

## AGREEMENT FOR PROFESSIONAL SERVICES

This Agreement is made and entered into this 13<sup>th</sup> day of October, 2022, by and between the **CITY OF MANTECA**, a public body, corporate and politic ("City") and **PACIFIC ADVANCED CIVIL ENGINEERS, INC.**, a California corporation ("Consultant").

### RECITALS

- A. Consultant is specially trained, experienced, and competent to perform the professional services required by this Agreement.
- B. Consultant possesses the skill, experience, ability, background, certification, and knowledge to provide the services described in this Agreement on the terms and conditions specified herein.
- C. City desires to retain Consultant to render the professional services set forth in this Agreement.

### AGREEMENT

1. Scope of Services. Consultant shall perform the services described in the attached Attachment 1 – Request for Proposals, that is incorporated by this reference, and pursuant to the Proposal submitted by Consultant dated September 6, 2022 and subsequent negotiated scope and fee dated September 14, 2022, and attached hereto as Attachment 2 – Consultant’s Proposal and Scope of Work; and subject to the direction of the City through its staff that may be provided from time to time. Performance of the services are sometimes referred to herein as “the Project.”

2. Work Through City Staff. Consultant shall perform its services pursuant to this Agreement solely through City staff. No communications, information or documentations shall be made directly to any applicant to the City without the prior written consent of the City. This shall not apply to the sole request of information or clarification of information by Consultant from the applicant. All requests shall be noted to City in an expeditious manner.

3. Time of Performance. Consultant’s services will commence upon execution of this Agreement and shall be completed in accordance with the Schedule of Activities, attached hereto as Attachment 3 – Schedule of Activities. All work shall be completed no later than December 31, 2024. Failure to submit work products in accordance with the Schedule of Activities may result in the City withholding progress payments. Repeated failure to complete work products in accordance with the Schedule of Activities may result in a reduction of the total compensation provided for in Section 4 herein.

4. Compensation. Without additional authorization from the City, compensation to be paid to Consultant shall not exceed **FOUR HUNDRED SIXTY-ONE THOUSAND EIGHT HUNDRED SEVENTY DOLLARS (\$ 461,870.00 )**. Payment by City under this Agreement

shall not be deemed a waiver of any defects, even if those defects were known to the City at the time of payment.

5. Method of Payment. Consultant shall submit monthly billings to City specifying and describing the work performed during the preceding month. Consultant's bills shall include a brief description of the services performed, the date the services were performed, the number of hours expended and by whom, and a description of any reimbursable expenditures. Full payment of each task will only be made at such time as each task is completed.

City shall pay Consultant no later than 30 days after approval of the monthly invoice by City staff. Payments may be delayed by City if Consultant fails to provide services in accordance with the Schedule of Activities, unless the City has provided prior written consent to any delay in the schedule.

6. Extra Work. At any time during the term of this Agreement, City may request that Consultant perform Extra Work. As used herein, the term "Extra Work" means any work that is determined by City to be necessary for the proper completion of the Project, but which the parties did not reasonably anticipate would be necessary at the time of execution of this Agreement. Consultant shall not perform, nor be compensated for, Extra Work without the City's prior written authorization. Budget available for extra work is estimated to be approximately FOURTY-SIX THOUSAND ONE HUNDRED EIGHTY-SEVEN DOLLARS (\$46,187).

7. Termination. This Agreement may be terminated by the City immediately for cause, or by either party without cause upon 15 days' prior written notice of termination. Upon termination, Consultant shall be entitled to compensation for services performed up to the effective date of termination upon submittal of an invoice for same.

8. Ownership of Documents; Confidentiality.

A. All plans, studies, documents, and other writings prepared by and for Consultant, its officers, employees, agents, and subcontractors in the course of implementing this Agreement, except working notes and internal documents, shall become the property of City upon payment to Consultant for such work. City shall have the sole right to use such materials in its discretion without further compensation to Consultant or to any other party. Consultant shall, at Consultant's expense, provide such reports, plans, studies, documents and other writings to City upon written request by City. Consultant shall not be responsible for any unauthorized modification or use of such information for other than its intended purpose.

B. All memoranda, specifications, plans, procedures, drawings, descriptions, computer program data, input record data, written information, and other documents and data, either created by or provided to Consultant in connection with the performance of this Agreement, shall be held confidential by Consultant. These materials shall not, without the City's prior written consent, be used by Consultant for any purposes other than the performance of the services under this Agreement. Nor shall these materials be disclosed to any person or entity not connected with the performance of services under this Agreement. Nothing furnished to Consultant that is otherwise known to Consultant, or is generally known, or has become

known to the related profession shall be deemed confidential. Consultant shall not use City's name or insignia, photographs relating to the Project for which Consultant's services are rendered, or any publicity pertaining to the Consultant's services under this Agreement in any magazine, trade paper, newspaper, television or radio production, or other similar medium without the City's prior written consent.

9. Consultant's Books and Records.

A. Consultant shall maintain all ledgers, books of account, invoices, vouchers, canceled checks, and other records or documents evidencing or relating to charges for services, or expenditures and disbursements charged to City, for a minimum period of three years, or for any longer period required by law, from the date of final payment to Consultant under this Agreement.

B. Consultant shall maintain all records that document performance under this Agreement for a minimum period of three years, or for any longer period required by law, from the date of termination or completion of this Agreement.

C. Any records or documents required to be maintained pursuant to this Agreement shall be made available for inspection or audit at any time during regular business hours, upon written request by the City Manager, City Attorney, City Auditor, or a designated representative of any of these officers. Copies of such documents shall be provided to City for inspection at City Hall when it is practical to do so. Otherwise, unless an alternative is mutually agreed upon, the records shall be available at Consultant's address specified in Section 16 of this Agreement.

D. Where City has reason to believe that records or documents may be lost or discarded due to the dissolution or termination of Consultant's business, City may, by written request, require that custody of the records be given to the City and that the records and documents be maintained in City Hall. Access to these records and documents shall be granted to any party authorized by Consultant, Consultant's representatives, or Consultant's successor-in-interest.

10. Independent Contractor. In the performance of the work and services required by this Agreement, Consultant shall act as and be an independent contractor and not an agent, or employee of the City. Consultant shall obtain no rights to retirement or other benefits that accrue to City's employees, and Consultant expressly waives any claim it may have to any such rights.

11. Interest of Consultant.

A. Consultant represents that neither it nor any employee has any investment or interest in real property, and shall not acquire any such interest, direct or indirect, within the area covered by this Agreement, or any other source of income, interest in real property, or investment that would be affected in any manner or degree by the performance of Consultant's services hereunder. Consultant further represents that, in the performance of its duties hereunder, no person having any such interest shall perform any services under this Agreement.

B. Consultant is not a designated employee within the meaning of the Political Reform Act because Consultant:

- (1) will conduct research and arrive at conclusions with respect to its rendition of information, advice, recommendation, or counsel independent of the control and direction of the City, or of any City official, other than normal Agreement monitoring; and
- (2) possesses no authority with respect to any City decision beyond the rendition of information, advice, recommendation, or counsel. (FPPC Reg. 18700(a)(2).)

12. Professional Ability of Consultant.

A. City is relying upon the professional training and ability of Consultant to perform the services hereunder as a material inducement to enter into this Agreement. Consultant shall therefore provide skilled professional and technical personnel to perform all services under this Agreement. All work performed by Consultant shall be in accordance with applicable legal requirements and shall meet the standard of quality ordinarily to be expected of competent professionals in Consultant's field of expertise.

B. The primary provider of the services required by this Agreement shall be Andy Komor. A list of other individuals assigned to the Project will be provided to City for its review and approval, and these individuals shall not be replaced without the City's prior written consent.

13. Compliance with Laws. Consultant shall use the customary standard of care in its profession to comply with all applicable federal, state, and local statutes, codes, ordinances, and regulations.

14. Licenses. Consultant represents and warrants to City that it has all licenses, permits, qualifications, insurance, and approvals that are legally required of Consultant to practice its profession. Consultant represents and warrants to City that Consultant shall, at its sole cost and expense, keep in effect or obtain at all times during the term of this Agreement, any licenses, permits, insurance, and approvals that are legally required of Consultant to practice its profession.

15. Indemnification and Hold Harmless. Consultant agrees to defend, indemnify, and hold harmless the City, its officers, officials, agents, employees, and volunteers, from and against any and all claims, demands, actions, losses, damages, injuries, and liability, direct or indirect (including any and all costs and expenses in connection therewith), arising out of Consultant's performance of this Agreement, or Consultant's failure to comply with any of its obligations contained in this Agreement; excluding, however, any claim arising out of the active negligence or willful misconduct of the City, its officers, agents, employees, or volunteers.

16. Insurance Requirements.

A. Job specific insurance requirements can be found on the attached Attachment 4. Other insurance provisions can be found below:

B. Endorsements. Each general liability and automobile liability insurance policy shall be with insurers possessing an A.M. Best's rating of no less than A:VII and shall be endorsed with language substantially as follows:

- (1) The City, its elected and appointed officers, officials, employees, agents and volunteers are to be covered as additional insureds with respect to liability arising out of work performed by or on behalf of the Consultant, including materials, parts, or equipment furnished in connection with such work.
- (2) The policy shall be considered primary insurance as respects the City, its elected and appointed officers, officials, employees, agents and volunteers. Any insurance maintained by the City, including any self-insured retention the City may have, shall be considered excess insurance only and shall not contribute with it.
- (3) The insurance shall apply to each insured and additional insured as though a separate policy had been written for each, except with respect to the limits of liability of the insuring company.
- (4) The insurer waives all rights of subrogation against the City, its elected and appointed officers, officials, employees, and agents.
- (5) Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the City, its elected and appointed officers, officials, employees, agents, or volunteers.
- (6) The insurance provided by the policy shall not be suspended, voided, canceled, or reduced in coverage or in limits except after 30 days written notice has been received by the City.
- (7) The City will not accept any endorsements that were issued in 2004. Acceptable endorsement forms are CG 20 10 11 85 or both CG 20 10 10 01 and CG 20 37 10 01.

C. Deductibles and Self-Insured Retentions. Any deductibles or self-insured retentions must be declared to and approved by the City. At the City's option, Consultant shall demonstrate financial capability for payment of those deductibles or self-insured retentions.

D. Certificates of Insurance. Consultant shall provide to City certificates of insurance with original endorsements as evidence of the required insurance coverage. Certificates of insurance shall be filed with the City on or before commencement of performance of this Agreement. Current certification of insurance shall be kept on file with the City at all times during the term of this Agreement.

17. Notices. Any notice required to be given under this Agreement shall be in writing and either served personally or sent prepaid, first class mail. Any such notice shall be addressed to the other party at the address set forth below. Notice shall be deemed communicated within 48 hours from the time of mailing if mailed as provided in this section.

If to City: City of Manteca  
1001 W. Center Street  
Manteca, CA 95337  
Attention: Somporn Boonsalat

If to Consultant: Pacific Advanced Civil Engineering, Inc.  
17520 Newhope St., Suite 200  
Fountain Valley, CA 92708  
Attention: Andy Komor

18. Entire Agreement. This Agreement constitutes the complete and exclusive statement of Agreement between the City and Consultant. All prior written and oral communications, including correspondence, drafts, memoranda, and representations, are superseded in their entirety by this Agreement.

19. Amendments. This Agreement may be amended only by a written document executed by both Consultant and City and approved as to form by the City Attorney.

20. Assignment and Subcontracting. The parties recognize that a substantial inducement to City for entering into this Agreement is the professional reputation, experience, and competence of Consultant. Assignments of any or all rights, duties, or obligations of the Consultant under this Agreement will be permitted only with the express written consent of the City. Consultant shall not subcontract any portion of the work to be performed under this Agreement without the written authorization of the City. If City consents to such subcontract, Consultant shall be fully responsible to City for all acts or omissions of the subcontractor. Nothing in this Agreement shall create any contractual relationship between City and subcontractor nor shall it create any obligation on the part of the City to pay any monies due to any such subcontractor other than as may be required by law.

21. Waiver. Waiver of any breach or default under this Agreement shall not constitute a continuing waiver of a subsequent breach or default of the same or any other provision under this Agreement.

22. Severability. If any provision of this Agreement is held to be invalid, illegal, or otherwise unenforceable by a court of competent jurisdiction, the remaining provisions of this Agreement shall continue in full force and effect.

23. Controlling Law; Venue. This Agreement and all matters relating to it shall be governed by the laws of the State of California, and any legal action relating to this Agreement shall take place in the Superior Court, County of San Joaquin.

24. Litigation Expenses and Attorneys' Fees. If either party to this Agreement commences any legal action against the other party arising out of this Agreement, the prevailing

party shall be entitled to recover its reasonable litigation expenses, including court costs, expert witness fees, discovery expenses, and attorneys' fees.

25. Mediation. The parties agree to make a good faith attempt to resolve any disputes arising out of this Agreement through mediation prior to commencing litigation. The parties shall mutually agree upon the mediator and shall divide the costs of mediation equally. If the parties are unable to agree upon a mediator, the dispute shall be submitted to JAMS/ENDISPUTE ("JAMS") or its successor in interest. JAMS shall provide the parties with the names of five qualified mediators. Each party shall have the option to strike two of the five mediators selected by JAMS, and thereafter the mediator remaining shall hear the dispute. If the dispute remains unresolved after mediation, either party may commence litigation.

26. Execution. This Agreement may be executed in several counterparts, each of which shall constitute one and the same instrument and shall become binding upon the parties when at least one copy has been signed by both parties.

27. Authority to Enter Agreement. Consultant warrants that it has all requisite power and authority to conduct its business and to execute, deliver, and perform this Agreement. Each party warrants to the other that the signatories to this Agreement have the legal power, right, and authority to enter into this Agreement and to bind each party.

28. Prohibited Interests.

A. Consultant warrants that it has not employed or retained any person, other than a bona fide employee working solely for Consultant, to solicit or secure this Agreement. Further, Consultant warrants that it has neither paid nor agreed to pay any person, other than a bona fide employee working solely for Consultant, any fee, commission, percentage, brokerage fee, gift, or other consideration contingent upon or resulting from the award or making of this Agreement. For any breach or violation of this warranty, City shall have the right to rescind this Agreement without liability.

B. For the term of this Agreement, no member, officer, or employee of City, during the period of his or her service with City, shall have any direct interest in this Agreement, or obtain any present or anticipated material benefit arising therefrom.

29. Equal Opportunity Employment. Consultant represents that it is an equal opportunity employer, and it shall not discriminate against any subcontractor, employee, or applicant for employment because of race, religion, color, national origin, handicap, ancestry, sex, or age. Such non-discrimination shall include, but not be limited to, all activities related to initial employment, upgrading, demotion, transfer, recruitment or recruitment advertising, layoff or termination.

30. Precedence. In case of conflict between Consultant's Proposal/Consultant's attachments and the City's Agreement/City's attachments, the City's Agreement and City's attachments shall take precedence over Consultant's proposal/Consultant's attachments.

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TO EFFECTUATE THIS AGREEMENT, each of the parties has caused this Agreement to be executed by its duly authorized representative as of the date set forth in the introductory paragraph on page 1 above.

**CITY OF MANTECA:**

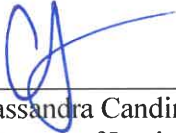


Toni Lundgren  
Interim City Manager

**CONSULTANT:**

Pacific Advanced Civil Engineering, Inc.  
*(Type name of Consultant/form of organization)\**

**ATTEST:**



Cassandra Candini-Tilton,  
Director of Legislative Services

By:



*(Signature)*

Andy Komor, V.P., Environmental Water Division  
*(Type name and title)*

**COUNTERSIGNED:**



Bret Harmon,  
Director of Finance

By:

*(Signature)*

*(Type name and title)*

**COUNTERSIGNED:**



Dawn Cortesi,  
Interim Director of Human Resources

Address:

\_\_\_\_\_

\_\_\_\_\_

Telephone:

\_\_\_\_\_

**APPROVED AS TO FORM:**



~~E. David Nefouse,~~ **DANIELLA G. GREEN**  
City Attorney **DEPUTY CITY ATTORNEY**

ATTACHMENT 1  
REQUEST FOR PROPOSAL

# City of Manteca



## WQCF Improvements Project Request for Proposals

**Issued:** August 18, 2022

**Electronic Proposals are Due:** September 6, 2022 at 5:00 PM PST

## RFP: WQCF CAPACITY IMPROVEMENTS

## Contents

1	Introduction .....	4
1.1	Time is of the Essence .....	4
2	Background .....	5
3	Proposal Submission and Format .....	7
3.1	Inquiries and Addenda .....	7
3.2	Work Proposal.....	8
3.3	Organization Credentials, Background .....	8
3.4	Experience.....	8
3.5	Project Team .....	9
3.5.1	Lead Firm.....	9
3.5.2	Project Manager.....	9
3.5.3	Project Team .....	9
3.6	Project Understanding and Approach.....	10
3.7	Schedule of Work.....	10
3.8	Exceptions to Professional Services Agreement.....	10
4	Scope of Services .....	10
4.1	Task 1 – Project Management .....	10
4.2	Task 2 – Construction Documents .....	11
4.3	Final Project Report to the California Energy Commission.....	11
4.3.1	Background .....	11
4.3.2	Project Description.....	11
4.4	WQCF Capacity Studies Technical Memorandum (TM).....	12
4.5	Replace Internal Mixed Liquor Recycle (IMLR) Pumps .....	12
4.5.1	Background .....	12
4.5.2	Project Description.....	12
4.6	Fix Flow Split to The North Plant Aeration Basins.....	13
4.6.1	Background .....	13
4.6.2	Project Description.....	14
4.7	Add New Independent Mixing System to Zone B .....	14
4.8	Add Process Aeration Control to Improve Monitoring and Control of Denitrification.....	14
4.8.1	Background .....	14
4.8.2	Project Description.....	14

Attachment 1 - RFP

RFP: WQCF CAPACITY IMPROVEMENTS

4.9 Assist City Staff in Construction Bidding and Contractor Selection ..... 14

4.10 Assistance and Coordination During Construction ..... 15

4.11 Operations & Maintenance Manuals ..... 15

4.12 Document Submittals ..... 15

4.13 Deliverables ..... 16

    4.13.1 Draft copies ..... 16

    4.13.2 Final document ..... 16

    4.13.3 Project Schedule ..... 16

5 Cost Proposal ..... 16

6 Proposal Evaluation ..... 16

7 Acceptance or Rejection of Proposal ..... 17

8 Agreement for Professional Services ..... 17

9 Insurance Requirements ..... 17

List of Tables	
Table 1	RFP Deadlines
Table 2	Links to Reference Documents and City Resources
Table 3	RFP Contact Information

List of Appendices	
Appendix A	California Energy Commission Report Template
Appendix B	Project Cost Estimates
Appendix C	Professional Services Agreement
Appendix D	Insurance Requirements for Professional Services
Appendix E	Sample O&M Chapter 7
Appendix F	Naming Standards and Asset Hierarchy

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

## 1 Introduction

Notice is hereby given that the City of Manteca (City) is inviting ELECTRONIC REQUEST FOR PROPOSALS (RFPs) from professional consulting firms to prepare the Wastewater Quality Control Facility (WQCF) Capacity Improvements Project (Project). **Table 1** lists RFP deadlines.

The City is requesting proposals from qualified consultants to provide professional services for the following:

1. Final Project Report to the California Energy Commission
  - a. Report template is provided in **Appendix A**
2. WQCF Capacity Improvements Technical Memorandum (TM)

### Design and Construction Services:

Cost estimates for the projects listed below are included in **Appendix B**.

3. Replace Internal Mixed Liquor Recycle (IMLR) Pumps
4. Fix Flow Split to the North Plant Aeration Basins
5. Add New Independent Mixing System to Zone B
6. Add Process Aeration Control to Improve Monitoring and Control of Denitrification

Firms submitting proposals for this project must have a project manager licensed as a Professional Engineer in the State of California and have experience in the field of wastewater treatment, operation, and maintenance of municipal wastewater systems. Innovation is encouraged to provide the City with comprehensive services in the most efficient, cost effective manner.

### 1.1 Time is of the Essence

Time is of the essence with respect to this contract. Please refer to **Table 1** for deadlines. The successful proposer should be able to perform all required tasks set forth in the Scope of Services section.

**Table 1: RFP Deadlines**

Milestone	Deadline
RFP Issued	08/18/2022
Deadline for Clarifications/Inquiries	08/31/2022, 5:00 pm PST
Deadline for Proposal Submittal	09/06/2022, 5:00 pm PST
Interviews (tentative)	09/14/2022
Award of Contract (tentative)	10/04/2022
Notice to Proceed (tentative)	10/05/2022

PST: Pacific Standard Time

Proposals received after the deadline time and date listed in **Table 1** will not be considered. The City accepts no responsibility if delivery is made to another electronic mail address or other technological issues that cause a submittal to be late or not received by the deadline. An evaluation team will review submitted proposals and select the best proposal based on the evaluation criteria outlined in the RFP. The selected consultant will then be recommended to the City Council for entering into a contractual

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

agreement for services. A free electronic copy of the RFP can be obtained by going to the City's website via the link below.

**Link to this RFP:** <https://www.ci.manteca.ca.us/Pages/RequestForProposal.aspx>

## 2 Background

The City provides sewer collection service to residents and businesses within the City limits and provides treatment at the City's Wastewater Quality Control Facility (WQCF). The City is located approximately 15 miles north of Modesto and 10 miles south of Stockton. The Union Pacific Railroad runs diagonally from southeast to northwest through the City. Highway 120 crosses the southern portion of the City and provides access to Interstate 5, located about four miles to the west of the City, and Highway 99 along the eastern boundary of the City.

The City's current sewer service area coincides with the current City boundary. In 2020 the estimated population of the City was 84,400, according to population data published by the California Department of Finance (DOF).

The WQCF is located southwest of downtown Manteca on 22-acres owned by the City. The WQCF treats municipal wastewater collected from the City of Manteca and the City of Lathrop, and seasonally accepts industrial food processing waste effluent from Eckert Cold Storage. Per contractual agreement, 8.42 mgd of plant capacity is allocated to the City of Manteca and 1.45 mgd is allocated to the City of Lathrop.

The City's current National Pollution Discharge Elimination System (NPDES) Permit, which regulates the wastewater effluent quantity and quality, was issued by the Central Valley Regional Water Quality Control Board and is Order R5-2021-0003 NPDES No. CA0081558.

The WQCF treats an average dry weather flow (ADWF) of about 7.6 mgd and has an average dry weather flow (ADWF) capacity of 9.87 mgd. However, historic water use reductions in the community combined with population growth have increased the biological oxygen demand (BOD) and total Kjeldahl nitrogen (TKN) concentration in the influent wastewater. The higher strength wastewater, results in increased biochemical oxygen demand (BOD) and nitrogen loading on the plant.

The City's sewer service area is divided into north, south and central sewer sheds. The municipal wastewater collection system includes 242 miles of sewer mains and 19 pump stations. The collection system includes gravity flow pipes ranging from 6-inch to 60-inch diameter, and force mains from 6-inch to 54-inch diameter.

The existing collection system generally serves the developed portions of the City, with major trunk sewers located in the core of the City (the central sewer shed), approximately bounded by State Route 120 to the south, Austin Road to the east, Lathrop Road to the north, and Airport Way to the west.

Additional information about the WQCF, including the NPDES Permit are listed below, and in the appendices of this RFP. Please use the corresponding links to obtain copies of each document.

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

Table 2: Links to Reference Documents and City Resources

Document / Resource	Link
0 - RFP (this document & appendices)	
1 - NPDES Permit	<a href="https://www.ci.manteca.ca.us/Pages/RequestForProposal.aspx">https://www.ci.manteca.ca.us/Pages/RequestForProposal.aspx</a>
2 - WQCF Phase III Expansion	
GIS Online Access	<a href="https://data-manteca.opendata.arcgis.com/datasets/3478489d53204631b7909d7d1e65c504_9">https://data-manteca.opendata.arcgis.com/datasets/3478489d53204631b7909d7d1e65c504_9</a>
General Plan Update	<a href="https://manteca.generalplan.org/">https://manteca.generalplan.org/</a>

The Manteca WQCF began operation in 1959 with treatment consisting of a sole oxidation pond. Pond effluent was discharged to the surrounding land. In 1970, the first major upgrade to the plant occurred. This upgrade included the construction of preliminary and primary treatment facilities and aerobic sludge digestion. Effluent continued to be discharged to the land for agricultural applications. Process flow diagrams are included in the appendices of this RFP.

At present, the WQCF consists of the North Side Facilities (NSF) and South Side Facilities (SSF). The following provides additional detail of each phase.

- **Phase I Expansion 1986-1988:** as part of the Clean Water Grant Program, a major expansion to the plant was constructed. This Phase I Expansion Project included the construction of secondary treatment facilities, anaerobic sludge digesters, sludge drying beds, a chlorine disinfection system, and an outfall to the San Joaquin River. Design capacity (average) of the plant following the Phase I project was 5.45 mgd.
- **The Phase II Expansion 1992-1993:** added a primary sedimentation basin, secondary clarifier, and four sludge drying beds, increasing the average plant capacity to 6.95 mgd.

The majority of the northside facilities was constructed during the Phase I and II expansion projects at the plant and consists of two aerated grit tanks, three primary sedimentation basins, a biotower feed pump station, two biotowers, five ultra-fine bubble activated sludge aeration basins, and three secondary clarifiers.

- **Phase III Expansion Project 2002-2008:** construction of southside facilities, which included the following:
  1. Increasing average treatment capacity from 6.95 mgd to 9.87 mgd.
  2. Influent pump station and fine screening facilities to accommodate future collection system infrastructure plans and projected build-out flows for the service area.
  3. Septage receiving station
  4. Odor control  
Support facilities (laboratory, locker room building, shop/maintenance building)
  5. Wastewater fine screening

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

6. Influent pumping (screw centrifugal pumps)
7. Aerated grit removal
8. Primary sedimentation  
BOD reduction, nitrification, and denitrification in aeration basins
9. Secondary clarification
10. Secondary effluent equalization/storage
11. Chemical addition, rapid mixing, and flocculation
12. Filtration with cloth-disk filters (CDFs)
13. Wastewater disinfection with UV light
14. Effluent pumping
15. Wastewater disposal by land application
16. Sludge pumping (primary and waste activated)
17. Sludge thickening through dissolved air flotation
18. Anaerobic digestion of thickened sludge
19. Digested sludge dewatering with high-solids centrifuges
20. Recycled water pumping and storage

### 3 Proposal Submission and Format

Proposers must submit a Work Proposal and Cost Proposal via email (refer to **Table 3**). All responses must be completed as required, signed by an officer of the firm who is authorized to enter into a binding agreement with the City on behalf of the company (proof of signature authority must be attached), and must be received in the place and time designated in **Table 1**.

**Table 3: RFP Contact Information**

**Submit questions, RFIs, and proposal packages to the contact information below. Questions and answers will be posted to the City's RFP website.**

Contact: Kyzen Nicolas, Assistant Engineer  
 Email: [knicolas@ci.manteca.ca.us](mailto:knicolas@ci.manteca.ca.us)  
 Subject Line: *WQCF Capacity Improvements RFP*

**Notes:**

1. Submittals or inquiries sent to other emails will not be accepted.
2. Deadline to ask questions: refer to **Table 1** of this RFP for applicable deadlines. Questions and/or inquiries via phone and to other city personnel will not be answered.
3. Questions and answers will be posted to the City's RFP website.

Proposals shall be concise, well-organized and demonstrate the consultant's qualifications and experience relating to the proposed project. At minimum, proposals shall include the information in the following sections.

#### 3.1 Inquiries and Addenda

All inquiries and questions shall be submitted in writing via email. Refer to city contact identified in Section 3 of this RFP. Inquiries received after the due date to ask questions will be disregarded. Please include

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

the following in the subject line of the email: "WQCF Capacity Improvements RFP." Telephonic inquiries will not be taken. Questions and answers will be posted on the City's website.

The City will

issue any revisions to this RFP as addenda. The City will post questions, answers and addenda on the City's website. Proposers are responsible for receipt of all addenda. The City's issuance of a written addendum is the only official method whereby the City will interpret, clarify, or provide additional information concerning this RFP. No oral revision to any provision in the RFP shall be binding.

### 3.2 Work Proposal

All proposals shall have a 15-page (one-sided page) limit. The proposal, resumes, and project schedule shall all be included within the 15-page limit. The cover letter shall consist of maximum two (2) pages and include the following:

- a. The proposer's legal name, address, telephone number, email address, and contact person for the remainder of the selection process;
- b. Any qualifying statements or comments regarding the proposer's submittal, including proof of proposer's capabilities to prepare design drawings, design specifications, and technical reports related to pumping and wastewater treatment processes;
- c. Statement indicating the validity of the proposal for a minimum period of 120 calendar days subsequent to the proposal due date; and
- d. Resumes provided for each staff member shall be one page long at most. Resumes shall indicate college education, degrees earned, year licensing was obtained, and relevant project experience.

### 3.3 Organization Credentials, Background

- a. Number of years in business working in wastewater industry preparing retrofits to activated sludge processes;
- b. Type of organization (partnership, corporation, etc.);
- c. Location of the office that will support your project team and perform the work. The individuals identified in the proposal shall be the same individuals that must complete the project work and meet/communicate with City staff on an on-going, consistent, and regular basis. The City shall be notified in writing of any change in staff members at minimum 30-days in advance. Changes in staff will need to be approved in writing by the City. This applies to all staff including staff from other firms; and
- d. Count and description of personnel resources within the firm, including, but not limited to, in-house professional disciplines of the firm.

### 3.4 Experience

Relevant experience with the preparation of wastewater treatment systems including retrofits to activated sludge processes, pump design and sizing, pipeline systems, hydraulic design, and technical writing.

A minimum of three (3) references of existing and past water agency clients with emphasis given to work completed within the last five years. Please provide the following:

- a. Project name/location
- b. Project Manager name

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

- c. Completion date or current status
- d. Client name and client representative with telephone number and e-mail address
- e. Description of project
- f. Original project budget and final cost
- g. Original project duration and final project duration
- h. If project team includes a prime consultant and sub-consultants, provide detail regarding the role of the consultant and sub-consultants.

### 3.5 Project Team

#### 3.5.1 Lead Firm

Clearly identify the lead firm noting the following items:

- A. The lead firm shall oversee the project, be responsible for the successful completion of the work, and coordinate the work of all its sub-consultants.
- B. The lead firm must provide information that demonstrates its experience as a prime or major sub-consultant on projects of similar type, size, and complexity as the project under consideration.
- C. The Lead Firm shall possess all permits, licenses, and professional credentials necessary to perform services as specified under this RFP.

#### 3.5.2 Project Manager

Identify the Project Manager, which will be the primary client contact, that will be responsible for the management of the project (through the duration of the entire project), and for ensuring that the project performs within the agreed-upon scope, schedule, and budget. Information regarding the Project Manager's qualifications and experience (both technical and managerial) shall be provided as indicated below.

- A. Project Manager shall conduct presentation during interview by City staff.
- B. The Project Manager must have demonstrated strong project management and organization skills, contract management abilities, and effective communication and interpersonal skills.
- C. The Project Manager must meet the minimum qualifications, as follows:
  - i. An employee of the lead firm; and
  - ii. A minimum of 10 years of relevant experience with the preparation of similar projects.

#### 3.5.3 Project Team

Only personnel that will work on the project (through the duration of the project) shall be identified in the proposal. Changes to the project team shall be approved by the City.

- a. The project team may consist of staff from the lead firm and from other consulting firms with expertise in specific areas (sub-consultants).
- b. The proposal should clearly identify key personnel and Subject Matter Experts with workload information and commitments of availability to work on the project to ensure that all prescribed deadlines are met.
- c. List of proposed team members with titles that are expected to be involved throughout the life of the project, including prime consultants and sub-consultants;
- d. Provide an organization chart of the proposed project staffing; and

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

- e. Provide resumes (one-page maximum per team member) and related experience of each member that will be involved. Emphasis should be given to work completed for comparable municipalities within the last three years.

### 3.6 Project Understanding and Approach

This section should demonstrate the proposer's understanding of the Project and the services required under this RFP, how the work will be organized, and anticipated key issues to be addressed. This section should include:

- a. Description of the proposer's overall approach to the services required under the Scope of Services, such as an outline of a work plan that describes how the proposer will organize the services;
- b. Description of those areas that the proposer is most likely to have challenges, and discuss means to resolve those conflicts or avoid them altogether;
- c. Identify what the proposer feels are the key components to making the project successful; and
- d. Other information that will assist City in selecting the most qualified consultant.

### 3.7 Schedule of Work

The proposal shall include a schedule of work items on a task-by-task basis, including an estimated completion date for each task.

### 3.8 Exceptions to Professional Services Agreement

Exceptions shall be submitted in writing with justification clearly stated. Any consultant with exceptions to terms contained in the City's Agreement for Professional Services (see **Appendix C**) must advise the City of such and requested modifications as part of its proposal. Failure of a proposer to accept the terms of the City's Agreement for Professional Services may result in the rejection of the proposal. It shall be the responsibility of the prospective consultants to review all sections and exhibits of the Agreement for Professional Services, including insurance requirements included as **Appendix D**.

If no exceptions are noted, the City will assume the proposer is able to and will enter into the Agreement for Professional Services and fulfill the terms and requirements set therein. The City may recover any damages accruing to the City as a result of the successful consultant's failure or refusal to execute the City's Agreement for Professional Services.

## 4 Scope of Services

The Scope of Services is comprised of the tasks detailed in the following sections.

### 4.1 Task 1 – Project Management

The consultant shall attend a project kick-off conference call with the use of screen sharing capability with City staff to discuss project parameters, scheduling constraints, and other relevant information regarding services required by this RFP to prepare the Project, and additional documents as outlined below. **Consultant shall maintain a project schedule, which shall be updated, and submitted to the City at least**

**RFP: WQCF CAPACITY IMPROVEMENTS**

**once per month.** Project update meetings shall take place once per month at minimum or more frequently as required by project needs.

If in-person meetings or gatherings are needed, considerations for enhancing protection of individuals and preventing spread of coronavirus disease 2019 (COVID-19) will need to be implemented. City staff and consultant will coordinate and determine, whether and how to implement these considerations, and make the necessary adjustments to meet the needs and circumstances of the local community. ZOOM or similar remote meeting applications may be used if remote meetings are needed. City staff and consultant will coordinate the best use of remote meeting applications to encourage public participation. In-person meetings will be held as needed for the project.

The consultant shall prepare a detailed schedule of the project and identify completion dates for key milestones. The consultant is responsible for reviewing and becoming familiar with all pertinent data and requirements for completion of the project.

#### 4.2 Task 2 – Construction Documents

The selected firm will develop two sets of detailed design drawings and construction specifications for this project.

Construction documents shall incorporate City Engineering Standards and General Conditions as appropriate. Plans and specifications shall be submitted to the City for review at the 75%, and 100% design stages. The 75%, and 100% submittals shall drawings, specifications, supporting documents, and engineer's cost estimate for review. A technical review meeting shall be held after the 75% submittals to discuss the City's comments. One reproducible set and PDF fi sets of drawings and specifications along with the final engineer's cost estimate shall be provided as the Final submittal. Specifications shall also be provided electronically in both PDF and Microsoft Word (Word 2010) formats.

#### 4.3 Final Project Report to the California Energy Commission

##### 4.3.1 Background

The City of Manteca's Waste to Fuel Program will be the first example of a new approach to demonstrate cost effective methods to comply with AB1826 legislation which affects solid waste by utilizing synergies available to municipalities at their local wastewater treatment plant. The project was completed on December 2019.

The project produces vehicle fuel from co-digested food waste and sewage sludge to generate digester gas that will be processed into transportation fuel for the City of Manteca Solid Waste and other vehicle fleets. Intercepting landfill bound food waste reduces greenhouse gases in two ways. First, it reduces fugitive emissions of methane at landfills. Second, methane produced from co-digestion of the food waste with sewage sludge is used to offset diesel usage in the solid waste collection and other City fleets, creating a renewable low carbon fuel source for the community.

##### 4.3.2 Project Description

Prepare the final report using the CA Energy Commission template (included as **Appendix A**).

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

- a. Project Number: ARV-16-027 (Amendment 03)
- b. Please use the template included at the end of the RFP
- c. Final Outline of Final Report: September 30, 2022
- d. Draft Final Report: November 15, 2022
- e. Final Report to CA Energy Commission due: December 20, 2022

#### 4.4 WQCF Capacity Studies Technical Memorandum (TM)

Prepare technical memorandum detailing all of the projects included in this RFP. The TM shall include detailed design information including, but not limited to, pump sizing, design layouts, and other design information needed for future reference. The TM shall be submitted once all design has been completed to ensure the final design information is accurate.

**The WQCF needs to maintain normal operation at all times during the construction phase. The following projects need to be designed and constructed in a way that minimizes downtime and maintains operation of the WQCF.**

#### 4.5 Replace Internal Mixed Liquor Recycle (IMLR) Pumps

##### 4.5.1 Background

The North and South Plants each include five aeration basins. The aeration basins, secondary clarifiers, and return activated sludge/waste activated sludge pump stations are often collectively referred to as the secondary treatment or the activated sludge process. Operation of these facilities requires a significant degree of monitoring and adjustments to ensure that the process is performing well.

The purpose of the aeration basins is to remove BOD, Nitrogen and remaining settleable solids also known as Total Suspended Solids (TSS) from the liquid stream. Efficient operation of the activated sludge process should produce a final effluent that complies with the BOD, TSS, and nitrogen requirements of the NPDES permit.

The northside aeration basins are designated as Aeration Basin Nos. 1-5. Aeration Basin Nos. 1-3 were constructed in 1986. Aeration Basin Nos. 4 and 5 were constructed in 2002 as part of the Phase III Expansion, Schedule A Project. The Phase III Expansion Project included replacing the aeration panels in the existing basins and modifications to enable full nitrification and denitrification. The northside aeration basins include the following components: concrete basins, blowers, diffuser panels, air distribution piping, effluent channel gates, effluent channel telescopic valves, recirculation pumps, and mixers.

The southside aeration basins, designated as Aeration Basin Nos. 6-10, were constructed in 2003-2005 as part of the Phase III Expansion, Schedule B Project. The southside aeration basins include the following components: concrete basins, blowers, diffuser panels, air distribution piping, recirculation pumps, and mixers. The components are described below.

##### 4.5.2 Project Description

This project entails replacing the IMLR pumps in all ten aeration basins in both North and South Plants to attain a capacity of at least 2.8 Mgal/d per basin in the North Plant and 3.6 Mgal/d per basin in the South Plant (even higher capacity would provide more flexibility). Existing recirculation pump capacity is about

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

2 Mgal/d per basin in both plants. In addition to replacing the pumps, provide variable frequency drives, IMLR flow meters, and related controls so that IMLR flows can be automatically controlled in proportion to plant flow rates. Additionally, provide all the analyzers required for proper nitrification/denitrification process control in each Zone. Improvements to the supervisory control and data acquisition (SCADA) features to track flow information may be required.

This project requires draining one aeration basin at a time (10 existing aeration basins). The City is looking for recommendation on project sequencing that keeps the WQCF in operation while at the same time completing this project.

- a. North Plant - Replace the existing (5) IMLR pumps with new (5) wall pumps rated at 3.0 Mgal/d at 2.3 feet, 4.9 hp each.
- b. South Plant - Replace the existing (5) IMLR pumps with new (5) wall pumps rated at 4.0 Mgal/d at 2.0 feet, 6.5 hp each. Replace 12" stainless steel IMLR pipe with new 14" stainless steel IMLR pipe.
- c. Provide (5) 10 hp wall-mount VFDs at each plant. Provide support with the RWQCB in coordinating plant operations during construction. This includes putting together documentation and meetings with the RWQCB.
- d. Provide concrete bases, SCADA programming, P&ID drawings of new pumps, equipment numbering per the City's Equipment Naming Convention (see **Appendix F**), instrumentation, and required electrical work.

## 4.6 Fix Flow Split to The North Plant Aeration Basins

### 4.6.1 Background

The primary sedimentation basins are rectangular concrete units with concurrent scum and sludge removal. Each sedimentation basin has two inlet openings, each fitted with a stop gate frame (G07-03 through G07-08), for flow distribution control and shutdown of the basin. Spray nozzles are mounted across the inlet end of each basin. The spray nozzles direct a fine spray of 2W water at the wastewater surface and consequently push the floating materials out of the inlet end of the basin into the return path of the longitudinal sludge collecting flights which push the floating materials to the basin scum skimmer. In each basin, a PVC ball valve in the spray header/2W water connection provides for shutdown and throttling of the spray water flow.

In each basin, the settled wastewater is collected by three effluent launder troughs with V-notch overflow weirs. The outlet of each effluent launder is fitted with a stop gate for isolation. The effluent launders discharge the collected wastewater into the primary effluent channel. Refer to appendices for additional information.

The original design was to have 44% of the total flow treated by the North Plant and 56% of the total flow treated by the South Plant. However, staff have encountered Nitrogen removal when 44% of the total flow is sent to the North Plant. The North Plant is known to have poor flow split between the aeration basins which is suspected to contribute to the poor treatment performance.

**RFP: WQCF CAPACITY IMPROVEMENTS**

#### 4.6.2 Project Description

This project entails investigating the root cause and determine what is preventing the North Plant from handling 44% of the total flow. At a minimum, this project will need to address the unequal flow splitting between the aeration basins. Refer to appendices for additional information. Improvements to the SCADA features to track the flow split between each aeration basin should be considered and coordinated with the operation staff.

#### 4.7 Add New Independent Mixing System to Zone B

Provide improved aeration instrumentation and controls and additional mixing facilities to allow all Zone Bs to operate with less airflow and at a lower DO concentrations. The mixing facilities are needed to keep the solids in Zone B suspended when air flows needed to attain low DO concentrations are lower than air flows required to keep the zones mixed. Improvements to the SCADA features to track total air deliveries to each zone in each basin will be required to assist with process troubleshooting and optimization.

#### 4.8 Add Process Aeration Control to Improve Monitoring and Control of Denitrification

##### 4.8.1 Background

The existing aeration control system monitors and does a good job of controlling Dissolved Oxygen (DO) in each aerobic zone of the aeration basins. However, oxidation reduction potential (ORP), ammonia, nitrite, and nitrate are not monitored. Plant staff have installed temporary ORP, ammonia, and nitrate probes in a few basins to help diagnose issues with meeting nitrate+nitrite limits. The monitoring of DO, ORP, ammonia, nitrite, and nitrate in each zone is critical to optimizing the performance of each aeration basin and quickly identifying operational issues with the basins.

##### 4.8.2 Project Description

This project entails working with WQCF staff to determine what additional analyzers are needed to monitor and optimize performance of the all aeration basins. This project will install at a minimum a permanent monitoring system in all ten (10) aeration basins to monitor:

- oxidation reduction potential (ORP)
- ammonia
- nitrite
- nitrate

In addition to the process control instrumentation, finetuning the air flow control requires replacing the existing 4-in air flow control valves for Zone B.

- Evaluate different options for the monitoring system with WQCF staff that include costs, probe types, etc. that will best meet the needs of the treatment process and can be efficiently maintained. The evaluation and final selection of the monitoring system will need to be submitted in a technical memorandum.

#### 4.9 Assist City Staff in Construction Bidding and Contractor Selection

Provide assistance during contractor selection processes. The City will require assistance with the following tasks:

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

- Coordinate and conduct pre-bid meetings, prepare and distribute pre-bid meeting minutes as necessary
- Prepare responses to bidder's inquiries during bid period (RFI's)
- Prepare and distribute bid addenda
- Review construction bids received and prepare a recommendation to the City regarding bid completeness/responsiveness, bidder capabilities, and contract award
- Prepare conformed sets of specifications and drawings as directed by City staff

#### 4.10 Assistance and Coordination During Construction

The selected firm will provide engineering services during construction including the following:

- Coordinate and conduct weekly meetings, prepare and distribute meeting minutes as necessary
- Prepare responses to bidder's inquiries i.e. RFI's
- Prepare as-builts sets of specifications and drawings as directed by City staff
- Review contractor submittals for conformance with the design drawings and specifications, and provide responses to contractor. Consultant shall submit the necessary templates for the following: RFI responses, submittal responses, etc. to provide support during the construction phase of the project
- Coordinate with City on change order requests
- Provide services needed during construction
- Coordinate WQCF shut downs, and sequencing between City and construction staff

#### 4.11 Operations & Maintenance Manuals

Consultant shall update the City's Operations and Maintenance Manual (O&M Manual) to include the projects in this RFP (excludes the CA Energy Commission Report and TM). The O&M Manual shall follow the format of the sample O&M chapter included as **Appendix E**, and include:

- Table of Contents
- Introductory sections i.e. purpose and process summary
- Figures
- Association with other treatment systems and equipment
- Descriptions and specifications
- Relevant formulas and calculations
- Descriptions of control strategies, instrumentation, alarms, etc.
- Problems and troubleshooting guide(s)

#### 4.12 Document Submittals

The following document submittal guidelines shall apply, except where noted, for each document identified for each task.

- Draft version of each document for internal review
- Final version, which incorporates comments from City staff

## RFP: WQCF CAPACITY IMPROVEMENTS

#### 4.13 Deliverables

The Consultant shall provide to the City the following products and services as part of this project and others the consultant deems necessary to provide a complete Project.

**Note: this applies to technical documents like the TMs and the CA Energy Commission Final Report.**

##### 4.13.1 Draft copies

- One (1) PDF copy
- One (1) electronic version of the complete document in Word 2010 file format
- One (1) electronic version in PowerPoint file format (applies to presentations)
- One (1) AutoCAD version of figures and exhibits, where needed

##### 4.13.2 Final document

- One (1) PDF copy
- One (1) electronic version of the complete document in Word 2010 file format
- One (1) electronic version of the complete document in AutoCAD
- One (1) electronic version in PowerPoint file format (applies to presentations)

##### 4.13.3 Project Schedule

Given the complexity and number of documents required in the Scope of Work, the consultant shall update the project schedule on a monthly basis. Please submit PDF copy and a copy in Microsoft Project format.

## 5 Cost Proposal

The proposer must submit a detailed cost proposal for all services and materials anticipated to complete the Scope of Services with a “not-to-exceed” fixed fee, which shall be the sum of all tasks. The cost proposal shall be submitted as a separate PDF file. The file name shall follow this naming convention: “*WQCF Capacity Improvements RFP.pdf*”. Provide a fixed dollar amount for each of the services and materials as described in the Scope of Services.

Include an hourly rate table for typical planning and engineering classifications that may be requested for separate tasks not included in this RFP.

Consultant shall submit monthly invoices listing work completed. Invoices shall list summarize work broken down hourly rate, position, and material fees

Innovation is encouraged and expected to provide the City with comprehensive services in the most efficient and cost effective manner.

## 6 Proposal Evaluation

City staff will evaluate each proposal for completeness and content. Each proposal will be evaluated based upon the relevant qualifications and experience of the proposer. Staff may choose to interview two or more closely ranked firms, allowing 30 minutes for a presentation of the short-listed firms and another 30 minutes for a questions/answer session. License status and references will also be verified. The proposal review will focus on the following criteria:

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

- a. Project Management (15 points). Components of project management that demonstrate capability in management of projects of this scope. Include a sample monthly report. Please include a project schedule that accounts for the Scope of Services.
- b. Project Understanding/Project Approach (40 points). The proposal adequately demonstrates an understanding and experience in preparing similar potable water projects for municipalities. Innovative approaches for alternative solutions and recommendations are preferred.
- c. Experience (40 points). The firm's expertise and professional qualifications with similar work. Qualifications of the firm and individuals assigned to perform the work.
- d. Project schedule (5 points). Thoroughness of the project schedule, ability to complete the project within the selected timeframe.

## 7 Acceptance or Rejection of Proposal

The City reserves the right to accept or reject any and all proposals. The City also reserves the right to waive any informality or irregularity in any proposal or in the bidding as deemed to be in its best interest. Additionally, the City may, for any reason, decide not to award an agreement as a result of this RFP or cancel the RFP process. The City shall not be obligated to respond to any proposal submitted, nor be legally bound in any manner by the submission of the proposal. The City reserves the right to negotiate Project deliverables and associated costs.

The City may require selected consultant to submit additional data or information the City deems necessary to substantiate the costs presented by the proposer. The City may also require selected consultant to revise one or more elements of its proposal in accordance with contract negotiations.

## 8 Agreement for Professional Services

Refer to **Appendix C** for the City's Agreement for Professional Services.

## 9 Insurance Requirements

Additionally, the successful proposer shall also secure all insurance required under the Agreement for Professional Services and provide any necessary documentation to the City as part of the Agreement for Professional Services. Refer to **Appendix D** for details.



**CALIFORNIA  
ENERGY COMMISSION**



**CALIFORNIA  
NATURAL  
RESOURCES  
AGENCY**

Clean Transportation Program

## **FINAL PROJECT REPORT**

**Title of Report, in Title Case  
With Capitalized Words  
Except for Some Small  
Words Like a, the, and, for**  
Subtitle of Report, If Used

**Prepared for: California Energy Commission**

**Prepared by: Name of Recipient**

**Month 202X | CEC-600-202X-XXX**



# California Energy Commission

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## DISCLAIMER

This report was prepared as the result of work sponsored by the California Energy Commission (CEC). It does not necessarily represent the views of the CEC, its employees, or the State of California. The CEC, the State of California, its employees, contractors, and subcontractors make no warrant, express or implied, and assume no legal liability for the information in this report; nor does any party represent that the use of this information will not infringe upon privately owned rights. This report has not been approved or disapproved by the CEC nor has the CEC passed upon the accuracy or adequacy of the information in this report.

## ACKNOWLEDGEMENTS

Acknowledgement text goes here.

## PREFACE

Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007) created the Clean Transportation Program. The statute authorizes the California Energy Commission (CEC) to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. Assembly Bill 8 (Perea, Chapter 401, Statutes of 2013) reauthorizes the Clean Transportation Program through January 1, 2024, and specifies that the CEC allocate up to \$20 million per year (or up to 20 percent of each fiscal year's funds) in funding for hydrogen station development until at least 100 stations are operational.

The Clean Transportation Program has an annual budget of about \$100 million and provides financial support for projects that:

- Reduce California's use and dependence on petroleum transportation fuels and increase the use of alternative and renewable fuels and advanced vehicle technologies.
- Produce sustainable alternative and renewable low-carbon fuels in California.
- Expand alternative fueling infrastructure and fueling stations.
- Improve the efficiency, performance and market viability of alternative light-, medium-, and heavy-duty vehicle technologies.
- Retrofit medium- and heavy-duty on-road and nonroad vehicle fleets to alternative technologies or fuel use.
- Expand the alternative fueling infrastructure available to existing fleets, public transit, and transportation corridors.
- Establish workforce-training programs and conduct public outreach on the benefits of alternative transportation fuels and vehicle technologies.

To be eligible for funding under the Clean Transportation Program, a project must be consistent with the CEC's annual Clean Transportation Program Investment Plan Update. The CEC issued *solicitation number, or agreement number if not via competitive solicitation to describe purpose of solicitation/agreement*. In response to *solicitation number*, the recipient submitted an application which was proposed for funding in the CEC's notice of proposed awards *date of NOPA* and the agreement was executed as *agreement number* on *date of execution*.

*Note: If needed, insert a blank page so that the Abstract begins on the left side in two-page electronic view (same side as the cover page).*

## ABSTRACT

Abstract text goes here.

**Keywords:** (Required for all Commission Reports/Papers)

Citation is required for all reports/papers.

If there is no Acknowledgements page, the citation goes at the bottom of the Preface page; if there is no Preface, the citation goes on the reverse side of the credits page.

Please use the following citation for this report:

Author(s) Last Name, First Name, subsequent author(s) are First Name Last Name. 202X. *Title of Report*. California Energy Commission. Publication Number: CEC-600-202X-XXX.

*Note: If needed, insert a blank page so that the Table of Contents begins on the left side in two-page electronic view (same side as the cover page).*

# TABLE OF CONTENTS

	Page
Acknowledgements (Optional) .....	i
Preface.....	ii
Abstract (Required for all Commission Reports/Papers) .....	iii
Table of Contents.....	v
List of Figures.....	v
List of Tables .....	v
Executive Summary.....	1
Executive Summary Subheading.....	1
Executive Summary Sub-subheading, If You Absolutely Need It (But Don't Push It.) .....	1
CHAPTER 1: Why Is This Paper Important.....	2
Heading 3: Please Read This Paper .....	3
Heading 4: This Is a Good Paper .....	3
Glossary .....	5
APPENDIX A: Name of Appendix.....	A-1
Appendix Subheading.....	A-1
Appendix Sub-subheading.....	A-1

# LIST OF FIGURES

	Page
Figure 1: Text Goes Here in Title Case .....	3

# LIST OF TABLES

	Page
Table 1: Text Goes Here in Title Case.....	4

*Note: If needed, insert a blank page so that Executive Summary begins on the left side in two-page electronic view (same side as the cover page).*

## EXECUTIVE SUMMARY

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*Note: If needed, insert a blank page so that Chapter 1 begins on the left side in two-page electronic view (same side as the cover page).*

# CHAPTER 1: Why Is This Paper Important

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## Heading 3: Please Read This Paper

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## Heading 4: This Is a Good Paper

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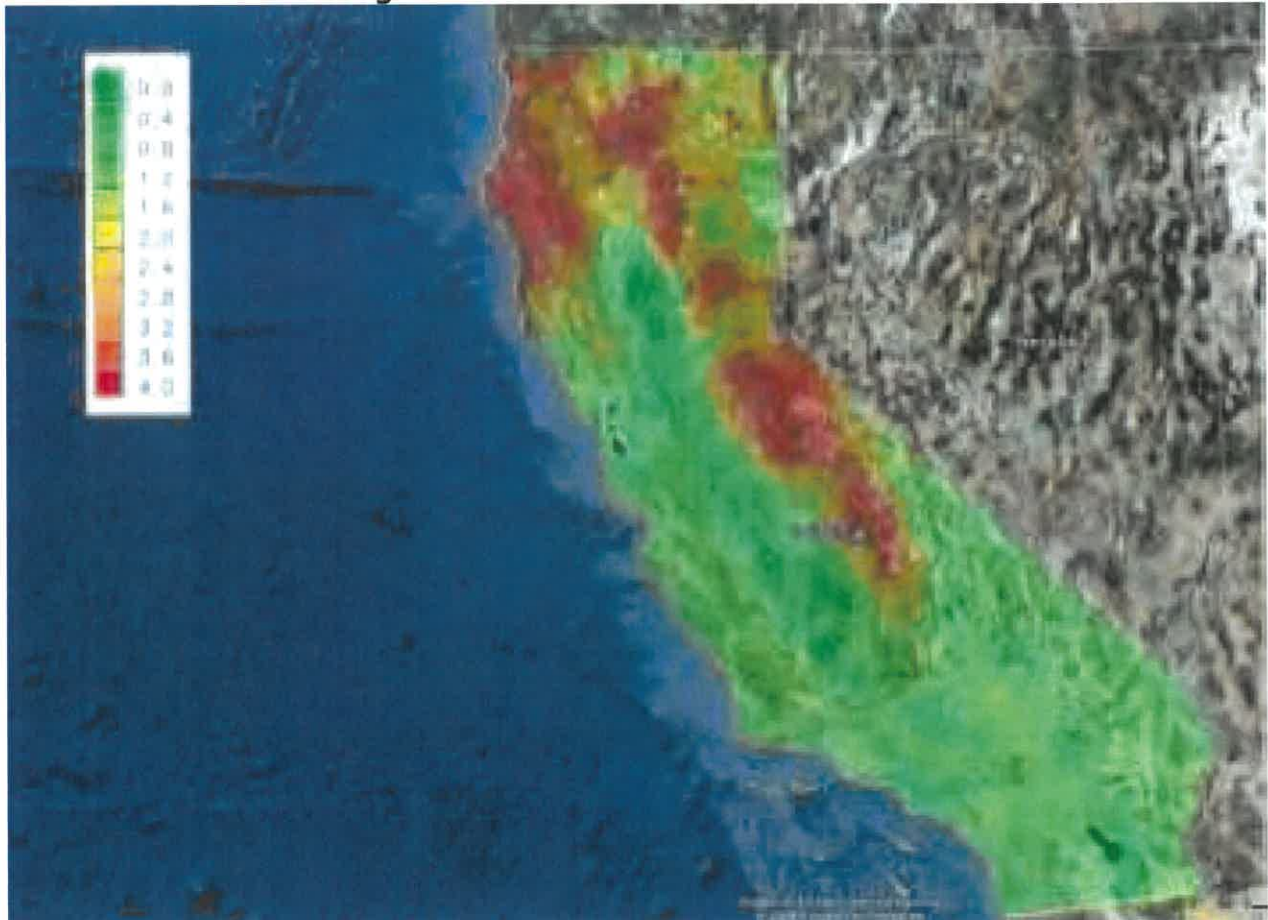
## Heading 5: Are You Interested Yet?

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## *Heading 6: Use Only If Necessary!*

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**Table 1: Text Goes Here in Title Case**

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Data 1	Data 2	Data 3	Data 4	Data 5

Source: California Energy Commission staff

## GLOSSARY

(These are typical glossary entries. modify this section based on the contents of your report)

**ALTERNATING CURRENT (AC)**—Flow of electricity that constantly changes direction between positive and negative sides. Almost all power produced by electric utilities in the United States moves in current that shifts direction at a rate of 60 times per second.

*(Entries found in the [the CEC glossary web page](https://www.energy.ca.gov/resources/energy-glossary), <https://www.energy.ca.gov/resources/energy-glossary>, do not require footnote citations)*

**BATTERY ELECTRIC VEHICLE (BEV)**—Also known as an “All-electric” vehicle (AEV), BEVs utilize energy that is stored in rechargeable battery packs. BEVs sustain their power through the batteries and therefore must be plugged into an external electricity source in order to recharge.

**CALIFORNIA DEPARTMENT OF TRANSPORTATION (Caltrans)**—Responsible for the design, construction, maintenance, and operation of the California State Highway System, as well as that portion of the Interstate Highway System within the state's boundaries.<sup>2</sup>

*(Entries that aren't listed in the CEC online glossary use footnotes, like the one above, to cite the most credible source available)*

**CALIFORNIA ENERGY COMMISSION (CEC)**—The state agency established by the Warren-Alquist State Energy Resources Conservation and Development Act in 1974 (Public Resources Code, Sections 25000 et seq.) responsible for energy policy. The Energy Commission's five major areas of responsibilities are:

1. Forecasting future statewide energy needs
2. Licensing power plants sufficient to meet those needs
3. Promoting energy conservation and efficiency measures
4. Developing renewable and alternative energy resources, including providing assistance to develop clean transportation fuels
5. Planning for and directing state response to energy emergencies.

**COMPRESSED NATURAL GAS (CNG)**—Natural gas that has been compressed under high pressure, typically between 2,000 and 3,600 pounds per square inch, held in a container. The gas expands when released for use as a fuel.

**DIRECT CURRENT (DC)**—A charge of electricity that flows in one direction and is the type of power that comes from a battery.

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<sup>2</sup> [Department of Transportation glossary webpage https://dot.ca.gov/az.html](https://dot.ca.gov/az.html)

# APPENDIX A: Name of Appendix

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**Instructions:**

**Determine if the final project report you are working on is considered a backlog report which would use the Abbreviated Publishing Procedure Routing Log. (The abbreviated process is to be discontinued when the backlog project is finished)**

**If not, continue with the Publishing Procedure Routing Log and add the name of the appropriate supervisor. (for projects "active" in PIMS on 4/1/2019 and later)**

**After selecting a log, delete these instructions and the unnecessary version of the routing log. Turn on tracked changes and create a comment tied to the "ROUTING LOG" below. Then continue to follow the [E-routing instructions](#).**

**ROUTING LOG****Abbreviated Publishing Procedure Routing Log**

<b>Publication Approval Chain</b>	<b>@Mention:</b>
Supervisor	<a href="#">Wendell Krell</a> (for supervisor)
Office Manager	N/A
Media Office	N/A
Legal	N/A
Deputy/Small Office Director	<a href="#">Melanie Vail</a>
OGA (if report is legislatively mandated)	N/A
Executive Office	N/A
Lead Commissioner	N/A

Route to Spencer Kelley and Wendell Krell after John Butler approves the report for publication.

**Publishing Procedure Routing Log**

<b>Publication Approval Chain</b>	<b>@Mention:</b>
Supervisor	List FTD Supervisor Here
Office Manager	N/A
Media Office	<a href="#">Carol Robinson</a> , <a href="#">Lana McAllister</a>
Legal	N/A
Deputy/Small Office Director	<a href="#">Melanie Vail</a>
OGA (if report is legislatively mandated)	N/A
Executive Office	<a href="#">Gaylene Cooper</a>
Lead Commissioner	N/A

Route to Spencer Kelley after the Executive Office approves the report for publication.



## 1. REPLACE INTERNAL MIXED LIQUOR RECYCLE (IMLR) PUMPS

The internal mixed liquor recycle (IMLR) pumps are used to transfer mixed liquor from the downstream end of each aeration basin back to the anoxic zone at the upstream end of the aeration basin. Process modeling shows the existing pumps are too small and the removal of additional nitrogen from the system requires returning more flow to the front of the aeration basins. Currently, there are no provisions for monitoring or control of the IMLR flow. To optimize nitrogen removal, the IMLR pumps must be flow paced in proportion to the influent flow to the basins. This will be achieved by adding a VFD drive and submersible magnetic flow meter for each pump and integrating the pump controls into the plant Supervisory Control and Data Acquisition (SCADA) system. The flow increase for the South Plant requires replacing the 12" IMLR pipe with a 14" IMLR pipe to keep the head condition on the low-head propeller pumps within a reasonable range.

There is no space in the existing MCCs at either plant to accommodate VFD drives for the IMLR pumps. In the North plant, the VFDs will be located on the wall opposite MCC-05-01 in the lower blower gallery. In the South Plant, the VFDs will be located on the wall opposite MCC-06-01, even though this space was intended for the future Phase IV Expansion. Like the RAS pumps, the immediate need is a higher priority than the possible future need in the Phase IV Expansion, which will be re-evaluated as part of the next wastewater master plan.

Replacing the IMLR pumps for each plant would consist of the following:

- North Plant - Replace the existing (5) IMLR pumps with new (5) wall pumps rated at 3.0 Mgal/d at 2.3 feet, 4.9 hp each.
- South Plant - Replace the existing (5) IMLR pumps with new (5) wall pumps rated at 4.0 Mgal/d at 2.0 feet, 6.5 hp each. Replace 12" stainless steel IMLR pipe with new 14" stainless steel IMLR pipe.
- Provide (5) 10 hp wall-mount VFDs at each plant.
- Miscellaneous piping, instrumentation, SCADA, and electrical work.

Project costs for the for replacement of the IMLR pumps at the North and South Plants are presented in **Table A-3**.

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

## APPENDIX B

Table A-3 Project Costs for Replacement of IMLR Pumps at Both Plants

Description	Cost
IMLR Pump Systems	\$ 1,101,000
Subtotal	\$ 1,101,000
Bonds/Mobilization/Demobilization	6%
Bonds/Mobilization/Demobilization	\$ 66,000
Subtotal	\$ 1,167,000
Contingency	20%
Contingency	\$ 233,000
Total	\$ 1,400,000
Engineering Design	6% \$ 84,000
Manteca Staff Costs	6% \$ 84,000
Engineering Services During Construction	6% \$ 84,000
Construction Management and Inspection	15% \$ 211,000
Total Project Cost	\$ 1,863,000

## 2. FIX FLOW SPLIT TO THE NORTH PLANT AERATION BASINS

WQCF staff have reported poor performance when sending the desired 44% of the total influent flow to the North plant. As a result, plant staff sends less flow to the North Plant, which puts more stress on the South Plant. The North plant is known to have a poor flow split between the aeration basins and this is thought to be the primary cause of the poor performance; however, there may be other contributing factors that have not been identified. The flow split for the North Plant is accomplished with downward opening weir gates on the side of the aeration basin influent channel. Because the basins were constructed at different times and were a retrofit of the original primary clarifiers, the influent channel has a 24" step in the bottom of the channel where the old Parshall Flume was installed and the outlet gates vary in size from 3 feet wide to 6 feet wide. Evenly splitting flow under variable flow conditions with this arrangement is impossible.

The proposed fix is to install a fiber reinforced plastic (FRP or fiberglass) box and weir around each gate inside the aeration basin. The same weir length would be provided for all aeration basins and all weirs would be at the same elevation.

Project costs for the for installation of the FRP weir boxes to fix the flow split for the North Plant are presented in **Table A-4**.

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

## APPENDIX B

Table A-4 Project Costs for Fixing Flow Split in North Plant

Description	Cost
Flow Splitter Boxes	\$ 157,000
Subtotal	\$ 157,000
Bonds/Mobilization/Demobilization	6%
Bonds/Mobilization/Demobilization	\$ 9,000
Subtotal	\$ 166,000
Contingency	20%
Contingency	\$ 33,000
Total	\$ 199,000
Engineering Design (1)	
	25% \$ 50,000
Manteca Staff Costs	
	6% \$ 12,000
Engineering Services During Construction	
	6% \$ 12,000
Construction Management and Inspection	
	16% \$ 31,000
Total Project Cost	\$ 304,000
Notes: 1) Design cost is higher in proportion to construction cost because of extensive hydraulic modeling required for this alternative.	

## RFP: WQCF CAPACITY IMPROVEMENTS

## APPENDIX B

**3. ADD NEW INDEPENDENT MIXING SYSTEM TO ZONE B**

Section 3 recommends lowering the air flow to Zone B of each aeration basin even further than currently practiced to reduce the dissolved oxygen (DO) level in the zone and thereby improve denitrification. Currently, when the air is turned down to its lowest level, there is not enough mixing in the zone and the mixed liquor solids begin to settle. To counter this, a separate mixing system for Zone B that is independent of the air flow to the zone is needed. The new mixing system must be compatible with the existing fine bubble diffuser system. Propeller mixers, such as used for Zone A would damage the diffuser system and will, therefore, not work in Zone B.

The proposed mixing system for Zone B that is compatible with the existing diffusers is an intermittent coarse bubble compressed gas mixing system. This system uses high pressure air with nozzles and valves to create large bubbles that mix the tank. The mixing is controlled independent of the aeration air flow. A separate system with control panel for each plant would be provided.

Installing a separate mixing system for Zone B of each aeration basin would consist of the following:

- Coarse bubble mixing system in each plant.
- Miscellaneous small diameter high pressure air piping.
- Miscellaneous instrumentation, SCADA, and electrical work.

Project costs for the for installation of the Zone B mixing systems are presented in **Table A-5**.

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

## APPENDIX B

Table A-5 Project Costs for Zone B Mixing System in All Aeration Basins

Description	Cost
Zone B Mixing	\$ 1,213,000
Subtotal	\$ 1,213,000
Bonds/Mobilization/Demobilization	6%
Bonds/Mobilization/Demobilization	\$ 73,000
Subtotal	\$ 1,286,000
Contingency	20%
Contingency	\$ 257,000
Total	\$ 1,543,000
Engineering Design	6% \$ 93,000
Manteca Staff Costs	6% \$ 93,000
Engineering Services During Construction	6% \$ 93,000
Construction Management and Inspection	15% \$ 230,000
Total Project Cost	\$ 2,052,000

## RFP: WQCF CAPACITY IMPROVEMENTS

## APPENDIX B

#### 4. ADD PROCESS AERATION CONTROL TO IMPROVE MONITORING AND CONTROL OF DENITRIFICATION

The existing aeration control system monitors and does a good job of controlling Dissolved Oxygen (DO) in each aerobic zone of the aeration basins. However, oxidation reduction potential (ORP), ammonia, and nitrate are not monitored. WQCF plant staff have installed temporary ORP, ammonia, and nitrate probes in a few basins to help diagnose issues with meeting nitrate limits. The monitoring of ORP, ammonia, and nitrate in each basin is critical to optimizing the performance of each aeration basin and quickly identifying operational issues with the basins. The temporary monitoring program set up by WQCF staff needs to be expanded to permanent installations in all 10 basins. Because the South Plant was recently retrofitted with new HACH 1000 controllers, probes only and no new controllers are needed for the South Plant. The North Plant will require new probes and HACH 4500 controllers.

The ORP signal from Zone B would be used to control the air flow to Zone B. The ammonia and nitrate probes will be used to monitor nitrogen removal through the process.

In addition to the process control instrumentation, properly controlling the air flow to very low levels requires replacing the existing 4" air flow control valves for Zone B with 2" or 3" air flow control valves.

Adding additional process control and monitoring of each aeration basin would consist of the following:

- Replace 4" air flow control valves with 2" air flow control valves (10) total.
- North Plant – install (5) SC4500 controllers, (5) ORP probes in Zone B, (5) Nitrate/NH4 probes in Zone B.
- South Plant – install (5) ORP probes in Zone B, (5) Nitrate/NH4 probes in Zone B.
- Miscellaneous piping, instrumentation, SCADA, and electrical work.

Project costs for the for installation of additional process aeration control and monitoring are presented in **Table A-6**.

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

## APPENDIX B

Table A-6 Project Costs for Additional Process Aeration Control and Monitoring

Description	Cost
Process Aeration Control	\$ 537,000
Subtotal	\$ 537,000
Bonds/Mobilization/Demobilization	6%
Bonds/Mobilization/Demobilization	\$ 32,000
Subtotal	\$ 569,000
Contingency	20%
Contingency	\$ 114,000
Total	\$ 683,000
Engineering Design	6% \$ 41,000
Manteca Staff Costs	6% \$ 41,000
Engineering Services During Construction	6% \$ 41,000
Construction Management and Inspection	15% \$ 102,000
Total Project Cost	\$ 908,000

## EXHIBIT 1

**Insurance Requirements for Professional Services****INSURANCE REQUIREMENTS**

Consultants shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Consultant, his agents, representatives, employees or subcontractors.

**Minimum Limits of Insurance:** Coverage shall be at least as broad as:

**Commercial General Liability**

- Commercial General Liability Insurance with \$2,000,000 minimum limit per occurrence.
- If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.
- Commercial General Liability Additional Insured Endorsement naming the following as insured **on 2001 or earlier issued endorsement forms:**  
*"City of Manteca, its officers, officials, employees, agents, and volunteers".*

**Automobile Liability**

If the vehicles are brought onto city facilities, covering any auto, or of Contractor has no owned autos, hired, and non-owned autos, the Contractor shall maintain automobile liability with limits no less than:

- Automobile Liability Insurance with \$1,000,000 minimum limit per accident for bodily injury and property damage.
- Automobile Liability Additional Insured Endorsement naming the following as additional insured:  
*"City of Manteca, its officers, officials, employees, agents, and volunteers".*

**Worker's Compensation**

As required by the State of California, with Statutory Limits, and Employer's Liability Insurance with limit of no less than \$1,000,000 per accident for bodily injury or disease.

**Professional Liability (Errors and Omissions)**

Insurance appropriate to the Contractor's profession, with limit no less than \$2,000,000 per occurrence or claim, \$2,000,000 aggregate

**Other Insurance Provisions:**

The insurance policies are to contain, or be endorsed to contain, the following provisions:

1. The City of Manteca, its officers, officials, employees, agents and volunteers are to be covered as insured's as respect to: liability arising out of work or operations performed by or on behalf of the Consultant including materials, parts, or equipment furnished in connection with such work operations. General liability coverage can be provided in the form of an endorsement to the Consultant's insurance at least as broad as CG 20 10 and CG 20 37 if completed operations coverage is required.
2. For any claims related to this contract, the Consultant's insurance coverage shall be primary insurance as respects the City, its officers, officials, employees, agents and volunteers. Any insurance or self-insurance maintained by the City, its officers, officials, employees, agents or volunteers, shall be excess of the Consultant's insurance and shall not contribute with it.

## APPENDIX D

3. The applicant's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.
4. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the City of Manteca.

**Verification of Coverage**

Consultant shall furnish the City with original certificates and amendatory endorsements or copies of the applicable policy language effecting coverage required by this clause. All certificates and endorsements are to be received and approved by the Entity before work commences. However, failure to obtain the required documents prior to the work beginning shall not waive the Consultant's obligation to provide them. The City of Manteca reserves the right to require complete, certified copies of all required insurance policies, including endorsements required by these specifications, at any time.

**Notice of Cancellation**

Each insurance policy required above shall provide that coverage shall not be canceled, except with notice to the Entity.

**Acceptability of Insurers**

Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A:VII, unless otherwise acceptable to the City of Manteca

**Waiver of Subrogation**

Consultant hereby grants to The City of Manteca a waiver of any right to subrogation which any insurer of said Consultant may acquire against the Entity by virtue of the payment of any loss under such insurance. Consultant agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation, but this provision applies regardless of whether or not the Entity has received a waiver of subrogation endorsement from the insurer.

**Subcontractors**

Consultant shall require and verify that all subcontractors maintain insurance meeting all the requirements stated herein, and Contractor shall ensure that The City of Manteca is an additional insured on insurance required from subcontractors.

**SPECIAL RISKS OR CIRCUMSTANCES**

The City of Manteca reserves the right to modify these requirements based on the nature of the risk, prior events, insurance coverage, or other special circumstances.

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**Secondary Clarifiers****Table of Contents**

PURPOSE.....	3
PROCESS DESCRIPTION .....	4
RELATIONSHIP TO OTHER EQUIPMENT .....	10
OPERATION AND DESCRIPTION .....	11
Center Feed Column.....	12
Drive Unit .....	12
Energy Dissipation Inlet (EDI).....	12
Feedwell.....	12
Sludge Rake Arms .....	12
Ducking Skimmer.....	12
Rotating Scum Pipe.....	13
Effluent Weir.....	13
Effluent Launch.....	13
Pressure Relief Valves.....	13
Secondary Clarifier Specifications .....	14
Power Distribution.....	15
Operational Parameters.....	16
Design Criteria .....	20
Operational Considerations and Process Control.....	21
CONTROLS AND INSTRUMENTATION .....	22
Clarifier Drive Control Description .....	22
Clarifier Drive Status and Alarms.....	23
Rotating Scum Pipe.....	23
MONITORING AND MAINTENANCE .....	26
Safety.....	26

Routine Operations ..... 27

Preventative Maintenance ..... 28

STARTUP/SHUTDOWN PROCEDURES ..... 29

    General Procedures..... 29

    Pre-Startup Procedures..... 29

    Startup Procedures ..... 30

    Shutdown Procedures..... 32

POTENTIAL PROBLEMS AND TROUBLESHOOTING ..... 35

    Process Troubleshooting ..... 35

    Mechanical Troubleshooting ..... 35

**Tables**

Table 7-1 Northside Secondary Clarifiers Specifications ..... 14

Table 7-2 Southside Secondary Clarifiers Specifications ..... 14

Table 7-3 Northside Facility Power Distribution Information ..... 15

Table 7-4 Southside Facility Power Distribution Information ..... 16

Table 7-5 Northside Secondary Clarifiers Design Criteria ..... 20

Table 7-6 Southside Secondary Clarifiers Design Criteria ..... 20

Table 7-7 Clarifier Drive Unit Control Summary ..... 22

Table 7-8 Clarifier Drive Unit Status and Alarm Summary ..... 23

Table 7-9 Rotating Scum Pipe Control Summary ..... 23

Table 7-10 Clarifier Routine Operation Tasks ..... 27

Table 7-11 Clarifier Preventative Maintenance Schedules ..... 28

Table 7-12 Troubleshooting Guide ..... 35

**Figure**

Figure 7-1 Northside Secondary Clarifiers Plan View ..... 5

Figure 7-2 Southside Secondary Clarifiers Plan View ..... 6

Figure 7-3 Secondary Typical Section View ..... 7

Figure 7-4 Southside Clarifier Splitter Box Plan and Section View ..... 8

Figure 7-5 Secondary Clarifier Process Flow Schematic ..... 9

Figure 7-6 Northside Facility Secondary Clarifier Rotating Scum Pipe LCP ..... 24

Figure 7-7 Southside Facility Secondary Clarifier Rotating Scum Pipe LCP ..... 24

## PURPOSE

The purpose of the secondary clarifiers is to separate settleable solids from aeration basin effluent, also known as mixed liquor, leaving a high-quality secondary effluent. Suspended solids in the mixed liquor settle to the bottom while the clarified effluent overtops a weir into a collection trough for conveyance to downstream processes. Effective operation of the secondary clarifiers is critical for the WQCF to produce effluent that complies with BOD, TSS, and nitrogen requirements of the NPDES permit.

The secondary clarifiers are one component of the secondary treatment process, also known as the Activated Sludge process. Other major systems include the Aeration Basins and RAS/WAS Pump Stations.

Operation of these systems require a significant degree of monitoring and adjustment to ensure that the overall Activated Sludge process is performing well. This chapter provides detail regarding proper operation of the secondary clarifiers. Refer to the following chapters for information on other secondary treatment facilities.

- Chapter 6 – Aeration Basins
- Chapter 8 – RAS/WAS Pump Stations
- Chapter 9 – Secondary Process Control

A process flow diagram illustrating how these systems interact with one another is presented in Chapter 9 – Secondary Process Control.

## PROCESS DESCRIPTION

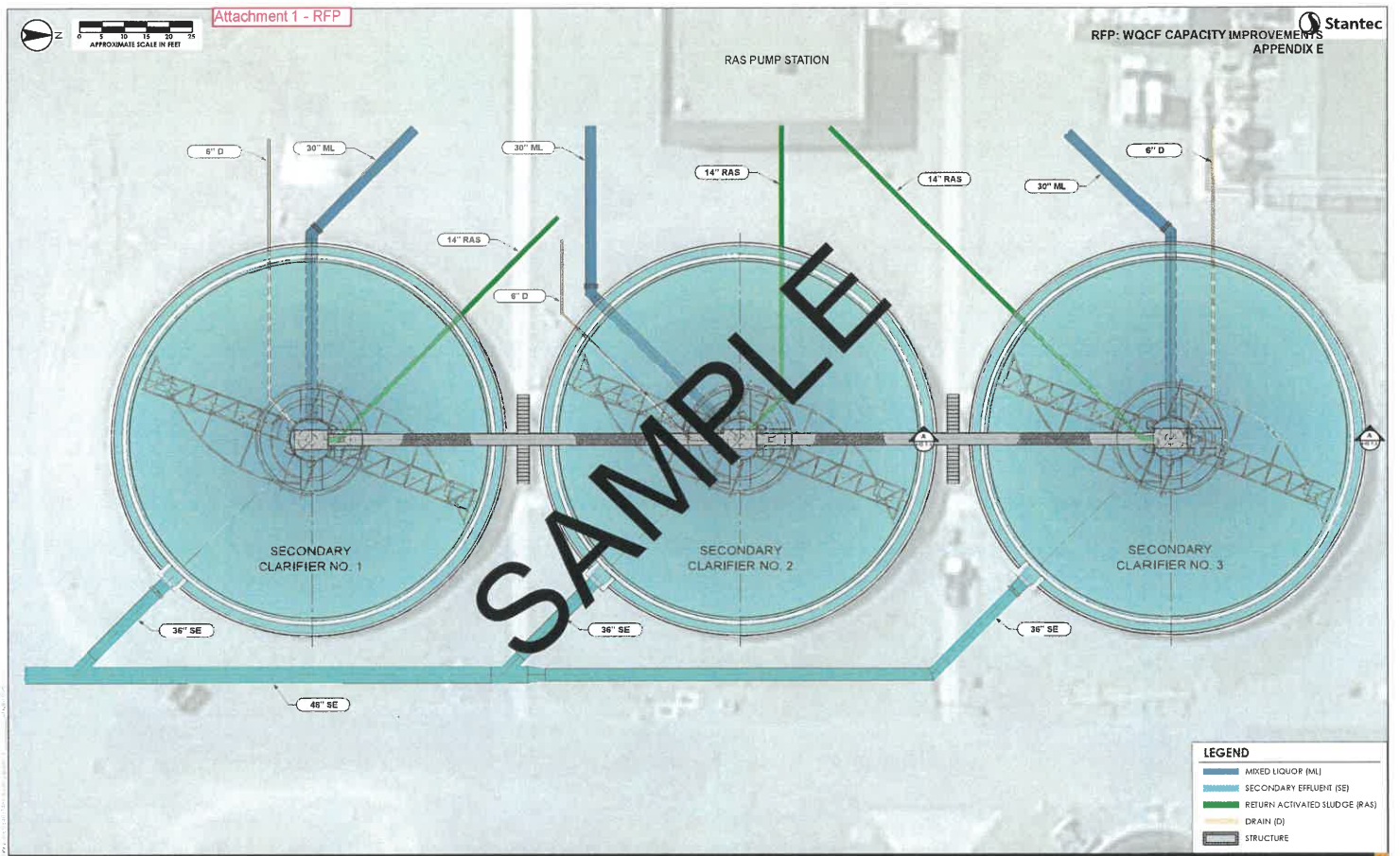
There are five total secondary clarifiers at the Manteca WQCF: three at the Northside Facility (ME0901, ME0902, and ME0903) and two at the Southside Facility (CLAR-07-01 and CLAR-07-02). All the clarifiers are similar in configuration and operation.

The secondary clarifiers are circular concrete tanks with a center drive mechanism supported on a stationary center-feed influent column. Mixed liquor influent from the aeration basins enters the secondary clarifiers through the influent column in the center of each unit where energy dissipation occurs. Suspended solids in the mixed liquor settle to the bottom while the clarified effluent overtops a peripheral weir into an effluent launder for conveyance downstream. Sludge and scum collection systems remove settleable and floatable solids.

At the Northside Facility, mixed liquor is fed directly from the effluent channel for Aeration Basins 1-5 to the clarifiers. At the aeration basins, Secondary Clarifier No.1 and No. 3 have isolation gate valves and Secondary Clarifier No.2 has two isolation stem gates (STPG-05-01 and -02). See Chapter 06 for additional information.

At the Southside Facility, mixed liquor from Aeration Basins 6-10 flows through the Southside Secondary Clarifiers Splitter Box prior to entering the clarifiers. The splitter box is a 25-foot-square concrete structure equipped with two weir gates (WIRG-07-01 through -04) that is designed to promote even splitting of the flow to each of the two active clarifiers and two future clarifiers. A layout of the splitter box is presented in Figure 7-4.

**NOTE:** Refer to Figure 7-1 Northside Secondary Clarifiers Plan, Figure 7-2 Southside Secondary Clarifiers Plan, Figure 7-3 Secondary Clarifiers Typical Section, Figure 7-4 Southside Secondary Clarifier Splitter Box Plan and Section, Figure 7-5 Secondary Clarifiers Process Flow Schematic.



Attachment 1 - RFP

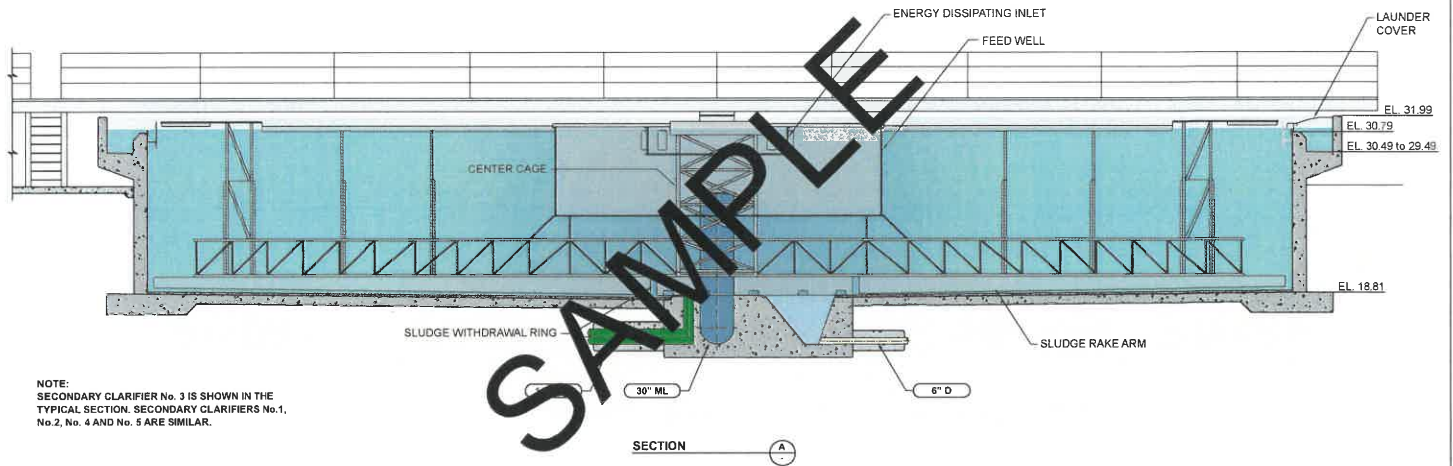
RFP: WQCF CAPACITY IMPROVEMENTS  
APPENDIX E  
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Figure 7-1  
Northside Secondary Clarifier Plan View








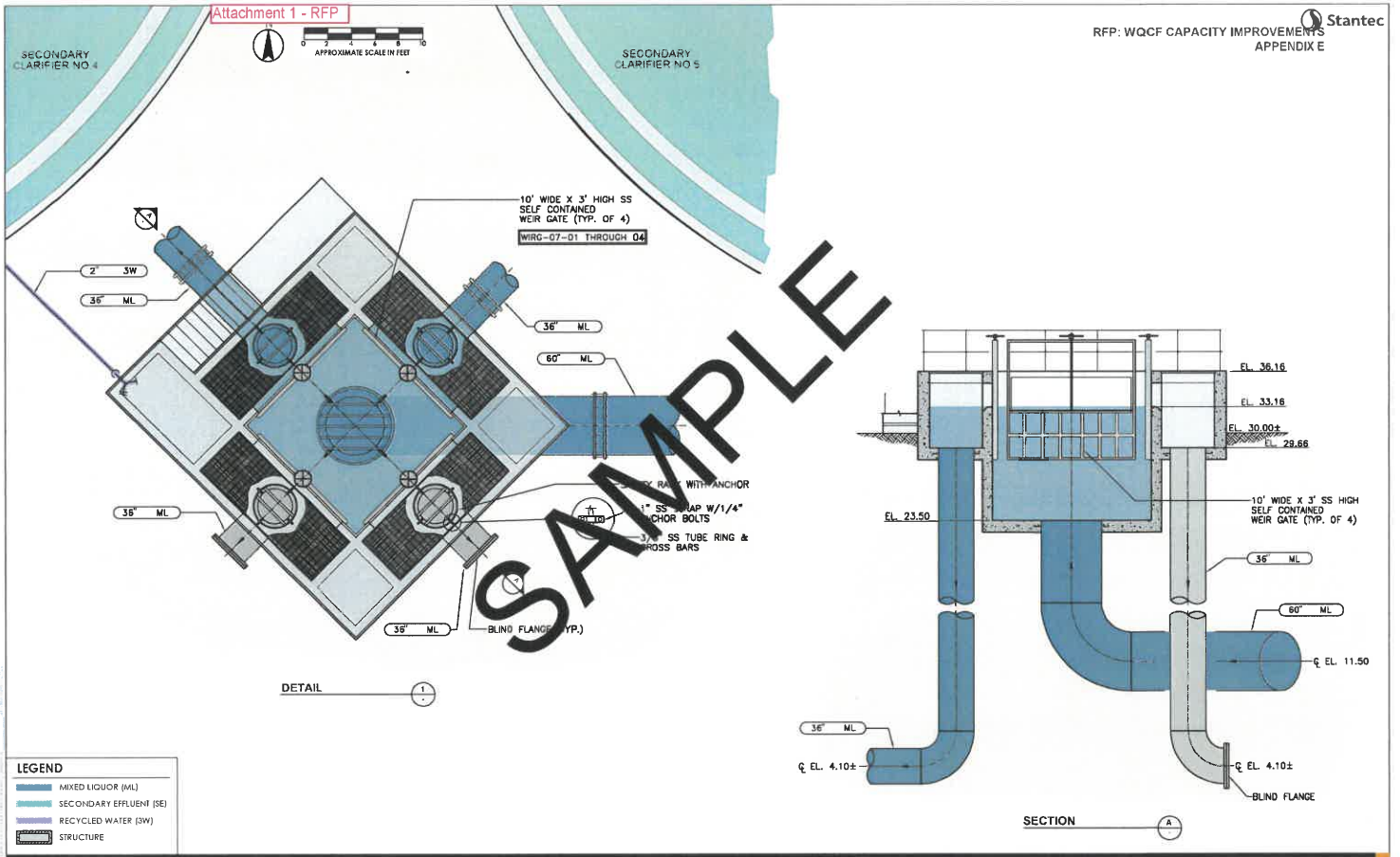
Attachment 1 - RFP

RFP: WQCF CAPACITY IMPROVEMENTS  
APPENDIX E 



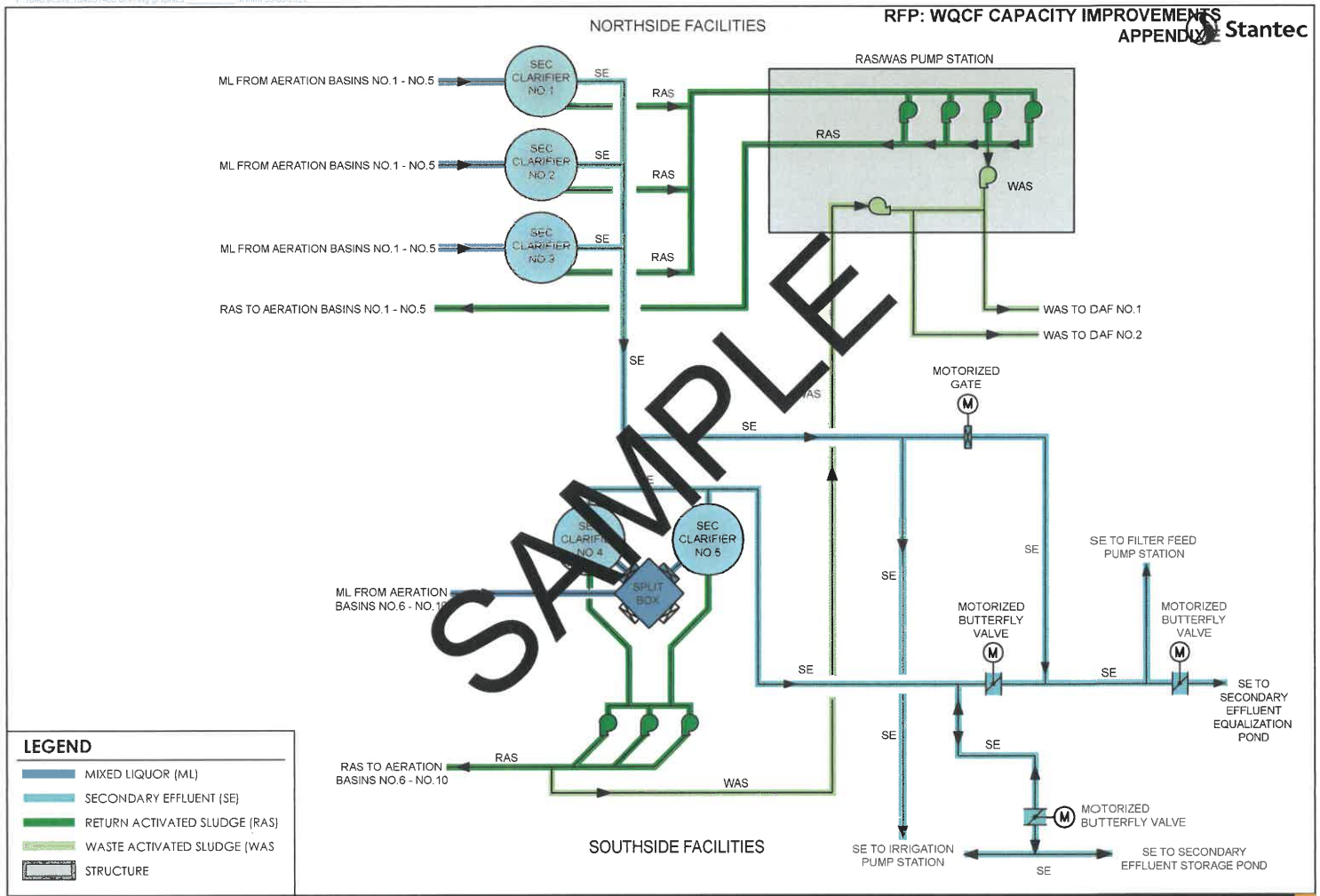
NOTE:  
SECONDARY CLARIFIER No. 3 IS SHOWN IN THE  
TYPICAL SECTION. SECONDARY CLARIFIERS No.1,  
No.2, No. 4 AND No. 5 ARE SIMILAR.

LEGEND	
	MIXED LIQUOR (ML)
	SECONDARY EFFLUENT (SE)
	RETURN ACTIVATED SLUDGE (RAS)
	DRAIN (D)
	STRUCTURE



Attachment 1 - RFP

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**LEGEND**

- MIXED LIQUOR (ML)
- SECONDARY EFFLUENT (SE)
- RETURN ACTIVATED SLUDGE (RAS)
- WASTE ACTIVATED SLUDGE (WAS)
- STRUCTURE

**DRAFT**

Figure 7-5  
Secondary Clarifiers Schematic

## RELATIONSHIP TO OTHER EQUIPMENT

*Inflow* to the Northside Secondary Clarifiers No. 1, No. 2, and No. 3 includes:

- Mixed liquor effluent from Aeration Basin 1-5 effluent channel that is delivered to each clarifier by gravity.

*Outflow* from the Northside Secondary Clarifiers No. 1, No. 2, and No. 3 includes

- Secondary clarifier effluent that is delivered to the Filter Feed Pump Station and/or Secondary Effluent Equalization Pond by gravity.
- Sludge that is delivered to the RAS/WAS Pump Station by gravity.
- Floating solids (scum) that are delivered to the plant sewer system by gravity.

*Inflow* to the Southside Secondary Clarifiers No.4 and No.5 includes:

- Mixed liquor effluent from Aeration Basin 6-10 effluent channel that is routed through the Southside Secondary Clarifier Splitter Box to each clarifier by gravity.

*Outflow* from the Southside Secondary Clarifiers No.4 and No.5 includes:

- Secondary clarifier effluent that is delivered to the Filter Feed Pump Station and/or Secondary Effluent Equalization Pond by gravity.
- Sludge that is delivered to the RAS Pump Station by gravity.
- Floating solids (scum) that are delivered to the plant sewer system by gravity.

## OPERATION AND DESCRIPTION

This section describes the primary components of the secondary clarifiers that are listed below.

- Center Feed Column
- Drive Unit
- Energy Dissipation Inlet (EDI)
- Feedwell
- Sludge Rake Arms
- Ducking Skimmer
- Rotating Scum Pipe
- Effluent Weir
- Launder
- Pressure Relief Valves

**NOTE:** The "Clarifier Mechanism" refers to the collective rotating assembly consisting of the drive unit, EDI, feedwell, sludge rake arms, and ducking skimmer.

**CENTER FEED COLUMN**

The center feed column is a structural pipe that supports the rotating clarifier mechanism. Mixed liquor influent enters the secondary clarifier through the bottom and is discharged into the EDI through openings near the top of the column

**DRIVE UNIT**

The drive unit is a large turntable-type gear unit that is powered by a constant speed motor through a speed reducer and shear pin coupling. The drive unit has a manually adjustable VFD for the motor.

The drive unit is mounted to the top of the center feed column. A center cage that is hung from the unit provides structural support for the EDI, feedwell, sludge rake arms, and ducking skimmer.

**ENERGY DISSIPATION INLET (EDI)**

The energy dissipation inlet (EDI) is a cylindrical drum with a sealed bottom designed to disperse high velocity mixed liquor flow from the center feed column in a low velocity, tangential direction into the feedwell. This promotes maximum flocculation and gentle mixing without disturbing the settled solids at the floor of the clarifier basin.

**FEEDWELL**

The feedwell is a larger diameter circular FRP drum surrounding the center feed column and EDI. Mixed liquor swirls slowly through the feedwell and eventually exits from the open bottom to the remainder of the clarifier without disturbance or formation of velocity currents. Baffled openings located near the water surface allow scum to exit the feedwell.

**SLUDGE RAKE ARMS**

Clarifiers are equipped with sludge rake arms with spiral shaped blades and adjustable squeegees. The spiral blades rotate and are designed to push settled sludge to a sludge withdrawal ring located in the center of the clarifier. An effluent pipe removes collected sludge from the sludge withdrawal ring.

**DUCKING SKIMMER**

The ducking skimmer is a flat plate surface skimmer connected to the sludge rake arms. As the clarifier mechanism rotates, the skimmer collects floating solids and directs them into a rotating scum pipe located at the water surface. The skimmer has a hinged arm that allows it to "duck" under the rotating scum pipe during each revolution of the clarifier mechanism.

### ROTATING SCUM PIPE

The rotating scum pipe is a slotted pipe near the water surface that extends radially from the clarifier feedwell to the inner wall of the concrete tank. Scum is directed into the slots by the ducking skimmer.

A drive motor rotates the pipe, which allows the slots to modulate between completely unsubmerged to partially submerged depending on the amount of scum that needs to be collected.

Scum that enters the rotating pipe flows by gravity to an effluent line that discharges into the plant sewer system.

### EFFLUENT WEIR

A V-notch weir is mounted around the periphery of the clarifier tank at the water surface. Incoming mixed liquor forces the clarifier effluent to overtop the weir and flow into the effluent launder.

### EFFLUENT LAUNDER

A rectangular cross-section concrete effluent launder is built into the inside perimeter of the concrete tank. The launder is sloped to a collection box for collection and discharge of the flow through the secondary effluent pipe.

### PRESSURE RELIEF VALVES

Hydrostatic pressure relief valves in recessed pockets in the clarifier floor protect the clarifier structure from damage caused by "floating" when the clarifier is empty and groundwater levels are high.

**SECONDARY CLARIFIER SPECIFICATIONS**

Details and specifications for the secondary clarifiers are presented in Table 7-1 and Table 7-2.

**Table 7-1 Northside Secondary Clarifiers Specifications**

Description	Specifications
<b>Secondary Clarifier No.1, No.2, and No.3 (ME0901, ME0902, and ME0903)</b>	
Diameter, ft	85
Side Water Depth, ft	12
Surface Area, ft <sup>2</sup>	5,675
Volume, ft <sup>3</sup>	68,090
Type	Center Feed, Peripheral Overflow
Clarifier Drive Manufacturer, Model	Westec, Model XXX
Clarifier Drive Motor Size	1 HP
Rotating Scum Pipe Manufacturer, Model	Simco, Model XXX
Rotating Scum Pipe Motor Size	1 HP
Mixed Liquor Influent Pipe Diameter, in	30
Secondary Effluent Pipe Diameter, in	36
Sludge Effluent Pipe Diameter, in	14
Scum Effluent Pipe Diameter, in	4

**Table 7-2 Southside Secondary Clarifiers Specifications**

Description	Specifications
<b>Secondary Clarifiers No.4 and No.5 (CLAR-07-01 and CLAR-07-02)</b>	
Diameter, ft	110
Side Water Depth, ft	16
Surface Area, ft <sup>2</sup>	9,503
Volume, ft <sup>3</sup>	152,053
Type	Center Feed, Peripheral Overflow
Clarifier Drive Manufacturer, Model	Westech, Model XXX
Clarifier Drive Motor	1 HP
Rotating Scum Pipe Manufacturer, Model	Westech, Model XXX
Rotating Scum Pipe Motor Size	1 HP
Mixed Liquor Influent Pipe Diameter, in	42
Secondary Effluent Pipe Diameter, in	24
Sludge Effluent Pipe Diameter, in	16
Scum Effluent Pipe Diameter, in	4

**POWER DISTRIBUTION**

Secondary clarifier drive unit motors and rotating scum pipe motors receive 480-volt, 3-phase power from a motor control center (MCC). The MCC receives emergency power from an automatic transfer switch (ATS) located in a distribution switchboard (DSB).

Lighting and receptacles located at each secondary clarifier receive 120-volt, 1-phase power from a panel located in an MCC. The power for the panel is supplied through a step-down transformer (e.g. 480-volts to 120-volts) in the MCC.

Table 7-3 and Table 7-4 present power distribution information for clarifier motors and lighting.

**Table 7-3 Northside Facility Power Distribution Information**

Parameter	Value
<b>Secondary Clarifier No.1, No.2, and No.3 (ME0901, ME0902, and ME0903)</b>	
<b>Motors (Drive Unit and Rotating Scum Pipe)</b>	
Power Supply	480-Volt, 3-Phase
MCC Name	MCC-F
MCC Location	RAS/WAS Building
ATS Name	ATS-12-01
DSB Name	DSB-12-01
ATS/DSB Location	Administration/Laboratory Building
<b>Lighting</b>	
Power Supply	120-Volt, 1-Phase
Panel Name	LPF
MCC Name	MCC-F
MCC Location	RAS/WAS Building

**Table 7-4 Southside Facility Power Distribution Information**

Parameter	Value
<b>Secondary Clarifiers No.4 and No.5 (CLAR-07-01 and CLAR-07-02)</b>	
<b>Motors (Drive Unit and Rotating Scum Pipe)</b>	
Power Supply	480-Volt, 3-Phase
MCC Name	MCC-07-01
MCC Location	Southside MCC/Generator Building
ATS Name	ATS-06-01
DSB Name	DSBE-06-01
ATS/DSB Location	Southside MCC/Generator Building
<b>Lighting</b>	
Power Supply	120-Volt, 1-Phase
Panel Name	DPNL-06-01
MCC Name	MCC-06-01
MCC Location	Southside MCC/Generator Building

**OPERATIONAL PARAMETERS**

Performance of the secondary clarifiers can be affected by monitoring and/or adjusting the following parameters:

1. Hydraulic Retention Time (HRT)
2. Solids Loading Rate (SLR)
3. Surface Overflow Rate (SOR)

These parameters are affected by the influent mixed liquor flow rate and RAS/WAS flow rates. Refer to Chapter 8 – RAS/WAS Pump Stations and Chapter 9 – Secondary Process Control for a complete discussion on the amount of sludge to be returned or wasted and for applicable calculation sheets for the determination of RAS and WAS flow.

**Hydraulic Retention Time (HRT)**

The hydraulic retention time (HRT) represents the time a particle remains in the clarifier and is typically measured in hours. Excessive retention times can lead to septic conditions for the settled sludge.

HRT is a function of clarifier volume and influent flow rate, and is calculated using the following formula:

$$\text{HRT (hrs)} = \frac{[A \text{ (ft}^2\text{)} \times D \text{ (ft)} \times 7.48 \text{ (gal/ft}^3\text{)}] \times [\text{Units}] \times [24 \text{ (hrs/day)}]}{[Q_{ML} \text{ (gal/day)}]}$$

where:

- A = Clarifier Surface Area (ft<sup>2</sup>)  
 D = Sidewater Depth (ft)  
 Units = Number of Clarifier Units in Operation (-)  
 Q<sub>ML</sub> = Influent Mixed Liquor Flow Rate (gal/day)

Because the secondary clarifiers at the Northside and Southside Facilities have different dimensions, their HRTs need to be calculated and evaluated independently. The following presents an example calculation for the HRT at the Northside Facility when the influent flow is 4,785,000 gpd (9.75 mgd peak flow split evenly between the Northside and Southside Facilities) and all three Northside Facility clarifiers are operating.

$$\text{HRT} = \frac{[5,670 \text{ ft}^2 \times 12 \text{ ft} \times 7.48 \text{ gal/ft}^3] \times [3 \text{ Units}] \times [24 \text{ hrs/day}]}{[4,785,000 \text{ gal/day}]}$$

$$\text{HRT} = 2.7 \text{ hours}$$

**Solids Loading Rate (SLR)**

The solids loading rate (SLR) is a function of the mass of solids entering the clarifier and the clarifier surface area, and is calculated using the following formula:

$$\text{SLR (lb/ft}^2\text{/day)} = \frac{[Q_i \text{ (mgd)} + Q_{\text{RAS}} \text{ (mgd)}] \times [\text{MLSS (mg/L)}] \times [8.34 \text{ (lb/gal)}]}{[A \text{ (ft}^2\text{)}] \times [\text{Units}]}$$

where:

$Q_i$	=	Influent Mixed Liquor Flow Rate (mgd)
$Q_{\text{RAS}}$	=	RAS Flow Rate (mgd)
MLSS	=	Mixed Liquor Suspended Solids Concentration (mg/L)
A	=	Clarifier Surface Area (ft <sup>2</sup> )
Units	=	Number of Clarifier Units in Operation (-)

Because the secondary clarifiers at the Northside and Southside Facilities have different dimensions, their SLRs need to be calculated and evaluated independently. The following presents an example calculation for the SLR at the Northside Facility when the influent flow is 4.875 mgd, 2.375 mgd peak flow split evenly between the Northside and Southside Facilities, a RAS flow rate is 50% of influent flow, MLSS concentration is 3000 mg/L, and all three Northside Facility clarifiers are operating.

$$\text{SLR} = \frac{[4.875 \text{ mgd} + 2.375 \text{ mgd}] \times [3,000 \text{ mg/L}] \times [8.34 \text{ (lb/gal)}]}{[5,675 \text{ ft}^2] \times [3 \text{ Units}]}$$

$$\text{SLR} = 10.5 \text{ lb/ft}^2\text{-day}$$

**Surface Overflow Rate (SOR)**

The surface overflow rate (SOR) is a function of the clarifier effluent flow rate and the clarifier surface area, and is calculated using the following formula:

$$\text{SOR (gal/ft}^2\text{ - day)} = \frac{[Q_E \text{ (gal/day)}]}{[A \text{ (ft}^2\text{)}] \times [\text{Units}]}$$

where:

$Q_E$	=	Clarifier Effluent Flow Rate (gal/day)
A	=	Clarifier Surface Area (ft <sup>2</sup> )
Units	=	Number of Clarifier Units in Operation (-)

Because the secondary clarifiers at the Northside and Southside Facilities have different dimensions, their SORs need to be calculated and evaluated independently. The following presents an example calculation for the SOR at the Northside Facility when the influent flow is 4,785 mgd (9.57 mgd peak flow split evenly between the Northside and Southside Facilities) and all three Northside Facility clarifiers are operating.

$$\text{SOR} = \frac{[4,785,000 \text{ gal/day}]}{[5,675 \text{ ft}^2 \times [3 \text{ Units}]}$$

$$\text{SOR} = 281 \text{ gal/ft}^2\text{ - day}$$

**DESIGN CRITERIA**

The design for secondary clarifiers is typically based on hydraulic overflow rates and solids loading rates. Recommended and design overflow rates and solids loading rates for the secondary clarifiers are presented in Table 7-5 and Table 7-6.

**Table 7-5 Northside Secondary Clarifiers Design Criteria**

Condition	Surface Overflow Rate (gal/ft <sup>2</sup> -day)	Solids Loading Rate (lb/ft <sup>2</sup> -day) <sup>a</sup>
<b>Secondary Clarifier No.1, No.2, and No.3 (ME0901, ME0902, and ME0903)</b>		
<b>Average Flow (4.94 mgd)</b>		
Recommended value	400 to 600	14 to 24
Design value with one unit out of service	435	17
<b>Peak Flow (9.57 mgd)</b>		
Recommended value	800 to 1,000	38
Design value	560	22
Design value with one unit out of service	840	31

**Table 7-6 Southside Secondary Clarifiers Design Criteria**

Condition	Surface Overflow Rate (gal/ft <sup>2</sup> -day)	Solids Loading Rate (lb/ft <sup>2</sup> -day) <sup>a</sup>
<b>Secondary Clarifiers No.4 and No.5 (CLAR-07-01 and CLAR-07-02)</b>		
<b>Average Flow (4.94 mgd)</b>		
Recommended value	400 to 600	14 to 24
Design value with one unit out of service	520	17
<b>Peak Flow (9.57 mgd)</b>		
Recommended value	800 to 1,000	38
Design value	505	19
Design value with one unit out of service	1,010	38

The solids loading rates presented in these tables assume an MLSS concentration of 3,000 mg/L and a recycle ratio of 50% of influent flow. Refer to Chapter 9 – Secondary Process Control for additional information on MLSS and recycle ratio.

## OPERATIONAL CONSIDERATIONS AND PROCESS CONTROL

The Operator should control the RAS flow rate to maintain a sludge blanket at an average depth of 1 to 2 feet to prevent anaerobic conditions. Refer to Chapter 9 – Secondary Process Control for details on controlling the RAS flow rate.

The sludge blanket is monitored using a “Sludge Judge” by doing the following:

1. Slowly lower the Sludge Judge to the bottom of the clarifier tank. The float valve opens, allowing liquid to enter the column.
2. When the Sludge Judge touches the bottom and the column has been filled to the surface level, tug slightly on the rope as the unit is raised. This sets the check valve, trapping the liquid inside.
3. After the unit has been raised clear of clarifier water surface, the amount of solids in the sample can be read using the 1-foot (0.31-meter) increments marked on the column sections.
4. To release the material in the unit, touch the pin extending from the bottom section against a hard surface. This opens the check valve to drain the sample.



**IMPORTANT:** Measure the sludge blanket depth at approximately the same time each shift to account for daily variations in influent flow rate. The sludge blanket depth will change as the influent flow rate changes.

## CONTROLS AND INSTRUMENTATION

This section describes the general configuration and logic for secondary clarifier power, mechanical controls, and instrumentation. Refer to the drawings and literature furnished by equipment manufacturers for additional details.

### CLARIFIER DRIVE CONTROL DESCRIPTION

Controls for each clarifier drive unit are identical. Operation of the drive unit is done manually by local control panels (LCPs) located adjacent to the drive unit motor (at the end of the clarifier bridge). There is no automatic or remote control functionality. A clarifier runs continuously if turned on. The MCC serves as the main disconnect for power to the drive unit, but the clarifier cannot be started from the MCC or SCADA.

Each clarifier includes a torque-control system that protects the clarifier drive mechanism from an overload condition, such as an excessive amount of solids or debris in the tank. If a HIGH TORQUE condition (100% torque) is detected, an operator alarm is triggered. At a preset TORQUE OVERLOAD (20%), an interlock shuts down the drive unit to prevent damage.

Table 7-7 presents a summary of clarifier drive unit controls. Additional discussion is provided below.

**Table 7-7 Clarifier Drive Unit Control Summary**

Facility	Location	Control/Action
Northside	Secondary Clarifier No. 1 Drive Unit LCP (XXXX)	START pushbutton LOCKOUT-STOP pushbutton
	Secondary Clarifier No. 2 Drive Unit LCP (XXXX)	
	Secondary Clarifier No. 3 Drive Unit LCP (XXXX)	
	RAS/WAS Building (MCC-07-01)	Main disconnect
Southside	Secondary Clarifier No. 4 LCP (XXXX)	START pushbutton
	Secondary Clarifier No. 5 LCP (XXXX)	LOCKOUT-STOP pushbutton
	Southside MCC/Generator Building (MCC-06-01)	Main Disconnect



**IMPORTANT:** Do not start the drive with an excessive amount of solids in the tank. Do not attempt to continue running when a high-torque condition is detected: find the trouble and correct it. Do not operate if ice forms or builds-up on inside of tank wall.

**Clarifier Drive Control Narrative**

1. When the START pushbutton is pressed, the clarifier runs continuously unless there is a TORQUE OVERLOAD (120% torque) condition. A HIGH TORQUE (100% torque) condition does not stop the clarifier.
2. When the LOCKOUT-STOP pushbutton is pressed, the clarifier stops.

**CLARIFIER DRIVE STATUS AND ALARMS**

The status and alarms for the secondary clarifiers is provided in the following table.

**Table 7-8 Clarifier Drive Unit Status and Alarm Summary**

Facility	Sensor	Indication/Alarm
Northside	Secondary Clarifier No. 1 High Torque (XXXX)	SCADA alarm/display
	Secondary Clarifier No. 2 High Torque (XXX)	
	Secondary Clarifier No. 3 High Torque (XXX)	
Southside	Secondary Clarifier No. 4 High Torque (XXXX)	SCADA alarm/display
	Secondary Clarifier No. 5 High Torque (XXXX)	

**ROTATING SCUM PIPE**

Table 7-9 presents a summary of rotating scum pipe controls. Additional discussion is provided below.

**Table 7-9 Rotating Scum Pipe Control Summary**

Facility	Location	Control/Action
Northside	Secondary Clarifier No. 1 Rotating Scum Pipe LCP (XXXX)	HOA switch Timer LOW, MIDDLE, HIGH switches LOWER and RAISE pushbuttons STOP pushbutton COUNT RESET pushbutton ON/OFF switch
	Secondary Clarifier No. 2 Rotating Scum Pipe LCP (XXXX)	
	Secondary Clarifier No. 3 Rotating Scum Pipe LCP (XXXX)	
	RAS/WAS Building (MCC-07-01)	Main disconnect
Southside	Secondary Clarifier No. 4 Rotating Scum Pipe LCP (XXXX)	HOA switch Timer LOW, MIDDLE, HIGH switches LOWER and RAISE pushbuttons STOP pushbutton COUNT RESET pushbutton ON/OFF switch
	Secondary Clarifier No. 5 Rotating Scum Pipe LCP (XXXX)	
	Southside MCC/Generator Building (MCC-06-01)	Main Disconnect

**Rotating Scum Pipe Control Description**

Controls for each rotating scum pipe are identical. Operation of the unit is done manually by local control panels (LCPs) located near the rotating scum pipe motor. There is no remote control functionality. The MCC serves as the main disconnect for power to the rotating scum pipe, but the unit cannot be started from the MCC or SCADA.

At the Northside Facility, the LCPs are located on the side of the clarifier tank under the clarifier walkway. At the Southside Facility, the LCPs are located along the clarifier walkway. Figure 7-7 and Figure 7-8 present typical rotating scum pipe LCP configurations for the Northside and Southside Facilities.

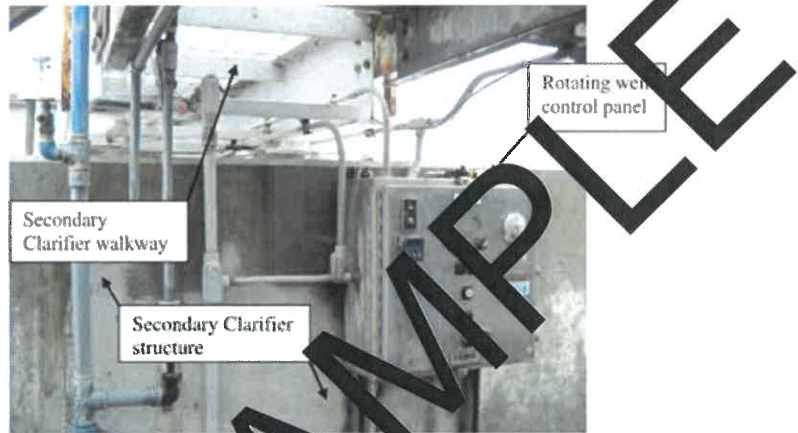


Figure 7-6 Northside Facility Secondary Clarifier Rotating Scum Pipe LCP

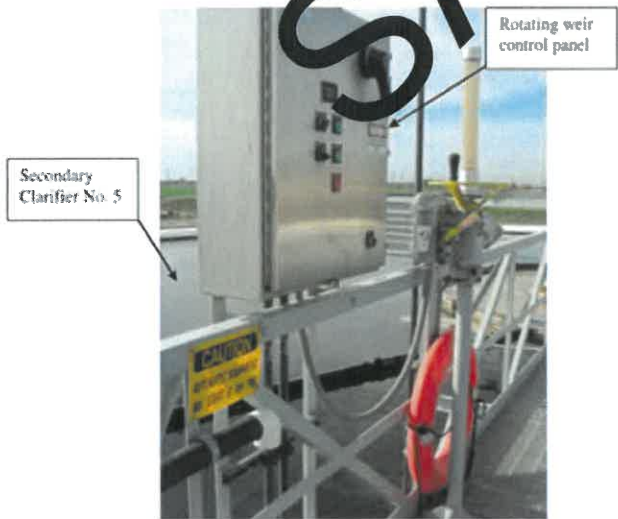


Figure 7-7 Southside Facility Secondary Clarifier Rotating Scum Pipe LCP

**Rotating Scum Pipe Control Narrative**

1. When the ON/OFF switch is ON, the panel receives power and the system runs as summarized below. When the ON/OFF switch is OFF, the panel does not receive power and the system does not run.
2. When the HOA switch is set to HAND, the LOWER and RAISE pushbuttons are used to rotate the scum pipe to a desired setting.
3. When the HOA switch is set to OFF, the scum pipe does not rotate.
4. When the HOA switch is set to AUTO, the scum pipe rotates automatically on a cycle based on the timer setting. The LOW, MIDDLE, HIGH switch is used to select how much the scum pipe rotates in each cycle. Pressing the STOP pushbutton stops the system.
5. Pressing the COUNT RESET pushbutton resets the cycle count to zero.

SAMPLE

## MONITORING AND MAINTENANCE

The following sections contain step-by-step procedures for operation and maintenance of the secondary clarifiers.



**IMPORTANT:** Before attempting to operate the equipment in any mode, the operator should be thoroughly familiar with the purpose and descriptions of the process components, with control and instrumentation functionality, with all pertinent safety considerations, and with the respective equipment manufacturer's operation and maintenance instructions.

For detailed instructions on procedures, repairs, or parts lists associated with operation and recommended maintenance items, refer to the manufacturer's Operations and Maintenance manual.

### SAFETY

The following are some of the fundamental safety precautions that should be observed when operating or maintaining the secondary clarifiers. As part of the plant's safety program, the operators should develop a comprehensive list of safety procedures for the process based on appropriate reference materials and their own experience.

1. Be sure that all gratings, safety shields, or other guards are properly installed.
2. Position all local and motor starter control switches to OFF or STOP and perform proper lockout/tagout procedures when working on equipment.
3. Keep all water hoses and power cords rolled up and properly stored.
4. Anyone entering the area should be wearing adequate PPE for the work being performed. This includes, but is not limited, items such as safety glasses, safety shoes, or hard hats.
5. Locate "WARNING" signs to alert people of moving parts. Keep hands, clothing, and other items that may snag away from all moving parts.
6. Keep all flammable or explosive materials away from the equipment area at all times.
7. Report all potential safety hazards to the Operations Supervisor.

**ROUTINE OPERATIONS**

Table 7-10 presents recommended routine operation tasks and intervals.

**Table 7-10 Clarifier Routine Operation Tasks**

Interval	Task
Daily	<ol style="list-style-type: none"> <li>1. Check sludge blanket depths <b>twice per day</b> and record results on daily round sheet. Refer to "Process Control" section.</li> <li>2. Perform secchi disc readings and record results in MSO (day shift only).</li> <li>3. Check clarifier mechanism and rotating scum pipe for proper operation.</li> <li>4. Spray down foam, as necessary.</li> <li>5. Check automatic sampler for proper operation.</li> <li>6. Keep the area clean and free from trash and debris.</li> <li>7. Keep the cooling surfaces of electric motors clean.</li> <li>8. Replace burned-out light bulbs or safety lights.</li> <li>9. Keep all gratings, access covers, and safety shields in place.</li> </ol>
Weekly	<ol style="list-style-type: none"> <li>1. Spray down effluent launder.</li> <li>2. Grease the main gear and bearing. Use recommended lubricants.</li> <li>3. Apply spray oil to drag box plunger (or as required).</li> <li>4. Examine all bearing parts of clarifier mechanism for excessive wear.</li> <li>5. Test limit switches on the torque control system of the clarifier mechanism.</li> <li>6. Check that all bolts and nuts are tight, and that original adjustments and adjustments are maintained.</li> </ol>
Monthly	<ol style="list-style-type: none"> <li>1. Grease Cyclo reducer, upper bearing, and lower bearing in clarifier mechanism. Use recommended lubricants.</li> <li>2. Check the torque overload alarm.</li> <li>3. Drain water trap.</li> </ol>

**PREVENTATIVE MAINTENANCE**

Secondary clarifiers require a certain amount of preventative maintenance. Table 7-11 presents a quick-reference summary of recommended preventative maintenance intervals and maintenance items taken from the manufacturer's O&M manual.



**IMPORTANT:** For detailed instructions on procedures, repairs, or parts lists associated with recommended maintenance items, refer to the manufacturer's Operations and Maintenance manual.

**Table 7-11 Clarifier Preventative Maintenance Schedules**

Maintenance Interval	Recommended Inspection or Maintenance
Daily	<ol style="list-style-type: none"> <li>1. Oil torque box plunger.</li> <li>2. Check oil level in drive gear reducer.</li> <li>3. Inspect and test torque box limit switches.</li> <li>4. Clean motor vents and area around motor and drive.</li> <li>5. Check for algae growth in the launders and wash as needed to remove buildup on launder walls and floor.</li> <li>6. Check for grease and scum buildup in the clarifier and spray towards rotating scum pipe, as needed.</li> </ol>
Monthly	<ol style="list-style-type: none"> <li>1. Check for any loose fasteners or hardware.</li> <li>2. Check drives for noise, unusual vibration or wear, and condensation. Drain-off any condensation and refill oil.</li> </ol>
Quarterly	<ol style="list-style-type: none"> <li>1. Check mounting hardware.</li> <li>2. Check downers and baffle piece hardware.</li> </ol>
Yearly	<ol style="list-style-type: none"> <li>1. Disassemble and perform a complete wash down.</li> <li>2. Check all fasteners between the rake arms and cage.</li> <li>3. Remove rust, or badly corroded steel members. Paint as required.</li> <li>4. Check the squeegees for wear and damage.</li> <li>5. Change oil in main drive unit and refill.</li> <li>6. Inspect gears and bearings for wear if teardown is indicated.</li> <li>7. Inspect condition of scum box connectors.</li> <li>8. Grease motor bearings.</li> <li>9. Check coating on clarifier mechanism and re-coat as necessary.</li> </ol>
As Required	<ol style="list-style-type: none"> <li>1. Perform maintenance per equipment Manufacturer's O&amp;M Manual.</li> </ol>

## STARTUP/SHUTDOWN PROCEDURES

Secondary clarifiers may be added or removed from service to accommodate influent flow variations or required maintenance. However, certain steps must be taken to ensure proper operation of upstream and downstream processes. The following sections outline general startup and shutdown procedures but should not preclude using common sense or knowledge gained through experience.



**IMPORTANT:** ALWAYS lock-out and tag-out equipment before performing maintenance or repairs.

### GENERAL PROCEDURES

The following procedures provide general guidance for startup or shutdown of a secondary clarifier:

1. Be alert and check for general safety hazards that could cause bodily injury or equipment damage as a result of performing process modifications. Undertake any required corrective action before proceeding with work.
2. Determine how the startup or shutdown of a secondary clarifier will affect other parts of the process and any other process.
3. Prepare the equipment for startup according to instructions in the manufacturer's O&M manuals.

### PRE-STARTUP PROCEDURES

Pre-startup procedures for bringing a clarifier online are summarized below. However, operator experience and knowledge of the equipment being placed into service should prevail over these steps.

1. Check to ensure that all field and panel switches connected with the unit and its associated equipment are initially in the OFF position.
2. Check that mechanical equipment is properly lubricated and ready for operation. Refer to the manufacturer's O&M manual.
3. Check drive alignment and belt tension.
4. Check 3-phase motors for proper rotation. If reverse operation can damage the unit, disconnect the drive linkage before bumping the motor.
5. Supply power to the MCC. See the "Operation and Description" section for location of the MCC and DSB for the Northside and Southside Facilities.

- a. At the MCC DSB, close the main breaker to the MSB.
- b. At the MSB, close the MCC feeder breaker.
- c. At the MCC, position the main breaker to ON.

## STARTUP PROCEDURES

Startup procedures for bringing a clarifier online are summarized below.

1. Inspect the tank and mechanism path for any obstructions and close the clarifier drain valve.
2. Before allowing wastewater into the clarifier, start the drive unit and rotating weir pipe using the START pushbuttons at each respective LCP while the tank is still empty. Operate for several revolutions and monitor carefully for correct rotation and possible interferences.
3. Check the torque box alarm and shutdown settings for correct operation by pushing the hand plunger on the torque box. An alarm should occur at the HIGH TORQUE condition followed by a mechanism shutdown at the TORQUE OVERLOAD condition. Refer to the "Operation and Description" section for torque settings.
4. After the TORQUE OVERLOAD shutdown, press the RESET pushbutton on the drive mechanism LCP to restart the drive. The mechanism should not restart until this pushbutton is pressed. If the unit does not operate at the given settings, check the field wiring for correct installation.
5. Enable SCADA alarms associated with the clarifier.



**IMPORTANT:** Filling a secondary clarifier with secondary effluent may affect FFPS or irrigation flow. Check with the operator of the day before starting to fill the clarifier

6. Begin filling the secondary clarifier that is being placed online by closing the secondary effluent diversion gate and installing slide gates in the irrigation structure to back up secondary effluent.



**IMPORTANT:** While filling the clarifier, it is important to watch the water level in the feedwell carefully. To prevent the feedwell drum from bending, limit the fill rate, which may be achieved during low flow periods or by limiting the RAS flow rate. While the clarifier is filling, if the water level in the drum gets above half full, reduce the fill rate until the water level inside the feedwell recedes. Once the water level inside the clarifier reaches the bottom of the feedwell, it is safe to send water at design flow rates. Always follow manufacturer's latest O&M procedures for startup requirements.

7. When the water in the secondary clarifier that is being placed online is approximately one foot from the effluent weir, reverse the actions taken in Step 5.
6. Direct flow from the aeration basins to the secondary clarifier by manually opening the appropriate isolation valve or gate:
  - a. Secondary Clarifier No. 1 – Open Valve XXX located near the Aeration Basin 1-5 effluent channel.
  - b. Secondary Clarifier No. 2 – Open Stop Gates STP-05-01 and -02 located in the Aeration Basin 1-5 effluent channel.
  - c. Secondary Clarifier No. 3 – Open Valve XXX located near the Aeration Basin 1-5 effluent channel.
  - d. Secondary Clarifier No. 4 – Open Gate (WIR-07-01) located in the Southside Secondary Clarifiers Splitter Box.
  - e. Secondary Clarifier No. 5 – Open Gate (WIR-07-02) located in the Southside Secondary Clarifiers Splitter Box.
7. Start the RAS pump for the secondary clarifier being brought online in MANUAL mode to verify they are operational and then place all switches in AUTO mode. Check the RAS flow rate and adjust as needed. Reference Chapter 8 – RAS/WAS Pump Station for procedure on RAS pump startup.



**IMPORTANT:** Remember, proper start-up and operation depends on one major rule: withdraw solids at the same rate that they are fed into the tank because clarifiers are not designed to store solids.

8. Monitor the development of the sludge blanket. As the solids start to settle, the underflow concentration will begin to increase. At this time, the sludge blanket should start to develop and then rise.
9. For reasonable clarifier performance, the sludge blanket should be 1 to 2 feet deep. Refer to the "Operational Procedures" section for instruction on monitoring the sludge blanket using a Sludge Judge.
10. If the blanket does not develop within a few hours, the underflow withdrawal rate (RAS pumping) is probably too high. Slow down the sludge withdrawal until the blanket starts to appear.
11. If the sludge blanket appears, but the depth continues to increase, then the sludge withdrawal rate must also be increased until a steady state is achieved.

12. At this steady state, the underflow solids mass should be equivalent to the incoming solids mass. If the sludge blanket continues to rise even at maximum sludge withdrawal rates, then the influent feed rate must be decreased (by putting more clarifiers online). Generally, clarifiers are conservatively designed, making this case unlikely.

Refer to Chapter 9 – Secondary Process Control for additional details on maintaining optimal clarifier performance.

### SHUTDOWN PROCEDURES

Shutdown procedures for bringing a clarifier online are summarized below. Two different shutdown procedures are discussed: (1) shutdown without draining, and (2) shutdown with draining.

**NOTE:** Shutting down all secondary clarifiers at either the Northside or Southside Facility requires all flow to be diverted to the other facility for treatment. This should only be attempted if absolutely required. When shutting down one or multiple clarifiers at a plant, careful consideration should be taken for appropriate plant flow splitting and mixed liquor transferring. Refer to Chapter 9 – Secondary Process Control for more information.

**Shutdown Without Draining** – Normally, routine preventative maintenance can be performed without draining the clarifier. In most cases, the drive unit can be left running. However, if power to the drive unit must be shut off, the mechanism should not be stopped for more than 30 minutes.

1. Stop flow from the aeration basins to the secondary clarifier by manually closing the appropriate isolation valve or gate:

a. Secondary Clarifier No. 1 – Close Valve XXX located near the Aeration Basin 1-5 effluent channel.

b. Secondary Clarifier No. 2 – Close Stop Gates STP-05-01 and -02 located in the Aeration Basin 1-5 effluent channel.

c. Secondary Clarifier No. 3 – Close Valve XXX located near the Aeration Basin 1-5 effluent channel.

d. Secondary Clarifier No. 4 – Close Gate (WIRG-07-01) located in the Southside Secondary Clarifiers Splitter Box.

e. Secondary Clarifier No. 5 – Close Gate (WIRG-07-02) located in the Southside Secondary Clarifiers Splitter Box.

2. Stop the drive unit by pressing the LOCKOUT-STOP pushbutton at the drive unit LCP. Stop the rotating weir pipe by placing the HOA switch at the LCP to OFF.
3. Disconnect power to the MCC. See the "Operation and Description" section for location of the MCC and DSB for the Northside and Southside Facilities.
  - a. At the MCC, position the main breaker to OFF.
  - b. At the MSB, open the MCC feeder breaker.
  - c. At the MCC DSB, open the main breaker to the MSB.
4. Reverse Step 1 through Step 3 to place the clarifier back into service. Executing the comprehensive startup procedure is not necessary when performing a shutdown without draining.

**Shutdown with Draining** – This gives facility personnel an opportunity to inspect all parts of the mechanism, perform adjustments and maintenance to submerged components, touch-up paint, and remove uncollected solids in the tank.

**CAUTION:** *If a small amount of liquid is allowed to remain in the tank, it may cover drains in the clarifier floor. Personnel working in the tank should be very careful to first locate and mark drains to avoid injury from accidentally falling or stepping in them. Personnel working in the tank should follow approved Confined Space Entry procedures.*

1. Stop flow from the aeration basins to the secondary clarifier by manually closing the appropriate isolation valve or gate:
  - a. Secondary Clarifier No. 1 – Close Valve XXX located near the Aeration Basin 1-5 effluent channel.
  - b. Secondary Clarifier No. 2 – Close Stop Gates STP-05-01 and -02 located in the Aeration Basin 1-5 effluent channel.
  - c. Secondary Clarifier No. 3 - Close Valve XXX located near the Aeration Basin 1-5 effluent channel.
  - d. Secondary Clarifier No. 4 – Close Gate (WIRG-07-01) located in the Southside Secondary Clarifiers Splitter Box.
  - e. Secondary Clarifier No. 5 – Close Gate (WIRG-07-02) located in the Southside Secondary Clarifiers Splitter Box.
2. Before proceeding with draining the secondary clarifiers, the groundwater table must be checked and dewatering accomplished as necessary to lower the groundwater elevation below the lowest point of the clarifier's foundation. If tanks

are emptied without the groundwater being lowered, cracking of the existing slab is possible. Dewatering should be continued as required to keep the groundwater at a safe level the entire time that the clarifier is empty.

3. Place the associated RAS pump for the secondary clarifier that is being removed from service in MANUAL and continue to pump the sludge out of the secondary clarifier. Refer to Chapter 8 – RAS/WAS Pump Station related to operation of the RAS pumps.
4. When the water level in the clarifier is approximately three feet below the effluent weirs, stop the clarifier drive unit by pressing the LOCKOUT-STOP pushbutton at the LCP and stop the rotating weir pipe by placing the HOA switch to OFF at the LCP.
5. Disconnect power to the MCC. See the "Operation and Description" section for location of the MCC and DSB for the Northside and Southside Facilities.
  - a. At the MCC, position the main breaker to OFF.
  - b. At the MSB, open the MCC feeder breaker.
  - c. At the MCC DSB, open the main breaker to the MSB.
6. When the secondary clarifier is nearly empty, place the associated CAS pump for the secondary clarifier that is being removed from service in OFF. Refer to Chapter 8 – RAS/WAS Pump Station for details related to operation and shutdown of the RAS pumps.
7. Open the clarifier drain valve and use a high-pressure hose to wash any remaining sludge from the tank and mechanism into the drain.
8. Perform equipment maintenance and return to service as soon as possible.

## POTENTIAL PROBLEMS AND TROUBLESHOOTING

### PROCESS TROUBLESHOOTING

Refer to the troubleshooting guide in Chapter 9 – Secondary Process Control to address abnormal process operation associated with the secondary clarifiers such as bulking, rising, or floating sludge.

### MECHANICAL TROUBLESHOOTING

Basic mechanical faults can typically be isolated, verified and corrected using common sense and a few basic procedures. The following table provides a list of potential problems, possible causes, and remedies to expedite any troubleshooting process.

**Table 7-12 Troubleshooting Guide**

Symptom	Possible Cause	Remedy
1) Overload alarm sounds or the drive motor stops	1a) Excessive accumulation of solids in the bottom of the tank resulting from sludge being discharged at an average rate less than the rate of introduction of solids with the feed.	<p>Adjust rate of feed introduction.</p> <ul style="list-style-type: none"> <li>Immediately bypass the feed and open the underflow line to eliminate the accumulation of solids.</li> <li>Allow the mechanism to continue to operate, if possible. If the overload is so heavy that the cutout switch continues to stop the drive, it will be necessary to drain the tank and manually remove the solids.</li> </ul>
	1b) Interference with rake arm operation may also be caused by a foreign object (e.g. rocks, tools, etc.) being dropped into the tank.	<ul style="list-style-type: none"> <li>Stop the mechanism and see if the object can be removed. This may require use of grappling hooks to "fish" the object out.</li> <li>If not successful within a short time, it will be necessary to cut off the influent to prevent too great an accumulation of sludge.</li> <li>If the object cannot be removed with the tank filled, it will be necessary to drain the tank and remove it before operating the mechanism.</li> <li>Check the rake arms for any damage or deformation before resuming operations.</li> </ul>
	1c) A rake arm may be dragging on the bottom of the tank. The arm could be out of alignment or be subject to structure failure.	The tank must be drained and the arm adjusted or repaired.
	1d) A skimmer arm may be dragging on the tank wall	The arm must be adjusted to allow unrestricted movement.

Table 7-12 Troubleshooting Guide (Continued)

Symptom	Possible Cause	Remedy
2) Underflow lines becomes plugged	2a) Too thick underflow.	To clear the line, back flush with high-pressure water until the line is cleared.
	2b) Foreign object in the line causing plugging.	<ul style="list-style-type: none"> <li>Stop the mechanism and see if the object can be removed. (This may have to be done by means of grappling hooks or "fishing the object out").</li> <li>If not successful within a short time, it will be necessary to cut off the influent to prevent too great an accumulation of sludge.</li> <li>If the object cannot be removed with the tank filled, it will be necessary to drain the tank and remove it before operating the mechanism.</li> <li>Check the rake arms for any damage or deformation before resuming operations.</li> <li>Source of trouble must be located and corrected before restarting mechanism.</li> </ul>
3) Motor not rotating	3a) Terminal wires are loose.	3a) Check connections.
	3b) Fuses have been blown	3b) Determine cause of overload and replace fuses.
	3c) Circuit breakers have tripped	3c) Reset and check running amps.
	3d) Burnt windings due to prolonged overload.	3d) Check all that apply; remove cause and replace motor.
	3e) Excessive cold temperatures causing lubricants to flow freely.	3e) Provide temporary heat. Change to lower viscosity lubricants, or make sure to run continuously.
4) Motor overheating	4a) Motor is overloaded	4a) Determine overload cause and remove.
	4b) Motor operating at wrong voltage	4b) Check supply voltage and correct as needed.
5) Motor excessive noise	5a) Coupling misaligned	5a) Align coupling
	5b) Coupling halves too close	5b) Correct gap per specifications
	5c) Worn bearings	5c) Replace worn bearings
	5d) Broken fan	5d) Replace fan
	5e) Bent fan cover	5e) Repair or replace fan
	5f) Loose fasteners	5f) Tighten fasteners
6) Mechanism not turning	6a) Shear pin broken (if provided)	6a) Replace broken shear pin
	6b) Coupling between motor and reducer broken.	6b) Replace broken couplings
	6c) Sheared or slipped key between drive train components.	6c) Replace sheared key

Table 7-12 Troubleshooting Guide (Continued)

Symptom	Possible Cause	Remedy
7) Torque control device not operating correctly	7a) Check adjustment of cams 7b) Check for bent, broken or bound-up parts. 7c) Zeroing screw not set properly 7d) Torque Arm retaining screw bent or broken.	7a) Contact the manufacturer for assistance. 7b) Replace bent or broken parts 7c) Set zeroing screw properly per drawing. 7d) Remove or replace torque arm
8) Reducer or drive running with excessive noise or vibration	8a) Lack of lubrication 8b) Loose fasteners 8c) Loose coupling	8a) Check and add grease/oil as required. 8b) Tighten fasteners 8c) Tighten coupling
9) Reducer overheating	9a) Reducer is overloaded 9b) Incorrect lubricant or quantity	9a) Determine cause of overload 9b) Check for proper lubricant and level
10) Lubricant leakage from reducer	10a) Seal or shaft worn out 10b) Excessive lubricant 10c) Water contamination 10d) Loose reducer fasteners	10a) Repair or replace seal and shaft 10b) Reduce frequency of re-lubrication 10c) Find water contamination source and correct. 10d) Tighten fasteners
11) Main gear/main bearing noise	Lack of lubricant	Check gear teeth and add grease/oil as required.

SAMPLE

# NAMING STANDARDS AND ASSET HIERARCHY

City of Manteca

## Abstract

The objective of this document is to describe the City of Manteca equipment naming conventions for all of the equipment located at the Wastewater Quality Control Facility (WQCF), Water, Waste/Stormwater Collection, and for the Supervisory Control and Data Acquisition (SCADA) system. Updates to the standard are anticipated with most new Capital Improvement Projects (CIP) as new locations and equipment are added.

Revision	Description	Date	By
4.0	Modified Assets	8/8/2019	Public Works, Thomas Mannor
4.1	Modified Assets	11/4/2019	Public Works, Richard Ngo
4.2	Modified Assets	7/13/2020	Public Works, Thomas Mannor
4.3	Modified Assets	9/29/2021	Public Works, Thomas Mannor
4.4	Modified Assets	8/18/2022	Public Works, Thomas Mannor

## RFP: WQCF CAPACITY IMPROVEMENTS APPENDIX F

### 1 Naming Standards and Asset Hierarchy

#### 1.1 Objective

The objective of this document is to describe the City of Manteca equipment naming conventions for all of the equipment located at the Wastewater Quality Control Facility (WQCF), Water, Waste/Stormwater Collection, and for the Supervisory Control and Data Acquisition (SCADA) system. The naming conventions shall be utilized for all upcoming project design drawings, SCADA, Piping and Instrumentation Diagrams (P&ID), Loop Diagrams and other documents used to identify equipment.

This standard is intended to be a living document. Updates to the standard are anticipated with most new Capital Improvement Projects (CIP) as new locations and equipment are added. This standard does not apply to instruments associated with fire alarm, security, and information technology systems, unless these systems are interfacing with the PLC or SCADA systems.

The location hierarchy for the WQCF, Water, and Waste/Stormwater Collection is shown on **Figure 1** and **Figure 2**. This location hierarchy will be used for segments 1 and 2 of the standard equipment naming convention shown in **Figure 3**.

#### 1.2 Engineering Submittals and Equipment Tags

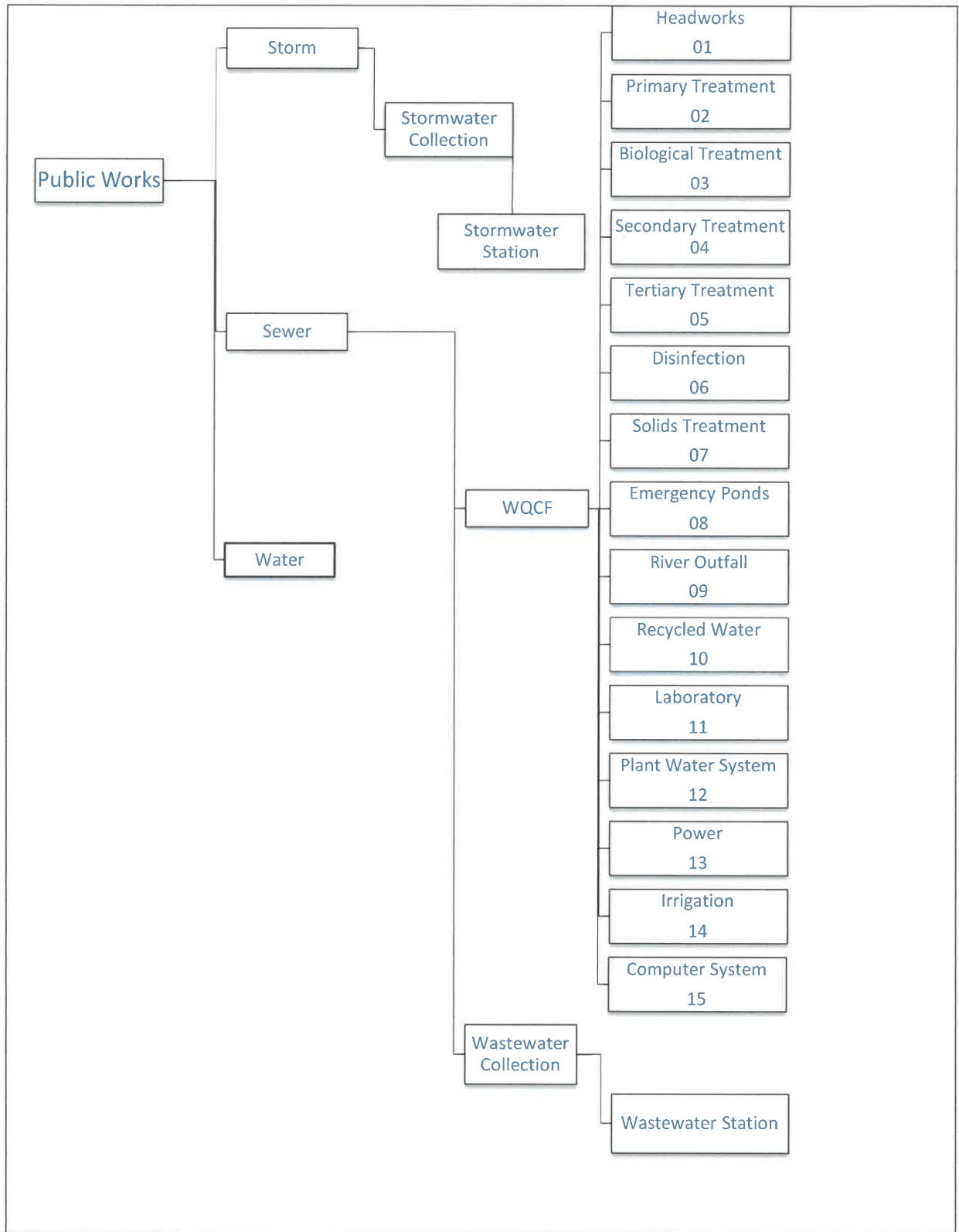
All design drawings, including SCADA submittals shall follow the instructions listed in **Table 1** for each submittal type.

**Table 1 – Submittal Details**

Submittal Type (Format)	Description	Reference
Asset Database (Excel 2010 or comma delimited file)	In addition to Design Drawings, the engineer shall submit an asset database listing all of the equipment/instruments included in the Design Drawings.	The City of Manteca will provide Excel spreadsheet template.
Design Drawings	The Design Drawings shall only utilize segments 3 to 6 of the equipment naming convention identified in this document (see <b>Figure 3</b> ). Tag numbers for instruments identified in P&IDs shall follow the instrumentation tag naming convention identified in <b>Figure 4</b> .	Refer to <b>Figure 3</b> and <b>Figure 4</b> .
SCADA	The Design Drawings shall only utilize segments 3 to 6 of the equipment naming convention identified in this document (see <b>Figure 2</b> ).	Refer to <b>Figure 3</b> .
Equipment Name Plates	The physical name plates for equipment shall only include equipment naming segments 3 to 6. The equipment name plate shall be made of stainless steel. Font shall be engraved or stamped on the name plate and shall be at minimum 16-point, Arial font.	Refer to <b>Figure 3</b> .

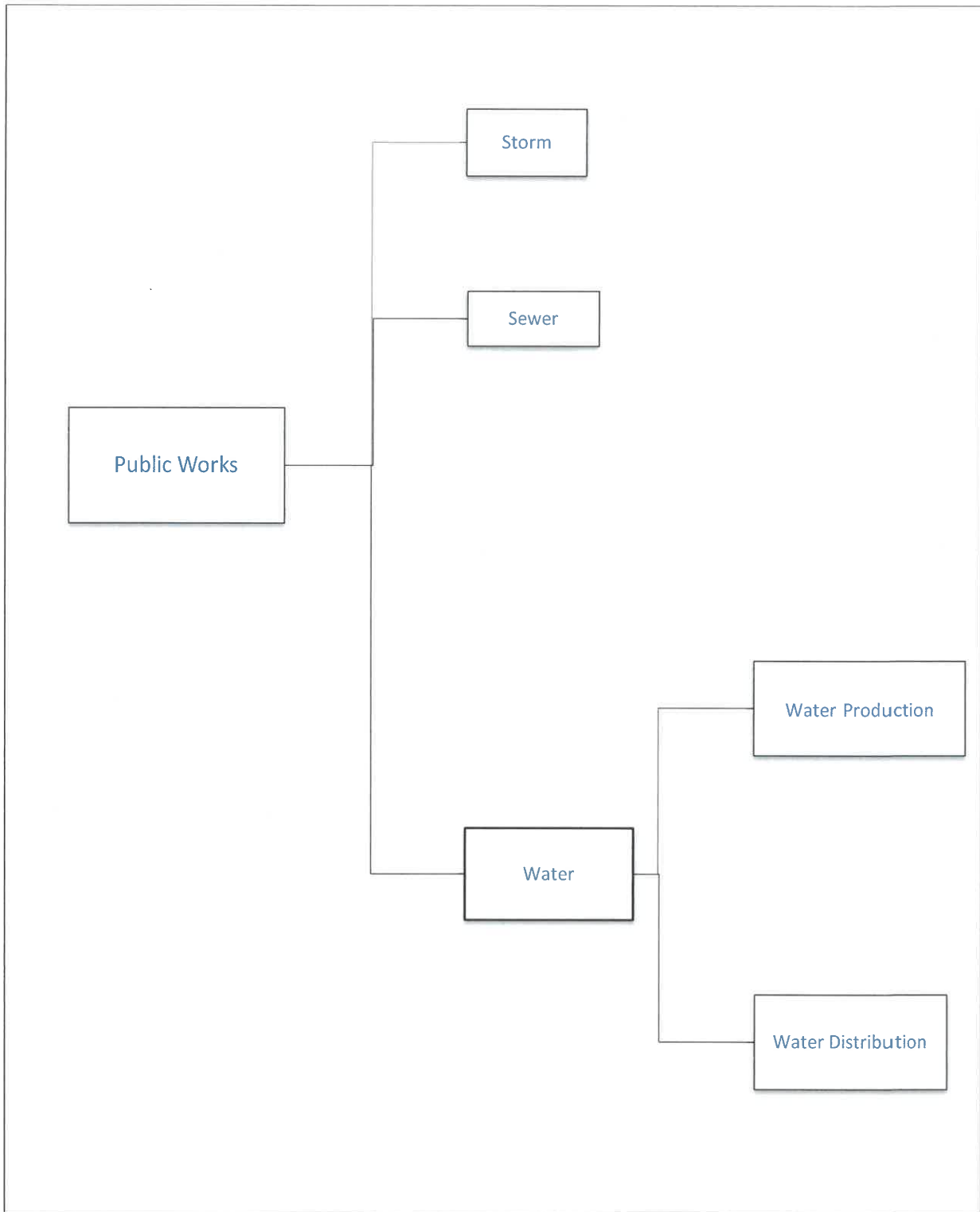
Attachment 1 - RFP

RFP: WQCF CAPACITY IMPROVEMENTS  
Figure 1 – Utilities Location Hierarchy APPENDIX F



RFP: WQCF CAPACITY IMPROVEMENTS  
APPENDIX F

Figure 2 – Utilities Location Hierarchy



RFP: WQCF CAPACITY IMPROVEMENTS  
APPENDIX F

1.3 Description of Standard

The naming standard for the WQCF, Water, and Waste/Stormwater Collection systems are detailed in this section. The equipment naming standard is segmented into six fields with a maximum of four characters per segment as shown in **Figure 3**. The naming standard will apply to facility equipment, process control, SCADA, and field instrumentation. There are some exceptions to the number of segments required, please refer to **Table 1** at the beginning of this document.

Figure 3 – Naming Standard



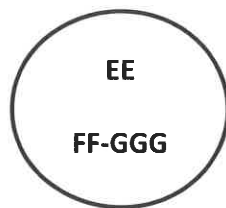
Segment Key

- ① Facility Location
- ② System Location
- ③ Process Abbreviation
- ④ Asset Type
- ⑤ System Code
- ⑥ Sequential Number

The abbreviations for segments 1, 2, 3 and 5 are listed in **Table A, B and C** respectively, and are attached at the end of this document. The abbreviations for segment 4 (facility equipment *Asset Type*) are listed in **Table D**, also attached at the end of this document. Field instrumentation and process control abbreviations for segment 4 shall be based on *ISA-5.1 Identification Letters*, listed in **Table E** (attached at the end of this document). If the *ISA-5.1 Identification Letters* falls under “User’s Choice” the proposed identification letters shall be submitted to Public Works Engineering Department for approval.

The tag numbering for the instrument tags is shown in **Figure 4** below. The tag numbering will be made up of three segments.

Figure 4 – General Instrumentation Symbol with Tag Number



Segment	Key
EE	<i>ISA 5.1 Identification Letter</i>
FF	System Code
GGG	Sequential Number

RFP: WQCF CAPACITY IMPROVEMENTS  
APPENDIX F**1.4 Equipment Naming Examples**

This section presents four equipment naming examples.

**Example 1: Equipment name for a pump located in the solids treatment process area.**

WQCF-SLDT-DIG-PMP-07-001

1. Wastewater Quality Control Facility
2. Solids Treatment
3. Digesters
4. Pump
5. Solids Treatment System Code
6. Facility Equipment number 1

**Example 2: Equipment name for a temperature element located in the solids treatment process area.**

WQCF-SLDT-DIG-TE-07-001

1. Wastewater Quality Control Facility
2. Solids Treatment
3. Digesters
4. Temperature Element
5. Solids Treatment System Code
6. Control Instrument number 1

**Example 3: Equipment name for a pump located in the wastewater station area.**

WWC-WW10-WW-PMP-10-001

1. Wastewater Collection
2. Wastewater Station 10
3. Wastewater
4. Pump
5. Wastewater Station System Code 10
6. Facility Equipment number 1

**Example 4: Equipment name for a generator located in the stormwater station area.**

SWC-SW21-SW-GEN-21-001

1. Stormwater Collection
2. Stormwater Station 21
3. Emergency Power
4. Generator
5. Stormwater Station System Code 21
6. Facility Equipment number 1

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

Table A - WQCF System Location and Abbreviations

## APPENDIX F

① Facility Location	② Systems Location	Process/Sub-System Description	③ Process/Sub-System Abbreviation	④ Asset Type	⑤ System Code	
WQCF	Headworks(HWK)			Refer to Table D for asset type abbreviations	01	
		Foul Air Removal	FAR			
		Influent Pumping Station	IPS			
		Barscreens	BSN			
		Septage Receiving	SEP			
	Primary Treatment (PT)					02
		North & South Grit Removal	NGR, SGR			
		Primary Sedimentation Basins	NPSB, SPSB			
	Biological Treatment (BIO)					03
		Biotowers	BIOT			
		North & South Aeration Basins	NAB, SAB			
	Secondary Treatment (ST)					04
		North & South Secondary Clarifiers	NSC, SSC			
		North & South RAS	NRAS, SRAS			
		Secondary Effluent Equalization Pond	SEEP			
	Tertiary Treatment (TT)					05
		Filter Feed Pump Station	FFPS			
		Flocculation	FLOC			
		Tertiary Filtration	TF			
		Chemical Feed	CHMF			
	Disinfection (DIS)					06
		UV Disinfection	UV			
		Effluent Pump Station	EPS			
	Solids Treatment (SLDT)					07
		DAFT	DAF			
		North & South WAS	NWAS, SWAS			
		Digesters	DIG			
		Sludge Blending	SLB			
		Dewatering	DEW			
		Gas Flare	GFL			
		Centrifuge	CENT			
		Centrifuge Polymer	CPLY			
		Food Waste	FWST			

Attachment 1 - RFP

RFP: WQCF CAPACITY IMPROVEMENTS

① Facility Location	② Systems Location	Process/Sub-System Description	③ Process/Sub-System Abbreviation	④ Asset Type	⑤ System Code	
		Fats Oils Greases	FOG	Refer to Table D for asset type abbreviations		
		Compressed Natural Gas	CNG			
		Biogas Handling	BIOG			
		Digester Chemical Sys (Ferric)	DCS			
	Emergency Ponds (EPD)					08
		Secondary Effluent Storage Pond	SESP			
	River Outfall (RIO)					09
		River Outfall	RIO			
	Recycled Water					10
		Recycled Water Pump Station	RWPS			
		RW Chlorine Contact Tank	CCT			
		RW Disinfection	RWDS			
		UV Recycled Water Pump Station	UVRW			
		Commercial and Residential Recycled Fill Station System	CRWS,RRWS			
	Laboratory (LAB)					11
		Vacuum system	VAC			
		Compressed Air system	CAS			
		Deionized water system	DI			
		metals analysis system	MET			
		Anion analysis system	IC			
		Ancillary Systems	AS			
	Plant Water System (PW)					12
		1 Water (potable)	1W			
		2 Water (non-potable)	2W			
		3 Water Recycled Water	3W			
	Power (PWR)					13
		Normal Power	NP			
		Emergency Power	EPW			
	Irrigation (IRR)				14	
		Irrigation Pump Station	IRPS			
		Industrial Pond (Eckerts)	IDP			
		Agricultural Fields	IAG			
	Computer System (CPS)				15	
		Network	NET			
		SCADA	SCD			

Attachment 1 - RFP

RFP: WQCF CAPACITY IMPROVEMENTS

Table B – Collection System Location and Abbreviations

APPENDIX F

① Facility Location	② Systems Location	Process/Sub-System Description	③ Process/Sub-System Abbreviation	④ Asset Type	⑤ System Code
Wastewater Collections (WWC)				Refer to Table D for asset type abbreviations	
	Wastewater Station Number (WW##)*				Station Number
		Wastewater	WW		
Stormwater Collections (SWC)					
	Stormwater Station Number (SW##)*				Station Number
* Number ##	(SW21)*	Stormwater “city owned”	SW		
* Letter ##	(SWBB)*	Stormwater “private owned”	SW		
	Stormwater Treatment (SWT##)*				
		Stormwater Treatment	SWT		

\*Note, consult with the Engineering Department for the station number (##).



## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

Table D – WQCF and Collection Asset Type and Abbreviations (Segment 4 of the Naming Convention) APPENDIX F

ID	DESCRIPTION	ID	DESCRIPTION
ABS	Air Blast System	CNV	Conveyor
ANC	Acid Neutralization Chamber	CONT	Container
AC	Air Conditioner	CRD	Chart Recorder
ACL	Auto Clave	CVLT	Con Vault Fuel Tank
ACT	Actuator	CV	Control Valve
ADL	Auto Dialer	CWR	Clothes Washer
ADM	Air Diffusion Module	DF	Disk Filter
AE	Analyzing Element	DIW	Deionized Water
AFD	Adjustable Frequency Drive	DO	Dissolved Oxygen
AHU	Air Handling Unit	DPIS	Differential Pressure Ind Switch
AIT	Analyzing Ind Transmitter	DPIT	Differential Pressure Ind Trans
AMO	Ammonium	DPR	Dampener
ARV	Air Release Valve	DRY	Dryer
ATS	Automatic Transfer Switch	DS	Distribution Switch
AUX	Auxiliary Supporting Equip	DSBE	Distribution Bus Electrical
AWS	Acid Wash Station	DTRK	Dump Truck
BAT	Battery	DVR	Digital Video Recorder
BCG	Bio CNG Unit	DWR	Dishwasher
BFP	Backflow Preventer	EPS	Effluent Pump Station
BIN	Cake Bins	EQV	Earthquake Valve
BKP	Breaker Panel	EWS	Eye Wash Station
BLDG	Building		
BLR	Blower	EVAP	Evaporative Cooler
BNK	Bank	EXH	Exhaust
BOL	Boiler	FAN	Fan
BRB	Brown Bear Attachment	FAR	Flame Arrestor
BSC	Box Scraper Attachment	FD	Flight Drive
BSN	Bar Screen	FEQ	Field Equipment
BV	Butterfly Valve	FEX	Flow Element Devices
CAM	Camera	FIB	Flow Indication Beacon
CART	Golf Cart	FIT	Flow Indicating Transmitter
CDT	Condensate Trap	FKL	Forklift
CENT	Centrifuge	FLDR	Front Loader
CFD	Chemical Feeder	FLR	Flare
CGS	Combustible Gas Sensor	FLT	Filter
CHLR	Chiller	FM	Flow Meter
CHN	Channel	FMR	Flail Mower Attachment
CHV	Check Valve	FRC	Furnace
CLDR	Case Loader	FS	Float Switch
CMP	Compressor	FSH	Float Switch High Level
CNG	Compressed Natural Gas Unit	FSL	Float switch Low Level

## Attachment 1 - RFP

## RFP: WQCF CAPACITY IMPROVEMENTS

ID	DESCRIPTION	ID	DESCRIPTION	APPENDIX F
GAC	Granular Activated Carbon	PCMP	Portable Air Compressor	
GBX	Gearbox	PDC	Power Distribution Center	
GDT	Gas Detector	PDS	Pressure Differential Switch	
GEN	Generator	PGEN	Portable Generator	
GFL	Gas Flare	PHR	Portable Hose Reel	
GOP	Gate Operator Drive Unit	PIT	Pressure Indicating Transmitter	
GRD	Grinder	PLC	Programmable Logic Controller	
GV	Gate Valve	PLY	Poly	
HEX	Heat Exchanger	PMP	Pump	
ICE	Ice Machine	PMS	Plasma Mass Spectroscopy	
KV	Knife Valve	PND	Pond	
LAPT	Laptop	PNL	Panel	
LCP	Local Control Panel	PPL	Pipeline	
INC	Incubator	PPLG	Portable 36" Pipe Plug	
IV	Isolation Valve	PPMP	Portable 3", 6" Pump	
LDB	Load Bank	PRNT	Printer	
LDR	Loader	PRV	Pressure Reducing Valve	
LI	Level Indicator	PS	Pressure Switch	
LIT	Level Indicating Transmitter	PSV	Pressure Safety Valve	
LKR	Locker Room	PV	Pressure Valve	
LNR	Liner	PVM	Pinch Valve Manual	
LS	Level Switch	PW	Pressure Washer	
LT	Light	REG	Regulator	
LUB	Lubricator-Automatic, Pressure	RVSS	Reduced Voltage Soft Starter	
LVR	Louver	SBD	Switch Board	
MBA	Mechanical Brush Aerator	SCB	Scrubber	
MCC	Motor Control Center	SCG	Security Gate	
MEC	Mechanism	SCN	Screen	
MEM	Membrane	SCRT	Spray Cart	
MOV	Motor Operated Valve	SCV	Screw Conveyor	
MPS	Module Power Supply	SDS	Storm Debris Separator	
MTN	Maintenance	SE	Speed Element	
MTR	Motor	SFT	Water Softener	
MXR	Mixer	SKM	Skimmer	
NIT	Nitrate	SKS	Skid Steer (BobCat)	
NSW	Network Switch	SLG	Slide Gate	
OCU	Odor Control Unit	SMP	Sampler	
ORP	Oxygen Reduction Potential	SP	Sump Pump	
OVN	180 Solids oven	SPD	Surge Protection Device	
PAT	Pneumatic Air Tank	SS	Safety Shower	
PC	Personnel Computer	STN	Strainer	

Attachment 1 - RFP

RFP: WQCF CAPACITY IMPROVEMENTS

APPENDIX F

ID	DESCRIPTION	ID	DESCRIPTION
SV	Solenoid Valve	VFD	Variable Frequency Drive
SUMP	Sump Pits	VNT	Ventilator
		VS	Vibration Switch
SWGR	Switch Gear	WAH	Wet Well Access Hatch
SWP	Sweeper Attachment	WD	Weight Differential
SYS	System	WE	Weight Element
TE	Temperature Element	WIT	Weight Indicating Transmitter
TEK	ISO Temperature Unit (Lab)	WOSS	Water Oil Sand Separator
TIT	Temp Indicating transmitter	WRW	Weir Washer
TNK	Tank	WTH	Water Heater
TRK	Truck	VACU	Vacuum Unit
TRKT	Tractor	VNT	Ventilator
TS	Temperature Switch	XFMR	Transformer
TSH	Temp Switch High	YLT	Yard Lighting
TURB	Turbidity Meter	ZS	Door Intrusion
TV	Telescoping Valve	ZSH	Smoke Detector
TWSS	Truck Wash Station Sump		
UPS	Uninterruptible Power Supply		
UVW	UV System Bulb Washer		
VACT	Vaccon Truck		
VAL	Valve		
SWGR	Switch Gear		

**RFP: WQCF CAPACITY IMPROVEMENTS  
APPENDIX F**

**Table E – ISA-5.1 Identification Letters** (Segment 4, used for loop diagrams and P&IDs)

	First Letters		Succeeding Letters		
	Measured/ Initiation Variable	Variable Modifier	Readout/Passive Function	Output/Active Function	Function Modifier
<b>A</b>	Analysis		Alarm		
<b>B</b>	Burner, Combustion		User's Choice	User's Choice	User's Choice
<b>C</b>	User's Choice			Control	Close
<b>D</b>	User's Choice	Difference, Differential			Deviation
<b>E</b>	Voltage		Sensor, Primary Element		
<b>F</b>	Flow, Flow Rate	Ratio			
<b>G</b>	User's Choice		Glass, Gauge, Viewing Device		
<b>H</b>	Hand				High
<b>I</b>	Current		Indicate		
<b>J</b>	Power	Scan			
<b>K</b>	Time, Schedule	Time Rate of Change		Control Station	
<b>L</b>	Level		Light		Low
<b>M</b>	User's Choice				Middle, Intermediate
<b>N</b>	User's Choice		User's Choice	User's Choice	User's Choice
<b>O</b>	User's Choice		Orifice, Restriction		Open
<b>P</b>	Pressure		Point (Test Connection)		
<b>Q</b>	Quantity	Integrate, Totalize	Integrate, Totalize		
<b>R</b>	Radiation		Record		Run
<b>S</b>	Speed, Frequency	Safety		Switch	Stop
<b>T</b>	Temperature			Transmit	
<b>U</b>	Multivariable		Multifunction	Multifunction	
<b>V</b>	Vibration, Mechanical Analysis			Valve, Damper, Louver	
<b>W</b>	Weight, Force		Well, Probe		
<b>X</b>	Unclassified	X-axis	Accessory Devices, Unclassified	Unclassified	Unclassified
<b>Y</b>	Event, State, Presence	Y-axis		Auxiliary Devices	
<b>Z</b>	Position, Dimension	Z-axis, Safety Instrumented System		Driver, Actuator, Unclassified final control element	

**Attachment 1 - RFP**

**RFP: WQCF CAPACITY IMPROVEMENTS  
APPENDIX F**

Notes:

ATTACHMENT 2

CONSULTANT'S PROPOSAL AND SCOPE OF WORK

PROFESSIONAL ENGINEERING SERVICES PROPOSAL FOR THE CITY OF MANTECA

# WASTEWATER QUALITY CONTROL FACILITY (WQCF)

## CAPACITY IMPROVEMENTS PROJECT



PREPARED FOR:



Attn: Kyzen Nicolas  
 1001 West Center Street  
 Manteca, California 95337

PREPARED BY:



17520 Newhope Street, Suite 200  
 Fountain Valley, California 92708  
 714.481.7300 | www.pacewater.com

#C03.2 | SEPT 6, 2022

**CITY OF MANTECA**  
**WQCF Capacity Improvements Project RFP**  
**ADDENDUM 1**  
**ISSUED: September 1, 2022**

I acknowledge receipt of Addendum No. 1.

Company: Pacific Advanced Civil Engineering, Inc. (PACE)

---

By: Andy Komor, MS, PE

---

Title: Sr. Vice President, Environmental Water Division

---

Address: 17520 Newhope St., Suite 200, Fountain Valley, CA 92708

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Date: 9/6/2022

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# contents

<b>Cover Letter</b>	
<b>Organization Credentials, Background</b> .....	1
<b>Experience</b> .....	2
<b>Project Team</b>	
Lead Firm .....	7
Project Manager .....	7
Project Team .....	7
<b>Project Understanding &amp; Approach</b>	
Project Understanding .....	9
Project Approach .....	11
Scope of Services .....	12
<b>Schedule of Work</b> .....	15
<b>Exceptions to Professional Services Agreement</b> .....	15
<b>Cost Proposal</b> .....	Submitted as Separate PDF

## Attachment 2 - Consultant Proposal



September 6, 2022

City of Manteca  
 Kyzen Nicolas, Assistant Engineer | knicolas@ci.manteca.ca.us

Re: **Professional Engineering Services Proposal for the City of Manteca  
 Wastewater Quality Control Facility (WQCF)  
 Capacity Improvements Project**

Dear Mr. Nicolas,

The Wastewater Quality Control Facility (WQCF) Capacity Improvements Project provides a unique and important opportunity to setup your treatment facility to improve the removal of nitrate nitrogen. The facility also has small secondary process basins with low carbon after primary treatment, which limits the ability to reduce nitrate nitrogen. After meeting with Dustin and Cody onsite on 8/17/22, it is evident the facility is well-organized, operating efficiently, and is flexible in the operation. After careful review of the RFP documents, interviewing City Operations, and comparing to successes on other local nutrient-removal facilities, we have provided some important approaches and concepts in this proposal to best achieve these goals. We look forward to working together with the City to explore, decide, and implement these concepts to provide a reliable, efficient, and easy-to-operate facility for low life cycle cost.

In the base request we agree with improving internal recycle pumping, anoxic mixing, flow splitting, and instrumentation control. We have extensive experience with these base items to work together to install the best elements that will work most effectively. For example, the internal recycle pumping systems could be shared in a common pumping center to improve mixing of mixed liquor and reduce the number of pumping units. The instrumentation available using modern technology also needs to be robust and not float out of range, and often ORP is the most proven way to achieve this consistent operation. Also included in this proposal through the capacity analysis is a BioWin Model that is a key tool for the City to look at other ways to benefit denitrification. Models will look at increased carbon through the primary clarifiers, centrate addition to North/South Plant with and without side stream treatment, and changing HRT/SRT. This modeling tool will direct the design to the most feasible way to improve denitrification capacity possible.

It was great spending time walking your plant on 8/17/22, and we are excited to have the opportunity to interview with you and work together on these and other elements described. Improving nitrate reduction is tricky and challenging. Due to primary clarification and low SRT operation, it may not be possible to achieve nitrate reduction goals without looking at every possibility for upgrade. Without sufficient carbon to reduce dissolved oxygen, it is difficult to achieve low enough ORP for nitrate removal.

PACE is highly specialized in designing advanced water recycling facilities with nutrient removal, including extensive experience with BioWin Modeling, Field Operations Optimization (including Lathrop Nitrogen Removal). Additionally, we have a strong understanding of parameters, including RAS and internal recycle and influent loading to achieve desired nitrogen removal goals. My masters thesis was on nitrate reduction, and we have years of experience in applications near you on optimization strategies and real equipment in operation for years. ***Our proposal is valid for a minimum period of 120 calendar days subsequent to the proposal due date.*** We look forward to going through our proposal and working together on this important project.

Sincerely,

Andy Komor, MS, PE  
 Vice President, Environmental Water Division

**Legal Name**

Pacific Advanced Civil Engineering, Inc.

**Address**

17520 Newhope St., Suite 200  
 Fountain Valley, CA 92708

**Phone Number**

(714) 514-8919

**Email**

akomor@pacewater.com

**Contact**

Andy Komor, MS, PE

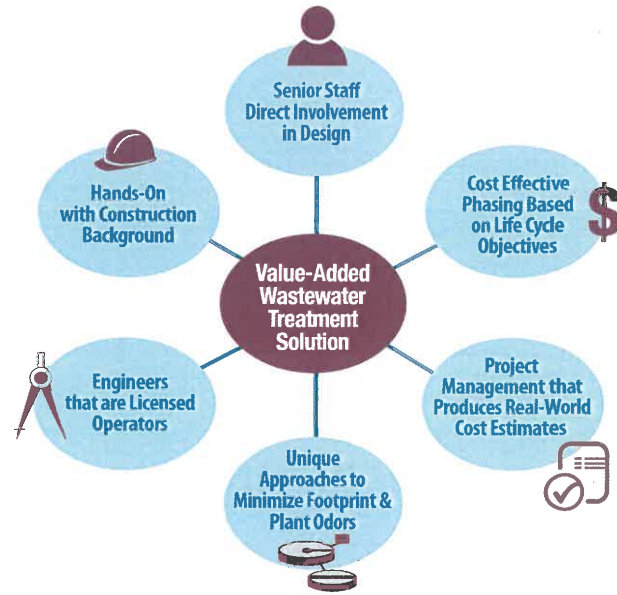
**Proof of Signature Authority**

The project manager,  
 Andy Komor, MS, PE is an  
 official authorized to  
 bind the firm.



# ABOUT PACE

PACE is a specialized civil engineering firm offering advanced water resource services. We offer a wide range of engineering services related to water, wastewater, stormwater management and water resource permitting and regulatory compliance to ensure projects are both economically viable and environmentally sustainable. PACE staff members include licensed professional engineers with PhDs, scientists, university instructors and policy-makers in the water resource arena. **In the last 10 years alone, PACE has performed design on more than 40 advanced wastewater treatment facilities.** We offer in-house advanced modeling capabilities, a water quality laboratory and piloting facility for use on projects to ensure designs are functional and operable in practice. PACE has experience designing and permitting a wide range of process technologies, based on project needs.



Years in Business **35 yrs**

Type of Organization  
**Corporation**

Location of Office  
17520 Newhope St., Suite 200  
Fountain Valley, CA 92708

## PACE IS EXPERIENCED IN ALL AREAS OF WASTEWATER TREATMENT INCLUDING:

- ◆ Wastewater treatment facility planning and design for new facilities and expansions
- ◆ Wastewater quality assessment, treatment development, and planning
- ◆ Advanced treatment using RO, MBR, Ion Exchange, and proprietary process systems
- ◆ Permitting for Title 22 (CA) unrestricted reuse, NPDES discharge and groundwater recharge projects
- ◆ Complex remote and local SCADA systems
- ◆ EPA 503 Class A and B bio-solids reuse processing, dewatering and permitting
- ◆ Sewage collection and reclaimed water distribution systems
- ◆ Energy efficiency audits, renewable power and cogeneration
- ◆ Treatment process optimization

## Advanced Treatment Focus



PACE has designed hundreds of treatment facilities for municipalities and land developers in both traditional design-bid-build and design-build settings. Our experience is not only with design-related tasks, but also with construction and operation of our treatment facility designs, allowing us to consistently provide practical engineering solutions at or below established project budgets. Treatment facility experience includes wastewater, stormwater and potable water, as well as advanced water recycling of highly contaminated waste streams such as irrigation tailwater and produced water from fracking operations.

## Personnel Resources

Water/Sanitary Treatment/Infrastructure Engineer (16)  
Laboratory Researcher (3)  
Computer Aided Drafting (12)

Geographic Information Systems (4)  
Construction Estimator (22)  
Construction Management (4)

Electrical Engineer (3)



# EXPERIENCE

## City of Lathrop Advanced Water Treatment and Recycling Facility Expansion *Lathrop, CA*



### Relevant Features

- ◆ Uses HACH Amtrax Ammonia Probes for optimized nitrification, along with most open valve dissolved oxygen control to optimize nitrogen removal in all treatment trains
- ◆ Consolidation of two treatment facilities (domestic and industrial) into one facility
- ◆ Existing facility upgrade that maintained operations during construction
- ◆ Flexible treatment and thickening of biosolids processes
- ◆ Recycled water quality permitted for river discharge, recycled water uses, and groundwater infiltration
- ◆ Value engineering / performance-based specifications
- ◆ Instrumentation and controls programming

### Client Info

**City of Lathrop**  
Ken Reed - City Project Manager  
(209) 992-7363 | kreed@ci.lathrop.ca.us

**Original / Final Budget Cost** \$5.1M

**Original / Final Duration / Completion Date**  
2015 - On-Going (including phase 3) / On-going

### Team Members

#### PACE

**Andy Komor, MS, PE** Project Manager  
**James Matthews, PE** Principal - QA/QC and Instrumentation Controls  
**Robert Murphy, PE** Sr. Project Engineer  
**Thomas Mihara, EIT**  
Design Engineer (services during construction)  
**Ernesto Camarena**  
Sr. Instrumentation & Controls Specialist  
**Thomas Gutierrez** Sr. CAD Designer  
**Neil Chin, EIT** CAD Designer  
**Shanka Henkanatte Gedara, PhD, EIT**  
Water Quality Specialist

#### Subconsultants

**SPI** Membrane Design Support  
**PERC Water** Constructability Review and Operability Consultant  
**ENGEO** Geotechnical Services  
**PK Associates** Structural Engineering  
**Square (1) Design Group** Architecture Design

PACE provided project development, studies, design, and bid and construction administration phase services for the expansion of the Lathrop Consolidated Treatment Facility, an MBR wastewater treatment facility that features highly aesthetic architecture and an administration building that allows for public outreach and understanding of the facility's operations for its visitors. Pre-expansion, facility was 1.0 MGD and the expanded capacity is 2.5 MGD, with an ultimate build-out capacity of 9.0 MGD. PACE provided a creative approach to the upgrade with a new secondary and MBR treatment system accessed at grade level with an integrated process mechanical design that minimized valving and pumping that improves process treatment simplicity and makes the unit processes visible to operators. The design is straightforward and allowed for ease in facility expansion. The new treatment system process design was based around use of the existing chlorine contact basin (CCB), without having to expand the CCB infrastructure for continued production of Title 22 disinfected tertiary recycled water under the new design flow conditions. This was achieved through a free

chlorine contact time revalidation study performed by PACE and approved through the CA DDW.

Additionally, PACE designed a conversion for the existing MBR facility that will be used for aerobic sludge digestion and thickening processes for the new constructed MBR facility. The design approach enabled construction of the new facilities while the existing facilities remained in operation. The new facility also includes an existing upstream influent flow equalization system that keeps secondary, membrane and disinfection flows constant for optimal treatment and reduction of downstream treatment process costs. The facility features common wall modular construction that reduces the footprint of the process tanks, improves operational flexibility, and reduces capital and maintenance costs for the structure, equipment, piping and wiring. An initial topography site study led to minimizing grade and pavement design work to achieve proper drainage, as well as providing a favorable balance for site cut and fill quantities and ultimately eliminated excessive offsite import and hauling.

## Mountain House Water Reclamation Facility Expansion *Tracy, CA*



### Relevant Features

- ◆ Provides post anoxic nitrate polishing zone to remove remaining nitrate prior to tertiary filtration and disinfection
- ◆ Two phases of expansion, first replacing an outdated aerated lagoon currently process conversion and capacity expansion
- ◆ Sludge processing to meet EPA Class B Biosolids Requirements with centrifuge dewatering
- ◆ Acquired WDR for Title 22 unrestricted reuse and effluent discharge to Old River
- ◆ Energy efficient aeration and low-energy mixers
- ◆ Operational during construction – developed sequence of construction

PACE, as the Engineer of Record, provided design, permitting, construction services, and start-up services for Phases II expansion and is currently providing design for the Phase III expansion of the Mountain House Water Reclamation Facility. The Phase II expansion replaced the 0.45 MGD aerated lagoon wastewater treatment plant with a 3.0 MGD advanced SBR Water Reclamation Facility.

The Phase III expansion, currently under construction, expands the facility to build-out the capacity of 5.4 MGD. The secondary treatment process is being

converted to a membrane bio-reactor to meet the existing waste discharge requirements and also comply with California Title 22 Recycled Water Requirements for unrestricted reuse. As part of the conversion, PACE designed the facility around use of existing infrastructure. This includes repurposing and subdividing the existing SBR process tanks into anoxic, oxic, and post-anoxic tanks prior to feeding the new MBR facility. The design also incorporates the existing UV channel system for tertiary treatment with the modified and expanded facility.

### Client Info

Mountain House Community Services District  
Nader Shareghi  
(209) 831-5607 | nshareghi@sjgov.org

**Original / Final Budget Cost** \$4.5M

### Original / Final Duration / Completion Date

Phase II: 2004 – 2006; Phase III: 2017- On-Going / On-going

### Team Members

#### PACE

Andy Komor, MS, PE Project Manager / Engineer-of-Record

James Matthews, PE Principal – QA/QC and

Instrumentation Controls Programming Principal

Robert Murphy, PE Sr. Project Engineer

Thomas Mihara, PE Design Engineer (Services during Construction)

Thomas Gutierrez Sr. CAD Designer

Neil Chin, EIT CAD Designer

Chris Najarian, PE Sr. Electrical Engineer

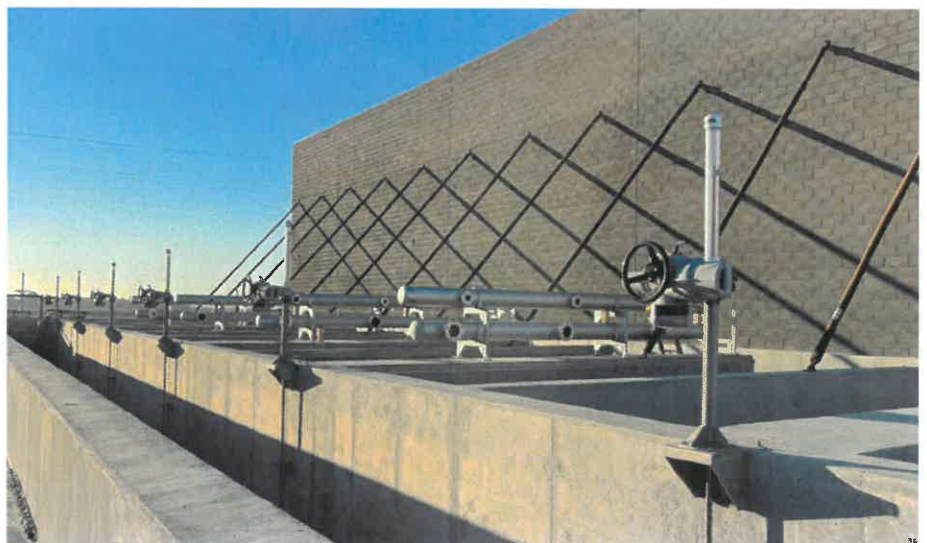
Ernesto Camarena Sr. Instrumentation & Controls Specialist

#### Subconsultants

ENGEO Geotechnical Services

PK Associates Structural Engineering

Square (1) Design Group Architecture Design



# Tuolumne Utilities District Sonora Regional Wastewater Treatment Plant *Sonora, CA*



## Relevant Features

- ◆ Provides freeboard and equalized secondary treatment to handle variability in inflow and loading
- ◆ Treatment process conversion to Parkson's Biolac Extended Aeration Activated Sludge
- ◆ Operational during construction – developed sequence of construction
- ◆ Received USDA-RD funding
- ◆ Instrumentation and controls programming



PACE performed a facility assessment and upgrade design for the 2.6 MGD Average Daily Flows (ADF) Sonora Regional Wastewater Treatment Plant (SRWWTP) to address the facility's declining effluent performance. The existing SRWWTP features a conventional trickling filter secondary process that utilizes two trickling filters, followed by two secondary clarifiers, three aerated polishing ponds, and a chlorine disinfection system. Based on recent flows and loads, the influent flow limits identified in the WDRs are not exceeded, but the facility is at its design Biochemical Oxygen Demand (BOD) influent load limit, and is exceeding its design suspended solids loading criteria.

To improve the facility's functionality and performance, PACE is performing design upgrades to increase the capacity to 5.0 MGD of Max Day Flows (MDF) and 10.0 MGD Peak Hour Flows (PHF)

and will convert the secondary treatment process to an Extended Aeration Activated Sludge (EAAS) process utilizing the Parkson's Biolac<sup>®</sup> mixing and aeration process. All wastewater flows to the proposed SRWWTP process will be treated by a new headworks, primary screening and grit removal, new dual-train extended aeration activated sludge (EAAS) basins, new secondary clarifiers, new chlorine disinfection system, new effluent disk cloth filters and a new sludge dewatering facility. These upgrades will also replace the existing polishing ponds and include a new administration and electrical building, a new headworks and sludge dewatering building and a renovated digestion building where the existing anaerobic digesters will be repurposed into aerobic digesters for solids processing. The facility will also maintain operation during construction by waiting to demolish the existing facility until the new facility is in full operation.

### Client Info

Tuolumne Utilities District  
Edwin Pattison  
(209) 968-4436 | epattison@tudwater.com

**Original / Final Budget Cost** \$1.9M

**Original / Final Duration / Completion Date**  
2019 - On-Going / On-going

### Team Members

#### PACE

Andy Komor, MS, PE Project Manager  
James Matthews, PE Principal  
Chris Najarian, PE Sr. Electrical Engineer  
Ernesto Camarena  
Sr. Instrumentation & Controls Specialist

#### Subconsultants

Square (1) Design Group Architecture Design



# Las Virgenes Municipal Water District Tapia Water Reclamation Facility Blower and Aeration Equipment Improvements *Calabasas, CA*



## Relevant Features

- ◆ Evaluated of the Bardenpho Activated Sludge Treatment Process to identify deficiencies and process improvements
- ◆ Developed the Performance-based Specifications for the replacement of (3) 900 HP, 4160 medium voltage Centrifugal Blowers with (3) new 400 HP, 480V, High Speed Turbo Magnetic Bearing Blowers
- ◆ Design upgrades to the aeration system that included the installation of new retrievable fine bubble diffusers
- ◆ Develop the process control strategy for the aeration process using the Fully-Open Valve concept to control the air flow to each treatment basin based on DO and ORP control.
- ◆ Evaluated and designed the removal of the medium voltage electrical switchgear to multiple plant processes
- ◆ Designed control strategy for aeration system and new blowers



PACE provided the Las Virgenes Municipal Water District (District) with design and design support during construction for the Tapia Water Reclamation Facility (WRF) Process Air Improvement Project. The Tapia WRF used (3) 900 HP, 4610V, Roots centrifugal blowers to provide air to their biological treatment process, as well as other ancillary processes. The District wanted to improve energy efficiency and reduce operational cost by implementing new blowers and aeration equipment. PACE evaluated the existing conditions, including the existing treatment process, blower performances, as-built drawings, etc., as well as spent time with the Operations Staff to better understand the challenges and identify the right solutions. After the evaluation, PACE

provided design upgrades to the process air system that included the installation of (3) new 400 HP, 480V Sulzer Magnetic Bearing Blowers; upgrades the aeration system to include the installation of over 60 retrievable, OTT fine bubble aeration grids; and electrical gear conversion from 4160 medium voltage to 480 low voltage system. A unique element of the project was the use of Performance-based Specifications developed by PACE to reduce the equipment capital cost of the project (i.e., blowers and fine bubble diffusers costs) by more than 30%. It also included an O&M service contract that helps the District understands future O&M cost. The project was completed in 2019 and realized an average energy saving of over 25%.

### Client Info

Las Virgenes Municipal Water District  
Eric Schlageter  
(818) 251-2142 | ESchlageter@lvmwd.com

**Original / Final Budget Cost** \$410K

### Original / Final Duration / Completion Date

October 2016 - December 2019 (original) / October 2016 - October 2019 (actual) / 2019

### Team Members

James Matthews, PE Principal  
Robert Murphy, PE Sr. Project Manager  
Thomas Mihara, PE Project Engineer  
Chris Najarian, PE Sr. Electrical Engineer  
Thomas Gutierrez Sr. CAD Designer  
Neil Chin, EIT CAD Designer  
Ernesto Camarena  
Sr. Instrumentation & Controls Specialist



# City of San Clemente Water Reclamation Facility Upgrades and Improvements *San Clemente, CA*



## Relevant Features

- ◆ Sludge thickening and dewatering design
- ◆ Biological modeling
- ◆ Facility upgrades
- ◆ Continuous operation during construction of upgrades
- ◆ Aeration, blowers design
- ◆ Instrumentation and controls, and SCADA integration



PACE has provided consulting, design, construction administration, and controls and integration services for the City of San Clemente on several process efficiency upgrade projects for their 7.0 MGD Water Reclamation Facility (WRF). With goals of gaining efficiency and cutting back on power uses and associated operational costs for the WRF, the City looked to upgrade several aspects of their facility. Such projects included replacing aging infrastructure in both the sludge handling and dewatering process areas, provided sludge thickening process upgrades, and secondary aeration process upgrades.

One of the biggest energy efficiency upgrades to the WRF included replacement of the aging multistage centrifugal blowers to new modern high speed turbo blowers, which were planned to be coupled to the high-efficiency aeration diffusers the City had previously installed. PACE worked with the City to develop performance-based specifications with a goal of receipt of bids providing low equipment capital costs, high performance, and low

power usage, along with guaranteed performance for the project design parameters. PACE selected two new 150 Hp high-speed single stage turbo blowers providing flow in the range of 2,000 SCFM up to 7,000 SCFM (3.5:1 turndown), meeting air demands in both high and low loading conditions. As part of the project, PACE provided integration services for the new blowers and reprogramming of field control valves for pairing with a new DO control system, allowing for further optimization of the aeration system and lower overall power usage. PACE also provided grant funding coordination efforts on behalf of the City, as the project qualified for grants under the local utility and California Public Utilities Commission's Statewide Customized Offering Program. With the project a reduction of 75 kW peak demand was realized, along with a savings of 655,000 kW-Hours an annual basis. Following the project, PACE provided the City with biological modeling data, aimed at coupling the aeration upgrades projects with benefits of full nitrification and lower chemical usage on the disinfection side of the facility.

### Client Info

City of San Clemente  
Amir Ilkhanipour MS, PE  
(949) 361-6140 | [IlkhanipourA@san-clemente.org](mailto:IlkhanipourA@san-clemente.org)

**Original / Final Budget Cost** \$6.1M

**Original / Final Duration / Completion Date**  
2013 - On-Going / On-going

### Team Members

James Matthews, PE Project Manager  
Robert Murphy, PE Sr. Project Engineer  
Chris Najarian, PE Sr. Electrical Engineer  
Thomas Gutierrez Sr. CAD Designer  
Ernesto Camarena  
Sr. Instrumentation & Controls Specialist

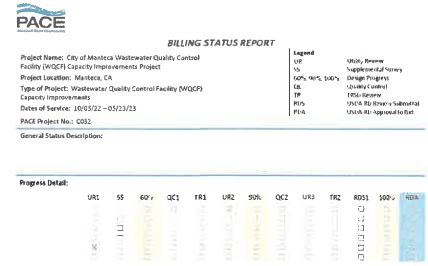
Attachment 2 - Consultant Proposal

# PROJECT TEAM

## Lead Firm

### responsibility for successful completion

**PROJECT MANAGEMENT** PACE shall oversee the project and will be responsible for the successful completion of the work. All correspondence to the City, whether incoming or outgoing, will be through the Project Manager, Andy Komor. The Project Manager will keep the City informed of the project progress on a bi-weekly basis unless otherwise indicated in the work plan or contract work scope. In addition to the progress reports, an Action Items Matrix (A.I.M.) will be prepared, updated bi-weekly, and provided to the City to identify actions to be accomplished, description of the activity, the date for completion, and lead the person responsible for ensuring the action is completed. Adherence to the project schedule is achieved by managing the project through continuous analysis of staffing requirements and production schedule monitoring. PACE will use the Microsoft (M.S.) Project scheduling system to continuously monitor project costs, labor, and progress.



▲ Project specific billing status report to detail progress

**MONTHLY BILLING** With such a multifaceted project, we understand there will many components to track. PACE has developed a Billing Status Report that will accompany each invoice to ensure the City of Manteca understands the progress made and the associated billing.

### firm experience on similar projects

Relevant Project Experience	Treatment Capacity (MGD)	Delivery Method
City of Burbank WRP Upgrades, Burbank, CA	12.0	DBB
Las Virgenes MWD Tapia WRF Aeration & Digester Rehabilitation Upgrades, Calabasas, CA	12.0	DBB
City of San Clemente WRP Solids Upgrades, San Clemente CA	7.2	DBB
City of Santa Paula WRF, Santa Paula, CA	4.2	DBOF
Litchfield Park CSD Palm Valley WRF, Goodyear, AZ	4.1	DBO
City of Sierra Vista EOP WWTP, Sierra Vista, AZ	4.0	DBO

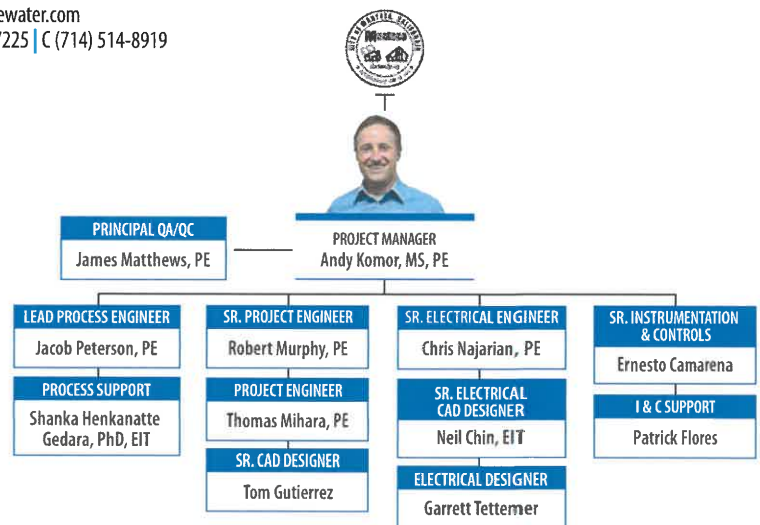
### permits, licenses, and professional credentials

PACE possesses all permits, licenses, and professional credentials necessary to perform services as specified in the RFP.

## Project Manager / Team

 akomor@pacewater.com  
 D (714) 481-7225 | C (714) 514-8919

**ANDY KOMOR, MS, PE** is a technical expert on engineering infrastructure having successfully performed engineering design, project management, and field services for over \$350 million in capital on over 60 completed water resource projects in the past 15 years. His background as a researcher has led to several national presentations and technical papers. Andy Komor is sought after as a technical consultant and designer on water resources projects including advanced wastewater treatment and water recycling, drinking water, water infrastructure, ocean and brackish water desalination, groundwater recharge, lake and reservoir water quality enhancements and new technology research and development. As part of the design and engineering of such projects, Andy Komor is adept at providing comprehensive civil, mechanical, structural, electrical, and controls designs which are innovative, cost effective, and highly-operable. He also has significant experience in field engineering, construction oversight and start-up services through design-build projects and design-bid-build project structures. Andy Komor has an excellent breadth and depth of experience in water resources, and will ensure a value-added approach, sound design, and effective implementation of the project.



Attachment 2 - Consultant Proposal

NAME AND TEAM ROLE	EXP. EDUCATION, PROF. REG.	AVAILABILITY AND CURRENT WORKLOAD	AVAILABILITY AND CURRENT WORKLOAD	RELATED PROJECT EXPERIENCE WITHIN THE LAST 3 YEARS	
<b>ANDY KOMOR, MS, PE</b> <i>Project Manager</i>	22 years MS Civil and Environmental Engineer, Arizona State University BS Civil Engineering, University of Minnesota PE – CA: 64928 / 2003	<ul style="list-style-type: none"> <li>Advanced wastewater treatment</li> <li>Biological nutrient removal / water quality treatment systems</li> <li>Sediment / suspended solids management</li> <li>Solids handling facilities</li> <li>Effluent reuse systems</li> </ul>	<ul style="list-style-type: none"> <li>Pump stations / mechanical</li> <li>Pipeline systems / hydraulics</li> <li>Water storage facilities</li> <li>Wetland treatment systems</li> </ul>	<p>30% Available</p> <p>Current workload:</p> <ul style="list-style-type: none"> <li>Phase 3 Expansion of the Lathrop Consolidated Treatment Facility</li> <li>Mountain -ouse WRF Expansion Design Services During Construction</li> <li>Tuolumne Utilities District Sonoma Regional WWTP Services During Construction</li> <li>Crescenta/Punta Dena Potable and Non-Potable Water Supply Design Development</li> </ul>	<ul style="list-style-type: none"> <li>City of Lathrop Advanced Water Treatment and Recycling Facility Expansion – City of Lathrop, CA</li> <li>Mountain -ouse Water Reclamation Facility Expansion – Tracy, CA</li> <li>Tuolumne Utilities District Sonoma Regional Wastewater Treatment Plant Sonoma, CA</li> <li>Escalon Recycled Water Master Plan Expansion Study – Escalon, CA</li> <li>Santa Monica Sustainable Water Infrastructure Project (SW-PI) Advanced Water Treatment Facility – Santa Monica, CA</li> <li>Coronado Satellite Water Recycling Facility (SWRF) – Coronado, CA</li> <li>Solvang Wastewater Treatment Plant Enhanced Treatment Study – Solvang, CA</li> </ul>
<b>JAMES MATTHEWS, PE</b> <i>Principal / QA/QC</i>	30 years BS Civil Engineering, San Diego State University PE – CA: CS7746 / 1997 Wastewater Treatment Operator Certification: AZ	<ul style="list-style-type: none"> <li>Water/wastewater treatment</li> <li>Instrumentation &amp; controls systems</li> <li>Water conveyance and distribution</li> <li>Reclaimed water systems</li> </ul>	<ul style="list-style-type: none"> <li>Pump stations / mechanical</li> <li>Pipeline systems / hydraulics</li> <li>Water storage facilities</li> </ul>	<p>20% Available</p> <p>Current workload:</p> <ul style="list-style-type: none"> <li>Burbank S/ADA Troubleshooting &amp; Programming, Controls &amp; Instrumentation Consulting Services</li> <li>Pacific Grove WRF Operational, Training, and Consulting Services</li> <li>Sanval Water Reclamation Facility Conceptual Design Report</li> <li>California City S/ADA Server improvements</li> <li>River Island Controls &amp; Integration Services</li> <li>Pendleton South WWTP Operation Support Services</li> </ul>	<ul style="list-style-type: none"> <li>City of Lathrop Advanced Water Treatment and Recycling Facility Expansion – City of Lathrop, CA</li> <li>Mountain -ouse Water Reclamation Facility Expansion – Tracy, CA</li> <li>Tuolumne Utilities District Sonoma Regional Wastewater Treatment Plant Sonoma, CA</li> <li>Las Virgenes Municipal Water District Tapia Water Reclamation Facility Blower and Aeration Equipment Improvements - Calabasas, CA</li> <li>City of San Clemente Water Reclamation Facility upgrades and improvements - San Clemente, CA</li> <li>Escalon Recycled Water Master Plan expansion Study – Escalon, CA</li> <li>Santa Monica Sustainable Water Infrastructure Project (SW-PI) Advanced Water Treatment Facility – Santa Monica, CA</li> <li>Coronado Satellite Water Recycling Facility (SWRF) – Coronado, CA</li> <li>Burbank Wastewater Reclamation Plant - upgrades – Burbank, CA</li> <li>Solvang Wastewater Treatment Plant Enhanced Treatment Study – Solvang, CA</li> <li>West County Wastewater District (WCW) Plant Energy Upgrades – Richmond, CA</li> <li>Quartzsite Wastewater Treatment Plant Evaluation and Expansion - Quartzsite, AZ</li> </ul>
<b>JACOB PETERSON, PE</b> <i>Lead Process Engineer</i>	17 years BS Civil Engineering, California Polytechnic University PE – CA: 79146 / 2011	<ul style="list-style-type: none"> <li>Wastewater treatment</li> <li>Sewer collection</li> <li>Well Design / Wellhead Treatment</li> <li>Pump stations / mechanical systems</li> <li>Water treatment</li> </ul>	<ul style="list-style-type: none"> <li>Water conveyance and distribution</li> <li>Hydraulic modeling</li> <li>Permitting</li> <li>Plans and specifications</li> <li>Construction oversight</li> <li>Cost estimates</li> </ul>	<p>40% Available</p> <p>Current workload:</p> <ul style="list-style-type: none"> <li>Santa Monica Sustainable Water Infrastructure Project (SW-PI) Advanced Water Treatment Facility</li> </ul>	<ul style="list-style-type: none"> <li>Santa Monica Sustainable Water Infrastructure Project (SW-PI) Advanced Water Treatment Facility - Santa Monica, CA</li> <li>Coronado Satellite Water Recycling Facility (SWRF) – Coronado, CA</li> <li>West County Wastewater District (WCW) Plant Energy Upgrades – Richmond, CA</li> <li>Quartzsite Wastewater Treatment Plant Evaluation and Expansion - Quartzsite, AZ</li> </ul>
<b>ROBERT MURPHY, PE</b> <i>Sr. Project Engineer</i>	16 years BS Civil Engineering, CSU Long Beach PE – CA: C83207 / 2014	<ul style="list-style-type: none"> <li>Wastewater treatment</li> <li>Permitting</li> <li>Reclaimed water systems</li> <li>Water treatment</li> <li>Water conveyance and distribution</li> </ul>	<ul style="list-style-type: none"> <li>Water storage</li> <li>Pump station / mechanical systems</li> <li>Well design / wellhead treatment</li> <li>Surveying services management</li> </ul>	<p>40% Available</p> <p>Current workload:</p> <ul style="list-style-type: none"> <li>Burbank WRP – Raw Influent Pump Replacement</li> <li>Mountain -ouse WRF Phase 4 Expansion</li> </ul>	<ul style="list-style-type: none"> <li>City of Lathrop Advanced Water Treatment and Recycling Facility Expansion – City of Lathrop, CA</li> <li>Mountain -ouse Water Reclamation Facility Expansion – Tracy, CA</li> <li>Las Virgenes Municipal Water District Tapia Water Reclamation Facility Blower and Aeration Equipment Improvements - Calabasas, CA</li> <li>City of San Clemente Water Reclamation Facility upgrades and improvements - San Clemente, CA</li> <li>Escalon Recycled Water Master Plan Expansion Study – Escalon, CA</li> <li>Burbank Wastewater Reclamation Plant - upgrades – Burbank, CA</li> </ul>
<b>CHRIS NAJARIAN, PE</b> <i>Sr. Electrical Engineer</i>	12 years BS Electrical Engineering, Illinois Institute of Technology PE – CA: 22545 / 2018	<ul style="list-style-type: none"> <li>Electrical engineering design</li> <li>Electrical distribution systems</li> <li>NES code compliance</li> <li>OS-A &amp; NFPA safety standards</li> <li>Emergency and backup power equipment</li> </ul>	<ul style="list-style-type: none"> <li>Automated transfer systems</li> <li>Building support electrical systems</li> <li>Emergency repair assessments</li> </ul>	<p>40% Available</p> <p>Current workload:</p> <ul style="list-style-type: none"> <li>West County Wastewater District (WCW) Plant Energy Upgrades</li> <li>Sanval Water Reclamation Facility Conceptual Design Report</li> <li>Tuolumne Utilities District Sonoma Regional Wastewater Treatment Plant</li> </ul>	<ul style="list-style-type: none"> <li>City of Lathrop Advanced Water Treatment and Recycling Facility Expansion – City of Lathrop, CA</li> <li>Mountain -ouse Water Reclamation Facility Expansion – Tracy, CA</li> <li>Las Virgenes Municipal Water District Tapia Water Reclamation Facility Blower and Aeration Equipment Improvements - Calabasas, CA</li> <li>City of San Clemente Water Reclamation Facility upgrades and improvements - San Clemente, CA</li> <li>Santa Monica Sustainable Water Infrastructure Project (SW-PI) Advanced Water Treatment Facility – Santa Monica, CA</li> <li>Burbank Wastewater Reclamation Plant - upgrades – Burbank, CA</li> </ul>
<b>ERNESTO CAMARENA</b> <i>Sr. Instrumentation and Controls Specialist</i>	28 years AA / Applied Science, Computer Aided Drafting, ITI Technical Institute	<ul style="list-style-type: none"> <li>PLCs, S/ADA</li> <li>Field instrumentation</li> <li>Development of P&amp;IDs</li> <li>Start-up, commissioning, and training</li> </ul>	<ul style="list-style-type: none"> <li>Troubleshooting and operations support</li> <li>Software, radio and cellular communications systems</li> </ul>	<p>40% Available</p> <p>Current workload:</p> <ul style="list-style-type: none"> <li>Tuolumne Utilities District Sonoma Regional Wastewater Treatment Plant</li> <li>Mountain -ouse Water Reclamation Facility Expansion</li> </ul>	<ul style="list-style-type: none"> <li>City of Lathrop Advanced Water Treatment and Recycling Facility Expansion – City of Lathrop, CA</li> <li>Mountain -ouse Water Reclamation Facility Expansion – Tracy, CA</li> <li>Tuolumne Utilities District Sonoma Regional Wastewater Treatment Plant – Sonoma, CA</li> <li>Las Virgenes Municipal Water District Tapia Water Reclamation Facility Blower and Aeration Equipment Improvements - Calabasas, CA</li> <li>City of San Clemente Water Reclamation Facility upgrades and improvements - San Clemente, CA</li> <li>Santa Monica Sustainable Water Infrastructure Project (SW-PI) Advanced Water Treatment Facility – Santa Monica, CA</li> <li>Burbank Wastewater Reclamation Plant - upgrades – Burbank, CA</li> <li>Sanval Water Reclamation Facility Conceptual Design Report</li> </ul>

# PROJECT UNDERSTANDING AND APPROACH

## Project Understanding

The City of Manteca's existing wastewater treatment facility has been challenged with capacity and operability deficiencies including nitrogen removal capabilities. It is common for primary treated wastewater to be low in carbon, and a low carbon to nitrogen ratio can limit nitrate reduction. The secondary biological activated sludge systems have relatively low HRT and SRT, and require optimized operation to achieve the required nitrogen removal goals. Better internal recycle pumping, aeration and pumping control, anoxic mixing, and flow distribution is required to advance the facility to the nitrogen removal goals desired.

Currently, the facility operates two independent secondary treatment systems, and the SRT is reduced to optimize sludge production and increase biogas production from the high WAS load. This setup encourages fast carbon uptake and respiration of oxygen, and it is important to improve the combination of carbon and nitrate together to improve nitrate reduction.



With the **upgrades to the project**, the City is looking to:

- I** *Maximize nitrate reduction in both secondary trains using improved internal recycle, instrumentation, mixing, and other controls/operational strategies*
- II** *Other nitrate improvement strategies not included herein include analysis of centrate nitrogen load reduction, intentional carry-over of BOD from primaries into the anoxic zone, and manipulation of SRT*

As part of early design development, the City is seeking to confirm that the initial recommendations are still the preferred design ideology for the WWTP Upgrade. For example, the internal recycle pumping systems may be outfitted with a common collection and re-pumping center instead of individual trains pumping, to simplify the operation and provide a better mixture of nitrate and carbon back to the anoxic reactors. A common collection and re-pumping center is included for the same design as proposed herein, if selected. Also, as part of the capacity assessment, a Bio-Win model will be created and refined including an assessment of centrate nitrogen treatment with a sidestream reactor. This will reduce the nitrogen load and improve the carbon to nitrogen ratio of the secondary reactors. The model will also look at combinations of reactors online. It will also include reducing the number of primary reactors when BOD is low in the anoxic reactor, to assess if turning primaries off will benefit nitrate removal.

Main SCADA screen overview during 8/17/22 site visit with Dustin and Cody at Manteca WWTP. A detailed Bio-Win model will be created to assess the proposed nitrate removal systems proposed, along with other concepts, including centrate treatment, primary clarifier reduction, and other concepts.



Secondary effluent during 8/17/22 site visit. Ideally, improved nitrate removal will be provided while maintaining other facility functions, including good filtration ability and high sludge/biogas production.



Proposed secondary process improvements include new internal recycle pumping (possibly with a new central pump station configuration), better anoxic mixing, enhanced flow splitting, and better instrumentation monitoring and control. Possibly additional adjustments can be made to primary



Enhanced denitrification will reduce aeration air. Even if primary effluent is strategically altered to provide more carbon in the anoxic zone, the carbon will be removed without additional air. More sludge will be produced to improve the loss of primary sludge in this method if selected for implementation.



# WWTP Upgrade Project Approach And Concepts

## simple operation

### 1 Simple Process and Clean Organization Minimizes Total Life-Cycle Cost

One of the goals of the secondary process upgrades is to provide a system that is consistent in operation and doesn't require excessive adjustment of fine tuning on a frequent basis. By increasing anoxic mixing, reducing the nitrogen load from centrate, increasing primary BOD, and controlling tightly the internal recycle with ORP and other instrumentation, the denitrification process can become very reliable in a straightforward operational process.

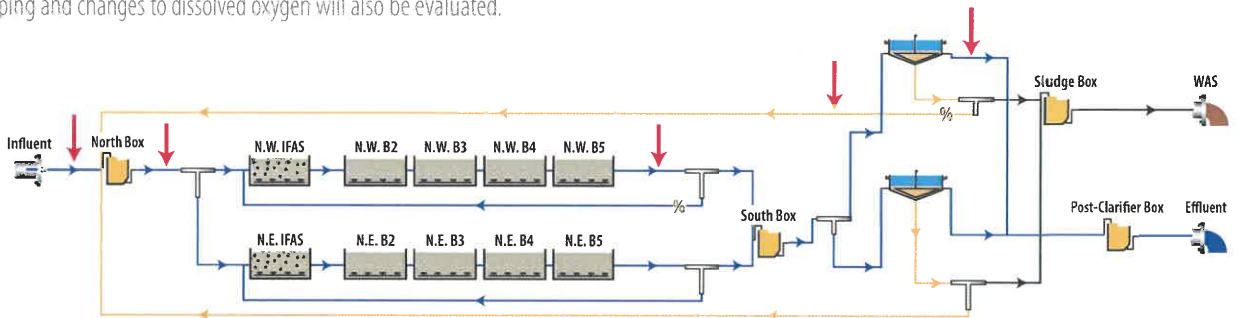
▶ Nearby, City of Lathrop WRF has high nitrogen similar to Manteca, and the secondary process internal recycle and RAS pumping has simple process control to maintain very low nitrogen.



## treats variable load

### 2 Understanding Diurnal Load Provides Efficient Operation Flexibility in Variable Load Conditions

A process flow model will be created to understand how to optimize the facility operation under changes in flow and load to maintain consistent nitrogen removal. Potentially equalization, centrate treatment/holding, and reducing the number of trains of primary and secondary will be evaluated. The increase in pumping and changes to dissolved oxygen will also be evaluated.



▲ Nearby, City of Escalon, CA BioWin modeling used to optimize the system process configurations.

## low capital cost

### 3 Potential Single Area Location for Internal Recycle Pumping Reduces Construction Scope



All of the proposed internal recycle pumping ideally could be located together on the discharge of the secondary basins to provide homogenous mixing of all trains and optimized nitrate transfer back to the anoxic zone. All piping runs, conduit, wire, and instrumentation cabling will be minimized to reduce construction cost. Operators will benefit from reduced equipment and close proximity of materials and equipment.

◀ Nearby Mountain House, CA recycle pumping center with low lift pumps and no valves.

## Scope of Services

### 1 Progress Meetings, Project Schedule, and Coordination

Project Manager, Andy Komor, will continue to be the City's lead point of communication and management for the wastewater upgrade to ensure a successful and well-thought-out project, delivered on time and on budget. Andy and Project Coordinator, Dianne Lora, will prepare and update project management documents, including a real-time updated design schedule Gantt Chart, and detailed monthly written progress updates, including written documentation of key decisions made throughout the project, invoice preparation, critical path identification, etc. Andy will also provide weekly updates by phone and email, monthly site visits and presentations to City staff, and manage the overall project team, consultants, regulatory progress, utility agencies, and stakeholders. In addition to informal conference calls or virtual meetings, the PACE project team will participate in up to five formal progress meetings throughout the project.

### 2 Project Specifications, Cost Estimates, 75%/100% Drawings Packages

Lead CAD Production Manager, Tom Gutierrez, will develop all project basefiles. Basefiles will include existing systems demolition identification, connections to existing infrastructure and piping, and new digital files of existing basins, equipment, and utilities. Existing linework and information, including annotation, will be created in digital format for use in the subsequent plan development. Utility coordination is a critical component of the design to match connections from existing to new infrastructure. Additional site research and background data collection will be performed by Sr. Electrical Engineer, Chris Najarian, and Sr. Project Engineer, Robert Murphy. The site research visit will also be used for the project team to gather any existing plans and additional information regarding utilities, critical dimensions, and other existing conditions and conduct interviews with plant operators and maintenance staff for their needs with the new upgrades.

PACE's design team shall provide all custom technical specifications and project manuals (and City front-end documents), as outlined in the RFP, including the major equipment performance specifications, the solar specifications, the summary of work, sequence of construction, and the sequence of operation/control strategy and programming. At each design phase, the specifications shall be updated with additional levels of detail. PACE shall provide a bid schedule in a format that can be grouped and compared with the engineer's construction cost estimate. The specifications will be QA/QC checked by Senior Project Engineers, Duncan Lee and Robert Murphy, who specialize in construction administration at PACE. Digital copies will be prepared at each design iteration, and three hard copies of the specifications stamped and signed will be provided after final document preparation.

PACE will prepare cost estimates with portions filled in with the real quantity and cost information including equipment budgeted by vendors. The cost estimates will be prepared by senior staff including Principal, James Matthews and Project Manager, Andy Komor. The recent construction costs of multiple PACE-designed wastewater projects in California will be used to base unit costs. Capital costs will be provided with the milestone design package deliverables and include demolition, mechanical equipment, electrical equipment, instrumentation equipment, installation costs, startup and commissioning, and warranty. Operations and maintenance costs will include labor, power, repair, replacement, software, lab, and reporting. All cost estimates will be provided digitally in Excel format to the City.

% COMPLETION	GENERAL	DEMO	MECH	ELECT	P&ID	TOTAL
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▲ Table 1 – Estimated number of WWTP upgrade plan sheets per design completion phase.

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It is imperative to create a detailed and well-thought-out plan for construction sequencing on a brown-field construction project where construction occurs during ongoing facility operation and with live utilities present. As part of this task, Project Manager, Andy Komor, Principal, James Matthews, and Sr. Electrical Engineer, Chris Najarian will meet with the City and project stakeholders and create an example contractor Sequence of Construction with detailed step-by-step instructions, including stakeholder interaction requirements. This Sequence of Construction will be provided in the summary of the Work Specifications section, with appendices of the specifications to include all listed elements from the RFP, including an organized sample Gantt chart of activities and exhibits color coded with the various suggested stages of work. This consultant-driven construction sequencing intends to present one way to perform the work, and it is not intended to dictate the means and methods used by the selected contractor. It will provide backup of the intended delays and coordination needed with existing operations and the utility, which will assist with avoiding unexpected contractor costs or change order requests.

### 3 *Cal Energy Commission Report*

PACE will evaluate reduction in energy use with enhanced denitrification, by reducing of aeration air caused by reduced carbon without air. A power monitor will be provided on the existing aeration air system to confirm existing power demands, and it will be calibrated with the BioWin Model for air demand. Then the updates to the project will be modeled for reduced aeration demand, and the final installation will be monitored again after completion. The results will be included in the energy commission report.

### 4 *Capacity Studies and BioWin Technical Memo*

Task 4 will determine the direction of the design, size of the facilities, quantity of equipment, layout, and type of equipment to use. Dr. Shanka Gedara will provide BioWin Modeling of the system configurations including the enhanced mixing, internal recycle, DO control, and other elements. He will also provide modeling of centrate treatment and primary treatment reduction to determine net benefit to denitrification. The entire project team led by Project Manager, Andy Komor, Principal, James Matthews, and Sr. Project Engineer, Robert Murphy, will focus on these decisions to ensure the City, Operators, and Stakeholders are comfortable and excited about the proposed upgrade solutions. Two design charrettes will be provided to present the recommended design direction and receive and incorporate project team comments. Before the initial design charrette, PACE will provide the City with key documents to be provided, including 30% design level submittal of equipment lists along with specifications for major equipment, hydraulic profile, process and instrumentation diagrams (P&IDs), control strategy, electrical one-line diagram, and Basis of Design table. The capacity, system sizing, redundancy, backup power supply, and other decisions will be made considering the target budget, a reasonable level of improvements, and the overall upgrade needs.

Additional project development, including equipment sizing and layouts are included in this proposal to assist the City in understanding the cost risks. The result of the additional concept development and it demonstrates a simple, straightforward, and cost-effective implementation approach.

### 5 *Replace Internal Mixed Liquor Recycle Pumps*

PACE's Project Manager, Andy Komor, and Sr. Project Engineer, Robert Murphy, will lead the team to provide additional information and details to improve internal recycle pumping including individual pumps or common "center based" pumping. The recommended upgrade will be described and finalized with overall process design calculations/Basis of Design information, process and instrumentation diagrams, and mechanical, electrical of the upgraded facility. PACE will provide draft mechanical engineering design including components, piping, minor equipment, instrumentation, and hydraulic structures of new proposed facilities as needed, and will provide design of the selected alternative process mechanical and electrical components. The mechanical design will include AutoCAD MEP 3D design sheets and a 2D plan and section. An equipment list

will be provided and will be based on early phase major equipment specifications for vendor solicitation. PACE will provide a draft electrical engineering design including electrical notes, a single line diagram of proposed loads onto existing and proposed service distribution equipment, new electrical load calculations, field conduit layout, and draft electrical details for new proposed facilities. The PACE team will provide an operability review of the design in progress, selected components, and check the design progress against capital, operation, and present worth cost estimates.

## 6 *Fix Flow Spilt*

PACE's team will provide an analysis of hydraulic characteristics of the flow spilt and determine optimization strategies to streamline the flow split to improve operation including denitrification during all periods of the day. Flow split strategies will be developed through the modeling process, and process variable control will be developed to optimize the flow split. Possibly, combining or recombining the secondary mixed liquor will be considered if feasible to simplify recycling of flows. Centrate and filter backwash return flows will also be considered. The resulting recommendations will be implemented in a design with process mechanical, electrical, instrumentation, etc.

## 7 *Add Zone B Mixing System*

PACE will provide selection of new mixing equipment after reviewing options with the City including coarse bubble systems, big bubble systems, propeller mixers, and pumped mixing. Once selected, draft mechanical engineering design including components, piping, and minor equipment of new proposed facilities will be provided as needed, and PACE will provide design of the selected alternative process mechanical and electrical components. The mechanical design will include AutoCAD MEP 3D design sheets and a 2D plan and section. An equipment list will be provided and will be based on early phase major equipment specifications for vendor solicitation. PACE will provide a draft electrical engineering design including electrical notes, a single line diagram of proposed loads onto existing and proposed service distribution equipment, new electrical load calculations, field conduit layout, and draft electrical details for new proposed facilities.

## 8 *Add Process Aeration Control for DeNite*

PACE will provide insight and alternatives for various process control instrumentation concepts including new probes for ORP, nitrate, nitrite, ammonia, and biological activity. The pros and cons, reliability, and accuracy (and cost) of the various systems will be presented for review by City Operations. Locations of the proposed instruments and upgrades to process control variables including aeration air, internal recycle pumping, wasting, and other parameters will be evaluated. The selected instruments shall be designed into the facility including mounting, electrical, mechanical, etc. including P&ID upgrades and sequence of operation specification.

## 9 *Bidding Assistance*

PACE's Project Manager, Andy Komor, and Sr. Project Engineer, Robert Murphy, will attend the pre-bid meeting to present the project to the contractors in an organized manner to ensure comfort with the design intent. Attendance at this meeting will include a PowerPoint presentation and a site walk tour. PACE's staff will also answer questions from the contractors during the bid process, issue contract bid addendums as needed, and incorporate any clarifications to the design drawings used for construction.

## 10 *Construction Phase Support Services*

PACE has provided a budget cost of \$80,000 for construction phase support, as estimated in the fee worksheet, to provide site visits during construction (6 site visits), respond to contractor design-related questions and information requests, and review key submittals at the City's request. PACE shall provide key feedback on the construction progress, startup, commissioning, and control systems to ensure a successful design outcome.

# 11 Operation and Maintenance Manuals

PACE will provide digital operation and maintenance manuals with custom operational control strategy and operational objectives, along with vendor information. Operational cheat sheets with condensed graphs will be provided to fine tune the new systems to improve operation. Two revisions are included in this task.

## ASSUMPTIONS

- Public outreach activities other than Board meeting presentations are not included in this scope.
- CEQA/NEPA processing is assumed based on a Negative Declaration / Finding of No Significant Impacts (ND/FONSI), and no environmental permitting is included.
- Electrical planning services include coordination with the local utility, applications for change in electrical service is included for up to 10 man-hours (includes utility coordination for a solar power system).
- Trace contaminants and salts treatment not typical of primary, secondary, and tertiary processes is not included in the project scope, including advanced oxidation and RO desalination.
- Items expected to be provided by the City:
  - Water quality data representing influent conditions
  - Base files
  - Site access
  - Repair logs
  - Existing utility information research and mapping. Potholing for utility survey purposes.
- Any proposed project changes which affect work in progress or previously completed will be justification for additional compensation.
- The fees proposed herein shall apply for one year from the date of the proposal. Due to ever-changing costs, Consultant will increase those portions of the contract fee for which work must still be completed after one year from the date of proposal, as negotiated with the Client up to a maximum of ten percent (10%).

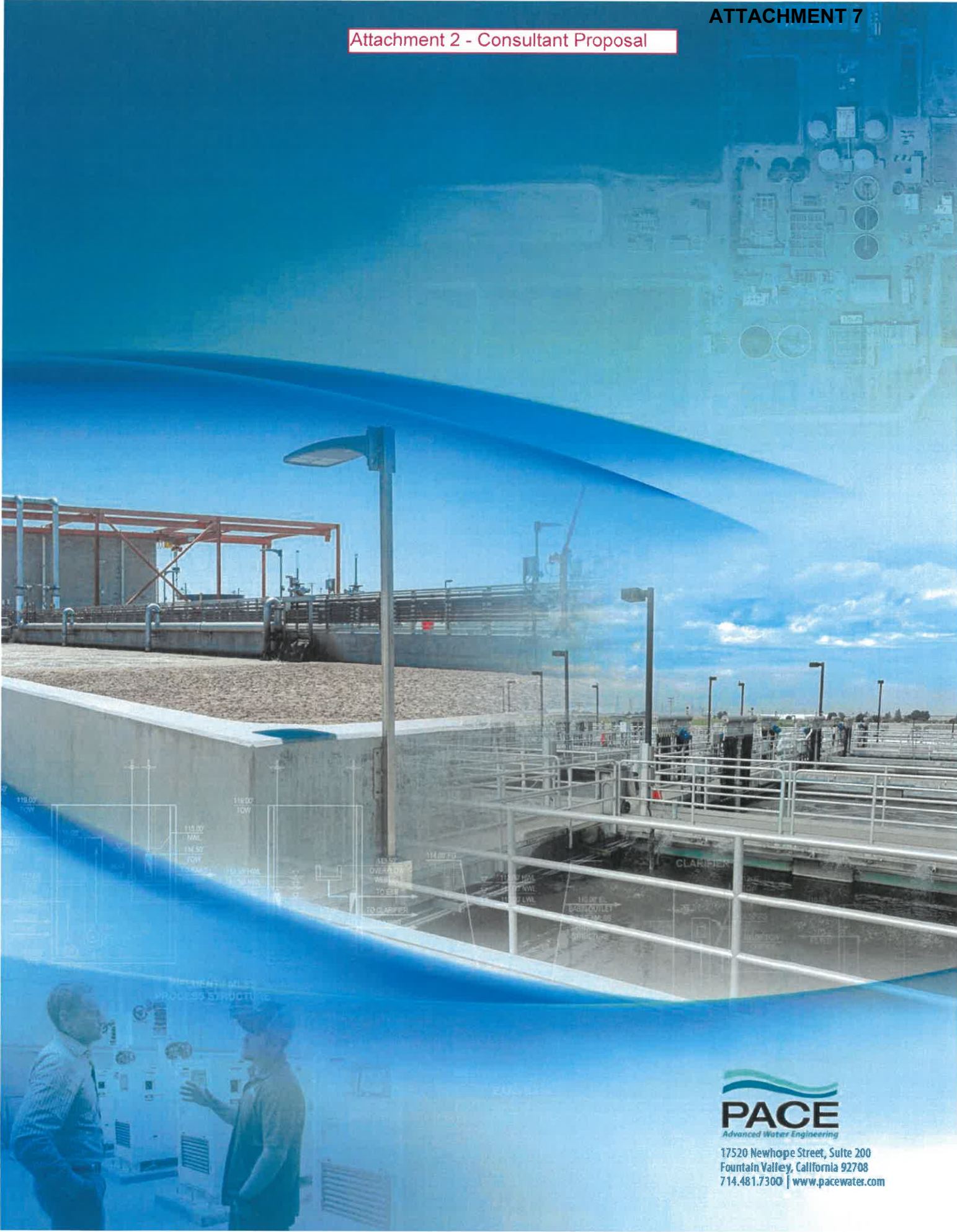
## WORK SCHEDULE

TASK NUMBER AND DESCRIPTION	WK 1	WK 2	WK 3	WK 4	WK 5	WK 6	WK 7	WK 8	WK 9	WK 10	WK 11	WK 12	WK 13	WK 14	WK 15	WK 16	WK 17	WK 18	WK 19	WK 20	WK 21	WK 22	WK 23	WK 24	WK 25	WK 26	WK 27	WK 28	WK 29	WK 30
1 Progress Meetings, Project Schedule, and Coordination	[Bar]																													
2 Project Specifications, Cost Estimates, 75% Package	[Bar]					[Bar]					[Bar]					[Bar]					[Bar]									
City Review	[Bar]												[Bar]																	
Project Specifications, Cost Estimates, 100% Package	[Bar]															[Bar]														
City Review	[Bar]																							[Bar]						
Project Specifications, Cost Estimates, Final Package	[Bar]																									[Bar]				
3 Cal Energy Commission Report	[Bar]															[Bar]														
4 Capacity Studies Tech Memo	[Bar]					[Bar]					[Bar]					[Bar]														
5 Replace Internal Mixed Liquor Recycle Pumps	[Bar]			[Bar]			[Bar]			[Bar]			[Bar]			[Bar]			[Bar]											
6 Fix Flow Split to North Plant Aeration Basins	[Bar]				[Bar]				[Bar]				[Bar]				[Bar]													
7 Add Zone B Mixing System	[Bar]						[Bar]						[Bar]						[Bar]											
8 Add Process Aeration Control for DeNite	[Bar]															[Bar]														
9 Bidding Assistance	[Bar]					[Bar]					[Bar]					[Bar]														
10 Construction Phase Support (6 Site Visits)	[Bar]																													[Bar]
11 Operation and Maintenance Manuals	[Bar]																													[Bar]

\* Construction duration is estimated to run approximately 14 months and the O&M manual will be developed at the end of construction.

## EXCEPTIONS TO PROFESSIONAL SERVICES AGREEMENT

PACE has no exceptions to the terms contained in the City's Agreement for Professional Services (Appendix C).



17520 Newhope Street, Suite 200  
Fountain Valley, California 92708  
714.481.7300 | [www.pacewater.com](http://www.pacewater.com)

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### 3 *Cal Energy Commission Report*

**PACE shall provide an assessment and final revision to the calculations, data, description, and report for the previously installed waste-to-energy project. The report shall confirm energy savings with that previously installed project. See Task 8 for additional energy assessment for the denitrification project.**

### 4 *Capacity Studies and BioWin Technical Memo*

Task 4 will determine the direction of the design, size of the facilities, quantity of equipment, layout, and type of equipment to use. Dr. Shanka Gedara will provide BioWin Modeling of the system configurations including the enhanced mixing, internal recycle, DO control, and other elements. He will also provide modeling of centrate treatment and primary treatment reduction to determine net benefit to denitrification. The entire project team led by Project Manager, Andy Komor, Principal, James Matthews, and Sr. Project Engineer, Robert Murphy, will focus on these decisions to ensure the City, Operators, and Stakeholders are comfortable and excited about the proposed upgrade solutions. Two design charrettes will be provided to present the recommended design direction and receive and incorporate project team comments. Before the initial design charrette, PACE will provide the City with key documents to be provided, including 30% design level submittal of equipment lists along with specifications for major equipment, hydraulic profile, process and instrumentation diagrams (P&IDs), control strategy, electrical one-line diagram, and Basis of Design table. The capacity, system sizing, redundancy, backup power supply, and other decisions will be made considering the target budget, a reasonable level of improvements, and the overall upgrade needs.

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PACE's team will provide an analysis of hydraulic characteristics of the flow spilt and determine optimization strategies to streamline the flow split to improve operation including denitrification during all periods of the day. Flow split strategies will be developed through the modeling process, and process variable control will be developed to optimize the flow split. Possibly, combining or recombining the secondary mixed liquor will be considered if feasible to simplify recycling of flows. Centrate and filter backwash return flows will also be considered. The resulting recommendations will be implemented in a design with process mechanical, electrical, instrumentation, etc.

## 7 *Add Zone B Mixing System*

PACE will provide selection of new mixing equipment after reviewing options with the City including coarse bubble systems, big bubble systems, propeller mixers, and pumped mixing. Once selected, draft mechanical engineering design including components, piping, and minor equipment of new proposed facilities will be provided as needed, and PACE will provide design of the selected alternative process mechanical and electrical components. The mechanical design will include AutoCAD MEP 3D design sheets and a 2D plan and section. An equipment list will be provided and will be based on early phase major equipment specifications for vendor solicitation. PACE will provide a draft electrical engineering design including electrical notes, a single line diagram of proposed loads onto existing and proposed service distribution equipment, new electrical load calculations, field conduit layout, and draft electrical details for new proposed facilities.

## 8 *Add Process Aeration Control for DeNite*

PACE will provide insight and alternatives for various process control instrumentation concepts including new probes for ORP, nitrate, nitrite, ammonia, and biological activity. The pros and cons, reliability, and accuracy (and cost) of the various systems will be presented for review by City Operations. Locations of the proposed instruments and upgrades to process control variables including aeration air, internal recycle pumping, wasting, and other parameters will be evaluated. The selected instruments shall be designed into the facility including mounting, electrical, mechanical, etc. including P&ID upgrades and sequence of operation specification.

**Task 8 also includes an assessment of energy reduction or change in electrical use from enhanced denitrification process recommended and implemented. The changes shall be quantified and included in the design documents.**

## 9 *Bidding Assistance*

PACE's Project Manager, Andy Komor, and Sr. Project Engineer, Robert Murphy, will attend the pre-bid meeting to present the project to the contractors in an organized manner to ensure comfort with the design intent. Attendance at this meeting will include a PowerPoint presentation and a site walk tour. PACE's staff will also answer questions from the contractors during the bid process, issue contract bid addendums as needed, and incorporate any clarifications to the design drawings used for construction.

## 10 *Construction Phase Support Services*

PACE has provided a budget cost of \$80,000 for construction phase support, as estimated in the fee worksheet, to provide site visits during construction (6 site visits), respond to contractor design-related questions and information requests, and review key submittals at the City's request. PACE shall provide key feedback on the construction progress, startup, commissioning, and control systems to ensure a successful design outcome.

**Task 10 includes up to 30 submittal reviews, 20 RFI responses for construction phase activities and equipment. Task 10 also includes a custom operational strategy write up to be included in the digital Operations Manual to describe how to use new equipment and instruments, along with compiling the vendor O&Ms.**

## 11 *Operation and Maintenance Manuals*

PACE will provide digital operation and maintenance manuals with custom operational control strategy and operational objectives, along with vendor information. Operational cheat sheets with condensed graphs will be provided to fine tune the new systems to improve operation. Two revisions are included in this task.

# ASSUMPTIONS

1. Public outreach activities other than Board meeting presentations are not included in this scope.
2. CEQA/NEPA processing is assumed based on a Negative Declaration / Finding of No Significant Impacts (ND/FONSI), and no environmental permitting is included.
3. Electrical planning services include coordination with the local utility, applications for change in electrical service is included for up to 10 man-hours (includes utility coordination for a solar power system).
4. Trace contaminants and salts treatment not typical of primary, secondary, and tertiary processes is not included in the project scope, including advanced oxidation and RO desalination.
5. Items expected to be provided by the City:
  - a. Water quality data representing influent conditions
  - b. Base files
  - c. Site access
  - d. Repair logs
  - e. Existing utility information research and mapping. Potholing for utility survey purposes.
6. Any proposed project changes which affect work in progress or previously completed will be justification for additional compensation.
7. The fees proposed herein shall apply for one year from the date of the proposal. Due to ever-changing costs, Consultant will increase those portions of the contract fee for which work must still be completed after one year from the date of proposal, as negotiated with the Client up to a maximum of ten percent (10%).

Attachment 2 - Scope of Work

**ENGINEERING FEE ESTIMATE  
PROJECT WORKSHEET**



**Project Data**  
 Project: City of Manteca WQCF Capacity Improvement  
 Client: City of Manteca  
 PACE Job Number: C032  
 Initial Estimate Date: September 14, 2022

**TOTAL FEE TASKS 1-11: \$461,870**

TASK	PACE									Man-Power Subtotal Hours	Man-Power Subtotal Fee	Printing	Total Task Cost
	Eng Principal	Project Manager	Electrical Engineer	Process Engineer	I&C Specialist	Project Engineer	Sr. CAD Designer	Project Coordinator					
	\$255	\$220	\$215	\$185	\$155	\$160	\$140	\$95					
	Matthews	Korner	Najarian	Murphy	Camarena	Mills, Tg. Gedara	Gutierrez, Chin	Lora					
1	Progress Meetings, Project Schedule, and Coordination	8	80	8	12	4	24		40	176	\$31,840		\$31,840
2	Project Specifications, Cost Estimates, 75%/100% Drawings Package	2	36	8	40	8	80	80	40	294	\$46,590	\$800	\$47,390
3	Cal Energy Commission Report	4	4	48	4		60		16	136	\$24,080		\$24,080
4	Capacity Studies and BioWin Tech Memo	2	16		40		120		8	186	\$31,390		\$31,390
5	Replace Internal Mixed Liquor Recycle Pumps	2	20	20	40	20	60	180	8	350	\$55,270		\$55,270
6	Fix Flow Split to North Plant Aeration Basins	2	16		48	20	20	120	8	234	\$36,770		\$36,770
7	Add Zone B Mixing System	2	12	16	48	20	20	80	8	206	\$33,730		\$33,730
8	Add Process Aeration Control for DeNite	8	24	48	60	80	80	160	12	472	\$77,480		\$77,480
9	Bidding Assistance		16	8	24		12		24	84	\$13,880		\$13,880
10	Construction Phase Support (6 Site Visits)		100	24	120	24	240		40	548	\$95,280		\$95,280
11	Operation and Maintenance Manuals		4		24		40		32	100	\$14,760		\$14,760
	<b>TOTAL TASKS 1-11</b>	<b>30</b>	<b>328</b>	<b>180</b>	<b>460</b>	<b>176</b>	<b>796</b>	<b>620</b>	<b>236</b>	<b>2786</b>	<b>\$461,070</b>	<b>\$800</b>	<b>\$461,870</b>

ATTACHMENT 3  
SCHEDULE OF ACTIVITIES



# WORK SCHEDULE

TASK NUMBER AND DESCRIPTION	WK 1	WK 2	WK 3	WK 4	WK 5	WK 6	WK 7	WK 8	WK 9	WK 10	WK 11	WK 12	WK 13	WK 14	WK 15	WK 16	WK 17	WK 18	WK 19	WK 20	WK 21	WK 22	WK 23	WK 24	WK 25	WK 26	WK 27	WK 28	WK 29	WK 30
1 Progress Meetings, Project Schedule, and Coordination	[Solid Blue Bar]																													
2 Project Specifications, Cost Estimates, 75% Package																														
City Review																														
Project Specifications, Cost Estimates, 100% Package																														
City Review																														
Project Specifications, Cost Estimates, Final Package																														
3 Cal Energy Commission Report																														
4 Capacity Studies Tech Memo																														
5 Replace Internal Mixed Liquor Recycle Pumps																														
6 Fix Flow Split to North Plant Aeration Basins																														
7 Add Zone B Mixing System																														
8 Add Process Aeration Control for DeNite																														
9 Bidding Assistance																														
10 Construction Phase Support (6 Site Visits)																														
11 Operation and Maintenance Manuals																														

\* Construction duration is estimated to run approximately 14 months and the O&M manual will be developed at the end of construction.  
**Project is estimated to be completed by December 31, 2024**

ATTACHMENT 4  
INSURANCE REQUIREMENTS





**WAIVER OF OUR RIGHT TO RECOVER FROM OTHERS ENDORSEMENT**

We have the right to recover our payments from anyone liable for an injury covered by this policy. We will not enforce our right against the person or organization named in the Schedule. (This agreement applies only to the extent that you perform work under a written contract that requires you to obtain this agreement from us.)

This agreement shall not operate directly or indirectly to benefit anyone not named in the Schedule.

Schedule

**Blanket Waiver**

**Person/Organization:**

Blanket Waiver - Any person or organization for whom the Named Insured has agreed by written contract to furnish this waiver.

**Job Description**

All AZ Operations

**Waiver Premium**

This endorsement changes the policy to which it is attached and is effective on the date issued unless otherwise stated.

**(The information below is required only when this endorsement is issued subsequent to preparation of the policy.)**

Endorsement Effective: 03/02/2022

Policy No.: PAWC332710

Endorsement No.:

Insured: Pacific Advanced Civil Engineering, Inc.

Premium \$

Insurance Company: Oak River Insurance Company

**WC 00 03 13**

Countersigned by \_\_\_\_\_

(Ed. 4-84)

**THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.**

## **BUSINESS AUTO PROTECTION - GOLD**

This endorsement modifies insurance provided under the following:  
BUSINESS AUTO COVERAGE FORM

### **SUMMARY OF COVERAGES**

- A. Effect of This Endorsement
- B. Newly Acquired or Formed Entities
- C. Employees as Insureds – Nonowned Autos
- D. Additional Insured by Contract, Permit or Agreement
- E. Supplementary Payments – Bail Bonds
- F. Supplementary Payments – Loss of Earnings
- G. Personal Effects and Property of Others Extension
- H. Prejudgment Interest Coverage
- I. Fellow Employee – Officer, Managers and Supervisors
- J. Hired Auto Physical Damage
- K. Temporary Substitute Autos – Physical Damage Coverage
- L. Expanded Towing Coverage
- M. Auto Loan or Lease Coverage
- N. Original Equipment Manufacturer Parts – Leased Private Passenger Types
- O. Deductible Amendments
- P. Rental Reimbursement Coverage
- Q. Expanded Transportation Expense
- R. Extra Expense – Stolen Autos
- S. Physical Damage Limit of Insurance
- T. New Vehicle Replacement Cost
- U. Physical Damage Coverage Extension
- V. Transfer of Rights of Recovery Against Others To Us
- W. Section IV – Business Auto Conditions – Notice of and Knowledge of Occurrence
- X. Hired Car Coverage Territory
- Y. Emergency Lock Out
- Z. Cancellation Condition

**COMMERCIAL AUTO  
AC 70 05 03 16**

**A. EFFECT OF THIS ENDORSEMENT**

Coverage provided under this policy is modified by the provisions of this endorsement. If there is any conflict between the provisions of this endorsement and the provision(s) of any state-specific endorsement also attached to this policy, then the provision(s) of the state-specific endorsement shall apply instead of the provisions of this endorsement that are in conflict, but only to the extent of the conflict, and only to the extent necessary to bring such provisions into conformance with the state requirement(s) contained in the provision(s) of the state-specific endorsement.

**B. NEWLY ACQUIRED OR FORMED ENTITIES**

The Named Insured shown in the Declarations is amended to include any organization you newly acquire or form, other than a partnership, joint venture, or limited liability company, and over which you maintain ownership or majority (more than 50%) interest; if there is no other similar insurance available to that organization. Coverage under this provision is afforded until the 180<sup>th</sup> day after you acquire or form the organization or the end of the policy period, whichever is later.

**C. EMPLOYEES AS INSURED – NONOWNED AUTOS**

The following is added to paragraph A.1. Who Is An Insured of SECTION II – COVERED AUTOS LIABILITY COVERAGE:

- d. Any "employee" of yours is an "insured" while using a covered "auto" you don't own, hire or borrow in your business or your personal affairs.

**D. ADDITIONAL INSURED BY CONTRACT, PERMIT OR AGREEMENT**

The following is added to A.1. Who Is An Insured of SECTION II – COVERED AUTOS LIABILITY COVERAGE:

Any person or organization that you are required to name as an additional insured in a written contract or agreement that is executed or signed by you prior to a "bodily injury" or "property damage" occurrence is an "insured" for Covered Auto Liability coverage. However, with respect to covered "autos", such person or organization is an insured only to the extent that person or organization qualifies as an "insured" under A.1. Who is an Insured of SECTION II – COVERED AUTOS LIABILITY COVERAGE:

If specifically required by the written contract or agreement referenced in the paragraph above, any coverage provided by this endorsement to an additional insured shall be primary and any other valid and collectible Insurance available to the additional insured shall be non-contributory with this insurance. If the written contract does not require this coverage to be primary and the additional insured's coverage to be non-contributory, then this insurance will be excess over any other valid and collectible insurance available to the additional insured.

**E. SUPPLEMENTARY PAYMENTS – BAIL BONDS**

Supplementary Payments of SECTION II – COVERED AUTOS LIABILITY COVERAGE is revised as follows:

- (2) Up to \$2,500 for cost of bail bonds (including bonds for related traffic law violations) required because of an "accident" we cover. We do not have to furnish these bonds.

**F. SUPPLEMENTARY PAYMENTS – LOSS OF EARNINGS**

Supplementary Payments of the SECTION II – COVERED AUTOS LIABILITY COVERAGE is revised as follows:

- (4) All reasonable expenses incurred by the "insured" at our request, including actual loss of earnings up to \$500 a day because of time off from work.

**G. PERSONAL EFFECTS AND PROPERTY OF OTHERS EXTENSION**

1. The Care, Custody or Control Exclusion of SECTION II – COVERED AUTOS LIABILITY COVERAGE, does not apply to "property damage" to property, other than your property, up to an amount not exceeding \$250 in any one "accident". Coverage is excess over any other valid and collectible insurance.

2. The following paragraph is added to A.4. Coverage Extensions of SECTION III – PHYSICAL DAMAGE COVERAGE:

- c. We will pay up to \$500 for your property that is lost or damaged as a result of a covered "loss", without applying a deductible. Coverage is excess over any other valid and collectible insurance.

**COMMERCIAL AUTO  
AC 70 05 03 16**

**H. PREJUDGMENT INTEREST COVERAGE**

The following paragraph is added to SECTION II – COVERED AUTOS LIABILITY COVERAGE, 2. Coverage Extensions, a. Supplementary Payments:

- (7) Prejudgment interest awarded against the "insured" on that part of the judgment we pay. If we make an offer to pay the applicable limit of insurance, we will not pay any prejudgment interest based on that period of time after the offer.

**I. FELLOW EMPLOYEE – OFFICERS, MANAGERS, AND SUPERVISORS**

The Fellow Employee Exclusion in SECTION II – COVERED AUTOS LIABILITY COVERAGE is replaced as follows:

- A. "Bodily injury" to any fellow "employee" of the "insured" arising out of and in the course of the fellow "employee's" employment or while performing duties related to the conduct of your business. This exclusion does not apply to an "insured" who occupies a position as an officer, manager, or supervisor.

**J. HIRED AUTO PHYSICAL DAMAGE**

If covered "auto" designation symbols 1 or 8 apply to Liability Coverage and if at least one "auto" you own is covered by this policy for Comprehensive, Specified Causes of Loss, or Collision coverages, then the Physical Damage coverages provided are extended to "autos" you lease, hire, rent or borrow without a driver; and provisions in the Business Auto Coverage Form applicable to Hired Auto Physical Damage apply up to a limit of \$100,000. The deductible will be equal to the largest deductible applicable to any owned "auto" for that coverage. Any Comprehensive deductible does not apply to fire or lightning.

**K. TEMPORARY SUBSTITUTE AUTOS – PHYSICAL DAMAGE COVERAGE**

The following is added to paragraph C. Certain Trailers, Mobile Equipment And Temporary Substitute Autos of SECTION I - COVERED AUTOS:

If Physical Damage Coverage is provided by this Coverage Form, the following types of vehicles are also covered "autos" for Physical Damage Coverage:

Any "auto" you do not own while used with the permission of its owner as a temporary

substitute for a covered "auto" you own that is out of service because of its:

- a. Breakdown;
- b. Repair;
- c. Servicing;
- d. "Loss"; or
- e. Destruction

The coverage that applies is the same as the coverage provided for the vehicle being replaced.

**L. EXPANDED TOWING COVERAGE**

1. We will pay up to:
  - a. \$100 for a covered "auto" you own of the private passenger type, or
  - b. \$500 for a covered "auto" you own that is not of the private passenger type,
 for towing and labor costs incurred each time the covered "auto" is disabled. However, the labor must be performed at the place of disablement.
2. This coverage applies only for an "auto" covered on this policy for Comprehensive or Specified Causes of Loss Coverage and Collision Coverages.
3. Payment applies in addition to the otherwise applicable amount of each coverage you have on a covered "auto".

**M. AUTO LOAN OR LEASE COVERAGE**

1. In the event of a total "loss" to a covered "auto", we will pay any unpaid amount due on the loan or lease, including up to a maximum of \$500 for early termination fees or penalties, for your covered "auto" less:
  - a. The amount paid under SECTION III – PHYSICAL DAMAGE COVERAGE of this policy; and
  - b. Any:
    - 1) Overdue lease/loan payments at the time of the "loss";
    - 2) Financial penalties imposed under a lease for excessive use, abnormal wear and tear or high mileage;
    - 3) Security deposits not refunded by a lessor;
    - 4) Costs of extended warranties, Credit Life insurance, Health, Accident, or Disability insurance purchased with the lease; and

**COMMERCIAL AUTO  
AC 70 05 03 16**

- 5) Carry-over balances from previous leases.
2. This coverage only applies to a "loss" which is also covered under this policy for Comprehensive, Specified Causes of Loss, or Collision coverage.
3. Coverage does not apply to any unpaid amount due on a loan for which the covered "auto" is not the sole collateral.

**N. ORIGINAL EQUIPMENT MANUFACTURER PARTS – LEASED PRIVATE PASSENGER TYPES**

Under Paragraph C. Limit of Insurance of SECTION III – PHYSICAL DAMAGE COVERAGE, Section 4 is added as follows:

4. We will use new original equipment vehicle manufacturer parts for any private passenger type covered "auto" where required by the lease agreement which has a term of at least six months. If a new original equipment vehicle manufacturer part is not in production or distribution we may use a like, kind and quality replacement part.

**O. DEDUCTIBLE AMENDMENTS**

The following are added to the Deductible provision of SECTION III – PHYSICAL DAMAGE COVERAGE:

If another policy or coverage form that is not an automobile policy or coverage form issued by this company applies to the same "accident", the following applies:

1. If the deductible under this coverage is the smaller (or smallest) deductible, it will be waived:
2. If the deductible under this coverage is not the smaller (or smallest) deductible, it will be reduced by the amount of the smaller (or smallest) deductible.

If a Comprehensive or Specified Causes of Loss Coverage "loss" from one "accident" involves two or more covered "autos", only the highest deductible applicable to those coverages will be applied to the "accident," if the cause of the loss is covered for those vehicles. This provision only applies if you carry Comprehensive or Specified Causes of Loss Coverage for those vehicles, and does not extend coverage to any covered "autos" for which you do not carry such coverage.

No deductible applies to glass if the glass is repaired, in a manner acceptable to us, rather than replaced.

**P. RENTAL REIMBURSEMENT COVERAGE**

1. This coverage applies only to a covered "auto" for which Physical Damage Coverage is provided on this policy.
2. We will pay for rental reimbursement expenses incurred by you for the rental of an "auto" because of "loss" to a covered "auto". Payment applies in addition to the otherwise applicable amount of each coverage you have on a covered "auto." No deductibles apply to this coverage.
3. We will pay only for those expenses incurred during the policy period beginning 24 hours after the "loss" and ending, regardless of the policy's expiration, with the lesser of the following number of days:
  - a. The number of days reasonably required to repair or replace the covered "auto". If "loss" is caused by theft, this number of days is added to the number of days it takes to locate the covered "auto" and return it to you.
  - b. The number of days shown in the Schedule.
4. Our payment is limited to the lesser of the following amounts:
  - a. Necessary and actual expenses incurred.
  - b. \$75 for any one day or for a maximum of 30 days.
5. This coverage does not apply while there are spare or reserve "autos" available to you for your operations.
6. If "loss" results from the total theft of a covered "auto" of the private passenger type, we will pay under this coverage only that amount of your rental reimbursement expenses which is not already provided for under SECTION III – PHYSICAL DAMAGE COVERAGE Coverage Extension.

**Q. EXPANDED TRANSPORTATION EXPENSE**

Paragraph A.4.a. of SECTION III – PHYSICAL DAMAGE COVERAGE is replaced by the following:

We will pay up to \$50 per day to a maximum of \$1500 for temporary transportation expense incurred by you because of the total theft of a

**COMMERCIAL AUTO  
AC 70 05 03 16**

covered "auto" of the private passenger type. We will only pay for those covered "autos" for which you carry Comprehensive or Specified Causes of Loss Coverage. We will pay for temporary transportation expenses incurred during the period beginning 24 hours after the theft and ending, regardless of the policy's expiration, when the covered "auto" is returned to use or we pay for its "loss".

**R. EXTRA EXPENSE – STOLEN AUTOS**

The following paragraph is added to Coverage Extensions of SECTION III – PHYSICAL DAMAGE COVERAGE:

- c. We will pay for up to \$5,000 for the expense of returning a stolen covered "auto" to you. We will pay only for those covered "autos" for which you carry Comprehensive or Specified Causes of Loss Coverage

**S. PHYSICAL DAMAGE LIMIT OF INSURANCE**

Under SECTION III – PHYSICAL DAMAGE COVERAGE, Paragraph C., Limit of Insurance is replaced by the following:

**C. Limit Of Insurance**

1. The most we will pay for "loss" in any one "accident" is the lesser of:
  - a. The actual cash value of the damaged or stolen property as of the time of the "loss", or
  - b. The cost of repairing or replacing the damaged or stolen property.
2. \$1500 is the most we will pay for "loss" in any one "accident" to all electronic equipment that reproduces, receives or transmits audio, visual or data signals which, at the time of "loss", is:
  - a. Permanently installed in or upon the covered "auto" in a housing, opening or other location that is not normally used by the "auto" manufacturer for the installation of such equipment.
  - b. Removable from a permanently installed housing unit as described in Paragraph 2.a. above or is an integral part of that equipment; or
  - c. An integral part of such equipment.
3. An adjustment for depreciation and physical condition will be made in determining actual cash value in the event of a total "loss".
4. The cost of repairing or replacing may:
  - a. Be based on an estimate which includes parts furnished by the original equip-

ment manufacturer or other sources including non-original equipment manufacturers and

- b. If a repair or replacement results in better than like kind or quality, we will not pay for the amount of the net improvement.
5. If we offer to pay the actual cash value of the damaged or stolen property, we will value auto advertising wraps, paint customization, and similar business related advertising modifications, in addition to the actual cash value of the property. Auto advertising wraps, paint customization, and similar business related advertising modifications will be valued at the cost to replace them with an adjustment made for depreciation and physical condition.

**T. NEW VEHICLE REPLACEMENT COST**

The following is added to the Limit of Insurance provision of SECTION III – PHYSICAL DAMAGE COVERAGE:

5. The provisions of paragraphs 1. and 3. do not apply to a covered "auto" of the private passenger type or a vehicle with a gross vehicle weight rating of 20,000 pounds or less which is a "new vehicle."

In the event of a total "loss" to your new vehicle to which this coverage applies, we will pay at your option:

- a. The verifiable "new vehicle" purchase price you paid for your damaged vehicle, not including any insurance or warranties purchased;
- b. If it is available, the purchase price, as negotiated by us, of a "new vehicle" of the same make, model, and equipment or the most similar model available, not including any furnishings, parts, or equipment not installed by the manufacturer or manufacturers' dealership; or .
- c. The market value of your damaged vehicle, not including any furnishings, parts, or equipment not installed by the manufacturer or manufacturer's dealership.

We will not pay for initiation or set up costs associated with loans or leases

As used in this endorsement, a "new vehicle" means an "auto" of which you are the original owner that has not been previ-

**COMMERCIAL AUTO  
AC 70 05 03 16**

ously titled and which you purchased less than 365 days before the date of the "loss".

**U. PHYSICAL DAMAGE COVERAGE EXTENSIONS**

Under SECTION III – PHYSICAL DAMAGE COVERAGE, A. Coverage, Coverage Extensions, b. Loss of Use Expenses is replaced by the following:

**b. Loss of Use Expenses**

For Hired Auto Physical Damage, we will pay expenses for which an "insured" becomes legally responsible to pay for loss of use of a vehicle rented or hired without a driver, under a written rental contract or agreement. We will pay for loss of use expenses if caused by:

- (1) Other than collision if the Declarations indicate that Comprehensive Coverage is provided for any covered "auto";
- (2) Specified Causes of Loss only if the Declarations indicate that Specified Causes of Loss Coverage is provided for any covered "auto"; or
- (3) Collision only if the Declarations indicate that Collision Coverage is provided for any covered "auto."

However, the most we will pay for any expenses for loss of use is \$50 per day, to a maximum of \$1,500. The insurance provided by this provision is excess over any other collectible insurance.

**V. TRANSFER OF RIGHTS OF RECOVERY AGAINST OTHERS TO US**

The following is added to the Transfer Of Rights Of Recovery Against Others To Us Condition:

We waive any right of recovery we may have against any person or organization to the extent required of you by a written contract executed prior to any "accident" because of payments we make for damages under this coverage form.

**W. NOTICE OF AND KNOWLEDGE OF OCCURRENCE**

SECTION IV – BUSINESS AUTO CONDITIONS, Paragraph A is amended as follows:

**6. NOTICE OF AND KNOWLEDGE OF OCCURRENCE**

a. Your obligation in the Duties in the Event of Accident, Claim, Suit or Loss Condition relative to notification requirements applies only when the "accident" or "loss" is known to:

- (1) You, if you are an individual;
- (2) A partner, if you are a partnership;
- (3) A member, if you are a limited liability company; or
- (4) An executive officer or insurance manager, if you are a corporation.

b. Your obligation in the. Duties in the Event of Accident, Claim, Suit or Loss Condition relative to providing us with documents concerning a claim or "suit" will not be considered breached unless the breach occurs after such claim or "suit" is known to:

- (1) You, if you are an individual;
- (2) A partner, if you are a partnership;
- (3) A member, if you are a limited liability company; or
- (4) An executive officer or insurance manager, if you are a corporation.

**X. HIRED CAR – COVERAGE TERRITORY**

Item (5) of the Policy Period, Coverage Territory General Conditions is replaced by the following:

- (5) Anywhere in the world if a covered "auto" is leased, hired, rented or borrowed without a driver for a period of 30 days or less; and

**Y. EMERGENCY LOCKOUT**

We will reimburse you up to \$100 for reasonable expense incurred for the services of a locksmith to gain entry into your covered "auto" subject to these provisions:

1. Your door key, electronic key or key entry pad has been lost, stolen or locked in your covered "auto" and you are unable to enter such "auto" , or
2. Your keyless entry device battery dies and you are unable to enter such "auto" as a result,
3. Your key, electronic key or key entry pad has been lost or stolen and you have changed the lock to prevent an unauthorized entry; and

4. Original copies of receipts for services of a locksmith must be provided before reimbursement is payable.

**Z. CANCELLATION CONDITION**

Paragraph A.2. of the COMMON POLICY CONDITION – CANCELLATION applies except as follows:

**COMMERCIAL AUTO  
AC 70 05 03 16**

If we cancel for any reason other than non-payment of premium, we will mail or deliver to the First Named Insured written notice of cancellation at least 60 days before the effective date of cancellation. This provision does not apply in those states that require more than 60 days prior notice of cancellation.

POLICY NUMBER: MKLV5PBC004560

**COMMERCIAL GENERAL LIABILITY  
CG 20 37 07 04**

**THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.**

**ADDITIONAL INSURED – OWNERS, LESSEES OR  
CONTRACTORS – COMPLETED OPERATIONS**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

**SCHEDULE**

<b>Name Of Additional Insured Person(s) Or Organization(s):</b>	<b>Location And Description Of Completed Operations</b>
As required by written contract executed by both parties prior to loss; Applies to commercial work only	All locations; Applies to commercial work only
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

**Section II – Who Is An Insured** is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by "your work" at the location designated and described in the schedule of this endorsement performed for that additional insured and included in the "products-completed operations hazard".

POLICY NUMBER:MKLV5PBC004560

**LIABILITY**

**COMMERCIAL GENERAL**

**THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.**

**ADDITIONAL INSURED – OWNERS, LESSEES  
OR CONTRACTORS – (FORM B)**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART.

**SCHEDULE**

**Name Of Person Or Organization:**

As required by written contract executed by both parties prior to loss; Applies to commercial work only

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

WHO IS AN INSURED (Section II) is amended to include as an insured the person or organization shown in the Schedule, but only with respect to liability arising out of "your work" for that insured by or for you.



COMMERCIAL GENERAL LIABILITY  
POLICY NUMBER: MKLV5PBC004560

## EVANSTON INSURANCE COMPANY

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

### BLANKET WAIVER OF TRANSFER OF RIGHTS OF RECOVERY AGAINST OTHERS TO US

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE FORM

#### SCHEDULE

**Name Of Person Or Organization:**

Any person(s) or organization(s) with whom the Named Insured agrees, in a written contract executed prior to the "occurrence", to waive rights of recovery

**Additional Premium:** Included

The following is added to Condition 8. Transfer Of Rights Of Recovery Against Others To Us under Section IV – Commercial General Liability Conditions:

We waive any right of recovery we may have against any person or organization shown in the Schedule of this endorsement. This waiver applies only to the person or organization shown in the Schedule of this endorsement.

All other terms and conditions remain unchanged.

## COMMON POLICY CONDITIONS

All Coverage Parts included in this policy are subject to the following conditions.

### A. Cancellation

1. The first Named Insured shown in the Declarations may cancel this policy by mailing or delivering to us advance written notice of cancellation.
2. We may cancel this policy by mailing or delivering to the first Named Insured written notice of cancellation at least:
  - a. 10 days before the effective date of cancellation if we cancel for nonpayment of premium; or
  - b. 30 days before the effective date of cancellation if we cancel for any other reason.
3. We will mail or deliver our notice to the first Named Insured's last mailing address known to us.
4. Notice of cancellation will state the effective date of cancellation. The policy period will end on that date.
5. If this policy is cancelled, we will send the first Named Insured any premium refund due. If we cancel, the refund will be pro rata. If the first Named Insured cancels, the refund may be less than pro rata. The cancellation will be effective even if we have not made or offered a refund.
6. If notice is mailed, proof of mailing will be sufficient proof of notice.

### B. Changes

This policy contains all the agreements between you and us concerning the insurance afforded. The first Named Insured shown in the Declarations is authorized to make changes in the terms of this policy with our consent. This policy's terms can be amended or waived only by endorsement issued by us and made a part of this policy.

### C. Examination Of Your Books And Records

We may examine and audit your books and records as they relate to this policy at any time during the policy period and up to three years afterward.

### D. Inspections And Surveys

1. We have the right to:
  - a. Make inspections and surveys at any time;

- b. Give you reports on the conditions we find; and

- c. Recommend changes.

2. We are not obligated to make any inspections, surveys, reports or recommendations and any such actions we do undertake relate only to insurability and the premiums to be charged. We do not make safety inspections. We do not undertake to perform the duty of any person or organization to provide for the health or safety of workers or the public. And we do not warrant that conditions:
  - a. Are safe or healthful; or
  - b. Comply with laws, regulations, codes or standards.

- a. Are safe or healthful; or
  - b. Comply with laws, regulations, codes or standards.

3. Paragraphs 1. and 2. of this condition apply not only to us, but also to any rating, advisory, rate service or similar organization which makes insurance inspections, surveys, reports or recommendations.

4. Paragraph 2. of this condition does not apply to any inspections, surveys, reports or recommendations we may make relative to certification, under state or municipal statutes, ordinances or regulations, of boilers, pressure vessels or elevators.

### E. Premiums

The first Named Insured shown in the Declarations:

1. Is responsible for the payment of all premiums; and
2. Will be the payee for any return premiums we pay.

### F. Transfer Of Your Rights And Duties Under This Policy

Your rights and duties under this policy may not be transferred without our written consent except in the case of death of an individual named insured.

If you die, your rights and duties will be transferred to your legal representative but only while acting within the scope of duties as your legal representative. Until your legal representative is appointed, anyone having proper temporary custody of your property will have your rights and duties but only with respect to that property.

**THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.**

**PRIMARY AND NONCONTRIBUTORY – OTHER INSURANCE CONDITION**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART  
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

The following is added to the **Other Insurance** Condition and supersedes any provision to the contrary:

**Primary And Noncontributory Insurance**

This insurance is primary to and will not seek contribution from any other insurance available to an additional insured under your policy provided that:

(1) The additional insured is a Named Insured under such other insurance; and

(2) You have agreed in writing in a contract or agreement that this insurance would be primary and would not seek contribution from any other insurance available to the additional insured.