CONTRACT DOCUMENTS FOR

RADIO SYSTEM UPGRADES (RSU) PROJECT AT THE SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT CONTRACT 6010

VOLUME 3 of 5: PROJECT DESCRIPTION

REGIONALSAN
TAKING THE WASTE OUT OF WATER
Sacramento Regional County Sanitation District

SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT

8521 Laguna Station Road
Elk Grove, CA 95758

CONTRACT DOCUMENTS

for the

RADIO SYSTEM UPGRADES (RSU) PROJECT
AT THE SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT
CONTRACT 6010

VOLUME 3 OF 5: PROJECT DESCRIPTION

including

Introduction, Purpose and Objective, Scope of Work, Background

JULY 2019

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Section 1 - Introduction

1.1 Sacramento Regional Wastewater Treatment Plant (SRWTP)

Regional San serves a population of about 1.4 million in the Sacramento County region, and operates the regional wastewater conveyance system and the Sacramento Regional Wastewater Treatment Plant (SRWTP) located near Elk Grove, California.

SRWTP is a large site: about 900 acres of treatment process area surrounded by 2,500 acres of uninhabited "bufferlands." Within the process area are several aboveground buildings and a network of underground tunnels concentrated within a 400-acre area. For purposes of this RFP, the Project Area is this 400-acre area.

Refer to *Vol 5 – Project and Reference Drawings* for site plans of the project area.

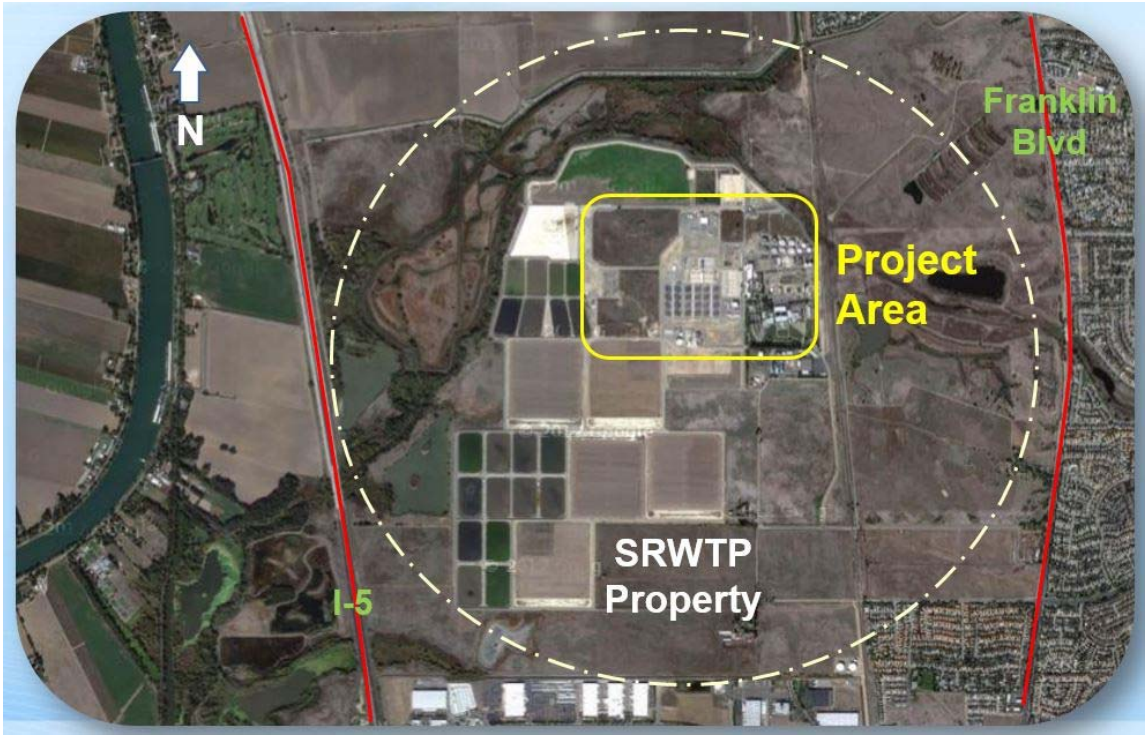

Figure 1 SRWTP Site

1.2 Emergency Responder Radio Coverage

The Sacramento Regional Radio Communications Systems (SRRCS) provides radio communications for fire emergency medical services and law enforcement agencies ("Emergency Responders"). Buildings and other structures that do not have adequate radio coverage must be equipped with an "Emergency Responder Radio Coverage System" (ERRCS) to boost the radio signals within their structure(s).

Recent radio coverage studies at Sacramento Regional Wastewater Treatment Plant (SRWTP) indicated several "dead zones" and other areas where radio coverage is inadequate. These areas include the SRWTP's underground tunnel system and some above ground buildings.

Refer to *Section 4.1 – Background* for more details about SRRCS, and Attachments to this RFP for a copy of the radio coverage study.

1.3 SRWTP Expansion

In 2010, the Regional Water Board issued a new wastewater discharge permit for Regional San. The new discharge permit brought substantial changes and resulted in the need to construct significant new treatment processes at the SRWTP. As a result, Regional San has moved forward with and is now in the process of constructing significant new treatment processes and associated structures (these new facilities are collectively known as the "EchoWater Project").

These new facilities will also require adequate radio coverage for Emergency Responders.

Due to the magnitude of constructing the new treatment process, the EchoWater Project was broken out and comprised of several "EchoWater" projects—the largest of which are the "BNR" and "TTF" projects.

Building these new projects and associated structures will continue through 2023, with some of the facilities coming on-line earlier than others. As such, this Radio System Upgrades (RSU) Project must be sequenced and delivered accordingly (as outlined in *Section 3 - Scope of Services*.)

1.4 Radio Communication at SRWTP

There are two platforms for radio communication at SRWTP: SRRCS and SRWTP's local analog 800 MHz system (Plant radio system).

The Plant radio system—installed circa 1980—is owned and operated by Regional San, and serves as SRWTP's primary form of communication for field staffs' day-to-day operations. The analog 800 MHz system is comprised of four receivers and associated repeaters relaying signal via two local channels.

Regional San staff can also communicate on the existing analog SRRCS system. However, the SRRCS is in the process of complete transition from analog to the new digital "P25" compliant system. SRWTP handheld radios will not operate on the SRRCS, so both communication platforms have to be maintained.

Regional San owns approximately 160 two-way handheld radios (composed mostly of Motorola MTS 2000) and does not plan to replace these radios with P25 capable handheld radios as part of this project.

Any proposed radio system must work in conjunction with, and not interfere with the existing Plant radio system and radios. Further, the District's preference is to "piggy back" the analog

800 MHz radio system off the ERRCS to improve their locally repeated 800 MHz radio coverage.

Refer to *Section 4 – Background* for additional information on the Plant radio system and SRRCS transition to P25.

Section 2 - Purpose and Objective

The purpose of this project is to provide adequate radio coverage to the existing and new structures at SRWTP for Emergency Responders in accordance with **Emergency Responder Coverage for Non-High Rise Buildings Based on the 2016 California Fire Code with City of Elk Grove Fire Code Ordinance Section 17.04.110 for Public Safety 800 MHz Radio Building Amplification Systems*.**

In addition, any proposed ERRCS system must meet the following criteria:

- ✓ Interoperability with Sacramento County's P25 trunked system
- ✓ No interference with SRWTP's locally repeated radio channels. Preferably, the ERRCS will also boost SRWTP's local radio communication.
- ✓ Accommodations and provisions for expanding radio coverage within new and future structures identified in this RFP.
- ✓ Is a modular system, with 20% capacity to accommodate the connection and expansion of future structures beyond the ones identified in this RFP.

* Refer to Volume 4 – Specifications, Appendix A - *Cosumnes Fire Department Letter to Regional San* for additional information on coverage requirements.

Section 3 - Scope of Work

The project includes all work necessary to plan, design, permit, procure, install, and commission a new radio system that is compliant with Emergency Responder coverage, and meets the objectives described in *Section 2 - Purpose and Objectives*.

As mentioned in *1.3 - SRWTP Expansion*, due to the timing of the new facilities coming on-line, the work must be separated as follows:

I. **Existing Structures -** Plan, design, permit, procure equipment, install, and commission a new radio system and associated infrastructure that provides radio coverage for Emergency Responders in *existing structures* at SRWTP.

II. **New BNR Structures** - Plan, design, permit, and procure equipment for expanding the proposed radio system, which will provide emergency responder approved radio coverage in *new BNR structures* at SRWTP. Provide a separate allowance cost in your cost proposal that will cover the Work necessary to install and commission this portion of

the work according to the contractor's approved plan. Only provide installation and commissioning costs in the allowance, as the planning, design and procurement of the equipment is considered part of the original scope. The allowance work will only be authorized to proceed if Regional San directs the Contractor to do so.

III. **Future TTF Structures -** Plan and design, up to a 90% design-level, the proposed emergency responder radio system to provide sufficient emergency responder radio coverage within the *Future TTF structures* at SRWTP based on the construction drawings for that project. Do not include the procurement, installation or commissioning for this portion of the proposal in your cost estimate.

The scope of work shall support and collaborate with all phases of a new radio system. The proposed system shall be designed to support and accommodate future expansion capabilities throughout the SRWTP.

Spare power circuits at local electrical panels will be made available to the Contractor for use on this project where it exists.

Spare fiber optic strands from the distributed plant-wide fiber optic cable will be available to the Contactor for use on this project where it exists.

Refer to *Volume 5 – Project and Reference Drawings* for additional details on available fiber, associated routing plans, and locations of fiber optic termination panels.

The following sections provide details of the work to be completed.

3.1 Existing Structures

Existing structures at SRWTP are comprised of several buildings and a network of below-ground tunnels.

Buildings vary in size, material, and occupancy type, but are primarily reinforced concrete and masonry structures.

A layout of SRWTP's structures and tunnel system, building floor plans, tunnel details, and existing fiber optic backbone are included in *Volume 5 – Project and Reference Drawings.*

The following figures shown an aerial layout of the tunnel system and a section view.

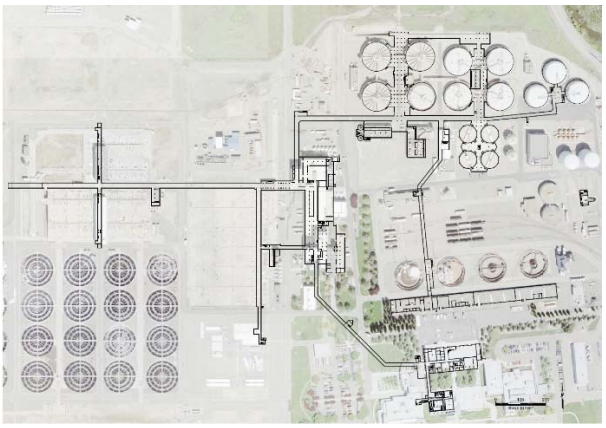

Figure 2 Existing Tunnel System
Black lines show layout of tunnel system

Figure 3 Existing Tunnel Section
View inside Central Tunnel

The scope of work includes all work, labor, materials, and equipment to plan, design, permit, procure, install, and commission a new radio system that provides adequate radio coverage to the existing structures at SRWTP. The following are minimum work-breakdown structure (WBS) elements for the project. **Proposers are to include these WBS elements, at a minimum, in their Schedule and Cost Proposal; however, the cost proposal can be rolled up to the Parent Task when several Child Tasks are listed below the Parent**. Additional WBS elements may be added by the Proposer, as needed.

3.1.1 Pre-Design Activities

3.1.1.1 Schedule

The Contractor will develop a project schedule from project initiation to close-out, based on the information contained in this RFP and include in their Proposal. The final schedule will be negotiated after the Contractor is selected, and developed in consultation with the District and other onsite projects such as BNR and TTF projects.

Schedule shall include all WBS elements needed to complete the project, using a Critical Path Method (CPM), developed in Microsoft Project, or other software approved by the District.

Reference: PROGRESS PAYMENT PROCEDURES Section (01 29 76), CONSTRUCTION PROGRESS SCHEDULE Section (01 32 16) for additional information on schedule requirements.

3.1.1.2 Additional Coverage Testing

In February 2019, The District contracted with a 3rd party testing company to measure the status of the current radio strength at the SRWTP. The existing Coverage Assessment Report is included in this RFP to provide Proposers an understanding of the existing radio coverage at SRWTP, and what the Proposer has to account for when responding to this RFP. Some buildings were not tested and therefore do not appear in the existing Coverage Assessment.

Contractor shall inspect the existing structures at SRWTP, and review the existing Coverage Assessment Report to verify which structures require any new hardware to comply with the AHJ's requirements.

Buildings that are listed as "not tested" in the existing Coverage Assessment shall be assumed to have insufficient radio coverage, for purposes of responding to this RFP. Proposer shall include sufficient hardware to cover these structures in their planning, design, procurement, installation and commissioning. Any "not tested" buildings later "verified" by the awarded contractor to already have sufficient radio coverage will be deducted from the project scope via change order.

The awarded Contractor shall plan to provide additional radio strength testing in the existing structures as needed prior to finalizing the design and other deliverables indicated in following sections.

As allowable by the AHJ, the Contractor may combine his additional radio tests to the District's existing Radio Coverage Report when submitting a permit application to CSD Fire Department.

Reference: Attachment A - Radio Coverage Assessment Report*;* Volume 4 - Specifications, *Cosumnes Fire Dept. Letter to Regional San* for additional information on coverage assessment requirements.

3.1.2 Design Activities

The awarded Contractor shall design an ERRCS to the level of detail required by the Fire Department before submitting a permit package. At various phases of project design, the Contractor shall submit project documents to the District for review and comment. The intent of District review is to ensure any contractor-proposed ERRCS does not conflict or interfere with District equipment or operations, follows District specifications, and does not deviate from the project approach included in the Proposal.

As outlined in Section 2 above, the design must support future equipment, and provide maintenance accessibility.

Reference: Attachment B - *Regional San Drafting Standards,* for minimum standards and guidelines on preparing design drawings*;* Volume 4 – *Specification* for additional information on project requirements.

3.1.2.1 Preliminary Design Submittal

Prepare and submit to District for review and comment, a Preliminary Design submittal. **The preliminary design shall be based upon and support the Contractor's project approach submitted with their Technical Proposal.**

Include in the Preliminary Design Submittal the follow information:

System Design – Provide a complete description of the proposed ERRCS, including, block diagrams and or radio communications system schematic showing fiber and coaxial cable routes (proposed and

existing), equipment layouts showing proposed locations, and other necessary information to provide a complete and comprehensive description of the proposed system. Layout drawings should be on 11x17 sheet size and drawn to scale whenever appropriate.

Include design documents that show how the ERRCS is going to improve the Plant's analog 800 MHz radio system coverage.

Equipment List – List all specified equipment shown on the plans and associated software, including manufacturer, part number, description, quantity, and symbol used on the plans. **The equipment listed should match the Proposed Products Form included with the contractor's Proposal.**

Equipment Specification Sheets – Submit manufacturer "cut" sheets on all proposed equipment shown on the plans. These include, but are not limited to:

- Amplifiers
- Antennas
- Fiber optic cables and termination panels
- Coaxial cables and connectors
- Conduits
- Splitters, combiners, couplers, or any other passive components proposed
- NEMA 4-type waterproof enclosure for repeaters, transmitters, receivers, signal booster components and battery system components
- Any equipment requiring FCC certification (*2016 CFC 510.4.2.4*)
- Backup battery and charging system or, if used, generator specifications and plans.

3.1.2.2 90% Design Submittal

Prepare and submit to District for review and comment, a Ninety Percent (90%) Design submittal. The 90% design submittal shall expand upon the Preliminary Design Submittal with all District comments addressed and all applicable details and layout drawings included.

The Contractor is directed to *Vol. 4 Specifications, Appendix A - Cosumnes Fire Dept. Letter to Regional San* for additional information on what the Authority Having Jurisdiction (AHJ) requires in the permit package submittal.

The following is a guideline for what to include in the 90% design submittal:

Plans, including but not limited to:

- General/Civil – Site plan showing locations of major equipment and riser diagrams of the existing site, BNR, and TTF radio repeater systems.

- Electrical – Single line diagrams, locations of required power panel circuits, raceways, termination panels, backup power, and emergency power disconnect switches.
- Communication – Updated plant-wide fiber optic plan drawings showing new fiber optic and coaxial cable termination panels, raceways, cables, and devices
- Schematic drawing of alarm interconnection
- Elevation and Roof plans – showing the subject building(s) with outdoor antennas, including details on location, orientation, height, grounding, surge protection (NEC), anchoring and cable entries in compliance with 2016 CFC Section 504.4. Include anchoring calculations for required wind and conditions for each outdoor antenna.
- Floor plans – for each interior space update existing AutoCAD drawing to show equipment, power, and antenna locations, fiber optic and coax routes, conduit size, and locations of any miscellaneous system components, including splitters, couplers, filters, inline amplifiers and alarm/protection equipment. All components shall be named or labeled and referenced in the contactors materials lists and power budget calculation tables.
- Any other applicable drawings the Contractor deems necessary to include

3.1.2.3 100% Design Submittal

One Hundred Percent (100%) design submittal shall expand upon the 90% Design Submittal with all District comments addressed, include at least the following items, plus any additional plans required by CSD Fire Department.

The Contractor is directed to *Vol. 4 Specifications, Cosumnes Fire Dept. Letter to Regional San* for additional information on what the Authority Having Jurisdiction (AHJ) requires for the plans and equipment sheets.

The following is a guideline for what to include in the 100% design submittal:

90% Design Submittal – All items included in the 90% design submittal, with any District comments addressed.

Plans –

- All plans from 90% design submittal with District comments addressed.
- Construction Details:
  - Construction details indicating the location of the 24 hour secondary power source and the power budget calculations. (2016 CFC 51 0.4.2.3)
  - Construction details and or notes indicating how signal booster components and battery systems will be protected in NEMA 4-type waterproof cabinets. (2016 CFC 510.4.2.4)

- Construction details indicating how the ERRCS system is connected to the building fire alarm or monitoring system including a description of sequence of events associated with testing the alarms. (2016 CFC 51 0.4.2.4)
- Construction details indicating how the cable is protected against physical damage in areas that have public access.
- Construction details for pathway survivability meeting Level 1, 2 or 3 on each of the cable extensions to the indoor mounted antennas. Plenum rated coaxial cables will be used inside buildings. Cables that are exposed to sunlight shall be UV rated and suitable for outdoor use.
- Construction details for the 2 hour rated riser for the coaxial cables between the amplifier and antennas on each floor. (2016 NFPA 72, 24.3.6.8- 24.3.6.8.4.)

- Conduit and Cable Schedules
- Single line diagram showing the interconnection of the entire system

Reference: *Vol. 4 Specification; Cosumnes Fire Dept. Letter to Regional San* for additional information on equipment requirements.

3.1.3 Pre-Construction Activities

3.1.3.1 Fire Department Permit Package

The Contractor is responsible for all work necessary to obtain a fire department construction permit to install an Emergency Responder Radio Coverage System at SRWTP. This includes all work associated with preparing and submitting the permit application, all necessary documents and plans required for review and approval as described in *Cosumnes Fire Dept. Letter to Regional San* or otherwise directed by the AHJ, and any re-submittals required by the fire marshal.

Contractor to prepare and submit to the CSD Fire Department a comprehensive permit package for review and approval on the proposed ERRCS. The permit package shall contain final plans (i.e. 100% Design Submittal items, with any previous District review comments addressed), and any other information required by the AHJ.

District will pay the permit fee that accompanies the permit application. Refer to PERMIT REQUIREMENTS Section 01 41 26 for information on Contractor and District responsibilities for other permits and fees.

Reference: *Vol. 4 - Specifications, Appendix A - Cosumnes Fire Dept. Letter to Regional San*

3.1.3.2 Work Plan

The project shall be designed so that it can be constructed with minimum adverse impacts on existing operations. This includes all connections to existing plant processes, utilities, auxiliary systems, instrumentation and controls, electrical and computer systems, and structures. The construction sequence shall ensure that there is a means for the Contractor to do the work without undue difficulty. If the work has challenges, the sequence shall identify those challenges and constraints.

The Contractor shall prepare a "Construction/ Operations Sequencing Plan" for use in discussions with Plant staff. **A project approach narrative will be included with the proposers Technical Proposal – Project Approach.** The Plan shall include:

- Specific work items and any associated Contractor constraints
- A narrative description for maintaining Plant radio communication
- A narrative description of methods for making connections to existing infrastructure
- A narrative description of minimizing impacts to Plant operations and coordinating with other ongoing work
- Identification of any process and equipment shutdown constraints

The final work plan will be developed by the awarded contractor in consultation with the Regional San staff, operators, and, if necessary, other onsite contractors for projects such as BNR and TTF projects.

Upon discussions with Regional San staff and other onsite projects that may be impacted by items in the "Construction/Operations Sequencing Plan", work items and sequencing shall be adjusted and incorporated into the final work plan.

Regional San must review and approve the final work plan before construction activities begin.

Reference: WORK RESTRICTIONS Section 01 14 00 for scheduling restrictions; COMMISSIONING Section 01 91 00.

3.1.3.3 Access Request

Contractor work activities that impact existing District operations, other on-site construction work, all real property, or any facilities used by staff, require an approved, signed Access Request (AR) prior to commencement. This includes mobilization into any new areas. The AR allows District Operations and the Safety office to review the proposed work and contractor's safe work practices, inform the contractor of any special hazards in the area, and sufficient time to schedule and coordinate any process or equipment shutdowns needed or other on-site construction work, to support the contractor's work.

Reference: COORDINATION WITH OCCUPANTS Section 01 14 16

3.1.4 Construction Activities

Construction activities cannot begin until the fire department has issued a permit and other pre-construction activities have been completed and approved by Regional San.

Contractor is directed to *Vol. 4 - Specification* for general requirement and prerequisites for construction activities.

In addition to typical contractor construction activities, meetings will be required throughout the duration of the Contract to facilitate communication, coordination and resolution of issues. Project meetings include:

- ✓ Preconstruction ("Kick-off") Meeting prior to commencement of construction work. (w/ Key Construction Team members from Contractor, i.e. Superintendent/Foreman, Radio System Design PM; and District, i.e. District PM, CM, Control System Rep)
- ✓ Weekly Progress Meetings
- ✓ Other project-specific meetings requested by Contractor or District.

The Contractor, Contractor's System Integrator/Designer, major subcontractors, and other pertinent parties involved in the Work shall attend these meetings. (District attendees will include District staff and their representatives, and the District's Construction Manager.)

The District's Construction Manager will designate the purpose, date, time, and location for meetings after the contract is awarded and throughout construction, as needed.

Reference: *Vol. 4 Specification* for additional information on requirements.

3.1.5 Commissioning and Acceptance Activities

Once the ERRCS system is installed, the Contractor is responsible for preparing and coordinating all inspection and acceptance documentation and procedures required by the AHJ.

3.1.5.1 Inspection Documentation

Prepare all inspection documentation outlined in the *Cosumnes Fire Dept. Letter to Regional San*, or otherwise required by the AHJ.

3.1.5.2 Acceptance Testing

Acceptance testing is required to demonstrate compliance to the provisions of CFC Section 510.

The District will obtain and fund special inspection services with a 3rd Party Test Service approved by the AHJ.

The Contractor is directed to Appendix A, *Cosumnes Fire Dept. Letter to Regional San* for his responsibilities during acceptance testing.

If any specific structure on the SRWTP site fails, or any contractor-installed equipment fails the acceptance testing as required by the AHJ, the Contractor is responsible to correct all deficiencies and re-schedule the Acceptance Testing, at no additional cost to the District.

3.1.5.3 As-built Drawings

Prior to project completion, the Contractor shall furnish to the District As-Built drawings. As-built drawings shall include any changes from the original plans that occurred during construction to

reflect the "as-built" condition of the installed system. The final As-Built drawings shall be provided to Regional San in AutoCAD and PDF format.

Reference: Attachment B - *Regional San Drafting Standards;* PROJECT RECORD DRAWINGS Section 01 78 39

3.1.5.4 O&M Manuals and Training

Prior to project completion, the Contractor shall submit operation and maintenance (O&M) data on the equipment and software associated with the project.

The Contractor shall provide a minimum of two 4-hour training sessions to District personnel in the operation and maintenance of the new radio system.

Reference: OPERATION AND MAINTENANCE DATA Section 01 78 23; TRAINING Section 01 79 10

3.1.5.5 Warranty

Prior to project completion, Contractor shall furnish to the District all manufacturer warranty certificates, which are in addition to the overall 1-year project warranty provided by the Contractor, which doesn't start until the project has received final acceptance. Any deficiencies discovered during the warranty period are the responsibility of the Contractor to correct in a timely manner, at no additional cost to the District.

Reference: OPERATION AND MAINTENANCE DATA Section 01 78 23

3.2 New BNR Structures

The Biological Nutrient Removal (BNR) Project (construction cost over $400 million) is building an improved treatment process to SRWTP. An ERRCS will be required within BNR's galleries and new buildings in order for the District to take occupancy of the new facility.

Due to the uncertainty of when the BNR project will be in a state that would allow the installation of the new radio system, the scope of work for this area will only include planning, design, permitting (to the extent possible), and procurement of the equipment for expanding the proposed radio system within BNR's structures.

If the timing lines up between the BNR project completion and the construction period related to this RSU Project, the BNR allowance identified in the cost proposal will likely be authorized by Regional San to the RSU Contractor to install and commission the new radio system in the BNR area. **If the District authorizes the BNR allowance**, **the Contractor shall prioritize BNR work over the existing structures work** so the District is not delayed from taking occupancy of the new BNR facility. Refer to Vol. 4 – Specification, WORK RESTRICTIONS Section 01 14 00 and CONTRACT TIME Section 01 14 20 for more details on schedule prioritization of the BNR work.

Spare single-mode fibers from BNR ACC-52 fiber optic termination panel to the PCC 5th floor fiber optic termination panel are available to the Contactor for use on this project.

As of the issuance date of this RFP, construction work on the BNR structures is approximately 80% complete, however heavy mechanical and electrical work in the area could still prevent access to the site by the RSU Contractor.

A layout of the BNR project as well as construction drawings including floor plans, and fiber optic network drawings are included in Volume 5 – *Project and Reference Drawings.*

An aerial and section view of the BNR and east/west gallery are shown in the figures below.

Figure 3 BNR Site
3D model looking northeast

Figure 4 BNR East/West Gallery
Section view looking west

The following are minimum work-breakdown structure (WBS) elements to be included in the project for this portion of the work. **Proposers are to include, at a minimum, these WBS elements in their Schedule and Cost Proposals.** Additional WBS elements may be added by Proposer as deemed appropriate.

3.2.1 Pre-Design Activities

3.2.1.1 Schedule

Finalize Schedule for the new BNR structures as described in Section 3.1.1 *Existing Structures, Pre-Design Activities.*

3.2.1.2 Additional Coverage Testing

Contractor shall provide, as part of their design for the BNR area, additional signal strength testing prior to submitting the final design. As mentioned in Section 3.1.1.2 *Additional Coverage Testing,* the District contracted with a 3rd party testing company to perform an existing Coverage Assessment at SRWTP. Included in the assessment were radio tests inside the BNR galleries and buildings still under construction; however, this cannot be relied upon due to the incomplete construction of the BNR facilities at the time of the assessment*.

*** Note: At the time of the District's radio testing (February 21, 2019) the BNR project was approximately 70% complete and therefore does not necessarily reflect the radio strength once the BNR project is complete.**

A Radio Coverage Assessment Report was performed to measure the status of the current radio strength at the SRWTP. This report is included in this RFP to provide Proposers an understanding of the existing radio coverage at SRWTP, and what the Proposer has to account for when responding to this RFP. Some buildings were not tested and therefore do not appear in the existing Coverage Assessment.

BNR structures not tested or partially tested in the existing Coverage Assessment shall be assumed to have insufficient radio coverage for purposes of responding to this RFP.

Contractor shall review the structures associated with the BNR project, plan to provide an additional radio strength test in the BNR structures prior to finalizing the design, and provide the deliverables as indicated in above sections.

For any buildings not tested in the existing Coverage Assessment, which the awarded Contractor's radio testing determine to have adequate radio coverage, or do not fall under the requirements of the fire code or are exempted by the AHJ, a deductive change order and a negotiated adjustment will be made to the GMP.

Contractor has the option to combine his additional radio tests to the Coverage Study described in Section 3.1.1 *Existing Structures, Additional Coverage Testing* when submitting a permit application to CSD Fire Department, as allowable by the AHJ.

Reference: Vol. 4 – Specifications, *Cosumnes Fire Dept. Letter to Regional San*; Attachment B to this RFP, (*Existing) Radio Coverage Assessment Report*.

3.2.2 Design Activities

Prepare Design Submittals for the new BNR structures as described in Section 3.1.2 *Existing Structures, Design Activities.*

3.2.3 Pre-Construction Activities

3.2.3.1 Fire Department Permit Package

Prepare and submit Fire Department permit package as described in Section 3.1.3.1 *Existing Structures, Fire Department Permit Package.* Contractor to determine whether to include with the *Existing Structures* permit package or separate, as allowable by the AHJ.

District will pay the permit fee associated with the permit application.

3.2.3.2 Work Plan

Prepare a work plan for the ERRCS within the BNR as described in Section 3.1.3.2 *Existing Structures, Work Plan.* Include in the work plan how coordination between any ongoing construction activities by the BNR project and this RSU project will be addressed.

3.2.4 Procure BNR Equipment

3.2.4.1 Procure BNR Equipment

Once the scope items above are completed and the Fire Department approves the permitting plans, the Contractor shall procure all equipment associated with the proposed BNR radio system. This includes, but not limited to, all equipment shown on the plans and equipment list, and associated hardware and software.

Compensation will be based on the Cost Breakdown Form and Materials List in the Contractor's Cost Proposal and paid in accordance with PROGRESS PAYMENT PROCEDURES Section (01 29 76) and CONSTRUCTION PROGRESS SCHEDULE Section (01 32 16).

3.2.5 Construction Activities (ALLOWANCE)

If determined and approved by the District, the Contractor shall install and commission the BNR radio system. Compensation will be based on the bid amount listed in the Contractor's Cost Proposal and paid according to PROGRESS PAYMENT PROCEDURES Section (01 29 76) and CONSTRUCTION PROGRESS SCHEDULE Section (01 32 16).

3.2.5.1 Install BNR ERRCS (ALLOWANCE)

Install radio system for BNR Structures as described in Section 3.1.4 *Existing Structures, Construction Activities*

3.2.6 Commissioning and Acceptance Activities (ALLOWANCE)

Contractor to perform commissioning activities for BNR Structures as described in Section 3.1.5 *Existing Structures, Commissioning and Acceptance Activities.*

3.3 Future TTF Structures

The Tertiary Treatment Filtration (TTF) Project (construction costs over $300 million) is adding a third level (tertiary) of treatment to SRWTP's wastewater treatment process. Construction of the TTF Project is anticipated to be complete in 2023.

The scope of work for this phase of the Project is limited to planning (pre-design activities) and design for purposes of streamlining future expansion of the ERRCS radio system within TTF's structures.

Spare single-mode fibers from TTF ACC fiber optic termination panel to the PCC 5th floor fiber optic termination panel are available to the Contactor for use on this project.

A layout of the TTF project, construction drawings and fiber optic network drawings are included in *Volume 5 – Project and Reference Drawings.*

The following figures show 3D renderings of the TTF site.

Figure 5 TTF Site
View looking southeast

Figure 6 TTF – Granular Media Filter (GMF) Support Center

3.3.1 Pre-Design Activities

Pre-design activities include planning for the expansions of radio coverage, in coordination with the new radio systems proposed in Sections 3.1 and 3.2.

3.3.1.1 Simulated Coverage Assessment

Provide a planning-level Coverage Assessment of the TTF structures using predictive software, or other acceptable methods, to determine unmitigated radio signal strengths.

Figure 7 TTF - Disinfection Contract Basin (DCB)
DCB in foreground, view looking northwest

3.3.2 Design Activities (90% Design Level)

Based on the planning-level Coverage Assessment, contractor is to perform design activities for the TTF Structures up to the 90% design-level submittal as described in Section 3.1.2.1&2 *Existing Structures, Design Activities.*

Section 4 - Background

The following section provides addition information on Sacramento Regional Radio Communications System (SRRCS) and the existing radio system at SRWTP, as mentioned in *Section 1 - Introduction.*

4.1 Sacramento Regional Radio Communications System

The Sacramento Regional Radio Communications System (SRRCS) is a region-wide public safety communications system resulting from a twenty-year partnership of many governmental jurisdictions that have collaborated to develop and operate a public safety communication network. Primary users are law enforcement and fire departments, transportation services, park rangers, and the coroner for mutual aid of surrounding counties.

4.2 Project 25 (P25)

Project 25 (P25) is a suite of national standards for digital radio communications for use by federal, state, and local public safety agencies in North America to enable them to communicate with each other during emergencies. Upgrading to P25 improves interoperability, or the capability of multiple public safety and local government jurisdictions to communicate seamlessly without the need for multiple radios.

In January 2013, SRRCS began a seven-year transition from the analog radio system to a new 30-channel P25 compliant system. The transition to the P25 system was planned over five phases. **By**

December 31, 2019, the last phase will be complete, **completing the SRRCS transition to a P25 compliant system.**

On December 31, 2019, all SRRCS radios will be P25 compliant and any radio system that is P25 compliant will be able to communicate with SRRCS members.

At this point, SRWTP's existing local radio system will not be able to communicate on the SRRCS system (unless hardware upgrades are made to their local radio system.)

4.3 Existing Radio System at SRWTP

SRWTP existing radio system is an analog 800 MHz system—installed circa 1980.

Communication on the analog 800 MHz system is limited to the Plant and comprised of four receivers. Each pair of receivers, installed at various locations within the Plant, relays signal for two Plant channels known as "Plant1" and "Plant2." Plant1 operates at 854.1125(TX) and 809.1125(RX) and Plant2 operates at 859.2375(TX) and 814.2375(RX). The receivers relay the communication signals to a set of Motorola comparators located on the fourth floor at the Plant Computer Control System (PCCS) Shop. The comparators forward the stronger received signal to its respective repeaters. The existing repeaters are Motorola MSF 5000 that were installed circa 1980; they are also located at the fourth floor in the PCCS Shop. From there, the signal is forwarded on its corresponding channel to the transmitter.

Also located in the Plant Control Center (PCC), are two (2) Motorola MCD 5000 dispatch console. The MCD 5000 dispatch consoles network to a local switch in the PCC Shop that communicates to a Motorola Radio Gateway Unit (RGU) onto various channels. From there it communicates to the Motorola XTL 5000 consolettes.

SRWTP owns approximately 160 two-way handheld radios, composed mostly of Motorola MTS handheld 2000 radios of various types. In addition, approximately 20 Motorola XTL-2500 mobile radios are installed in various Regional San vehicles and equipment. These mobile radios operate in the same manner as the handheld radios, with the exception the mobile radios have more power and therefore can operate at farther points away from the receiving antennas.

See Table 1 for a list of existing radio equipment at SRWTP.

Regional San acknowledges their repeater system is outdated, no longer supported by the manufacturer for replacement parts or repairs, and reaching the end of its useful line. **Therefore, Proposers should not include the use of the Districts repeater system to supplement their proposed ERRCS. Furthermore, the District desires to utilize the hardware from this Project to "piggy-back" off the new radio booster system to improve radio coverage on their local "Plant" channels *without interfering with Emergency Responder radio communications or having to replace their handheld radios.***

Table 1 Existing Radio Equipment at SRWTP

Equipment	Make/Model	Quantity	Notes	Location
Handheld Radio	Motorola MTS 2000	163	Majority manufactured circa 1993.	
Mobile Radio Units	Motorola XTL-2500	18		Various Vehicles
(Digital) Handheld Radio	Motorola XTL-5000 (digital)	2	Programmable units that connect to the County trunk system. Units are Flash upgradable to P25	
Repeater	Motorola MSF 5000	2	Operate at 800 MHz (in analog format only). Installed circa 1983.	PCC
Consulates (Base Units)	Motorola XTL-5000	2	Programmable units that connect to the County trunk system. Units are Flash upgradable to P25	PCC
Voting Receivers		2		
Receivers		4*	Relaying radio signals inside tunnels to the PCC. At the PCC the received signals is compared via a comparator to the signals from the other two receivers. The strongest signal is sent to the repeater. *Only 3 of the receivers work; 1 is indefinitely broken.	Tunnel
Radio Channels	--	16	Includes Plant1 and Plant2	
Comparators	Motorola	2	Relays stronger signal from receiver to its respective repeater	PCC
PCC = Plant Control Center, 4th Floor				

4.4 Assigned Radio Frequencies

The downlink frequencies assigned to SRRCS are in the 851-854 MHz range, with the uplink frequencies 45 MHz lower, starting in the 806 MHz range.

The current 800 MHz downlink and uplink frequencies assigned to the SRRCS are included in the Vol. 4 - Specifications, Appendix A - *Cosumnes Fire Dept. Letter to Regional San.*

The local radio frequencies assigned to SRWTP “Plant1” & “Plant2” channels are 854.1125(TX) and 809.1125(RX), and 859.2375(TX) and 814.2375(RX), respectively.