NORTH COAST RESOURCE PARTNERSHIP
2018/19 IRWM Project Application

The North Coast Resource Partnership (NCRP) 2018/19 Project Application Instructions and additional information can be found at the NCRP 2018/19 Project Solicitation webpage (https://northcoastresourcepartnership.org/proposition-1-irwm-round-1-implementation-funding-solicitation/). Please fill out grey text boxes and select all the check boxes that apply to the project. Application responses should be clear, brief and succinct.

Project Applications will be accepted until 5:00 pm, ~~March 8, 2019~~ **March 15, 2019.** It is important to save the application file with a distinct file name that references the project name. When the application is complete, please email to kgledhill@westcoastwatershed.com

If you have questions, need additional information or proposal development assistance please contact:

- Katherine Gledhill at kgledhill@westcoastwatershed.com or 707.795.1235
- Tribal Projects: Sherri Norris, NCRP Tribal Coordinator at sherri@cieaweb.org or 510.848.2043

Project Name: Scotia Community Services District (SCSD) Emergency Power Generator

A. ORGANIZATION INFORMATION

1. **Organization Name: Scotia Community Service District**

2. **Contact Name/Title**
   Name: Leslie Marshall
   Title: General Manager
   Email: infoscotiacsd@gmail.com
   Phone Number (include area code): (707) 764-3030

3. **Organization Address (City, County, State, Zip Code):**
   PO Box 104, Scotia CA 95565

4. **Organization Type**
   ☒ Public agency

☐ Non-profit organization
☐ Public utility
☐ Federally recognized Indian Tribe
☐ California State Indian Tribe listed on the Native American Heritage Commission's California Tribal Consultation List
☐ Mutual water company
☐ Other:

5. **Authorized Representative** (if different from the contact name)
   Name: same as contact name
   Title:
   Email:
   Phone Number (include area code):

6. **Has the organization implemented similar projects in the past?** ☐ yes ☒ no
   Briefly describe these previous projects.

7. **List all projects the organization is submitting to the North Coast Resource Partnership for the 2018/19 Project Solicitation in order of priority.**
   The emergency power generator for the raw water river pumps is the only project being submitted by Scotia Community Service District (SCSD).

8. **Organization Information Notes:**
   SCSD was formed in 2014, as a California Special District to provide water, wastewater, parks and recreation, limited streetlighting and storm drainage to the community of Scotia.

B. ELIGIBILITY

1. **North Coast Resource Partnership and North Coast IRWM Objectives**

GOAL 1: INTRAREGIONAL COOPERATION & ADAPTIVE MANAGEMENT
☒ Objective 1 - Respect local autonomy and local knowledge in Plan and project development and implementation
☐ Objective 2 - Provide an ongoing framework for inclusive, efficient intraregional cooperation and effective, accountable NCIRWMP project implementation
☐ Objective 3 - Integrate Traditional Ecological Knowledge in collaboration with Tribes to incorporate these practices into North Coast Projects and Plans

GOAL 2: ECONOMIC VITALITY
☒ Objective 4 - Ensure that economically disadvantaged communities are supported and that project implementation enhances the economic vitality of disadvantaged communities by improving built and natural infrastructure systems and promoting adequate housing
☐ Objective 5 - Conserve and improve the economic benefits of North Coast Region working landscapes and natural areas

GOAL 3: ECOSYSTEM CONSERVATION AND ENHANCEMENT

☐ Objective 6 – Conserve, enhance, and restore watersheds and aquatic ecosystems, including functions, habitats, and elements that support biological diversity

☐ Objective 7 - Enhance salmonid populations by conserving, enhancing, and restoring required habitats and watershed processes

GOAL 4: BENEFICIAL USES OF WATER

☒ Objective 8 - Ensure water supply reliability and quality for municipal, domestic, agricultural, Tribal, and recreational uses while minimizing impacts to sensitive resources

☐ Objective 9 - Improve drinking water quality and water related infrastructure to protect public health, with a focus on economically disadvantaged communities

☐ Objective 10 - Protect groundwater resources from over-drafting and contamination

GOAL 5: CLIMATE ADAPTATION & ENERGY INDEPENDENCE

☐ Objective 11 - Address climate change effects, impacts, vulnerabilities, and strategies for local and regional sectors to improve air and water quality and promote public health

☐ Objective 12 - Promote local energy independence, water/ energy use efficiency, GHG emission reduction, and jobs creation

GOAL 6: PUBLIC SAFETY

☐ Objective 13 - Improve flood protection and reduce flood risk in support of public safety

2. Does the project have a minimum 15-year useful life?

☒ yes ☐ no

If no, explain how it is consistent with Government Code 16727.

3. Other Eligibility Requirements and Documentation

CALIFORNIA GROUNDWATER MANAGEMENT SUSTAINABILITY COMPLIANCE

a) Does the project that directly affect groundwater levels or quality?
   ☐ yes ☒ no
b) If Yes, will the organization be able to provide compliance documentation outlined in the instructions, to include in the NCRP Regional Project Application should the project be selected as a Priority Project?
   ☐ yes ☐ no

CASGEM COMPLIANCE

a) Does the project overlie a medium or high groundwater basin as prioritized by DWR?
   ☐ yes ☒ no
b) If Yes, list the groundwater basin and CASGEM priority:
c) If Yes, please specify the name of the organization that is the designated monitoring entity:
d) If there is no monitoring entity, please indicate whether the project is wholly located in an economically disadvantaged community.
   ☐ yes ☐ no

URBAN WATER MANAGEMENT PLAN

a) Is the organization required to file an Urban Water Management Plan (UWMP)?

☐ yes ☒ no

b) If Yes, list the date the UWMP was approved by DWR:

c) Is the UWMP in compliance with AB 1420 requirements?
☐ yes ☐ no

d) Does the urban water supplier meet the water meter requirements of CWC 525?
☐ yes ☐ no

c) If Yes, will the organization be able to provide compliance documentation outlined in the instructions, to include in the NCRP Regional Project Application should the project be selected as a Priority Project?
☐ yes ☐ no

AGRICULTURAL WATER MANAGEMENT PLAN

a) Is the organization – or any organization that will receive funding from the project – required to file an Agricultural Water Management Plan (AWMP)?
☐ yes ☒ no

b) If Yes, list date the AWMP was approved by DWR:

c) Does the agricultural water supplier(s) meet the requirements in CWC Part 2.55 Division 6?
☐ yes ☐ no

SURFACE WATER DIVERSION REPORTS

a) Is the organization required to file surface water diversion reports per the requirements in CWC Part 5.1 Division 2?
☐ yes ☒ no

d) If Yes, will the organization be able to provide SWRCB verification documentation outlined in the instructions, to include in the NCRP Regional Project Application should the project be selected as a Priority Project?
☐ yes ☐ no

STORM WATER MANAGEMENT PLAN

a) Is the project a stormwater and/or dry weather runoff capture project?
☐ yes ☒ no

b) If yes, does the project benefit a Disadvantaged Community with a population of 20,000 or less?
☐ yes ☐ no

e) If No, will the organization be able to provide documentation that the project is included in a Stormwater Resource Plan that has been incorporated into the North Coast IRWM Plan, should the project be selected as a Priority Project?
☐ yes ☒ no

C. GENERAL PROJECT INFORMATION

1. **Project Name: Scotia Community Services District (SCSD) Emergency Power Generator**

2. **Eligible Project Type under 2018/19 IRWM Grant Solicitation**
   - ☐ Water reuse and recycling for non-potable reuse and direct and indirect potable reuse
   - ☐ Water-use efficiency and water conservation

- ☐ Local and regional surface and underground water storage, including groundwater aquifer cleanup or recharge projects
- ☐ Regional water conveyance facilities that improve integration of separate water systems
- ☐ Watershed protection, restoration, and management projects, including projects that reduce the risk of wildfire or improve water supply reliability
- ☐ Stormwater resource management projects to reduce, manage, treat, or capture rainwater or stormwater
- ☐ Stormwater resource management projects that provide multiple benefits such as water quality, water supply, flood control, or open space
- ☐ Decision support tools that evaluate the benefits and costs of multi-benefit stormwater projects
- ☐ Stormwater resource management projects to implement a stormwater resource plan
- ☐ Conjunctive use of surface and groundwater storage facilities
- ☐ Decision support tools to model regional water management strategies to account for climate change and other changes in regional demand and supply projections
- ☐ Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff
- ☐ Regional projects or programs as defined by the IRWM Planning Act (Water Code §10537)
- ☒ Other: Increased water supply reliability and avoided water shortage costs.

3. Project Abstract

The project will provide the community of Scotia with a reliable water source, for the SCSD Water Treatment Plant, during PG&E Power failures.

4. Project Description

The SCSD has experienced repeated power failures over the past several years. The raw water supply, from the Eel River Pump Station, to the SCSD Water Treatment Plant does not have an emergency power generator. The project will provide emergency power to the two (2) river pumps and a continuous supply of water to the water treatment plant for domestic and commercial use as well as fire suppression for the entire community.

5. Specific Project Goals/Objectives

Goal 1: Provide Scotia community with continuing water supply
Goal 1 Objective: Increase water supply reliability and avoid water shortage costs
Goal 1 Objective:
Goal 1 Objective:
Goal 1 Objective:

Goal 2:
Goal 2 Objective:
Goal 2 Objective:
Goal 2 Objective:
Goal 2 Objective:

Goal 3:
Goal 3 Objective:
Goal 3 Objective:
Goal 3 Objective:

Additional Goals & Objectives (List)

6. **Describe how the project addresses the North Coast Resource Partnership and North Coast IRWM Plan Goals and Objectives selected**.
   Increased water supply reliability and avoid shortage costs.

7. **Describe the need for the project**.
   Emergency power generator provides continuous supply of domestic, commercial, and fire suppression water.

8. **List the impaired water bodies (303d listing) that the project benefits:**
   N/A

9. **Will this project mitigate an existing or potential Cease and Desist Order or other regulatory compliance enforcement action?** ☐ yes ☒ no
   If so, please describe?

10. **Describe the population served by this project.**
    Approximately 1000 residents and 15 commercial businesses.

11. **Does the project provide direct water-related benefits to a project area comprised of Disadvantaged Communities or Economically Distressed Communities?**
    - ☒ Entirely
    - ☐ Partially
    - ☐ No

    List the Disadvantaged Community(s) (DAC)
    Scotia Community

12. **Does the project provide direct water-related benefits to a project area comprised of Severely Disadvantaged Communities (SDAC)?**
    - ☐ Entirely
    - ☐ Partially
    - ☒ No

    List the Severely Disadvantaged Community(s)

13. **Does the project provide direct water-related benefits to a Tribe or Tribes**?
    - ☐ Entirely
    - ☐ Partially
    - ☒ No

    List the Tribal Community(s)

    If yes, please provide evidence of support from each Tribe listed as receiving these benefits.

14. **If the project provides benefits to a DAC, EDA or Tribe, explain the water-related need of the DAC, EDA or Tribe and how the project will address the described need.**
    Relible supply of domestic, commercial, and fire suppression water.

15. **Does the project address and/or adapt to the effects of climate change? Does the project address the climate change vulnerabilities in the North Coast region?** ☐ yes ☒ no
    If yes, please explain.

16. **Describe how the project contributes to regional water self-reliance.**
    N/A

17. **Describe how the project benefits salmonids, other endangered/threatened species and sensitive habitats.**
    N/A

18. **Describe local and/or political support for this project.**
    N/A

19. **List all collaborating partners and agencies and nature of collaboration.**
    N/A

20. **Is this project part or a phase of a larger project?** ☐ yes ☒ no
    Are there similar efforts being made by other groups? ☐ yes ☒ no
    If so, please describe?

21. **Describe the kind of notification, outreach and collaboration that has been done with the County(ies) and/or Tribes within the proposed project impact area, including the source and receiving watersheds, if applicable.**
    N/A

22. **Describe how the project provides a benefit that meets at least one of the Statewide Priorities as defined in the 2018 IRWM Grant Program Guidelines and Tribal priorities as defined by the NCRP?**
    Increased water supply reliablilty and avoided water shortage costs.

23. **Project Information Notes:**
    None

D. PROJECT LOCATION

1. **Describe the location of the project**
    Geographical Information
    The building that houses the generator is located on APN# 205-351-023 on the westernmost side adjacent to the Railroad right of way. This building is located on an easement on Humboldt Redwood

Company's property and is accessed via a locked gate at the log pond clarifier located on APN# 205-421-006.

2. **Site Address (if relevant):**
   Not relevant

3. **Does the applicant have legal access rights, easements, or other access capabilities to the property to implement the project?**
   ☒ Yes If yes, please describe
   ☐ No If No, please provide a clear and concise narrative with a schedule, to obtain necessary access.
   ☐ NA If NA, please describe why physical access to a property is not needed.
   Easement for existing structure on private property

4. **Project Location Notes:**
   None

E. PROJECT TASKS, BUDGET AND SCHEDULE

1. **Projected Project Start Date:** 3/1/20
   Anticipated Project End Date: 3/1/21

2. **Will CEQA be completed within 6 months of Final Award?**
   ☐ Yes State Clearinghouse Number:
   ☐ NA, Project is exempt from CEQA
   ☐ NA, Not a Project under CEQA
   ☒ NA, Project benefits entirely to DAC, EDA or Tribe, or is a Tribal local sponsor. [Projects providing a water-related benefit entirely to DACs, EDAs, or Tribes, or projects implemented by Tribes are exempt from this requirement].
   ☐ No

3. **Please complete the CEQA Information Table below**
   Indicate which CEQA steps are currently complete and for those that are not complete, provide the estimated date for completion.

CEQA STEP	COMPLETE? (y/n)	ESTIMATED DATE TO COMPLETE
Initial Study		
Notice & invitation to consult sent to Tribes per AB52		
Notice of Preparation		
Draft EIR/MND/ND		
Public Review		
Final EIR/MND/ND		
Adoption of Final EIR/MND/ND		
Notice of Determination		

CEQA STEP	COMPLETE? (y/n)	ESTIMATED DATE TO COMPLETE
N/A - not a CEQA Project	Yes	

If additional explanation or justification of the timeline is needed or why the project does not require CEQA, please describe.
Gor the addition of an emergency power generator at already existing, already CEQA approved building and slab

4. **Will all permits necessary to begin construction be acquired within 6 months of Final Award?**
   ☐ Yes
   ☒ NA, Project benefits entirely to DAC, EDA, Tribe, or is a Tribal local sponsor
   ☐ No

5. **PERMIT ACQUISITION PLAN**

Type of Permit	Permitting Agency	Date Acquired or Anticipated

For permits not acquired: describe actions taken to date and issues that may delay acquisition of permit.

6. **Describe the financial need for the project**.
   SCSD does not have the funds needed for this project. The project is in an Economically Diasadvantaged Community.

7. **Is the project budget scalable?** ☐ yes ☒ no
   Describe how a scaled budget would impact the overall project.

8. **Describe the basis for the costs used to derive the project budget according to each budget category.**
   Provided by a contracted engineering firm.

9. **Provide a narrative on cost considerations including alternative project costs.**
   N/A

10. **List the sources of non-state matching funds, amounts and indicate their status**.

    N/A

11. **List the sources and amount of state matching funds.**

    N/A

12. **Cost Share Waiver Requested (DAC or EDA)?** ☐ yes ☒ no

Cost Share Waiver Justification: Describe what percentage of the proposed project area encompasses a DAC/EDA, how the community meets the definition of a DAC/EDA, and the water-related need of the DAC/EDA that the project addresses. In order to receive a cost share waiver, the applicant must demonstrate that the project will provide benefits that address a water-related need of a DAC/EDA.

13. **Major Tasks, Schedule and Budget for NCRP 2018 IRWM Project Solicitation**
Please complete MS Excel table available at https://northcoastresourcepartnership.org/proposition-1-irwm-round-1-implementation-funding-solicitation/; see instructions for submitting the required excel document with the application materials.

14. **Project Tasks, Budget and Schedule Notes:**

F. PROJECT BENEFITS & JUSTIFICATION

1. **Does the proposed project provide physical benefits to multiple IRWM regions or funding area(s)?**
☐ yes ☒ no
If Yes, provide a description of the impacts to the various regions.

2. **Provide a narrative for project justification. Include any other information that supports the justification for this project, including how the project can achieve the claimed level of benefits. List any studies, plans, designs or engineering reports completed for the project.** *Please see the instructions for more information about submitting these documents with the final application.*

3. **Does the project address a contaminant listed in AB 1249 (nitrate, arsenic, perchlorate, or hexavalent chromium)?** ☐ yes ☒ no
If yes, provide a description of how the project helps address the contamination.

4. **Does the project provide safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes consistent with AB 685?** ☐ yes ☒ no
If Yes, please describe.

5. **Does the project employ new or innovative technologies or practices, including decision support tools that support the integration of multiple jurisdictions, including, but not limited to, water supply, flood control, land use, and sanitation?** ☐ yes ☒ no
If Yes, please describe.

6. **For each of the Potential Benefits that the project claims complete the following table to describe an estimate of the benefits expected to result from the proposed project.** [*See the NCRP Project*

Application Instructions, Potential Project Benefits Worksheet and background information to help complete the table. The NCRP Project Application, Attachment B includes additional guidance, source materials and examples from North Coast projects.]

PROJECT BENEFITS TABLE

Potential Benefits Description	Physical Amt of Benefit	Physical Units	Est. Economic Value per year	Economic Units
Water Supply				
Water Quality				
Other Ecosystem Service Benefits				
Other Benefits				

7. Project Justification & Technical Basis Notes:

Major Tasks, Schedule and Budget for North Coast Resource Partnership 2018/19 IRWM Project Solicitation

Project Name: Scotia River Pump Emergency Generator
Organization Name: Scotia Community Services District

Task #	Major Tasks	Task Description	Major Deliverables	Current Stage of Completion	IRWM Task Budget	Non-State Match	Total Task Budget	Start Date	Completion Date
A	**Category (a): Direct Project Administration**								
1	Administration	In cooperation with the County of Humboldt sign a sub-grantee agreement for work to be completed on this project. Develop invoices with support documentation. Provide audited financial statements and other deliverables as required	Invoices, audited financial statements and other deliverables as required	0%	$2,000.00	$0.00	$2,000.00	3/25/19	10/15/20
2	Monitoring Plan	Develop Monitoring Plan to include goals and measurable objectives	Final Monitoring Plan	0%	$1,500.00	$0.00	$1,500.00	3/25/19	10/15/20
3	Labor Compliance Program	Execute service agreement with Labor Compliance Program company	Submission of Labor Compliance Program	0%	$3,000.00	$0.00	$3,000.00	7/1/19	10/15/19
4	Reporting	Develop monthly reports describing work completed, challenges, and strategies for reaching remaining project objectives. Develop Final Report	Quarterly and Final Reports	0%	$5,000.00	$0.00	$5,000.00	3/25/19	10/15/20
B	**Category (b): Land Purchase/Easement**								
1	Right of Way Easement	Aquire inlarged Easement Area	New Easement area	0%	$0.00	$2,500.00	$2,500.00	3/25/19	7/1/19
C	**Category (c): Planning/Design/Engineering/Environmental Documentation**								
1	Final Design /Plans	Prepare Bid Plans & Specificiations	Bid Package for a new Emergency Generator	20%	$20,000.00	$5,000.00	$25,000.00	1/1/17	7/1/19
2	Bidding Assistance/Review	Assist the District with Bidding and Reviewing Bids	Select a bidder to perform the work	0%	$3,000.00	$0.00	$3,000.00	7/1/19	8/15/19
3	Environmental Documentation: CEQA *	Assist with the preparation of a CEQA CAT EX filling	Catagoraical Exemption Notice for CEQA	0%	$3,000.00	$0.00	$3,000.00	3/25/19	7/1/19
4	Right of Way Easement	Expand existing right of way easment to incompass Generator Pad	New inlarged easment area	0%	$10,000.00	$0.00	$10,000.00	3/25/19	7/1/19
5				0%	$0.00	$0.00	$0.00		
6				0%	$0.00	$0.00	$0.00		
7				0%	$0.00	$0.00	$0.00		
8				0%	$0.00	$0.00	$0.00		
D	**Category (d): Construction/Implementation**								
1	Construction/Implementation Contracting	Assist with Construction Oversite	Review Submittals, final inspection for compliance with plans	0%	$5,000.00	$0.00	$5,000.00	8/15/19	10/15/19
2	Mobilization and Site Preparation			0%	$35,000.00	$0.00	$0.00		
3	Project Construction/Implementation: [PLEASE COMPLETE]	Construct new concrete pad, approximatly 160 sqft, with conduit	New concrete pad to place generator on	0%	$7,500.00	$0.00	$7,500.00	8/15/19	10/15/19
4	Project Construction/Implementation: [PLEASE COMPLETE]	Purchase and Install Generator and Automatic Transfer Switch	New Generator and Transfer Switch	0%	$140,000.00	$0.00	$140,000.00	8/15/19	10/15/19
5	Project Construction/Implementation: [PLEASE COMPLETE]	Wire new Generator and Transfer Switch and test	Working and tested generator system	0%	$15,000.00	$0.00	$15,000.00	10/1/19	10/15/19
6				0%	$0.00	$0.00	$0.00		
7	Project Signage			0%	$0.00	$0.00	$0.00		
8	Project Close Out, Inspection & Demobilization	Inspect project components and establish that work is complete. Verify that all project components have been installed and are functioning as specified will be conducted as part of construction inspection and project closeout. Conduct project completion photo monitoring. Prepare record drawings.	As-Built and Record Drawings; Project completion site photos	0%	$5,000.00	$0.00	$5,000.00	10/15/19	11/15/19

Project Name: Scotia River Pump Emergency Generator
Organization Name: Scotia Community Services District

Task #	Major Tasks	Task Description	Major Deliverables	Current Stage of Completion	IRWM Task Budget	Non-State Match	Total Task Budget	Start Date	Completion Date
9	Project Performance Monitoring	The performance of the project will be monitored in accordance to the Monitoring Plan using the following measurement tools and methods: [PLEASE COMPLETE}	Document for 1 year that they system does it's monthly run checks, track the hour meter, perform scheudled maintenance	0%	$5,000.00	$0.00	$5,000.00	3/25/19	10/15/20
10	Construction Administration	Complete tasks necessary to administer construction contract. Keep daily records of construction activities, inspection, and progress. Conduct project construction photo-monitoring.	Construction Management Logs; Completed construction administration tasks documented in monthly progress reports	0%	$7,500.00	$0.00	$7,500.00	8/15/19	10/15/19
	Total North Coast Resource Partnership 2018/19 IRWM Grant Request				**$267,500.00**	**$7,500.00**	**$240,000.00**		
	Is Requested Budget scalable by 25%? If yes, indicate scaled totals; if no delete budget amount provided.				**$200,625.00**	**$5,625.00**	**$180,000.00**		
	Is Requested Budget scalable by 50%? If yes, indicate scaled totals; if no delete budget amount provided.				**$133,750.00**	**$3,750.00**	**$120,000.00**		

Scotia River Pump Improvements
Power and Signal Conduit and Cable Schedule

Label	Description	A
1	Existing conduit and conductors to remain without modification	All
2	Existing conduit and conductors to remain without modification	All
3	Existing conduit and conductors to remain without modification	All
4	Provide 1" conduit, (1) #4/0 Cu	6
5	Remove existing conductors, conduit to be abandoned.	6
6	Provide (2) sets of 4" conduit, (3) 750kcmil, (1) #2/0 Cu	6
7	Provide (2) sets of 4" conduit, (3) 750kcmil, (1) #2/0 Cu	6
8	Provide (2) sets of 4" conduit, (3) 750kcmil, (1) #2/0 Cu	6
9	Provide 3/4" conduit, (10) #14	6
10	Provide 3/4" conduit, (2) #12, (1) #12G	1
11	Provide 3/4" conduit, (4) #12, (1) #12G	6
12	Provide 1" conduit, (2) #10, (1) #12G	5
13	Remove existing conductors, conduit to be abandoned. (See Drwg E2 notes)	4
14	Remove conduit sleeves where exposed Direct buried cable to be abandoned	4
15	Remove existing conductors, conduit to be abandoned. (See Drwg E2 notes)	4
16	Remove conduit sleeves where exposed Direct buried cable to be abandoned	4
17	Remove existing conductors, conduit to be abandoned. (See Drwg E2 notes)	4
18	Remove conduit sleeves where exposed Direct buried cable to be abandoned	4
19	Remove existing conductors, conduit to be abandoned. (See Drwg E2 notes)	4
20	Remove conduit sleeves where exposed Direct buried cable to be abandoned	4
21	Remove all existing exposed direct buried cable and pump cables.	2,4
22	Existing conduit and conductors to remain without modification	All
23	Existing conduit and conductors to remain without modification	All
24	Remove existing conduit and conductors	4
25	Remove existing conduit and conductors	4
26	Existing 4" conduit - remove where exposed, abandon where embedded	2
27	Existing 4" conduit - remove where exposed, abandon where embedded	2
28	Provide Type MC direct buried armored cable, (3) 600kcmil, (1) 1/0G Cu	2
29	Temporary routing of Type MC armored pump feeder cable on ground surface	2
30	Not used	
31	Provide 30 ft of (3) individual 350kcmil Copper Type W Mining cables	2
32	(3) 2/0 individual cables furnished by pump Manufacturer	2
33	Provide (1) #1/0 Type W Mining cable directly connected to ground fitting	2
34	Provide Type MC direct buried armored cable, (3) 600kcmil, (1) 1/0G Cu	2,4
35	Not used	
36	Provide 30 ft of (3) individual 350kcmil Copper Type W Mining cables	4
37	(3) 2/0 individual cables furnished by pump Manufacturer	4
38	Provide 3/4" conduit, (20) #14	2.4
39	Provide 1/2" conduit, (10) #14	2
40	Provide 1/2" conduit, (10) #14	2,4
41	Provide 1-1/2" conduit, (2) 2pr TSP #18 cable [Analog Sig]	1
42	Provide 1" conduit, (9) #14, [120V signal wiring]	1
43	Existing 2" conduit, Provide (2) 2-pair TSP #18 cable	1

Column A - Phase Identification; **1** - PCP-100, Press Trans, **2** - Pump Feeders, Pump #1
3 - Pump Feeder Relocation, **4 -** MCC Demo**,** Pump #2, **5** FIT, Fiber Cable, **6** - Generator

Scotia River Pump Improvements
Power and Signal Conduit and Cable Schedule

Label	Description	A
44	Existing 2" conduit, Remove exist wire in phase 4	4
45	Existing 2" conduit, Provide (9) #14	1,6
46	Existing 2" conduit, For future wiring	All
47	Existing 2" conduit, Provide (1) 2pr TSP #18 cable. Remove all wire in Phase 4	1,4
48	Provide 1-1/2" conduit with (4) #14, (2) pull tapes	2
49	Provide 1-1/2" conduit with (2) pull tapes for future pump motor sensor wiring	2
50	Provide 1/2" Sched 40 PVC conduit with (4) #14 [Temp float switch wire routing]	2
51	Provide 1-1/2" conduit with (4) #14, (2) pull tapes	3
52	Provide 1-1/2" conduit with (2) pull tapes for future pump motor sensor wiring	3
53	Jacketed cable furnished with float switch	2
54	Provide 1" conduit, (1) 2pr TSP #18 cable	1
55	Provide 1" conduit, (5) #14	6
56	Provide 2" conduit with 3 cell innerduct, (1) 12 strand fiber cable,(4) 2pr TSP cables [1-spare], (8) #14 [2-spare]	5
57	Provide 2" spare conduit for future signal wiring, with (2) 3/16" pull tapes	5
58	Provide 3/4" conduit with (1) 2pr TSP cable, (2) #14	5
59	Provide 3/4" conduit, (2) #12, (1) #12G	5
60	Provide 1" conduit, (2) #12, (1) #12G	5
61	Provide 1-1/2" conduit with (3) 2pr TSP cables [1-spare], (6) #14 [2-spare]	5
62	Provide 2" conduit, 3 cell innerduct, (1) 12 strand fiber cable	5
63	Provide 2" spare conduit for future signal wiring, with (2) 3/16" pull tapes	5
64	Provide 2" conduit, (1) 6 pair telephone utility service cable	5
65	Existing 2" conduit, Provide 3 cell innerduct, (1) 12 strand fiber cable	5
66	Existing 2" conduit, Provide (1) 6 pair telephone utility cable, (2) 3/16" pull tapes	5
67	Existing 2" conduit, with (2) 2pr TSP #18 cables	All
68	Existing 2" conduit, with (2) #12, (1) #12G	All
69	Existing 2" conduit with (2) 2pr TSP cables, Provide 3 cell innerduct containing (1) 12 strand fiber cable	5
70	Existing 2" conduit, Provide (1) 6 pr telephone utility serv cable, (2) 3/16" pull tapes	5
71	Existing 2" conduit, with (2) #12, (1) #12G	All
72	Existing 2" conduit with (2) 2pr TSP cables, Provide 3 cell innerduct containing (1) 12 strand fiber cable	5
73	Provide 2" conduit, (1) 6 pair telephone utility service cable, (2) 3/16" pull tapes	5
74	Existing 2" conduit, with (2) #12, (1) #12G	All
75	Existing Analog signal wiring, provide additional analog wirng to PCP-200	5
76	Provide 1-1/2" conduit with (6) 2pr TSP cables, 2#14, (1) 12 strand fiber cable	5
77	Provide 1-1/2" conduit for future wiring	5
78	Provide 1" conduit, (10) #14	5
79	Provide 1/2" conduit, (2) #12, (1) #12G	5
80	Existing conduit with 120V power wiring, Provide (2) #12, (1) #12G	5

Column A - Phase Identification; **1** - PCP-100, Press Trans, **2** - Pump Feeders, Pump #1
3 - Pump Feeder Relocation, **4 -** MCC Demo**,** Pump #2, **5** FIT, Fiber Cable, **6** - Generator

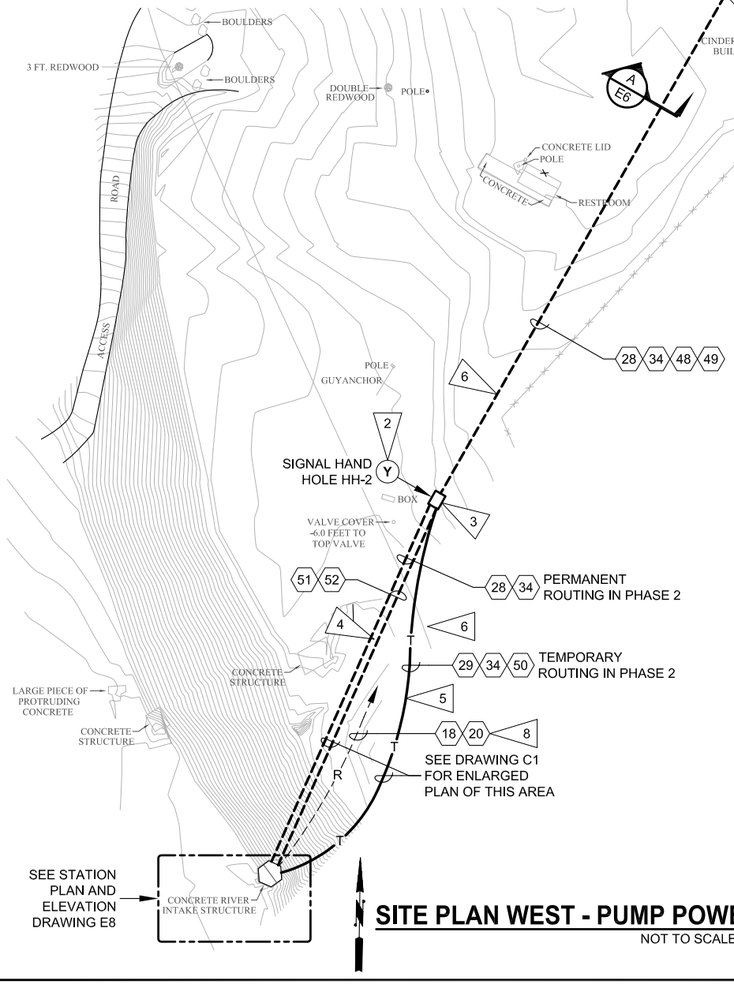
Scotia River Pump Improvements
Power and Signal Conduit and Cable Schedule

Label	Description	A
81	Provide 1" conduit with (2) 2pr TSP #18 cables	5
82	Provide 3/4" conduit with (1) 2pr TSP #18 cable	5
83	Provide 3/4" conduit with (1) 2pr TSP #18 cable	5
84	Provide 3/4" conduit, (2) #12, (1) #12G	5
85	Provide 3/4" conduit with (1) 2pr TSP cable, (2) #14	5

Column A - Phase Identification; **1** - PCP-100, Press Trans, **2** - Pump Feeders, Pump #1
3 - Pump Feeder Relocation, **4 -** MCC Demo**,** Pump #2, **5** FIT, Fiber Cable, **6** - Generator

DRAWING NOTES:

1. POWER FEEDER CABLES AND SIGNAL CONDUITS TO BE ROUTED AT 90 DEGREES AT CROSSING UNDER RAILROAD BED.
2. APPROXIMATE LOCATION SHOWN FOR HANDHOLE. ACTUAL LOCATION TO BE DETERMINED IN THE FIELD BY CONTRACTOR AND OWNERS REPRESENTATIVE.
3. LOCATION OF HANDHOLE TO BE CHOSEN TO ALLOW FUTURE INSTALLATION OF RACK MOUNTED ENCLOSURE FOR PUMP MOTOR THERMAL AND MOISTURE SENSOR RELAYS.
4. FINAL ROUTING OF SIGNAL CONDUITS AND PUMP POWER FEEDER ARMORED CABLES TO BE INSTALLED AT TIME OF WATER PIPE INSTALLATION. SEE SECTION A ON DRAWING C-7 FOR INSTALLATION REQUIREMENTS.
5. ONE SIGNAL CONDUIT WITH FLOAT WIRING AND TWO POWER FEEDER ARMORED CABLES ARE TO BE LAID ON GROUND SURFACE TEMPORARILY DURING PHASE 2. CONTRACTOR IS TO PROVIDE BRIGHT COLORED WARNING LABELS AROUND BUNDLE OF (3) RACEWAYS EVERY 20 FEET WITH TEXT READING "WARNING - ELECTRICAL" OR SIMILAR TEXT. DURING PHASE 3 POWER FEEDER CABLES ARE TO BE PERMANENTLY RE-INSTALLED AT A DEPTH OF 30 INCHES IN TRENCH WITH WATER PIPE. SIGNAL CONDUCTORS ARE TO BE REROUTED IN PVC CONDUIT IN SAME TRENCH. ½" PVC CONDUIT USED FOR TEMPORARY ROUTING IS TO BE DISCARDED.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTRACTING THE SERVICES OF A UTILITY LOCATES COMPANY TO DETERMINE LOCATION OF EXISTING PUMP MEDIUM VOLTAGE POWER FEEDERS PRIOR TO PERFORMING TRENCH EXCAVATION. ANY CONFLICT BETWEEN EXISTING FEEDER ROUTING AND ROUTING SHOWN FOR NEW PUMP FEEDERS SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGN ENGINEERS FOR THEIR INVOLVEMENT IN THE RESOLUTION OF THE CONFLICT.
7. ASSUMED LOCATION OF (4) ORIGINAL PUMP CONTROLLERS AND EXISTING SIGNAL DEVICES CIRCUITED TO MCC IN PUMP BUILDING. CONTRACTOR TO VERIFY AND CONTACT DESIGN ENGINEER IF MODIFICATIONS IN DESIGN ARE DETERMINED NECESSARY.
8. EXISTING DIRECT BURIAL PUMP FEEDERS ACTUAL ROUTING TO BE DETERMINED PRIOR TO TRENCHING.



ELECTRICAL SYMBOLS LEGEND

SYMBOL	SYMBOL DESCRIPTION
———	EXPOSED CONDUIT
- - - -	CONDUIT ROUTED BELOW FLOOR OR CONCEALED
———o	CONDUIT TURNED UP OR DOWN
E	EXISTING CONDUIT AND WIRE TO REMAIN
R	EXISTING CONDUIT AND WIRE TO BE REMOVED
T	TEMPORARY CONDUIT OR CABLE
F	FUTURE CONDUIT
G	GROUND CONDUCTOR
	CONDUCTOR CONNECTION (ON ONE-LINE DIAGRAM)
J	JUNCTION BOX
XA / XP	BREAKER: AMPRE RATING/ NO. OF POLES (ONE-LINE DIAGRAM)
F	FLOAT SWITCH
FM	FLOW METER
PT	PRESSURE TRANSMITTER
RVSS	REDUCED VOLTAGE SOFT START
CLA	CHLORINE ANALYZER
M	MOTOR
A	ELECTRICAL EQUIPMENT TAG
1	DRAWING NOTE SYMBOL
1	RACEWAY TAG

SCOTIA RIVER PUMP ELECTRICAL EQUIPMENT LIST

NO.	EQUIPMENT DESCRIPTION	PHASE	
A	PAD-MOUNTED PG&E UTILITY TRANSFORMER	-	REMAIN
B	UTILITY SERVICE CT ENCLOSURE AND METER	-	REMAIN
C	UTILITY SERVICE DISCONNECT BREAKER	-	REMAIN
D	MOTOR CONTROL CENTER	4	REMOVE
E	MOTOR CONTROL CENTER	-	REMAIN
F	480V-120/240V TRANSFORMER	-	REMAIN
G	120/240V POWER PANEL BOARD	-	REMAIN
H	480V-2600V PUMP FEEDER TRANSFORMERS (4)	4	REMOVE
I	NOT USED		
J	HIGH VOLTAGE PUMP CONTROLLER EQUIPMENT	4	REMOVE
K	RAW WATER BOOSTER PUMPS P102A / PIO2B (2.6KV)	4	REMOVE
L	FIRE WATER BOOSTER PUMP P103 (2.6KV)	4	REMOVE
M	ORIGINAL RAW WATER INTAKE PUMP NO. 1 (2.6KV)	-	REMOVED
N	ORIGINAL RAW WATER INTAKE PUMP NO. 2 (2.6KV)	4	REMOVE
O	SIGNAL WIREWAY	-	REMAIN
P	SIGNAL HANDHOLE	-	REMAIN
Q	CONTROL SENSORS FOR PUMP SHUTDOWN	4	REMOVE
R	PUMP CONTROL PANEL (PNL PCP-100)	1	PROVIDE
S	RAW WATER PRESSURE TRANSMITTER (PIT-101)	1	PROVIDE
T	FIRE WATER PRESSURE TRANSMITTER (PIT-102)	1	PROVIDE
U	MCC ADDITION - PUMP P101A RVSS CONTROLLER	2	PROVIDE
V	RAW WATER INTAKE PUMP P101A (480V)	2	PROVIDE
W	MCC ADDITION - PUMP P101B RVSS CONTROLLER	2	PROVIDE
X	RAW WATER INTAKE PUMP P101B (480V)	5	PROVIDE
Y	SIGNAL PULLING HAND HOLES (HH-1, HH-2)	2	PROVIDE
Z	SIGNAL JUNCTION BOX (SJB-1)	2,3	PROVIDE
AA	LEVEL SWITCH LOW ALARM FLOAT (LSLA) - "CABLE EXPOSED"	2	PROVIDE
BB	LEVEL SWITCH LOW-LOW ALARM FLOAT (LSLLA) - "CAVITATION"	2	PROVIDE
CC	120V POWER / SIGNAL PULLING HANDHOLES (HH-3, 4, 5, 6)	5	PROVIDE
DD	MASTER (MAINLINE) FLOWMETER (FIT-101)	5	PROVIDE
EE	SERVICE NO. 1 (POWER PLANT) FLOW METER (FIT-102)	5	PROVIDE
FF	SERVICE NO. 2 (MILL) FLOW METER (FIT-103)	5	PROVIDE
GG	SIGNAL PULLING HANDHOLES (HH-7 THRU HH-10)	5	PROVIDE
HH	SIGNAL PULLING HANDHOLES (HH-11 THRU HH-15)	5	PROVIDE
II	NOT USED		
JJ	CHLORINE ANALYZER	-	REMAIN
KK	EXISTING WATER TANK LEVEL TRANSDUCER	-	REMAIN
LL	DATA LOGGER	-	REMAIN
MM	WTP CONTROL PANEL (PNL PCP-200)	5	PROVIDE
NN	AUTO DIALER EQUIPMENT	-	REMAIN
OO	WTP 120/240V POWER PANELBOARD	-	REMAIN
PP	RAW WATER STORAGE PRESSURE TRANSMITTER (PIT-201)	5	PROVIDE
QQ	FIRE WATER STORAGE PRESSURE TRANSMITTER (PIT-202)	5	PROVIDE
RR	FIRE WATER PIPELINE FLOWMETER (FIT-203)	5	PROVIDE
SS	AUTOMATIC TRANSFER SWITCH (ATS)	6	PROVIDE
TT	CUSTOM POWER WIREWAY	6	PROVIDE
UU	STANDBY DIESEL ENGINE GENERATOR	6	PROVIDE

SITE PLAN WEST - PUMP POWER BUILDING TO RIVER

NOT TO SCALE

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

CONSULTING ENGINEERS & GEOLOGISTS, INC.
275 MARKET AVENUE
COOS BAY, OR. 97420
WWW.SHN-ENGR.COM
541-266-9890

NO.	REVISION	BY	DATE

DSGN RS | DR MAS | CHK | APVD

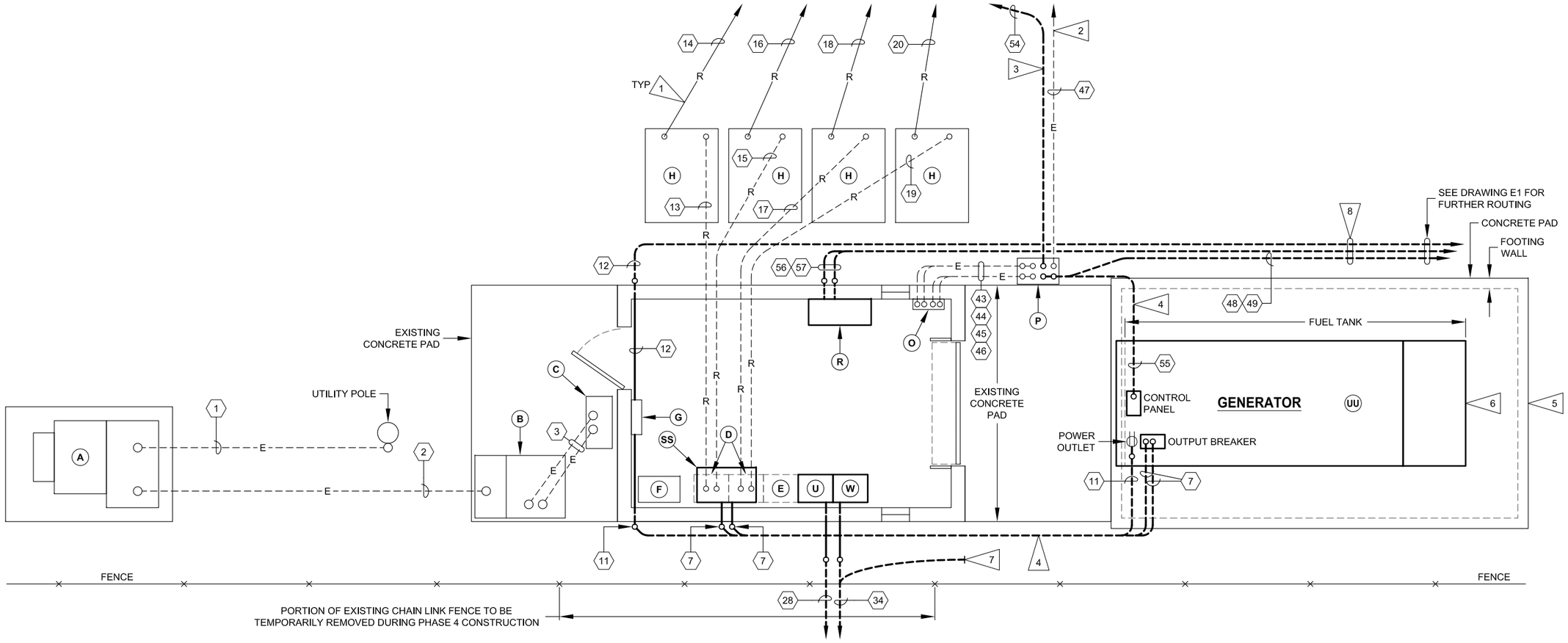
TOWN OF SCOTIA, LLC
SCOTIA INFRASTRUCTURE IMPROVEMENTS
SCOTIA, CALIFORNIA

WEST OVERALL SITE PLAN, LEGEND, EQUIPMENT LIST

RSE RICHARD SAMPLE ENGINEERING
1197 Magnolia Ave. Redding, CA 96001
530-242-1134 Fax: 530-242-1136
E-mail: rse@integrity.com

REGISTERED PROFESSIONAL ENGINEER
RICHARD A. SAMPLE
16423
EXP. 06/30/19
ELECTRICAL
STATE OF CALIFORNIA

SHEET E1
SEQ –
DATE 10/2018
PROJ. NO. 005161.410



PLAN - PUMP POWER BUILDING AREA ELECTRICAL

SCALE: 0 1 2 3 4 5

DRAWING NOTES:

1. ROUTING OF UNDERGROUND HIGH VOLTAGE FEEDER HAS BEEN SHOWN BASED ON ASSUMPTION THAT ORIGINAL CONTROLLERS ASSOCIATED WITH (4) EXISTING HIGH VOLTAGE PUMPS ARE LOCATED IN BUILDING SHOWN ON DRAWING E1. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING ACTUAL ROUTING. SEE NOTE 6 ON DRAWING E1 FOR FURTHER REQUIREMENTS.
2. DESIGN SHOWN ON THESE DRAWINGS ASSUMES THAT (1) 2" EXISTING CONDUIT WITH SIGNAL CONDUCTORS ASSOCIATED WITH RAW WATER AND FIRE WATER PUMP CONTROL IS ROUTED BETWEEN EXISTING SIGNAL HAND HOLE AND PUMP BUILDING AS SHOWN ON DRAWING E1. CONTRACTOR SHALL VERIFY BEFORE PERFORMING WORK ASSOCIATED WITH THE SIGNAL CIRCUITRY.
3. PROVIDE TRENCHING, BACKFILL, CONDUIT AND CONDUCTORS BETWEEN BUILDING AND NEW PRESSURE TRANSMITTER PIT102 HAND HOLE. SEE DRAWING E1 FOR FURTHER ROUTING.
4. CONDUITS TO BE PROVIDED DURING PHASE 6.
5. CONCRETE RETAINING WALL AND PAD ASSOCIATED WITH GENERATOR INSTALLATION, PROVIDED DURING PHASE 6, IS TO BE CONSTRUCTED BASED ON DESIGN SHOWN ON CIVIL DRAWINGS.
6. GENERATOR TO BE PROVIDED DURING PHASE 6.
7. CONTRACTOR TO LOOP ARMORED CABLE ASSOCIATED WITH PUMP 101B AT THIS LOCATION UNTIL CONSTRUCTION WORK ASSOCIATED WITH PHASE 4.
8. PROVIDE TRENCHING, BACKFILL, CONDUIT AND CONDUCTORS BETWEEN BUILDING AND LOCATION OF NEW FLOW METERS. SEE DRAWINGS E1 AND E10 FOR FURTHER ROUTING.

RICHARD SAMPLE ENGINEERING
RSE
1197 Magnolia Ave. Redding, CA 96001
530-242-1134 Fax: 530-242-1136
E-mail: rse@integrity.com

REGISTERED PROFESSIONAL ENGINEER
RICHARD A. SAMPLE
16423
EXP. 06/30/19
ELECTRICAL
STATE OF CALIFORNIA

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

SHN
CONSULTING ENGINEERS & GEOLOGISTS, INC.
275 MARKET AVENUE
COOS BAY, OR. 97420
WWW.SHN-ENGR.COM
541-266-9890

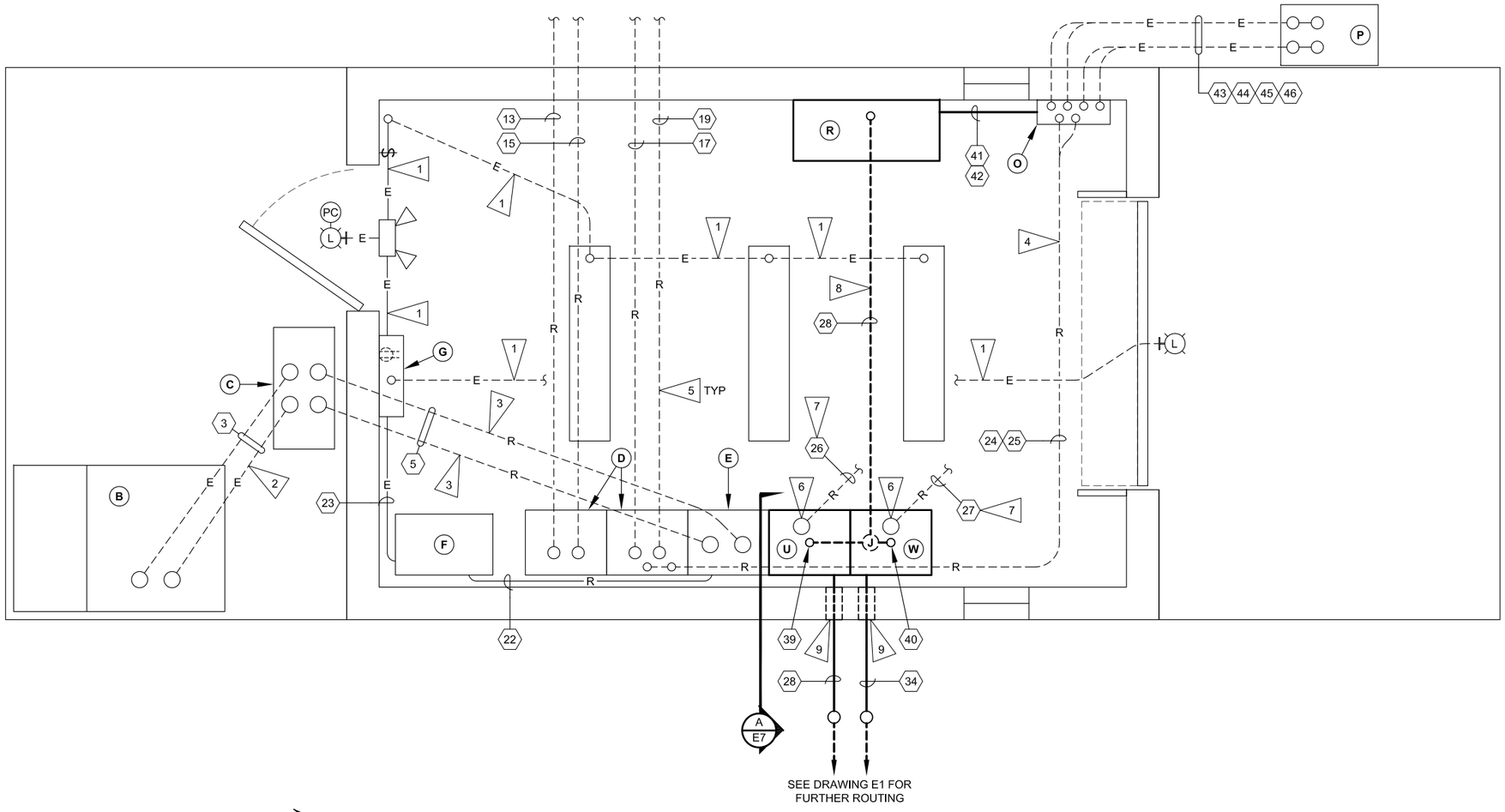
NO.	REVISION	BY	DATE

DSGN RS
DR MAS
CHK
APV'D

TOWN OF SCOTIA, LLC
SCOTIA INFRASTRUCTURE IMPROVEMENTS
SCOTIA, CALIFORNIA

PUMP POWER BUILDING AREA PLAN

SHEET E2
SEQ –
DATE 10/2018
PROJ. NO. 005161.410



PLAN - PUMP POWER BUILDING EXISTING AND PHASE 1,2,3,4 ELECTRICAL

SCALE:

0 .5 1 2

DRAWING NOTES:

1. EXISTING CONDUITS AND CONDUCTORS ROUTED EXPOSED OR ABOVE CEILING TO REMAIN WITHOUT MODIFICATION.
2. EXISTING CONDUITS AND CONDUCTORS ROUTED BELOW CONCRETE SLAB TO REMAIN WITHOUT MODIFICATION.
3. CONDUITS ROUTED BELOW FLOOR. SEE CONDUIT & CABLE SCHEDULE FOR REQUIRED MODIFICATION.
4. CONDUITS ROUTED ABOVE CEILING. SEE CONDUIT & CABLE SCHEDULE FOR REQUIRED MODIFICATION.
5. CONDUITS ROUTED BELOW FLOOR TO TRANSFORMERS. SEE CONDUIT & CABLE SCHEDULE FOR REQUIRED MODIFICATION.
6. CONDUIT TO BE CUT FLUSH WITH FLOOR AND PLUGGED WITH CONCRETE.
7. ACTUAL ROUTING OF EXISTING CONDUIT SLEEVES IS UNKNOWN.
8. CONTRACTOR TO PROVIDE NEW CONDUIT AND CONDUCTORS ROUTED ABOVE EXISTING CEILING. SEE CONDUIT & CABLE SCHEDULE FOR DETAILED REQUIREMENTS.
9. PROVIDE 4" DIAMETER PVC CONDUIT SLEEVE IN WALL AND BACK OF VFD ENCLOSURE. PROVIDE SILICONE SEALANT (GRAY, U.V. RESISTANT) AROUND CONDUIT IN PENETRATION THROUGH WALL AND AROUND ARMORED CABLE INSIDE PVC SLEEVE.

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

SHN CONSULTING ENGINEERS & GEOLOGISTS, INC.
275 MARKET AVENUE COOS BAY, OR. 97420
WWW.SHN-ENGR.COM 541-266-9890

NO.	REVISION	DATE	BY

DSGN RS
DR MAS
CHK
APV'D

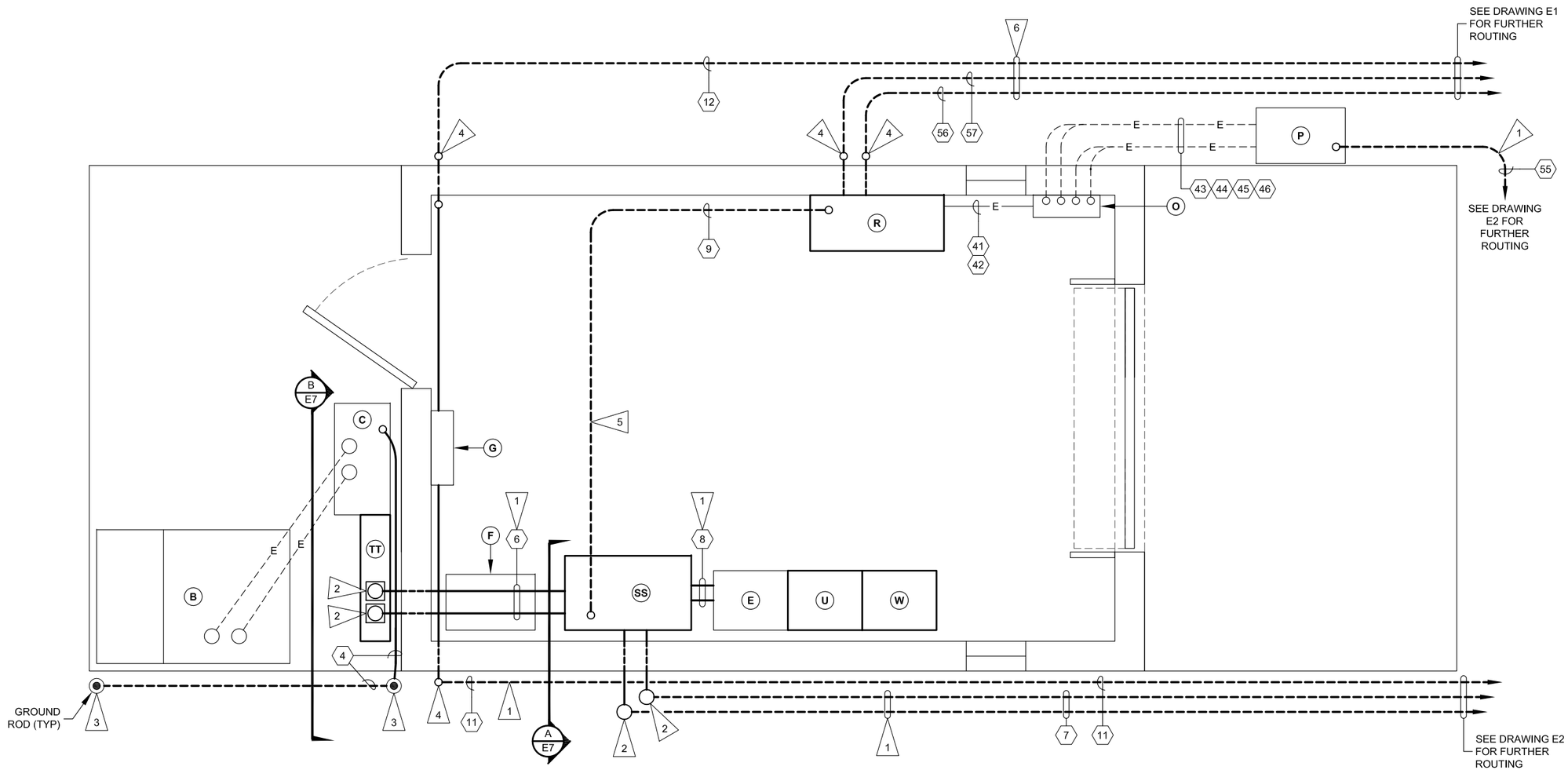
TOWN OF SCOTIA, LLC
SCOTIA INFRASTRUCTURE IMPROVEMENTS
SCOTIA, CALIFORNIA

PUMP POWER BUILDING EXIST. & PHASE 1,2,3,4 ELECT PLAN

RSE RICHARD SAMPLE ENGINEERING
1197 Magnolia Ave. Redding, CA 96001
530-242-1134 Fax: 530-242-1136
E-mail: rse@Integrity.com

REGISTERED PROFESSIONAL ENGINEER RICHARD A. SAMPLE 16423 EXP. 06/30/19 ELECTRICAL STATE OF CALIFORNIA

SHEET E3
SEQ –
DATE 10/2018
PROJ. NO. 005161.410



PLAN - PUMP POWER BUILDING PHASE 5 AND 6 ELECTRICAL

SCALE: 0 .5 1 2

DRAWING NOTES:

1. CONDUITS TO BE PROVIDED DURING PHASE 6.
2. PROVIDE MOGUL PULLING ELBOW ON BUILDING EXTERIOR DURING PHASE 6 AT HEIGHT COORDINATED WITH CONDUIT PENETRATION INTO ATS FOR CONDUCTOR CONNECTION TO LUGS DESIGNATED FOR UTILITY AND GENERATOR FEEDERS. PULLING ELBOW SHALL BE COOPER CROUSE-HINDS MOGUL TYPE MODEL LBNEC10 OR EQUAL.
3. PROVIDE GROUND ROD AND ASSOCIATED CONDUIT AND CONDUCTORS DURING PHASE 6.
4. PROVIDE IRON ALLOY CONDUIT BODY WITH PENETRATION THROUGH BUILDING WALL AT APPROXIMATELY 12 INCHES ABOVE FLOOR. CONDUIT BODY SHALL BE COOPER CHROUSE-HINDS FORM 7, MODEL LB OR EQUAL.
5. CONTRACTOR TO PROVIDE NEW CONDUIT AND CONDUCTORS ROUTED ABOVE EXISTING CEILING. SEE CONDUIT & CABLE SCHEDULE FOR DETAILED REQUIREMENTS.
6. CONDUITS AND CONDUCTORS PROVIDED DURING PHASE 5 TO (3) FLOW METERS AND CONTROL PANEL IN EXISTING WASTEWATER TREATMENT PLANT.

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

SHN
CONSULTING ENGINEERS & GEOLOGISTS, INC.
275 MARKET AVENUE COOS BAY, OR. 97420
WWW.SHN-ENGR.COM 541-266-9890

NO.	DATE	REVISION	BY

DSGN RS DR MAS CHK APVD

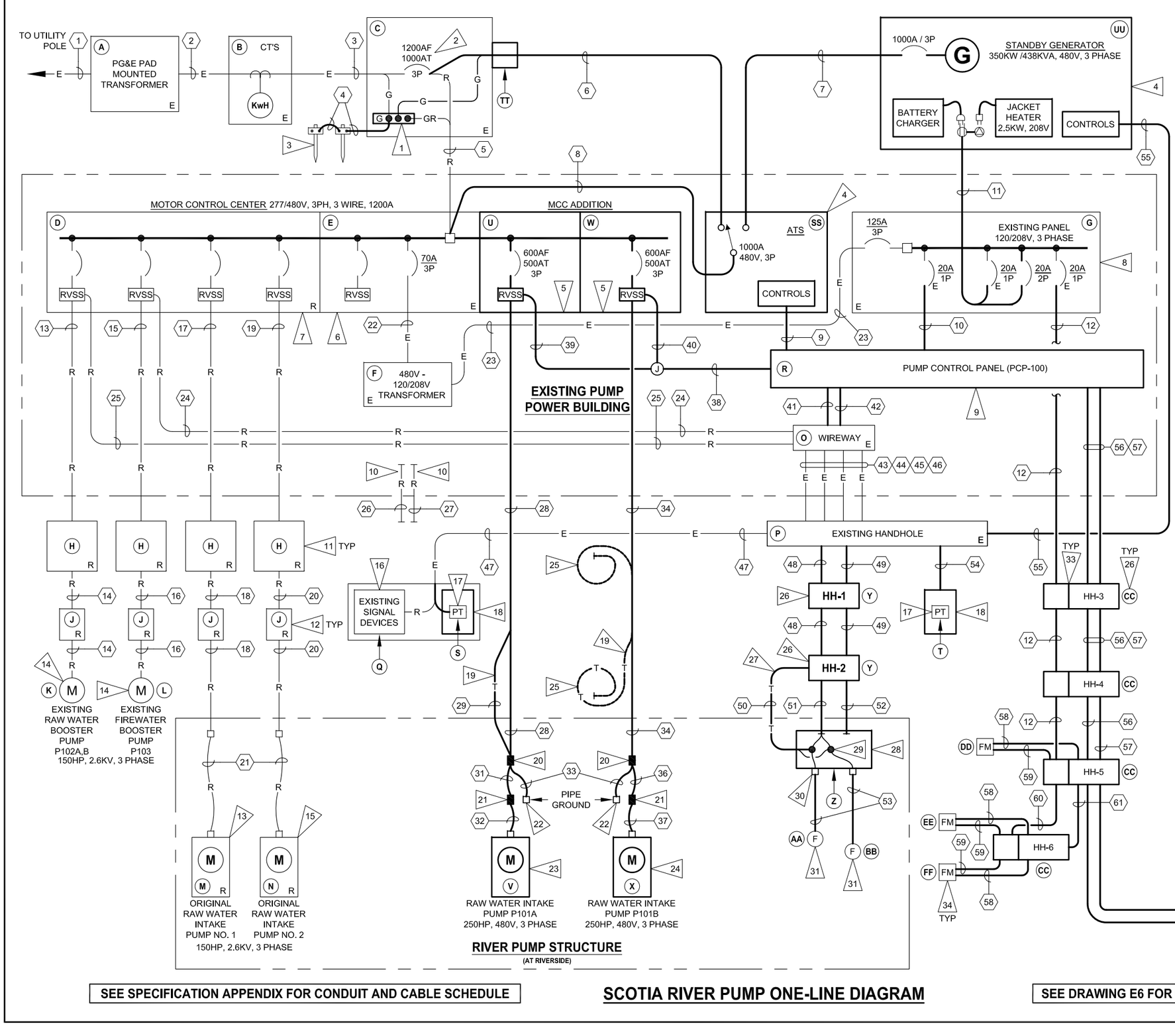
TOWN OF SCOTIA, LLC
SCOTIA INFRASTRUCTURE IMPROVEMENTS
SCOTIA, CALIFORNIA

PUMP POWER BUILDING PHASE 5&6 ELECTRICAL PLAN

RSE RICHARD SAMPLE ENGINEERING
1197 Magnolia Ave. Redding, CA 96001
530-242-1134 Fax: 530-242-1136
E-mail: rse@integrity.com

REGISTERED PROFESSIONAL ENGINEER RICHARD A. SAMPLE 16423 ELECTRICAL STATE OF CALIFORNIA EXP. 06/30/19

SHEET E4
SEQ –
DATE 10/2018
PROJ. NO. 005161.410



SEE SPECIFICATION APPENDIX FOR CONDUIT AND CABLE SCHEDULE

SCOTIA RIVER PUMP ONE-LINE DIAGRAM

SEE DRAWING E6 FOR ONE-LINE DIAGRAM NOTES

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SHN
CONSULTING ENGINEERS & GEOLOGISTS, INC.
275 MARKET AVENUE COOS BAY, OR. 97420
WWW.SHN-ENGR.COM 541-266-9890

REVISION	DATE	BY

DSGN	RS
DR	MAS
CHK	
APVD	

TOWN OF SCOTIA, LLC
SCOTIA INFRASTRUCTURE IMPROVEMENTS
SCOTIA, CALIFORNIA

POWER AND SIGNAL ONE-LINE DIAGRAM

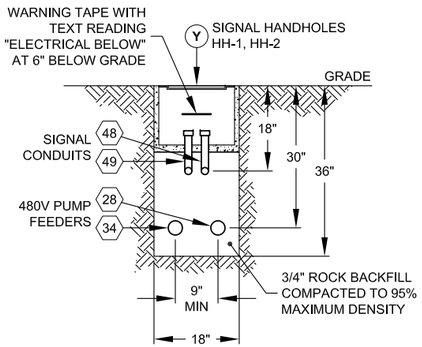
RSE RICHARD SAMPLE ENGINEERING
1197 Magnolia Ave. Redding, CA 96001
530-242-1134 Fax: 530-242-1136
E-mail: rse@integrity.com

REGISTERED PROFESSIONAL ENGINEER RICHARD A. SAMPLE 16423 EXP. 06/30/19 ELECTRICAL STATE OF CALIFORNIA

SHEET	E5
SEQ	–
DATE	10/2018
PROJ. NO.	005161.410

DRAWING E5 NOTES:

1. REPLACE (4) LUG GROUND BUS WITH (6) LUG GROUND BUS.
2. EXISTING SERVICE MAIN DISCONNECT BREAKER WITH FRAME RATING OF 1200A, AND TRIP RATING SET AT 1000A IS TO REMAIN WITHOUT MODIFICATION.
3. CONTRACTOR TO PROVIDE 3/4 INCH BY 8 FOOT COPPER CLAD STEEL GROUND RODS.
4. REFER TO SPECIFICATION SECTION 26 32 13 FOR DETAILED REQUIREMENTS FOR THE PROVISION OF A STANDBY GENERATOR AND AUTOMATIC TRANSFER SWITCH DURING PHASE 6.
5. REFER TO SPECIFICATION SECTION 26 24 19 FOR DETAILED REQUIREMENTS FOR THE PROVISION OF MOTOR CONTROL CENTER (MCC) ADDITION DURING PHASE 2.
6. PORTION OF EXISTING MOTOR CONTROL CENTER TO REMAIN.
7. PORTION OF EXISTING MOTOR CONTROL CENTER TO BE REMOVED DURING PHASE 4. REFER TO SPECIFICATION SECTION 26 24 19 FOR DESCRIPTION OF REMOVAL REQUIREMENTS.
8. CONNECT CIRCUITS TO (1) EXISTING 20A, 1P BREAKER DURING PHASE 1, TO (1) 20A, 1P BREAKER DURING PHASE 5 AND (1) 20A BREAKER DURING PHASE 6. PROVIDE (1) 20A, 2P BREAKER DURING PHASE 6. MODIFY EXISTING PANEL CIRCUIT INDEX TO SHOW NEW LOAD CIRCUITRY.
9. CUSTOM PANEL PROVIDED BY PORTLAND ENGINEERING DURING PHASE 1. REFER TO CONTROL SYSTEM DRAWINGS FOR ALL SIGNAL CONNECTIONS ASSOCIATED WITH PUMP RVSS CONTROLLERS, ATS, FIELD PRESSURE TRANSDUCERS, FIELD FLOW METERS, AND GENERATOR EQUIPMENT.
10. EXISTING CONDUIT STUBBED OUT OF BUILDING, ORIGINALLY INTENDED FOR PUMP FEEDER ROUTING IS TO BE REMOVED AND ABANDONED.
11. EXISTING MEDIUM VOLTAGE TRANSFORMERS ARE TO BE DISCONNECTED BASED ON SEQUENCE OF REQUIRED WORK DESCRIBED IN SPECIFICATION SECTION 26 01 00. CONTRACTOR TO ASSIST OWNER IN RELOCATION.
12. EXISTING MEDIUM VOLTAGE CONTROLLERS ARE TO BE DISCONNECTED BASED ON SEQUENCE OF REQUIRED WORK DESCRIBED IN SPECIFICATION SECTION 26 01 00. EQUIPMENT TO BE ABANDONED IN PLACE.
13. EXISTING MEDIUM VOLTAGE PUMP / MOTOR HAS BEEN REMOVED PREVIOUSLY.
14. PUMPS TO BE REMOVED BY OTHERS.
15. CONTRACTOR TO DISCONNECT EXISTING PUMP FEEDER CABLE AT PUMP. EXPOSED PORTION OF CABLE IS TO BE CUT AND REMOVED BY CONTRACTOR. CONTRACTOR IS TO ASSIST THE OWNER IN THE REMOVAL OF THE PUMP.
16. CONTRACTOR TO DETERMINE LOCATION OF FIELD SIGNAL EQUIPMENT OR DEVICES ASSOCIATED WITH BOOSTER AND FIRE PUMPS WITH THE ASSISTANCE OF THE OWNERS REPRESENTATIVE. EQUIPMENT IS TO BE DISCONNECTED DURING PHASE 4 AND BE RETURNED TO OWNER.
17. PRESSURE TRANSMITTER TO BE FURNISHED BY PORTLAND ENGINEERING AND INSTALLED BY CONTRACTOR.
18. PROVIDE REINFORCED CONCRETE METER BOX WITH LID STAMPED WITH "ELECTRIC" MARKING, CHRISTY MODEL B09 (BOX), N-9D/B-9D (LID).
19. TEMPORARY ROUTING OF ARMORED CABLES AROUND ROAD CONSTRUCTION SITE.
20. SEE DETAIL 3 ON DRAWING E9 FOR CABLE SPLICE REQUIREMENTS.
21. SEE DETAIL 2 ON DRAWING E9 FOR CABLE SPLICE REQUIREMENTS.
22. PROVIDE COPPER GROUND CLAMP WITH BRONZE HARDWARE SIZED FOR 8 INCH DIAMETER WATER PIPE AND #1 GROUND CONDUCTOR, BURNDY MODEL NO. GAR3907.
23. PUMP FURNISHED PREVIOUSLY, TO BE INSTALLED BY CONTRACTOR DURING PHASE 2
24. PUMP TO BE FURNISHED BY OWNER, INSTALLED BY CONTRACTOR DURING PHASE 4.
25. ARMORED FEEDER CABLE FURNISHED DURING PHASE 2 FOR PUMP P101B TO BE COILED ADJACENT TO THE PUMP POWER BUILDING AND ADJACENT TO EXISTING PUMP STRUCTURE UNTIL COMPLETION OF FINAL ROUTING INSTALLATION OF THE FEEDER DURING PHASES 3 AND 4.
26. SIGNAL WIRING HAND HOLE, 23"W, 36"L, 12"D REINFORCED CONCRETE WITH STEEL FRAME BODY, FLUSH GALVANIZED STEEL CHECKER PLATE LID, H20 CONTINUOUS ROADWAY TRAFFIC RATED, STAINLESS STEEL HEX HEAD BOLTS FOR LOCKABLE LID, LOGO ON LID READING "SIGNAL", MANUFACTURER: OLDCASTLE - CHRISTY COMPANY, MODEL B1730.
27. FLOAT CONDUCTORS ROUTED TEMPORARILY THROUGH 1/2" PVC CONDUIT DURING PHASE 2.
28. PROVIDE 20"H, 20"W, 6"D, NEMA 4X, TYPE 316 STAINLESS STEEL, CONTINUOUS HINGE JUNCTION BOX HOFFMAN MFG. MODEL NO. 1418N4S16D6
29. PROVIDE TEMPORARY SPLICE DURING PHASE 2 BETWEEN #14 XHHW SIGNAL CONDUCTOR AND LEVEL FLOAT CONDUCTORS. USE SUBMERSIBLE WATERTIGHT CONDUCTOR SPICE KIT WITH COPPER BUTT CONNECTOR FOR #14 GAGE WIRE, 3M DUAL WALLED HEAT SHRINK TUBING, TUHORSE COMPANY NO. SK4C101214. (AVAILABLE ON AMAZON).
30. PROVIDE NON-METALIC CORD GRIPS ON FLOAT CABLES AT PENETRATION THROUGH BOX WALL.
31. PROVIDE FREE FLOATING POLYPROPYLENE LEVEL FLOAT SWITCH WITH SPDT (NO/NC) MERCURY-FREE CONTACTS, BULB SHAPE, ADJUSTABLE CORD WEIGHT, 50 FOOT 3/C PVC CORD. MANUFACTURER: DWYER COMPANY MODEL NO. FSW2-D-N-P-N-50 OR APPROVED EQUAL.
32. (NOT USED)
33. CONTRACTOR TO PROVIDE FIBERGLASS BARRIER, RIGIDLY ATTACHED TO HAND HOLE, TO PROVIDE SEPARATION BETWEEN 120V INSTRUMENT POWER WIRING AND SIGNAL WIRING TO ENSURE ANALOG SIGNAL QUALITY.
34. FLOWMETER EQUIPMENT TO BE FURNISHED BY PORTLAND ENGINEERING AND INSTALLED BY THE CONTRACTOR.
35. CONTRACTOR TO COORDINATE WITH ATT TELEPHONE COMPANY AS NECESSARY FOR ACQUIRING DSL INTERNET CONNECTION AT LOCATION IN EXISTING OVERHEAD TELEPHONE UTILITY DISTRIBUTION SYSTEM.
36. CONTRACTOR TO DETERMINE END LOCATION OF (2) PVC CONDUITS INSTALLED DURING PREVIOUS PROJECT AND INSTALL NEW HAND HOLE.
37. EXISTING HAND HOLES PROVIDED DURING PREVIOUS PROJECT.
38. EXISTING POWER AND SIGNAL ELECTRICAL AT SHED BUILDING LOCATED ADJACENT TO WATER TANK TO REMAIN WITHOUT MODIFICATION.
39. CONTRACTOR TO PROVIDE JUNCTION BOXES, CONDUIT BODY FITTINGS, EMT CONDUIT AS NECESSARY TO ROUTE 120V POWER AND SIGNAL WIRING INSIDE EXISTING CLOSET AREA AS SHOWN.
40. CONTRACTOR TO DETERMINE METHOD TO INTERFACE WITH EXISTING DATA LOGGER EQUIPMENT TO TRANSFER SIGNAL RELATED TO TANK LEVEL TRANSDUCER TO NEW PCP-200 CONTROL PANEL.
41. NEW CONTROL PANEL FURNISHED BY PORTLAND ENGINEERING AND INSTALLED BY THE CONTRACTOR.
42. CONTRACTOR TO COORDINATE WITH OWNERS REPRESENTATIVE TO DETERMINE SPECIFIC SIGNAL CIRCUITRY TO BE PROVIDED BETWEEN EXISTING AUTO DIALER AND NEW PCP-200 CONTROL PANEL.
43. PROVIDE BREAKER AND ASSOCIATED CONDUIT AND CONDUCTORS FOR POWERING NEW PCP-200 CONTROL PANEL AND FLOW METER AS SHOWN.
44. PRESSURE TRANSMITTER TO BE FURNISHED BY PORTLAND ENGINEERING AND INSTALLED BY CONTRACTOR.
45. FLOW METER TRANSMITTER / SENSOR TO BE FURNISHED BY PORTLAND ENGINEERING AND INSTALLED BY CONTRACTOR.



A / E1 **SECTION - TRENCH**
NOT TO SCALE

RICHARD SAMPLE ENGINEERING
RSE
1197 Magnolia Ave. Redding, CA 96001
530-242-1134 Fax: 530-242-1136
E-mail: rse@integrity.com

REGISTERED PROFESSIONAL ENGINEER
RICHARD A. SAMPLE
16423
EXP. 06/30/19
ELECTRICAL
STATE OF CALIFORNIA

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SHN
CONSULTING ENGINEERS & GEOLOGISTS, INC.
275 MARKET AVENUE
COOS BAY, OR. 97420
WWW.SHN-ENGR.COM
541-266-9890

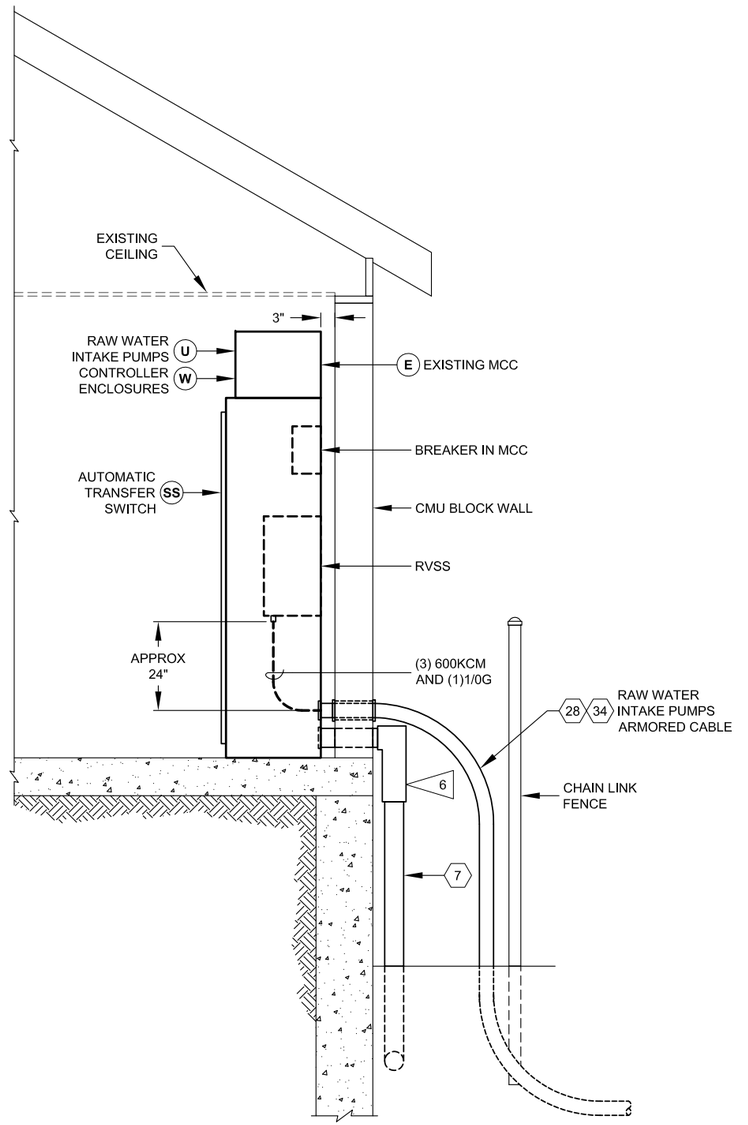
NO.	DATE	REVISION	BY

DSGN RS
DR MAS
CHK
APVD

TOWN OF SCOTIA, LLC
SCOTIA INFRASTRUCTURE IMPROVEMENTS
SCOTIA, CALIFORNIA

POWER AND SIGNAL ONE-LINE DIAGRAM NOTES, SECTION

SHEET E6
SEQ –
DATE 10/2018
PROJ. NO. 005161.410

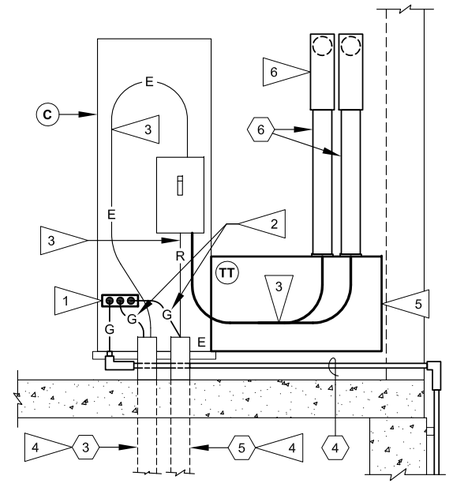


A / E3,4 **SECTION - EQUIPMENT CONNECTIONS**

NOT TO SCALE

DRAWING NOTES:

1. CONTRACTOR TO REPLACE EXISTING GROUND TERMINATION BUS WITH NEW TO ACCOMMODATE ADDITIONAL GROUND CONDUCTORS.
2. SINGLE LINE REPRESENTS TWO CONDUCTORS.
3. SINGLE LINE REPRESENTS SIX CONDUCTORS.
4. CONDUIT REPRESENTS TWO CONDUITS.
5. CONTRACTOR TO PROVIDE NEMA 3R WIREWAY / ENCLOSURE CUSTOM FABRICATED TO ALLOW CONDUCTORS TO BE ROUTED WITHIN ALLOWABLE BENDING RADIUSES AS SHOWN.
6. PROVIDE MOGUL TYPE PULLING ELBOWS AS DESCRIBED IN DRAWING E4, NOTE 2.



B / E4 **ELEVATION - SERVICE DISC. SWITCH MODIFICATIONS**

NOT TO SCALE

RSE RICHARD SAMPLE ENGINEERING
1197 Magnolia Ave. Redding, CA 96001
530-242-1134 Fax: 530-242-1136
E-mail: rse@integrity.com

REGISTERED PROFESSIONAL ENGINEER
RICHARD A. SAMPLE
16423
ELECTRICAL
EXP. 06/30/19
STATE OF CALIFORNIA

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SHN CONSULTING ENGINEERS & GEOLOGISTS, INC.
275 MARKET AVENUE COOS BAY, OR. 97420
WWW.SHN-ENGR.COM 541-266-9890

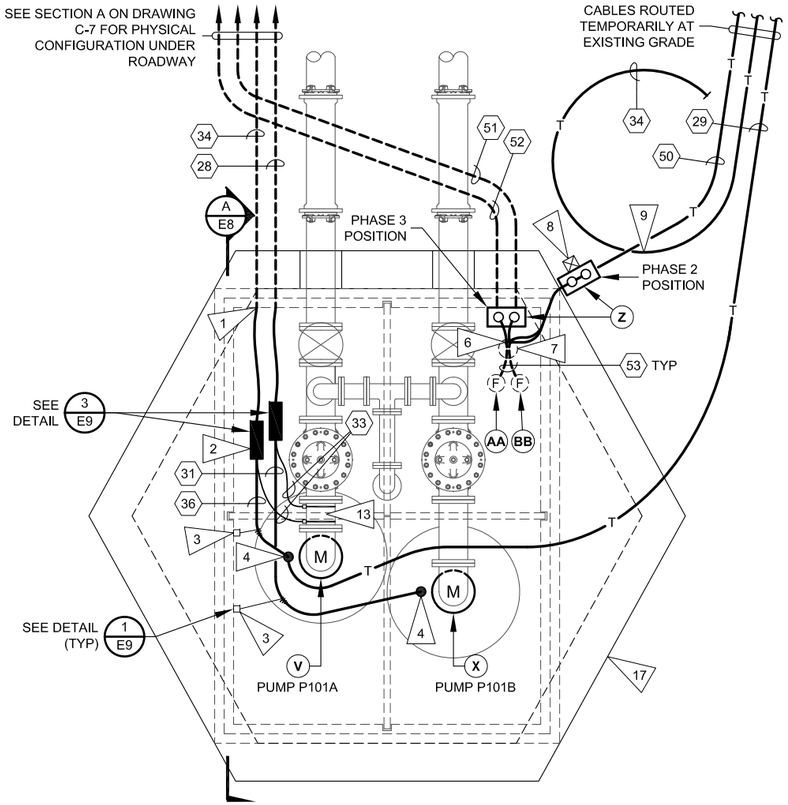
NO.	DATE	REVISION	BY

DSGN RS
DR MAS
CHK
APVD

TOWN OF SCOTIA, LLC
SCOTIA INFRASTRUCTURE IMPROVEMENTS
SCOTIA, CALIFORNIA

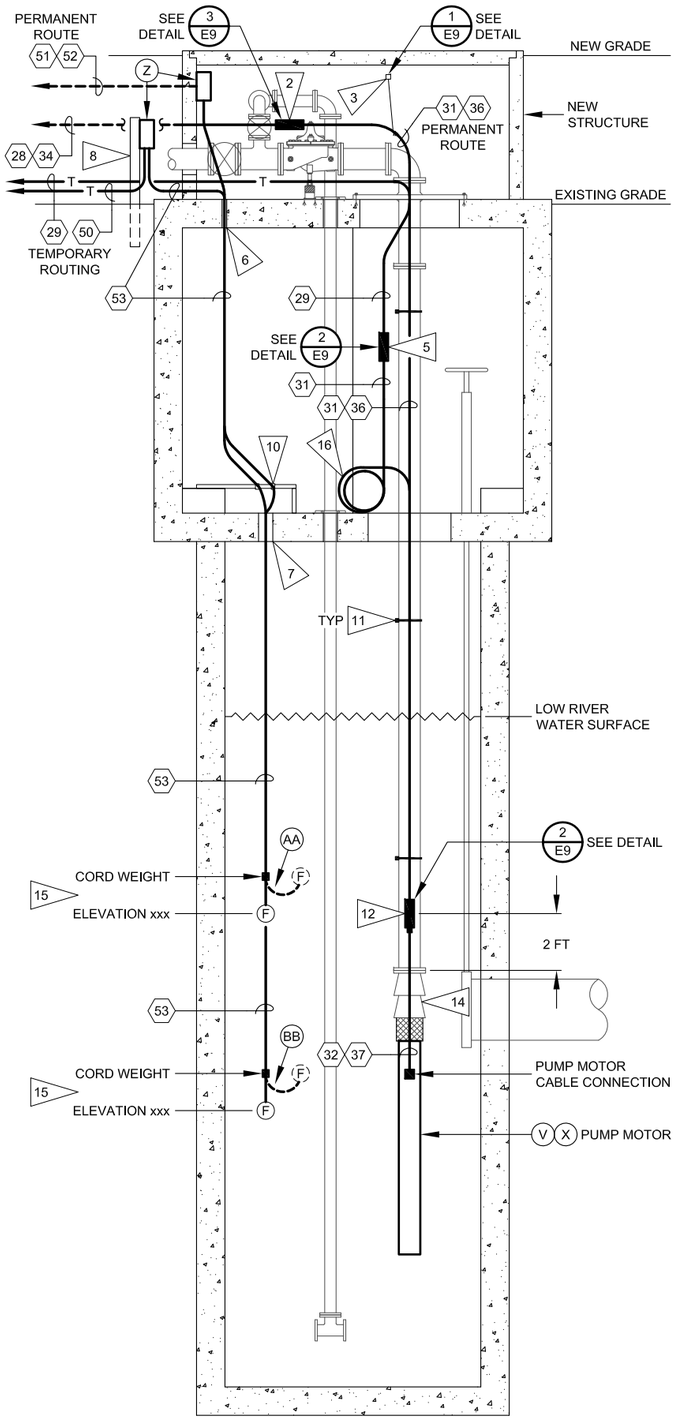
PUMP POWER BUILDING SECTION & ELEVATION

SHEET E7
SEQ –
DATE 10/2018
PROJ. NO. 005161.410



PLAN - TOP AREA ELECTRICAL

SCALE: 0 .5 1 2 4



A/E8 SECTION - PUMP STATION ELECTRICAL

SCALE: 0 1 2 3 4 5

DRAWING NOTES:

1. STUB ARMORED CABLE INTO NEW STRUCTURE THROUGH 4" PVC CONDUIT SLEEVE INSET IN CONCRETE WALL. PROVIDE SILICONE SEALANT AROUND CABLE INSIDE PVC SLEEVE.
2. SPLICE DETAIL ON DRAWING E9 FOR SPLICES PROVIDED DURING PHASES 2, 3 AND 4.
3. PROVIDE ONE OR MORE STAINLESS STEEL KELLUMS GRIPS SIZED TO SUPPORT CABLE WEIGHT INCLUDING VERTICAL PORTION OF CABLE TO PUMP.
4. CABLE TO PASS THROUGH HOLE CUT IN PLATE. PROVIDE ROUNDED EDGE AROUND RIM OF HOLE TO AVOID DAMAGE TO CABLE JACKET.
5. CABLE SPLICE TO BE PROVIDED DURING PHASE 2 AND REMOVED DURING PHASE 3. DO NOT REUSE.
6. CONTRACTOR TO CORE DRILL 2" MINIMUM DIAMETER HOLE IN EXISTING CONCRETE TO BE USED FOR ROUTING FLOAT CABLE FROM BELOW.
7. CONTRACTOR TO CORE DRILL 6" MINIMUM DIAMETER HOLE IN EXISTING CONCRETE TO BE USED FOR ROUTING FLOAT DOWN INTO LOWER CHAMBER.
8. PROVIDE 4"X 4" TREATED WOOD POST WITH CONCRETE AROUND BASE FOR TEMPORARY MOUNTING OF SIGNAL JUNCTION BOX. LOCATION IS TO BE CHOSEN BY CONTRACTOR TO AVOID INTERFERENCE WITH PUMP STATION EXTENSION CONSTRUCTION.
9. PORTION OF CABLE TO BE COILED AT THIS LOCATION DURING PHASE 2.
10. PROVIDE CABLE SUPPORT RACK USING STAINLESS STEEL UNISTRUT AND STAINLESS STEEL HARDWARE. FLOAT CABLE IS TO BE LOOPED AND ATTACHED WITH NYLON TIE-WRAP FOR SETTING FLOAT ELEVATION. LOOP OF 48' MINIMUM SPARE CABLE IS TO BE PROVIDED BETWEEN SUPPORT STRUCTURE AND SIGNAL JUNCTION BOX TO ALLOW LOWERING FLOAT ELEVATION IN THE FUTURE.
11. CONTRACTOR TO ATTACH CABLE TO PIPE USING HEAVY DUTY TIE-WRAPS.
12. CABLE SPLICE AT THIS LOCATION MADE BETWEEN (3) INDIVIDUAL MINING CABLES AND 3 INDIVIDUAL POWER CONDUCTORS FURNISHED WITH PUMP.
13. GROUND CLAMP MOUNTED AT THIS LOCATION FOR TERMINATION OF EXTENDED GROUND CONDUCTOR. CONNECTOR NUTS TO BE TIGHTENED TO 240 INCH-LBS.
14. PUMP OUTLINE REPRESENTS APPROXIMATE LOCATION OF INITIAL TEMPORARY POSITION FOR PUMP P101A USING EXISTING PIPING. PERMANENT LOCATION FOR BOTH PUMPS WILL BE LOWER WITH REQUIRED HEIGHT COORDINATED WITH THE OWNERS REPRESENTATIVE.
15. FLOAT OUTLINE LOCATIONS AND ELEVATIONS ARE ASSOCIATED WITH TEMPORARY POSITION OF PUMP P101A. FINAL PERMANENT FLOAT ELEVATIONS ARE TO BE DETERMINED BASED ON FINAL PUMP LOCATIONS.
16. PROVIDE SUFFICIENT JUMPER CABLE LOOPED TEMPORARILY ON STATION FLOOR DURING PHASE 2 TO BE CAPABLE OF REACHING LOCATION OF FINAL PERMANENT SPLICE LOCATION IN UPPER CHAMBER DURING PHASE 3.
17. REFER TO ONE-LINE DIAGRAM ON DRAWING E5 FOR DESCRIPTION OF PUMP REMOVAL REQUIREMENTS.

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

SHN
CONSULTING ENGINEERS & GEOLOGISTS, INC.
275 MARKET AVENUE
COOS BAY, OR. 97420
WWW.SHN-ENGR.COM
541-266-9890

NO.	DATE	REVISION	BY

DSGN RS
DR MAS
CHK
APVD

RSE RICHARD SAMPLE ENGINEERING
1197 Magnolia Ave. Redding, CA 96001
530-242-1134 Fax: 530-242-1136
E-mail: rse@integrity.com

REGISTERED PROFESSIONAL ENGINEER
RICHARD A. SAMPLE
16423
EXP. 06/30/19
ELECTRICAL
STATE OF CALIFORNIA

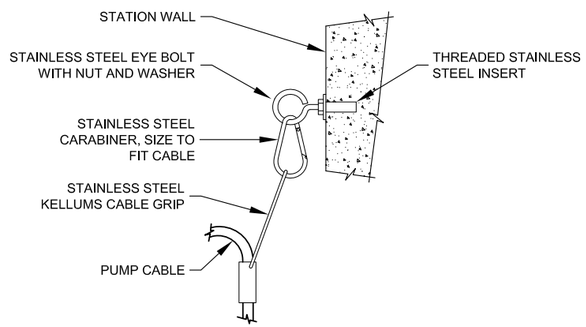
TOWN OF SCOTIA, LLC
SCOTIA INFRASTRUCTURE IMPROVEMENTS
SCOTIA, CALIFORNIA

PUMP STATION PLAN, SECTION

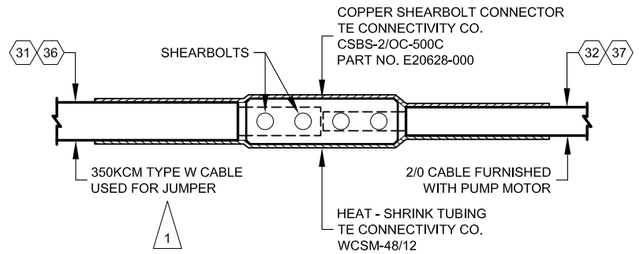
SHEET E8
SEQ –
DATE 10/2018
PROJ. NO. 005161.410

DRAWING NOTES:

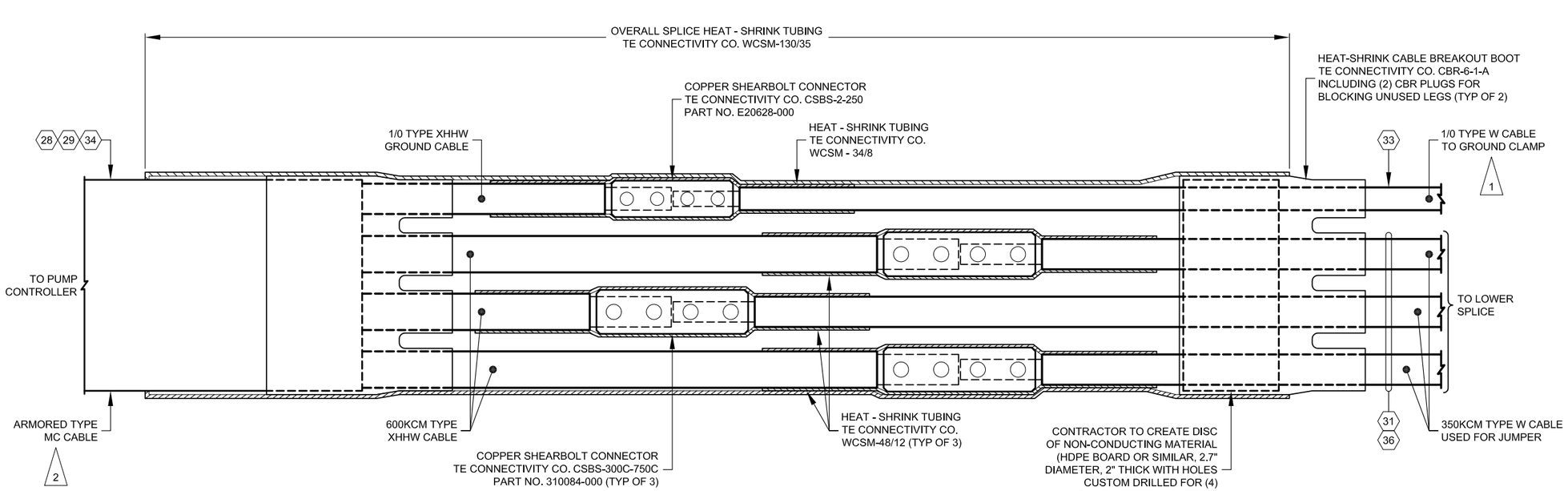
1. SEE SPECIFICATION ARTICLE 26 05 19-2.05.
2. SEE SPECIFICATION ARTICLE 26 05 19-2.04.



1/E8 **DETAIL- PUMP CABLE SUPPORT**
NOT TO SCALE



2/E8 **DETAIL - LOWER CABLE SPLICE**
NOT TO SCALE
TYPICAL FOR THREE CABLES



3/E8 **DETAIL - UPPER CABLE SPLICE**
SCALE: X/X"=1'-0"

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

SHN
CONSULTING ENGINEERS & GEOLOGISTS, INC.
275 MARKET AVENUE COOS BAY, OR. 97420
WWW.SHN-ENGR.COM 541-266-9890

NO.	REVISION	DATE	BY

DSGN RS
DR MAS
CHK
APVD

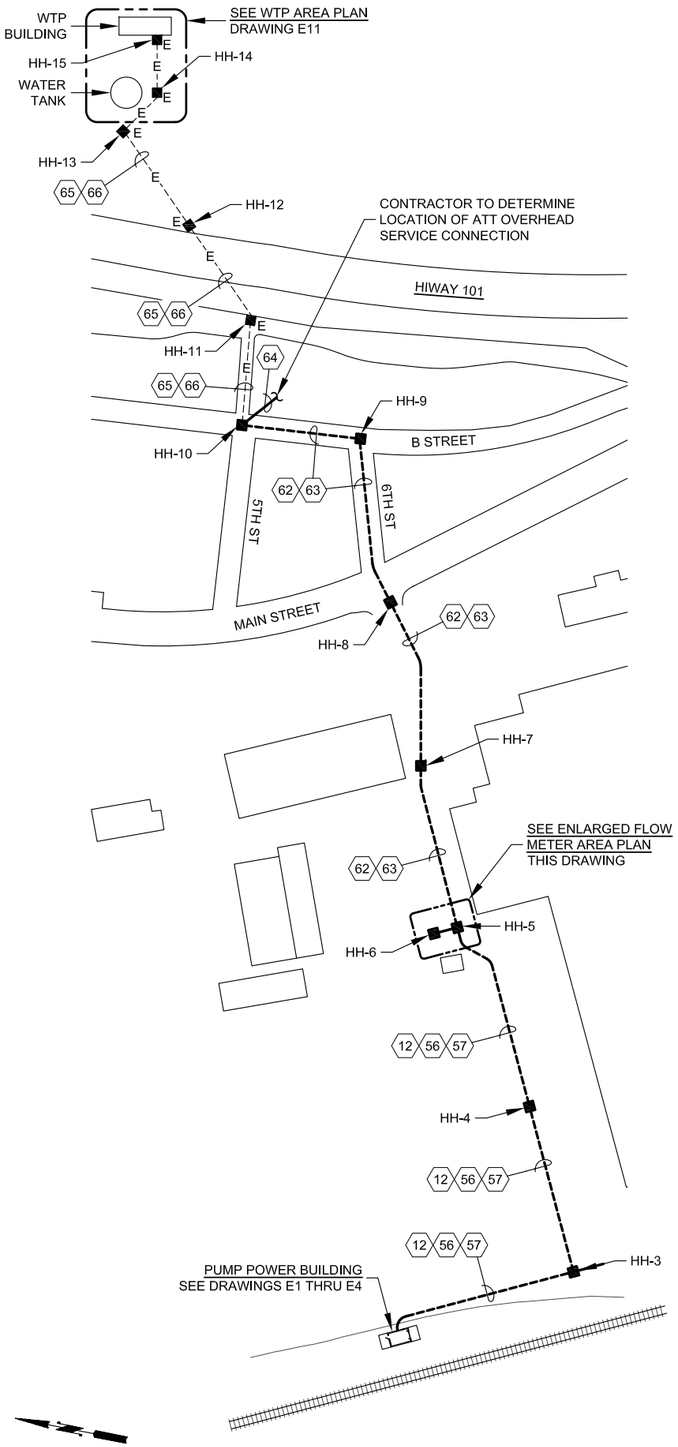
RSE RICHARD SAMPLE ENGINEERING
1197 Magnolia Ave. Redding, CA 96001
530-242-1134 Fax: 530-242-1136
E-mail: rse@integrity.com

REGISTERED PROFESSIONAL ENGINEER
RICHARD A. SAMPLE
16423
EXP. 06/30/19
ELECTRICAL
STATE OF CALIFORNIA

TOWN OF SCOTIA, LLC
SCOTIA INFRASTRUCTURE IMPROVEMENTS
SCOTIA, CALIFORNIA

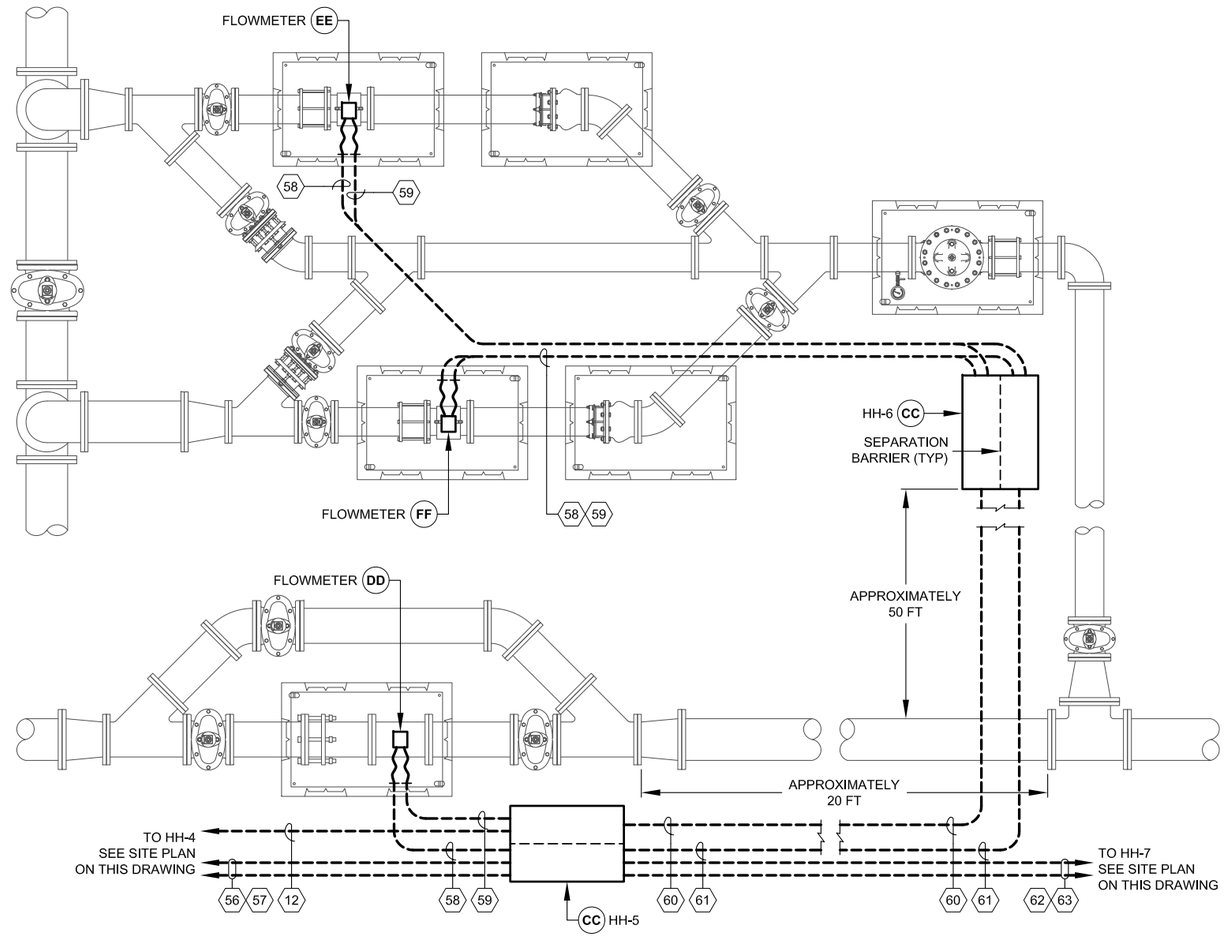
PUMP STATION CABLE DETAILS

SHEET E9
SEQ –
DATE 10/2018
PROJ. NO. 005161.410



SITE PLAN EAST - PUMP BUILDING TO WTP SIGNAL ROUTING

NOT TO SCALE



ENLARGED PLAN - FLOWMETER AREA ELECTRICAL

SCALE: 1/4" = 1'-0"

0 .5 1 2 4

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

CONSULTING ENGINEERS & GEOLOGISTS, INC.
275 MARKET AVENUE
COOS BAY, OR. 97420
WWW.SHN-ENGR.COM
541-266-9890

NO.	REVISION	BY	DATE

DSGN RS
DR MAS
CHK
APVD

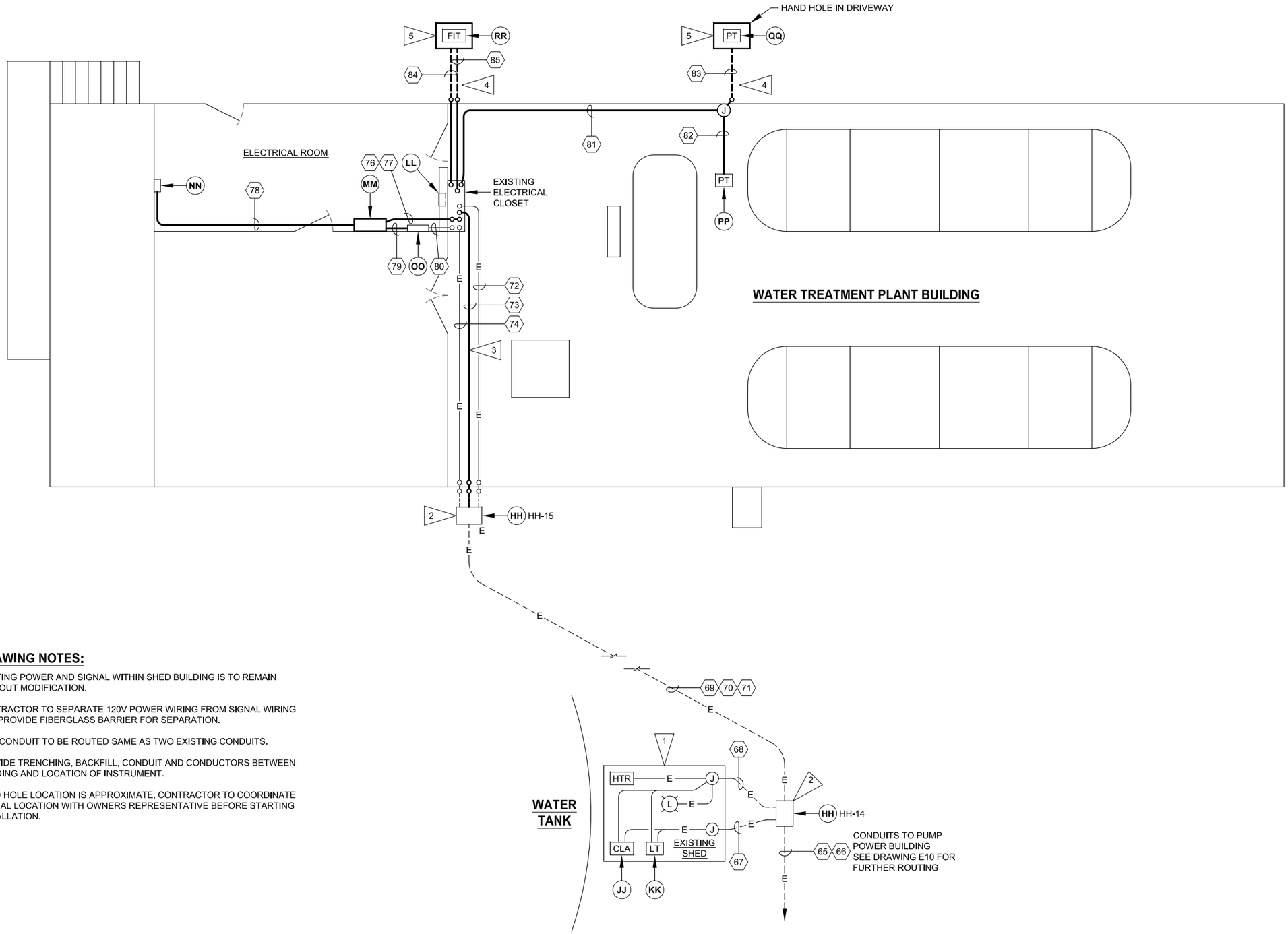
RICHARD SAMPLE ENGINEERING
RSE
1197 Magnolia Ave. Redding, CA 96001
530-242-1134 Fax: 530-242-1136
E-mail: rse@integrity.com

REGISTERED PROFESSIONAL ENGINEER
RICHARD A. SAMPLE
16423
EXP. 06/30/19
ELECTRICAL
STATE OF CALIFORNIA

TOWN OF SCOTIA, LLC
SCOTIA INFRASTRUCTURE IMPROVEMENTS
SCOTIA, CALIFORNIA

EAST OVERALL SITE PLAN, FLOWMETER AREA PLAN

SHEET E10
SEQ –
DATE 10/2018
PROJ. NO. 005161.410



DRAWING NOTES:

1. EXISTING POWER AND SIGNAL WITHIN SHED BUILDING IS TO REMAIN WITHOUT MODIFICATION.
2. CONTRACTOR TO SEPARATE 120V POWER WIRING FROM SIGNAL WIRING AND PROVIDE FIBERGLASS BARRIER FOR SEPARATION.
3. NEW CONDUIT TO BE ROUTED SAME AS TWO EXISTING CONDUITS.
4. PROVIDE TRENCHING, BACKFILL, CONDUIT AND CONDUCTORS BETWEEN BUILDING AND LOCATION OF INSTRUMENT.
5. HAND HOLE LOCATION IS APPROXIMATE, CONTRACTOR TO COORDINATE ACTUAL LOCATION WITH OWNERS REPRESENTATIVE BEFORE STARTING INSTALLATION.

PLAN - WATER TREATMENT PLANT AREA ELECTRICAL

NOT TO SCALE

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

SHN
CONSULTING ENGINEERS & GEOLOGISTS, INC.
275 MARKET AVENUE COOS BAY, OR. 97420
WWW.SHN-ENGR.COM 541-266-9890

NO.	REVISION	BY	DATE

DSGN RS
DR MAS
CHK
APVD

RSE RICHARD SAMPLE ENGINEERING
1197 Magnolia Ave. Redding, CA 96001
530-242-1134 Fax: 530-242-1136
E-mail: rse@lntegrity.com

REGISTERED PROFESSIONAL ENGINEER
RICHARD A. SAMPLE
16423
ELECTRICAL
EXP. 06/30/19
STATE OF CALIFORNIA

TOWN OF SCOTIA, LLC
SCOTIA INFRASTRUCTURE IMPROVEMENTS
SCOTIA, CALIFORNIA

WATER TREATMENT PLANT AREA PLAN

SHEET E11
SEQ –
DATE 10/2018
PROJ. NO. 005161.410

TOWN OF SCOTIA, LLC

SCOTIA INFRASTRUCTURE IMPROVEMENTS

DIVISION 26 - ELECTRICAL SPECIFICATION

Prepared by:

Richard Sample Engineering

October, 2018

TABLE OF CONTENTS

SECTION 26 01 00

ELECTRICAL – GENERAL

PART 1 – GENERAL

1.01 DESCRIPTION OF SERVICES

A. The Contractor shall provide all labor, material, tools, equipment (excepted as noted below) and services required to complete the furnishing, installation, wiring, connection, calibration, adjustment, testing and operation of all electrical equipment, devices and components as indicated and implied by the plans and these specifications.

Owner Furnished Equipment and Material

1. Pump Control Panel (PCP-100)
2. Pressure Transmitters (2) for temporary use
3. Raw Water Intake Pumps P101A and P101B
4. Pump power feeder armored cables
5. Motor Control Center Addition containing (2) RVSS Controllers
6. Flowmeters (3)
7. Pressure Transmitters (2) and Flowmeter (1) at Water Treatment Plant (WTP)
8. Water Treatment Plant Control Panel (PCP-200)
9. Standby Power Generator and Automatic Transfer Switch (ATS)

B. All equipment shall be readily accessible for maintenance, shall have electrical clearances in accordance with NEC and shall be installed in locations that will provide adequate cooling.

C. Test electrical equipment prior to installation so that defective equipment is not installed.

D. Provide assistance to Suppliers of equipment listed above and Portland Engineering personnel in start-up, follow-up and training of the Owner's personnel.

E. Make directly or assist equipment Suppliers in making all corrective measures required during start-up.

F. Provide field services of qualified technicians to supervise and check out the installation of the equipment, to supervise and check out interconnecting wiring, to conduct start-up of operation of the equipment, and to correct any problems that occur during start-up.

G. Nameplates shall be provided on Automatic Transfer Switch, Motor Control Center Pump RVSS equipment, Pump Control Panel (PCP-100), Pressure Transmitters, Flowmeters, Signal Junction Box SBJ-1. Nameplates shall be made of 1/16-inch thick machine engraved laminated phenolic having white letters not less than 3/8" inches high on black background. All nameplates shall include the equipment name or number.

H. Definitions:

1. The words “plans” and “drawings” are used interchangeably in this specification and in all cases shall be interpreted to mean “drawings”.

2. The word “provide” shall be interpreted to mean furnish and install.

1.02 RECOMMENDED ELECTRICAL IMPLEMENTATION SCHEDULE

The electrical sequence shown below grouped according to phases is to be used only as a suggested guideline. The sequence shown addresses major categories of work and does not include detailed work scope throughout the project. It shall be the Contractor’s responsibility to coordinate the work described below with the sequence requirements of all other disciplines and to develop an actual Sequence of Work prior to the start of construction.

A. **Phase 1** - Work during phase 1 shall consist of the following:

1. Install Pump Control Panel (PCP-100) in the Pump Power Building including associated 120V power circuitry from existing building power panelboard.

2. Provide (2) conduits between PCP-100 and an existing wireway and provide signal conductors routed in existing conduits above ceiling to (3) soft start controllers associated with existing pumps. See drawings from Portland Engineering for required wiring to be routed during Phase 1 and removed during Phase 4.

3. Provide trenching, backfill, conduit and analog signal cable required for interface between PCP-100 and Fire Water pipeline pressure transmitter PIT-102. Transmitter will be provided by others.

4. Provide conduit (as determined needed) and analog signal cable required for interface between PCP-100 and Raw Water pipeline pressure transmitter PIT-101. Transmitter will be provided by others.

5. Assist representative from Portland Engineering in testing of (2) pressure transducers and associated circuitry.

B. **Phase 2** - Work during phase 2 shall consist of the following:

1. Assist Owner in the removal of existing 2.6KV Raw Water Intake Pump No. 1 and transport pump to location determined by the Owners representative. Existing vertical piping down to pump mounting flange is to be reused temporarily during Phase 2.

2. Mount 480V Raw Water Intake Pump P101A to original pipe and make splice connection between pump feeder jumper cables and conductors furnished with pump motor in accordance with Detail 3 on Drawing E9. Ensure that source end of jumper cable has protective seal.

3. Install 480V Raw Water Intake Pump P101A with pipe and jumper cable in existing Pump Station structure.

4. Excavate and prepare trench between Pump Power Building and location of Signal Handhole HH-2 as shown on Drawing E1.

5. Install (2) Owner furnished armored pump feeder cables in trench between Pump Power Building and location of Signal Handhole HH-2.

6. Provide backfill over armored pump feeder cables from within 15 feet of Pump Power Building to Signal Handhole HH-2.

7. Provide (2) signal conduits from an existing handhole adjacent to the Pump Power Building to the location of Signal Handhole HH-2. Provide Handholes HH-1 and HH-2.

8. Provide and compress final backfill material over trench between 15 feet of Pump Power Building and signal Handhole HH-2. Portion of trench containing signal conduits along roadway may be left open to allow provision of (3) additional conduits to be routed to flowmeters during Phase 5.

9. Temporarily route portion of (2) armored pump feeder cables in above grade loop to pump station. Cable for Pump P101A with end seal is to be extended to location of splice with jumper cable inside upper chamber of existing Pump Station structure. Cable for Pump P101B is to be looped at grade outside the Pump Station structure.

10. Provide temporary signal conduit routed around same loop as armored cables, bundling (2) cables and signal conduit with zip ties and marking with warning tape.

11. Cut (2) existing 4" PVC conduits at floor line and plug with concrete flush with floor.

12. Install (2) new MCC vertical sections, furnished by the Owner, containing reduced voltage soft start (RVSS) controllers for Raw Water Intake Pumps P101A and P101B.

13. Drill (2) holes through Pump Power Building West wall and RVSS enclosure back panels and insert conduit sleeves.

14. Route Raw Water Intake Pump P101A armored feeder cable through sleeve and connect conductors to Pump P101A RVSS. Cable for Raw Water Intake Pump P101B is to be looped outside the building until Phase 4.

15. Provide signal junction box SJB-1 and associated support post at temporary mounting location outside pump station structure.

16. Provide signal wire and pull tape between Pump Control Panel PCP100 and signal handhole HH-2 and temporarily route signal wiring to SJB-1.

17. Provide (2) level float switches, mounting hardware and temporary splices in SJB-1.

18. Make temporary splice connection between Raw Water Intake Pump P101A jumper cable and armored cable conductors in accordance with Detail 2 on Drawing E9. Make temporary ground connection on pipe and attach cable to pipe.

19. Operationally test Raw Water Intake Pump P101A power feeder, checking for correct phase rotation.

20. Test Raw Water Intake Pump P101A RVSS controller for manually controlled pump operation.

21. Provide signal conduit and conductors between the PCP100 and Raw Water Intake Pumps P101A and P101B RVSS controllers.

22. Coordinate and assist representatives from Portland Engineering and the Owner in test of control and status communication between the PCP100 and Raw Water Intake Pump P101A RVSS controller. Automatic operation of PCP101A during this phase is to be based on signals received from Raw Water and Fire Water pressure transmitters.

C. **Phase 3** - Work during phase 3 following installation of water main pipe in trench in driveway to pump station and construction of pump station expansion chamber shall consist of the following:

1. Provide backfill material over water main pipe in trench and tamp to 95% compaction.

2. Disconnect Raw Water Intake Pump P101A pump feeder armored cable at existing temporary splice with jumper cable. Discard splice material.

3. Reroute armored cables (2) in trench to Pump Station Structure.

4. Perform insulation resistance tests on both armored cables in accordance with Specification Article 26 05 19 - 3.05C3.

5. Following successful insulation testing, cut off extra armored cable (due to permanent route in trench being shorter than the temporary route) leaving sufficient cable to make splices as shown on Drawing E8.

6. Coil Raw Water Intake Pump P101B armored cable temporarily adjacent to new pump station structure.

7. Core drill (2) holes in wall of new chamber of Pump Station structure.

8. Following successful insulation testing, insert Raw Water Intake Pump P101A armored cable into Pump Station upper chamber and seal around cable at wall using epoxy concrete grout.

9. Cut and remove cable armor and splice cable conductors for Raw Water Intake Pump P101A to existing jumper cable using new splice material in accordance with Detail 2 on Drawing E9. Check for proper pump rotation before completing splice.

10. Operationally test relocated Raw Water Intake Pump P101A power feeder and RVSS controller.

11. Provide backfill over armored pump feeder cables from Signal Handhole HH-2 to Pump Station Structure.

12. Remove and discard existing float / signal conductor splices at SJB-1.

13. Relocate Signal Junction Box SJB-1 to final location inside new Pump Station chamber. Remove wood post used to temporarily support SJB-1.

14. Provide (2) signal conduits from Signal Handhole HH-2 to Signal Junction Box SJB-1 in trench in driveway.

15. Reroute signal conductors, originally routed temporarily around loop, in final conduit in trench. Insert one pull tape in each signal conduit. Remove and discard PVC conduit used in temporarily loop.

16. Provide final splice between signal conductors from PCP100 and float cables inside SJB-1 using new submersible splice material.

17. Assist representative from representative from Portland Engineering in testing of level float signal inputs at the PCP100.

18. Provide and compress final backfill material over trench between signal Handhole HH-2 and Pump Station structure.

D. **Phase 4** - Work during phase 4 shall consist of the following:

1. Assist Owner in the removal of original 2.6KV Pump No. 2. Cut conduit and cable at inside face of station concrete wall and remove exposed portion. Plug hole with non-shrink cement epoxy grout, flush with face of wall.

2. Mount Raw Water Intake Pump P101B to new pipe and make splice connection between pump feeder jumper cable and conductors furnished with pump motor in accordance with Detail 3 on Drawing E9. Ensure that source end of jumper cable has protective seal.

3. Assist others in the installation of Raw Water Intake Pump P101B with pipe and jumper cable in existing Pump Station structure.

4. Route armored feeder cable for Raw Water Intake Pump P101B through sleeve at Pump Power Building, provided during Phase 2, and connect conductors to Pump P101B RVSS.

5. Insert armored cable for Raw Water Intake Pump P101B into Pump Station upper chamber and seal around cable at core-drilled hole in wall with non-shrink cement epoxy grout.

6. Cut and remove cable armor and splice cable conductors for Raw Water Intake Pump P101B to jumper cable using splice material in accordance with Detail 2 on Drawing E9. Make ground connection on pipe and attach cable to pipe. Check for proper rotation before completing splice.

7. Coordinate and assist representatives from Portland Engineering and the Owner in test of control and status communication between the PCP100 and Raw Water Intake Pump P101B RVSS controller. Automatic operation of P101B during this phase is to be based on signals received from Raw Water and Fire Water pressure transmitters.

8. Following successful operational testing of both new water intake pumps proceed with the following Phase 4 steps.

9. Remove conductors between original RVSS controllers in the existing MCC and (4) 480-2600V transformers.

10. With Owner assistance remove (2) existing MCC vertical sections and transport to location determined by the Owner representative. End plate from right end vertical section is to be reused to cover side of existing MCC section that is to remain.

11. Cut (4) existing feeder conduits at floor line and plug with concrete flush with floor.

12. With Owner assistance remove (4) existing transformers and transport to location determined by the Owners representative. Remove associated secondary conductors if feeder is routed in conduit. Abandon if feeder is direct buried cable. Conduits or direct buried cable are to be cut and removed down to 18" below grade at original transformer location.

13. Original 2.6KV controllers associated with Raw and Fire Water Booster Pumps and two Water Intake Water Pumps are to be removed by others.

14. Original 2.6KV Raw Water and Fire Water Booster Pumps are to be removed by others.

15. Remove field signal transmitters and control devices associated with Raw and Fire Water Booster Pumps and return equipment to Owner. Remove conductors back to MCC where originally routed through conduit. Otherwise abandon.

16. Remove signal conduits originally routed from wireway in building to original MCC.

E. **Phase 5** - Work during phase 5 shall consist of the following:

1. Provide telemetry communication between the Pump Control Panel PCP100 located in the Pump Power Building and the WTP Control Panel PCP200 located in the existing Water Treatment Plant.

2. As the method of communication provide fiber optic cable routed in PVC conduit in the same trench as the Water Main piping and conduits to (3) flowmeters, with Ethernet switches located at each facility.

3. Provide handholes, conduit, innerduct sleeve, fiber optic cable, and backfill associated with connection between PCP100 and PCP200.

4. Provide handholes, conduit, circuitry, trenching and backfill to PCP100 associated with (1) Mainline and (2) Service pipeline flowmeters. Flowmeters will be provided by others.

5. Assist representative from Portland Engineering in testing of (3) flowmeters and associated circuitry.

6. Provide handholes, conduit, circuitry, trenching and backfill to PCP200 associated with (1) Fire Water Service pipeline flowmeter and (1) Fire Water Service Pipeline pressure transmitter. Flowmeter and pressure transmitter will be provided by others.

7. Provide conduit and circuitry to PCP200 associated with (1) pressure transmitter inside the Water Treatment Building process equipment room.

8. Assist representative from Portland Engineering in testing of (1) flowmeter, (2) pressure transmitters and associated circuitry located at the WTP.

9. Provide communication cable routed in separate conduit from fiber cable to telephone utility network interface connection (location to be determined).

10. Assist representatives from Portland Engineering and the Owner in testing of telemetry communications between the PCP100 and the PCP200.

11. Assist representatives from Portland Engineering and the Owner in testing of automatic control of both Raw Water Intake Pumps P101A and P101B from PCP100 based on instrument signals received over telemetry communications from PCP200

12. Following successful operational testing described in Item 8 leave pressure transmitters PIT101 and PIT102 in place and circuited for possible future use as backup equipment.

F. **Phase 6** - Work during phase 6 shall consist of the following:

1. Provide 480V power, 120/208V power and control conduits extended from equipment within Pump Power Building to locations at standby generator coordinated with the generator Manufacturer.

2. Concrete base for generator, concrete curb wall and concrete slab to be provided by others in accordance with design to be developed by SHN Engineers.

3. Install generator with integral diesel fuel tank furnished by Owner.

4. Install the automatic transfer switch (ATS), furnished by the Owner, in Pump Power Building. Provide conduits through wall and conduit bodies on building exterior.

5. Provide conduits and 480V power conductors between ATS and original utility service disconnect breaker. Confirm correct phase rotation.

6. Remove originals conductors from existing conduit routed between MCC and utility service disconnect switch.

7. Provide conduits and 480V power conductors between ATS and Motor Control Center incoming lugs compartment. Confirm correct phase rotation.

8. Provide two ground rods and associated circuitry.

9. Provide 120/240V circuitry between panelboard and water jacket heater and battery charger at generator.

10. Provide signal circuitry between generator control panel and ATS and PCP100.

11. Provide assistance to generator Supplier and Portland Engineering representative in testing the generator and all control / status features.

12. Provide assistance it the training of the Owners personnel in the Operation and Maintenance of the generator and ATS.

1.03 STANDARDS AND CODES

A. Permits, licenses, approvals and other arrangements for work shall be obtained and paid for by the Contractor.

B. Electrical work shall be executed in strict accordance with the latest edition of the National Electrical Code and local ordinances and regulations.

C. All electrical equipment, materials, construction methods, tests and definitions shall be in strict conformity with the established standards of the following in their latest adopted revision:

1. Underwriters' Laboratories, Inc. (UL).

2. Institute of Electric and Electronic Engineers (IEEE).

3. National Electrical Manufacturers Association (NEMA).

4. Electrical Testing Laboratories (ETL).

5. Factory Mutual (F.M.).

D. All materials and equipment specified herein shall be approved by the Underwriter's Laboratories or other California State approved testing agencies, for the purpose for which they are used and shall bear the testing agencies' label.

E. All added materials shall be new, free from defects, of current manufacture and of quality specified or shown. Each type of material shall be of the same manufacture throughout the work.

1.04 CONTRACT DOCUMENTS

A. The electrical layouts are generally diagrammatic. The location of equipment is approximate unless dimensioned. Exact locations and routing of conduits shall be

governed by structural conditions and physical interferences and by locations of electrical terminations on equipment. Minor adjustments and deviations from the apparent locations shown on the drawings shall be provided without extra costs.

1.05 REFERENCE DOCUMENTS

A. The Contractor shall refer to the drawings, project data and shop drawings of other trades for additional details that affect the proper installation of the work. Diagrams and symbols showing electrical connections are diagrammatic only, and so do not necessarily show the exact physical arrangement of the equipment.

1.06 SITE FAMILIARIZATION

A. Before submitting a bid, the Electrical Contractor shall become familiar with all features of the site that may affect the execution of the work. The Contractor shall take all field measurements necessary for the work and shall assume full responsibility for their accuracy.

1.07 PROJECT RECORD DRAWINGS

A. A set of drawings shall be maintained at the job site showing any deviations in the electrical systems from the original design. Minor changes in branch circuit wiring may be omitted. A set of electrical drawings, marked in red to indicate the routing of concealed conduit runs and any deviations from the original design, shall be submitted to the Engineer for review at the completion of the project prior to final acceptance.

1.08 GUARANTEE

A. The Contractor shall guarantee his work and all components and equipment (with the exception of equipment specifically listed as furnished by the Owner under 1.01 A of this specification section) for a period of one year from date of acceptance of the installation. He shall remedy any defects in workmanship and repair or replace any faulty equipment (except as noted previously) that shall appear within the guarantee period without additional cost to the Owner.

1.09 CLEANUP

A. The premises must be kept free of accumulated materials, rubbish and debris at all times. Surplus material, tools and equipment must not be stored at the job site. At the completion of the job, all equipment and devices shall be left clean and in proper condition for their intended use.

1.10 DEMOLITION

A. The Contractor shall return electrical equipment removed during demolition to the Owner, as noted specifically in the drawings and specifications, or upon request by the Owner's representative during construction.

1.11 FACILITY OPERATION RESPONSIBILITIES

A. The existing River Pumping System including Pump Power Building and water pumps is to remain fully operational at all times during rehabilitation of the pump station with the exception of periods of power shutdown as described below. The Contractor shall be responsible for planning, coordination, scheduling, and the provision of temporary materials as required to meet these requirements.

B. Modifications during Phase 2 associated with the installation of new MCC equipment requiring disconnection of power to the original MCC from the existing Utility Service Disconnect Breaker shall be performed in such a way that maximum utility power downtime is 8 hours or less.

C. All electrical modifications associated with the new Pump P101A are to be installed and tested as described in these specifications and approval to proceed is to be obtained from the Owner's representative prior to the removal of electrical equipment and power feeder associated with the second original high voltage pump.

D. Modifications during Phase 3 associated with relocation of the pump station end of pump feeder armored cables shall be performed in such a way that maximum downtime of both pumps is 12 hours or less.

E. All electrical modifications during Phase 4 associated with the removal of the (2) existing MCC vertical sections, requiring disconnection of power to the original MCC from the existing Utility Service Disconnect shall me performed in such a way that maximum utility power downtime is 12 hours or less.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

*** * * END OF SECTION * * ***

SECTION 26 05 19
CONDUCTORS

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. This section covers the furnishing and installation of all wiring used in the river pumping system improvements. All wiring in the area of the pumping station shall be routed in conduit with specific exceptions noted on the drawings.

B. Refer to specification section 26 01 00 Electrical - General for a detailed description of work to be performed during the (6) phases of construction.

1.02 STANDARDS AND CODES

A. All materials and equipment specified herein shall be approved by the Underwriter's Laboratories or other California State approved testing agencies, for the purpose for which they are used and shall bear the testing agencies' label.

B. All materials and equipment specified herein shall conform with all applicable NEMA, ANSI and IEEE standards.

C. All materials and equipment specified herein and their installation methods shall conform to the latest published version of the National Electric Code (N.E.C.).

1.03 SUBMITTALS

A. In accordance with the requirements of Section 01 33 00 Submittal Procedures, submit catalog data showing material information and conformance with specifications. The intended use of each item shall be indicated.

PART 2 – PRODUCTS

2.01 CONDUCTORS - GENERAL

A. Conductors shall be copper. All conductors shall be stranded. Insulation for general power wiring shall be THWN, THHW. Insulation for underground power wiring shall be XHHW. Conductors used for power circuits shall not be smaller than No.12 AWG. Control conductors shall be No. 14 AWG, unless otherwise specified in this section or on conduit and cable schedule.

2.02 CONNECTORS

A. Utilize Ideal Industries' "Wing Nut" or 3M Company's "Scotchlock" preinsulated connectors for splices and taps in conductors No.10 AWG and smaller. For No. 8 AWG and larger conductors, utilize T&B compression connectors. Compress using recommended die and tools.

B. Connectors required in pump feeders at the Pump Station shall be as described in Details 2 and 3 on Drawing E9. Connectors shall be purchased from Anixter Inc..

2.03 SPLICE INSULATION

A. General - Splice insulation shall be equal to the conductor utilized.

B. Splices required in pump feeders at the Pump Station shall be as described in Details 2 and 3 on Drawing E9. Splices shall be purchased from Anixter Inc..

2.04 PUMP POWER FEEDER - ARMORED PORTION

A. Cable for temporary and permanent feeders routed between the Pump Power Building and the Pump Station structure shall be Type MC armored cable, 600V, 3-conductor 600kcmil, XHHW conductor insulation, 1/0 ground, purchased from Anixter Inc. by the Owner.

2.05 PUMP POWER FEEDER - JUMPER PORTION

A. Flexible jumper cable for connecting between the armored cable and conductors supplied with the pumps shall be 1/C Size 350 AWG, CU, 2000V, EPDM/CPE Type W, RHH/RHW-2 Industrial Grade Cable, Southwire Company Stock Code No. 570249, purchased from Anixter, Inc.

B. Flexible cable used to extend ground conductor from armored portion of feeder to ground clamp on piping inside the pump station structure shall be 1/C Size 1/0 AWG, CU, 2000V, EPDM/CPE Type W, RHH/RHW-2 Industrial Grade Cable, Southwire Company Stock Code No. 583936, purchased from Anixter, Inc.

2.06 SHIELDED SIGNAL CABLE

A. Signal conductor cable shall be AWG #18 with (2) individually twisted, shielded pairs. Conductors shall be tinned copper with color coded PVC insulation. Shielding shall be aluminum foil polyester tape with copper drain wire. The cable shall have an overall PVC jacket. The insulation system shall be rated for 300 volts. Manufacturer: Belden, Part No. 9368, Supplier: Anixter, Part No. 323-036-1802-B.

2.07 FIBER OPTIC CABLE

A. The Fiber Cables shall be of a gel-free, low smoke, non-halogenated design. The cable shall be fully dielectric and be suitable for outdoor use in a buried HDPE conduit.

B. The Fiber Optic Cable shall comply with the following standards:

1) IEEE-383 flame test

2) TIA/EIA 455

3) NEC-770 ratings and cable markings

4) UL-990 cable ratings and markings

C. Manufacturer: 12-strand multimode, non-armored fiber optic cable shall be Corning Cable Systems ALTOS Lite cable 012KWC-T4130D20 or approved equal.

2.08 COMMUNICATION CABLE

A. Telephone communications cable shall be AWG #24, solid tinned copper conductors, PVC insulated with chrome PVC jacket. Conductors shall be rated for 150 V, 80 degrees C. Cable is to be Belden No.9566 (six pair) or equal.

2.09 INNERDUCT

A. Innerduct shall be installed on all fiber runs. Innerduct is intended to prevent twisting and excess inter-cable friction to allow for future fiber optic cable installation as well as cable removal/replacement.

1) Innerduct shall be 2", three-cell type and contain color-coded stitching for cell identification.

2) The innerduct shall have a maximum co-efficient of friction of 0.08.

3) The innerduct shall contain a solid copper, polyvinyl color coated conductor (19AWG minimum) for tracing and rated for a minimum of 6 amps and 600 volts. Conductor shall be placed in the sidewall edge fold of the sleeve.

4) All innerduct cells will contain a minimum 1250lbs color-coded pull tape furnished with the innerduct.

B. Innerduct shall be MaxCell MXD2003WH1000 or approved equal.

2.10 WIRING SCHEDULE

A. Refer to the Power and Signal Conduit and Cable Schedule included in Appendix A following the Electrical Specification for a description of conduits.

PART 3 – EXECUTION

3.01 GENERAL

A. Keep all conductors within the allowable tension limits during installation. Lubricants for wire pulling, if used, shall be approved for the insulation and raceway material. Observe cable Manufacturer's and industry standard cable bending radius recommendations.

B. Incoming signal cables in the station SCADA System enclosure, ATS or VFD controller equipment shall be bundled and laced at intervals not greater than six inches and neatly spread into trees and connected to their respective terminals.

C. Sufficient slack shall be allowed in cables for alterations in terminal connections. Lacing shall be done with plastic cable ties using a tensioning tool designed for that purpose.

3.02 GENERAL WIRE AND CABLE TERMINATION

A. Power conductors No. 8 AWG and larger may be terminated directly in box-type lugs without terminals. Insulated terminals of the spade or ring-tongue type shall be used on all stranded control and power conductors No. 12 AWG and smaller. Insulated terminals shall be used also on all stranded instrumentation wiring.

B. Terminals and connectors shall be installed with the compression tool recommended by the terminal manufacturer. Solid wire shall not be lugged, but shall be terminated with a full ring eye of the wire under the binding-head screw or saddle of the terminal block. Electrical spring connectors may be used only on lighting circuits.

C. With the exception of the pump feeders and a temporary power service cable connection (shown in Elevation B on Drawing E7) no splices shall be used in power, control and signal wiring. The wiring shall be continuous from point-to-point. Extending existing cables will not be allowed.

3.03 PUMP FEEDER CABLE SPLICES

A. Cable splicing provided in pump cables, provided as shown and described in Details 2 and 3 on Drawing E8, shall be installed in strict accordance with the splice manufacturers guidelines and requirements.

3.04 CONTROL WIRE LABELING

A. All field wiring provided by the Contractor between the station SCADA System and VFD controller equipment, Standby Power ATS and Generator, pressure transducers, flowmeters and pump station level float switches shall be labeled at each end with applicable identification. When selecting wire label text for field installed wires, the Contractor shall incorporate either the remote device tag name or the output terminal number at the original equipment or control panel whenever possible.

B. Field installed wire markers shall be Vinyl self-laminating write-on-type with transparent extension that laminates the written text when wrapped around itself. Markers shall be T&B WSL series or equal.

C. The Contractor shall be responsible for completing the Field Control Conductor Label Schedule attached at the end of this section. The completed schedule will be included in the station Operations and Maintenance Manual for future reference. The completed schedule must be submitted to the Engineer for review and approval prior to project final acceptance by the Owner.

3.05 GENERAL TESTS

A. The Contractor shall provide all material, equipment, labor and technical supervision to perform tests and inspections as specified herein. It is the intent of these tests to assure that all electrical equipment as supplied and installed by the Contractor is operational within the industry and Manufacturer’s tolerances and is installed in accordance with design documents.

B. If the test results indicate that corrective measures are required, the Contractor shall undertake all such corrective measures, and re-test until satisfactory results are obtained at no additional cost to the Owner.

Test reports must be submitted to the engineer prior to final acceptance by the owner.

C. Conductor tests: Following the completion of installation, test conductors as follows:

1. Visually inspect exposed sections of all conductors for physical damage. Verify that cable is supplied and connected in accordance with specifications and drawings.

2. Perform continuity test on all conductors to ensure proper cable connection.

3. Perform voltage and low voltage insulation resistance (Megger) tests on the armored cable portion of the pump feeders. Tests are to be performed on each feeder after relocation during Phase 3 and before making connection at either end of the cable. The contractor is advised to follow the recommendations found in Article 8.9 Megger Testing found in the Technical Information Handbook furnished by Anixter Company.

D. Test Values

1. Insulation resistance tests shall be performed at 500 volts DC for one minute.

2. Minimum megger readings at 20 degrees C shall be one megohm

E. Fault Locating

1. Should the test values indicate a fault in the cables insulation the Contractor shall follow the guidelines found in Article 8.8 Fault Locating in locating the fault. The Contractor is to acquire the services of technical staff persons from Anixter Company in evaluating the test data and in resolving how to correct the problem.

*** * * END OF SECTION * * ***

ATTACHMENTS:

Field Control Conductor Label Schedule

Conductor Test Report

FIELD CONTROL CONDUCTOR LABEL SCHEDULE

Page ____ of _____

PROJECT: River Pump Station	**OWNER: Town of Scotia, LLC**
CONTRACTOR CO. NAME: **LABELED BY:**	➢ **DATE:**

LABEL TEXT	**FROM: (SOURCE)**	**TO: (END EQUIP. OR DEVICE)**

NOTES / REMARKS:

CONDUCTOR TEST REPORT

PROJECT: River Pump Station

OWNER: Town of Scotia, LLC

CONTRACTOR CO. NAME:

PHONE NO.:

TESTED BY:

TEST DATE:

Conduit Label (1)	V (2)	C (3)	Operating Load Voltage						Insulation Resistance - OHMS					
			VAB	VCB	VCA	VAN	VBN	VCN	A-B	B-C	C-A	A-G	B-G	C-G
28														
34														

(1) Refer to conduit and cable schedule and one-line diagram for description of feeder identified by label shown on this report.

(2) Visual Inspection - Check when completed.

(3) Continuity Test - Check when completed.

SECTION 26 05 33
CONDUITS AND RACEWAYS

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. This section covers the furnishing and installation of all raceways, fittings and boxes used in the river pumping system improvements. All wiring shall be routed in conduit with specific exceptions noted on the drawings in the area of the pumping station.

B. Refer to specification section 26 01 00 Electrical - General for a detailed description of work to be performed during the (6) phases of construction.

C. Ground Conductor: All power distribution raceway shall contain a minimum of one continuous copper equipment-grounding conductor sized in accordance with the N.E.C.

1.02 STANDARDS AND CODES

A. All materials and equipment specified herein shall be approved by the Underwriter's Laboratories or other California State approved testing agencies, for the purpose for which they are used and shall bear the testing agencies' label.

B. All materials and equipment specified herein shall conform with all applicable NEMA, ANSI and IEEE standards.

C. All materials and equipment specified herein and their installation methods shall conform to the latest published version of the National Electric Code (N.E.C.).

1.03 SUBMITTALS

A. In accordance with the requirements of Section 01 33 00 Submittal Procedures, submit catalog data showing material information and conformance with specifications. The intended use of each item shall be indicated.

PART 2 – PRODUCTS

2.01 GENERAL

A. All materials shall be new, free from defects, of current manufacture, of quality specified or shown. Each type of material shall be of the same manufacturer throughout the work.

2.02 RACEWAY

A. All conduits located within the existing Pump Power Building shall be galvanized rigid steel (G.R.C.).

B. Above grade portion of conduits routed between the Pump Power Building and the Standby Power Equipment shall be galvanized rigid steel (G.R.C.).

C. Below grade portion of conduits routed between the Pump Power Building and the Standby Power Equipment shall be Schedule 80 PVC.

D. Signal conduits routed underground between the Pump Power Building and other field locations shall be Schedule 80 PVC.

E. Signal conduit routed temporarily above grade between Signal Handhole HH-2 and the Signal Junction Box SJB-1 located at the Pump Station Structure, shall be Schedule 40 PVC.

F. Fiber Optic / Analog Signal conduits routed between the Pump Power Building and Handhole HH-10 at the end of existing conduits installed previously from the Water Treatment Plant Building, shall be Schedule 80 HDPE.

G. Pump feeders routed between the Pump Power Building and the Pump Station structure shall be Type MC armored cable. Refer to specification section 26 05 19 Conductors for further detail.

H. Rigid conduit (GRC) shall be steel, hot dipped galvanized. Terminations shall be by means of threaded hubs or double locknuts and insulating grounding type bushings.

I. Nonmetallic conduit shall be rigid PVC, Schedule 80, with the exception of the temporary conduit noted above in item E. Fittings shall be of the same material as the raceway and installed with solvent per the Manufacturer's instructions. Conduit, fittings and solvent shall all be manufactured by the same Manufacturer. All 90-degree elbows associated with transition from below grade shall be made with galvanized rigid steel.

J. High Density Polyethylene Conduit Type HDPE, Schedule 80. Vertical bends shall be 30 inch minimum radius. Horizontal bends shall be 60 inch minimum radius. Bushings shall be provided at each handhole or end enclosure.

2.03 FITTINGS AND BOXES

A. Locknuts shall be extra heavy steel electroplated with zinc for sizes 3/4 inch to two inches. Locknuts larger than two inches shall be of malleable iron, electroplated with zinc.

B. Bushings shall be steel or malleable iron threaded type electroplated with zinc or hot-dip galvanized. Bushings shall have a molded-phenolic or nylon-insulating collar

C. Junction boxes; device boxes; fixture support boxes; and oblong, round and rectangular conduit fittings (condulets) for use on galvanized rigid steel raceways shall be zinc electroplated cast ferrous alloy. Integrally cast threaded hubs or bosses shall be provided for all conduit entrances and shall provide for full five thread contact on tightening. Drilling and threading shall be done before finishing. The cover plate shall be of similar cast ferrous alloy material and finish. A full body neoprene gasket shall be provided with the cover. Stainless steel screws shall be provided for all covers.

2.04 CONDUIT AND CABLE SUPPORTS

A. Racks shall be constructed from framing channel. Channels used inside the Pump Power Building shall be steel, hot dip galvanized, 1.5 ounces per square foot after fabrication. Hardware shall be electro-galvanized.

B. Framing channels on the Pump Power Building exterior and at the Pump Station Structure shall be made of stainless steel. All hardware shall be stainless steel.

C. Field cuts shall be re-galvanized by the Galv-A-Weld process or by Gal-Van-Ize as manufactured by Lawson Products, Inc..

D. Channels attached directly to building surfaces shall be 14-gauge minimum thickness, 1 5/8 inches deep.

2.05 CONDUIT SCHEDULE

A. Refer to the Power and Signal Conduit and Cable Schedule included in Appendix A following the Electrical Specification for a description of conduits.

PART 3 – EXECUTION

3.01 CONDUIT

A. Exposed conduit shall be installed with runs parallel or perpendicular to walls, structural members or intersections of vertical planes and ceiling. No conduit shall approach closer than 6 inches to any object operating above the rated temperature of the insulation of the wiring in the conduit. Frequency of conduit supports shall be per N.E.C.

B. Conduit supported directly from the building structure shall be spaced out at least 1-5/8 inch using framing channel. Framing channel shall meet the requirements of paragraph 2.04.

C. Welding, brazing or otherwise heating of the conduit is not allowed. Plumber's perforated straphanger iron shall not be used for any purpose.

D. Where required for ease of pulling and as necessary to meet codes, install junction or pull boxes even though not shown on the drawings.

E. Conduit shall terminate in junction boxes, outlet boxes or panels with proper fittings. Conduit entering freestanding panels shall terminate in clear wiring space. Where such conduits are located on drawings with dimensions or elevations, adjust as necessary for conduits to enter clear wiring space and shall be terminated with a grounding bushing.

F. All conduit entering sheet-steel NEMA 1 boxes or cabinets shall be secured by locknuts on both the interior and exterior and an insulating bushing installed over the conduit end. All joints shall be made with standard couplings or specified unions. Running threads shall not be used in lieu of conduit nipples, nor shall excessive threads be used on any conduit. Conduit terminated in NEMA 4 shall be terminated with rain tight hubs. Conduits terminated in cast boxes shall have five full threads of contact. The ends of all conduits shall be cut square, reamed and threaded with straight threads. Conduit joints shall be made up with T&B Kopr-Shield which shall be applied to the male threads only.

G. Exercise necessary precautions to prevent the lodging of dirt, concrete or trash in the conduit, fittings and boxes during the course of installation.

H. When rigid steel conduit is threaded in the field, the threads shall be re-galvanized by the Galv-a-weld process or by Gal-van-ize as manufactured by Lawson Products, Inc.

*** * * END OF SECTION * * ***

SECTION 26 24 19

MOTOR CONTROL EQUIPMENT

PART 2 GENERAL

1.01 DESCRIPTION OF WORK

A. This section covers the furnishing and installation of additions to an existing Motor Control Center (MCC) located in the Town of Scotia Raw Water Pump Power Building during Phase 1, as shown on the drawings and as specified herein.

B. MCC additions shall consist of two (2) vertical MCC sections containing reduced voltage electronic soft starters (RVSS) for operation of two (2) 250HP, 480V, 3-phase, constant torque submersible Raw Water Intake Pumps.

C. This section also covers the removal of two (2) existing MCC vertical sections during Phase 4 as described in Article 5.06 below.

1.02 STANDARDS AND CODES

A. All materials and equipment specified herein shall be approved by the Underwriter's Laboratories or other State of California approved testing agencies, for the purpose for which they are used and shall bear the testing agencies' label.

D. All materials and equipment specified herein shall conform with all applicable NEMA, ANSI and IEEE standards.

C. All materials and equipment specified herein and their installation methods shall conform to the latest published version of the National Electric Code (N.E.C.).

1.03 SUBMITTALS

A. Submit catalog data showing pertinent overall dimensions and component information. Also provide interconnecting wiring diagrams complete with terminals numbers, showing interface with the Pump Control Panel (PCP100).

1.04 COORDINATION

A. The supplier of the motor control center shall equip the assembly with all appurtenances and accessories including but not limited to control relays, control contacts, control wiring and terminal strips as required for interface with the Pump Control Panel (PCP100) to provide a totally integrated and operable system. The Contractor shall be responsible for all interface and coordination between the MCC Supplier and the Pump Control Panel (PCP100) Integrator as necessary for coordination of MCC device and circuitry provision.

1.05 WARRANTY

A. The MCC equipment and all material and devices contained therein, shall be warranted to be free from defects in materials and workmanship for a period of two years from project acceptance during the phase that the MCC is installed.

1.06 OPERATIONS AND MAINTENANCE DATA

A. The Manufacturer of the MCC and RVSS equipment shall prepare and assemble detailed operation and maintenance manuals as described herein. The manuals shall contain data that shall include but not be limited to the following:

1. Programming instructions.
2. Preventative maintenance procedures.
3. Trouble-shooting.
4. Calibration.
5. Testing.
6. Replacement of components.
7. Automatic mode operation.
8. Manual mode operation.
9. System schematics.
10. As-built wiring diagrams.
11. Catalog data and complete parts list for all equipment and control devices.
12. Listing of recommended spare parts.
13. Listing of recommended maintenance tools and equipment

1.07 SUPPLIERS

A. Manufacturer / Series: Eaton / Freedom 2100 Series as required to match existing MCC equipment. Equipment by other manufacturers shall not be accepted.

B. Manufacturer contact:

Eaton - Northern California District
Steve John, Santa Rosa Eaton Sales
707-528-9000, SteveMJohn@Eaton.com

C. Distributor contact:

Platt Electric - Ukiah, CA
Jeff Clevenger - Branch Manager
(707) 462-9990 jeff.clevenger@platt.com

PART 3 PRODUCTS

2.01 MOTOR CONTROL CENTER

A. The motor control center shall be designed, assembled and factory tested by the Supplier, shall be installed by the Contractor, and shall be tested and placed into operation by the Supplier with assistance as necessary by the Contractor.

B. The MCC shall consist of a vertical sections that can be joined together to form a rigid free-standing, completely enclosed assembly.

C. Color shall be ANSI #61 gray.

D. An existing vertical section metal side panel on the left end of the existing MCC shall be removed by the Contractor as necessary to extend the MCC by adding the additional RVSS pump controllers. The MCC addition shall be furnished with power splice bus to connect with the existing MCC bus along with bolts to attach the two structures together.

E. Floor sills and lifting means shall be provided.

F. The vertical sections shall be fabricated of sheet steel, shaped and reinforced to form a rigid, freestanding structure. Section shall have flange formed doors and/or covers both front and rear. The door shall include provisions for padlocking all breakers in the open position.

G. The motor control center shall be suitable for operation on 480 volts, three phase, three-wire, 60 hertz. Wiring shall be NEMA Class II, Type B. Each unit shall be completely pre-wired with all control wiring numbered and terminated on terminal strips. No terminal strips are required for the load wiring. Auxiliary components such as HOA selector switches, indicating lights and other indicating and/or recording devices shall be mounted on the compartment door or cover.

H. Control power for each pump soft-starter shall be provided from integral 480-120VAC control power transformers located within each controller.

2.02 REDUCED VOLTAGE SOFT STARTER UNITS

A. Motor starter units shall be combination type with the following minimum features:

1. IT Soft Start S811 Non-Communicating, 420 Ampere, Standard Duty
2. Pump deceleration ramp down control feature
3. 1200A Copper Horizontal Bus
4. Horizontal ground bus matching existing with lugs for 1/0 ground conductors.
5. NEMA Rated HMCP breaker, 600A frame, 500A trip set
6. Load power feeder lugs sized tor (1) 600kcmil copper conductor per phase.
7. IT Soft Start 120V Interface and 100VA Control Power Transformer
8. Hand-Off-Auto Selector Switch with "switch in auto position" auxiliary contact
9. Load feeder cable incoming through back at 8 inches above bottom.
10. Door-mounted LED PTT indicating lights for, RUN and FAIL (overload tripped) with engraved labels.
11. Control relays and / or RVSS output contacts for remote communication of PUMP IN AUTO, PUMP RUNNING, OVERLOAD TRIP status to the station Pump Control Panel (PCP100).
12. Soft Start Operator Interface Unit mounted on the vertical section door.

2.03 CONTROL RELAYS

A. Control relays shall be industrial “ice cube” type, respond in 25 ms, capable of 200,000 operations (electrical and mechanical), and carry 5 Amps at 220VAC. They must be SPDT at a minimum and have an indicating light to show when they are energized.

B. Control relays shall mount in sockets secured to DIN rail and be interchangeable with one another. Two spare relays of each type shall be provided with the system.

C. Control relays shall be General Electric CR420 or equal.

2.04 NAMEPLATES

A. Each motor control center controller shall have a nameplate designating the equipment and its identifying number. Data shall be as shown on the one-line diagrams. Nameplates shall be made of 1/16" thick machine engraved laminated phenolic having white letters not less than 3/8" high on a black background. Nameplates for identifying relays and devices that are located inside the panels shall be of the sandwich phenolic described above.

PART 3 EXECUTION

3.01 GENERAL

A. The Motor control center shall be completely factory pre-wired and tested and delivered to the site ready for external connections to the existing MCC and field equipment.

B. All assembly and wiring not completed by the Manufacturer, due to shipping sections, shall be the responsibility of the Contractor.

3.02 INSTALLATION

A. Only workers who are skilled and experienced in the installation of MCC equipment shall perform the installation of the MCC equipment additions in the Raw Water Pump Power Building.

B. The motor control center shall be leveled and securely anchored to the floor.

C. Installation shall include all interconnecting wiring between the RVSS equipment and the Pump Control Panel (PCP100) and equipment motors as shown on the drawings. All field installed control and signal wiring installed by the Contractor shall be labeled at both ends for ease of servicing in accordance with the requirements of Section 26 05 19.

3.03 WIRING

A. Refer to 26 05 19 - 3.02 Wire and Cable Termination.

3.04 START-UP

A. After completion of the installation, the MCC Supplier shall fully test and place the RSVV equipment into operation.

B. The Contractor shall be responsible for coordinating with the Pump Control Panel (PCP100) programmer for communications between the Pump Control Panel PLC and RVSS's.

C. The MCC Supplier shall be responsible for programming and configuration changes of the RVSS required during startup and testing. Final configuration settings shall be documented and provided to the Owner for reference.

D. The Contractor, with the assistance of the Pump Control Panel PLC programmer as necessary, shall correct all deficiencies and defects and make any and all repairs, replacements, modifications and adjustments as malfunctions or failures occur. The Contractor shall perform all such work required to cause and maintain proper operation of the RVSS equipment.

3.05 OPERATIONS AND MAINTENANCE TRAINING

A. The Contractor shall conduct a specifically organized training session in operation and maintenance of the RVSS equipment for personnel employed by the Owner. The training sessions shall be conducted to educate and train the personnel in maintenance and operation of the units. Training shall include, but not be limited to, the following:

1. Preventative maintenance procedures.
2. Programming procedures.
3. Troubleshooting.
4. Calibration.
5. Testing.
6. Replacement of components.
7. Automatic mode operation.
8. Manual mode operation.

B. One training session of at least one (2) hours in duration, shall be conducted at the Pump Station Power Building (after start-up of RVSS equipment associated with Pump P101A installed Phase 2) concerning instruction and operation of the RVSS equipment. The MCC Supplier shall prepare and assemble specific instruction materials for the training session and shall supply such materials to the Contractor at least two (2) weeks prior to the time of the training.

3.06 EXISTING MCC DEMOLITION

B. The Contractor shall be responsible during Phase 4 for the complete removal of two existing MCC vertical section containing RVSS associated with (2) original Raw Water Intake Pumps, (1) Raw Water Booster Pump and (1) Fire Water Booster Pump.

***** END OF SECTION *****

`

SECTION 26 32 13

DIESEL ENGINE DRIVEN GENERATOR EQUIPMENT

1. GENERAL

1.1 DESCRIPTION OF WORK

This section covers the provision of a standby power generator set at the existing River Pump Power Building during Phase 6 including a diesel engine-driven generator with controls, integral fuel tank, skintight enclosure, automatic transfer switch (ATS) and all required auxiliary systems.

The provision of equipment and all associated work described herein shall be the sole responsibility of the generator manufacturer / supplier hereafter referred to as the Supplier.

1.2 GENERAL

The generator set shall be a complete, factory-assembled power generating system including a diesel engine, radiator-type engine cooling system, engine exhaust system, engine fuel system, engine speed control system, engine starting system, generator, generator regulator system, control panel, main circuit breaker, structural steel support frame assembly, sound attenuated skintight enclosure and all other components and ancillary devices required for a complete, operable system.

The generator set shall be designed by the Manufacturer and all components of the generator set shall be selected by the Manufacturer to:

A. Be equipped and installed for service based on seismic calculations.

B. Be an integrated electrical generating system with compatible components and all required controls and appurtenances.

C. Continuously produce the kVA demanded by the load described in 1.4 for any duration of interruption of the normal utility source.

1.3 REGULATORY REQUIREMENTS

All equipment and materials shall conform to the latest revised editions of applicable standards published by the following organizations:

- American National Standards Institute (ANSI)
- Institute of Electrical and Electronic Engineers (IEEE)
- National Electrical Manufacturer Association (NEMA)
- Underwriters' Laboratories (U/L)
- Instrument Society of America (ISA)
- National Fire Protection Association (NFPA)

All electrical equipment and materials, and the design, construction, installation, and application thereof shall comply with all applicable provisions of the National Electrical Code (NEC), the Occupational Safety and Health Act (OSHA), and any applicable Federal, State, and local ordinances, rules and regulations.

All materials and equipment specified herein shall be approved by the Underwriter's Laboratories or other California State approved testing agencies, for the purpose for which they are used and shall bear the testing agencies' label. The generator set shall have a U.L. 2200 listing.

1.4 REQUIRED PERFORMANCE

Performance of the generator set shall be based on operation of the assembly with all specified and required appurtenances.

The generator set shall be rated for continuous standby service. However, the temperature rise of the generator shall not exceed 105 degrees C above a 40 degrees C ambient, when producing a full rated load for a continuous period of time.

Voltage Drop: The engine generator unit supplied must start the indicated load with a sustained RMS voltage drop no greater than 20 percent of rated phase to phase voltage during the starting period. The starting period shall be from zero up to three seconds.

Frequency Regulation: Plus or minus 3 hertz maximum, no load to rated load.

Voltage Regulation: Plus or minus 2 percent maximum.

The generator set shall be capable of starting and operating the following load without exceeding the temperature ratings of the engine or the generator:

A. Connected base load consisting of miscellaneous 120V and 240V loads totaling 5 kVA. It is expected that the overall power factor will be .80.

B. Start a 250 HP submersible raw water intake pump motor using an electronic reduced voltage soft start (RVSS) controller.

C. Ten (10) percent spare capacity.

D. The generator set shall be sized by the Supplier to start and operate the load indicated herein while meeting the performance requirements set forth herein.

E. The minimum acceptable engine generator set shall be capable of producing at least 350kW / 438KVA, at .8 power factor, continuously.

F. The output voltage shall be 480 Y/277 volts, 3 phase, 3 wire, 60 hertz.

1.5 FACTORY TESTING

The actual engine and generator to be incorporated in the generator set shall be fully and completely tested by the Manufacturer of each unit after manufacturing to determine specific operating characteristics. Testing of the engine shall be performed in accordance with procedures certified by an independent test laboratory. Testing of the generator shall be performed in accordance with IEEE Standard 115 and NFPA 110.

The assembled generator set shall be operated by the generator set Supplier in the Supplier's plant to break in and test the unit. The sequence and each load level shall be as required by the engine Supplier to properly break in and test the engine. The generator set shall be operated as required to verify and adjust the functioning of all other components.

1.6 SHOP DRAWINGS

In accordance with the requirements of Section 01 33 00 Submittal Procedures, the Supplier of the generator set shall develop all shop drawings required for design, fabrication, assembly and installation of the unit. Shop drawings shall include all drawings required in manufacture of components and assembly and installation of the generator set.

Installation details shall include the size, number, type and location of vibration isolation pads and anchor bolts; the size, number, type and location of interconnecting wiring and conduit; installation of the generator set and all appurtenances; and other installation requirements. Shop drawings shall be submitted to the Contractor for review and approval.

1.7 SUBMITTALS

In accordance with the requirements of Section 01 33 00 Submittal Procedures, the following project data shall be submitted by the Contractor prior to placement of a purchase order for the equipment:

A. Detailed plan and elevation drawings of the generator set indicating overall dimensions and the specific location of all components, including the engine exhaust system fuel tank and enclosure.

B. Detailed plan and elevation drawings of the ATS equipment indicating overall dimensions and specific location of internal components.

C. Detailed drawings indicating installation requirements and the specific location of vibration isolation pads and anchor bolts.

D. Detailed plan of the face of the control panel indicating overall dimensions and the specific location of all components.

E. Detailed specifications and standard operating characteristics of the engine, the generator and all components.

F. Certification by the Manufacturer and documentation that appropriate linear and torsional vibration analyses have been performed and that the engine and generator are compatible units.

G. Certification by the Manufacturer and documentation that the generator set will meet or exceed the general requirements as specified in Part 1.02 of this section and the required performance as specified in Part 1.04 of this section.

H. Generator control schematic.

I. Engine control schematic.

J. Detailed specifications and drawing of the diesel fuel tank.

K. Detailed specifications and drawings of the engine exhaust system.

L. Detailed specifications and drawings of the sound attenuated weatherproof enclosure.

1.8 WARRANTY

In accordance with the requirements of Section 01 78 36, the Contractor shall guarantee the generator set, fuel tank, silencer, enclosure, battery charger and ATS equipment to be free of defects in design, materials and workmanship for a period of one (1) year following the date of acceptance, by formal action of the Owner, of all work under the contract. The guarantee shall include all parts and labor and shall be secured by a written guarantee from the Supplier to the Owner. The written guarantee shall be delivered to the Owner prior to date of acceptance of all work under the contract.

2. PRODUCTS

2.1 ACCEPTABLE MANUFACTURER / SUPPLIER

The generator set shall be manufactured / supplied by the following:

Kohler Power Systems
Distributor: Bay City Electric Works
Contract: Doug Tostenson, 866-938-8200, Ext 822

Other equipment manufacturer / suppliers will not be accepted or considered.

2.2 ENGINE

The engine shall be a water-cooled, in-line, four-stroke cycle, compression ignition, diesel-fueled unit. The engine shall be fully and completely capable of and equipped for driving electrical generators. The specific model of engine selected by the Manufacturer of the generator set shall have an acceptable history of successful similar applications.

The engine shall be equipped for operation with ASTM D975, No. 2-D diesel fuel. The fuel system shall include a fuel pump and replaceable element fuel filter.

The engine shall be equipped with a pressurized oil lubricating system which shall include threaded, spin-on type, full flow lubricating oil filters which are located for easy removal. The lubricating system shall be equipped with spring-loaded bypass valves which will allow oil circulation if the filters are plugged.

The engine shall be fitted with a crank case ventilation (CCV) kit as required to meet California Emission regulations. The engine shall be fitted so that fuel blow-by shall be drained back to the fuel tank.

A pipe extension and valve shall be provided from the engine oil drain pan to outside the support skid for draining the oil.

The engine shall be equipped with an electric starting system which includes a lead acid battery set, an engine-driven battery charging alternator and appropriate electrical controls. The system shall be 12-volt. The batteries shall be mounted on a fabricated steel housing and must be easily accessible for maintenance. Batteries shall be bolted down to guard against movement during an earthquake. A battery charger shall be provided as specified under Article 2.10 of this section.

The engine shall be equipped with a unit-mounted, radiator type cooling system which shall maintain the jacket water temperature at the level required for proper operation of the engine from no load to full load.

The engine shall be equipped with a water jacket heater which shall be thermostatically controlled to maintain the coolant temperature at 120 degrees F. Operation of the heater shall be stopped while the engine is turning. Isolation valves shall be provided to allow removal of the heater without draining the engine block coolant.

2.3 GENERATOR

The generator shall be a brushless, revolving field type and shall be fully and completely capable of and equipped to be driven by a diesel engine and to produce the starting and running kVA demanded by the connected load. The specific model of generator, selected by the Manufacturer of the generator set, shall have an acceptable history of successful similar applications.

The generator shall be sized and rated so that the temperature rise of the unit will not exceed 105 degrees C over ambient temperature of 40 degrees C under standby, full load conditions in accordance with NEMA MG1-22.40. The generator shall be fully guarded in accordance with NEMA MC1-1.25.

The rotating brushless exciter shall incorporate a full wave, three-phase rotating rectifier with hermetically sealed, metallic type, silicon diodes to supply main field excitation.

The generator shall be equipped with a solid-state, volts-per-hertz type regulator which is compatible with both the engine and the generator. The regulator shall be capable of regulating the generator under sudden zero to full load changes.

The regulator shall be housed and mounted for protection of all components against moisture and vibration. The regulator assembly shall be mounted on the generator.

2.4 CONTROL PANEL

The generator set shall be equipped with a control panel that shall include the following:

A. Digital display of the following:
   1. Engine coolant temperature
   2. Engine lubricating oil temperature
   3. Engine lubricating oil pressure
   4. Engine running time
   5. Battery charging voltage
   6. Engine/generator RPM
   7. Generator volts
   8. Generator Amps
   9. Generator Frequency

B. Voltage adjustment rheostat (minimum plus/minus five percent)

C. Individual digital display indication for:
   1. System Ready
   2. Selector switch not in AUTOMATIC position
   3. High water temperature
   4. Low water temperature
   5. Low water level
   6. Low lubricating oil pressure
   7. Engine starting prohibited after three (3) cranking cycles

8. High engine/generator speed
9. Generator run failure
10. High/low battery voltage
11. Battery charger failure
12. Low fuel alarm
13. Low fuel shutdown
14. Fuel tank leak

D. Dry contacts wired to a terminal strip for common remote alarm for conditions listed as items 3 through 14 under Article C above.

E. Dry contacts wired to a terminal strip for each of the following:
   1. Generator Run
   2. Generator Fail (shutdown)
   3. Low fuel alarm

F. Three position (automatic/off/test) selector switch which shall:
   1. In the automatic position, allow the engine to automatically start when contacts in the transfer switch control circuit close and stop five minutes after the control circuit contacts open.
   2. In the off position, prohibit starting of the engine
   3. In the test position - cause the engine to start and remain in operation until the selector switch is moved to either of the other positions.

G. An automatic starting system that shall cause and control operation of the engine starter motor until the engine has started. The starting system shall include manually adjustable timing circuits for control of the time of operation of the engine starter motor and the time from stopping of operation of the starter motor (after the engine has failed to start) to re-initiation of operation of the starter motor. The starting system shall enable the number of starting cycles to be manually selected and shall prohibit operation of the starter motor if the engine fails to start after three (3) starting cycles. The starting system circuitry shall include dry contacts for remote indication of generator set running and not running conditions.

H. Engine emergency shutdown controls that shall include sensors and control circuits which shall stop operation of the engine when the engine coolant temperature rises to a pre-selected value, when the engine coolant drops below a pre-selected level, the engine lubricating oil pressure drops to a pre-selected value and the engine speed rises to a pre-selected value. The controls shall prohibit subsequent restarting of the engine until a reset switch is manually engaged.

2.5 MAIN CIRCUIT BREAKER

A main line molded case three-pole circuit breaker of 1000 amps, 480 volts shall be installed as a load circuit interrupting and protection device. It shall operate both manually as an isolation switch and automatically during overload and short circuit conditions.

The trip unit for each pole shall have elements providing inverse time delay during overload and instantaneous magnetic tripping for short circuit protection. The circuit breaker shall meet standards established by Underwriters' Laboratories, National Electric Manufacturer's Association, and National Electric Code.

The circuit breaker shall be mounted in a NEMA-1 enclosure adjacent to the generator control panel on the right side of the unit (when facing the generator end) as shown on the drawings.

2.6 SUPPORT FRAME

The engine and generator shall be mounted on and supported by a welded support frame fabricated of structural steel members. The Manufacturer shall specifically design the support frame to:

A. Resist bending forces and loads imposed by the engine and generator during transportation and during operation.

B. Limit torsional and bending movement caused by torque reactions

C. Prevent resonant vibration

The support frame shall be mounted on and supported by rubber pad type isolators selected by the Manufacturer of the generator set. These support pads are to be in addition to the rubber donut isolaters provided by the generator Manufacturer between the generator and the support skid as standard fabrication. The Manufacturer shall design the support frame for incorporation of and attachment to the isolator and shall define all requirements for mounting of the isolator pads on to the supporting concrete base surface.

2.7 FUEL TANK SYSTEM

A. The fuel storage system shall consist of a sub-base tank mounted beneath the generator support skids of sufficient capacity to provide a minimum of 24 hours of engine operation at 100 percent generator loading. The tank shall be double-walled steel with annunciation for a leak into the containment area. Penetrations shall be provided for all fuel connections and level sensing equipment.

B. The fuel tank shall be double walled with the containment cell fuel capacity sized in accordance with California State regulation requirements.

B. The system shall include the following:

1. Containment fuel leak alarm sensor

2. Level float for critical low fuel alarm and generator engine shutdown set at 10% capacity level.

3. Level float for low level fuel alarm set at 40% capacity level.

4. Level float for high level fuel alarm set at 95 percent capacity level to signal operations' personnel to stop adding fuel to the tank.

5. Plastic sight gage mounted on the tank.

6. Fuel fill overflow reservoir, vent piping including flexible sections, fuel strainer and lockable manual fill cap.

C. It shall be the responsibility of the Generator Supplier to determine whether a fuel tank overfill reservoir will be required and if required provide a concealed configuration which minimizes the potential for vandalism.

D. The fuel tank ventilation piping shall be provided in accordance with State of California regulations. A top cap shall be provided to avoid rain from entering the pipe.

E. The Contractor shall fill fuel tank with fuel following startup testing.

2.8 EXHAUST SYSTEM

A. The exhaust system shall include exhaust pipe connection to the engine exhaust manifold, exhaust piping, silencer, penetration thimble, rain cap and support system. Exhaust system components shall be of size(s) as recommended by the generator manufacturer.

B. The silencer shall be a critical rated unit and shall be installed inside the engine generator weatherproof enclosure.

2.9 BATTERY CHARGER

The battery charger shall operate on two charging modes; "float" and equalize" with automatic maintenance of battery voltage. The charger is to provide temperature compensation to prevent the battery from being overcharged or undercharged at high/low temperatures. DC voltage regulation shall be 1% from no load to full load and over AC input line voltage variations of +/- 10%. N.O. contacts shall be provided for remote indication of high/low battery voltage and battery charger failure. Charger shall be furnished in a NEMA 1 enclosure with DC ammeter, DC voltmeter and "power on" indicating light. Input voltage -120V, output voltage -12VDC. The charger shall be mounted inside the generator enclosure.

2.10 MISCELLANEOUS WIRING CONNECTIONS

The Supplier shall be responsible for the provision of a duplex receptacle and interconnecting cable and plugs for circuiting the battery charger equipment to the Owner's 120-volt power source.

The Supplier shall be responsible for the provision of a simplex receptacle and interconnecting cable and plug rated 20A, 240V for circuiting the engine jacket heater equipment rated 2500W, 240V to the Owner's 240-volt power source, while the engine generator is not in use.

2.11 ENGINE / GENERATOR ENCLOSURE

The engine generator set shall be enclosed in a skintight type sound attenuated housing, which shall be totally weatherproof. The enclosure shall be sized to contain the engine generator set, exhaust silencer, battery, output breaker and battery charger and allow adequate room to service the entire unit.

Sound attenuation shall be provided within the enclosure for the engine generator so that measured sound levels under rated generator loading do not exceed 75 dBA at a distance of 23 feet from the enclosure.

2.12 AUTOMATIC TRANSFER SWITCH (ATS)

The transfer switch shall be manufactured by Kohler, Model KCP.

The transfer switch shall be provided with MPAC 1200 controller.

The transfer switch shall be equipped with three poles for normal and emergency service of 480 volts, 60 hertz, three phase. The transfer switch shall be rated 1000 amperes.

The equipment shall have short-circuit rating not less than 22,000 amperes RMS symmetrical.

The transfer switch shall be mechanically and electrically held and rated to 600 volts for all classes of load and continuous inductive duty.

The transfer switch shall conform to UL 1008 provisions for Withstand Current Ratings and Closing Ratings.

The switch shall be capable of enduring 6000 cycles of complete opening and closing at rated current and voltage at a rate of six cycles per minute without failure.

The switch shall be double throw, inherently interlocked mechanically and electrically to prevent supplying the load from both sources simultaneously. The operating current shall be obtained from the source to which the load is to be transferred. The transfer mechanism shall be of the double break design with solid silver cadmium surface contacts and individual heat resistant arch chambers.

Arc barriers and magnetic blow out coils will also be acceptable if single break contacts are used. The contacts shall be capable of carrying 20 times the continuous rating for interrupting current.

All contacts, coils, etc. shall be readily accessible for replacement from the front of the panel without major disassembly of associated parts.

The transfer switch shall have UL 1008 listing.

The transfer switch shall include the following accessories:

A. Undervoltage Sensor: Adjustable solid state low voltage sensing relays (start five to 20 percent below stop setting; stop 75 to 100 percent). Provide for each phase.

B. Time Delay Start and Stop: Solid state adjustable time delay on start (one to 60 seconds). Solid state adjustable time delay on stop prior to shutdown. (Can be provided in control panel.) Time delay on stop is to provide for engine cooldown.

C. Time Delay Transfer & Retransfer: Solid state time delay relay adjustable 1.0 to 60 seconds for transfer to emergency and .5 to five minutes for retransfer to normal.

D. With or Without Load Selector Switch: Switch to select exercise with or without load.

E. Normal-Test Switch: Switch such that in the "Normal" mode the transfer switch will operate automatically and in the "Test" mode the generator will start for test purposes. This switch shall work in conjunction with the "With" or "Without" load switch.

F. Exercise Clock: An exerciser clock shall be provided which shall be programmable to exercise the generator set. The exerciser shall be adjustable from 15 to 30 minutes once each week. The exercise shall be

either with or without load. If power fails during the exercise cycle, the load shall automatically pick up.

G. Programmed Transition: The load transfer control shall be capable of remaining in the neutral position for an adjustable time of .5 to 60 seconds when transferring from one line power source to the other to allow residual voltages to decay before application of the source.

H. NEMA 1 enclosure.

I. Position lights for normal and emergency position indication.

J. Switch position indication limit switches for normal and generator positions.

3. EXECUTION

3.1 PREPARATION FOR INSTALLATION

It shall be the responsibility of the Contractor to coordinate with the Supplier regarding actual final generator / fuel tank dimensions as necessary to install anchor bolts and conduit penetrations in the concrete base.

3.2 ONSITE DELIVERY

The Supplier shall be responsible for all handling and transportation associated with the delivery of the standby generator set. Off-loading shall be the responsibility of the Contractor. The Supplier shall be responsible for the coordination of timing and details of off-loading, with the Contractor at least one week prior to actual delivery.

3.2 INSTALLATION COORDINATION AND INSPECTION

The Supplier shall be responsible for the provision of installation support services, which are to include descriptive installation literature, diagrams and personal technical support by telephone or site visits (minimum 8 hrs. onsite) as necessary. Following the installation of the generator by the Contractor, and prior to initial operation, the Supplier shall fully inspect the installation, and direct the Contractor in the correction of any deficiencies, defects, modifications, repairs or adjustments as necessary. After the completion of any necessary corrections, the Supplier shall assist the Contractor in the initial startup and on-site testing of the generator.

The Supplier shall set adjustable time delay relays in the automatic transfer switch as follows:

Time Delay Function	**Time Setting**
Engine Start	2 seconds
Engine Stop	5 minutes
Transfer to Emergency	3 seconds
Retransfer to Normal	5 minutes
Programmed Transition Time in Neutral Position	1.5 seconds

3.3 ON-SITE LOAD TEST

The generator set shall be tested by the Supplier after installation. All components of the generator set shall be fully and completely operated and tested under simulated power failure conditions and under a full load for a period of at least two continuous hours. Load banks shall be provided by the Supplier of the generator set as required to supplement the connected facility load and to provide full load conditions. Operating temperature, load amperes and voltage shall be recorded every 1/2 hour.

3.4 OPERATION AND MAINTENANCE TRAINING

The Supplier of the generator set shall conduct specifically organized training sessions in operation and maintenance of the unit for personnel employed by the Owner. The training sessions shall be conducted to educate and train the personnel in maintenance and operation of all components of the unit. Training shall include, but not be limited to, the following:

- Preventative maintenance procedures
- Trouble-shooting
- Calibration
- Testing
- Replacement of components
- Automatic mode operation
- Manual mode operation

At least one (1) training session, at least two (4) hours in duration, shall be conducted at the Pump Power Building site after start-up of the system. The Supplier shall prepare and assemble specific instruction materials for the training session and shall supply such materials to the Owner at least two (2) weeks prior to the time of the training.

3.5 OPERATION AND MAINTENANCE DATA

The Supplier of the generator set shall prepare and assemble detailed operation and maintenance manuals in accordance with the requirements of Section 01 70 00. The manuals shall include, but not be limited to, the following:

- Preventive maintenance procedures
- Trouble-shooting
- Calibration
- Testing
- Replacement of components
- Automatic mode operation
- Programming
- Manual mode operation

- System schematics
- As-built wiring diagrams of overall system
- Catalog data and complete parts list for all equipment and control devices.
- Listing of recommended spare parts
- Listing of recommended maintenance tools and equipment

END OF SECTION