information | All PLC information shall be accessible to the operator via the workstations in the control room, and at operator access nodes located throughout plant. This shall include vendor package system PLCs. | |
| Field Bus Device Network | | | |
| 1 | Field Connections | Hardwired to the nearest area MCC or Control Panel | |
| 2 | Requirement for Networking Devices | | Hardwired instruments shall be furnished. This section is therefore inapplicable. |
| 3 | Field Bus Compatibility | | Hardwired instruments shall be furnished. This section is therefore inapplicable. |
| 4 | Industry Standard | | Hardwired instruments shall be furnished. This section is therefore inapplicable. |

9.2.2 Redundancy, Reliability, and Spares

| Item | Parameter | Criteria | Notes |
|------|-------------|---|-------|
| 1 | Requirement | The inventory of spares shall be maintained during the DB Transitional Operation period | |

| Item | Parameter | Criteria | Notes |
|------|------------------------|---|--------------------------------------|
| | | such that all spares noted in the original inventory are still available at the conclusion of the Transitional Operation period | |
| 2 | PLC | Online redundant PLCs may be required for critical processes | |
| 3 | PLC Uninstalled Spares | <ul style="list-style-type: none"> • Provide spares sufficient to allow any of the following to be swapped out on failure: <ul style="list-style-type: none"> ○ PLC IO cards (hot-swapped) ○ backplane ○ CPU ○ Power supply | |
| 4 | I/O Cards | Duty/standby unit I/O and equipment from separate process trains shall be connected to separate I/O cards | |
| 5 | I/O Capacity | Installed spare IO capacity of 20% in all PLCs, excluding vendor-supplied PLCs associated with specific equipment | |
| 6 | Program Backup | <ul style="list-style-type: none"> • Programs and configuration backups shall be stored for fast upload into new modules or CPUs if they are replaced • During Transitional Operation period backup copies of the PLC programs will be made every 2 months, minimum | |
| 7 | Server Redundancy | Provide redundant servers for HMI Application Servers, Device Integration Servers and Historian | Provide hot standby for SCADA server |
| 8 | Power Supply | PLC Hardware Racks shall have adequate power supplies installed to support a minimum of 25 percent I/O expansion | |
| 9 | Reliability | The network system shall be designed to be robust and reliable and shall meet latest Department of Homeland Security (DHS) Best Management Practices (BMPs) | Coordinate with SCADA Master Plan |
| 10 | Battery Backup & UPS | All control CPU's, PLC's and additional hardware necessary to keep the WRF functioning or automatically restart after a power loss shall be powered through UPS power circuit(s). This requirement includes | |

| Item | Parameter | Criteria | Notes |
|------|-----------|---|-------|
| | | the main operation control room computers and monitors. | |

9.3 Cyber Security

| Item | Parameter | Criteria | Notes |
|------|---------------------------|--|--|
| 1 | Software | <ul style="list-style-type: none"> • Provide Host Intrusion Detection (HID) and Malicious Intrusion detection software on all SCADA computers hosting operating systems, as well as computers identified as functioning only as Human Machine Interface (HMI) nodes • Configure the software to interface with the SCADA system software, such that abnormal conditions or intrusions are annunciated on SCADA operator PCs • Make all log files accessible on SCADA operator PCs | Coordinate software with SCADA Master Plan |
| 2 | SCADA Login and Passwords | <ul style="list-style-type: none"> • Require user specific operator login credentials for access at all computerized host access points • Provide prescribed automatic logout functionality (i.e. logout upon programmable period of inactivity) • Coordinate login credential protocol with Owner • Provide unique login identification for all users with programmable access rights | Coordinate with SCADA Master Plan |
| 3 | Default Passwords | Delete all default login credentials, and store passwords in a secure location, once | |
| 4 | Secure Design | <ul style="list-style-type: none"> • Apply network architecture design elements that effectively implement firewall appliances, data diodes, data encryption appliances, and data encrypted communications mediums to prevent network intrusion and unauthorized data access • Utilize industry best practice and design in accordance with ISA/IEC- | Coordinate with SCADA Master Plan |

| Item | Parameter | Criteria | Notes |
|------|-----------|--|-------|
| | | 62443 Industrial Network and System Security <ul style="list-style-type: none"> • Provide system operator notification indicating system and device status, with controls that permit manual and automatic blocking of network access points • Comply with latest Department of Homeland Security (DHS) Best Management Practices (BMPs) | |

9.4 Control System Hardware

9.4.1 Programmable Logic Controllers

| Item | Parameter | Criteria | Notes |
|------|------------------------|---|-----------------------------------|
| 1 | Manufacturer | Area PLC Manufacturer shall be by same manufacturer | Coordinate with SCADA Master Plan |
| 2 | Operator Controls | All PLC programs shall be configured to allow modification to set points, pump sequencing, timers, etc. readily by Plant personnel | |
| 3 | Vendor Package Systems | <ul style="list-style-type: none"> • Vendor PLCs shall have processor program and vital configuration information backed up in a similar manner to the other site PLCs. | |
| 4 | Latest Equipment | Each PLC shall utilize the latest CPU processors, communications modules and the latest I/O modules | |
| 5 | Programming Software | The PLCs shall be programmed using the latest version of software identified in the SCADA Master Plan | |
| 6 | Input/Output | <ul style="list-style-type: none"> • Input modules shall be 24 volts Direct Current (DC) modules only • Output modules shall be relay modules used to trigger interposing relays • Analog modules shall be 4-20 mA 24VDC isolated input and output channel design • Analog input isolators shall be used • Utilize RTD modules for RTD monitoring • All analog inputs shall be scaled into specified engineering units at the PLC | |

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|---|--|--|--|
| | | <ul style="list-style-type: none"> High and low alarm trip points shall be provided at 90% and 10% of span for all analog points | |
| 7 | Transient Voltage Surge Suppression (TVSS) | All analog signals exiting buildings to or from devices or instruments shall have transient voltage surge suppression (TVSS) to reduce risk of lightning or power surge conditions | |
| 8 | Startup Procedure | <ul style="list-style-type: none"> All PLCs shall be configured to have a startup procedure in the event that a PLC needs to be shut down and restarted The startup program shall have either a fixed startup procedure or have retentive values | |
| 9 | Programming | <ul style="list-style-type: none"> Use object-oriented programming, based on function blocks for all typical equipment and functions, in accordance with IEC 61131-3 Configured to allow modification using the programming and integration devices and software installed in the system | |

9.4.2 Instrumentation and Field Devices

| Item | Parameter | Criteria | Notes |
|------|-------------------|---|---|
| 1 | Level: Radar | <ul style="list-style-type: none"> Manufacturer: ABB, Siemens, Rosemount, Endress & Hauser or equal Measurement Range: 0 % through 100 % level Measurement Resolution: 0.1 inch or less Measurement Accuracy: +/- 0.25 % of measured distance for distances greater than 3.3 feet | Consider where foaming may be an issue, especially in cases where ultrasonic LT may not be suitable |
| 2 | Level: Ultrasonic | <ul style="list-style-type: none"> Manufacturer: ABB, Siemens, Rosemount, Endress & Hauser or equal Measurement Range: 0 % through 100 % level Measurement Resolution: 0.1 inch or less Measurement Accuracy: +/- 0.25 % of measured distance for distances greater than 3.3 feet | Non-contact level monitoring |
| 3 | Level: Pressure | <ul style="list-style-type: none"> Manufacturers: ABB, Siemens, Rosemount, Endress & Hauser or equal Measurement Accuracy: +/- 0.1 % of range. | Where non-contact level monitoring is not required and ease of access to the |

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| | | | transmitter is desired e.g. water tanks |
| 4 | Level: Submersible Hydrostatic | <ul style="list-style-type: none"> Manufacturers: ABB, Siemens, Rosemount, Endress & Hauser or equal Measurement Accuracy: +/- 0.25 % | Covered basins |
| 5 | Level: Conductivity Probe | Manufacturers: Warrick or equal | |
| 6 | Level: Float Switch | <ul style="list-style-type: none"> Manufacturers: Magnetrol, Kari, Flygt, or equal Mercury shall not be acceptable in float switch devices | Level alarm detection. Not used for primary process control applications. |
| 7 | Pressure: Absolute, Diaphragm Type | <ul style="list-style-type: none"> Manufacturers: ABB, Siemens, Rosemount, Endress & Hauser or equal. Accuracy: +/- 0.1 % of range Chemical Installation: Isolation Diaphragm Seal Calibration/Testing: 3-way valve manifold for calibration/testing and tapping point for pressure gauge | Pipe pressure, pump discharge/suction, general process pressure |
| 8 | Pressure: Differential | <ul style="list-style-type: none"> Manufacturers: ABB, Siemens, Rosemount, Endress & Hauser or equal Accuracy: +/- 0.1 % of range Chemical Installation: Isolation Diaphragm Sea 3-way valve manifold for calibration/testing and tapping point for pressure gauge | Pressure drop across filters, etc |
| 9 | Pressure Switch | Manufacturers: Ashcroft or equal. | |
| 10 | Flow: Electromagnetic, Full Pipe | <ul style="list-style-type: none"> Manufacturers: ABB, Siemens, Rosemount, Endress & Hauser or equal Installation: Vault or above ground. Shall not be direct buried Maintenance: Provide maintenance bypass for critical applications where a bypass or standby does not exist Accuracy: Max 1 % of measured, for flow velocities between 10 % and 100 % of full scale Grounding: Provide grounding rings on all installations Repeatability: Max 0.25 % of full scale | Primary and secondary process flows |
| 11 | Flow: Open Channel | <ul style="list-style-type: none"> Manufacturers: ABB, Siemens, Rosemount, Endress & Hauser or equal Accuracy: Product shall be chosen for maximum accuracy based on the | |

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| | | dimensions and flow pattern of the channel | |
| 12 | Flow: Air | Manufacturers: FCI Insertion, or equal | |
| 13 | Flow: Liquid Switch | Manufacturers (thermal flow switch): Dwyer, IFM, or equal | Pump no flow, sample line no flow, etc. |
| 14 | Flow: Air Switch | Manufacturers: FCI, or equal | Ventilation/extraction fan no flow, etc. |
| 15 | Limit: Switch | Manufacturer: Square D, Class 9007 Type C, or equal | |
| 16 | Temperature: Transmitter | Manufacturer: ABB, Siemens, Rosemount, Endress & Hauser or equal | Process temperature |
| 17 | Temperature: Switch | Manufacturer: Ashcroft, Allen Bradley, or equal | |
| 18 | Vibration: Transmitter | Manufacturer: Bently Nevada, or equal | Vibration monitoring for large pumps, motors, blowers, etc. |
| 19 | Online Analyzers: General | All online analyzers should be same manufacturer to extent possible | Hach is preferred |
| 20 | Residual Chlorine Analyzer | <ul style="list-style-type: none"> Manufacturer: Hach, or equal Type: Free chlorine type Accuracy: Max + 0.5% of reading Repeatability: Max 0.2% of reading. | |
| 21 | Turbidity Analyzer | <ul style="list-style-type: none"> Manufacturer: Hach, or equal Accuracy: Max 2% of NTU reading Repeatability: Max 1% of NTU reading | Turbidity analyzers shall be provided in an enclosure to protect them from the elements. [PCO 052] |
| 22 | TOC Analyzer | <ul style="list-style-type: none"> Manufacturer: Hach or equal Accuracy/reliability: Max + 3% of reading or 0.3 mg C/L Compensation: Automatic compensation for atmospheric pressure changes Other Requirements: In addition to the above requirements, DB specification shall include requirements for self-testing and self-cleaning requirements, sample system and pumps, service frequency, cycle time, etc. | Regulatory monitoring for plant product water |
| 23 | pH Analyzer | <ul style="list-style-type: none"> Manufacturer: Hach, or equal Accuracy: Max + 0.5% of reading Repeatability: Max 0.2% of reading | |

| | | | |
|----|-----------------------|---|--|
| 24 | Conductivity Analyzer | <ul style="list-style-type: none"> Manufacturer: Hach, or equal Accuracy: Max 3% of reading Repeatability: Max 0.2% of reading | |
| 25 | Exterior Lighting | All exterior lighting shall be SCADA controllable (on-off times) | |

9.4.3 Junction Boxes

| Item | Parameter | Criteria | Notes |
|------|------------|---|-------|
| 1 | Mounting | Shall be accessible from floor or platforms | |
| 2 | Doors | Doors shall be able to open without interference | |
| 3 | Pull Boxes | Provide above-grade pull boxes to the extent feasible | |

9.4.4 Local Control Panels

| Item | Parameter | Criteria | Notes |
|------|---|--|-------|
| 1 | Location | <ul style="list-style-type: none"> Located close to the equipment Local control switches and indicators only where required to address specific safety or maintenance concerns, otherwise all manual control shall be available via SCADA only (accessible locally via wireless tablet or operator node computers) | |
| 2 | Local-Off-Remote Switch and Control Devices, Indicator Lights and Pushbuttons | <ul style="list-style-type: none"> Where required, LOR switch shall allow an operator to take manual control of a device or piece of equipment and operate it from that panel manually. LCPs should be protected from the weather and/or be appropriate for the environment that they are operated in. All exterior enclosures shall be NEMA 4X. | |
| 3 | Enclosures | <ul style="list-style-type: none"> All cabinetry located outdoors should be fully enclosed, no false fronts or HMI on outside doors. Any internal equipment requiring regular maintenance shall be out of arc flash area. | |

9.4.5 Instrument Mounting and Access

| Item | Parameter | Criteria | Notes |
|------|-----------------------------|---|---|
| 1 | Housing | All outdoor process instruments shall be housed in IP68, NEMA 4X enclosures, or vendor requirements, whichever is more stringent | |
| 2 | Access | Access shall be considered in the selection of instrumentation. For example, tanks shall be measured using pressure at the base of the tank wherever practical, to eliminate the need for maintenance access to the top of tanks. | |
| 3 | Instrument Height | Instruments mounted at a working level between 3 and 5 feet above the operating floor | |
| 4 | Indicator Height | Process indicators and indicating transmitters mounted in a position that is readable by an operator without requiring the use of a ladder or the building of platforms | |
| 5 | Capillary Tube Installation | Temperature and pressure instruments capillary sensors shall be installed and clamped in tube racks. Excess capillary tube shall be coiled and clamped to the mounting stand below the instrument. | |
| 6 | Grouping | Instruments located near each other shall be grouped to the maximum extent possible on a common mounting stand, wall bracket or instrument rack | |
| 7 | Dirt/Moisture Removal | Instrument impulse lines shall incorporate a blowdown leg or contamination accumulation leg for the removal of dirt and moisture | |
| 8 | Isolation Valves | <ul style="list-style-type: none"> Instrumentation taps to process lines shall be isolated by a root valve at the connection Isolation valves for taps to process lines shall be 1/4-turn ball valves of materials compatible with the process fluid Isolation valves for chemical service shall match isolation valves used in other portions of that chemical piping | |
| 9 | Analyzers | <ul style="list-style-type: none"> Analyzers for primary process lines shall be installed in bypass assemblies | Where possible, flow through analyzers shall be provided indoors or in shed |

| | | | |
|--|--|---|---|
| | | <p>external to the main process headers to allow routine maintenance</p> <ul style="list-style-type: none"> Analyzer assemblies shall include an isolation valve at each process connection tap, pressure regulator, manual sample valve, rotameter flow element with integral flow metering valve, check valve, miscellaneous piping and fittings Generally, panel mounted and located in close proximity to the relevant sample point in a designated analyzer room (where possible) for improved access for common operational and maintenance activities on these units The analyzer waste streams shall be discharged into a tundish and drained to a common collection point for either pumped return to a specified point along the process or drained to waste All analyzers shall have zero flow detection and pressure and flow control valves on the inlet to ensure a constant rate of feed through the analyzer Manual sample points shall be provided for sampling water at various points through the main process, typically with each change in process unit and upstream and downstream of chemical dose points for manual checks of water quality and chemistry Assemblies for analyzer sensors which must remain wetted at all times (e.g., pH sensors) shall incorporate a vacuum breaker in the drain piping Sample drain shall be routed to a hub drain | <p>to protect from the elements. Submersible probes shall be installed adjacent to their sampling location. [PCO 052]</p> |
|--|--|---|---|

9.5 Monitoring and Control

9.5.1 Control Philosophy

General control descriptions for key process systems are included in the equipment system descriptions in Section 2.

| Item | Parameter | Criteria | Notes |
|------|-----------|----------|-------|
|------|-----------|----------|-------|

| | | | |
|---|-------------------------------|---|--|
| 1 | Vendor Packaged Systems | <ul style="list-style-type: none"> Preliminary vendor supplied screens shall be provided to the City for approval before final screen development | |
| 2 | Level of Automation | <ul style="list-style-type: none"> Fully automated such that, as far as practical, all day-to-day operational adjustments and reporting can be conducted from the SCADA screens Provide sufficient automation such that critical processes can be controlled remotely | The plant will be staffed 40 hours per week and will be operated remotely on nights and weekends |
| 3 | Network Communications Alarms | Failure of Ethernet switches, PLCs, or any network communications shall be alarmed | |
| 4 | Local Control | <ul style="list-style-type: none"> Local manual override shall be accomplished with a hard-wired switch except where personnel, equipment or the process are protected by equipment software interlocks that need to be maintained at all times. The system shall not be able to create a safety issue for the local operator. For example, do not allow remote operation if local manual override is selected. Automatically indicate on SCADA screens when a device in automatic or local control. | |
| 5 | Startup/Shutdown | <ul style="list-style-type: none"> Shutdown of the Plant units shall be fully automated Recovery after a power outage or shutdown shall be mostly automatic, but shall require operator intervention in order for the process to begin, and may require additional operator intervention through the startup sequence as determined during the plant design in order to ensure safety and compliance requirements are met | |
| 6 | Control Locations | <ul style="list-style-type: none"> Allow the automatic and manual operation of the new system from the Operator Workstations and from wireless tablet devices Additional remote-control access may be incorporated during the Transitional Operation period, with | Coordinate operator privileges with login program |

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| | | limited secure control access, subject to approval by the City | |
| 7 | Downtime | Minimize the down time due to monitoring and control component failure | |
| 8 | Future | <ul style="list-style-type: none"> Use the latest available technology to efficiently and responsibly ensure ease of expansion or modification in the future as requirements change Allow bandwidth in the control system infrastructure for future monitoring, control and diagnostics | |
| 9 | Power Monitoring | Monitor and alarm standby power and alternative power (solar) | |

9.5.2 SCADA HMI

| Item | Parameter | Criteria | Notes |
|------|--------------------------|--|---|
| 1 | Scope and Type | Refer to section “Plant Architecture & Software” | |
| 2 | Integration | <ul style="list-style-type: none"> Submit written control descriptions and sample control screens for City approval prior to integration | City shall have option to attend factory performance testing at their cost. |
| 3 | Standards | New HMI screens shall be developed following City SCADA standards | |
| 4 | Analog Signal Monitoring | <ul style="list-style-type: none"> All analog and discrete inputs to the PLC shall be displayed on the SCADA screens Real-time and historical trending for all analog inputs to the PLC shall be available from the local screens | |
| 5 | Alarm Hierarchy | <ul style="list-style-type: none"> A hierarchy of alarms shall be specified, which shall be adjustable by the operators. Each alarm shall be classified with a corresponding value representing criticality. The system shall present the alarms in different ways based on the criticality, per City SCADA standards. | |
| 6 | Alarms | <ul style="list-style-type: none"> All alarm functions shall be carried out at the PLC level. All alarms shall display on a common alarm screen. | |

| | | | |
|---|---|---|--|
| | | <ul style="list-style-type: none"> All alarms must be acknowledged by the Plant operating staff before they can be cleared. Some alarms may be cleared from SCADA. Others shall need local reset. Philosophy shall be based on safety and equipment protection. No alarm shall clear automatically until it has been properly acknowledged. | |
| 7 | Alarm/Interlock Effect on MANUAL/AUTO Control | <ul style="list-style-type: none"> Equipment safety interlocks specified to shutdown equipment "independent of control mode" or other like description shall be active regardless of PLC (MANUAL/AUTO) or field control station (ON, LOCAL/REMOTE) operating status Other software generated alarms shall remain active independent of operating mode, but only effect specified control actions in AUTO (PLC) and REMOTE (field) operating modes | |
| 8 | Equipment Monitoring | <ul style="list-style-type: none"> For all equipment controlled by the PLC, the equipment shall receive and display applicable status and alarm signals, such as operating mode (LOCAL, REMOTE, etc.), operating status (ON, OPEN, CLOSED, etc.) and alarm status (FAIL, LOCKED-OUT, etc.). For multistate devices where an actual digital input is not provided, provide PLC logic based on the status of the other inputs to develop the remaining status. For example, for LOR switches use the status of the LOCAL and REMOTE inputs to develop and display the status of the OFF position. | |
| 9 | SCADA AUTO/MANUAL | For all equipment controlled by the PLC, DB shall provide separate displays and poke points for selection of AUTO/MANUAL operating modes. In AUTO mode, the device shall be controlled by the PLC. In MANUAL mode, the device shall be operated by START/STOP, OPEN/CLOSE poke points, as appropriate. The | |

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| | | workstation shall display the current operating status of each device and an alarm if the equipment fails to respond to a command signal after an operator adjustable time period. | |
| 10 | Proportional, Integral, Derivative (PID) Control | <ul style="list-style-type: none"> • PID control functions shall be performed at the PLC with controller faceplate displays at the workstation • Standard PID control operator interface shall be provided, including AUTO/ MANUAL mode selection: <ul style="list-style-type: none"> ○ In AUTO, the controller output shall be based on the PID control function at the PLC ○ In MANUAL, the output of the controller shall be based on an operator set value ○ Transfer between MANUAL and AUTO shall be bumpless ○ At the workstation, DB shall provide AUTO/MANUAL selection poke points for PID controlled equipment, with graphic loading displays for manual control • PID loop tuning parameters shall be available via SCADA, but shall require engineering login to make adjustments | |
| 11 | Enclosures | <ul style="list-style-type: none"> • All cabinetry located outdoors should be fully enclosed, no false fronts or HMI on outside doors • Any internal equipment requiring regular maintenance shall be out of arc flash area | |

9.5.3 Typical Monitoring and Control

| Item | Parameter | Criteria | Notes |
|------|-------------------------|---|-------|
| 1 | All Analog Transmitters | Transmitter fail alarm | |
| 2 | Level Transmitters | <ul style="list-style-type: none"> • Continuous level monitoring | |

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| | | <ul style="list-style-type: none"> • PLC calculated high/low level alarm • PLC calculated high-high/low-low level alarm | |
| 3 | Level Switches | <ul style="list-style-type: none"> • High/ low level alarms • High-high/low-low level alarms | |
| 4 | Flow Transmitters | <ul style="list-style-type: none"> • Continuous flow monitoring • PLC calculated flow totals • PLC calculated high/low flow alarms | |
| 5 | Flow Switches | Flow alarms where applicable | |
| 6 | Pressure Transmitters | <ul style="list-style-type: none"> • Continuous pressure monitoring • PLC calculated high/low pressure alarms | |
| 7 | Analyzers (pH/LEL/H2S/CL2/DO etc.) | <ul style="list-style-type: none"> • Continuous signal monitoring • Dry contact high/low level alarm • PLC calculated high-high/low-low level alarm | |
| 8 | Temperature Transmitters | <ul style="list-style-type: none"> • Continuous temperature indication • PLC calculated high/low temperature alarm | |
| 9 | Temperature Switches | <ul style="list-style-type: none"> • High temperature alarm • Low temperature alarm | |
| 10 | Open/Close Valve or Gate | <ul style="list-style-type: none"> • Valve open/close command • Valve open/close position indication • Valve in Auto or Remote indication • Valve fault indication | |
| 11 | Modulating Flow Control Valve | <ul style="list-style-type: none"> • Valve position set point • Valve position feedback • Valve open/close position indication if applicable • Valve fault indication | |
| 12 | Constant Speed Drive | <ul style="list-style-type: none"> • Drive start/stop command • Drive running indication • Drive in auto or remote indication • Drive faulted: General Fault or Multiple Fault Indicators, etc. • PLC calculated drive run time • Failure to respond to command or change of status when not commanded • Diagnostics, DB to confirm specific parameters | |
| 13 | Variable Speed Drive | <ul style="list-style-type: none"> • VFD start/stop command • VFD running indication • VFD in auto indication • VFD faulted • VFD speed set point • VFD speed feedback | |

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|----|-----------------------------|---|--|
| | | <ul style="list-style-type: none"> • PLC calculated VFD run time • Diagnostics, DB to confirm specific parameters | |
| 14 | Chemical Dosing/Feed System | <ul style="list-style-type: none"> • Chemical dosing/feed systems • Chemical volume/quantity used calculated values | |

9.5.4 Labeling

| Item | Parameter | Criteria | Notes |
|------|--------------------|---|-------|
| 1 | Equipment Labeling | Submit comprehensive labeling schedule indicating tag information, type, material of construction, manufacturer, and other critical information | |

SECTION 10 MECHANICAL HVAC CRITERIA

10.1 General

The following section includes the performance criteria for the mechanical HVAC systems for the WRF. Coordinate these requirements with Section 9.

10.1.1 Code Requirements

All work shall conform to the requirements of the latest edition of the following codes:

| Item | Parameter | Criteria | Notes |
|------|-------------|----------------------------------|-------|
| 1 | Building | California Building Code (CBC) | |
| 2 | Mechanical | California Mechanical Code (CMC) | |
| 3 | Energy | California Energy Code (CEnC) | |
| 4 | Fire | California Fire Code (CFC) | |
| 5 | Ventilation | NFPA 820 | |

10.1.2 Referenced Standards

All work shall comply with the latest edition of the referenced standards from the following organizations:

| Item | Parameter | Criteria | Notes |
|------|---------------|---|-------|
| 1 | Organizations | <ul style="list-style-type: none"> • Air Conditioning, Heating, and Refrigeration Institute (AHRI) • Air Moving and Conditioning Association (AMCA) • American National Standards Institute (ANSI) • American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE) • American Society of Mechanical Engineers (ASME) • American Society for Testing Materials (ASTM) • American Welding Society (AWS) • Associated Air Balance Council (AABC) • Manufacturer’s Standardization Society (MSS) • National Electrical Manufacturers Association (NEMA). | |

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|--|--|---|--|
| | | <ul style="list-style-type: none"> National Fire Protection Association (NFPA) Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Underwriters Laboratories, Inc. (UL) | |
|--|--|---|--|

10.1.3 Installation Requirements

Conform to the manufacturers' installation requirements for materials and equipment furnished.

10.1.4 Design Criteria - Temperature

| Item | Parameter | Criteria | Notes |
|------|-----------------------------|--|--|
| 1 | Outdoor Design Temperatures | <ul style="list-style-type: none"> Buildings containing WRF processes or equipment: <ul style="list-style-type: none"> Summer: 88/65 degrees F dry bulb/wet bulb Winter: 31 degrees F Operations Building and Maintenance Building: <ul style="list-style-type: none"> Summer: 82/64 degrees F dry bulb/wet bulb Winter: 31 degrees F Electrical building, electrical rooms, and server room: <ul style="list-style-type: none"> Summer: 95/63 degrees F dry bulb/wet bulb Winter: 31 degrees F | Confirm requirements and conform to ASHRAE standards |
| 2 | Indoor Design Temperatures | <ul style="list-style-type: none"> Buildings containing WRF processes or equipment: <ul style="list-style-type: none"> Cooling: design outdoor temperature plus 10 degrees F Operations Building and Maintenance Building (non-shop and storage areas): <ul style="list-style-type: none"> Cooling: 70 to 78 degrees F and 20 to 60% relative humidity [Design Development] Heating: 65 to 72 degrees F and 20 to 60% relative humidity [Design Development] Maintenance Building Shop and Storage Area: <ul style="list-style-type: none"> 60 degrees F minimum | |

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|--|--|---|--|
| | | <ul style="list-style-type: none"> • Electrical building and electrical rooms: <ul style="list-style-type: none"> ○ 90 degrees F maximum [Design Development] • Server Room: <ul style="list-style-type: none"> ○ 68 to 74 degrees F dry bulb and 40 to 60% relative humidity | |
|--|--|---|--|

10.1.5 Design Criteria - Ventilation

| Item | Parameter | Criteria | Notes |
|------|--|---|-------|
| 1 | Buildings Containing WRF Processes or Equipment | Supply air and exhaust air ventilation in accordance with NFPA 820, latest edition | |
| 2 | Operations Building and Maintenance Building | <ul style="list-style-type: none"> • Outdoor air ventilation in accordance with the 2016 CEnC and ASHRAE 62 • Exhaust air ventilation in accordance with 2016 CMC and ASHRAE 62, minimum 10 air changes per hour • Provide a minimum of 6 air changes per hour for tanks, channels, and/or within process enclosures | |
| 3 | Electrical Building, Electrical Rooms, and Server Room | Outdoor air ventilation sufficient to maintain the spaces at a positive differential pressure of 0.1 inches water column relative to ambient | |

10.1.6 Configuration of Systems

| Item | Parameter | Criteria | Notes |
|------|---|--|-----------------------|
| 1 | Buildings Containing WRF Processes or Equipment | HVAC systems serving buildings containing WRF processes or equipment shall provide sufficient ventilation to achieve the lowest electrical hazardous location classification indicated in NFPA 820. Centrifugal fans and air cleaning devices should be used for ventilation. Multiple fans shall be employed. | |
| 2 | Operations Building and Maintenance | Rooftop package air conditioning (AC) units, power ventilators, and air cleaning devices should be used for HVAC systems. | Minimum four AC units |

| | | | |
|---|--|---|--|
| | Building: Non-Shop and Storage Areas | Split systems or other types of systems may also be considered. | |
| 3 | Maintenance Building Shop and Storage Area: 60 degrees F minimum | Power ventilators and air cleaning devices should be used | |
| 4 | Electrical Building and Electrical Rooms | Split system air conditioner, (100% redundant), power ventilators, and air cleaning devices should be used for HVAC systems | |
| 5 | Server Room | Split system air conditioner, (100% redundant), power ventilator, and air cleaning devices should be used for HVAC system | |

10.2 Basic Mechanical HVAC Work

| Item | Parameter | Criteria | Notes |
|------|----------------------|--|-------|
| 1 | Listing | All equipment, devices, and control panels furnished as part of this work shall be listed, labeled, or certified for the intended use by a Nationally Recognized Testing Laboratory as recognized by the United States Department of Labor, Occupational Safety, and Health Administration | |
| 2 | Motors | All motors shall conform to NEMA Standards MG 1 | |
| 3 | Supports and Anchors | Pipe supports and anchors shall conform to the requirements of MSS SP-58, SP-69, and SP-89 | |
| 4 | Identification | All piping, valves, ductwork, and equipment shall be label in accordance with ANSI A13.1 | |
| 5 | Insulation | Insulate refrigerant piping, condensate drain piping within buildings, and supply and return ductwork | |
| 6 | Access | Provide permanent access via ladders or stairs for all equipment | |

10.3 Fuel Storage for Emergency Generator

| Item | Parameter | Criteria | Notes |
|------|-----------|--|-------|
| 1 | Fuel Type | Diesel | |
| 2 | Volume | Sufficient for 24 hours of generator operation | |

10.4 Mechanical HVAC Equipment

| Item | Parameter | Criteria | Notes |
|------|--|--|-------|
| 1 | Rooftop Package Air Conditioning Units | Unit shall be outdoor type, rooftop mounted, electrically controlled, cooling unit utilizing a hermetic scroll compressor and gas heating. Unit shall use R-410A refrigerant. Unit shall meet ASHRAE 90.1 minimum efficiency requirements, be rated in accordance with AHRI Standards 210/240 and 340/360, be designed to conform to ASHRAE 15, 2001, and be UL-tested and certified in accordance with ANSI Z21.47 Standards and UL-listed. Roof curb shall be designed to conform to NRCA Standards. Unit shall be designed in accordance with UL Standard 1995, including tested to withstand rain. High efficient motors shall meet section 313 of the Energy Independence and Security Act of 2007 (EISA 2007). Interior cabinet surfaces of evaporator compartment shall be insulated with a minimum 1/2 inch thick, minimum 1-1/2 lb. density, flexible fiberglass insulation. Controls shall be complete with self-contained low-voltage control circuit protected by a resettable circuit breaker on the 24V transformer side. Safeties shall include compressor over-temperature and over-current and low-pressure switch, and high-pressure switch. Unit shall use 2-inch disposable filter. Unit shall be furnished with enthalpy economizer, barometric relief dampers, and hinged access panels. | |
| 2 | Split System Air Conditioning Units | Indoor Unit: Unit includes a chassis, coil, insulation, drain pan assembly, fan, and motor. Unit shall be horizontal, ductless, indoor system with field-installed condensate pump, automatic fan speed control, auto restart after power outage, self-check function, and integral diagnostics. Cabinet is heavy gauge with formed edges and access panels. Cooling coils shall be copper tube with aluminum fins and copper tube connections. All coils shall be burst tested at 450 psig air pressure and leak tested at 100 psig air pressure under water. The maximum working pressure shall be 300 psig. Fan wheel shall be centrifugal forward curved double width. Fan wheel and housing shall be formed material and corrosion resistant. Fan speed control is automatic. Motors shall be brushless, permanently lubricated, have characteristics as scheduled, and be furnished with integral thermal overload protection. Motors shall be factory run tested and assembled prior to shipping. Controls shall be wall-mounted wireless. Outdoor Unit includes chassis, coil, compressor, refrigerant piping, condenser fan and motor, and controls. Cabinet is heavy | |

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|---|-------------------------------|---|--|
| | | gauge galvanized steel with formed edges and access openings for piping and conduit. Compressor is twin rotor with inverter drive. Refrigerant type is R410A. Piping connections are flared. Controls include automatic condenser fan speed control, auto restart after power outage, self-check function, integrated diagnostics, anti-recycle timer, defrost, and low-ambient lock out. | |
| 3 | Centrifugal Fans | Fans for ventilation systems serving hazardous areas classified under provisions of Article 500 of NFPA 70 shall be fabricated in accordance with AMCA Type A or Type B spark-resistant construction. Provide centrifugal vent sets. Fan shall be manufactured in an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories in conformance with UL 705. Fan shall bear the AMCA Certified Ratings Seal for Sound and Air Performance. The housing shall be able to be rotated in the field to eight discharge positions. Construction shall be bolted and welded utilizing corrosion resistant fasteners. Bearing support shall be 10-gauge welded steel. Fan shall include a weather cover with latched side access inspection ports for the motor compartment. Provide an engrave nameplate indicating fan performance and model number. | |
| 4 | Power and Gravity Ventilators | Spun aluminum housing, roof-mounted, belt-driven, upblast centrifugal exhaust ventilator. Fan shall be manufactured in an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories in conformance with UL 705. Fan shall bear the AMCA Certified Ratings Seal for Sound and Air Performance. Gravity ventilator shall have spun aluminum housing similar to exhaust ventilator. | |
| 5 | Air Cleaning Devices | Factory fabricated, replaceable, dry, pleated air filters in the, minimum 2" thick, minimum MERV 8 in accordance with ASHRAE Test Standard 52.2-2007. Filters shall be listed as UL 900. Factory-assembled side servicing housings with flanges for insertion into ductwork. Construct of 16-gauge galvanized steel. Provide access doors with continuous gasketing. | |

10.5 Ductwork and Appurtenances

| Item | Parameter | Criteria | Notes |
|------|-----------|--|-------|
| 1 | Ductwork | <ul style="list-style-type: none"> Construct rigid ducts using ASTM A653M-2003 G90 sheet metal in accordance with recommendations of the ASHRAE Guide, SMACNA | |

| | | | |
|---|------------------------|--|---|
| | | <p>1985 HVAC Duct Construction Standards Metal and Flexible, NFPA 90A, and the California Mechanical Code. Flexible ducts with an exterior reinforced vapor barrier, minimum R = 8.0 insulation, encapsulated steel wire helix, and impervious, smooth, non-perforated interior polymer liner. The maximum length shall be seven feet. Flexible ducts shall be limited to use at the terminal ends of the duct system only. Flexible ducts shall conform to UL-181.</p> <ul style="list-style-type: none"> • Ducts for odor control ventilation shall be FRP. | |
| 2 | Ductwork Accessories | <p>Round ducts and rectangular ducts with maximum dimension 16" or smaller shall have butterfly type balancing damper with quadrant locks, fabricated according to SMACNA standards. Rectangular ducts with maximum dimension greater than or equal to 17" shall have opposed blade configuration with quadrant locks. Provide flexible connections and sunshields (if outdoor) for each duct connection to a piece of equipment.</p> | |
| 3 | Air Outlets and Inlets | <p>Construct with steel backpans and removable perforated steel faces, and compatible with the ceiling system in which installed. Diffusers shall be equipped with four cores consisting of pattern control vanes that individually pivot to adjust air pattern from horizontal to vertical. The air pattern can be adjusted further by rotating the cores in the field to provide a 1-way, 2-way, 3-way, or 4-way air pattern. Provide volume dampers in the necks of the devices.</p> | <p>Provide plastic materials in corrosive areas</p> |

10.6 Mechanical Controls and Monitoring

| Item | Parameter | Criteria | Notes |
|------|-----------|---|-------|
| 1 | Controls | <p>Controls shall be based on digital equipment and shall monitor and control space temperature and/or space humidity</p> | |

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|---|------------|---|--|
| | | to maintain indoor temperatures within the ranges established in the design criteria. | |
| 2 | Setpoints | Setpoints shall be adjustable by occupants but shall be limited within a range determined by the City | |
| 3 | Monitoring | All continuously operating ventilation systems serving WRF processes shall include flow detector devices connected to alarm signaling systems to indicate inadequate ventilation and ventilation system failure. The flow detection devices shall monitor both the supply and exhaust fans. Distinct local and remote alarms shall be provided in accordance with NFPA 820. | |

10.7 Startup, Commissioning, and Testing

| Item | Parameter | Criteria | Notes |
|------|-----------------------------------|---|-------|
| 1 | Startup | Startup for all equipment addressed by this section is required. Startup shall be performed by factory trained technicians and shall address all requirements in the manufacturers' installation and startup documentation. | |
| 2 | Commissioning | Commissioning is required for all HVAC systems addressed by this section. Requirements for system commissioning shall be based on the guidelines established by ASHRAE 202-2013. | |
| 3 | Testing | Testing required by codes, referenced standards, and installation instructions shall be performed in accordance with those requirements | |
| 4 | Testing, Adjusting, and Balancing | Testing, adjusting, and balancing of all equipment and HVAC systems addressed by this section is required. Work shall be in accordance with the 7th Edition of the AABC National Standards for Total System Balance and the requirements of ASHRAE Standard 111-2008 (RA 2017). | |

SECTION 11 DEMOLITION AND REMOVAL OF EXISTING WWTP

11.1 General – Demolition of Existing WWTP will be performed by other and this option is removed from the contract.

[clarification]

SECTION 12 FACILITY STARTUP AND COMMISSIONING AND TRANSFER OF OPERATIONS**12.1 General**

Equipment testing and startup are required for satisfactory completion of the construction phase of the contract and therefore shall be completed prior to operation of the facility.

12.2 Definitions

For purposes of facility startup and commissioning, the following definitions shall apply:

- *Manufacturer's Representative*: Employee of manufacturer who is factory trained and knowledgeable in the technical aspects of the products and systems.
- *Functional Testing*: Tests necessary to demonstrate that the installed equipment and systems function as specified and operate in the manner intended.
- *Startup Period*: Startup of any portion of the entire facility will be considered complete when the facility or designated portion has properly operated 2 weeks without interruption. This period is in addition to any specified functional or performance testing and training.
- *Acceptance Testing*: The operation of the entire facility to demonstrate the successful operation and integration of all the elements including ancillary systems.
- *Performance and Operation Testing*: The operation of the entire facility to demonstrate the facility's ability to meet performance requirements of the RFP, design documents generated by the DB, and finally to verify the performance guarantees submitted by the DB.

12.3 Facility Testing Plan

The DB shall organize and conduct a meeting to coordinate the development of the factory acceptance tests, manufacturers installation certification, functional tests, performance testing, and 6-month operational verification plan. The meeting must have participation from manufacturers' representatives, the City, and DB. After the planning meeting but no later than 3 months prior to the acceptance testing, the DB shall submit a draft Facility Testing Plan to the City. The Facility Testing Plan shall include the Functional Testing plan, the Acceptance Testing plan, and the Performance and Operation Testing plan. All permit-required confirmation testing shall be done by a third-party ELAP certified lab, to be paid for by the DB during the acceptance testing period. The DB shall submit the results of each testing program.

All testing plans and protocols shall define the procedures to be used, methods to verify compliance with the performance criteria, and include the following minimum components:

- The specific measurements that will be made, including identification of permanent and temporary measurement devices
- Calibration procedures for measuring devices
- Redundancy of any measuring device to demonstrate accuracy
- Organization of the testing team, including responsibilities
- The testing program and schedule
- Operations and maintenance schedule during the test period
- Specific detailed sampling protocols to be used in conducting the acceptance test

- Include testing plan to conduct all necessary facility and system performance tests to meet DDW and Title 22 testing and reporting requirements for GRRP's using subsurface application
- The quantities of influent that will be used and selected equipment that will demonstrate the capability of equipment to handle the design flows

12.4 Functional Testing

- The DB shall furnish the services of a manufacturer's representative for each piece of major equipment, to inspect, to check, and to adjust, if necessary, the equipment installation. In each case, the DB shall arrange to have the manufacturer's representative revisit the project site as often as necessary until any issues have been corrected, and the equipment installation and operation is acceptable to the manufacturer's representative. The DB shall conduct, with the assistance of the manufacturer's representative, startup and field tests on equipment, systems, and subsystems.
- Functional testing shall be required for all mechanically or electrically operated equipment and process systems, including but not limited to mechanical, electrical, instrumentation, and controls. Functional testing shall also be required for all control equipment and meters. Testing shall include checking for proper rotation, alignment, speed excessive vibration, quiet operation, and full capability of all other required functions. The DB shall perform initial equipment and system adjustments and calibrations in the presence and with the assistance of the manufacturer's representative.
- The DB shall furnish the manufacturer's representative a written report certifying that the equipment has been properly installed and lubricated, is in accurate alignment, is free from any undue stress imposed by connecting piping or anchor bolts, and has been operated satisfactorily under full-load conditions.
- The DB shall schedule all manufacturer certification testing. The manufacturer's representative and the operating personnel and the owner's representative will witness manufacturer certification testing.

12.5 Acceptance Testing

- The acceptance test shall demonstrate the ability of the WRF to meet contract requirements.
- After all certification, functional and equipment tests have been performed and all equipment has successfully met startup requirements, the facility shall be operated as a complete system for two weeks prior to entering the Transitional Operation Phase.
- The acceptance test shall not be conducted until the acceptance test plan is approved by the City and Regulatory agencies, and authorization is received from the City. The acceptance test plan shall describe the provisions for disposal of non-compliant effluent that may be generated during the execution of the acceptance test.
- All labor (excluding certified operators), materials, and equipment necessary to perform the acceptance test shall be provided by the FBV. Once the facility is treating wastewater, the City will provide certified operators. During the acceptance test, the FBV will operate, and be responsible for all costs for all systems under normal operating conditions, including but not limited to, routine equipment operation, maintenance services. Electricity and Chemical costs [PCO 119] will be paid by the City.
- The acceptance test shall also demonstrate the WRF's ability to operate on the emergency generator, in the event of total plant power failure, including automatic transfer to the emergency

generator. The system should demonstrate that the quality of effluent, and capability to process the influent is not diminished due to an automatic transfer to the emergency generator.

- The acceptance test should demonstrate the UPS for power and controls performing without loss of data and control.
- The acceptance test shall demonstrate manual shutdown, manual start-up, automatic shutdown, automatic start-up, and automatic transfer of equipment that requires any or all of those functions, without interruption of flow, or quality of effluent.
- Acceptance test shall include all necessary facility and system performance tests to meet DDW and Title 22 testing and reporting requirements for the Advanced Water Purification Facility to be employed to achieve Groundwater recharge through subsurface application. The scope of the Acceptance Testing shall be limited to the performance of the AWP unit operations to produce a water quality set forth in Section 1.6.2. See Attachment 4 for further clarification. [PCO 89]
- The City operational staff and owner's representative will witness acceptance testing. The City will provide at least one operator for eight hours per day, during the acceptance test period.
- The DB shall provide reports in accordance with the requirements of the regulatory agencies, with certification of the results demonstrating performance, all relevant data measured and recorded during the testing, and any calculations that were used in determining test results, and any certifications from equipment manufacturers that equipment was operated according to manufacturer's recommendations, any other available documentation reasonably requested by the City or regulatory agencies.
- DB shall provide initial oil fill and first oil change on all equipment as required by manufacturers' recommendations prior to the facility transfer to City for Performance and Operation Testing.

12.6 Performance and Operation Testing

- Following completion of acceptance testing, the City shall operate the facility for the 30 days as the Performance and Operational Testing period. During this period, the facility will be operated by the City under the direction of the FBV. Following this 30-day period, the City, FBV, and owner's representative shall meet to discuss the operation of the facility and evaluate the Performance. If at the conclusion of this meeting the City determines additional testing, optimization or monitoring is required they may request additional services from the Design Builder for up to an additional six month period. The cost and scope of these services will be agreed to by both parties and added to the contract via amendment.
- The performance and operations testing will be conducted by the City in accordance with the approved performance and operations plan.
- All labor, materials, and equipment necessary for the Performance and Operational Testing period shall be provided by the City. During the Performance and Operational Testing period the City is responsible for all costs for all systems under normal operating conditions, including but not limited to routine equipment operation, maintenance services, analytical costs, and chemical and electric usage. During performance and operation testing FBV will be responsible for all warranty repairs. FBV is responsible for any costs associated with permit violations.
- [PCO 064]

SECTION 13 SECURITY

13.1 General

Provide a security system that gives the City the ability to remotely monitor key areas within the site and notify the City of any intrusions. The completed security system shall be integrated with the City’s SCADA system.

| Item | Parameter | Criteria | Notes |
|------|----------------------------------|--|---|
| 1 | Construction/Work Area | Make adequate provision for the protection of the work area against fire, theft, and vandalism, and for the protection of the public against exposure to injury | |
| 2 | General Design Principles | <ul style="list-style-type: none"> Discrete security measures shall be planned into the facility Site design shall address security issues related to access control; electronic protection; and protection against man-made and natural disasters Security measures shall be consistent with Department of Homeland Security (DHS) Best Management Practices (BMPs) | |
| 3 | Security Measures | Intrusion detection, access control and CCTV video surveillance system security zoning shall provide a defensible perimeter and provide visual surveillance and defensible perimeter space to deter trespassing and vandalism | Do not monitor perimeter fence integrity i.e. cut wire or short circuit detection |
| 4 | Intrusion Detection System (IDS) | <ul style="list-style-type: none"> An IDS shall be provided. IDS field devices shall be connected to alarm panel. Alarm signals shall be relayed and integrated with SCADA system. Provide IDS devices on all exterior doors on Operations and Maintenance Buildings. Provide motion detectors on interior of Operations and Maintenance Buildings. Provide IDS with capability of assigning unique staff identification numbers and logging time and individual staff input to IDS system. Provide ability to activate and inactivate unique staff IDs. | |

| | | | |
|---|----------------------------------|--|---|
| | | <ul style="list-style-type: none"> Add one exterior security camera to enhance coverage of the facility grounds (6 other cameras already in design), add door detectors and motion sensors at the RO Bldg, Storage Shed, Electrical Bldg (detectors and sensors at Ops Bldg and Maint Bldg are already in design). [PCO 94] | |
| 5 | Access Control System (ACS) | <ul style="list-style-type: none"> An ACS at the gate to the non-public portions of the plant shall be comprised of an electrically operated vehicle gate, the gate shall be operated by contactless badges, and hardwired gate opener switch at the reception desk. Exiting vehicles shall trigger the gate to open automatically. Automatic Security Gates shall be equipped with pre-emptive equipment. This shall satisfy the following conditions: During power loss, the device shall be capable of manual operation to unlock and open the gates. Confirm device is suitable with local Fire Department. | Fire Department access and keypad entry station shall be available at the gate for entry. |
| 6 | Closed Circuit Television (CCTV) | <ul style="list-style-type: none"> CCTV security cameras for main front gate access and site security purposes. The system shall include weatherproof high-resolution IP or panoramic video cameras. The video surveillance system shall provide recording capacity of 30 days. The system shall have night vision capability and utilize video motion detection for alarm recording. Video motion detection events shall be recorded at full speed and camera resolution. The video surveillance system shall be available through the SCADA network. Provide video surveillance at critical points throughout the plant. | |

| | | | |
|----|--|--|--|
| 7 | Battery Backup & UPS | <ul style="list-style-type: none"> • All electronic security systems shall be powered from an UPS/generator supported power circuit(s) • IDS and ACS systems shall have power supplies with minimum of 8 hours of battery power backup • Video surveillance system shall be supported with UPS system with a minimum of 2-hour run time | |
| 8 | Supervisory Control and Data Acquisition (SCADA) Integration | <ul style="list-style-type: none"> • The SCADA system shall incorporate intrusion detection alarms from following electronic security systems: <ul style="list-style-type: none"> ○ Main Gate ○ Operations Building ○ Maintenance Building ○ Space Motion Detection | |
| 9 | Main Access Gate | Main gate to the plant shall be manually operated and locked with a padlock. Coordinate manual access and entry with Emergency Services. | |
| 10 | Exterior Lighting | All exterior lighting shall be SCADA controllable (on-off times) | |

SECTION 14 DELIVERABLES

The following table (edited version of Exhibit E of the RFP) defines the deliverables expected during the project.

| Submittals Required | Due Date |
|---|--|
| Functional Relationships | N/A [Per 3/27/19 Meeting] |
| Health and Safety Plan (Including IIPP) | 30 Days Prior to Construction NTP |
| Data and Document Management Plan ¹ | 30 Days After Design NTP |
| Design QA/QC Plan | 30 Days After Design NTP |
| Design Management Plan ¹ | 30 Days After Design NTP |
| Environmental Management Plan | 30 Days Prior to Construction NTP |
| Construction QA/QC Plan | 30 Days Prior to Construction NTP |
| Design Builders Construction Management Plan | 30 Days Prior to Construction NTP |
| Preliminary Baseline Schedule | 14 days after Design NTP |
| Baseline Schedule | 60 days after Design NTP |
| Weekly Reports | Weekly throughout the Construction Contract duration [Per 3/27/19 Meeting] |
| Monthly Report, Baseline schedule update, Certified Payroll, Pay Application and California Civil Code 8122 waivers and release forms | Monthly |
| 3-week Look-ahead Schedule | Weekly during active construction |
| UV Validation Testing Plan | 6 months prior to testing |
| UV Validation Test Results | 1 month after test |
| All Testing Plans and Submittals per Title 22 and DDW | As required by permitting agencies |
| Certified Payroll | Per DIR, state and federal funding standards |
| Subcontractor Advertisement/Bid Results | As required in Funding Agency Documents |

| Basis of Design (30%) | Per Schedule |
|--|---------------------|
| Code Analysis²: Submittal shall consist of an outline of applicable provisions of building codes, Regional and State Water Quality Control Board, Fire Department, and other codes. The outline shall include a written report and diagrammatic drawings which delineate the design criteria as appropriate. | |
| Architectural Design Themes – N/A [Per 3/27/19 Meeting] | |
| Schematic Design Report: Report detailing the review and analysis of each building and process component or treatment processes. Based on the Design Criteria Report, RFP requirements, and submitted proposal, with description of proposed changes, improvements, and/or additional requirements. Provide equipment cut sheets for critical equipment, and include preliminary design details for each discipline. This report shall include design flow rates and loadings, energy consumptions, chemical uses, operational and maintenance costs. Design report shall also include updated cost estimates for entire project. | |
| Civil Drawings: Site Plan showing locations of treatment facilities, buildings, structures, and access roadways and pedestrian pathways Site Access Road Plan showing road location Grading plans showing existing contours at 1-foot intervals and proposed grading concepts to a level sufficient to illustrate general site drainage and cut and fill areas. Utility Plans showing existing utilities, points-of-connections, and new site utilities | |
| Landscape Drawings: Plans showing conceptual hardscape and planting areas. | |

| |
|--|
| <p>Architectural Drawings: Overall Facility Dimensions Structure dimensions Major interior and exterior elements Floorplan layout with room names and size Site Sections Basic Elevations</p> |
| <p>Structural Drawings: N/A [Per 3/27/19 Meeting]</p> |
| <p>Plumbing Drawings: N/A [Per 3/27/19 Meeting]</p> |
| <p>HVAC Drawings: N/A [Per 3/27/19 Meeting]</p> |
| <p>Electrical Drawings: Conceptual single-line diagrams and plans showing site conduit routing, MCC and equipment locations and sizes.</p> |

| Design Development 60% | Per schedule |
|---|--------------|
| <p>Code Analysis²: Updated analysis from schematic design.</p> | |
| <p>Civil Drawings: Site Demolition Plan Site Plan showing dimensions of site features Site Access Road Plan showing road location and geometrics Grading plans showing general drainage, benchmarks, elevations for structures and exterior elements, and existing and proposed contours. Utility Plans updated with utilities showing plan and profiles along alignments and utility corridors, ductbanks, all equipment and structures Trench design and protection Miscellaneous Civil Details</p> | |
| <p>Landscape Drawings: Plans showing locations of plant types and trees</p> | |
| <p>Material board: Show all exterior, interior, coatings, color pallets, and glazing materials for architectural items</p> | |
| <p>Architectural Drawings: Updated Floorplans with corridors, door swings, fire ratings, exits, fire doors, plumbing fixtures, built-in features, movable furniture, sections and elevations. Architectural schedules for doors, glazing, finishes Drawings of all buildings, structures and process areas</p> | |
| <p>Structural Drawings: Structural plans showing structural elements (e.g. framing member sizes, reinforcement details, etc.) and details scaled per architectural drawings</p> | |
| <p>Plumbing Drawings: Show all piping (including alignments and sizes), fixtures and equipment requiring plumbing, waste lines, vents, air, gas, water, fire water system</p> | |
| <p>HVAC Drawings: Floor plans with equipment, main duct systems, air balances, large scale equipment room drawings and equipment schedules</p> | |
| <p>Electrical Drawings: Updated plans from schematic design documents to include MCC layouts with loads, lighting layouts, preliminary arc flash and trip study, equipment locations and sizes. Typical light fixture cut sheets Electrical room drawings Individual MCC detailed single lines</p> | |
| <p>Controls: PLC and SCADA layouts and block diagrams Equipment and instrument locations Input/output points</p> | |

| | |
|--|--|
| P&ID's | |
| Specification: Complete Technical Specifications per the outline. Specification must include construction guidelines, sequencing, construction materials, equipment specifications, submittal requirements, and test requirements. [Per 3/27/19 Meeting] | |
| Construction Documents 90% | 30 Days prior to permit submittals (for Owner review) |
| Code Analysis²: Updated analysis from Design Development | |
| Civil Drawings: | |
| Finalized plans from the Design Development Phase Site Survey and Control Plan Final Utilities Plan that: | |
| <ul style="list-style-type: none"> • Are coordinated with Architectural, Mechanical, Plumbing, Electrical, etc.; • Show manholes, valves, valve boxes, cleanouts, lift stations, process structures, etc.; • Include fully designed process piping horizontal and vertical locations and sizes; and • Show location, size, and elevations of all utilities. | |
| Landscape Drawings: | |
| To be provided as a separate submittal. | |
| Material Board: Show all finalized exterior, interior, coatings, color pallets, and glazing materials for architectural items | |
| Architectural Drawings: | |
| Reflected Ceiling plans, details | |
| Structural Drawings: | |
| Plans that indicate the location, type of member, size, and material of each structural element for foundations, floors, roofs, and any intermediate levels. List assumed safe bearing pressures on soils and ultimate strengths of concrete. Schedules (beam, column, and slab) Details of all connections, assemblies, expansion joints, and similar items Structural framing systems for piping, nonstructural elements and fixed equipment | |
| Plumbing Drawings: | |
| Floor plans showing complete process and domestic plumbing systems with the following information: | |
| <ul style="list-style-type: none"> • Location sizes, elevations of water, firewater, sewers, drains, waste, waste vents, and process piping with risers and connections to equipment, drains, and fixtures. • Locations of meters, valves, cleanouts, etc. • Fire-extinguishing equipment such as sprinklers and standpipes. • Location and sizes of natural gas, compressed air, process air piping. • Single line process diagram for all process piping • Equipment Schedules | |
| HVAC Drawings: | |
| Mechanical floorplans showing complete HVAC systems including | |
| <ul style="list-style-type: none"> • Air Conditioning systems including refrigerators, water and refrigerant piping, and duct work • Odor Control and Exhaust ventilation systems showing duct sizes, duct locations, condensate, equipment connections and discharge locations • Detailed floor plans and sections for all mechanical rooms and equipment | |

| |
|---|
| <ul style="list-style-type: none"> • Air balance schedule indicating the CFM of outside air, supply air, return air, odor control air, and exhaust for all air systems • Elevations of mechanical equipment to ensure airflows and access to component parts • Equipment mounting details • Isometric diagrams of HVAC water systems • Sequence of operations diagram • Equipment Schedules |
| <p>Electrical Drawings:</p> <ul style="list-style-type: none"> • Transformers and connections • Feeder and conduit sizes • Light fixtures, receptacles, switches, and power outlets • Telephone outlets, conduits, terminal cabinets, and backboards • Complete fire alarm system including inter connections to SCADA • Equipment local control panels • Emergency electrical power system including generator, transfer switches, fuel tanks, and all auxiliaries • Electrical Details including all mounting details • Equipment Schedules |
| <p>Instrumentation and Controls Drawings:</p> <ul style="list-style-type: none"> • Instrumentation Remote I/O cabinet details • Controls Details • Equipment Schedules |
| <p>Technical Specifications: Updated Specifications based on the specifications submitted as part of the Design Development work submittal.</p> |
| <p>Final Design Calculations Developer shall clearly list all design criteria, assumptions, and references used for process, structural, mechanical, and electrical calculations. Calculations shall be arranged in a clear manner and shall include schematic diagrams and spreadsheets where necessary together with information sufficient to show compliance with applicable Law and the Contract Documents. Calculations shall be checked and stamped by Licensed Professional in applicable disciplines. Calculations shall be submitted for:</p> <ul style="list-style-type: none"> • Structural shall include basis for structural design, unusual conditions, and diagrams • Mechanical shall include HVAC loads, equipment sizing and selection data, duct/pipe/pump sizing selection data and all seismic/structural calculations • Plumbing shall include piping/pump/equipment sizing and selection data, and seismic/structural calculations • Electrical shall include transformer loads and calculations, fault interrupt calculations, and lighting calculations. • Process calculations shall be performed with the use of an acceptable wastewater treatment computer modeling software program (i.e., BioWin). All system inputs and outputs must be submitted. |

| | |
|--|--|
| Post Design Submittals | |
| Building Permit Drawing Set | 90% Set will be used for permit reviews. However, separate sets may be required as required for early works as defined by Design-Builder. Design-Builder is directed to anticipate and allow for sufficient review, revision and resubmission for building permit approvals. |
| Misc. Permit Submittal Requirements | All necessary documents necessary to complete design or construction of the project (i.e. Traffic Control, SWPPP) |
| Pre-Construction site condition record video | 10 days prior to start of construction on the WRF |
| Equipment and Materials | Prior to release for production |
| Building Furnishings | Prior to release for production |
| Shop Drawings and Finish Materials | With sufficient time for City review and approval prior to order release |
| Daily Record of Construction activities | Following Business day 12:00 p.m. |
| Construction Photos | Monthly within 3 days of pay application |
| Existing WWTP Shutdown and Decommissioning Plan | Must be submitted 60 days prior to Decommissioning |
| As-Built Drawings | Prior to Final Completion and Payment |
| Structural Engineer Observation Certification | Prior to Certificate of Occupancy |
| Air Balance Report (Air Side Report) | Prior to Final Acceptance |
| Hazardous and/or Toxic Abatement and Demolition Plan | Prior to Demolition of existing WWTP |
| Operation and Maintenance Manuals | Prior to Facility Testing |
| Traffic Control Plans | As required by Agencies |
| Training Plan | 3 months prior to equipment testing |
| Facility Testing Plan | Minimum 3 months prior to Facility Testing |
| Facility Verification Plan | Minimum 3 months prior to Facility Testing |
| UV Validation Test results | 30 Days after validation testing |
| Miscellaneous Certificates of testing and inspection | 7 days after testing unless otherwise specified |
| Facility Test Reports | 30 days after Testing |
| Certificate of Final Completion | After all work and punch list items are completed |

Notes:

1. May be combined into a single document, or separate.
2. May be combined into the Basis of Design Report, or separate.

SECTION 15 UNFORESEEN CONDITIONS

15.1 Weather Delays

- Average weather days covered under the yearly NOAA averages will be consider non-compensable. Direct cost impacts to the field above and beyond normal industry standard such as act of god and beyond the NOAA daily average will be resolved separately. [PCO 60]
- Weather damage repairs from a rainstorm event on the Site in January 2021: FBV was reimbursed for actual expenditures associated with the January 2021 major storm (8"+ of precipitation in 48 hours). [PCO 96]

15.2 COVID

The COVID-19 pandemic has caused FBV to incur additional field costs to execute the work. FBV crew worked less efficiently. Additional safety protocol measures recommended by OSHA and State of California were implemented which included a period of daily screenings for temperature, additional sanitation and cleaning services for the field offices and the temporary field toilets and wash stations, safety stand downs, social distancing, COVID testing and lost time for some employees. We have also purchased extra PPE, thermometers, and cleaning supplies and rented additional porta-potties, among other costs. [PCO 77] Covid-19 has also caused certain material costs to escalate. [PCO 101]

15.3 LANDSLIDE

On January 28, 2021, the previous cut-slope landslide area reactivated during a major storm. The DB Team has performed extensive site investigation, and developed preliminary remediation drawings, and submitted total costs in the amount of \$825,300 to address the known conditions. The remediation scope of work includes: removal and stockpiling of approximately 17,000 cy of loose material to the mapped slip plane, benching into competent native subgrade material, installing a subdrain system at each bench with drainage to surface, placement and compaction of 17,000+ cy of engineered fill, surface contours to enhance precipitation run-off, concrete v-ditches to divert run-off from the areas, and the installation of two inclinometer for future monitoring by the City (monitoring not included). Future deliverables shall include As-Built IFC Drawings of all site work revisions and a P.E. stamped Geotech Report amendment indicating approval of work performed and updated slope stability analysis. [PCO 92]

15.4 Amendment No 7 Items (Approved by Council August 23, 2022)

In addition to the scope changes in this Exhibit Amendment No 7 also includes compensation for the following PCO's:

| PCO | Title |
|-----|--|
| 102 | City Requested SCADA Screen Revisions |
| 105 | WRF Monument Entry Sign Modifications |
| 110 | Chem Facility Fencing Revisions |
| 113 | Modify H2O SCADA Screen for RO System |
| 114 | RO/UV Building Wall & Ceiling Insulation |
| 118 | Fine Screen LOTO Capability |

15.5 Amendment No 8 Items (Approved by Council November 29, 2022)

In addition to the scope changes in this Exhibit Amendment No 8 also includes compensation for the following PCO's:

| PCO | Title |
|-----|---|
| 97 | Hydroseeding Soil Amendment & Coverage Limits |
| 103 | SRF Reimbursement Request Requirements |
| 108 | Defer SEED PLANT Milestone and WRF Commission |
| 121 | Credit for Alternate Frog Barrier Top Lip. |

15.6 Amendment No 9 Items (Approved by Council May 24, 2023)

In addition to the scope changes in this Exhibit Amendment No 9 also includes compensation for the following PCO's:

| PCO | Title |
|-------|-----------------------------------|
| 120 | Seed Sludge Maintenance Period |
| 128 | Granite Material Escalation |
| 132.2 | Additional Paving at WRC Entrance |
| 133 | Rancher Gate |

CITY OF MORRO BAY

AMENDMENT NO. 4 TO THE AGREEMENT
FOR CONSULTANT SERVICES
BETWEEN THE CITY OF MORRO BAY
AND COGSTONE RESOURCE MANAGEMENT

This Amendment No. 4 is entered by and between the City of Morro Bay, a municipal corporation (“City”) and Cogstone Resource Management, a California corporation (“Consultant”).

RECITALS

WHEREAS, City and Consultant entered into an agreement as of January 12, 2021, for cultural resources monitoring and management services related to the Water Reclamation Facility Lift Station and Offsite Pipelines Project (the “Project”), which was approved by the City Council for a not-to-exceed amount of \$264,918 (the “Agreement”).

WHEREAS, the Agreement when prepared and signed had a typo showing the not-to-exceed amount was \$261,918.40;

WHEREAS, the Parties amended the Agreement as of October 12, 2021, to include additional services and established a not to exceed amount of \$740,803.22 for the entire Agreement (Amendment No. 1);

WHEREAS, the Parties amended the Agreement as of August 23, 2022, to include additional services and established a not to exceed amount of \$390,270.00 for the entire Agreement (Amendment No. 2);

WHEREAS, the Parties amended the Agreement as of November 22, 2022, to include additional services and established a not to exceed amount of \$97,535.90 for the entire Agreement (Amendment No. 3);

WHEREAS, the Agreement, Amendment No. 1, Amendment No. 2 and Amendment No. 3 are hereinafter referred to as the Amended Agreement;

WHEREAS, the Parties now agree to amend the Amended Agreement to provide for monitoring and project management services for the Project, which work requires an expansion of the tasks to be provided by Consultant pursuant to the Amended Agreement;

WHEREAS, Consultant has specific knowledge and experience to provide technical oversight needed to accomplish necessary tasks required to meet the City Council's goals for the Project, and

WHEREAS, due to the expansion of tasks to be provided, the compensation payable pursuant to the Amended Agreement must be increased.

NOW THEREFORE, City and Consultant mutually agree to amend the Amended Agreement as follows:

1. The additional services to be provided by Consultant, pursuant to the Amended Agreement, as hereby amended, shall include Tasks 1.1, 2.1, 2.2, 2.3, and 2.4 of the Scope as set forth in Exhibit A, attached hereto and incorporated herein by this reference (the "Additional Work"). The Additional Work has already be commenced and was completed in February 2023.
2. The compensation for the Additional Work shall not exceed \$31,033.52. All Additional Work and further optional tasks shall be paid in accordance with the hourly rates set forth in Exhibit B, attached hereto and incorporated herein by this reference (the "hourly rates") and the process established by the Amended Agreement on a time and materials basis. With the amount added for satisfactorily completion of the Additional Work and further optional tasks, if all are requested to be performed, the total compensation paid pursuant to the Amended Agreement, as hereby amended, shall not exceed \$1,524,560.64.
3. Except as expressly stated herein, all terms and conditions in the Amended Agreement shall remain in full force and effect.
4. The effective date of this Amendment No. 4 shall be deemed to be May 24, 2023.

IN WITNESS WHEREOF, the parties have caused this Amendment No. 4 to be executed by their duly authorized representatives as of the day first written above.

CITY OF MORRO BAY

CONSULTANT

By: _____
Greg Carpenter,
Interim City Manager

By: _____
Its _____

Attest:

By: _____
Its _____

Dana Swanson, City Clerk

Approved As To Form:

Chris Neumeyer, City Attorney



PALEONTOLOGY - ARCHAEOLOGY - HISTORY

February 7, 2023

Cogstone 5170

To: Scott Collins, City of Morro Bay
 From: Desireé Martinez, Project Manager

RE: Change Order 04 for the Water Reclamation Facility Lift Station and Offsite Pipelines Construction

Cogstone has completed a budget analysis for our contract dated January 27, 2021, due to changes in scope and cost. Cogstone's original contract totaled \$264,918.00 and Change Order 1 totaled \$740,803.22 and Change Order 2 totaled \$390,270.00. Change Order 2 included optional tasks in the amount of \$43,060. Change order 3 totaled \$97,535.90 for a total new contract sum of \$1,493,527.12. We are requesting Change Order 04 to cover Native American monitoring, coordination with Native American monitors, response to inadvertent finds including additional reporting time, and project team coordination through February 3, 2023. Cogstone will not complete additional work beyond this date unless additional hours are added to this change order and approved in advance.

Change Order 04 Scope of Work

We are requesting the following scope due to the increased length in the Project which includes work completed in January and February 2023:

- Additional Project Team Coordination totaling 23.25 hours through January 2023.
- Additional archaeological monitoring from December 2022 totaling 8 hours.
- Additional response to inadvertent finds in February 2023 totaling 9 hours including additional reporting and response to comments time totaling 20 hours.
- Additional Native American monitoring in January 2023 totaling approximately 100 hours and 40 hours in February 2023. These totals are estimated and only time worked will be billed.

Assumptions

Cogstone assumes all work on this project is complete unless additional time is approved and added to Change Order 04 in advance of work. If additional work is not approved and added to Change Order 04 in advance and in detail, Cogstone requests that all future work be requested from Far Western which includes all archaeological and paleontological resources monitoring, Native American monitoring and coordination with Native American monitors, project team coordination, responses to inadvertent finds, sensitivity trainings, and any additional reporting requirements.

1518 West Taft Avenue
 Orange, CA 92865
 Office (714) 974-8300

Branch Offices
 San Diego – Riverside – Morro Bay – Sacramento

cogstone.com
 Toll free (888) 333-3212

Federal Certifications WOSB, EDWOSB, SDB
 State Certifications DBE, WBE, UDBE

CHANGE ORDER

Client Contact: Scott Collins, City Manager
 Client Company: City of Morro Bay
 Client Contract #: 01181.0001/537195.1
 Client Contract Date: January 27, 2021
 Change Order No.: 04

Summary of Increased Scope:

- Additional Project Team Coordination totaling 23.25 hours through January 2023.
- Additional archaeological monitoring from December 2022 totaling 8 hours.
- Additional response to inadvertent finds in February 2023 totaling 9 hours including additional reporting and response to comments time totaling 20 hours.
- Additional Native American monitoring in January 2023 totaling approximately 100 hours and 40 hours in February 2023. These totals are estimated and only time worked will be billed.

Contract Summary:

| | |
|--|-----------------------|
| Original Contract Amount | \$264,918.00 |
| Change Order 01 and Optional Monitoring Tasks | \$740,803.22 |
| Change Order 02 and Optional Monitoring Tasks | \$390,270.00 |
| Change Order 03 and Optional Monitoring Tasks | \$97,535.90 |
| Contract Total including Change Orders 01, 02, 03 | \$1,493,527.12 |
| Proposed Costs for Change Order 04 | \$31,033.52 |
| New Contract Sum including Change Order 4 | \$1,524,560.64 |

Client accepts Change Order 04 and it will become a supplement to the contract with all provisions of the contract applying hereto.

 Client Signature

 Client Name (printed or typed)

 Date

EXHIBIT - B

| ESTIMATED LABOR HOURS & COSTS | | | | | | | | | | | | | |
|---|--|-------------|---|---|-------------|-------------|--------------|----------------|------------------|-------------------|--------------------|--------------------------|---------------------|
| Water Reclamation Facility Lift Station and Offsite Pipelines Construction (Cogstone 5170) Change Order 4 | Title | QA/QC | Principal Investigator for Paleontology | Task Manager & Principal Investigator for Archaeology | Supervisor | GIS | A/P Monitor | A/P Monitor OT | Technical Editor | | | | |
| | | | | | | | | | | Hourly Rates | | | |
| | | Hours | Hours | Hours | Hours | Hours | Hours | Hours | Hours | TOTAL LABOR HOURS | TOTAL LABOR COSTS | TOTAL OTHER DIRECT COSTS | GRAND TOTAL |
| SCOPE OF WORK | | | | | | | | | | | | | |
| Task 1.1. Project Team Coordination | | | | | | | | | | | | | |
| | * Amount Expended over Contract Amount through January 2023 | 0.50 | | 22.75 | | | | | | 23.25 | \$ 2,461.25 | \$ - | \$ 2,461.25 |
| | ** Remaining Contract Credit | | | | | | | | | 0.00 | \$ - | \$ (20.23) | \$ (20.23) |
| | A. FEBRUARY 2023 Task Management and Communication | 1.00 | | 6.00 | | | | | | 7.00 | \$ 775.00 | \$ - | \$ 775.00 |
| Task 1.1. Project Team Coordination Subtotal | | 1.50 | 0.00 | 28.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 30.25 | \$ 3,236.25 | \$ (20.23) | \$ 3,216.02 |
| Task 2.1. Mitigation Monitoring During Construction | | | | | | | | | | | | | |
| | * Amount Expended over Contract Amount through January 2023 | | | | | | 8.00 | | | 8.00 | \$ 520.00 | \$ - | \$ 520.00 |
| Task 2.1. Mitigation Monitoring During Construction Subtotal | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.00 | 0.00 | 0.00 | 8.00 | \$ 520.00 | \$ - | \$ 520.00 |
| Task 2.2. Coordination with Tribal Monitors | | | | | | | | | | | | | |
| | * Amount Expended over Contract Amount through January 2023 | | | 16.50 | | | | | | 16.50 | \$ 1,732.50 | \$ 18,550.00 | \$ 20,282.50 |
| | A. FEBRUARY 2023 Task Management and Communication (Coordination with up to five Tribal members) | | | 4.00 | | | | | | 4.00 | \$ 420.00 | \$ 4,000.00 | \$ 4,420.00 |
| Task 2.2. Coordination with Tribal Monitors Subtotal | | 0.00 | 0.00 | 20.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.50 | \$ 2,152.50 | \$ 22,550.00 | \$ 24,702.50 |
| Task 2.3. On-Call Cultural Resources Monitoring | | | | | | | | | | | | | |
| | * Amount Expended over Contract Amount through January 2023 | | | 8.00 | | | | | | 8.00 | \$ 840.00 | \$ - | \$ 840.00 |
| | A. FEBRUARY 2023 A/P Monitoring and Response to Inadvertent Finds | | | 1.00 | | | 8.00 | | | 9.00 | \$ 625.00 | \$ - | \$ 625.00 |
| Task 2.3. On-Call Cultural Resources Monitoring Subtotal | | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 8.00 | 0.00 | 0.00 | 9.00 | \$ 625.00 | \$ - | \$ 625.00 |
| Task 2.4. Reporting | | | | | | | | | | | | | |
| | A. Additional Reporting Time (includes time for response to inadvertent finds in February 2023) | 2.00 | | 8.00 | | 2.00 | | | 4.00 | 16.00 | \$ 1,550.00 | \$ - | \$ 1,550.00 |
| | B. Additional Response to Comments Time | 1.00 | | 2.00 | | | | | 1.00 | 4.00 | \$ 420.00 | \$ - | \$ 420.00 |
| Task 2.4. Reporting Subtotal | | 3.00 | 0.00 | 10.00 | 0.00 | 2.00 | 0.00 | 0.00 | 5.00 | 20.00 | \$ 1,970.00 | \$ - | \$ 1,970.00 |
| GRAND TOTAL FOR ALL TASKS 1.1 - 2.4 | | 4.50 | 0.00 | 60.25 | 0.00 | 2.00 | 16.00 | 0.00 | 5.00 | 87.75 | \$ 8,503.75 | \$ 22,529.77 | \$ 31,033.52 |

| Other Direct Costs Itemized | UNITS | RATE | TOTAL |
|---|--------|--------------|--------------------|
| 1.1 ** Remaining Contract Credit | 1.00 | \$ (20.230) | \$ (20.23) |
| 2.2 A. Outstanding Native American Monitoring Invoices (Haylee Bautista July to December 2022) | 1.00 | \$ 8,550.000 | \$ 8,550.00 |
| 2.2 A. January 2023 Native American Monitoring (100 hours; *estimated time; only time billed will be invoiced) | 100.00 | \$ 100.000 | \$ 10,000.00 |
| 2.2 A. February 2023 Native American Monitoring (24 hours to-date; *estimated time only time billed will be invoiced) | 40.00 | \$ 100.000 | \$ 4,000.00 |
| Other Direct Total | | | \$22,529.77 |

Assumptions

- No additional Sensitivity Trainings are included.
- A maximum of two 4-hour responses to inadvertent finds is included including a response on February 2, 2023.
- Outstanding Native American invoices from July to December 2022 are included along with an estimated 100 hours of Native American Monitoring in January 2023 and 40 hours in February 2023.
- Due to lack of notice for cancellations, any cancellations with less than 24-hours' notice will be billed as a 4-hour minimum.
- Unless additional time is added to this change order, Cogstone will request that Far Western be contacted for additional monitoring work including scheduling and managing Native American monitors.
- Changes in scope will require a change order.

**AMENDMENT NO. 8 TO THE AGREEMENT
FOR CONSULTANT SERVICES
BETWEEN THE CITY OF MORRO BAY
AND CAROLLO ENGINEER, INC.**

This Amendment No. 8 is entered by and among the CITY OF MORRO BAY, a municipal corporation (“City”) and CAROLLO ENGINEERS, INC., a Delaware Corporation (“Consultant”). City and Consultant are sometimes collectively referred to as the “Parties.”

RECITALS

WHEREAS, City and Consultant entered into an agreement as of April 10, 2018, for consulting services related to the Program Management for the Water Resources Center (WRC Project), which was approved by the City Council for a total not-to-exceed amount of \$292,000 (the “Agreement”); and

WHEREAS, the Parties understood the Agreement was to cover completion of the Project Confirmation phase of the WRF Project (Phase 1); and

WHEREAS, the Parties amended the Agreement on November 27, 2018, to include additional services for a portion of the Project Implementation phase of the WRC Project (Phase 2) and established a total not-to-exceed amount of \$1,898,948.00 for the Agreement; and

WHEREAS, the Parties amended the Agreement on November 7, 2019, to include additional services for a portion of the Project Implementation and Project Oversight phases of the WRC Project (Phase 2 and 3) and established a total not-to-exceed amount of \$4,280,916 for the Agreement; and

WHEREAS, the Parties amended Agreement on June 23, 2020, to include additional services for Project Oversight phases of the WRC Project (Phase 3) and established a total not-to-exceed of \$6,354,049 for the Agreement; and

WHEREAS, the Parties amended Agreement on June 22, 2021, to include additional services for Project Oversight phases of the WRC Project (Phase 3) and established a total not-to-exceed of \$11,808,401 for the Agreement, and

WHEREAS, the Parties amended Agreement as of July 1, 2021, to expand the entities protected by the hold harmless clause in the Agreement; and

WHEREAS, the Parties amended Agreement as of June 14, 2022, to extend the contract expiration date to June 30, 2023 in the Agreement; and

WHEREAS, the Parties amended Agreement as of August 23, 2022, to include additional services for Project Oversight phases of the WRC Project (phase 3) established a total not-to-exceed of \$13,508,401 for the agreement; and

WHEREAS, the Agreement and the November 27, 2018, November 7, 2019, June 23, 2020, June 22, 2021, July 1, 2021, June 14, 2022, and August 23, 2022 amendments are hereinafter referred to as the “Amended Agreement;” and

WHEREAS, due to the extended timeframe for completion of the WRC Project, the expiration of the Amended Agreement must be extended, as well.

NOW, THEREFORE, City and Consultant mutually agree to further amend the Amended Agreement as follows:

1. The expiration date of the Amended Agreement shall be extended to June 30, 2024, at no additional cost.
2. Except as expressly stated herein, all terms and conditions in the Amended Agreement shall remain in full force and effect.
3. The effective date of this Amendment No. 8 shall be deemed to be May 24, 2023.

IN WITNESS WHEREOF, the Parties have caused this Amendment No. 8 to be executed by their duly authorized representatives.

CITY OF MORRO BAY
a municipal corporation

CONSULTANT

CAROLLO ENGINEERS, INC.

By: _____
Greg Carpenter, Interim City Manager

By: _____
Paul Amico, Vice President

Dated: _____, 2023

Dated: _____, 2023

Attest:

Dana Swanson, City Clerk

By: _____

Approved As To Form:

_____.

Its: _____

Chris Neumeyer, City Attorney

**AMENDMENT NO. 2 TO THE AGREEMENT
FOR CONSULTANT SERVICES
BETWEEN THE CITY OF MORRO BAY AND CONFLUENCE ENGINEERING SOLUTIONS**

This AMENDMENT NO. 2 TO THE CONTRACT FOR CONSULTANT SERVICES (“Amendment”) is entered into on the 24th day of May 2023, by and between the CITY OF MORRO BAY, a municipal corporation (“City”), and Confluence Engineering Solutions, Inc. (“Consultant”). City and Consultant are sometimes collectively referred to as the “Parties.”

RECITALS

WHEREAS, City entered into an Agreement with Consultant, on January 3, 2022, for engineering services related to the Capital Improvements to the City’s Water Distribution and Wastewater Collection Systems (the “Project”) for a not to exceed amount of \$45,000.00 (the “Agreement”); and

WHEREAS, the Parties amended the Agreement on August 23, 2022 (Amendment No. 1), to include Program Management services to assist the City with the implementation of the recycled water component of the Water Reclamation Facility Project (WRF Project) and other Water and Wastewater System Engineering Services; and

WHEREAS, the Agreement and the Amendment No. 1 are hereinafter referred to as the “Amended Agreement;” and

WHEREAS, City and Consultant now agree to amend the Amended Agreement to extend the expiration date of the Amended Agreement to allow the Consultant to continue to provide Program Management and other Engineering support services; and

NOW THEREFORE, City and Consultant mutually agree to amend the Agreement as follows:

1. The expiration date of the Amended Agreement shall be extended to June 30, 2024 at no additional cost.
2. Except as expressly set forth in this Amendment, the terms and conditions of the Amended Agreement shall remain in full force and effect.
3. The effective date of this Amendment No. 2 shall be deemed to be May 24, 2023 (Effective Date).

IN WITNESS WHEREOF, the parties have caused this Amendment No. 2 to be executed by their duly authorized representatives as of the Effective Date.

CITY OF MORRO BAY

CONFLUENCE ENGINEERING SOLUTIONS

By: _____
Greg Carpenter, Interim City Manager

By: _____
Daniel Heimel, President

Attest:

Dana Swanson, City Clerk

Approved As To Form:

Chris F. Neumeyer, City Attorney



City of Morro Bay
Water Reclamation Facility Program

QUARTERLY REPORT -
ENDING MARCH 31, 2023

FY 2022-2023 – 3rd Quarter
January 1 through March 31, 2023



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EXECUTIVE SUMMARY

“Our Water” is the City of Morro Bay’s (City’s) program to plan and build water and wastewater infrastructure for a sustainable future for the environment, our economy, and the community. This report summarizes key accomplishments and challenges during the third quarter (Q3) of the 2022-23 fiscal year (FY 22/23). It includes information and data on the overall program budget and the status of the individual program components.

ES.1 Progress During Q3 FY 22/23

The Water Resources Center (WRC) is approximately 97.6 percent complete, and Conveyance Facilities are approximately 99.4 percent complete. Substantial Completion was issued to the WRC design build contractor on January 15, 2023, and the City achieved compliance with the State’s Time Schedule Order (TSO) that required full operation of the WRC by February 28, 2023. Major construction on the Conveyance Facilities project was completed in Q3 and punch list coordination progressed. The Recycled Water Facilities (RWF) component of the program is approximately 12 percent complete and is anticipated to be completed by Spring 2025. The pilot injection well testing was completed on January 4, 2023. The major accomplishments are summarized below.

ES.2 Budget Status

The current program budget is \$159.84 million and \$133.1 million has been spent to-date.

ES.3 Key Q3 FY 22/23 Accomplishments

- The City took full occupancy of the WRC on January 1, 2023.
- The City met the February 28, 2023 TSO deadline.
- The City held a completion event for the WRC and Conveyance Facilities project on February 23, 2023 and introduced the public to the future of the Recycled Water component of Water Reclamation Facility (WRF) program.
- All roadway paving was completed for the Conveyance Facilities project.
- The pilot injection well extended period injection testing was completed on January 4, 2023.

ES.4 Challenges and Upcoming Activities

Wet weather and flooding in various parts of the City were the biggest challenges the City experienced during this quarter. Consequently, the WRC experienced flows that met or exceeded the design capacity of the WRC, which allowed the City to operate the WRC at full capacity and test the treatment processes at the peak flow rates.

The WRC and Conveyance Facilities contractors continue to close out of the major construction projects and focus on completing punch list work items, with the goal of achieving final completion of the contracts in the fourth quarter (Q4).

There are no significant challenges on the RWF portion of the project. Upcoming activities include the development of the engineering report for the injection wells and the final groundwater modeling results of the proposed indirect potable reuse (IPR) system. GSI Water Solutions, Inc. (GSI) (hydrogeologist) is expected to submit a draft engineering report to the RWF program manager (Confluence Engineering Solutions) in Q4.

Section 1

PROGRAM MANAGEMENT SUMMARY

1.1 Purpose of the Quarterly Progress Report

The WRF program quarterly progress report describes current budget status, funding agency reimbursements, planning/design and construction activities, and project component schedules. Abbreviations used throughout this quarterly progress report are found in Appendix A.

1.2 Program Budget

Table 1 shows the current program budget.

Table 1 WRF Program Budget

| Program Component | Baseline ⁽¹⁾ | FY 2021/2022 | FY 22/23 and Prior Quarter | Current Quarter ⁽²⁾ | Current % Change From Baseline |
|--------------------------|-------------------------|----------------------|----------------------------|--------------------------------|--------------------------------|
| WRC Plant | \$62,414,000 | \$77,687,023 | \$79,643,216 | \$79,643,216 | 28% |
| Conveyance Facilities | \$21,087,000 | \$37,982,000 | \$39,774,724 | \$39,774,724 | 89% |
| RWF | \$8,593,000 | \$6,668,000 | \$9,424,174 | \$9,424,174 | 10% |
| General Project | \$24,403,000 | \$15,445,000 | \$30,998,235 | \$30,998,235 | 27% |
| Construction Contingency | \$9,444,000 | \$6,892,854 | Note 2 | Note 2 | N/A |
| Total | \$125,941,000 | \$144,674,877 | \$159,840,349 | \$159,840,349 | 27% |

Notes:

Abbreviations: FY- fiscal year.

(1) Baseline budget established Q4 of FY 2017/2018.

(2) The FY 22/23 budget adopted by City Council on June 28, 2022 was \$159,840,349. As of current Q3, FY 22/23, Construction and Overall Program Contingency in the FY 22/23 budget is included within each Program Component with remaining breakdowns as follows: WRC \$1,690,221, Conveyance \$0, RWF \$261,197, and General Project \$618,897. The contingencies were reported incorrectly in the Q2 FY 22/23 Report, however, were identified correctly in the November 22, 2022 City Council Meeting Staff Report for the WRF Project contract amendments.

Table 2 shows the initial and current contract values by project component.

Table 2 Project Component Contract History

| Project Component | Contractor | Initial Contract Value | Current Contract Value | % Change |
|------------------------------|----------------------|------------------------|------------------------|------------|
| WRC Plant | | \$67,234,512 | \$78,015,298 | 16% |
| Design/Build | FBV (Overland) | \$67,234,512 | \$78,015,298 | 16% |
| Conveyance Facilities | | \$33,321,277 | \$39,893,315 | 20% |
| Design | Waterworks Engineers | \$1,360,565 | \$2,615,112 | 92% |
| Construction | Anvil Builders | \$31,493,675 | \$34,968,314 | 11% |

| Project Component | Contractor | Initial Contract Value | Current Contract Value | % Change |
|-------------------------------------|---|------------------------|------------------------|---------------|
| Permitting | Cogstone, Far Western, KMA | \$467,037 | \$2,309,889 | 395% |
| RWF | | \$752,832 | \$1,584,020 | 110% |
| Planning and Modeling | GSI, Cleath Harris | \$351,000 | \$1,173,513 | 234% |
| Pilot Injection Well Construction | ABC Liovin, Pacific Coast Well Drilling | \$358,300 | \$366,975 | 2% |
| Environmental Permitting | Rincon | \$43,532 | \$43,532 | 0% |
| Injection Wells Construction | To Be Determined | -- | -- | -- |
| General Project | | \$293,000 | \$14,603,120 | 4,884% |
| Program and Construction Management | Carollo ⁽¹⁾ | \$293,000 | \$13,508,401 | 4,510% |
| City Contracts | Note 2 | Note 2 | \$1,094,719 | -- |
| Total | | \$101,601,621 | \$134,095,753 | -- |

Notes:

Abbreviations: Carollo - Carollo Engineers, Inc.; FBV - Filanc Black & Veatch; KMA - Kevin Merk Associates.

(1) Program management costs include permitting, public outreach, funding support, and construction oversight/management.

(2) Initial City Contract values for previous and/or inactive consultants (such as Michael K. Nunley and Associates, Black & Veatch, Environmental Science Associates, and Kestrel) are unknown. Current contract values are shown only for currently active consultants including Bartle Wells Associates, Confluence, and James S. Phillips Automation (JSP Automation).

1.3 Cashflow Projections and Actual Expenditures

Figure 1 shows cashflow projections and actual expenditures through the current period.

Table 3 lists actual expenditures for each program component and the percent of the budget expended.

Table 3 WRF Program Expenditures

| Program Component | Previous Total | Current Quarter ⁽¹⁾ | Total To Date | FY 22/23 and Current Quarter Budget ⁽²⁾ | Percent Budget Expended |
|-----------------------|----------------------|--------------------------------|----------------------|--|-------------------------|
| WRC Plant | \$69,644,435 | \$2,032,539 | \$71,676,974 | \$79,643,216 | 90% |
| Conveyance Facilities | \$36,506,755 | \$1,233,801 | \$37,740,557 | \$39,774,724 | 95% |
| RWF | \$1,134,670 | \$103,819 | \$1,238,488 | \$9,424,174 | 13% |
| General Project | \$21,503,477 | \$988,896 | \$22,492,373 | \$30,998,235 | 73% |
| Total | \$128,789,337 | \$4,359,055 | \$133,148,392 | \$159,840,349 | 83% |

Notes:

(1) Q3 FY 22/23 total expenditures as tallied on the Accounts Payable Report run on April 27, 2023, which may not include all invoices paid through March 31, 2023 services (to be included with Q4 FY 22/23 report). See Appendix B Note 2 for additional details.

(2) The FY 22/23 budget adopted by City Council on June 28, 2022 was \$159,840,349.

1.4 Program Funding

Table 4 lists WRF program funding sources.

Table 4 WRF Program Funding Sources

| Funding Agency | Funding Type | Amount Financed | Initiation Date | Terms |
|---------------------------------|-------------------|----------------------|-----------------|-------------------------------|
| SWRCB – CWSRF Construction Loan | Low Interest Loan | \$66,604,638 | 7/1/2021 | 0.9%, 30 years |
| EPA – WIFIA | Low Interest Loan | \$61,700,336 | 3/9/2020 | 0.83%, 35 years |
| SWRCB – CWSRF Planning Loan | Low Interest Loan | \$10,300,000 | 12/11/2015 | 0.9%, 30 years |
| Recycled Water Planning Grant | Grant | \$75,000 | 9/10/2015 | Costs reimbursed upon request |
| Total | | \$138,679,974 | | |

Notes:

Abbreviations: CWSRF - Clean Water State Revolving Fund; EPA - Environmental Protection Agency; SWRCB - State Water Resources Control Board; WIFIA - Water Infrastructure Finance and Innovation Act.

Appendix C provides detailed information on funding reimbursements.

1.5 Program Schedule Overview

In June 2018, the City received a TSO from the Regional Water Quality Control Board that required the City to achieve full operation of the new WRC by February 2023. The key milestones included in the TSO are included in Appendix D, and the overall program schedule is shown in Figure 2. The current construction progress percent complete to-date per contract spent is 97.6 percent for the WRC and 99.4 percent for Conveyance Facilities. Figure 2 shows percent complete as an average between contract spent and scheduled date of completion. The RWF currently shows a project progress of 12 percent which represents the completion of the pilot injection study.

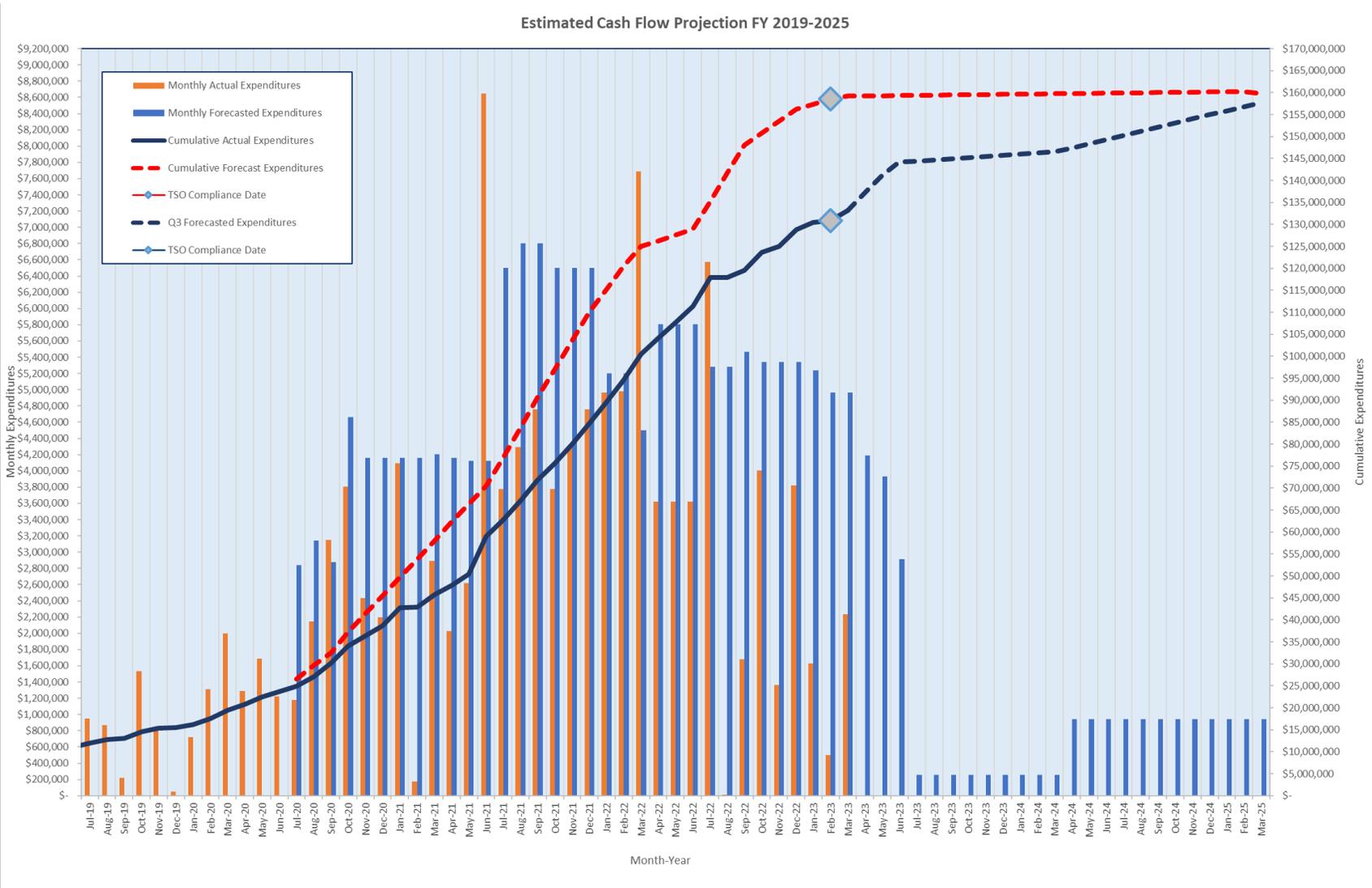


Figure 1 Program Cash Actual and Forecasted Expenditures



Morro Bay WRF Program
 Program Wide Schedule Summary
 Updated: FY22/23 Q3

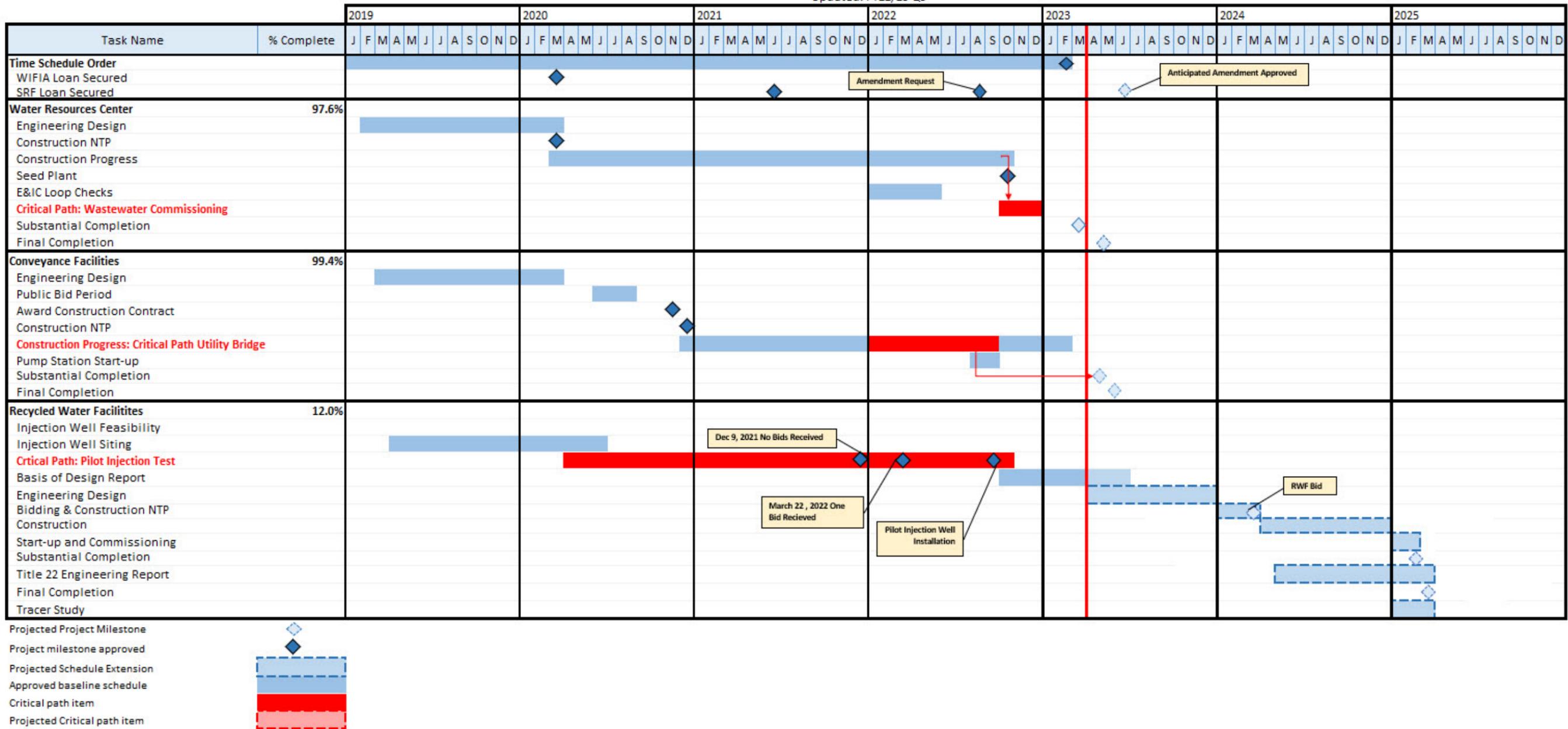


Figure 2 Program-Wide Summary Schedule

Section 2

WRC PROJECT

2.1 Construction Progress Summary

Major accomplishments during this period are summarized below:

General and Administrative:

- Milestone: The City completed the TSO milestone requirement of full operation of wastewater treatment facilities in compliance with the State National Pollutant Discharge Elimination System (NPDES) permit and other regulatory requirements.
- Contractor continues with the correction of punch list and warranty items.
- Contractor continues to maintain stormwater pollution prevention plan (SWPPP) best management practices (BMPs).
- Contractor continues to adhere to pertinent Mitigation Measures stipulations.
- Contractor/subcontractors continue to comply with Davis-Bacon Act requirements.
- Contractor has discontinued submitting critical path method schedule updates.
- The City hosted a completion event on February 23, 2023 for local and regional agencies and the public.
- The City experienced a long period of wet weather in December and January that caused operational challenges at the WRC. The City, with help from Carollo and the design build team, was able to work through these challenges to ensure treatment operations continued through the storm impacts.

Sitework:

- Completed.

Headworks:

- Completed and in service.

Biological Nutrient Removal (BNR)/Membrane Bioreactor (MBR) Treatment:

- Completed and in service.

Reverse Osmosis (RO)/Ultraviolet (UV) Advanced Oxidation Process (AOP):

- Facility is completed.
- RO and UV clean water and treated water testing was undertaken but not completed.
- RO and UV equipment are not commissioned as of the end of the reporting period. The design build team with Carollo oversight are expected to begin the UV commissioning and challenge testing in Q4.
- The City and the State Department of Drinking Water are in consultation regarding various issues.

Purified Water Facilities:

- Facilities are completed and tested with clean water (not commissioned).

Residuals/Sludge Processing:

- Completed and in service.

Electrical and Controls:

- Completed and in service.

Chemical Storage and Feed:

- Completed and in service.

Operations Building:

- Building is completed and occupied by City staff.

Maintenance Building:

- Building is completed and occupied by City staff.

City Yard Facilities:

- Buildings are completed and occupied by City staff.

2.2 Project Photographs

The following photos show progress during this period.



February 2023 – SWPPP BMPs at WRC Entrance in Preparation of Winter Storms



February 23, 2023 – Mayor Wixom Presenting at the Completion Event



February 23, 2023 – Completed IPR Pump Station



February 23, 2023 – Completed and Operational Headworks and Fine Screens

2.3 Contract Amendment Summary

Table 5 contains a summary of the contract amendments for the WRC project component. Each amendment included multiple change orders to address changes in scope from the original proposal. A detailed summary of each amendment is provided in Appendix E.

Table 5 WRC Project Contract Amendment Summary

| Amendment No. | Council Approval Date | Amount |
|---------------|-----------------------|---------------------|
| 1 | May 2019 | \$1,636,060 |
| 2 | March 2020 | \$63,937 |
| 3 | May 2020 | \$5,992,218 |
| 4 | November 2020 | \$835,097 |
| 5 | March 2021 | \$(195,946) |
| 6 | September 2021 | \$1,132,117 |
| 7 | June 2022 | \$0 |
| Revised 7 | August 2022 | \$359,885 |
| 8 | November 2022 | \$957,418 |
| Total | | \$10,780,786 |

2.4 Project Schedule

Figure 3 shows the WRC construction and startup schedule.



Morro Bay WRF Program
 Program Wide Schedule Summary
 Updated: FY22/23 Q3

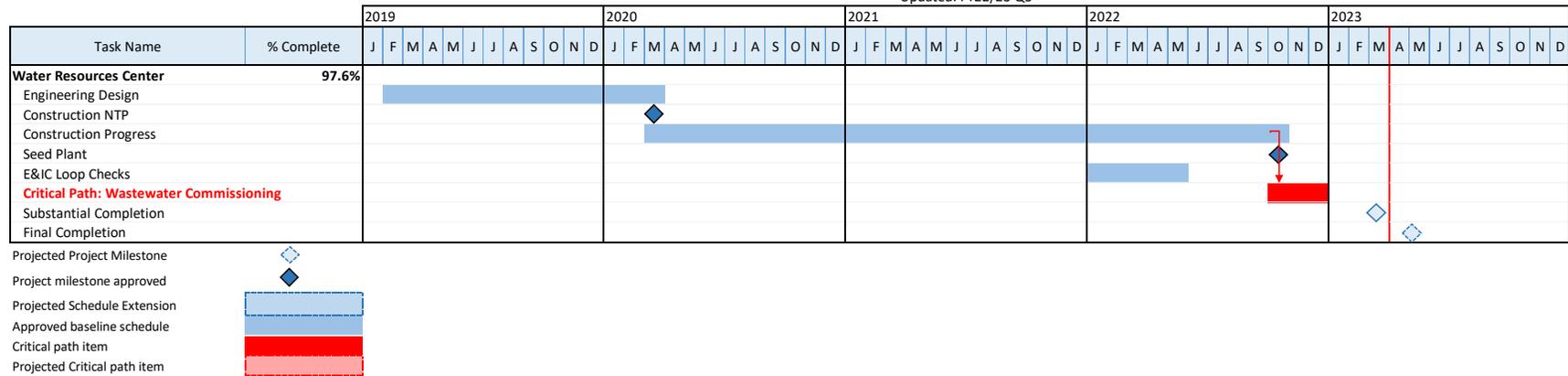


Figure 3 WRC Project Component Schedule

Section 3

CONVEYANCE FACILITIES PROJECT

3.1 Construction Progress Summary

Major accomplishments during this period are summarized below:

General and Administrative:

- Milestone: The City completed the TSO milestone requirement of full operation of the wastewater treatment facilities in compliance with the State NPDES permit and other regulatory requirements.
- Contractor continues with the correction of punch list and warranty items.
- Contractor continues to maintain SWPPP BMPs.
- Contractor continues to adhere to pertinent Mitigation Measures stipulations.
- Contractor/subcontractors continue to comply with Davis-Bacon Act requirements.
- No requests for public information were received during the reporting period.
- Contractor continues equipment operations and maintenance manual submittals.
- Contractor continues to submit 4-week look ahead schedules to identify punch list tasks scheduling as needed.
- The City experienced a long period of wet weather in December and January that caused damage to the bike path and required repairs of the bike path pavement subgrade and temporary fencing.

Sanitary Sewer Pump Stations:

Pump Station A:

- Pump Station facility is completed and in service.
- Sitework and fine grading were completed in this reporting period.
- Cleanup of the Pump Station A site was necessary after the January and February storm events.
- Permanent fencing was installed at site.

Pump Station B:

- Pump Station facility is completed and in service.
- Sitework and fine grading were completed in this reporting period.
- Permanent fencing was installed at site.

Existing Lift Station 2:

- Pump Station connection is completed and in service.

Existing Lift Station 3:

- Connection to existing Lift Station 3 was completed.

Pipelines:

Segment 1 – Atascadero Road (Existing City Wastewater Treatment Plant to Bike Path):

- Pipelines and other facilities in this segment are completed and in service.

Segment 2 – Bike Path (Atascadero Road to Morro Creek Foot Bridge):

- Pipelines and other facilities in this segment are completed and in service.
- The bike path grading and ground cover were damaged from the January storm event requiring the contractor to repair already completed work.
- Paving of bike path remains to be completed. Contractor to finalize bike path with painting and striping in Q4.

Segment 3 – Bike Path (Morro Creek Foot Bridge to Main Street):

- Pipelines and other facilities in this segment are completed and in service.
- The bike path grading and ground cover were damaged from the January storm event requiring the contractor to repair already completed work.
- The bike path has been paved. Contractor to finalize bike path with painting and striping in Q4.

Segment 4 – Main Street (Bike Path to Quintana Road):

- Pipelines and other facilities in this segment are completed and in service.
- Final paving has been completed.

Segment 5 – Quintana Road (Main Street to Morro Bay Boulevard):

- Pipelines and other facilities in this segment are completed and in service.
- Final paving has been completed.

Segment 6 – Quintana Road (Morro Bay Boulevard to La Loma Avenue):

- Pipelines and other facilities in this segment are completed and in service.
- Final paving has been completed.

Segment 7 – Quintana Road (La Loma Avenue to South Bay Boulevard):

- Pipelines and other facilities in this segment are completed and in service.
- Final paving has been completed.

Segment 8 – South Bay Boulevard (Quintana Road to New Morro Bay WRC):

- Pipelines and other facilities in this segment are completed and in service.

Segment 9 – Vistra Property (Bike Path to Existing Lift Station 2):

- Pipelines and other facilities in this segment are completed and in service.
- Final site restoration activities were completed. The contractor and construction management team are in contact with Vistra Energy for final sign-off.

3.2 Project Photographs

The following photos show progress during this period.



January 2023 – Flooding Along Bike Path



February 2023 – Quintana Road Paving



February 2023 – Pump Station B Fine Grading



March 2023 – Completed Morro Creek Utility Bridge

3.3 Change Order Summary

Table 6 contains a summary of the contract amendments for the Conveyance Facilities project component. Each amendment included multiple change orders to address changes in scope from the original proposal. A detailed summary of each amendment is provided in Appendix F.

Table 6 Conveyance Facilities Contract Amendment Summary

| Amendment No. | Council Approval Date | Amount |
|---------------|-----------------------|--------------------|
| 1 | October 2021 | \$674,485 |
| 2 | January 2022 | \$587,502 |
| 3 | March 2022 | \$241,317 |
| 4 | June 2022 | \$(54,065) |
| 5 | August 2022 | \$1,253,667 |
| 6 | November 2022 | \$646,763 |
| 7 | February 2023 | \$124,970 |
| Total | | \$3,474,639 |

3.4 Project Schedule

Figure 4 shows the Conveyance Facilities construction and startup schedule.



Morro Bay WRF Program
 Program Wide Schedule Summary
 Updated: FY22/23 Q3

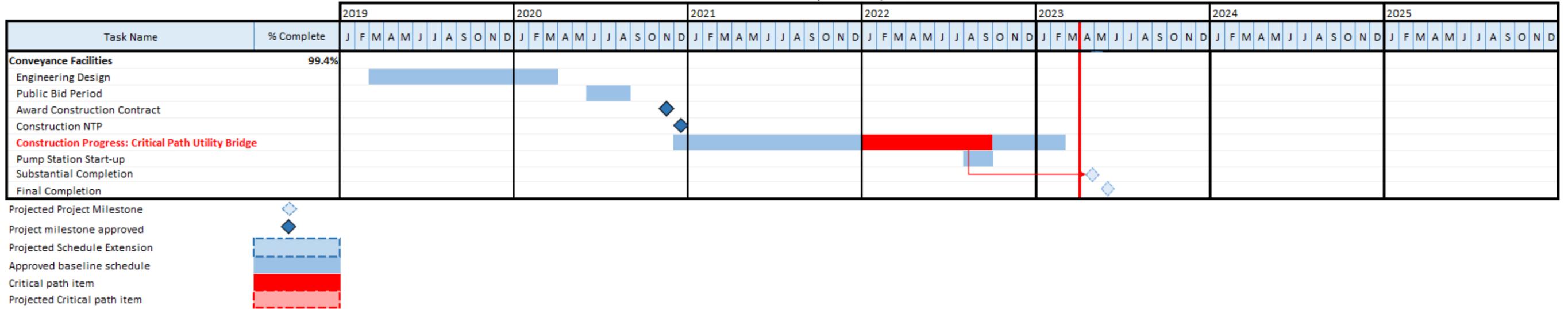


Figure 4 Conveyance Facilities Project Component Schedule

Section 4

RECYCLED WATER FACILITIES PROJECT

4.1 Project Progress Summary

The RWF component of the WRF program is currently in the planning pre-design phase, which includes the pilot study for the injection wells. GSI has completed Phase 1 and is currently working on Phase 2 of the hydrogeological work, which resulted in the selection of the west injection area and preliminary siting of the injection wells. The following activities were completed during this period:

- On January 4, 2023, the extended injection test, utilizing potable water from the City’s Water Distribution System, was completed using the pilot injection well.
- The City’s hydrogeologist consultant, GSI, administered the test and collected water level and water quality data at the injection well and nearby monitoring well.
- The results of the injection test will be utilized to update the Morro Basin Groundwater Model and improve the program team’s understanding of travel time in the groundwater basin.
- Additionally, following the injection test, GSI collected periodic water quality samples from the pilot injection well to evaluate potential geochemical interaction between the groundwater basin aquifer materials and the injected water.
- GSI utilized the findings from the injection test and other hydrogeologic investigations to begin preparation of the Basis of Design Report.
- Following the injection test Pacific Coast Well Drilling completed the remaining components of the project and reached Substantial Completion on February 24, 2023.
- The program management team evaluated different IPR pipeline alignment alternatives to identify a preferred alignment.
- The program management team developed estimates of the amount of wastewater that could be processed into advanced purified water under existing flow rates/diurnal patterns.

4.2 Project Photographs

There were no construction progress or project photographs taken this reporting period.

4.3 Project Schedule

Figure 5 shows the RWF construction and startup schedule.

Appendix A

ABBREVIATIONS

Appendix A

ABBREVIATIONS

| | |
|----------------|---|
| AOP | advanced oxidation process |
| BMP | best management practices |
| BNR | biological nutrient removal |
| Carollo | Carollo Engineers, Inc. |
| City | City of Morro Bay |
| CWRSF | Clean Water State Revolving Fund |
| EPA | Environmental Protection Agency |
| FBV | Filanc Black & Veatch |
| FY | fiscal year |
| FY 22/23 | 2022-23 fiscal year |
| GSI | GSI Water Solutions, Inc. |
| IPR | indirect potable reuse |
| JSP Automation | James S. Phillips Automation |
| KMA | Kevin Merk Associates |
| MBR | membrane bioreactor |
| NPDES | National Pollutant Discharge Elimination System |
| PCO | potential change order |
| Q3 | third quarter |
| Q4 | fourth quarter |
| RO | reverse osmosis |
| RWF | Recycled Water Facilities |
| SWPPP | stormwater pollution prevention plan |
| SWRCB | State Water Resources Control Board |
| TSO | Time Schedule Order |
| UV | ultraviolet |
| WIFIA | Water Infrastructure Finance and Innovation Act |
| WRC | Water Resources Center |
| WRF | Water Reclamation Facility |

Appendix B

QUARTERLY EXPENDITURES BY BUDGET CODE

Appendix B

QUARTERLY EXPENDITURES BY BUDGET CODE

| City Budget Code | Fund Name | Total Q3 FY22/23 Expenditures | Vendor Name | Project Component |
|---------------------------------|--|-------------------------------|---|-----------------------------|
| 4110 | Regular Pay | | | |
| 4599 | Other Pay | | | |
| 4910 | Employer Paid Benefits | | Summarized in Total Personnel Services | |
| 4911 | Pension Normal Cost | | | |
| 4999 | Labor Costs Applied | | | |
| Total Personnel Services | | \$13,089.65 | | City of Morro Bay |
| 5199 | Miscellaneous Operating Supplies | \$63,628.95 | Brenntag Pacific, US Bank Voyager Fleet Systems, Pacific Petroleum CA, Mechanics Bank, SWRCB, HD Supply | General Project |
| Total Supplies | | \$63,628.95 | Various | General Project |
| 6101, 7115, 7116 | Legal Services – General | \$22,977.97 | Aleshire & Wynder | General Project |
| 6301 | Electricity | \$14,842.84 | PG&E | |
| 6303 | Water | \$61.50 | City of Morro Bay | General Project |
| Total Services | | \$37,882.31 | Various | General Project |
| 6104 | Engineering Services | \$103,818.55 | GSI Water Solutions, Cleath Harris, Confluence (IPR) | RWF |
| 6105 | Consulting Services | \$23,906.25 | Confluence (WRF Program) | General Project |
| 6107 | Promotion and Advertising | \$360.00 | Estero Bay News | General Project |
| 6152 | Outside Laboratory Testing | \$14,601.25 | Pace Analytical, BSK Analytical | General Project |
| 6196 | Program Management & DB Procurement | \$835,427.37 | Carollo Engineers | General Project |
| Total Project Soft Costs | | \$978,113.42 | Various | RWF, General Project |
| 6106 | Contractual Services | \$1,052,150.21 | Anvil Builders | Conveyance |
| 7103 | WRF - On- Site Imprv Design - Build | \$94,550.00 | JSP Automation | WRC |
| 7104 | Design Phase - Lift Station & Force Main | \$2,994.21 | Water Works Engineers | Conveyance |

| City Budget Code | Fund Name | Total Q3 FY22/23 Expenditures | Vendor Name | Project Component |
|-------------------------------------|------------------------------|-------------------------------|-----------------------|------------------------|
| 7105 | Planning & Permitting | \$178,657.03 | Far Western, Cogstone | Conveyance |
| 7107 | WRC - On- Site Imprv - Build | \$1,937,989.40 | FBV | WRC |
| Total Construction Costs | | \$3,266,340.85 | Various | Conveyance, WRC |
| Total Quarterly Expenditures | | \$4,359,055.18 | | |

Notes:

- (1) City Budget Codes are from the latest Accounts Payable Report run on April 27, 2023.
- (2) Total quarterly expenditures shown only include invoices paid by the City in this quarter and are derived from a cash basis of accounting using the Accounts Payable reports provided by the City approximately one week after the end of the quarter. Total quarterly expenditures shown may differ from City fiscal year-end budget performance reports that are based on a modified accrual basis of accounting, which reallocates current quarter expenditures for services rendered in prior fiscal year back to the prior fiscal year.

Appendix C

WRF PROGRAM FUNDING REQUESTS AND
REIMBURSEMENTS STATUS SUMMARY

Appendix C

WRF PROGRAM FUNDING REQUESTS AND REIMBURSEMENTS STATUS SUMMARY

| Agency | Description | No. | Date Submitted | Requested Amount | Approved Amount | Received |
|--------|-------------------------|-----|----------------|------------------|-----------------|----------------|
| SWRCB | CWSRF Planning Loan | 1 | 12/18/2022 | \$289,595 | \$217,441 | Yes |
| SWRCB | CWSRF Planning Loan | 2 | 11/19/2022 | \$6,431,295 | \$5,312,748 | Yes |
| SWRCB | CWSRF Planning Loan | 3 | 10/20/2022 | \$3,910,211 | \$2,415,669 | Yes |
| SWRCB | CWSRF Planning Loan | 4 | 10/21/2022 | \$930,385 | \$484,617 | Yes |
| SWRCB | CWSRF Planning Loan | 5 | 4/22/2022 | \$0 (see 5A) | Pending | No |
| SWRCB | CWSRF Planning Loan | 5A | 9/26/2022 | \$0 | Not Applicable | Not Applicable |
| SWRCB | CWSRF Planning Loan | 5B | 11/22/2022 | \$1,982,581 | Pending | No |
| SWRCB | CWSRF Construction Loan | 1 | 9/21/2022 | \$11,185,433 | \$11,185,433 | Yes |
| SWRCB | CWSRF Construction Loan | 2 | 11/21/2022 | \$10,886,581 | \$10,886,581 | Yes |
| SWRCB | CWSRF Construction Loan | 3 | 12/21/2022 | \$5,463,514 | \$5,463,514 | Yes |
| SWRCB | CWSRF Construction Loan | 4 | 2/22/2022 | \$5,943,019 | \$5,943,019 | Yes |
| SWRCB | CWSRF Construction Loan | 5 | 3/22/2022 | \$6,095,373 | \$6,095,373 | Yes |
| SWRCB | CWSRF Construction Loan | 6 | 5/22/2022 | \$3,237,138 | \$3,237,138 | Yes |
| SWRCB | CWSRF Construction Loan | 7 | 6/22/2022 | \$2,145,403 | \$2,145,403 | Yes |
| SWRCB | CWSRF Construction Loan | 8 | 7/22/2022 | \$4,245,018 | \$4,245,018 | Yes |
| SWRCB | CWSRF Construction Loan | 9 | 8/22/2022 | \$3,896,973 | \$3,896,973 | Yes |
| SWRCB | CWSRF Construction Loan | 10 | 9/30/2022 | \$2,360,768 | \$2,360,768 | Yes |
| SWRCB | CWSRF Construction Loan | 11 | 12/5/2022 | \$2,744,578 | \$2,744,578 | Yes |
| SWRCB | CWSRF Construction Loan | 12 | 2/2/2023 | \$1,791,012 | Pending | No |
| SWRCB | CWSRF Construction Loan | 13 | 3/28/2023 | \$1,572,840 | Pending | No |
| EPA | WIFIA Loan | 1 | 5/20/2022 | \$1,100,944 | \$1,100,944 | Yes |
| EPA | WIFIA Loan | 2 | 6/20/2022 | \$61,014 | \$50,486 | Yes |
| EPA | WIFIA Loan | 3 | 7/20/2022 | \$3,489,409 | \$3,489,409 | Yes |
| EPA | WIFIA Loan | 4 | 7/20/2022 | \$2,461,121 | \$2,461,121 | Yes |
| EPA | WIFIA Loan | 5 | 8/20/2022 | \$142,863 | \$142,863 | Yes |
| EPA | WIFIA Loan | 6 | 10/20/2022 | \$1,635,106 | \$1,635,106 | Yes |
| EPA | WIFIA Loan | 7 | 12/20/2022 | \$3,008,572 | \$3,008,572 | Yes |
| EPA | WIFIA Loan | 8 | 12/20/2022 | \$3,671,499 | \$3,671,499 | Yes |
| EPA | WIFIA Loan | 9 | 1/21/2022 | \$5,553,851 | \$5,553,851 | Yes |

| Agency | Description | No. | Date Submitted | Requested Amount | Approved Amount | Received |
|--------------|-------------|-----|----------------|----------------------|----------------------|----------|
| EPA | WIFIA Loan | 10 | 3/21/2022 | \$2,440,399 | \$2,440,399 | Yes |
| EPA | WIFIA Loan | 11 | 4/21/2022 | \$1,621,783 | \$1,621,783 | Yes |
| EPA | WIFIA Loan | 12 | 5/21/2022 | \$2,988,342 | \$2,988,342 | Yes |
| EPA | WIFIA Loan | 13 | 6/21/2022 | \$3,544,987 | \$3,544,987 | Yes |
| EPA | WIFIA Loan | 14 | 7/21/2022 | \$2,692,977 | \$2,692,977 | Yes |
| EPA | WIFIA Loan | 15 | 8/21/2022 | \$1,328,552 | \$1,328,552 | Yes |
| EPA | WIFIA Loan | 16 | 9/21/2022 | \$488,601 | \$488,601 | Yes |
| EPA | WIFIA Loan | 17 | 10/21/2022 | \$321,117 | \$321,117 | Yes |
| EPA | WIFIA Loan | 18 | 11/21/2022 | \$346,279 | \$346,279 | Yes |
| EPA | WIFIA Loan | 19 | 12/21/2022 | \$1,005,341 | \$1,005,341 | Yes |
| EPA | WIFIA Loan | 20 | 1/22/2022 | \$337,646 | \$337,646 | Yes |
| EPA | WIFIA Loan | 21 | 3/22/2022 | \$956,562 | \$956,562 | Yes |
| EPA | WIFIA Loan | 22 | 4/22/2022 | \$395,308 | \$395,338 | Yes |
| EPA | WIFIA Loan | 23 | 5/22/2022 | \$1,315,288 | \$1,315,288 | Yes |
| EPA | WIFIA Loan | 24 | 6/30/2022 | \$155,599 | \$155,599 | Yes |
| EPA | WIFIA Loan | 25 | 7/28/2022 | \$169,286 | \$169,286 | Yes |
| EPA | WIFIA Loan | 26 | 8/22/2022 | \$723,244 | \$723,244 | Yes |
| EPA | WIFIA Loan | 27 | 9/30/2022 | \$653,121 | \$653,121 | Yes |
| EPA | WIFIA Loan | 28 | 10/26/2022 | \$968,147 | \$968,147 | Yes |
| EPA | WIFIA Loan | 29 | 12/20/2022 | \$433,862 | \$433,862 | Yes |
| EPA | WIFIA Loan | 30 | 2/1/2023 | \$262,959 | \$262,959 | Yes |
| Total | | | | \$119,385,496 | \$110,897,554 | |

Appendix D

PROGRAM MILESTONES

Appendix D

PROGRAM MILESTONES

| Milestone | Planned Completion Date |
|--------------------------------------|-------------------------|
| General Project | |
| Compliance with the TSO | 2/23/2023 |
| WIFIA Loan Secured | 3/9/2020 |
| SRF Loan Secured | 7/31/2021 |
| WRC | |
| Begin Design | 11/5/2018 |
| Construction Notice to Proceed | 3/20/2020 |
| Plant Seeding | 10/4/2022 |
| Substantial Completion | 1/15/2023 |
| Final Completion | 3/20/2023 |
| Conveyance Facilities | |
| Deliver 100 Percent Design | 6/15/2020 |
| Bid Advertisement | 6/16/2020 |
| Award Construction Contract | 11/10/2020 |
| Construction Notice to Proceed | 12/14/2020 |
| Substantial Completion | 10/17/2022 |
| Final Completion | 12/1/2022 |
| RWF | |
| Select Preferred Injection Area | 6/17/2020 |
| Pilot Injection Well - Complete | 10/1/2022 |
| Basis of Design of Report - Complete | 1/31/2023 |
| Engineering Design - Begin | 1/1/2023 |
| Construction Notice to Proceed | 3/15/2024 |
| Substantial Completion | 2/15/2025 |
| Final Completion | 3/15/2025 |

Appendix E

FBV AMENDMENT DETAILS

| No. | Item | Approved Amount (\$) | Cal Days | Amendment No. | Description |
|-----|--|----------------------|----------|---------------|--|
| 1 | New Sodium Hypochlorite Feed for Plant Water | 78,576 | 0 | 1 | Add a sodium hypochlorite (disinfection) chem feed pump, add sodium hypochlorite double contained piping from the Chemical Facility to the Recycled Water pumps. Additional electrical and controls for the new sodium hypochlorite pump. The added pump is needed for redundancy. |
| 2 | Change Architecture of Operations Building | (21,623) | 0 | 1 | The City requested to change the Operations Building exterior architecture back to a basic style, to delete the clerestory but to include cupolas and solatubes. The City requested the change to reduce project costs. |
| 4 | Headworks Odor Control | 18,422 | 0 | 1 | Adding foul air ducting from the Fine Screens and SAFE Diversion Box to the Headworks Odor Control Biofilter. Cost also includes adding a cover to the SAFE Diversion Box. The ducting and cover were adding to reduce foul air emissions. |
| 5 | Remove Canopy and Monorail at MBR | (185,434) | 0 | 1 | The MBR tank was originally design with a canopy cover and monorail/crane hoist. The monorail and crane hoist were originally included to move MBR cassettes in and out of the tank for cleaning and maintenance. The City requested the change to reduce project costs. In the future the City will use a crane or boom truck to remove MBR cassettes when necessary. |
| 9 | Consolidate Chemical Facilities | 218,978 | 0 | 1 | The original design provided chemical feed pumps and storage tanks at various locations where needed on site. The City requested to centralize all chemical storage tanks and feed equipment to one facility. Work includes a larger Chemical Facility structure, and additional chemical ductbanks and double containment piping. |
| 10 | Modify Chemical Piping | (15,856) | 0 | 1 | Revise underground chemical piping, to change double containment carrier piping from rigid pipe to flexible ducting. The City accepted this change to reduce project costs. |
| 15 | Remove Solids Dumpster Lid | 14,543 | 0 | 1 | At the Solids Handling Area, delete the Solids Dumpster Lid and delete the Hypalon Splash Guards. Add a canopy / awning structure over the dumpster area by extending the Solids handling Area canopy. The City prefers the open-air solids dumpster while providing the canopy to protect dewatered solids from rain and atmospheric moisture. |
| 16 | Modify Outfall Pump Station | 367,632 | 0 | 3 | Increase the guaranteed pump station capacity to 8.14 MGD. Change the original design of 3 medium sized VFD controlled pumps, to a modified configuration using 2 smaller pumps and 2 larger pumps, all with VFDs. Also add and modify pump station manifold piping and valving as necessary. The City requested the change to ensure adequate future flow capacity and maximize pumping efficiency. |
| 17 | Add SAFE Equalization Tank | 504,116 | 0 | 1 | Add SAFE Settle Tank (water bearing concrete structure) upstream of the SAFE system. The SAFE Settle Tank is added to the Sludge Holding Tank concrete structure. The new SAFE Settle Tank will either overflow to the SAFE System, or be pumped back to the SAFE Diversion Box using Solids Handling Pumps. Various segments of SAFE System diversion piping are upsized as required. |



| No. | Item | Approved Amount (\$) | Cal Days | Amendment No. | Description |
|-----|---|----------------------|----------|---------------|--|
| 18 | Instrumentation and Control Changes | 75,266 | 0 | 1 | The City prepared and issued a SCADA Master Plan for the WRF program. In January 2019, City staff and the DB team met and agreed on multiple technical items to coordinate between the City's SCADA Master Plan requirements and the DB Agreement scope. The PCO #18 proposal document includes a 6 page table of the multiple hardware and software changes. |
| 19 | Reduce Size of the Product Water Tank | (129,681) | 0 | 3 | The original DB Agreement included a 500,000 gallon bolted steel glass lined Product Water Tank. The City requested to decrease volume of Tank to 200,000 gallons. This was done to save project costs while also maintaining a suitable Product Water storage capacity on site. |
| 21 | Revise Maintenance Building Layout and Size | 516,583 | 0 | 1 | The Maintenance Building footprint is expanded from 50'x70' to 60'x90' and a second vehicle sized roll-up door is added. The change order also includes revised site grading and eliminating a step in the building foundation slab, such that the new layout providing a larger, single level, vehicle accessible, shop area. |
| 22 | Influent Piping and Metering | 411,766 | 0 | 1 | The original design included a single 18" influent raw sewage pipeline from Teresa Rd to the new Headworks and an 18" influent flow meter at the Headworks. The City requested to change the design to parallel 16" and 12" HDPE influent pipelines, each pipeline with a separate flow meter at the Headworks. The City requested the change to add redundancy to the influent piping system. |
| 23 | Outdoor-Rated Blowers (BNR) | (58,210) | 0 | 1 | Replace the specified Turbo Blowers with Outdoor Rated Dry Screw Positive Displacement Blowers. The change order includes various revisions to blower controls, valving, and Aeration Air piping. The change was made to reduce project costs while still providing a suitable capacity of Aeration Air for the biological facility process. |
| 24 | Remove Bypass of Coarse Screens | (37,137) | 0 | 1 | Delete the Coarse Screens bypass line, including both above grade and below grade 16" piping, valving, and fittings at the Headworks. The City requested the change to reduce project costs, as the bypass line was deemed not necessary. |
| 26 | SAFE Diversion Box Additions | 58,304 | 0 | 1 | Add a removable FRP cover over the SAFE Diversion Box. The new cover includes multiple FRP panel sections that are removable by hand and structurally rated to support foot traffic. The change also adds an access ladder and handrail to the top of the Diversion Box. The changes were requested by the City to improve access to the Diversion Box. |
| 28 | Size Dewatering as a Building in the Future | 30,983 | 0 | 1 | Expand the Solids Handling Area concrete foundation slab and canopy to 36'x45'. The change also includes reconfiguring the dewatering belt press, pumps, piping, etc. This change will allow walls to be added around the equipment in the future. The City requested this change in case excessive foul air is emitted in the future and odor control measure become necessary. |

| No. | Item | Approved Amount (\$) | Cal Days | Amendment No. | Description |
|-----|---|----------------------|----------|---------------|--|
| 30 | Match Blowers at SHT, BNR, and MBR System | 17,426 | 0 | 4 | There are 3 set of air blowers on the project: 2 each for MBR Air Scour, 3 each for BNR Aeration, and 2 each for Sludge Holding Tank mixing. The 2 each MBR Air Scour Blowers are Aerzen Blowers. The City requested that the 3 each BNR Aeration Blowers and 2 each Sludge Holding Tank Blowers also be supplied by Aerzen. The City requested this change for uniformity of equipment providers. |
| 31 | Coarse Screens and Grit Basins Stairs | 52,870 | 0 | 1 | The original design included various metal ladders to access the Headworks Coarse Screen and Grit Tank platform skids. This change deletes the ladders and adds 2 each 4 ft tall stair sets to the Course Screens and adds 2 each 8 ft tall stair sets to the Grit Tank area. This change also extends the Headworks foundation slab as required to provide foundations and landings for the added stairs. |
| 32 | Sulfuric Acid System | 315,652 | 0 | 3 | The City requested to add Sulfuric Acid feed pumps and a storage tank at the Chemical Facility. This change includes increasing the size of the Chemical Facility structure, adding double containment piping to both the RO Feed Tanks and the RO/UV Building, and adding all necessary electrical and controls. The City deemed that Sulfuric Acid addition is necessary for pH control/neutralization. |
| 37 | PLC/SCADA Software Uniformity | 201,577 | 0 | 3 | This PCO includes the cost to change PLC hardware and SCADA software from the standard offerings of the MBR, RO, and Headworks manufacturers to the City requested Allen Bradley and Wonderware products. This PCO applies to only those three equipment items and a separate PCO will be generated if a similar change is required for future procurements. The City requested this uniformity. |
| 38 | IPR Product Water Tank Bypass | (26,087) | 0 | 1 | Delete the Product Water Tank bypass line, including both above grade and below grade 8" piping, valving, and fittings at the Product Water Area. The City requested the change to reduce project costs, as the bypass line was deemed not necessary. |
| 39 | NTP Delay | 1,220,532 | 0 | 3 | This PCO includes extended general conditions costs due to the delay in receiving construction NTP from April 29, 2019 to March 20, 2020. The amount for the period April 29, 2019 to October 23, 2019 was in dispute and a reduction is provided to reflect the results of a negotiation. |
| 40 | Headworks Valve Automation | 249,946 | 0 | 3 | The change adds motor operated valving and controls to the Headworks treatment trains. This allows for automated shifting of flows from one treatment train to the other, as may be needed due to equipment malfunction or other alarm conditions, especially during periods when no operators are on site. The change includes adding 8 each motor operated valves, plus electrical and controls. |
| 41 | Perimeter Barbed Wire Fence | 79,935 | 8 | s 3&4 | City requested that FBV install a 5-strand barbed wire fence around the entire 27-acre project/property boundary, and along the Temporary Construction Easement (TCE) on the eastern boundary of site. The eastern boundary TCE fence will be relocated to the actual project/property boundary at project completion. |



| No. | Item | Approved Amount (\$) | Cal Days | Amendment No. | Description |
|-----|---|----------------------|----------|---------------|--|
| 42 | UV/AOP System Modifications | (33,481) | 0 | 3 | The City requested to delete the Standby UV Reactor from the scope of work to reduce project costs. The change includes FBV added costs for: UV system investigation, technical memoranda, development of alternatives, and resulting design revisions for associated mechanical, electrical, and controls. |
| 44 | Tank Access Improvements | 210,327 | 0 | 3 | This Change adds staircases to replace ladders throughout the site for improved access to treatment process basins. The change adds stairs, catwalks, and handrails at the BNR tanks, adds stair and landings at the SHT, add stairs and a grating platform at the MBR tank, and adds stairs, catwalk, and handrails at the SAFE system. |
| 45 | Maint. Building Ceiling and Auto Roll-Up Door | 21,009 | 0 | 3 | The City requested to add a motor actuator on one of the 14'X14' roll-up door at the Maintenance Building. This change includes the required added electrical and controls. |
| 46 | Curbed Washdown Areas | 76,250 | 0 | 3 | This change adds containment curbs, sloped slabs, floor drains, and drainage piping to sewer for various wastewater washdown areas. The change adds curbed washdown areas for the MBR cassette maintenance area, the solids/sludge dewatering area, and the Headworks Coarse Screen and Grit Tank area. The City requested the curbed washdown areas to better contain sewage spills. |
| 47 | Changes to Building Furnishings and Equipment | 85,194 | 0 | 3 | This Change adds office furnishings and appliances for the Operations and Maintenance Buildings, including desks, chairs, tables, shelves, cabinets, control room console, flat-screen monitors, kitchen and laboratory appliances, lockers, and maintenance building storage racks. The items were discussed and requested by the City during design meetings with the DB team Architect. |
| 50 | Water/Sewer Supply Shed Revisions | 13,142 | 0 | 3 | The original design includes a Water and Collections Storage Shed, with two equal sized rooms each with an exterior double-wide pedestrian door. This change deletes the double doors and adds 10 ft wide roll-up doors and single pedestrian doors for each room. |
| 52 | Analyzer Relocation and Enclosures | 76,555 | 0 | 3 | Relocate analyzers at Outfall/IPR Pump Station to indoors at the RO/UV Building, including adding 120' of sample piping between the sample point and building. Relocate analyzers at Dechlorination Facility to indoors at the Water/Collections Storage Shed, including adding 70' of sample piping between the sample point and building, and adding 70' of drainage piping to sewer. |
| 55 | Notice of Dispute PG&E Temporary Power | 13,163 | 0 | 3 | This PCO addresses the cost paid to PG&E for temporary power service. It has been a disputed item and negotiation has led to an agreement to split the cost 50/50. |

| No. | Item | Approved Amount (\$) | Cal Days | Amendment No. | Description |
|-----|---|----------------------|----------|---------------|---|
| 56 | Impacts of Water Quality Changes | 282,420 | 0 | 3 | In September 2019, the City provided updated influent Water Quality data to use as the basis of design. Multiple parameters were significantly different than listed in the DB Agreement. The revised Water Quality data impacted the RO equipment design. The added costs are for H2O Innovations (RO manufacturer) as well as for electrical and control changes by Electricraft. |
| 57 | Soil Lateral Earth Pressure | 116,329 | 0 | 3 | This change adds foundation sub-drains around below grade water bearing concrete structures as recommended by FBV and the Geotechnical Engineer. This change adds Miradrain Panels and 4" PVC drain piping around the perimeter of the BNR basin and Sludge Holding Tanks, to relieve lateral soil pressure on the concrete structures. |
| 58 | Permanent Exclusion Fencing | 855,991 | 0 | 3 | As required by environmental regulatory agencies, a concrete barrier wall for wildlife exclusion is added along the entire Eastern boundary of the site from Teresa Rd to the northern most tip of the site. The concrete barrier wall shall extend 24 inches above grade and 36 inches below grade, and include a nominal 6-inch top lip to serve as a climbing barrier. |
| 59 | Increased Escalation Costs | 1,232,677 | 0 | 3 | This PCO includes escalation costs due to the delay in receiving construction NTP from October 23, 2019 to March 20, 2020. |
| 61 | Potential Change Order (PCO) Design Impacts | 158,172 | 0 | 3 | This PCO is in response to FBV's claim for engineering redesign costs from changes requested by the City but subsequently reversed due to the cost being too high or otherwise excessive. The PCO also addresses FBV's claim for inefficiencies resulting from "changes in direction throughout the design development process". |
| 62 | Conduit Alternative Design | (268,400) | 0 | 3 | This change removed the original DB Agreement, Exhibit B, requirement to use PVC coated galvanized rigid steel conduit systems in all exterior and/or process areas on site. FBV proposed to use galvanized rigid steel conduit systems (without PVC coating) in all project locations as a value engineering suggestion. The City accepted the proposal in an attempt to reduce project costs. |
| 64 | Reduce Performance Period | (35,450) | 0 | 3 | The DB Agreement requires 6-months of FBV support during the Performance Test Period. The City requested to delete this requirement as not necessary. Note FBV remains responsible for the 12-month warranty against equipment and/or system malfunctions. The credit amount is taken directly from FBV's original bid proposal document. |
| 65 | Davis Bacon Wage Increases | 63,937 | 0 | 2 | The Contract amount is increased to compensate for the required implementation of CA Wage Determination dated 10/5/2018. FBV's original bid proposal document was based on CA Wage Determination dated 1/5/18 |

| No. | Item | Approved Amount (\$) | Cal Days | Amendment No. | Description |
|-----|---|----------------------|----------|---------------|--|
| 66 | Caltrans Intersection Improvements | (21,893) | 0 | 3 | Delete scope of work to extend intersection at Teresa Road and South Bay Boulevard for the new WRF Access Road. Adjust centerline of the WRF Access Road to be offset from the centerline of South Bay Boulevard. |
| 67 | BNR System Modifications | 742,405 | 0 | 3 | This change was requested by City to increase Aeration Air systems as required for full nitrification in the biological process. The costs include upsizing 3 each aeration blowers, stainless steel aeration piping, air meters, air valves, and adding aeration diffusers in the BNR basins. The change also adds Ammonium Sulfate pumps, tank, piping, and increases the size of the Chemical Facility. |
| 68 | SAFE Equalization Settle Tank Drain Piping | 62,215 | 0 | 3 | This change is requested by the City to provide a new pipeline to drain the SAFE Settle Tank. This pipeline will tie in to the existing dewatering feed pumps and will allow draining the tank back to the SAFE Diversion Box. The work includes adding 80 lf of 6" piping and adding 2 each 6" manual valves. |
| 69 | Third Party Testing and Inspection | 100,000 | 0 | 3 | The responsibility for 3rd party testing and inspection costs were in dispute for several months prior to construction. In April 2020 the City and FBV agreed that the cost of these services would be split 50/50 between the parties, up to a cap of \$200K. The agreement included the provision that if additional services are required above \$200K, it would be paid by the City. |
| 71 | CDFW Restrictions (Direct Costs & Inefficiencies) | 254,443 | 0 | 4 | The construction NTP on 3-20-2020 included restrictions from working in the designated spoils disposal area on site. The restrictions by CDFW were due to an erosional feature and were not resolved until 7-14-2020. As a result of the restrictions, FBV was required to stockpile spoils outside the disposal area, and then haul and grade the material a second time after the restrictions was lifted. |
| 72 | Owner Trailer Utility Hook Ups | 19,593 | 0 | 4 | This change provides utility connections to the Owner/Carollo field office trailer at the WRF. The work includes grading the trailer site, installing a temporary potable water connection, connecting temporary electrical, and providing electrical power through the project duration. The work also includes installing a temporary USPS jobsite mailbox. |
| 73 | Main Gates in Perimeter Fence | 27,031 | 0 | 4 | This change was requested by the City to add 2 pedestrian gates in the WRF perimeter fence, one north of the Operations Building and one at the northern most tip of site. Along with the pedestrian gate north of the Operation Building, also provide a 4' wide set of concrete stairs and a 4' wide sidewalk between paved areas. |
| 74 | Parking Canopy Electrical Receptacles | 42,346 | 0 | 4 | This change adds 7 outdoor rated duplex 120VAC electrical outlets on canopy poles around the Vehicle/Equipment Storage Canopy, and the WRF Parking Canopy. The work includes a new 480V circuit from the RO Building Electrical Room, a new 5KVA transformer, and all required underground and exposed power conduits, junction boxes, and outlet receptacles. |

| No. | Item | Approved Amount (\$) | Cal Days | Amendment No. | Description |
|-----|---|----------------------|----------|---------------|--|
| 75 | Security Windows at Admin Building | 11,079 | 0 | 4 | This change was requested by the City to add a security window in the lobby of the new Operations Building to separate City staff from members of the public in the lobby (similar to City Hall). |
| 76 | Additional Sodium Bisulfite Pump | 58,243 | 0 | 4 | This change was requested by the City to provide a redundant (second) Sodium Bisulfite feed pump at the Chemical Facility, including all associated mechanical work, piping, electrical and controls. This change also provides heated tote blankets for the Sodium Bisulfite storage totes to control temperature during cold weather. An electrical outlet is also added for the heated tote blankets. |
| 77 | Covid-19 Impacts | 125,000 | 0 | 6 | The DB Agreement stipulates that an "epidemic" or "quarantine restriction" is a compensable Force Majeure event. FBV originally submitted costs in the amount of \$152K for COVID-19 impacts based on added janitorial service, added COVID protective supplies, added Safety Officer time, added costs to send infected workers home for quarantine, and loss of efficiency (1 hr. per worker per day from 3/20/20 to 6/1/20 and 10 min. per worker per day from 6/1/20 to 3/20/21). The City was able to negotiate this cost down to \$125K based on a reduction of the assumed inefficiencies and was able to gain FBV agreement that this costs is considered final (i.e. that any future infections would be based on individuals deciding not to be vaccinated rather than Force Majeure). |
| 78 | Soil Slip Differing Site Conditions | 280,013 | 0 | 4 | On May 5, 2020 an unidentified ancient landslide was discovered when mass grading the cut slope above the Operations Building. This is a differing subsurface condition per Section 3.10.2 of the Agreement. The costs represent the additional effort associated with remediating the landslide. |
| 79 | Water/Sewer Shed Revisions (Ref. PCO 50) | 10,847 | 0 | 4 | This item is a continuation of PCO 50. FBV claims that their previous quote did not include all costs associated. |
| 82 | PLC/SCADA Uniformity Complete (Ref. PCO 37) | 108,887 | 0 | 4 | This PCO includes the cost to change PLC hardware and SCADA software from the standard offerings of the Belt Press and Cloth Disk Filter (SAFE) manufacturers to the City requested Allen Bradley and Wonderware products. This PCO applies to only those equipment items. PCO #37 was similarly for other equipment manufacturers on the project. |
| 84 | Alternate Red Legged Frog Barrier (Ref. PCO 58) | (468,768) | 0 | 5 | Environmental agencies overseeing the project have allowed an alternate wildlife barrier along the Eastern boundary of site. The PCO 58 concrete barrier is only required from Teresa Rd to the facility gate (400'). The remaining 1700' of exclusionary barrier shall be 2 mm thick HDPE attached to 6' chain link fencing, 24" above grade, 36" below grade, with a rigid 4" FRP top lip climbing barrier. |

| No. | Item | Approved Amount (\$) | Cal Days | Amendment No. | Description |
|-----|---|----------------------|----------|---------------|---|
| 86 | Pothole Existing Water Valve in Teresa Road | 5,189 | 0 | 4 | The City requested that FBV pothole an existing City water line and shut off on Teresa Road. On the next day, the City requested FBV pothole the 8" branch line service to the WRF property. The work was on T&M. |
| 87 | Modify Conduit Design Scope (Ref. PCO 62) | 272,822 | 0 | 5 | This change provides PVC coated electrical conduit systems (conduits, boxes, accessories) for all wastewater and product water processing and washdown areas, including outdoor process areas and indoors at the RO/UV Building. PVC coated Galvanized Rigid Steel (GRS) conduits provide superior corrosion protection. This PCO essentially reverses previous PCO #62. |
| 88 | Dead-Front Control Panels | 37,774 | 0 | 6 | City staff requested that all control panels be dead-front type, wherein no controls are exposed, and that a solid front door is furnished (i.e. keyed or with padlock hasp). FBV has submitted costs in the amount of \$37K and the City is in agreement. This change is being implemented on the following system control panels: Kusters (Headworks), Suez (MBR), Aerzen (Blowers), Gierlich-Mitchell (Sanitary Lift Station), Charter Machine (Dewatering), and other minor panels as required. |
| 90 | 24Vdc Digital Output Circuits | 25,689 | 0 | 6 | City staff requested that all control digital output circuits be 24vDC to match the 24vDC input signals as required by the DB Agreement. The City requested this to prevent potential signal interference. FBV had planned to use 120vAC digital outputs as the DB Agreement only stipulated the 24vDC signals on inputs (not outputs). This could potentially cause signal interferences and various control system disruptions. This item was disputed by the City as matching input and output signals is a design standard for some design firms (including Carollo). As part of negotiations the City elected to accept the proposed costs which include additional relays and power supply units in various Motor Control Centers (power distribution panels) for the 24Vdc PLC digital circuits being added. |
| 91 | Equipment Color (Tnemec 32GR Light Gray) | 12,500 | 0 | 6 | City staff requested that a standard color be established for all manufactured equipment, piping, etc., including for all field applied coatings. This is being implemented so that plant staff only need to maintain supply of one coating color, to simplify coating spot repairs during normal maintenance. The selected color is Tnemec 32R Light Gray or equal. FBV coordinated and made requests to each equipment supplier to change their standard or typical factory color to the Tnemec Light Gray or equal. Some supplier had costs impacts for the equipment color change. |

| No. | Item | Approved Amount (\$) | Cal Days | Amendment No. | Description |
|-----|--|----------------------|----------|---------------|---|
| 92 | West Cut-Slope Soil Slip Reactivation (2021) | 825,300 | 0 | 6 | On January 28, 2021, the previous cut-slope landslide area reactivated during a major storm. The DB Team has performed extensive site investigation, and develop preliminary remediation drawings, and submitted total costs in the amount of \$825,300 to address the known conditions. The remediation scope of work includes: removal and stockpiling of approximately 17,000 cy of loose material to the mapped slip plane, benching into competent native subgrade material, installing a subdrain system at each bench with drainage to surface, placement and compaction of \$17,000+ cy of engineered fill, surface contours to enhance precipitation run-off, concrete v-ditches to divert run-off from the areas, and the installation of two inclinometer for future monitoring by the City (monitoring not included). |
| 93 | NEMA 4X Electrical Enclosures | 40,000 | 0 | 6 | The City is requiring that all exterior electrical enclosures be NEMA 4X type. FBV submitted costs in the amount of \$97K to provide the NEMA 4X enclosures. The City does not agree with the contractual merits of this cost request. The City's contention is that the DB Agreement calls for all exterior and exposed electrical and control enclosures are to be NEMA 4X rated. FBV has argued that their intention, and the approved IFC design documents indicate reasonable alternatives to NEMA 4X. The City and FBV have agreed to the settlement amount noted herein and all applicable panels will be NEMA 4X rated. |
| 94 | Security System Revisions | 25,659 | 0 | 6 | The City requested the following improvements to the facility security system: add one exterior security camera to enhance coverage of the facility grounds (6 other cameras already in design), add door detectors and motion sensors at the RO Bldg, Storage Shed, Electrical Bldg (detectors and sensors at Ops Bldg and Maint Bldg are already in design). FBV submitted costs in the amount of \$25K and the City is agreeable to the proposed amount. |
| 96 | January 2021 Storm Event (1-26 thru 1-29) | 40,195 | 7 | 6 | FBV has submitted costs in the amount of \$40K for actual expenditures associated with the January 2021 major storm (8"+ of precipitation in 48 hours). The work included: actual labor, equipment, and materials to prepare for the storm, maintain the site during the storm while work was otherwise shutdown, and significant post storm efforts to clean and repair storm drain facilities, repair damaged embankments, and repair other erosional damage. The DB Agreement stipulates that "storms" are compensable Force Majeure events. As part of the settlement, City and FBV agree to amend the DB Agreement in that only non-compensable time extensions will be requested by FBV, and/or granted by the City, for any future weather related delay or impact. |
| 97 | Hydroseeding Soil & Coverage | 25,932 | 0 | 8 | FBV is reimbursed for additional expenditures related to providing hydroseeding and associated SWPPP and temporary irrigation for the soil slip area. |

| No. | Item | Approved Amount (\$) | Cal Days | Amendment No. | Description |
|-----|--|----------------------|----------|---------------|---|
| 98 | Materials Testing & Inspection (3rd Party) | 143,120 | 0 | 7 | Filanc-Black&Veath (FBV) is reimbursed for costs associated with 3rd party materials testing and special inspections. Under previous Amendment #3, FBV and the City agreed " All 3rd party testing and inspection shall be provided by FBV up to \$200,000. Anything in excess of \$200,000 shall be borne by the City". This change amount is based on actual applicable testing and inspection costs above \$200,000. |
| 100 | Add Thin-Client Licenses and Work Station | 17,229 | 0 | 7 | FBV is reimbursed and compensated for extra work associated with additional Control System elements as follows: (1) Add a thin client workstation in the Maintenance Building, including thin client machine with keyboard and mouse, currently there is just a 42" monitor; and (2) Add two additional Wonderware Supervisory Client License w/ Historian Client and one (1) Dell Wyse 570 Thin Client w/ Windows Server. |
| 101 | COVID-19 Related Material Cost Escalation | 48,744 | 0 | 7 | FBV is reimbursed for extra costs associated with COVID-19 material cost escalations from EDI (air diffusers), Jensen Precast (vaults and manholes), Miltimore Tile (bathroom tile), Pacific Acoustics (ceiling tiles) and S&M Fire (fire protection systems). FBV is requesting this material cost escalation reimbursement beyond normal yearly inflation statistics based on terms included in Design-Build Agreement between the City and FBV. |
| 102 | City Requested SCADA Screen Revisions | 60,000 | 0 | 7 | FBV is reimbursed for extra work associated with the following City requested SCADA screen upgrades: City and FBV screen development subcontractor shall meet to agree on upgrades to the control screen features, then screen development subcontractor shall implement City preferences including screen readability, graphics use, color use, layout of equipment, use of navigational features, etc. This change item also includes costs for similar modifications to control screens provided by equipment vendors to match the new standard, and costs for two additional empty SCADA server racks in Operations Building for the City's future use. |
| 103 | SRF Reimbursement Request Requirements | 119,319 | 0 | 8 | FBV is reimbursed for additional expenditures to assist the City with monthly billing information required for SRF funding, i.e. preparing a separate SRF formatted billing along with cost breakdown as per designated SRF categories, and provide all invoices. This task is performed on a monthly basis with FBV's payment application. Also includes costs to prepare an SRF formatted reconciliation breakdown for Pay Applications 1 to 31. |
| 105 | WRF Monument Entry Sign Modifications | 23,738 | 0 | 7 | |
| 106 | Add Wash Rack Grease and Sand Interceptor | 35,287 | 0 | 8 | FBV is reimbursed for additional expenditures to provide and install a grease and sand interceptor facility at the WRF Wash Rack (vehicle wash bay) as requested by City staff to match normal developer requirements. This includes an additional underground multiple chamber vault and underground piping modifications. |



| No. | Item | Approved Amount (\$) | Cal Days | Amendment No. | Description |
|-----|---|----------------------|----------|---------------|---|
| 107 | Vactor Unloading Facility Revisions | 38,880 | 0 | 8 | FBV is reimbursed for additional expenditures to provide and install vactor unloading station modifications requested by City staff, including procure and install two (2) 10' section of concrete k-rail with stainless steel brackets, fabrication and installation of stainless steel sluice gate within vactor trench drain, and installation of concrete weir wall in the downstream sewer manhole. |
| 108 | Defer SEED PLANT Milestone and Commission | 750,000 | 187 | 8 | FBV is reimbursed for additional expenditures related to deferring the planned seed plant activity from early July 2022 to early October 2022 (3 months) including, revising sequencing and coordination expenses, deferred maintenance period expenses through October 4, 2022, commissioning inefficiencies and remobilization expenses, extended overhead and added site expenses through October 4, 2022, increased cost for Builders Risk insurance, and allowed mark-ups and fees. |
| 109 | Procurement of Teletruck for City Staff | 74,562 | 0 | 7 | FBV is reimbursed for the procurement of a JCB Teletruck from Central California Power for City staff use after the project. Details of the purchase are encompassed in the quote dated 2/7/22 from Central California Power (JBC Dealer) to the City of Morro Bay (Stock Order/Serial No:3405218 - Model 30G4x4 CON). |
| 110 | Chem Facility Fencing Revisions | 24,767 | 0 | 7 | FBV is reimbursed for extra work associated with modifying the chain link fencing enclosure at Chemical Facility as per the City's direction. The changes entails widening 6 each double swing gates that had already been installed at each chemical bay. The work required removal of existing fence posts, fencing, and anchors, patching of concrete, re-installation of gate posts, and procurement, delivery, and installation of new wider gate panels (12 total). |
| 113 | Modify H2O SCADA Screen for RO System | 13,264 | 0 | 7 | FBV is reimbursed for extra work associated with the following City requested SCADA screen upgrades: City and RO System supplier (H2O Innovations) agreed on upgrades to the screens, and H2O Innovations provided additional RO System SCADA screen re-work so that color use and terminologies match the other project SCADA screens. |
| 114 | RO/UV Building Insulation (Disputed) | 32,025 | 0 | 7 | FBV was directed on 3/3/22 to provide wall and ceiling insulation at Building 16, Storage Shed and Building 50, RO/UV Facility. The City's directive was based upon an ICC Inspection Report dated 10/22/21, from a Certified Deputy Inspector for Code compliance, stating "the R.O. Building has heating, but no insulation at this time, but per Title 24 should be insulated." FBV considered this outside the original GMP scope and submitted original costs of approximately \$109K on 5/2/22. On 7/28/22, FBV notified the City that the materials had been purchased and submitted a cost of \$32,025 for insulation materials. Because the City and FBV disagree on whether the installation is included in the GMP, the City has agreed to take possession of the insulation materials until the installation cost matter has been resolved. Materials are currently stored on site. |

| No. | Item | Approved Amount (\$) | Cal Days | Amendment No. | Description |
|--------------|---|----------------------|------------|---------------|---|
| 117 | Water Main Connection on Teresa Road | 37,503 | 0 | 7 | FBV is reimbursed for extra work associated with providing and additional length of 18" water line piping, fittings, and gate valve for the new WRF City Water service connection. FBV had originally assumed their connection would be near the edge of pavement on Teresa Road. The final installation includes additional trenching, piping, fittings, and a valve extended to a connection point in the center of Teresa Road. This change also includes installing temporary piping and appurtenances to obtain construction water for the project site until the final connection is completed. |
| 118 | Fine Screen LOTO Capability (Disputed) | 26,905 | 0 | 7 | FBV is reimbursed for work associated with changes to the fine screens control panel and power feed that will facilitate safe and proper Lockout/Tagout procedures as follows: (1) Relocate flow meter transmitter 180 degrees from current position adjacent to fine screens vendor LCP to make room for new enclosures/equipment. (2) Remove fine screens and conveyor starters, circuit breakers, load monitors, and control wiring. (3) Relocate starters, circuit breakers, load monitors, and control wiring to new individual enclosures for each fine screen and conveyor. (4) Install one 480V main fused disconnect switch for local shutdown of existing 480V circuit. (5) Install one 480V fused disconnect on each new starter enclosure for individual load shutdown. Three individual 480V circuits will tap off of existing 480V circuit per NEC tap rule. (6) Install new 120V circuit from electrical building electrical panel, through local plant control panel, and terminate in vendor LCP for new control power. (7) Remove vendor control power transformer and re-wire door switch. (8) Install galvanized anchor based stand and kickers to support new enclosures. (9) Modify vendor LCP shroud to install conduits for extending new 480V power conductors and 120V control wiring. (10). Energize and test. |
| 119 | Credit for Chemicals Supplied by City | (141,972) | 0 | 7 | The City is credited back and reimbursed for process facility chemicals to be purchased and supplied by the City rather than FBV as was otherwise required by the Design Build Agreement. |
| 121 | Credit for Alternate Frog Barrier (Alum. Top Lip) | (12,000) | 0 | 8 | The City is reimbursed for the cost reduction to provide install an aluminum anti-climbing lip at the top of the HDPE frog barrier rather than FRP, which will provide a longer lifespan (over 30 years compared to the 10 to 20 year estimate for FRP). |
| TOTAL | | \$10,780,786 | 202 | | |

Appendix F

ANVIL AMENDMENT DETAILS



City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 001

Project: WRF Lift Stations and OffSite Pipelines Project **Contractor:** Anvil Builders, Inc.
Date: October 12, 2021 **Project Manager:** Gary Silveira

Upon mutual acceptance and execution of this document by the City of Morro Bay (City) and Anvil Builders, Inc. (Contractor), Contractor is hereby directed to make the following changes for the consideration set forth below:

See following page(s) for Descriptions and Reasons for Change

| PCO # | DESCRIPTION | Reason For Change | Amount | Contract Time (Calendar Days) |
|-----------------------------|--|-------------------|---------------|-------------------------------|
| 1 | SHPO Delay (35 days no dig moratorium) | REG | \$ 443,000.00 | 40 Days |
| 2 | Add 2 Each 10-in Valves and 10-in Tee | CR1 | \$ 23,498.00 | 0 Days |
| 3 | PS-B MAS-Relay Pump Protection Module per DC-01 | CR1 | \$ 13,477.00 | 0 Days |
| 4 | PS-A & PS-B Conduit Changes per DC-02 | CR1 | \$ 6,436.00 | 0 Days |
| 7 | Extend Waterline Relocation from Sta 71+00 to Sta 77+43 | DSC | \$ 131,096.00 | 0 Days |
| 12 | CA-SLO-2232H Work Interruptions from Stat 147 to Sta 150 | REG | \$ 56,978.00 | 0 Days |
| NET CHANGE ORDER ADJUSTMENT | | | \$ 674,485.00 | 40 Days |

| | |
|----------------------------------|------------------|
| ORIGINAL CONTRACT AMOUNT | \$ 31,493,675.00 |
| Previous Change Orders | \$ - |
| Previous Contract Amount | \$ 31,493,675.00 |
| Adjustments by this Change Order | \$ 674,485.00 |
| New Contract Amount | \$ 32,168,160.00 |

| | |
|-------------------------------|-----------|
| CURRENT FINAL COMPLETION DATE | 2/22/2022 |
| Extension Days s (Calendar) | 40 Days |
| NEW FINAL COMPLETION | 4/3/2022 |

Acceptance of this Change Order constitutes an agreement between the City and Contractor, and the work is to be performed subject to the same terms and conditions as are contained in the Agreement with Contractor and for work on the above-mentioned project.

By signature of this Change Order, the Contractor acknowledges that the adjustments to the Contract Cost and Time contained in the Change Order are in full satisfaction and accord and so waives any right to claim any further cost and time impacts at any time during and after completion of the Contract for the changes encompassed by this Change Order.

When signed by the Owner and Construction Manager and received by Contractor, this document becomes effective IMMEDIATELY, and the Contractor shall proceed with the change(s) described above.

ACCEPTED
 Anvil Builders Inc.
 Contractor (Company Name)

 (Authorized Signature) (Date)
 Gary Silveira - Project Manager
 (Print Name and Title)

APPROVED
 Carollo Engineers Inc
 Construction Manager

 Authorized Signature (Date)
 Paul Amico - Project Manager
 (Print Name and Title)

ACCEPTED
 City of Morro Bay
 Owner

 Authorized Signature (Date)
 Scott Collins - City Manager
 (Print Name and Title)



City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 001

Project: WRF Lift Stations and OffSite Pipelines Project

Contractor: Anvil Builders, Inc.

Date: October 12, 2021

| PCO # | TILE | DESCRIPTION OF CHANGE | Reason For Change |
|-------|---------------------------------------|--|-------------------|
| 1 | SHPO Delay | Project NTP was issued on 12-14-20. Based on a notification from SHPO, a stop work order was issued by the City on 2-16-21 restricting Anvil from conducting any ground-disturbing activities. Upon resolution of SHPO concerns, Anvil was allowed to begin most project ground-disturbing activities on 3-15-21 (35 calendar days later). This issue arose from the Section 3 Consultation between EPA and SHPO required as part of the City's WIFIA loan. The process included submittal of a Monitoring Plan to EPA that SHPO needed to approve before any ground-disturbing activities could begin. The Monitoring Plan was submitted to EPA on 10-3-2020, and EPA sent the document to SHPO in early November 2020. SHPO has a statutory requirement to provide a response within 30 days. EPA received SHPO comments in February 2021, past the 30 day limit. Under the regulations, EPA and the City could have moved forward since the statutory 30 day requirement was not met. However, EPA was not willing to do so. Consequently, the City was not approved by SHPO to move forward with any ground disturbing activities until 3-15-2021. Anvil subsequently filed a delay claim and time impact analysis resulting in this change order. | REG |
| 2 | Add 2 Each 10-in Valves and 10-in Tee | Anvil exposed the existing Waterline near Sta 121+30 as required to relocate the line per Contract. The existing piping configuration was discovered to be different from what was shown on the as-built drawings. After a review, City staff concluded that a new 10" Valve and 10" Tee fitting were needed to replace the existing piping configuration. This change will increase the reliability and operability of the water distribution system. | CR1 |
| 3 | PS-B MAS Pump Relay Module per DC-01 | The electrical Design Engineer issued Clarification No. 1 on 3-12-2021, indicating that the Pump Station B Pumps have been provided with a different pump protection system than shown in the design. The conduit and wire changes are required to incorporate the pump protection module. As a result conduit/wiring revisions were necessary at PS-B on Drawings 20-E-02, 03, 04, 05, 08 & and 20-I-01. | CR1 |
| 4 | PS-A & PS-B Conduit Changes per DC-02 | The electrical Design Engineer issued Clarification No. 2 on 4-19-2021, indicating that isolation of AC and DC signals is desired to prevent potential signal interferences. The following revisions will isolate the AC signals from the DC signals. As a result conduit/wiring revisions were necessary at PS-A on Drawings 10-E-3, 10-E-6, and 10-E-7, and at PS-B on Drawings 20-E-4, 20-E-5, 20-E-8, and 20-E-9. | CR1 |
| 7 | Extend 12" RO Waterline Relocation | The original Contract includes relocating an existing 12" Waterline on Quintana between Sta 77+43 and Sta 82+05, due to the waterline being in conflict with the main Joint trench. Anvil's trenching crew on Quintana encountered the waterline entering the main Joint Trench alignment at Sta 73+50. After additional potholing, the City decided to extend the water line relocation back to Sta 71+00 (adding approximately 643 LF of waterline relocation). | DSC |
| 12 | CA-SLO-2232H Work Interruptions | Trenching operations on Quintana Rd near South Bay Blvd (Sta 147 to Sta 150) was significantly impacted by two known archaeological sites (CA-SLO-2232/H and CA-SLO-1183), one of which contains recently discovered human burials. This area needed to have excavations treated differently in that direct loading of trucks was not allowed without first confirming the soil was negative for resources or remains. These instruction were provided and enforced by State mandated archeological and tribal monitors assigned to the project. | REG |

REASON FOR CHANGE CODES

CR1: City requested (required)

CR2: City requested (Optional)

E&O: Design Error or Omission

ABI: Anvil request / claim item

DSC: Differing Site Conditions

REG: Regulatory Agency Item



City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 002

Project: WRF Lift Stations and OffSite Pipelines Project **Contractor:** Anvil Builders, Inc.
Date: January 11, 2022 **Project Manager:** Matt Scholfield

Upon mutual acceptance and execution of this document by the City of Morro Bay (City) and Anvil Builders, Inc. (Contractor), Contractor is hereby directed to make the following changes for the consideration set forth below:

See following page(s) for Descriptions and Reasons for Change

| PCO # | DESCRIPTION | Reason For Change | Amount | Contract Time (Calendar Days) |
|-----------------------------|---|-------------------|---------------|-------------------------------|
| 9 | SoCal Gas Delays and Disruptions | ABI | \$ 43,017.00 | 0 Days |
| 22 | 6-Inch Waterline Relocation at Pump Station A | DCS | \$ 20,147.00 | 0 Days |
| 23 | Miscellaneous Unforeseen Utility Work | DSC | \$ 27,198.00 | 0 Days |
| 27 | MTBM Delays and Disruptions - Claim Resolution | ABI | \$ 111,161.00 | 0 Days |
| 28 | SLO County APCD Generator Mandates – Procurements | REG | \$ 301,703.00 | 0 Days |
| 34 | Bike Path Jack & Bore Concrete Debris Obstruction | DSC | \$ 84,276.00 | 0 Days |
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| NET CHANGE ORDER ADJUSTMENT | | | \$ 587,502.00 | 0 Days |

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|----------------------------------|------------------|
| ORIGINAL CONTRACT AMOUNT | \$ 31,493,675.00 |
| Previous Change Orders | \$ 674,485.00 |
| Previous Contract Amount | \$ 32,168,160.00 |
| Adjustments by this Change Order | \$ 587,502.00 |
| Change Order to Date | \$ 1,261,987.00 |
| New Contract Amount | \$ 32,755,662.00 |

| | |
|-------------------------------|----------|
| CURRENT FINAL COMPLETION DATE | 4/3/2022 |
| Extension Days (Calendar) | 0 Days |
| NEW FINAL COMPLETION | 4/3/2022 |

Acceptance of this Change Order constitutes an agreement between the City and Contractor, and the work is to be performed subject to the same terms and conditions as are contained in the Agreement with Contractor and for work on the above-mentioned project.

By signature of this Change Order, the Contractor acknowledges that the adjustments to the Contract Cost and Time contained in the Change Order are in full satisfaction and accord and so waives any right to claim any further cost and time impacts at any time during and after completion of the Contract for the changes encompassed by this Change Order.

ACCEPTED

Anvil Builders Inc.

Contractor (Company Name)

(Authorized Signature)

(Date)

Matt Scholfield

(Print Name and Title)

When signed by the Construction Manager, and upon execution of source document Amendment by City Council, this document becomes effective IMMEDIATELY, and Contractor shall proceed with the change(s) described above.

APPROVED

Carollo Engineers Inc / MEG Inc.

Construction Manager

Authorized Signature

(Date)

Steve Mimiaga - Construction Mngr.

(Print Name and Title)



City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 002

| Project: WRF Lift Stations and OffSite Pipelines Project | | | |
|---|---|--|--------------------------|
| Contractor: Anvil Builders, Inc. | | | |
| Date: January 11, 2022 | | | |
| PCO | TILE | DESCRIPTION OF CHANGE | Reason For Change |
| 9 | SoCal Gas Delays and Disruptions | The project's joint trench, containing multiple pipelines, parallels an existing 16" diameter SoCal Gas high pressure gas main for nearly the entire alignment along Quintana Road. SoCal Gas requires a representative to be on site during all digging activities as well as other work activities occurring within 10 ft of the high pressure gas main (i.e. that could potentially damage or otherwise impact the main). There have been several occurrences where the SoCal Gas representative did not show up for scheduled assignments, which prevented Anvil from performing contract work and/or progressing the joint trench. In these cases Anvil's entire crew was forced to literally stand-by and wait for the SoCal Gas representative to arrive. The City/Carollo have spent considerable time and effort to coordinate between Anvil and SoCal Gas to improve communication and cooperation, but nevertheless, Anvil was negatively impacted on the following days: 5/3/21 for 2 hours, 5/17/21 for 2.5 hours, 5/18/21 for 3 hours, 6/3/21 for 2 hours, 6/17/21 for 2.5 hours for 2 different crews, 8/10/21 for 4 hours. | ABI |
| 22 | 6" Waterline Relocation at Pump Sta. A | New Pump Station A is located on City property at the City's existing corporation yard on Atascadero Road. As part of the site preparation and demolition work at Pump Station A, an unknown 6" Waterline was discovered and needed to be relocated to construct the pump station. The extra work included potholing and locating the unknown utility, trenching and installation of new by-pass piping, pressure testing and disinfection of the relocated waterline, backfill and other site work. | DSC |
| 23 | Miscellaneous Unforeseen Utility Work | During the project work to date, the below noted miscellaneous unforeseen minor utility work was required for contract work to proceed. The following items are acknowledged as unforeseen conditions and as such warrant reimbursement of verified extra costs: (1) potholing unmarked utility at Pump Station A on 5/3/21, (2) emergency work to recover trench caving due to adjacent utilities from Sta 71+75 to Sta 71+85 on 6/13/21, (3) excavating around unmarked 4" (asbestos) Waterline at Sta 146+00 on 7/8/21, (4) Anvil crew standby time during potholing of incorrectly marked telephone conduit on 8/5/21, (5) unknown and unmarked Sanitary Sewer crossing at Sta 88+50, line was struck and repaired on 8/6/21, (6) potholing unknown and unmarked Sanitary Sewer lines on 8/9/21, and (7) unknown and unmarked Sanitary Sewer crossing at Sta 90+50, line was struck and repaired on 8/23/21. | DSC |
| 27 | MTBM Delays and Disruptions Claim Resolution | Anvil and their Microtunnel Boring Machine (MTBM) subcontractor, Vadnais Trenchless Services (Vadnais) encountered several unknown utilities, potential obstructions, and differing soil conditions along the MTBM alignment below the Morro Bay Roundabout, including complete equipment stoppages at approximately Sta 98+50 and Sta 98+65. Anvil's subcontractor (Vadnais) claimed delay and equipment standby time for these equipment stoppages that lasted over 8 weeks. During the 8 weeks of work stoppage, Anvil excavated and shored two separate 23 ft deep emergency recovery shafts to clear the apparent obstructions from in front of the MTBM cutting head. However, no actual obstruction was found, located, or confirmed during the recovery shaft excavations. Subsequently, the MTBM casing pipe installation was completed without further incidents. Anvil and Vadnais provided notifications of potential costs under PCO #14 and PCO #27 in excessive \$500,000 for the Vadnais equipment downtime, Vadnais loss of crew efficiencies, and for the cost of the two recovery shafts by Anvil. The City initially denied the claim for stoppages at Sta 98+50 and Sta 98+65, as no obstruction was found. The City does not dispute the other costs related to unknown utilities noted herein. After several meetings between the City, Carollo, Anvil, and Vadnais, a claim settlement was reached in the amount of \$111,161, wherein all other costs and impacts associated with both PCO #14 and PCO #27, are waived or otherwise agreed upon for the final lump sum amount noted herein. | ABI |
| 28 | SLO County APCD Emergency Generator Mandates – Procurements | On 9/24/21, the City received a Notice of Incomplete Applications from SLO County Air Pollution Control District (APCD), pursuant to the Pump Station A emergency generator and the Pump Station B emergency generator. It is City staff understanding that both generators were in compliance with APCD requirements at the time of Bid Opening in 2020. However, in late 2020, APCD rules were revised causing the two generators to now need retrofitted emissions reduction components to attain APCD compliance and approval. APCD is now also requiring Health Risk Assessments (HRAs) for both pump station sites which Carollo is undertaking via specialty subconsultant. This change order encompasses the below noted initial known costs for emissions reduction components, however it is acknowledged that there will be a subsequent change order for additional structural, mechanical, electrical, and sitework revisions necessary to implement the changes. This change order includes costs for the following assumed necessary procurement items: At Pump Station A add a Diesel Particulate Filter (DPF); and at Pump Station B add the DPF, plus Selective Catalytic Reduction (SCR) and Diesel Oxidation Catalysts (DOC) technologies. | REG |
| 34 | Bike Path Jack & Bore Concrete Debris Obstruction | On 11/11/21, about 3 pm, Anvil and their jack & bore subcontractor (Pacific Boring) encountered a concrete obstruction in the path of the 60" casing pipe. Anvil and Pacific Boring were immediately instructed to suspend the jack & bore mechanical operation and hand excavate to investigate and confirm the size and extent of the concrete obstruction. For the following 6 consecutive days (including Saturday 11/13/21 and Sunday 11/14/21), Anvil and Pacific Boring worked 8 to 10 hour shifts to hand excavate and jack hammer out the concrete obstruction, while simultaneously advancing the casing pipe about 20 ft using the hydraulic jacking equipment. On 11/18/21, the obstruction was cleared and Pacific Boring resumed normal jack & bore operations, finishing the casing installation the same day. Note that the obstruction appears to be an old Caltrans culvert structure from the original CA Route 1 highway. Also note that the jack & bore work through jurisdictional wetlands needed to proceed without delay, working through the weekend, in order to meet a California Department of Fish and Wildlife (CDFW) mandate for the tunnel to be completed by 11/19/21. | DSC |

REASON FOR CHANGE CODES
CR1: City requested (required)
CR2: City requested (Optional)
E&O: Design Error or Omission
ABI: Anvil request / claim item
DSC: Differing Site Conditions
REG: Regulatory Agency Item



City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 003

Project: WRF Lift Stations and OffSite Pipelines Project **Contractor:** Anvil Builders, Inc.
Date: March 22, 2022 **Project Manager:** Chris Fassari

Upon mutual acceptance and execution of this document by the City of Morro Bay (City) and Anvil Builders, Inc. (Contractor), Contractor is hereby directed to make the following changes for the consideration set forth below:

See following page(s) for Descriptions and Reasons for Change

| PCO # | DESCRIPTION | Reason For Change | Amount | Contract Time (Calendar Days) |
|-----------------------------|---|-------------------|---------------|-------------------------------|
| 8 | Additional Project Signage Costs | CR2 | \$ 9,196.00 | 0 Days |
| 9.2 | SoCal Gas Delays and Disruptions (Part 2) | ABI | \$ 20,750.00 | 0 Days |
| 13.1 | CA-SLO-16 Work Revisions (Time Extension) | REG | \$ - | 153 Days |
| 16 | Reroute Joint Trench below State Waterline at 121+75 | DSC | \$ 144,616.00 | 0 Days |
| 20 | Pothole Utilities for WRF Pilot Injection Well Layout | CR2 | \$ 15,291.00 | 0 Days |
| 32 | Broken Waterline at Quintana Road and Kings Avenue | ABI | \$ 6,198.00 | 0 Days |
| 39 | Cultural Monitor Extra Work at MTBM Launch Pit | DSC | \$ 45,266.00 | 0 Days |
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| NET CHANGE ORDER ADJUSTMENT | | | \$ 241,317.00 | 153 Days |

| | |
|----------------------------------|------------------|
| ORIGINAL CONTRACT AMOUNT | \$ 31,493,675.00 |
| Previous Change Orders | \$ 1,261,987.00 |
| Previous Contract Amount | \$ 32,755,662.00 |
| Adjustments by this Change Order | \$ 241,317.00 |
| Change Order to Date | \$ 1,503,304.00 |
| New Contract Amount | \$ 32,996,979.00 |

| | |
|-------------------------------|----------|
| CURRENT FINAL COMPLETION DATE | 4/3/2022 |
| Extension Days (Calendar) | 153 Days |
| NEW FINAL COMPLETION | 9/3/2022 |

Acceptance of this Change Order constitutes an agreement between the City and Contractor, and the work is to be performed subject to the same terms and conditions as are contained in the Agreement with Contractor and for work on the above-mentioned project.

By signature of this Change Order, the Contractor acknowledges that the adjustments to the Contract Cost and Time contained in the Change Order are in full satisfaction and accord and so waives any right to claim any further cost and time impacts at any time during and after completion of the Contract for the changes encompassed by this Change Order.

ACCEPTED

Anvil Builders Inc.

Contractor (Company Name)

(Authorized Signature) (Date)

Chris Fassari

(Print Name and Title)

When signed by the Construction Manager, and upon execution of source document Amendment by City Council, this document becomes effective IMMEDIATELY, and Contractor shall proceed with the change(s) described above.

APPROVED

Carollo Engineers Inc / MEG Inc.

Construction Manager

Authorized Signature (Date)

Steve Mimiaga - Construction Mngr.

(Print Name and Title)



City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 003

Project: WRF Lift Stations and OffSite Pipelines Project

Contractor: Anvil Builders, Inc.

Date: March 22, 2022

| PCO | TILE | DESCRIPTION OF CHANGE | Reason For Change |
|------|---|--|-------------------|
| 8 | Additional Project Signage Costs | The original contract included a \$5,000 allowance for additional signage not shown on the plans or required by the specifications. Anvil has exhausted this original budget responding to signage requests from City staff to date. This change order item provides reimbursement of Anvil costs to date to provide additional signage, including custom signs, above the \$5,000 allowance as directed by the City. These additional signs are deemed necessary for public safety, public information, enhanced traffic flow, and/or to enhance access to businesses open during construction. | CR2 |
| 9.2 | SoCal Gas Delays and Disruptions (Part 2) | The project's joint trench, containing multiple pipelines, parallels an existing 16" diameter SoCal Gas high pressure gas main for nearly the entire alignment along Quintana Road. SoCal Gas requires a representative to be on site during all digging activities as well as other work activities occurring within 10 ft of the high pressure gas main (i.e. that could potentially damage or otherwise impact the main). There have been several occurrences where the SoCal Gas representative did not show up for scheduled assignments, which prevented Anvil from performing contract work and/or progressing the joint trench. In these cases Anvil's entire crew was forced to literally stand-by and wait for the SoCal Gas representative to arrive. The City/Carollo have spent considerable time and effort to coordinate between Anvil and SoCal Gas to improve communication and cooperation, but nevertheless, Anvil was negatively impacted on the following days: 8/25/21 for 2 hours, 8/26/21 for 3.5 hours, 9/16/21 for 1.5 hours, 10/7/21 for 2 hours. This is the second change order to reimburse Anvil for SoCal Gas monitor disruptions, the previous change order amount was \$43,017.00. | ABI |
| 13.1 | CA-SLO-16 Work Revisions (Time Extension) | Anvil is provided a 153 day non-compensable time extension due to impacts caused by SHPO mandated work restriction at the Morro Creek Utility Bridge, based on the following analysis and terms: Per Anvil's approved Baseline Schedule, the Utility Bridge was to start Feb 1, 2021 with 23 days of float. Per Anvil's Feb 2022 Update, the Utility Bridge was actually started Feb 24, 2022, now with 153 days of negative float (delay). It is acknowledged that SHPO restrictions prevented Anvil from starting any work at the Utility Bridge prior to Feb 24, 2022. It is acknowledged that the on-going (thru March 2022) archeologist supervised work on site, required by SHPO, continues to impact Anvil's schedule. Direct cost impacts resulting from these circumstances are being tracked separately from this analysis. Anvil is provided the 153 calendar day non-compensable time extension at this time based on the applicable Critical Path Schedule Update negative float duration discuss herein above. Anvil has submitted a Time Impact Analysis requesting 201 calendar days. Anvil and the City agree to allow Anvil to seek additional time extensions if warranted in the future when the full extent of this on-going impact is known. The current Contract completion date is 4/3/2022 (through Amendment No. 3). With 153 calendar days added, the new Contract Completion Date will be Sept 3, 2022. The City currently views the SHPO restrictions at Utility Bridge as concurrent with other Anvil caused delays (i.e. the Pump Station A Electrical Building currently has 164 days of negative float). As such the City considers this delay as non-compensable at this time (no extended overhead merit). Similar to above, Anvil and the City agree to allow Anvil the opportunity to present substantiating documentation of extended overhead merit in the future when the full extent of this on-going impact is known. | REG |
| 16 | Reroute Joint Trench below State Waterline at 121+75 | Prior to starting the Joint Trench excavation near Sta 121+75, an existing 10" State Waterline was marked incorrectly in the field by the pipeline operator. Anvil excavated (potholed) the pipeline at the location marked in the field to verify its position. The State Waterline was not found at the marked location. The pipeline operator re-marked the line again in the field, this time where shown on the Contract Drawings at Sta 121+75. A pipeline was located at this location and the pipeline operators confirmed the line as the correct pipe in the field. Anvil then began excavating the 8-ft wide by 10-ft deep Joint Trench through the area. While excavating the Joint Trench, Anvil discovered another existing pipeline running adjacent to and below the pipe previously identified as the State Waterline shown on the plans. The pipeline operator subsequently confirmed that the adjacent lower pipe was actually the State Waterline to be protected in place. This caused Anvil to have to move back, re-excavate, and deepen the Joint Trench excavation from 10 ft to approximately 14 ft deep. This would allow the Joint Trench pipelines to pass below the lower pipe with required DDW clearances. In doing so, Anvil was also required to provide additional trench shoring measures and trench dewatering for the deeper trench; then Anvil encountered additional difficulties and inefficiencies installing the Joint Trench pipelines in the deeper trench, with additional groundwater, with increased soil instabilities, and additional shoring to work around, etc. Anvil was subsequently required to also provide additional Controlled Low Strength Material (CLSM) backfill and then additional select fill compaction as well. Anvil's pipe installation operation was significantly impacted over the period from 8/4/21 to 8/16/21. | DSC |
| 20 | Pothole Utilities for WRF Pilot Injection Well Layout | Anvil provided additional potholing and utility locating at the request of the City, near Anvil's stockpile and staging area on Vistra property (along Bike Path). This additional potholing and utility locating was required to determine the best location and layout for the future Pilot Injection Well to be installed under a separate City contract, as part of the Recycled Water facilities associated with the Morro Bay "Our Water" program. At the City's direction, Anvil contacted Underground Service Alert (USA), had the area underground utilities marked by utility owners, potholed several critical utilities, backfilled and restored the area, and provided resulting survey data to the City. | CR2 |



City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 003

Project: WRF Lift Stations and OffSite Pipelines Project

Contractor: Anvil Builders, Inc.

Date: March 22, 2022

| PCO | TILE | DESCRIPTION OF CHANGE | Reason For Change |
|-----|--|---|-------------------|
| 32 | Broken Waterline at Quintana Road and Kings Avenue | On Saturday, 10/29/21, City of Morro Bay staff observed a waterline leak where the waterline crosses the Anvil trench in the intersection of Quintana Road at Kings Avenue. The City subsequently confirmed that a 6" Water line, made of Transite (AC) pipe, had deflected and come apart just beyond Anvil's trench line. Anvil had been working in this intersection the previous week and there was strong indication that Anvil activities caused the line brake. Anvil indicated their position that they have no reason to assume they caused the water line break. The City has no reason to believe that the rupture would have occurred if not for Anvil trenching across and backfilling around the existing pipe. After additional discussion and negotiation it was agreed that the City would pay a portion of the Anvil crew expenses for repairs. The settlement amount is less than half of Anvil actual costs. Note that City staff also incurred costs for various activities including temporary repairs made when the leak was first discovered. | ABI |
| 39 | Cultural Monitor Extra Work at MTBM Launch Pit | Trenching operations just north of the Microtunnel launch pit on Quintana Road near the Morro Bay Blvd Roundabout (Sta 94 to Sta 95) was significantly impacted by a known archaeological site. Anvil work was significantly impacted by instructions provided and enforced by State mandated archeological and tribal monitors assigned to the project. During trenching in the subject area, all excavated spoils were treated differently in that direct loading of trucks was not allowed without first confirming the soil was negative for resources or remains, by hand investigations performed by the archeological and tribal monitors. Anvil's trenching and shoring operation was significantly impacted over the period from 10/21/21 to 11/8/21. | DSC |

REASON FOR CHANGE CODES

CR1: City requested (required)

CR2: City requested (Optional)

E&O: Design Error or Omission

ABI: Anvil request / claim item

DSC: Differing Site Conditions

REG: Regulatory Agency Item



City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 004

Project: WRF Lift Stations and OffSite Pipelines Project **Contractor:** Anvil Builders, Inc.
Date: June 14, 2022 **Project Manager:** Chris Fassari

Upon mutual acceptance and execution of this document by the City of Morro Bay (City) and Anvil Builders, Inc. (Contractor), Contractor is hereby directed to make the following changes for the consideration set forth below:

See following page(s) for Descriptions and Reasons for Change

| PCO # | DESCRIPTION | Reason For Change | Amount | Contract Time (Calendar Days) |
|-----------------------------|--|-------------------|-----------------|-------------------------------|
| 11 | Reroute IPR and Water Line Below Sta. 144 Culvert | DSC | \$ 103,893.00 | 0 Days |
| 19 | Remove City's Existing Desalination Iron Media Tank | CR2 | \$ 54,189.00 | 0 Days |
| 28.1 | SLO County APCD Generator Mandates (Rescind) | REG | \$ (301,703.00) | 0 Days |
| 33 | Paving Repairs Near Todd's Garage | CR2 | \$ 6,895.00 | 0 Days |
| 41 | Unknown Cementitious Subgrade at South Bay Blvd | DSC | \$ 26,600.00 | 0 Days |
| 42 | Unknown Conduits at South Bay Blvd and Quintana Road | DSC | \$ 7,788.00 | 0 Days |
| 49 | Vistra/PG&E Easements Unknown Extra Work Items | DSC | \$ 48,273.00 | 0 Days |
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| NET CHANGE ORDER ADJUSTMENT | | | \$ (54,065.00) | 0 Days |

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|----------------------------------|------------------|
| ORIGINAL CONTRACT AMOUNT | \$ 31,493,675.00 |
| Previous Change Orders | \$ 1,503,304.00 |
| Previous Contract Amount | \$ 32,996,979.00 |
| Adjustments by this Change Order | \$ (54,065.00) |
| Change Order to Date | \$ 1,449,239.00 |
| New Contract Amount | \$ 32,942,914.00 |

| | |
|-------------------------------|----------|
| CURRENT FINAL COMPLETION DATE | 9/3/2022 |
| Extension Days (Calendar) | 0 Days |
| NEW FINAL COMPLETION | 9/3/2022 |

Acceptance of this Change Order constitutes an agreement between the City and Contractor, and the work is to be performed subject to the same terms and conditions as are contained in the Agreement with Contractor and for work on the above-mentioned project.

By signature of this Change Order, the Contractor acknowledges that the adjustments to the Contract Cost and Time contained in the Change Order are in full satisfaction and accord and so waives any right to claim any further cost and time impacts at any time during and after completion of the Contract for the changes encompassed by this Change Order (EXCEPT AS NOTED IN ITEM 13.1 HEREIN WHEREIN DELAY IMPACTS ARE ON-GOING).

ACCEPTED

Anvil Builders Inc.

Contractor (Company Name)

(Authorized Signature) (Date)

Chris Fassari

(Print Name and Title)

When signed by the Construction Manager, and upon execution of source document Amendment by City Council, this document becomes effective IMMEDIATELY, and Contractor shall proceed with the change(s) described above.

APPROVED

Carollo Engineers Inc / MEG Inc.

Construction Manager

Authorized Signature (Date)

Steve Mimiaga - Construction Mngr.

(Print Name and Title)



**City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 004**

Project: WRF Lift Stations and OffSite Pipelines Project

Contractor: Anvil Builders, Inc.

Date: June 14, 2022

| PCO | TILE | DESCRIPTION OF CHANGE | Reason For Change |
|------|---|---|-------------------|
| 11 | Reroute IPR and Water Line Below Sta. 144 Culvert | The original design called for the IPR and Waterline relocation in this area to be placed above the existing stormwater culvert. After the trench was excavated, it was discovered that there was insufficient soil cover over the existing culvert to allow the IPR and Waterline to be installed over the top per Drawings. Consequently, these pipelines needed to be routed under the culvert, which increased the depth of excavations from 2 ft to 8 ft at Sta 143+99, thereby also increasing requirements for trench shoring, excavated spoils, backfill and compaction, , and potential groundwater management, between Sta 142+95 and Sta 144+95. Reference RFI #52. | DSC |
| 19 | Remove City's Existing Desalination Iron Media Tank | The City requested a quote from Anvil to remove and dispose of the existing Desalination Iron Media Tank (horizontal pressure filter) located east of Pump Station A, along Atascadero Rd. Anvils quote includes removal of the tank, tank supports, and air vacs atop the tank. Bid includes the removal of a max. of 20 CY of concrete inside the tank. Bid is based on the steel tank weighing a maximum of 55,000 lbs (once concrete is removed). Anvil will remove and replace the existing chain link with barbed wire fence; 50 LF max. Removal of adjacent piping and appurtenances (air-vacs, anchor bolts, etc.) is not included in this work. | CR2 |
| 28.1 | SLO County APCD Generator Mandates (Rescind) | On 9/24/21, the City received a Notice of Incomplete Applications from SLO County Air Pollution Control District (APCD), pursuant to the Pump Station A emergency generator and the Pump Station B emergency generator. The City subsequently completed and submitted Health Risk Assessments (HRAs) at each Pump Station, as was required by APCD as part of their Notice of Incomplete Applications. After submission of the HRAs, APCD reversed its initial determination and accepted both generators without modifications. As such, the City and Anvil agree to rescind the associated previous change order for added (assumed) emissions control devices included in Amendment No. 2. Reference PCO #28. | REG |
| 33 | Paving Repairs Near Todd's Garage | The City requested that Anvil repair existing failing pavement in the City right-of-way adjacent to Anvil's Joint Trench excavation. It was determined that the damaged asphalt was not the fault of Anvil operations but rather the on-going inclement weather and existing deteriorated pavement conditions. This occurred near Todd's Garage at 972 Quintana Rd, Morro Bay. The area was re-paved 12/10/2021. | CR2 |
| 41 | Unknown Cementitious Subgrade at South Bay Blvd | During Joint Trench and IPR excavation work on South Bay Blvd, the Contractor encountered cement-treated aggregate base-rock material below the existing pavement. This cementitious base material required additional effort and expenses in mechanical removal work and subsequent off-site disposal (material was not re-useable as backfill). This extra work warrants reimbursement of verified extra costs including documented labor, equipment, and other expenses on 2/1/2022, 2/3/2022, 2/4/2022, 2/5/2022, 2/10/2022, 2/11/2022, and 2/14/2022. | DSC |
| 42 | Unknown Conduits at South Bay Bvd and Quintana | During Joint Trench excavation work near the South Bay Blvd and Quintana Road intersection, the Contractor encountered and damaged unknown existing conduits which required additional effort and expenses to hand-dig around and repair. This extra work warrants reimbursement of verified extra costs including documented labor, equipment, and other expenses on 1/25/2022. The conduits were not shown on the plans or claimed by any known utility owner. | DSC |
| 49 | Vistra/PG&E Easements Unknown Extra Work Items | During the project work within PG&E/Vistra easements to date, the below noted miscellaneous unforeseen minor utility work was required for contract work to proceed. The following items are acknowledged as unforeseen conditions and as such warrant reimbursement of verified extra costs: (1) Excavate "test percolation ponds" at City request along Bike Path on 2/16/2022, (2) Unknown utilities encountered from Sta 53+00 to Sta 54+00 which impacted production on 2/16/2022, (3) Installation of exclusionary fencing along LS-2 as required by SHPO on 2/23/2022, (4) Potholing LS-2 alignment for unknown utilities not shown on plans but marked by utility companies on 3/7/2022, (5) Unforeseen concrete slab not shown on plans along LS-2 alignment impacting production on 3/22/2022, (6) Excavate around utilities not marked on plans along LS-2 alignment, 8 utilities total, between 3/17/2022 and 3/31/2022, (7) Sawcut, remove, and stockpile unknown concrete slab at Sta 21+00 of LS-2 alignment on 3/30/2022, and (8) Excavate and install 4" pipe and fittings to re-route existing Vistra waterline above LS-2 force main pipe on 4/6/2022. | DSC |

REASON FOR CHANGE CODES
CR1: City requested (required)
CR2: City requested (Optional)
E&O: Design Error or Omission
ABI: Anvil request / claim item
DSC: Differing Site Conditions
REG: Regulatory Agency Item



City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 005

Project: WRF Lift Stations and OffSite Pipelines Project **Contractor:** Anvil Builders, Inc.
Date: August 23, 2022 **Project Manager:** Chris Fassari

Upon mutual acceptance and execution of this document by the City of Morro Bay (City) and Anvil Builders, Inc. (Contractor), Contractor is hereby directed to make the following changes for the consideration set forth below:

See following page(s) for Descriptions and Reasons for Change

| PCO # | DESCRIPTION | Reason For Change | Amount | Contract Time (Calendar Days) |
|-----------------------------|---|-------------------|-----------------|-------------------------------|
| 13 | Utility Bridge Abutment Changes | REG | \$ 500,000.00 | 60 Days |
| 17 | Add Tracer Wire, Ground Rods, Terminal Stations | CR2 | \$ 108,521.00 | 0 Days |
| 25 | Construction Cost Escalation Increases from Vendors | DSC | \$ 292,000.00 | 0 Days |
| 50 | DSC at South Bay & Teresa (Utilities & Bedrock) | DSC | \$ 210,000.00 | 0 Days |
| 52 | High Level Switch Alarm Termination at Utility Bridge | CR1 | \$ 8,743.00 | 0 Days |
| 61 | City Sales Tax Increase During Project | DSC | \$ 134,403.00 | 0 Days |
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| NET CHANGE ORDER ADJUSTMENT | | | \$ 1,253,667.00 | 60 Days |

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|----------------------------------|------------------|-------------------------------|-----------|
| ORIGINAL CONTRACT AMOUNT | \$ 31,493,675.00 | CURRENT FINAL COMPLETION DATE | 9/3/2022 |
| Previous Change Orders | \$ 1,449,239.00 | Extension Days (Calendar) | 60 Days |
| Previous Contract Amount | \$ 32,942,914.00 | NEW FINAL COMPLETION | 11/2/2022 |
| Adjustments by this Change Order | \$ 1,253,667.00 | | |
| Change Order to Date | \$ 2,702,906.00 | | |
| New Contract Amount | \$ 34,196,581.00 | | |

Acceptance of this Change Order constitutes an agreement between the City and Contractor, and the work is to be performed subject to the same terms and conditions as are contained in the Agreement with Contractor and for work on the above-mentioned project.

By signature of this Change Order, the Contractor acknowledges that the adjustments to the Contract Cost and Time contained in the Change Order are in full satisfaction and accord and so waives any right to claim any further cost and time impacts at any time during and after completion of the Contract for the changes encompassed by this Change Order (EXCEPT AS NOTED IN ITEM 13.1 HEREIN WHEREIN DELAY IMPACTS ARE ON-GOING).

ACCEPTED

Anvil Builders Inc.

Contractor (Company Name)

(Authorized Signature) (Date)

Chris Fassari

(Print Name and Title)

When signed by the Construction Manager, and upon execution of source document Amendment by City Council, this document becomes effective IMMEDIATELY, and Contractor shall proceed with the change(s) described above.

APPROVED

Carollo Engineers Inc / MEG Inc.

Construction Manager

 8/23/2022

Authorized Signature (Date)

Steve Mimiaga - Construction Mngr.

(Print Name and Title)



**City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 005**

Project: WRF Lift Stations and OffSite Pipelines Project

Contractor: Anvil Builders, Inc.

Date: August 23, 2022

| PCO | TILE | DESCRIPTION OF CHANGE | Reason For Change |
|-----|---|---|-------------------|
| 13 | Utility Bridge Abutment Changes | Anvil is reimbursed and compensated for extra work associated with SHPO mandated work revisions including: (1) revising trenching and finish grade requirements between Atascadero Road and the North Bridge Abutment, (2) revised slide rail shoring at both Bridge Abutment excavations, (3) mandated dewatering systems regardless of groundwater level/status, (3) and Archeologist supervised excavations with severely impacted excavation operations throughout the entire CA-SLO-16 zone. Anvil is provided a 60 day non-compensable time extension through 11/2/2022. Anvil and the City agree to allow Anvil to present substantiating documentation of associated extended overhead impacts for incorporation in a future Amendment. | REG |
| 17 | Add Tracer Wire, Ground Rods, Terminal Stations | Anvil is reimbursed and compensated for extra work associated with adding Tracer Wire on all project pipelines that are not located in a Joint Trench. This includes: 7 segments of IPR line, 2 segments of BR line, and 4 segments of Relocated Waterlines. Anvil shall provide Tracer Wire starting and/or ending terminals (Tracer Wire Test Stations per Std Det 2060 and Ground Rods per Std Det 16410). Anvil shall also provide Tracer Wire Test Stations at approximately 500' intervals throughout all associated tracer wire systems. | CR2 |
| 25 | Construction Cost Escalation Increases from Vendors | Anvil is reimbursed and compensated for construction cost escalation increases from specific vendors resulting from the unprecedented COVID-19 caused inflation. The reimbursement is based on several specific vendors including: Aegion for special HDPE fusing, P&F Distributors for piping materials, Big Wakoo for fencing, Pacific Steel Group for rebar, R&B for construction materials, David Crye for trucking, JB Dewar for diesel fuel, and SC Fuels for diesel fuel. The compensation amount represents a 50/50 settlement split with Anvil. | DSC |
| 50 | DSC at South Bay & Teresa (Utilities & Bedrock) | Anvil is reimbursed and compensated for extra work associated with differing site conditions (DSC) encountered while installing project pipelines through the intersection of South Bay Blvd and Teresa Road including significant impacts for unknown bedrock over about 100-ft of trenching. This change item also includes impacts for utility conflicts encountered including for AT&T, SoCal Gas, State Water, City Water, and City Sewer. This change item also includes costs to remove and replace segments of existing City Sewer pipe and City Water pipe that were in poor condition and failing due to the adjacent bedrock excavation operations. | DSC |
| 52 | High Level Switch Alarm Termination at Utility Bridge | Anvil is reimbursed and compensated for extra work associated with eliminating the PLC at the Utility Bridge. The PLC only operated a flood sensor. The flood sensor will now be connected to the PLC at Pump Station A via added twisted shielded pair (control wire) running in one of the innerducts in the 4" FO conduit. The purchased PLC, solar panel, and other related equipment will be provided to the City as spare parts. | CR1 |
| 61 | City Sales Tax Increase During Project | Anvil is reimbursed and compensated for extra costs associated with the City raising local Sales Tax by 1% effective 4/1/2021, essentially just after Anvil started working on the project. This settlement amount is calculated to reflect 1% of all goods and materials purchased within the City and delivered to the site. | DSC |

REASON FOR CHANGE CODES
CR1: City requested (required)
CR2: City requested (Optional)
E&O: Design Error or Omission
ABI: Anvil request / claim item
DSC: Differing Site Conditions
REG: Regulatory Agency Item



City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 006

Project: WRF Lift Stations and OffSite Pipelines Project **Contractor:** Anvil Builders, Inc.
Date: November 29, 2022 **Project Manager:** Brett Bennett

Upon mutual acceptance and execution of this document by the City of Morro Bay (City) and Anvil Builders, Inc. (Contractor), Contractor is hereby directed to make the following changes for the consideration set forth below:

See following page(s) for Descriptions and Reasons for Change

| PCO # | DESCRIPTION | Reason For Change | Amount | Contract Time (Calendar Days) | |
|------------------------------------|---|-------------------|----------------------|-------------------------------|------|
| 26 | Relocate 12" City RO Waterline at Sta 87+00 | DSC | \$ 130,452.00 | 6 | Days |
| 31 | Existing Storm Drains Collapse at Sta 63+97 | DSC | \$ 7,389.00 | 2 | |
| 35 | Existing RO Brine Line Discharge to WRF Outfall | REG | \$ 200,000.00 | 12 | Days |
| 36 | DDW Initiated Realignment btwn Sta 99 and Sta 116 | REG | \$ 82,892.00 | 2 | |
| 37 | Restoration of Quintana Near Kings during Inclement Weather | DSC | \$ 13,000.00 | | |
| 45 | Atascadero BR and Joint Trench Realignments | DSC | \$ 34,023.00 | | |
| 53 | Pump Station B Grading and Drainage Revisions | E&O | \$ 65,102.00 | 5 | Days |
| 55 | 200 LF Fused 4" HDPE for City Emergency Leak Response | CR2 | \$ 1,338.00 | | |
| 57 | Add FCA Restraint Rods and Lugs at Pump Stations | E&O | \$ 47,647.00 | | |
| 58 | Change Wet Well Piping Fit-up Bolts to 316SS (RFI 122) | CR2 | \$ 9,963.00 | | |
| 59 | Pump Station A Retaining Wall Revision to Detail 1 | E&O | \$ 20,837.00 | | |
| 68 | Waterline Breaks on Atascadero Road near Hwy 1 | DSC | \$ 34,120.00 | 2 | |
| NET CHANGE ORDER ADJUSTMENT | | | \$ 646,763.00 | 29 Days | |

| | | | |
|----------------------------------|------------------|-------------------------------|-----------|
| ORIGINAL CONTRACT AMOUNT | \$ 31,493,675.00 | CURRENT FINAL COMPLETION DATE | 11/2/2022 |
| Previous Change Orders | \$ 2,702,906.00 | Extension Days (Calendar) | 29 Days |
| Previous Contract Amount | \$ 34,196,581.00 | NEW FINAL COMPLETION | 12/1/2022 |
| Adjustments by this Change Order | \$ 646,763.00 | | |
| Change Order to Date | \$ 3,349,669.00 | | |
| New Contract Amount | \$ 34,843,344.00 | | |

Acceptance of this Change Order constitutes an agreement between the City and Contractor, and the work is to be performed subject to the same terms and conditions as are contained in the Agreement with Contractor and for work on the above-mentioned project.

By signature of this Change Order, the Contractor acknowledges that the adjustments to the Contract Cost and Time contained in the Change Order are in full satisfaction and accord and so waives any right to claim any further cost and time impacts at any time during and after completion of the Contract for the changes encompassed by this Change Order (EXCEPT AS NOTED IN ITEM 13.1 HEREIN WHEREIN DELAY IMPACTS ARE ON-GOING).

ACCEPTED

Anvil Builders Inc.

Contractor (Company Name)

[Signature] 12/01/2022

(Authorized Signature) (Date)

Brett Bennett PM

(Print Name and Title)

When signed by the Construction Manager, and upon execution of source document Amendment by City Council, this document becomes effective IMMEDIATELY, and Contractor shall proceed with the change(s) described above.

APPROVED

Carollo Engineers Inc / MEG Inc.

Construction Manager

Authorized Signature (Date)

Steve Mimiaga - Construction Mngr.

(Print Name and Title)



City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 006

Project: WRF Lift Stations and OffSite Pipelines Project

Contractor: Anvil Builders, Inc.

Date: November 29, 2022

| PCO | TILE | DESCRIPTION OF CHANGE | Reason For Change |
|-----|---|---|-------------------|
| 26 | Relocate 12" City RO Waterline at Sta 87+00 | Anvil is reimbursed for extra work to relocate 12" City RO Waterline from Sta 85+90 to Sta 88+00, including potholing, saw cutting, trench excavation from Sta 85+90 to 88+00, installing waterline and backfill, hydrostatic testing, chlorinating, flushing, sampling/testing for BACT, placing concrete kickers for 45-degree elbows at tie-ins, and temporary paving. The relocation work was necessary to provide minimum clearance between the existing waterline and new parallel sewer lines. | DSC |
| 31 | Existing Storm Drains Collapse at Sta 63+97 | Anvil is reimbursed for extra work to repair collapsed storm drain at Sta 64+00, including excavating damaged storm drain, installation of new SD pipe, placement of CLSM backfill, backfilling and temporary paving. | DSC |
| 35 | Existing RO Brine Line Discharge to WRF Outfall | Anvil is reimbursed for extra work related to the City's groundwater RO facility, including re-routing RO concentrate to the existing Air Relief Structure (Ocean Outfall), setting a new 48" sewer diversion manhole near RO Bldg and connecting a new 12" SS to new influent manhole, upsizing new sewer from 8" to 12" (noted above) from added 48" sewer diversion manhole to new influent manhole, installing new 6" RO flush line across Pump Station A site to retaining wall penetration and Cam-Lok (for flushing emergency storage tanks), deleting 6" flush line and vaults shown on Contract Drawings, connecting to existing re-purposed Desal Feed line for new RO discharge (from RO Bldg), and connecting new 6" ROC line to the existing Air relief Structure (Ocean Outfall). | REG |
| 36 | DDW Initiated Realignment btwn Sta 100 and Sta 116 | Anvil is reimbursed for extra work to relocate or sleeve existing utilities located too close to new Sewer Force Mains and/or the IPR line as determined by the State of California Department of Drinking Water (DDW), including at Stations 100+56, 108+20, 113+52, and 115+52. The work includes potholing in advance of the work, saw cutting and excavating existing utilities to be relocated or sleeved, installing new piping and/or sleeve casing pipes, backfilling, compacting, and temporary paving. | REG |
| 37 | Restoration of Quintana Near Kings during Inclement Weather | Anvil is reimbursed for extra work to temporarily restore pavement on Quintana Road near Kings Avenue after an inclement weather event. The work included placement of CLSM backfill in a low area, installation, and maintenance of temporary cold mix asphalt. Temporary repairs were requested by City staff for public safety. | DSC |
| 45 | Atascadero BR and Joint Trench Realignments | Anvil is reimbursed for extra work to mitigate and realign the joint trench on Atascadero Road due to potential conflicts with existing utilities and to mitigate the narrow road leaving minimal space for traffic control devices on paved surfacing. Anvil extra work included, confirming the location of existing parallel waterlines by potholing, confirming the vertical clearance between the revised joint trench and all known crossing waterlines, confirming no conflict with other adjacent and crossing utilities, and paint marking in the field, the edges (sawcut lines) of Anvil's proposed Joint Trench for City staff review. | DSC |
| 53 | Pump Station Grading and Drainage Revisions | Anvil is reimbursed for extra work to correct grading and drainage issues at Pump Station B as noted in RFI #162, including adding various grade changes, grade breaks, and elevation adjustments throughout the pump station site, adding a concrete curb around the Electrical Building, and adding a concrete valley gutter, drain inlet, and curb drain to allow precipitation runoff to leave the site and flow into the existing Main Street storm drain system. | E&O |

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|----|--|--|-----|
| 55 | 200 LF Fused 4" HDPE for City Emergency Leak Response | Anvil is reimbursed for extra work to provide 200 LF fused 4-in HDPE for City use in their emergency response to a leak below Route-1 near Cloisters Park. This work is not otherwise related to the Anvil Pipelines and Pump Stations project. | CR2 |
| 57 | Add FCA Restraint Rods and Lugs at Pump Stations | Anvil is reimbursed for extra work to furnish and install restraint rods and lugs at all flange coupling adapters (FCAs) at each pump station. This includes 6 each FCAs at Pump Station A and 6 each FCAs at Pump Station B. Without these restraint rods the FCAs could come apart and/or leak during high pressure conditions for the noted above grade portions of pump station discharge piping. | E&O |
| 58 | Change Wet Well Piping Fit-up Bolts to 316SS (RFI 122) | Anvil is reimbursed for extra work to furnish and Install stainless steel flange bolts for all flanged piping connections within wastewater wet wells at both Pump Station A and Pump Station B. The specified carbon steel bolts would have a significantly shorter service life. | CR2 |
| 59 | Pump Station A Retaining Wall Revision to Detail 1 | Anvil is reimbursed for extra work to increase the size of the pump station site retaining wall and concrete footing, and to add steps in the wall/footing as required. The extra work includes increasing the size of the reinforced concrete footing and changing the CMU blocks from 8" to 10" for additional structural strength. The work also includes adding 3 steps in the wall to accommodate planned finish grading at Pump Station A. | E&O |
| 68 | Waterline Breaks on Atascadero Road near Hwy 1 | Anvil is reimbursed for extra work to repair a broken existing City waterline that failed during Anvil's work near Sta 26+75, which ceased crew work and diverted resources to repair the failed waterline. The work includes saw cutting and excavating the existing waterline, installing new piping and repair couplings, backfilling, compacting, and temporary paving. The extra work occurred mostly after hours on June 7, 2022. | DSC |

REASON FOR CHANGE CODES

CR1: City requested (required)

CR2: City requested (Optional)

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ABJ: Anvil request / claim item

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City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 007

Project: WRF Lift Stations and OffSite Pipelines Project **Contractor:** Anvil Builders, Inc.
Date: February 28, 2023 **Project Manager:** ~~Chris Fassari~~ *Brett Bennett*

Upon mutual acceptance and execution of this document by the City of Morro Bay (City) and Anvil Builders, Inc. (Contractor), Contractor is hereby directed to make the following changes for the consideration set forth below:

See following page(s) for Descriptions and Reasons for Change

| PCO # | DESCRIPTION | Reason For Change | Amount | Contract Time (Calendar Days) | |
|-----------------------------|--|-------------------|---------------|-------------------------------|------|
| 5 | Pump Station A Excavation NPDES Dewatering Permit | REG | \$ 55,856.00 | 0 | Days |
| 8 | Additional Project Signage Costs | CR1 | \$ 3,856.00 | 0 | Days |
| 23.1 | Miscellaneous Unforeseen Utility Work (Part 2) | DSC | \$ 17,949.00 | 0 | Days |
| 66 | Repair Leaking City Waterline at North Abutment | CR1 | \$ 10,958.00 | 0 | Days |
| 75 | Additional Bollards Required by PG&E at Pump Stations | REG | \$ 15,013.00 | 0 | Days |
| 78 | Change 1-in. AIR-DR Piping to Stainless Steel (DC #35) | CR1 | \$ 16,839.00 | 0 | Days |
| 80 | Repair Existing Leaking RO Line at PS-A Site (Pre-Existing Leak) | CR1 | \$ 4,499.00 | 0 | Days |
| NET CHANGE ORDER ADJUSTMENT | | | \$ 124,970.00 | 0 Days | |

| | |
|----------------------------------|------------------|
| ORIGINAL CONTRACT AMOUNT | \$ 31,493,675.00 |
| Previous Change Orders | \$ 3,349,669.00 |
| Previous Contract Amount | \$ 34,843,344.00 |
| Adjustments by this Change Order | \$ 124,970.00 |
| Change Order to Date | \$ 3,474,639.00 |
| New Contract Amount | \$ 34,968,314.00 |

| | |
|-------------------------------|-----------|
| CURRENT FINAL COMPLETION DATE | 12/1/2022 |
| Extension Days (Calendar) | 0 Days |
| NEW FINAL COMPLETION | 12/1/2022 |

Acceptance of this Change Order constitutes an agreement between the City and Contractor, and the work is to be performed subject to the same terms and conditions as are contained in the Agreement with Contractor and for work on the above-mentioned project.

By signature of this Change Order, the Contractor acknowledges that the adjustments to the Contract Cost and Time contained in the Change Order are in full satisfaction and accord and so waives any right to claim any further cost and time impacts at any time during and after completion of the Contract for the changes encompassed by this Change Order (EXCEPT AS NOTED IN ITEM 13.1 HEREIN WHEREIN DELAY IMPACTS ARE ON-GOING).

ACCEPTED

Anvil Builders Inc.

Contractor (Company Name)

Brett Bennett 3/15/2023

(Authorized Signature) (Date)

Chris Fassari *Brett Bennett, PM*

(Print Name and Title)

When signed by the Construction Manager, and upon execution of source document Amendment by City Council, this document becomes effective IMMEDIATELY, and Contractor shall proceed with the change(s) described above.

APPROVED

Carollo Engineers Inc / MEG Inc.

Construction Manager

 Authorized Signature (Date)

Steve Mimiaga - Construction Mngr.

(Print Name and Title)



City of Morro Bay
Water Reclamation Facility
Lift Stations and Offsite Pipelines Project
CHANGE ORDER 007

Project: WRF Lift Stations and OffSite Pipelines Project

Contractor: Anvil Builders, Inc.

Date: February 28, 2023

| PCO | TILE | DESCRIPTION OF CHANGE | Reason For Change |
|-----|--|--|-------------------|
| 5 | Pump Station A Excavation NPDES Dewatering Permit | The Contract permitted Anvil to discharge groundwater from the Pump Station A excavation into the sanitary sewer. The City later determined that the dewatering discharge could adversely affect the existing WWTP. The City obtained a permit from the Regional Board to discharge to the City's existing RO discharge outfall. The discharge permit required an extensive sampling and testing program, which Anvil is being reimbursed for. The costs also include added temporary piping and added shoring rental costs for the month or so while the City obtained the new discharge permit. | REG |
| 8 | Additional Project Signage Costs | The original contract included a \$5,000 allowance for additional signage not shown on the plans. Anvil exhausted this original budget responding to signage requests from City staff. Anvil also was reimbursed under previous PCO 8.1 for added signage through 2021. This PCO 8.2 provides reimbursement of Anvil costs during 2022 to provide signage requested by the City, including custom signs. These additional signs are deemed necessary for public safety, public information, improved traffic flow, and/or to enhance access to businesses open during construction. | CR1 |
| 23 | Miscellaneous Unforeseen Utility Work (Part 2) | During project work to date, the below noted miscellaneous unforeseen minor utility work was required for Contract work to proceed. The following items are acknowledged as unforeseen conditions and as such warrant reimbursement of verified extra costs: (1) IPR pipe minimum cover determination delay and standby time on 6/29/22; (2) locating unknown underground utilities requested/required by SoCal Gas on 7/28/22 and 7/29/22; and (3) delay costs and repair costs from an existing unknown and unmarked 2" waterline broken by Anvil on Kennedy Way on 8/30/22. | DSC |
| 66 | Repair Leaking City Waterline at North Abutment | On 9/20/22, Anvil staff observed at ground level a waterline leak where the waterline crosses Anvil's work area near the Morro Creek Utility Bridge north abutment. The City subsequently confirmed that a City Water line, made of Transite (AC) pipe, was leaking. Anvil crews excavated the pipeline, located the leak, and repaired the leak at the City's request. It is not believed that Anvil activities caused the leak. | CR1 |
| 75 | Additional Bollards Required by PG&E at Pump Stations | The Contract Drawings indicate an arrangement of steel bollards filled with concrete surrounding the new PG&E transformer equipment at both Pump Station A and Pump Station B. The bollards are intended to prevent vehicular traffic from coming in contact with the transformer equipment (for human safety and equipment protection). During site inspections by PG&E staff in advance of installing the new transformers, PG&E required that Anvil increase the number of bollards at both Pump Stations. Anvil is seeking reimbursement for this added work not shown on the Contract Drawings. | REG |
| 78 | Change 1-in. AIR-DR Piping to Stainless Steel (DC #35) | The Contract Drawings indicate 1" piping between each pump station discharge pipe assembly and the adjacent wet well below. Each Pump Station as 3 pumps and 3 discharge pipe assemblies with various instruments and appurtatances. Each discharge assemble also includes a 1" pipe with ball valve leading back to the adjacent wet well. This pipe can be used to release trapped air or drain sewage back to the wet well. The Contract Drawings call for Sch 40 PVC piping. During start-up one of these 1" pipe assembles failed on high pressure. The City subsequently directed Anvil to replace all 6 1" pipe assemblies with 316 Stainless Steel piping, fittings, and valves. | CR1 |
| 80 | Repair Existing Leaking RO Line at PS-A Site (Pre-Existing Leak) | On 11/18/22, Anvil and City staff observed at ground level an apparent waterline leak on site at Pump Station A. The City subsequently confirmed that it was the City's existing RO brine discharge line leading to the ocean discharge. Anvil crews excavated the pipeline, located the leak, and repaired the leak at the City's request. The leak is confirmed to be pre-existing and not caused by Anvil activities. | CR1 |

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