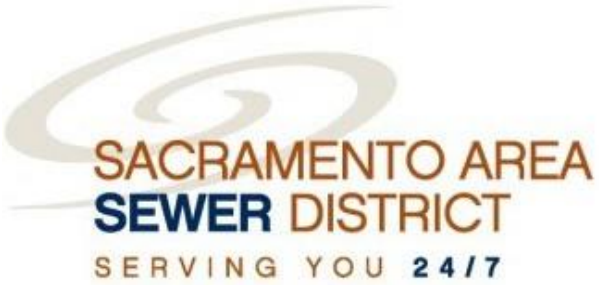

Commissioning Plan Preparation Guide

Sacramento Area Sewer District

Version 1.0

October 2020

Contents

Tables

Appendix

Abbreviations

Acronym	Description
BIM	Building Information Model
CAD	Computer Aided Drafting
CCTV	Closed Circuit Television
CM	Construction Manager
District	Sacramento Area Sewer District
EchoWater Facility	EchoWater Resource Recovery Facility
FAT	Factory Acceptance Test
HVAC	Heating, Ventilation, & Air Conditioning
I/O	Input/Output
IEC	International Electrotechnical Commission
MCRT	Mean Cell Residence Time
NETA	International Electrical Testing Association
NPDES	National Pollutant Discharge Elimination System
NTP	Notice to Proceed
O&M	Operations and Maintenance
PCC	Plant Control Center
PCCS	Plant Computer Control System
PLC	Programmable Logic Controller
PMO	Program Management Office
RAT	Reliability Acceptance Test
SacSewer	Sacramento Area Sewer District
SAT	Site Acceptance Test
SIT	Site Integration Test
VFD	Variable Frequency Drive

1.0 Introduction

This document establishes the requirements for the Design Consultant to prepare a Commissioning Plan for the Sacramento Area Sewer District (SacSewer) Primary Sludge Thickening Project (Project). The Commissioning Plan shall be developed by the Design Consultant in an effort to plan, organize, schedule, execute, and document the commissioning tests, activities, and deliverables associated with the Project. Inclusion of the Commissioning Plan with the contract documents shall provide Contractor awareness of the level of effort SacSewer requires during commissioning. The Commissioning Plan shall be included as an appendix to the Technical Specifications (Specifications).

The Project's Commissioning Plan shall account for integration between the Project and the existing EchoWater Facility.

1.1 SacSewer Design Standards

This document is one in a suite of SacSewer Design Standards (Standards) available for use by the Design Consultants. These Standards are created and maintained to provide consistency and efficiency among design projects within the EchoWater Facility. The Standards clearly document requirements, issues, decisions, products, and procedures agreed upon by SacSewer staff. The documents comprising the Standards include:

- **Design Contract Requirements –** Presents the content requirements for contract documents.
- **Design Guidelines** – Describes discipline-specific SacSewer design preferences above and beyond applicable codes and standards.
- **Guide Specifications** – A library of technical specifications.
- **CAD/BIM Standards** – Standards for computer aided drafting (CAD) drawings and Building Information Model (BIM) requirements for data and file management.
- **Standard Drawings and Typical Details** – A library of standard CAD drawings and typical details common across all projects.
- **Operations Manual Development Guide** – Presents the level of effort required, from the Design Consultant, to develop an Operations Manual for each project. In addition to providing details of the respective project, the Operations Manual must also include details of the interconnections to the existing EchoWater Facility and other projects. The Operations Manual will serve as a teaching and reference tool for SacSewer.

Additional requirements related to execution of the design, project deliverables, and designer coordination with SacSewer staff shall be contained in the request for proposals. Particular reference is made to the reliability-centered design (RCD) process implemented on projects involving treatment facilities and appurtenant equipment.

2.0 Commissioning

The objective of commissioning is to validate the installation, functionality, performance, and reliability of the constructed processes and the installed equipment and systems in accordance with the design intent, schedule, and the service levels required of SacSewer. Due to the complexity of the various commissioning activities and deliverables, commissioning is separated into four distinct stages as follows:

1. Pre-Commissioning
2. Clean Water Commissioning
3. Start-Up
4. Activation

Unless otherwise specified, the activities and deliverables for each stage must be completed, witnessed, documented, and accepted by SacSewer before initiating a subsequent stage. At a minimum, Table 1 identifies the activities and deliverables required during each stage of commissioning.

Table 1. Commissioning Activities and Deliverables

Pre-Commissioning	• Contractor's Commissioning Plan, test plans, and test forms • Vendor Draft Operations & Maintenance (O&M) manuals • Design Consultant's Draft and Draft Final Operations Manuals • Factory acceptance tests (FATs) • Delivery acceptance inspections • Storage and maintenance of equipment • Structural water tightness tests • Piping system pressure/leakage tests and cleaning/flushing • Verification of installed assets per design database (recording of installation dates) • Electrical equipment tests (e.g., power distribution systems, wire and cables, motors, and variable frequency drives (VFDs)) • Mechanical equipment pre-operational checkouts and manufacturers' installation certifications • Instrumentation and control system tests (e.g., network and communication systems, signals & cables, fiber optic cables, instrument calibration, and input/output (I/O) checkouts) • Auxiliary system tests (e.g., cathodic protection systems, heating, ventilation, and air conditioning (HVAC) systems, public address systems, access control systems, closed circuit television (CCTV) network systems, fire detection and alarm systems, and fire suppression sprinkler systems) • Vendors' and Design Consultant's training lesson plans • Vendor and Design Consultant training of SacSewer staff • Site Acceptance Tests (SATs)
Clean Water Commissioning	• Equipment operational & performance tests • Site Integration Tests (SITs) • Loop tuning • Maintenance of equipment • Vendor training completed • Vendor Draft Final O&M manuals

Table 1. Commissioning Activities and Deliverables

Start-Up	• Reliability Acceptance Tests (RATs) • Loop tuning • Performance tests • Maintenance of equipment • Field Inspection (Contractor's punch list) • Design Consultant's Final Operations Manual • Substantial Completion
Activation	• Maintenance of equipment • Vendor Final O&M manuals • Final Inspection • Field Acceptance and Notice of Completion (Commencement of warranty periods) • Final Acceptance

2.1 Pre-Commissioning

Pre-Commissioning includes testing of the water retaining structures, electrical equipment, mechanical equipment, instrumentation, network and communication systems, and other auxiliary systems such as HVAC systems, cathodic protection systems, public address systems, and fire protection systems. The tests are scheduled and conducted by the Contractor to verify the equipment's installation in accordance with the contract documents, the manufacturers' recommendations, and accepted industry standards.

Pre-Commissioning concludes with the equipment SATs that demonstrate the equipment (e.g., mechanical, electrical, instrumentation, communications) and programming operating together as a unit. The SATs are conducted under dry conditions and verify the controls and logic of individual assets (e.g., a modulating control valve, a submersible pump, a non-modulating control gate, a metering pump, etc.). To prevent damage to mechanical equipment requiring water to operate, the lead wires shall be disconnected from the motor starters. With the mechanical equipment inoperable, the equipment's responses to the test procedures will be confirmed at the motor starter. Specifically, the SATs demonstrate the proper function of the equipment and alarm indication at the plant computer control system (PCCS) for each hard-wired interlock and software protective interlock programmed into the programmable logic controller (PLC) and/or plant computer control system (PCCS). Simulating the alarms and interlocks in the field is performed by activating the final element or sensor.

Unless otherwise specified, the Contractor shall be responsible for organizing, scheduling, coordinating, and conducting the associated tests and activities, recording and submitting the test results to the project controls website (i.e., the internet-based software PMWeb), and, in general, ensuring the installation of the equipment is verified and ready for continuous operation during Clean Water Commissioning. At a minimum, the Pre-Commissioning activities, deliverables, and responsibilities are provided in Table 2.

Table 2. Pre-Commissioning Activities, Deliverables, and Responsibilities

Activity/Deliverable	Description	Responsibility
Contractor's Commissioning Plan, test plans, and test forms	The Contractor shall review, comment, edit, and submit the Commissioning Plan for SacSewer review and acceptance. The Commissioning Plan includes an introductory section, the equipment test plans, SAT plans, SIT plans, and RAT plans. The introductory section and the equipment test plans shall be submitted prior to receiving the equipment submittals. The test forms, SAT plans, SIT plans, and RAT plans shall be submitted prior to each scheduled date of testing. SacSewer accepted test plans and test forms shall be accessed through the project controls website.	SacSewer PM coordinates review of documents with Design Consultant and SacSewer.
Vendor Draft O&M manuals	The vendor prepared equipment O&M manuals are instruction manuals for the safe operation and maintenance of the equipment. The manuals also include requirements for the proper storage and maintenance of the equipment during construction. The Contractor shall include the submission and approval of the Draft O&M manuals in the Critical Path Method schedule.	
Equipment vendors' and Design Consultant's training lesson plans	In preparation for the training, the equipment vendors and the Design Consultant shall prepare and submit formal written lesson plans, training materials, and schedules for SacSewer review and acceptance.	
Design Consultant Draft and Draft Final Operations Manual	The Operations Manual serves as the basis for the Design Consultant's training of SacSewer staff.	SacSewer PM coordinates review of documents with SacSewer.
FATs	In accordance with the International Electrotechnical Commission (IEC) standard (IEC62381), the FAT is defined as an activity to demonstrate the vendor system and additionally supplied systems are in accordance with the Specifications. The FATs include, but are not limited to, factory noise tests, vibration tests, hydraulic pressure tests, electric and instrumentation subsystems tests, bench testing, performance and operating tests, and inspections in accordance with the relevant standards of the industry or as detailed in the Specifications. The Contractor submits the FAT plans for review and acceptance prior to scheduling the FAT. After the conclusion of the FAT, the Contractor submits the test results to the project controls website for review and acceptance.	SacSewer and Design Consultant have the option to witness the test. SacSewer PM coordinates review of test plans and test result submittals with Design Consultant and SacSewer.
Delivery acceptance inspections	The Contractor conducts and documents inspections on items delivered at the site of Work or to an authorized place of storage. Inspections are conducted to verify the equipment and materials are of the specified quantity, are in good order and condition at the time of delivery, conform to accepted submittals, and suitable for installation.	CM witnesses and accepts test results.
Equipment storage & maintenance	Equipment shipped from the manufacturer, whether immediately installed or stored in a warehouse, is the Contractor's responsibility to properly store, maintain, and service until Field Acceptance. This also includes electrical gear and instrumentation, which may have special storage requirements. The Contractor shall record maintenance activities and submit documents to the CM.	

Table 2. Pre-Commissioning Activities, Deliverables, and Responsibilities

Activity/Deliverable	Description	Responsibility
Structural water tightness	Concrete tanks, channels, and other structures having walls or slabs exposed or common with areas occupied by equipment or personnel, and subjected to hydrostatic pressure are tested for water tightness. Testing consists of filling the tank to the maximum operating water surface level and observing the loss of water or noticeable leaks over a minimum of 24-hours.	
Structural liners	Tests conducted on the welding strips and the completed surfaces of the liner for protection of reinforced concrete structures from corrosion.	
Piping system pressure/leakage and cleaning/flushing	Process piping and related fittings, gaskets, seals, and valves are hydrostatically tested. After successful completion of the piping system pressure and leakage tests, the piping is cleaned and flushed and ready for normal operations.	
Installation of assets	The equipment test plans shall be used by the Contractor and CM to track the completion of asset testing and record information such as delivery dates, installation dates, test dates, and test acceptance dates.	
International Electrical Testing Association (NETA)	Electrical acceptance testing includes checking correct connections, operation, and performance of newly-installed power distribution equipment prior to energizing. The testing verifies the installed equipment complies with the Specifications as well as with regulatory and safety requirements.	
Conductors & cables	Continuity and insulation resistance tests performed on conductors after wire pulling and prior to connecting equipment.	
Motors	Insulation resistance tests performed prior to connection. After connection, the correct motor rotation is verified by momentarily energizing the motor, provided that neither the motor nor the driven equipment is damaged by reverse operation.	
Mechanical equipment checkouts	Verification the equipment is properly installed, inspected, lubricated, cleaned, checked for foreign materials, anchored, braced, aligned, grounded, and proper rotation. In most cases, the pre-operational checklist provided by the manufacturer shall be used to record the inspections.	
Manufacturer Installation Certifications	After performing the pre-operational checkouts, the manufacturer's representative signs-off on the SacSewer-provided installation certification form.	
Manual valves and gates	Valves and gates are operated for binding, interference, or improper functioning. If specified, field leakage tests are conducted for the gates.	
Motor operated valves and gates	Motor operated valves and gates are operated using manual controls to demonstrate proper opening, closure, and timing.	
Pipeline accessories	Pipeline accessories such as air valves and blow offs shall be checked and operated.	
Networks and communications	Inspection of PCCS, PLC, and fieldbus network installation for adherence to manufacturer or governing standards group recommendations and industry best practices. Various inspections and tests are required prior to energizing and after energizing the network and communication systems.	

Table 2. Pre-Commissioning Activities, Deliverables, and Responsibilities

Activity/Deliverable	Description	Responsibility
Fiber optic cables	Fibers are tested for breaks, abnormalities, and overall attenuation characteristics to ensure the cable system meets the attenuation specifications. After delivery to the site and before installation, the Contractor generates an end-to-end optical time domain reflector trace and measures the optical attenuation for each fiber. After installation, each installed span of optical fiber is tested again for end-to-end optical time domain reflector traces and attenuation.	
Instrumentation	The Contractor ensures the instrumentation is calibrated to accurately read and record operating data. The Contractor follows standard calibration procedures, completes the standard calibration forms, and places a calibration sticker on the calibrated instruments.	
I/O checkouts	The PLC I/O terminals are tested to verify proper communication with the I/O equipment.	
Cathodic protection systems	Tests demonstrating the proper installation of the cathodic protection systems to control the corrosion of a metal surface. A qualified Corrosion Engineer certifies the installation and proper operation of the cathodic protection systems. The Corrosion Engineer provides a written report documenting the results of the testing and recommends corrective work as required to comply with the contract documents.	
HVAC systems	The HVAC equipment and control systems are tested, adjusted, and balanced. The Contractor provides a Certificate of Compliance stating each apparatus, device, outlet, and system has been tested, adjusted, and balanced so that it is operating in conformance with the manufacturer's recommendations and the specified design conditions.	
Public address systems	After the installation and inspection of the public address system components, the Contractor demonstrates the operation of each speaker and horn. The Contractor then conducts a system performance test demonstrating the capability of the system being perceived above ambient noise level during normal process operating conditions.	
Electronic access control & intrusion detection systems	Component and connectivity testing are provided to test each component, subsystem, and network. The system performance test demonstrates the ability of the system to meet the requirements of the manufacturer or Specifications.	
CCTV network systems	After the installation of the CCTV system components, the Contractor verifies the installation of the network components, DC power supplies, and the cameras. The system performance test verifies the operation of the network, compatibility with the existing SacSewer digital video recorders with the newly installed equipment, and compatibility with the existing SacSewer operator workstations.	
Fire detection & alarm systems	Testing of the fire detection and alarm system is performed in conformance with the requirements of the National Fire Protection Association 72. Testing includes a visual inspection of the fire detection system components, and a complete functional test demonstrating the operation of each device following installation. All circuits are tested for automatic sprinkler (pre-action), elevator recall, equipment shutdown, and alarm devices.	

Table 2. Pre-Commissioning Activities, Deliverables, and Responsibilities

Activity/Deliverable	Description	Responsibility
Fire suppression sprinkler systems	Flushing and testing of the fire suppression sprinkler system is performed in accordance with the California Fire Code, and witnessed and approved by the Cosumnes Community Services District Fire Marshal.	
Vendor training of SacSewer staff	The Contractor coordinates the scheduling of vendor-provided training with the SacSewer Commissioning Team. All vendor training is completed prior to beginning Clean Water Commissioning. In some cases, vendor training may be required during the initial stages of Clean Water Commissioning when equipment is operational.	Contractor and SacSewer coordinate the scheduling of the training sessions.
SATs	In accordance with IEC 62381, the SAT is defined as an activity to demonstrate the installation of the various vendor systems are in accordance with the applicable Specifications and installation instructions.	SacSewer and CM witnesses and supports the tests by providing personnel in the Plant Control Center (PCC) for controlling and confirming equipment responses at the PCCS and in the field. Contractor provides field personnel for supporting the operation of the equipment, troubleshooting, and responding to equipment failures.

2.2 Clean Water Commissioning

The objective of Clean Water Commissioning is to verify the operation and functionality of the equipment and the system controls (i.e., PLC control narratives and PCCS control strategies) by conducting the SITs with clean water. The SITs demonstrate the system controls by simulating various operating conditions to demonstrate the normal and abnormal operation of equipment under minimum and maximum design conditions. The tests serve as a precursor to the operating conditions expected during Start-Up. Before beginning an SIT, the equipment manufacturer's representative conducts the manufacturer's startup procedures, followed by the manufacturer's operational checkouts, and then any specified equipment field performance tests.

Unless otherwise specified or directed, the equipment in each SIT plan shall operate continuously for at least 10 days. If the SIT is halted due to a significant interruption, the cause of the failure is identified and rectified by the Contractor and the test is repeated in its entirety until the specified period of operation is completed without significant interruption. The SIT is considered complete after the test procedures are successfully demonstrated, witnessed, documented, and all testing deficiencies are resolved and accepted by SacSewer and CM staff. The Clean Water Commissioning activities, deliverables, and corresponding party's roles and responsibilities are provided in Table 3.

Table 3. Clean Water Commissioning Activities, Deliverables, and Responsibilities

Activity/Deliverable	Description	Responsibility
Equipment operational and performance tests	The manufacturer's representative conducts the manufacturer's recommended startup procedures and checks the operating equipment for abnormal vibration, abnormal temperature, abnormal amperage draw, harmonics, voltage, and other abnormal operating characteristics. The manufacturer's representative provides adjustments to equipment settings as necessary to meet the operational performance requirements in accordance with the Specifications or manufacturer's performance claims. The operational tests for VFDs consist of measuring the harmonics and the maximum voltage peak at the terminals of each motor.	Contractor conducts tests and submits test results. SacSewer and CM witnesses and accepts the test results.
SITs	In accordance with IEC 62381, the SIT is defined as an activity to demonstrate the merging of the various vendor systems to one overall system and all components work together as specified.	SacSewer and CM witnesses and supports the tests by providing personnel in the PCC for controlling and confirming equipment responses at the PCCS and in the field. Contractor provides field personnel for supporting the operation of the equipment, troubleshooting, and responding to equipment failures.
Loop tuning	During the SITs, loops are tuned to obtain the desired process control response. Loop tuning demonstrates stable operation of the loop under actual operating conditions or identifies necessary adjustments of closed loop tuning parameters.	SacSewer conducts.
Maintenance of equipment	Maintaining equipment in accordance with the manufacturers' warranty requirements.	Contractor performs and documents maintenance activities. SacSewer witnesses and confirms.
Vendor Draft Final O&M manuals	The Draft Final O&M manuals reflect resolution of comments to the Draft O&M manuals, training sessions, and completed testing and commissioning.	SacSewer PM coordinates review of documents with Design Consultant and SacSewer.

2.3 Start-Up

After the successful completion of Clean Water Commissioning, SacSewer provides the Contractor with a notice to proceed (NTP) to the Start-Up phase of commissioning. Start-Up includes completing the prerequisites required to begin the RAT, followed by conducting the RAT. The RAT demonstrates the continuous operation of the equipment under process water conditions for 30 days without a significant interruption. If equipment fails during the RAT, the event, cause and corrective action(s) will be documented and reviewed with SacSewer staff. Occurrence of a significant interruption shall require the in-progress RAT to be stopped and restarted at time equals zero (testing begins with Day 1 activities) after permanent corrections are made. A failure is defined as the inability of any component to perform its intended function regardless of the cause or severity of the failure. Further definitions for "significant interruptions" and "failures" are defined in the District's Commissioning Guide Specification (Section 01 91 00).

Process water testing is subject to the National Pollutant Discharge Elimination System (NPDES) effluent discharge limits; hence, SacSewer operations will be responsible for operating and monitoring the equipment and processes. In accordance with the NPDES permit, an Operations Plan (i.e., RAT Plan) shall be submitted to the Regional Water Quality Control Board no later than 30 days prior to the first day of discharge. Specific requirements of the Operations Plan include the following:

- Strategies and procedures for the startup of the facility.
- Measures taken to prevent permit violations.
- Testing cannot exceed 90 days for the adjusting and testing of a wastewater treatment unit relying on biological treatment, and 30 days for any other wastewater treatment unit. (Note: This requirement shall not be construed as limiting the requirements of the Contractor to successfully complete the RAT since the Contactor must demonstrate the reliable operation of the equipment for 30 consecutive days.)
- If, or when, violations do occur, demonstrate the violations resulted from the operation of the new wastewater treatment unit and the violations could not have been reasonably avoided.

If a biological process is involved, then a process acclimation period of three Mean Cell Residence Time (MCRT) cycles shall be provided prior to commencing the 30-day continuous operation test. The RAT plan shall include detailed procedures for establishing the biology and meeting the three MCRT cycles.

After the successful completion and SacSewer acceptance of all Start-Up activities and deliverables, SacSewer and the CM will release a Notice of Substantial Completion. The Start-Up activities, deliverables, and responsibilities are provided in Table 4.

Table 4. Start-Up Activities, Deliverables, and Responsibilities

Activity/Deliverable	Description	Responsibility
RAT(s)	The RAT is a SacSewer-standard test to demonstrate the operation of the various vendor systems working together under process water conditions in accordance with the applicable Specifications.	SacSewer operates, monitors, records operational data and observations, collects samples for SacSewer environmental laboratory analyses, and completes daily rounds. Contractor provides immediate assistance in case of equipment failures.
Performance tests	Verification of equipment, system, or process performance under process water conditions.	
Maintenance of equipment	Maintaining equipment in accordance with the manufacturers' warranty requirements.	Contractor performs and documents maintenance activities. SacSewer witnesses and confirms.
Site clean-up	The construction site is cleared of all construction materials and cleaned by the Contractor.	SacSewer and CM confirm and accept.
Field inspection (Contractor's punch list)	Inspections include final checkouts of the equipment, site cleanliness, substantial completion of the Work, and identification of minor corrective work (punch list) to be completed or corrected prior to Field Acceptance.	SacSewer and CM
Final Operations Manuals	The Final Operations Manual consist of record drawings and modifications to controls, setpoints, design criteria, etc. during Clean Water Commissioning and Start-Up.	SacSewer PM coordinates review of documents with SacSewer.
Substantial Completion	Confirmation the Work is substantially complete and ceases the counting of time for liquidated damages.	SacSewer and CM release notice to the Contractor.

2.4 Activation

SacSewer will issue a Field Acceptance Letter after final inspections verify the completion of the Contractor's punch list items. Field Acceptance initiates the commencement of the warranty period, at which time SacSewer assumes facility maintenance responsibilities. In conjunction with Field Acceptance, SacSewer records a Notice of Completion with the County Recorder. SacSewer's Board of Directors then provides Final Acceptance of all contract Work, or the portion of the Work indicated in the Field Acceptance Letter. The Activation activities, deliverables, and responsibilities are provided in Table 5.

Table 5. Activation Activities, Deliverables, and Responsibilities

Activity/Deliverable	Description	Responsibility
Maintenance of equipment	The Contractor will continue to maintain the equipment in accordance with the manufacturers' warranty requirements until Field Acceptance.	Contractor is to provide the consumable materials and performs and documents maintenance activities. SacSewer witnesses and confirms.

Table 5. Activation Activities, Deliverables, and Responsibilities

Activity/Deliverable	Description	Responsibility
Vendor Final O&M manuals	The Contractor shall revise and replace, remove, or add documents to correct deficiencies in the Draft Final O&M manuals. The revisions shall include resolution of comments from the Clean Water Commissioning tests, Start-Up tests, and training sessions.	SacSewer PM coordinates review of documents with Design Consultant and SacSewer.
Final inspections	Inspection of the completed punch list items.	SacSewer and CM
Field Acceptance and Notice of Completion (Commencement of warranty periods)	Field Acceptance is granted to the Contractor confirming the completion of the contract requirements and initiates the commencement of the warranty periods; at which time, SacSewer assumes facility maintenance responsibilities. In turn, a Notice of Completion is recorded with the County Recorder within 10 days after Field Acceptance. Notice of Completion releases all retention, not withheld due to stop notices or disputed Work, to the Contractor.	SacSewer and CM
Final Acceptance	Initiates the starting point for the statutes of limitations.	SacSewer's Board of Directors authorizes final acceptance of the contract.

3.0 Commissioning Plan

After NTP, the Contractor shall review, edit, and submit the Commissioning Plan (or parts thereof) for review and acceptance by the Design Consultant and SacSewer. The submittal dates of the various components of the Commissioning Plan (e.g., introductory section, equipment test plans, test forms, SAT plans, SIT plans, RAT plans) are dependent on the stage of commissioning as defined in the District's Commissioning Guide Specification (Section 01 91 00). The Contractor shall modify the Commissioning Plan, as necessary, to meet the requirements of the Specifications and the equipment supplied or installed. The Commissioning Plan will not be construed as limiting the testing required by the Specifications and is included with the contract documents for the Contractor to provide detailed schedules and identify the required labor, resources, and materials to successfully complete the specified commissioning activities. An outline of the Commissioning Plan is provided in Table 6 and a sample Commissioning Plan is provided in Appendix A.

Table 6. Commissioning Plan Outline

Heading	Section	Description
1. Introduction	A brief introduction to the Commissioning Plan.	
	a. Project Overview	A description of the project.
	b. Safety	A description of SacSewer's safety program.
	c. Project Controls	A description of the SacSewer-provided project controls system for submitting, reviewing, accepting, and accessing commissioning related documentation. In addition subsections shall be included to identify the commissioning-related documents to be submitted and a description for performing equipment maintenance.
	d. Commissioning Team	Identification of the key personnel required during commissioning.

Table 6. Commissioning Plan Outline

Heading	Section	Description
2. Testing	A brief introduction to the testing requirements and includes a table identifying the proposed test plans and a figure identifying each stakeholder's roles and responsibilities during each stage of commissioning.	
	a. Equipment Test Plans	A description of the equipment test plans and the associated test forms provided in the REFERENCE FORMS Section (01 91 10)
	b. SAT Plans	A brief description of the SAT plans and includes tables identifying the sequence of work and the roles and responsibilities of each stakeholder.
	c. SIT Plans	A brief description of the SIT plans and includes a table identifying the sequence of work. In addition, a subsection shall be included to discuss the strategies for conducting the various SIT plans, management of test water supply and disposal, and required temporary facilities.
	d. RAT Plan(s)	A brief discussion of the RAT plans and includes a table identifying the roles and responsibilities of each stakeholder. In addition, a subsection shall be included to discuss the strategies for conducting the RAT(s).
3. Training	A brief description of the Contractor-provided training requirements in accordance with the TRAINING Section (01 79 10).	
4. Schedules	a. Commissioning Activities and Deliverables	A brief description of the commissioning scheduling requirements.
	b. Monthly Updated Testing Schedules	
	c. Four-Week Look-Ahead Schedules	
	d. Master Schedule of Access Requests, Shutdowns, and Tie-ins	
5. Attachments	a. Equipment Test Plans	Includes the equipment test plans for manual valves and gates, motor operated valves and gates, mechanical equipment, electrical equipment, instrumentation, structural, and piping.
	b. SAT Plans	Includes the equipment SAT plans.
	c. SIT Plans	Includes the system SIT plans.
	d. RAT Plans	Includes the facility RAT plan(s).

Appendix A

Sample Commissioning Plan

(Available upon request)