Fairfield-Suisun Sewer District

ADDENDUM NO. 1

TO THE CONTRACT DOCUMENTS FOR THE

ELECTRICAL REPLACEMENT PHASE 2

SUISUN PUMP STATION 9006A

MAY 5, 2026

Ian Bronswick, P.E.
Project Manager

ELECTRICAL REPLACEMENT PHASE 2 – SUISUN PUMP STATION (9006A)
ADDENDUM NO. 1

This Addendum No. 1 Summary is provided to highlight key changes and clarifications to the Contract Documents for the above-referenced Project. Bidders shall review the full Addendum No. 1 for complete details and incorporate all modifications into their bids. This Addendum No. 1 shall become part of the Contract Documents and all provisions of the contract shall apply thereto.

Summary of Changes

General

- The due date to submit bids remains **unchanged**; Bids are due by **2:00P.M. on May 19th, 2026**.
- Addendum No. 1 includes a copy of the mandatory Pre-Bid Meeting sign-in sheet on page 53 of 53.

Plans

- Sheet Code 00G04:
  - The roadway name, “Civic Center Blvd” has been added as a label to the street as an identifier.
- Sheet Code 00D01:
  - General Note 1 text change as follows, “DIESEL TANK SHALL NOT BE DEMOLISHED UNTIL TEMPORARY ~~STANDBY POWER SYSTEM~~ FUEL SYSTEM AND CONTROLS ARE INSTALLED, TESTED, COMMISIONED, AND IN WORKING MANNER AS INDICATED IN SECTION 01312 – CONSTRAINTS AND SEQUENCING”.
- Sheet Code 00D02:
  - General Note 2 text change as follows, “DIESEL TANK SHALL NOT BE DEMOLISHED UNTIL TEMPORARY ~~STANDBY POWER SYSTEM~~ FUEL SYSTEM AND CONTROLS ARE INSTALLED, TESTED, COMMISIONED, AND IN WORKING MANNER”.
- Sheet Code 00C01:
  - TEMPORARY CONSTRUCTION STAGING AREA, keynote call out shall change from, “12” to “15”.
  - Keynote call out “12” shall be added to the drawing where the temporary fuel lines are connected to the existing fuel lines.
- Sheet Code 00C03:
  - Dimensions for the triple switch pad at the southwest corner of the building shall be added to reflect the following dimensions – 6’ x 13’-10” x 6”.
  - Dimensions for the ATS pad within the building shall be added to keynote 16 to reflect the following dimensions – 5’ x 4’-2” x 6”.

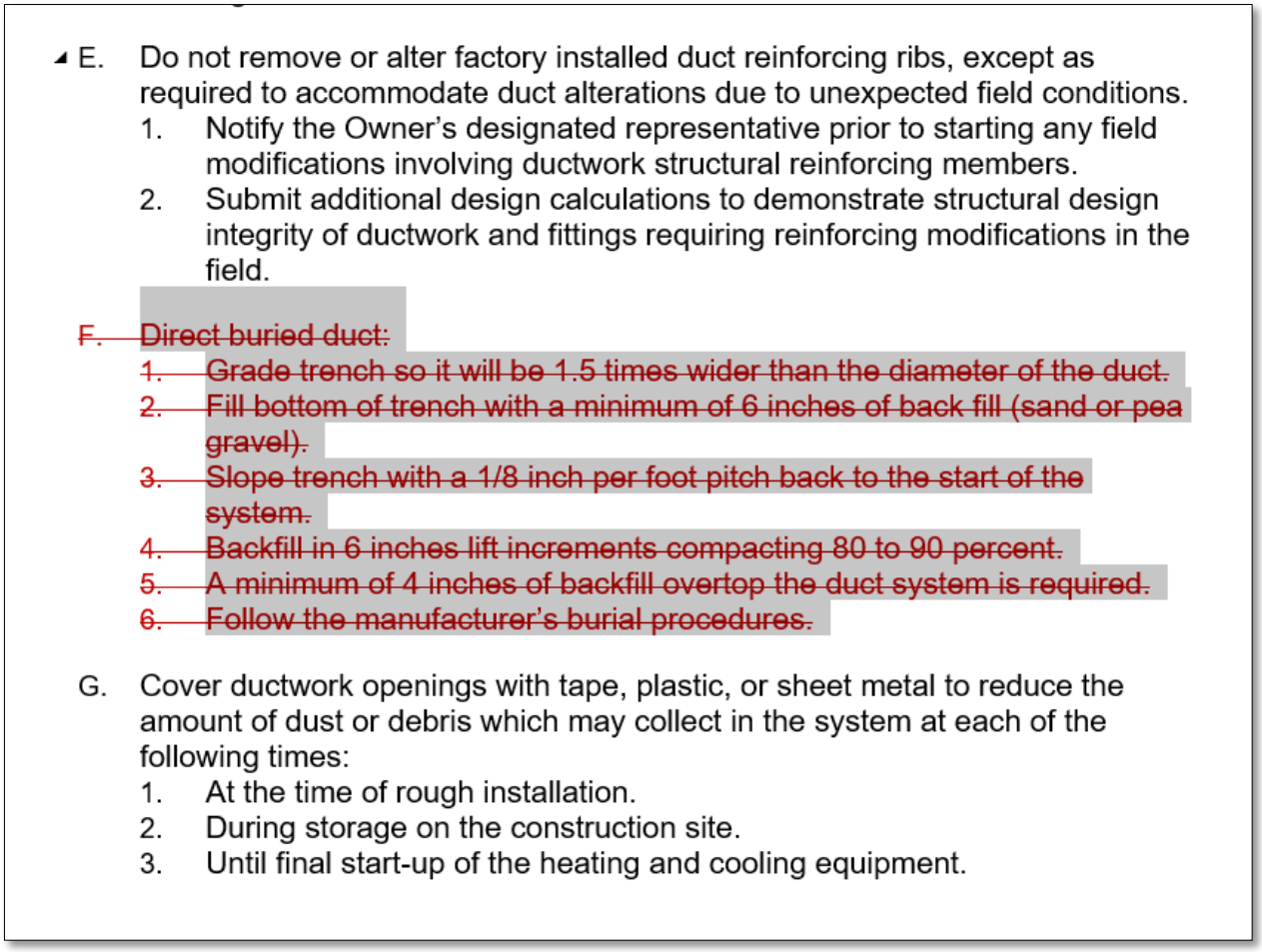
- Sheet Code 00C04:
    - The area currently identified as “SEEDING RESTORATION” shall be changed to “GRAVEL RESTORATION”.
- Sheet Code 00S05:
    - Clarification – Detail 2 on this sheet code is similar to, but not the same as, SD702 on Sheet Code 00TC01 and shall be treated as individual details.
- Sheet Code E003:
    - A call out has been added to the top of Detail A and B to reference trench and site restoration details on 00TC01.
- Sheet Code E052:
    - Additional call outs have been added to indicate cutting and capping of conduits.
    - Additional call outs have been added to indicate additional components to be removed.

Specifications

- Section 01756 - Commissioning:
    - Appendix F – Functional Testing Requirements, the table shall be updated to include A,B, C, D and will reflect the updated table shown below.

System	Subsystem	Consecutive Day Test Duration (Days)	Significant Interruption Duration (Hours)	Test Liquid	System Operated By
Standby Generator System		1	4	N/A	Contractor
	Switchgear				
	Engine Generators				
Odor Scrubber (upon relocation)		1	4	N/A	Contractor
Submersible Pumps (after right-angle decoupling)		1	4	N/A	Contractor
Triple Switch		1	4	N/A	Contractor
Automatic Transfer Switch		1	4	N/A	Contractor

- Section 15814 – Fiberglass Reinforced Plastic Ductwork:
    - Subsection Part 3 – Execution – 3.02 F, shall be struck through and removed from this specification as shown below.



E. Do not remove or alter factory installed duct reinforcing ribs, except as required to accommodate duct alterations due to unexpected field conditions.
1. Notify the Owner's designated representative prior to starting any field modifications involving ductwork structural reinforcing members.
2. Submit additional design calculations to demonstrate structural design integrity of ductwork and fittings requiring reinforcing modifications in the field.

~~F. Direct buried duct:~~
~~1. Grade trench so it will be 1.5 times wider than the diameter of the duct.~~
~~2. Fill bottom of trench with a minimum of 6 inches of back fill (sand or pea gravel).~~
~~3. Slope trench with a 1/8 inch per foot pitch back to the start of the system.~~
~~4. Backfill in 6 inches lift increments compacting 80 to 90 percent.~~
~~5. A minimum of 4 inches of backfill overtop the duct system is required.~~
~~6. Follow the manufacturer's burial procedures.~~

G. Cover ductwork openings with tape, plastic, or sheet metal to reduce the amount of dust or debris which may collect in the system at each of the following times:
1. At the time of rough installation.
2. During storage on the construction site.
3. Until final start-up of the heating and cooling equipment.

<u>Bid Items / Quantities</u>

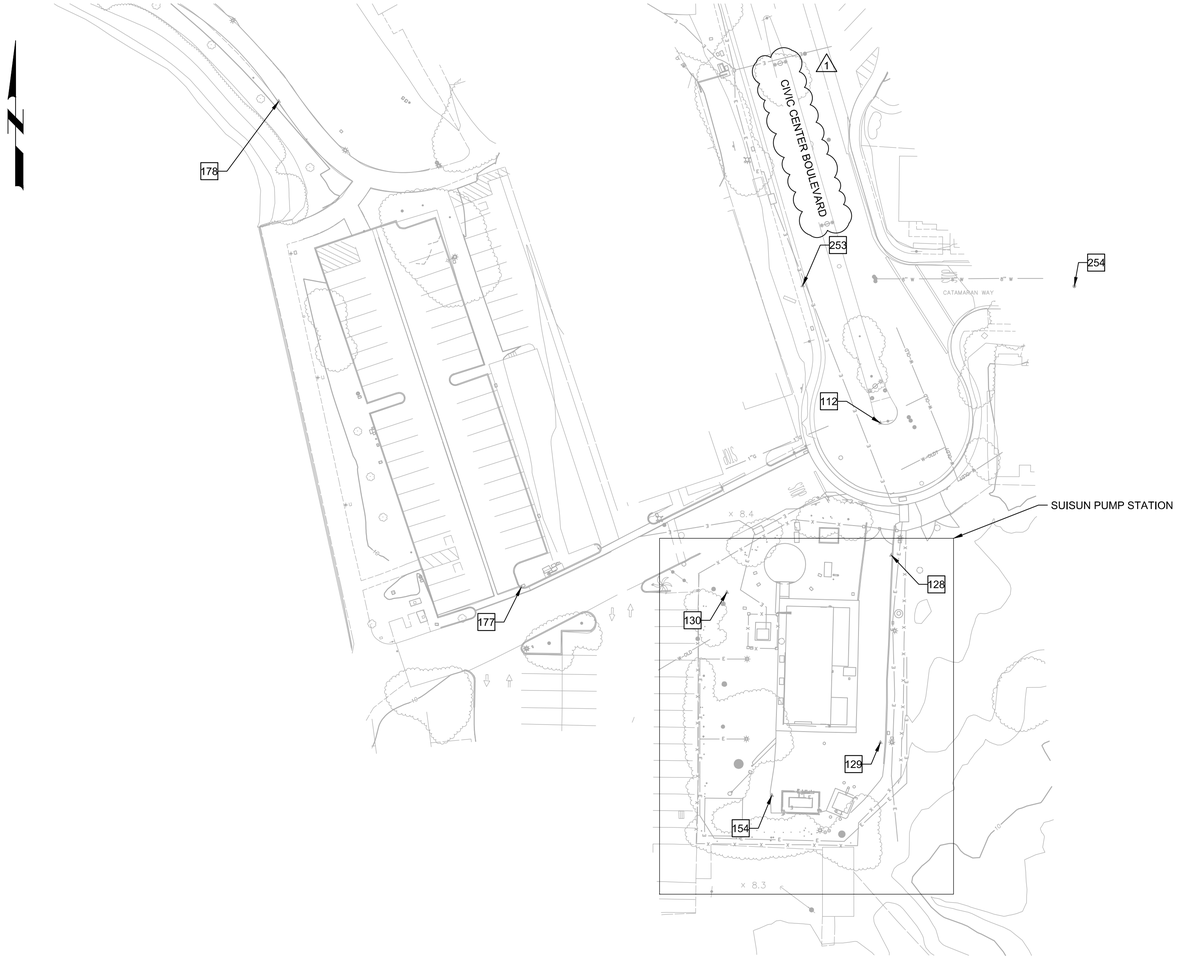
- Reduce seeding restoration from 3,000 sq ft to zero (0) sq ft.
- Increase gravel restoration from 1,600 sq ft to 4,600 sq ft.

<u>Clarifications</u>

- There are no additional clarifications identified in this, Addendum No. 1.

<u>Bidder Reminders</u>

- Bidders shall acknowledge receipt of all addenda in the Bid Proposal
- All changes included in Addendum No. 1 shall be reflected in the Bid



SURVEY CONTROL NOTES:

1. THE COORDINATE SYSTEM IS BASED ON THE CALIFORNIA COORDINATE SYSTEM, ZONE II NAD 83, EPOCH 2010, HOLDING COUNTY GPS CONTROL POINT (MONUMENT) WITH THE NGS PERMANENT IDENTIFIER (PID) AE7864 (N 1,847,962.20 E 6,553,073.53) .SEE "HTTPS://WWW.NGS.NOAA.GOV/DATASHEETS" FOR POINT DATA SHEETS AND DESCRIPTIONS. RTK GPS WAS USED TO ESTABLISH LOCAL CONTROL POINTS ON SITE: SEE TABLE BELOW FOR CONTROL POINTS. DISTANCES AND COORDINATES AS SHOWN ON THIS SURVEY SHOULD BE CONSIDERED AS GRID DISTANCES AND COORDINATES.

2. ELEVATIONS ARE BASED ON NAVD 88, PER COUNTY GPS CONTROL MONUMENT WITH NGS PID AE7864, AS PREVIOUSLY DESCRIBED, THE ELEVATION IS TAKEN AS 9.2 FEET (NAVD 88). USED RTK GPS TO ESTABLISH TEMPORARY PROJECT BENCHMARKS ON SITE. ACCURACY OF ELEVATIONS PROVIDED IS +/- 0.1 FT.

3. THIS SURVEY DOES NOT REPRESENT A COMPLETE BOUNDARY SURVEY. ALL PROPERTY CORNERS HAVE NOT BEEN SEARCHED FOR OR LOCATED OTHER THAN THE FOUND STREET MONUMENTS SHOWN ON THE SURVEY PER VARIOUS RECORD SUBDIVISION MAPS FOR THE NEIGHBORHOOD NEW CORNERS OR MONUMENTS HAVE NOT BEEN SET DURING THIS SURVEY. THE BOUNDARY (PROPERTY) LINES SHOWN HEREON ARE BASED ON RECORD INFORMATION ONLY. NOT ALL EASEMENTS MAY BE SHOWN. THE EXISTING EASEMENT INFORMATION SHOWN HEREON IS BASED ON THE VARIOUS RECORDED MAPS AND THE RECORD DOCUMENTS PROVIDED BY THE CLIENT/DISTRICT. BOUNDARY LINES WERE APPROXIMATELY ESTABLISHED BY USING RECORD BOUNDARY DATA SHOWN ON THE VARIOUS MAPS OF RECORD FOR THESE AREAS, AS OBTAINED FROM THE COUNTY SURVEYOR'S OFFICE. PROPERTY LINE LOCATIONS HAVE BEEN ESTABLISHED BY COMBINING DATA AND PERFORMING A "BEST FIT" INSERTION AND ROTATION INTO THE BASEMAP BASED ON THE RECORD MAPS LISTED AND THE MONUMENTS FOUND DURING THE COURSE OF THE SURVEY. PROPERTY LINES MAY BE CONSIDERED ACCURATE TO WITHIN +/- 0.5 FT OF TRUE LOCATIONS, MORE OR LESS.

CONTROL POINT TABLE (1 OF 3)

#	NORTHING	EASTING	ELEV.	DESC.
112	1848306.99	6551253.18	9.67	CP CUT+TC
128	1848237.25	6551258.95	9.31	CP MAG NL AC
129	1848138.35	6551253.14	10.27	CP MAG NL AC
130	1848217.59	6551172.08	8.97	CP HUB MAG
154	1848110.45	6551195.84	9.63	CP MAG AC
177	1848220.33	6551063.53	9.71	CP MAG TC
178	1848476.80	6550935.49	10.12	CP CUT+ EWLK
253	1848379.50	6551212.07	8.67	CP CUT+ TC
254	1848379.20	6551355.55	7.45	MON 2.5" BD PUNCH
255	1848375.96	6551681.63	8.53	MON 2.5" BD PUNCH

Know what's below. Call before you dig. usanorth811.org

0 20' 40' 80'
SCALE: 1" = 40'

REV	DATE	BY	DESCRIPTION
1	5-1-26	NLO	ADDENDUM #1

BID DOCUMENTS

DATE 04/01/2026
DESIGNED BY NLO
DRAWN BY ART
CHECKED BY RAH
JOB NUMBER 204087

Digitally signed by Ryan A. Hook
Contact Info: Carollo Engineers, Inc.
Date: 2026.05.04 09:54:35 -07'00'

REGISTERED PROFESSIONAL ENGINEER RYAN A. HOOK No. 68462 CIVIL STATE OF CALIFORNIA

carollo®

WARNING 0 1" IF BAR DOES NOT MEASURE 1 INCH DRAWING IS NOT TO SCALE

FAIRFIELD-SUISUN SEWER DISTRICT EST 1951

FAIRFIELD-SUISUN SEWER DISTRICT
1010 Chadbourne Road
Fairfield, CA 94534-9700
(707) 429-8930 phone
(707) 429-1280 fax

ELECTRICAL REPLACEMENT PHASE 2 - SUISUN PS
PROJECT NO. 9006B

GENERAL
SURVEY CONTROL

SHEET CODE 00G04
SHEET 4
OF 43 SHEETS

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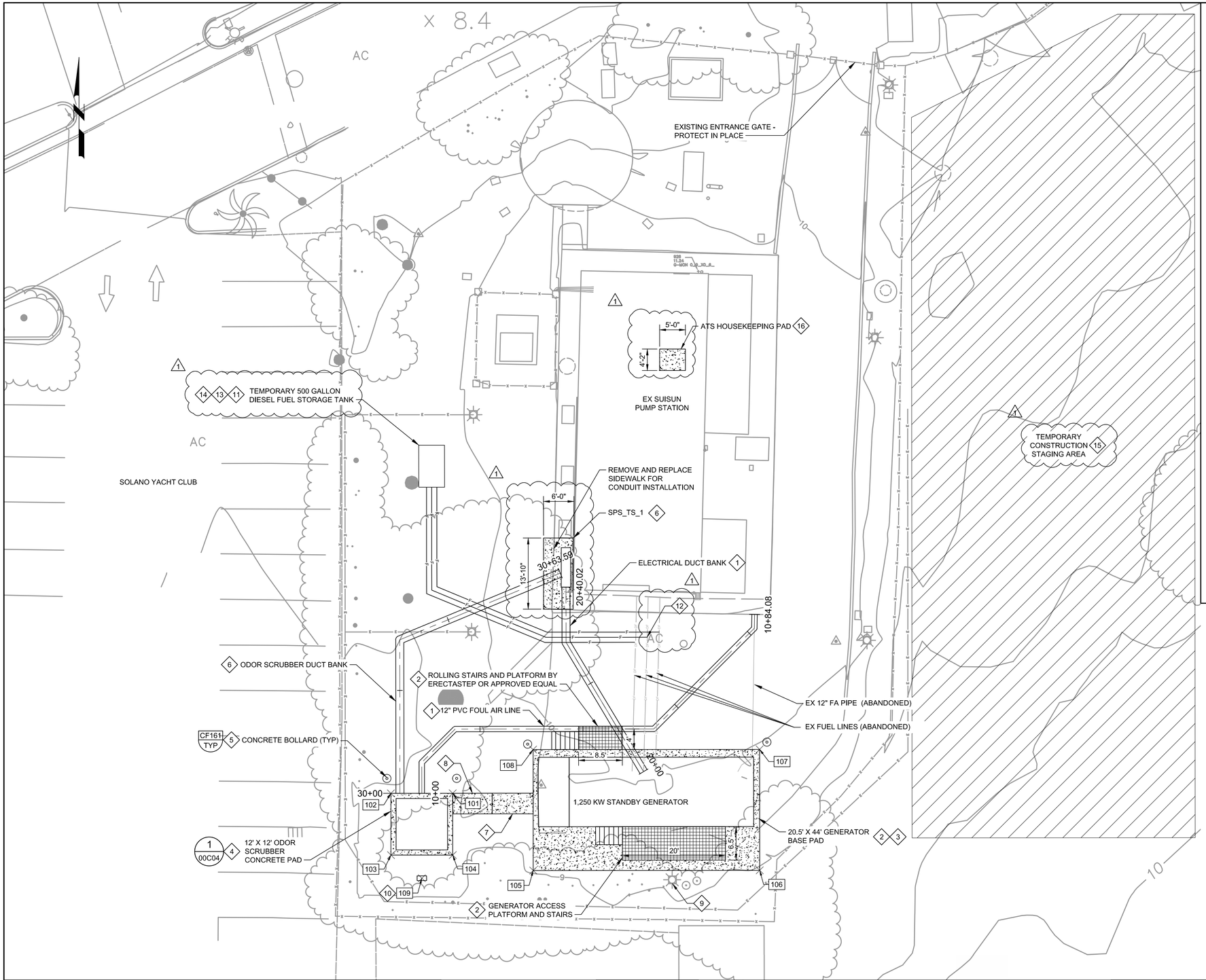
PROJECT NO. 204087-100000 FILE NAME: 204087_00G04.dwg



KEY NOTES:

1. REFER TO SHEET 00C02 FOR VERTICAL PROFILE ALIGNMENT OF DUCT BANK AND ODOR SCRUBBER FOUL AIR LINE.
2. REFER TO STRUCTURAL SHEETS FOR ELEVATED GENERATOR SLAB, LANDING PLATFORM AND ACCESS STAIRS, AND PAD PENETRATIONS.
3. CONTRACTOR SHALL CLEAR AND GRUB AREAS PRIOR TO INSTALLING SUBBASE FOR EQUIPMENT PADS.
4. CONTRACTOR SHALL ORIENT ODOR SCRUBBER SUCH THAT THE EXISTING BLOWER AND VENTING DISCHARGE FACES SOUTH.
5. COORDINATE WITH DISTRICT TO FIELD LOCATE FINAL LOCATION OF CONCRETE BOLLARDS.
6. REFER TO ELECTRICAL DRAWINGS FOR DUCT BANK SECTIONS AND EQUIPMENT DETAILS. FOR CONDUIT PENETRATION INTO THE STRUCTURE, SEE DETAIL 1 ON SHEET GS01.
7. CONCRETE PAD FOR NEW GENERATOR SHIP LADDER. REFER TO STRUCTURAL SHEETS.
8. INSTALL NEW SIDEWALK FROM SHIP LADDER CONCRETE PAD TO ODOR SCRUBBER CONCRETE PAD. REFER TO TYP DETAIL CR302.
9. PROTECT EXISTING LIGHT POLE IN PLACE.
10. INSTALL NEW 22"X11" CONCRETE PAD FOR THE ODOR SCRUBBER DISCONNECT SWITCH. FRONT OF CONCRETE PAD SHALL BE INSTALLED A MINIMUM OF 4' FROM ODOR SCRUBBER. REFER TO TYP DET SD702 ON SHT TC01 AND ELECTRICAL SHEETS FOR ADDITIONAL DETAILS.
11. CONTRACTOR SHALL FURNISH AND INSTALL A TEMPORARY 500-GALLON DIESEL FUEL TANK, INCLUDING ALL NECESSARY APPURTENANCES REQUIRED FOR PROPER OPERATION.
12. CONTRACTOR SHALL INTERCEPT THE EXISTING FUEL SUPPLY AND RETURN PIPING UPSTREAM OF ITS ENTRY INTO THE PUMP STATION BUILDING.
13. TEMPORARY FUEL PIPING SHALL BE INSTALLED TO CONNECT THE CONTRACTOR-FURNISHED TEMPORARY FUEL TANK TO THE EXISTING DAY TANK WITHIN THE PUMP STATION BUILDING.
14. THE LOCATION OF THE TEMPORARY FUEL TANK SHALL BE COORDINATED WITH THE DISTRICT PRIOR TO FINAL PLACEMENT. THE TANK SHALL BE POSITIONED TO ALLOW REFUELING WITHOUT REQUIRING ADDITIONAL EFFORT BY THE FUEL DELIVERY TRUCK AND SHALL NOT IMPEDE ACCESS TO, OR NORMAL OPERATION OF, THE PUMP STATION OR ITS COMPONENTS.
15. REFER TO APPENDIX F - TEMPORARY CONSTRUCTION ACCESS AGREEMENT IN THE SPECIFICATIONS FOR CONSTRUCTION STAGING AREA LOCATION AND DIMENSIONS.
16. HOUSEKEEPING PAD SHALL BE 6-INCHES THICK. FOR FINAL HOUSEKEEPING PAD DIMENSIONS SEE DETAIL SD702 ON SHEET S05.

GENERAL NOTES:

1. WORK SHALL BE LIMITED TO THE HOURS OF 7:00AM TO 4:00PM, WEEKDAYS ONLY. NO WORK SHALL BE ALLOWED ON WEEKENDS AND HOLIDAYS.
2. CONTRACTOR SHALL POTHOLE AND FIELD VERIFY HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING CROSSING UTILITIES 30 DAYS PRIOR TO CONSTRUCTION.
3. CONTRACTOR SHALL PROTECT ALL SURFACE FEATURES IN PLACE UNLESS OTHERWISE DIRECTED ON CONSTRUCTION PLANS, INCLUDING BUT NOT LIMITED TO STREET SIGNS, SURVEY MARKERS, UTILITY VAULTS, POLES, AND STRUCTURES. ANY DAMAGE TO FEATURES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
4. CONSTRUCTION WORK WILL TAKE PLACE ON AN ACTIVE PUMP STATION SITE. PUMP STATION ACCESS DRIVE SHALL NOT BE BLOCKED BY TEMPORARY FACILITIES DURING THE DURATION OF THE PROJECT. CONTRACTOR SHALL MINIMIZE DISRUPTIONS TO THE PUMP STATION AND COORDINATE WITH THE DISTRICT A MINIMUM OF 4-WEEKS IN ADVANCE WHEN OUTAGES AT THE PUMP STATION ARE REQUIRED FOR WORK.
5. REFER TO CIVIL TYPICAL DETAILS FOR TRENCH EXCAVATION AND BACKFILL PREPARATION DETAILS.
6. NEW 1,250 kW GENERATOR SHALL BE OWNER-FURNISHED, CONTRACTOR-INSTALLED. CONTRACTOR SHALL COORDINATE WITH DISTRICT FOR DELIVERY OF NEW GENERATOR.
7. CONTRACTOR SHALL TAKE MEASURES TO SUPPORT UNDERGROUND UTILITIES EXPOSED DURING EXCAVATION.
8. THE DISTRICT HAS SECURED A TEMPORARY CONSTRUCTION ACCESS AGREEMENT FOR A PORTION OF PRIVATE PROPERTY LOCATED TO THE EAST OF THE PROJECT SITE. IF CONTRACTOR CHOOSES TO USE THIS AREA DURING CONSTRUCTION, CONTRACTOR SHALL BE BOUND BY ALL PROVISIONS OF THE TEMPORARY CONSTRUCTION ACCESS AGREEMENT, AND SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL OBLIGATIONS ASSIGNED TO THE DISTRICT UNDER THE AGREEMENT, INCLUDING BUT NOT LIMITED TO, DUST CONTROL AND SITE RESTORATION. REFER TO APPENDIX F FOR A COPY OF THE AGREEMENT AND SITE PLAN.

COORDINATE CONTROL POINTS

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
101	1848108.88	6551178.65	11.09	ODOR SCRUBBER CONCRETE PAD
102	1848108.88	6551166.65	11.07	ODOR SCRUBBER CONCRETE PAD
103	1848096.88	6551166.65	11.00	ODOR SCRUBBER CONCRETE PAD
104	1848096.88	6551178.65	11.02	ODOR SCRUBBER CONCRETE PAD
105	1848093.86	6551194.28	9.68	GENERATOR BASE PAD
106	1848093.86	6551238.28	9.68	GENERATOR BASE PAD
107	1848117.36	6551238.28	9.68	GENERATOR BASE PAD
108	1848117.36	6551194.28	9.68	GENERATOR BASE PAD
109	1848092.38	6551172.65	10.80	DISCONNECT SWITCH CONC PAD

SCALE

0 5' 10' 20'

SCALE: 1" = 10'

REV	DATE	BY	DESCRIPTION
1	5-1-26	NLO	ADDENDUM #1

BID DOCUMENTS

DATE 04/01/2026
DESIGNED BY NLO
DRAWN BY ART
CHECKED BY RAH
JOB NUMBER 204087

Digitally signed by Ryan A. Hook
Contact Info: Carollo Engineers, Inc.
Date: 2026.05.04 08:48:52 -07'00'

REGISTERED PROFESSIONAL ENGINEER RYAN A. HOOK No. 68462 CIVIL STATE OF CALIFORNIA

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WARNING
0 1"
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ELECTRICAL REPLACEMENT PHASE 2 - SUISUN PS
PROJECT NO. 9006B

CIVIL
SUISUN PS SITE PLAN

SHEET CODE 00C01

SHEET 7 OF 43 SHEETS

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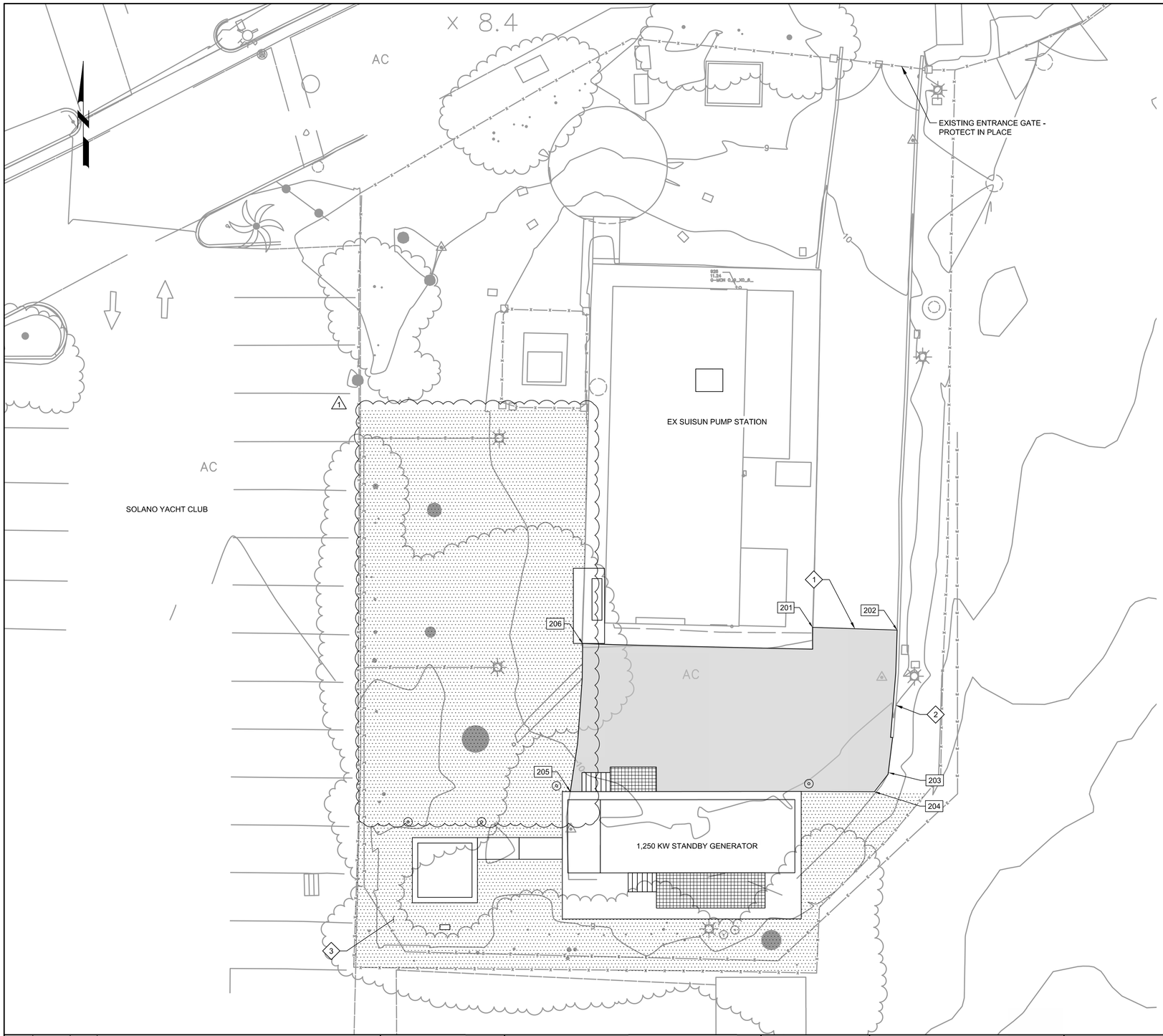

GENERAL NOTES:

1. WORK SHALL BE LIMITED TO THE HOURS OF 7:00AM TO 5:00PM, WEEKDAYS ONLY. NO WORK SHALL BE ALLOWED ON WEEKENDS AND HOLIDAYS.
2. CONTRACTOR SHALL PROTECT ALL SURFACE FEATURES IN PLACE UNLESS OTHERWISE DIRECTED ON CONSTRUCTION PLANS, INCLUDING BUT NOT LIMITED TO STREET SIGNS, SURVEY MARKERS, UTILITY VAULTS, POLES, AND STRUCTURES. ANY DAMAGE TO FEATURES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
3. CONSTRUCTION WORK WILL TAKE PLACE ON AN ACTIVE PUMP STATION SITE. PUMP STATION ACCESS DRIVE SHALL NOT BE BLOCKED BY TEMPORARY FACILITIES DURING THE DURATION OF THE PROJECT. CONTRACTOR SHALL MINIMIZE DISRUPTIONS TO THE PUMP STATION AND COORDINATE WITH THE DISTRICT A MINIMUM OF 4-WEEKS IN ADVANCE WHEN OUTAGES AT THE PUMP STATION ARE REQUIRED FOR WORK.
4. CONTRACTOR SHALL DOCUMENT SITE CONDITIONS PRIOR TO AND FOLLOWING CONSTRUCTION. CONTRACTOR SHALL PERFORM WORK AND SUBMIT PICTURES TO DISTRICT IN ACCORDANCE WITH SPECIFICATION 01340 - PHOTOGRAPHIC AND VIDEOGRAPHIC DOCUMENTATION.
5. ANY DAMAGES OUTSIDE OF THE RESTORATION LIMITS SHOWN CAUSED BY CONSTRUCTION ACTIVITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
6. DISTURBED AREAS OUTSIDE THE SITE RESTORATION HATCHING SHALL BE RESTORED TO EXISTING CONDITIONS.

KEY NOTES:

1. CONTRACTOR SHALL REHABILITATE EXISTING AC PAVEMENT IN ACCORDANCE WITH TYP DET CY111 ON SHT 00TC01 AND SPECIFICATIONS 02742A - ASPHALTIC CONCRETE PAVING AND 02952 - PAVEMENT RESTORATION AND REHABILITATION. CONTRACTOR SHALL MATCH EXISTING PAVEMENT THICKNESS.
2. CONTRACTOR SHALL REPLACE APPROX 25 LF OF EXISTING ASPHALT CURB TO MATCH EXISTING CURB.
3. CONTRACTOR SHALL RESTORE AREA USING NO. 57 STONE. CONTRACTOR SHALL SCARIFY SUBGRADE TO A MINIMUM OF 6 INCHES PRIOR TO COMPACTION. PREPARE SUBGRADE AND ELIMINATE UNEVEN AREAS AND LOW SPOTS. FINE GRADE AREA, COMPACT SUBGRADE, AND INSTALL A WEED BARRIER BLANKET. INSTALL NO. 57 STONE TO A THICKNESS OF 3-INCHES.

LEGEND:

1 — AC PAVEMENT REHABILITATION (2,000 SQ FT)

GRAVEL RESTORATION (4,600 SQ FT)

SCALE

0 5' 10' 20'

SCALE: 1" = 10'

REV	DATE	BY	DESCRIPTION
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CIVIL
CIVIL SITE RESTORATION

SHEET CODE 00C03
SHEET 9 OF 43 SHEETS

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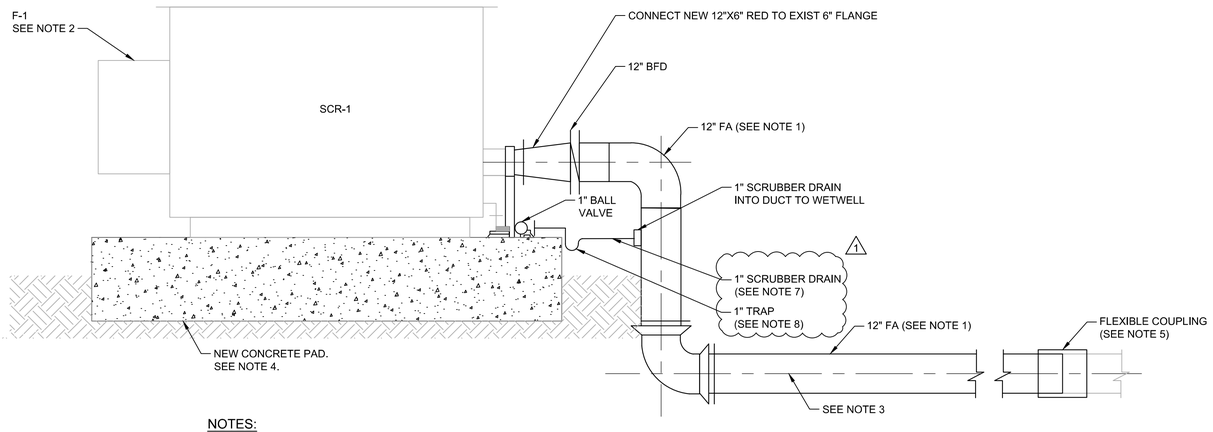
PROJECT NO. 204087-100000 FILE NAME: 204087_P2_00C03.dwg

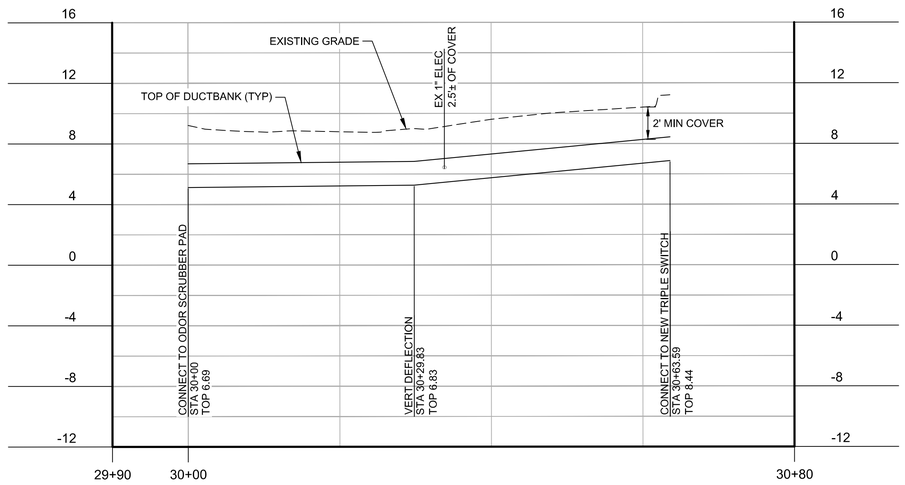


NOTES:

1. ABOVE-GROUND FOUL AIR PIPING AND FITTINGS SHALL BE FRP AND BELOW GROUND PIPING SHALL BE PVC PER THE SPECIFICATIONS. ALL BELOW GROUND PIPING WITH LESS THAN 30" COVER SHALL BE CONCRETE ENCASED PER TYP DET CY119.
2. EXISTING BLOWER AND VENTING DISCHARGE SHALL FACE SOUTH.
3. REFER TO DRAWING 00C02 FOR 12" FA ROUTING DETAILS.
4. REFER TO DRAWING 00S05 FOR ODOR SCRUBBER CONCRETE PAD DETAILS.
5. CONNECT NEW 12" FA LINE TO EXIST 12" FA USING A HEAVY DUTY SYNTHETIC RUBBER COUPLING WITH TYPE 316 STAINLESS STEEL CLAMPS AND HARDWARE AS INDICATED IN THE SPECIFICATIONS. CONTRACTOR SHALL FIELD VERIFY EXISTING PIPE ELEVATION PRIOR TO CONSTRUCTION. PROTECT EXISTING BUILDING IN PLACE.
6. REFER TO SPECIFICATION 02318 - TRENCHING FOR PIPE TRENCHING AND BACKFILL REQUIREMENTS.
7. SCRUBBER DRAIN PIPING SHALL BE SCHEDULE 80 PVC PER THE SPECIFICATIONS.
8. CONTRACTOR SHALL MATCH EXISTING TRAP DEPTH.

ODOR SCRUBBER FOUL AIR LINE

1 DETAIL
00C01 SCALE: NO SCALE



ODOR SCRUBBER DUCT BANK

C PROFILE
00C02 SCALE: HORIZ: 1" = 10'
VERT: 1" = 5'

REV	DATE	BY	DESCRIPTION
1	5-1-26	NLO	ADDENDUM #1

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Date: 2026.05.04 15:41:11 -07'00'

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RYAN A. HOOK
No. 68462
CIVIL
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PROJECT NO. 9006B

CIVIL
CIVIL DETAILS 1

SHEET CODE 00C04
SHEET 10
OF 43 SHEETS

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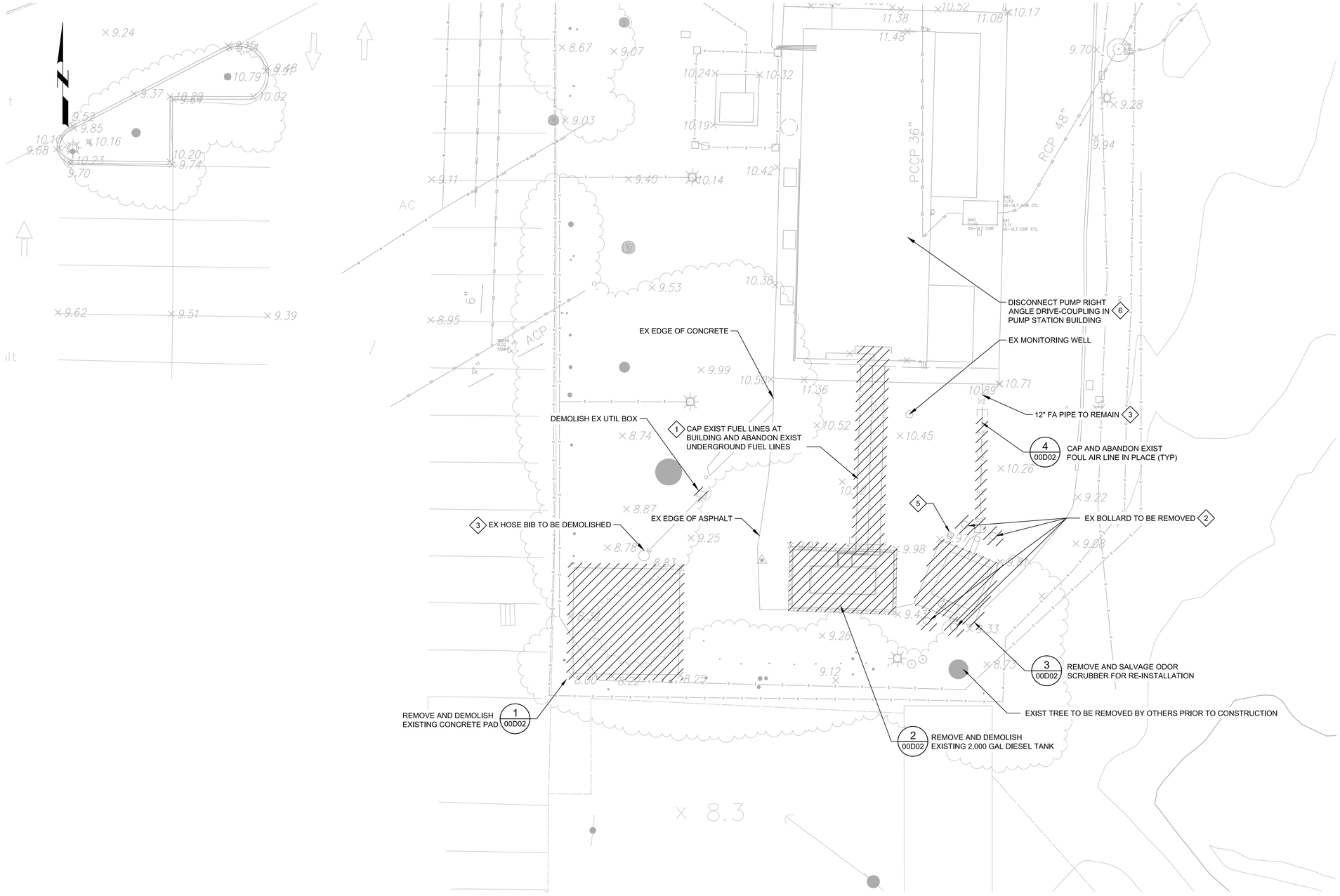

GENERAL NOTES:

1. DIESEL TANK SHALL NOT BE DEMOLISHED UNTIL TEMPORARY FUEL SYSTEM AND CONTROLS ARE INSTALLED, TESTED, COMMISSIONED, AND IN WORKING MANNER AS INDICATED IN SECTION 01312 - CONSTRAINTS AND SEQUENCING.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THE SAFE TRANSPORT AND DISPOSAL OF ALL MATERIALS CALLED OUT FOR DEMO. CONTRACTOR SHALL FOLLOW ALL NECESSARY REGULATIONS AND POLICIES FOR DISPOSAL OF MATERIALS.
3. REFER TO SPECIFICATION SECTION 01738 FOR ADDITIONAL DEMOLITION REQUIREMENTS.

KEY NOTES:

1. PROTECT EXISTING FUEL PIPING IN PLACE FOR CONNECTION TO PROPOSED TEMPORARY STANDBY POWER SYSTEM AS DESCRIBED IN SECTION 01312 - CONSTRAINTS AND SEQUENCING. ONCE PERMANENT STANDBY POWER SYSTEM HAS BEEN INSTALLED, TESTED, AND COMMISSIONED, CONTRACTOR SHALL CAP EXISTING FUEL LINE AT THE FUEL TANK TO BE DEMOLISHED AND JUST UPSTREAM OF EXISTING DAY TANK INSIDE PUMP STATION BUILDING. ABANDON EXISTING UNDERGROUND FUEL PIPING IN PLACE BETWEEN FUEL TANK AND PROPOSED CAP LOCATION.
2. REMOVE AND DISPOSE OF EXIST BOLLARDS AROUND EXIST ODOR SCRUBBER (4 TOT).
3. PROTECT EXISTING 12" FA PIPE TO REMAIN FOR RECONNECTION TO NEW 12" FA PIPE AS SHOWN ON SHEET 00C01.
4. REMOVE EXISTING EXISTING HOSE BIB AND VERTICAL PIPING TO 1' BELOW GRADE. CUT AND CAP UNDERGROUND PIPING AND ABANDON IN PLACE.
5. DISCONNECT AND REMOVE EXISTING ODOR SCRUBBER ELECTRICAL CONDUCTORS FROM MCC-SPS TO ODOR SCRUBBER IN ENTIRETY.
6. REFER TO SHEETS M01 AND E041 FOR DEMOLITION DETAILS REGARDING THE EXISTING PUMP RIGHT ANGLE DRIVE COUPLING INSIDE THE PUMP STATION BUILDING.

Know what's below. Call before you dig. usanorth811.org

SCALE

0 5' 10' 20'

SCALE: 1" = 10'

REV	DATE	BY	DESCRIPTION
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CHECKED BY RAH
JOB NUMBER 204087

Digitally signed by Ryan A. Hook
Contact Info: Carollo Engineers, Inc.
Date: 2026.05.04 08:43:21 -07'00'

REGISTERED PROFESSIONAL ENGINEER RYAN A. HOOK No. 68462 CIVIL STATE OF CALIFORNIA

carollo

WARNING
0 1"
IF BAR DOES NOT MEASURE 1 INCH DRAWING IS NOT TO SCALE

FAIRFIELD-SUISUN SEWER DISTRICT EST 1951

FAIRFIELD–SUISUN SEWER DISTRICT
1010 Chadbourne Road
Fairfield, CA 94534-9700
(707) 429-8930 phone
(707) 429-1280 fax

ELECTRICAL REPLACEMENT PHASE 2 - SUISUN PS
PROJECT NO. 9006B

DEMOLITION

SITE DEMOLITION PLAN

SHEET CODE 00D01

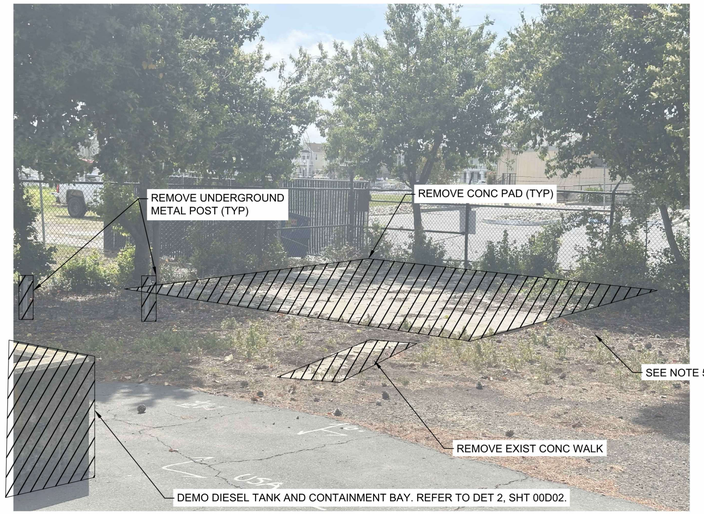
SHEET 5 OF 43 SHEETS

Plot Date:

LAST SAVED BY: JVergara

PROJECT NO. 204087-100000 FILE NAME: 204087_P2_00D01.dwg

Plot Date:



NOTES:

1. EXISTING FENCE AND TREES SHALL BE PROTECTED IN PLACE. CONTRACTOR SHALL PRUNE TREES AS NECESSARY TO PERFORM WORK.
2. FOLLOWING THE DEMOLITION OF THE CONCRETE PAD, THE AREA SHALL BE PREPARED AND WELL GRADED FOR THE INSTALLATION OF THE NEW ODOR SCRUBBER CONCRETE PAD. REFER TO CIVIL AND STRUCTURAL SHEETS.
3. ESTIMATED CONCRETE PAD DIMENSIONS ARE 20'-0"X20'-0". REFER TO AS-BUILT DRAWINGS INCLUDED IN APPENDIX D OF THE PROJECT SPECIFICATIONS FOR EXISTING CONCRETE PAD AND REINFORCING DETAILS. CONTRACTOR TO FIELD VERIFY PAD DIMENSIONS.
4. REFER TO SHEET 00C03 FOR SITE RESTORATION REQUIREMENTS.
5. REMOVE EXISTING HOSE BIB AND VERTICAL PIPING TO 1' BELOW GRADE. LOCATION SHOWN IN DETAIL IS APPROXIMATE ONLY. CONTRACTOR SHALL FIELD LOCATE HOSE BIB AND PIPING TO BE REMOVED.

1 CONCRETE PAD DEMOLITION

00D01 SCALE: NO SCALE

NOTES:

1. DEMOLITION SHALL INCLUDE REMOVAL OF DIESEL FUEL CONCRETE CONTAINMENT BAY AND CONTAINMENT WALL, REMOVAL OF 2000 GAL DIESEL FUEL TANK, PIPING, AND APPURTENANCES, AND REMOVAL OF EXISTING FUEL PIPING AS SHOWN ON SHEET 00D01.
2. DIESEL TANK SHALL NOT BE DEMOLISHED UNTIL TEMPORARY FUEL SYSTEM AND CONTROLS ARE INSTALLED, TESTED, COMMISSIONED, AND IN WORKING MANNER.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THE SAFE TRANSPORT AND DISPOSAL OF DIESEL TANK MATERIALS. CONTRACTOR SHALL FOLLOW ALL NECESSARY REGULATIONS AND POLICIES FOR DISPOSAL OF MATERIALS.
4. DIESEL TANK AND FUEL LINES SHALL BE DRAINED AND AIRED PRIOR TO ABANDONMENT. DIESEL FUEL LINE SHALL BE ABANDONED IN PLACE. CONTRACTOR SHALL PLUG 1 FOOT OF ABANDONED PIPELINE ENDS WITH CLASS B CONCRETE AND FILL ABANDONED PIPELINE WITH 2 SACK SLURRY CEMENT.
5. FOLLOWING THE DEMOLITION OF THE DIESEL TANK, THE SURFACE AREA SHALL BE WELL GRADED FOR THE INSTALLATION OF THE NEW PERMANENT GENERATOR CONCRETE PAD. REFER TO CIVIL AND STRUCTURAL SHEETS FOR GENERATOR PAD AND PEDESTAL DESIGN.
6. ESTIMATED CONCRETE CONTAINMENT BAY DIMENSIONS ARE 20'-0" LONG X 12'-0" WIDE X 2'-0" TALL. CONTRACTOR TO FIELD VERIFY PAD DIMENSIONS.
7. REFER TO SHEET 00C03 FOR SITE RESTORATION REQUIREMENTS.

2 DIESEL TANK DEMOLITION

00D01 SCALE: NO SCALE

NOTES:

1. EXISTING ODOR SCRUBBER, FAN, AND CONTROLS SHALL BE REMOVED AND SALVAGED FOR RE-INSTALLATION ON SITE. REFER TO CIVIL SHEETS FOR NEW LOCATION OF EQUIPMENT. CARE SHALL BE TAKEN DURING REMOVAL TO PREVENT DAMAGE TO THE ODOR CONTROL UNIT AND ALL ASSOCIATED APPURTENANCES TO ALLOW FOR REINSTALLATION AND RETURN TO SERVICE.
2. ODOR SCRUBBER DEMOLITION SHALL INCLUDE DEMOLITION AND DISPOSAL OF EXISTING CONCRETE PAD.
3. EXISTING 44" DIAMETER TREE SHALL BE REMOVED BY OTHERS PRIOR TO CONSTRUCTION.
4. EXISTING CONCRETE BOLLARDS SHALL BE REMOVED AND DISPOSED OF.
5. REFER TO SPECIFICATIONS 01312 - CONSTRAINTS AND SEQUENCING, AND 01312A - SUGGESTED WORK SEQUENCE FOR CONSTRAINTS WHEN TAKING THE ODOR SCRUBBER OUT OF SERVICE FOR RELOCATION.

3 ODOR SCRUBBER DEMOLITION

00D01 SCALE: NO SCALE

NOTES:

1. CUT PIPE AT 90-DEGREE VERTICAL BEND. REMOVE AND DISPOSE OF EXISTING 12" VERTICAL PIPING, FITTINGS, CONNECTION TO SCRUBBER DRAIN, AND 1" SCRUBBER DRAIN AND APPURTENANCES.
2. CAP AND ABANDON EXISTING FOUL AIR LINE IN PLACE. CONTRACTOR SHALL PLUG 1 FOOT OF ABANDONED PIPELINE ENDS WITH CLASS B CONCRETE AND FILL ABANDONED PIPELINE WITH 2 SACK SLURRY CEMENT.
3. REPLACE EXISTING DUCT SUPPORT.
4. REMOVE AND DEMOLISH EXISTING CONCRETE PAD. CLEAR AND ROUGH GRADE EXISTING PAD LOCATION FOR INSTALLATION OF PROPOSED GENERATOR FOUNDATION PAD. ESTIMATED CONCRETE PAD DIMENSIONS ARE 12'-0"X12'-0" AND THE TOP OF THE CONCRETE PAD IS APPROXIMATELY 1-FT ABOVE EXISTING SURFACE ELEVATION. CONTRACTOR TO FIELD VERIFY PAD DIMENSIONS.
5. EXISTING ODOR SCRUBBER FAN INCLUDES A 3.0HP, 460V, 3PH MOTOR.
6. REFER TO APPENDIX E IN THE CONSTRUCTION MANUAL FOR ODOR SCRUBBER SHOP DRAWINGS AND O&M MANUAL INCLUDING DISASSEMBLY AND RE-ASSEMBLY REQUIREMENTS.
7. CONTRACTOR SHALL INSTALL A TEMPORARY CAP ON THE EXISTING 12" FA LINE, WHICH SHALL REMAIN ACTIVE, TO PROTECT EXISTING PIPE IN PLACE UNTIL CONNECTION TO NEW 12" FA LINE IS COMPLETED.
8. REMOVE EXISTING 12" FA LINE AS REQUIRED TO MAINTAIN MINIMUM 5-FT CLEARANCE BETWEEN PIPE TO BE ABANDONED IN PLACE AND PIPE TO REMAIN ACTIVE.
9. CONTRACTOR SHALL TAKE NECESSARY MEASURES TO PROTECT EXISTING BUILDING AND SIDEWALK IN PLACE.

4 ODOR SCRUBBER FOUL AIR LINE ABANDONMENT

00D01 SCALE: NO SCALE

REV	DATE	BY	DESCRIPTION
1	5-1-26	NLO	ADDENDUM #1

BID DOCUMENTS

DATE 04/01/2026
DESIGNED BY NLO
DRAWN BY ART
CHECKED BY RAH
JOB NUMBER 204087

Digitally signed by Ryan A. Hook
Contact Info: Carollo Engineers, Inc.
Date: 2026.05.04 08:40:11 -07'00'

REGISTERED PROFESSIONAL ENGINEER RYAN A. HOOK No. 68462 CIVIL STATE OF CALIFORNIA

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WARNING
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ELECTRICAL REPLACEMENT PHASE 2 - SUISUN PS
PROJECT NO. 9006B

DEMOLITION
SITE DEMOLITION DETAILS

SHEET CODE 00D02
SHEET 6
OF 43 SHEETS

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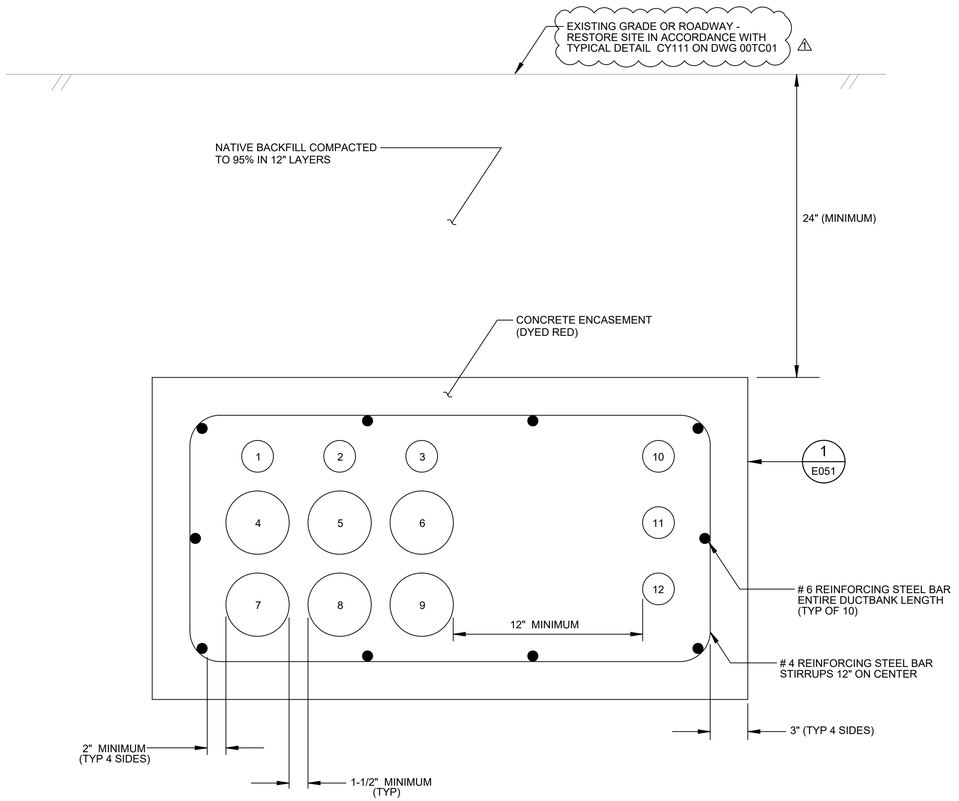
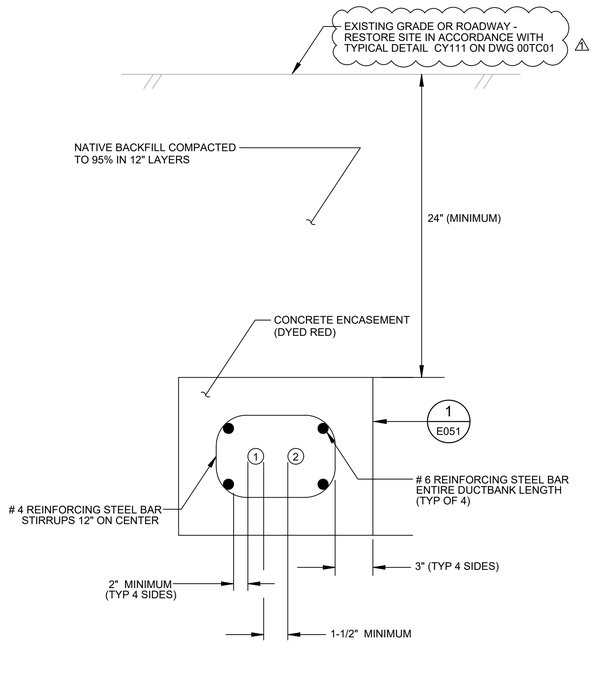
PROJECT NO. 204087-100000 FILE NAME: 204087_P2_00D02.dwg



DUCTBANK SCHEDULE		
CONDUIT NO.	SIZE	CIRCUITS
1	2"	PULLTAPE
2	2"	C-GENST
3	2"	P-GENTFR
4	4"	P-GEN-1
5	4"	P-GEN-2
6	4"	P-GEN-3
7	4"	P-GEN-4
8	4"	P-GEN-5
9	4"	P-GEN-6
10	2"	PULLTAPE
11	2"	C-GEN
12	2"	S-GEN

A E002 NEW UNDERGROUND DUCTBANK SECTION

NO SCALE



DUCTBANK SCHEDULE		
CONDUIT NO.	SIZE	CIRCUITS
1	1"	P-SCRUB
2	1"	PULLTAPE

B E002 NEW UNDERGROUND DUCTBANK SECTION

NO SCALE

NO:	DATE	BY	REVISIONS
1	5-1-26	TB	ADDENDUM 1

REGISTERED PROFESSIONAL ENGINEER TODD A. BEECHER E014712 Exp. 6/30/27 ELECTRICAL STATE OF CALIFORNIA
MARCH 2, 2026

FSSD PROJECT NO.:	9006B
DESIGN BY:	TB
DRAWN BY:	BEI
CHECKED BY:	BEI
DRAWING DATE:	MARCH 2026

Beecher Engineering, Inc.

FAIRFIELD-SUISUN SEWER DISTRICT
ELECTRICAL REPLACEMENT PROJECT PHASE 2

FAIRFIELD-SUISUN SEWER DISTRICT
1010 Chadbourne Road
Fairfield, CA 94534-9700
(707) 429-8930 phone
(707) 429-1280 fax

ELECTRICAL

BELOW-GRADE ELECTRICAL DUCTBANK SECTIONS

VERIFY SCALES
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0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

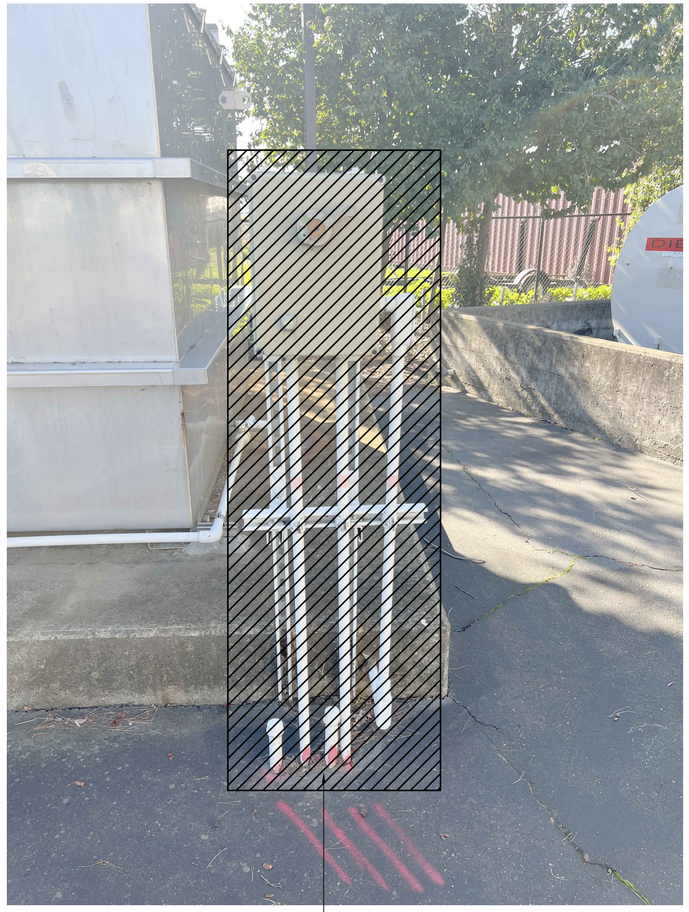
PROJECT NO. 9006B
DRAWING NO. E003
SHEET NO. 20 OF 43

DISCONNECT AND REMOVE EXISTING STANDBY GENERATOR AND EXISTING AUTOMATIC TRANSFER SWITCH, ALL ASSOCIATED EQUIPMENT AND DEVICES, CONDUITS, CONDUCTORS AND SUPPORTS. AFTER REMOVAL, CUT ALL STUBBED UP CONDUITS FLUSH WITH EXISTING FLOOR, FILL WITH NON-SHRINK GROUT AND MAKE SMOOTH WITH EXISTING STATION FLOOR ⚠

2 DETAIL - EXISTING EQUIPMENT DEMOLITION

2 / E041

NO SCALE



3 DETAIL - EXISTING SCRUBBER AREA DEMOLITION

3 / 00D01

NO SCALE

NO:	DATE	BY	REVISIONS
⚠	5-1-26	TB	ADDENDUM 1

REGISTERED PROFESSIONAL ENGINEER TODD A. BEECHER E014712 Exp. 6/30/27 ELECTRICAL STATE OF CALIFORNIA

MARCH 2, 2026

FSSD PROJECT NO.:	9006B
DESIGN BY:	TB
DRAWN BY:	BEI
CHECKED BY:	BEI
DRAWING DATE:	MARCH 2026

Beecher Engineering, Inc.

FAIRFIELD-SUISUN SEWER DISTRICT ELECTRICAL REPLACEMENT PROJECT PHASE 2

FAIRFIELD-SUISUN SEWER DISTRICT
1010 Chadbourne Road
Fairfield, CA 94534-9700
(707) 429-8930 phone
(707) 429-1280 fax

ELECTRICAL

ELECTRICAL DETAILS 2

VERIFY SCALES
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PROJECT NO. 9006B
DRAWING NO. E052
SHEET NO. 37 OF 43

SECTION 01756

COMMISSIONING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Commissioning.

B. Commissioning of owner-furnished equipment and/or relocated equipment shall be limited to verification of installation, field connections, controls integration, and functional operation within the installed systems. Factory testing and vendor internal commissioning are excluded.

1.02 DEFINITIONS

A. Commissioning: The process of planning for, testing of, and start-up of systems, subsystems, equipment, components, and devices of the Work to demonstrate, through documented verification, that the Work has successfully met the Contract Documents. It includes training the Owner's staff on operation and maintenance of the installed Work.

B. Commissioning Phases: The activities of commissioning are grouped into the phases defined in the following table:
   1. Table 1 - Commissioning Phases:

TABLE 1 - COMMISSIONING PHASES		
Planning Phase	**Testing and Training Phase**	**Start-Up Phase**
Draft Test Plans		Start-Up: • Documentation. • Owner Training.
	Installation Verification: • Documentation. • Owner Training.	
	Functional Testing: • Documentation. • Owner Training.	

   2. Attachment A provides Commissioning Flowcharts.

C. Component: A part of a system that does not have an electrical connection or internal electronics. Examples: Piping and pressure gauges.

D. Device: A part of a system that has electrical connections or internal electronics. Examples: Level transmitter or pressure transmitter.

E. Electrical Energization Plan: A plan to manage how and when power is applied to electrical equipment.

F. Equipment: A factory or field assembled apparatus that performs an identifiable function. Examples: Pumps, motors, VFDs, MCCs.

G. Functional Testing: Testing performed on a completed subsystem or system to demonstrate that the system meets the specified requirements. Example systems: Backwash system, dewatering system.

H. Installation Verification: Testing to demonstrate that equipment or system and associated components or devices have been properly installed. Example equipment: Pumps, meters, and blowers with associated piping.

I. Manufacturer's Certificate of Functional Compliance: The form completed by the manufacturer to confirm that testing of the installed equipment or system has been performed and the results conform to the specified performance. The form is provided in Attachment C provided at the end of this Section.

J. Manufacturer's Certificate of Installation Verification: The form completed by the manufacturer to confirm that the equipment or system is installed in conformance with the Contract. The form is provided in Attachment B at the end of this Section.

K. Owner Training: The Owner's staff is trained by the Contractor, with assistance from manufacturer, to operate and maintain the completed Work. This is sometimes referred to as Vendor Specific Training.

L. Process Stream: A series of liquid or solids flow processes that are designed to improve the water quality to meet regulatory permit requirements.

M. Source Testing: Test equipment or products for performance at point of manufacture or assembly for the requirements specified in the Contract Documents. Also referred to as factory testing and factory acceptance testing (FAT).

N. Start-Up: Operating the Work with process water to verify the Work meets the Contract Documents.

O. Start-Up Phase: The phase when Start-Up occurs.

P. Subsystem: A grouping of equipment, components, and devices that is a part of a larger system and that perform a single definable function. Examples: Sand filters, filter backwash.

Q. System: A grouping of equipment, components, and devices that perform a single definable function. If a system is a part of a larger system, it is referred to as a subsystem:
   1. Examples: Flocculation and sedimentation, filtration.

R. System Testing: Testing of a completed system for an extended time period. Examples: Headworks, filtration.

S. Water Management Plan: A plan to manage the test water used for commissioning from source to disposal. The test water may be clean water, potable water, non-potable water, or process water (e.g., raw water, plant water, sludge). The plan demonstrates how water will be produced, conveyed, treated, disposed of as directed by the plant manager, and/or recycled.

1.03 SUBMITTALS

A. Project Commissioning:
   1. Commissioning Coordinator's qualifications:
      a. Submit to Engineer no later than 30 days after Notice to Proceed.
      b. Describe previous similar experience on similar projects with a list of references, including phone numbers.
      c. Provide names and qualifications of commissioning assistants, if applicable.
   2. Schedules:
      a. Commissioning Schedule containing all commissioning activities.
      b. Owner Training Schedule.
   3. Test Plans:
      a. Submit draft Test Plan outlined in the Planning Phase, unless specified otherwise:
         1) Engineer approval of draft Test Plans required for successful completion of Planning Phase.
      b. Submit final Test Plan a minimum of 45 calendar days prior to testing.
      c. Engineer approval of final Test Plan required prior to start of testing.
   4. Test Reports:
      a. Submit draft Test Reports outline in the Planning Phase, unless specified otherwise:
         1) Engineer approval of draft Test Reports outline required for successful completion of Planning Phase.
      b. Submit final Test Report a maximum of 30 calendar days after testing.

B. Technical Sections Commissioning:
   1. Manufacturer's representative's qualifications:
      a. Submit to Engineer no later than 30 days in advance of required services.

b. Representative's name, phone, and e-mail address:
    1) May use 2 representatives: 1 for field testing and 1 for Owner Training.
    2) Provide resume stating instructor's technical expertise and instructional technology skills and experience.

2. Test Plans:
    a. Submit draft Test Plan outlined in the Planning Phase, unless specified otherwise:
        1) Engineer approval of draft Test Plans required for successful completion of Planning Phase.
    b. Submit final Test Plan a minimum of 45 calendar days prior to testing.
    c. Engineer approval of final Test Plan required prior to start of testing.
3. Test Reports:
    a. Submit draft Test Reports outline in the Planning Phase, unless specified otherwise:
        1) Engineer approval of draft Test Reports outline required for successful completion of Planning Phase.
    b. Submit final Test Report a maximum of 30 calendar days after testing.
4. Manufacturer's representatives field notes and data.
5. Owner Training:
    a. Prior to the training session:
        1) Training instructor qualifications.
        2) Training course materials: Due 30 calendar days prior to initial training session:
            a) If Owner requires, Continuing Education Units (CEUs), submit training materials to state regulatory agency in sufficient time to obtain approval for training prior to the training.
            b) Drafts of training agenda, lesson plan, presentation, handouts, and list of audio-visual aids.
            c) Format: 1 electronic copy in the format specified by the Owner.
    b. Post training session:
        1) Training course materials: Due 14 calendar days after class completion:
            a) Recordings.
            b) Class attendance sheet.
            c) Final version of training agenda, final lesson plan, presentation, handouts, and audio-visual aids.
            d) Format: 1 electronic copy in the format specified by the Owner.

2) Provide materials for all sessions of the class in a single transmittal.
3) If the Owner requires training CEUs, issue training CEU certificates approved by the state regulatory agency to Owner's staff who successfully completed the training.

1.04 COMMISSIONING COORDINATOR (CC)

A. Responsibilities include the following:
1. Part-time person.
2. Become thoroughly familiar with Contract Commissioning requirements.
3. Provide the primary interface with Engineer and Owner for Commissioning efforts.
4. Lead Commissioning efforts - all phases and tasks.
5. Coordinate training efforts.
6. Meetings:
a. CC is responsible for setting Commissioning coordination meeting dates and times, as well as preparing the agendas and meeting minutes.
b. CC shall conduct Commissioning progress meetings throughout construction, to plan, scope, coordinate, and schedule future activities, resolve problems, etc.
c. Frequency: Monthly minimum. Increase frequency as needed based on complexity and quantity of Commissioning activities.

1.05 PLANNING PHASE

A. Overview of Planning Phase:
1. Define approach and timing for Commissioning.
2. Obtain Engineer approval of draft Test Plans.

B. Test Plans.
1. Define approach and timing for:
a. Testing and Training Phases:
1) Major systems, with separate plans for each system.
b. Start-Up Phase.
c.
d. Define for Functional Testing:
1) Required temporary systems (pumps, piping, etc.).
2) Shutdown requirements for existing systems.
e. Furnish labor, power, tools, equipment, instruments, and services required for and incidental to testing activities.
2. Test forms minimum requirements:
a. Name of product to be tested.
b. Test date.
c. Names of persons conducting the test.
d. Names of persons witnessing the test, where applicable.

e. Test data.
f. Applicable project requirements as specified in the Technical Sections.
g. Check offs for each completed test or test step.
h. Place for signature of person conducting tests and for the witnessing person, as applicable.

3. Owner responsibilities:
   a. Owner will schedule staff within the constraints of their workloads:
      1) Those who will participate in this test have existing full-time work assignments, and testing is an additional assigned work task, therefore, scheduling is imperative.
         1) Maximum hours per day available for commissioning activities: 4.
         2) Days available for commissioning activities: Monday to Thursday.
         3) Scheduling coordination with the CC.
4. CC is responsible for the following:
   a. Coordinate schedule with the Owner's personnel and manufacturer's representatives (instructors).

C. Test Reports:
1. Minimum requirements:
   a. Title.
   b. Abstract.
   c. Equipment.
   d. Procedures.
   e. Results:
      1) Complete disclosure of the calculation methodologies.
   f. Conclusions.
   g. Signature by an authorized party.
   h. Appendices:
      1) Completed test forms signed by witnesses.
2. Water Management Plan:
   a. Requirements:
      1) Demonstrate how water will be produced, conveyed, treated, recycled, and or disposed until testing verifies specified requirements.
3. Commissioning Schedule:
   a. Content:
      1) Comply with Attachment F - Functional Testing Requirements and provide activities organized by system and subsystem.
      2) Include:
         a) Source Testing when required.
         b) Functional Testing.
         c) Owner Training.
      3) Comply with Attachment E - Commissioning Roles and Responsibilities Matrix.

b. Procedures:
    1) Submit Commissioning Schedule as specified in Section 01311 - CPM Construction Schedule.

1.06 TESTING AND TRAINING PHASE

A. Overview of Testing and Training Phase:
    1. General:
        a. Contractor tests the Work to verify it meets the Contract requirements.
        b. Contractor trains the Owner to operate and maintain the Work.
    2. Contractor responsibilities:
        a. Furnish labor, tools, equipment, instruments, and services required for and incidental to completing Commissioning activities in accordance with the approved Commissioning Plans.
    3. Owner responsibilities:
        a. Furnish labor, power, and services required for and incidental to completing Commissioning activities in accordance with the approved Commissioning Plans.
        b. Owner provided services, equipment, and/or materials to be as specified in Section 01010 - Summary of Work.

B. Installation Verification:
    1. Overview:
        a. Verifying the installation of equipment to be in accordance with Manufacturer's Instructions.
    2. Prerequisite:
        a. Engineer approval of Source Testing Report.
    3. Perform checks:
        a. Structural anchorage check.
        b. Electrical energization check.
            1) As specified in the flowchart shown in Attachment A.
        c. Health and safety check.
    4. Submit Manufacturer's Certificate of Installation Verification.
    5. Engineer approval of Manufacturer's Certificate of Installation Verification is required.

C. Functional Testing:
    1. Overview:
        a. Testing the function of a system or subsystem.
    2. Prerequisites:
        a. Engineer approval of Manufacturer's Certificate of Installation Verification.
        b. Engineer approval of Functional Test Plan required prior to testing.
            1)
    3. Witnessed.

4. Discipline checks:
    a. Verify support systems function properly, such as seal water, pipes, valves, etc.
    b. As specified in the individual Technical Sections.
5. Consecutive Day Test:
    a. Operate the Work as specified in Attachment F - Functional Testing Requirements and as specified in the individual Technical Sections:
        1) Successful completion of subsystem testing required prior to system testing.
    b. Failure response time:
        1) Be equipped and ready to provide emergency repairs, adjustments, and corrections to comply with the “Significant Interruption Duration” requirements as specified in Attachment F - Functional Testing Requirements.
    c. Duration:
        1) As specified in Attachment F - Functional Testing Requirements.
        2) Restart the consecutive day test when the system performance failures exceed the “Significant Interruption Duration” time period specified in Attachment F - Functional Testing Requirements:
            a) Individual equipment/system failures that are corrected within the “Significant Interruption Duration” time specified in Attachment F - Functional Testing Requirements shall not require the consecutive day test to be restarted unless the failure recurs.
            b) Engineer has the authority to reject the consecutive day test if individual equipment/system failures are repetitive.
6. Instrumentation and controls tests:
    a. Loop Validation Tests.
    b. Complete End-to-End Testing (CEET):
        1) Signal are tested from the field device through the PLC program, the network, and all the way to the operator’s HMI graphic screens.
7. Restore to condition prior to testing.
8. Submit Manufacturer’s Certificate of Functional Compliance.
9. Engineer approval of Manufacturer’s Certificate of Functional Compliance is required.

D. Documentation:
    1. Provide records generated during Commissioning Phase of Project, including, but not limited to:
        a. Training documentation.
        b. Manufacturer’s Certificate of Source Testing.
        c. Manufacturer’s Certificate of Installation Verification.
        d. Manufacturer’s Certificate of Functionality Compliance.

e. Daily logs of equipment/system testing identifying tests conducted and outcome.
f. Test forms and documentation.
g. Functional Testing results.
h. Logs of time spent by manufacturer's representatives performing services on the job site.
i. Equipment lubrication records.
j. Electrical phase, voltage, and amperage measurements.
k. Insulation resistance measurements.
l. Bearing temperature measurements.
m. Data sheets of control loop testing, including testing and calibration of instrumentation devices and setpoints.
n. Provide: 1 electronic copy in format specified by Owner.
o. Store the data within 24 hours of the test or document creation in the project system.
p. Due date: Within 14 calendar days of Substantial Completion.

2. Engineer approval of documentation is required.

E. Owner Training:
1. Training for Owner-furnished equipment will be provided by the Owner or Owner's designated vendor.
2. Contractor Responsibilities:
a. Coordinate scheduling to provide site access 30 days in advance.
b. Provide site access.
c. Support training activities as required for commissioning.

1.07 START-UP PHASE

A. Overview of Start-Up Phase:
1. General:
a. Confirm reliability requirements.

B. Start-Up Period:
1. Contractor responsibilities:
a. Support Owner to operate the Work.
2. Owner responsibilities:
a. Owner to operate the Work.
b. Owner-provided services, equipment, and/or materials to be as specified in Section 01010 - Summary of Work.
c. Furnish labor, power, tools, equipment, instruments, and services required for and incidental to completing commissioning activities in accordance with the approved Commissioning Plans.
3. Prerequisites:
a. Engineer approval of Testing and Training Phase.
4. Witnessed.

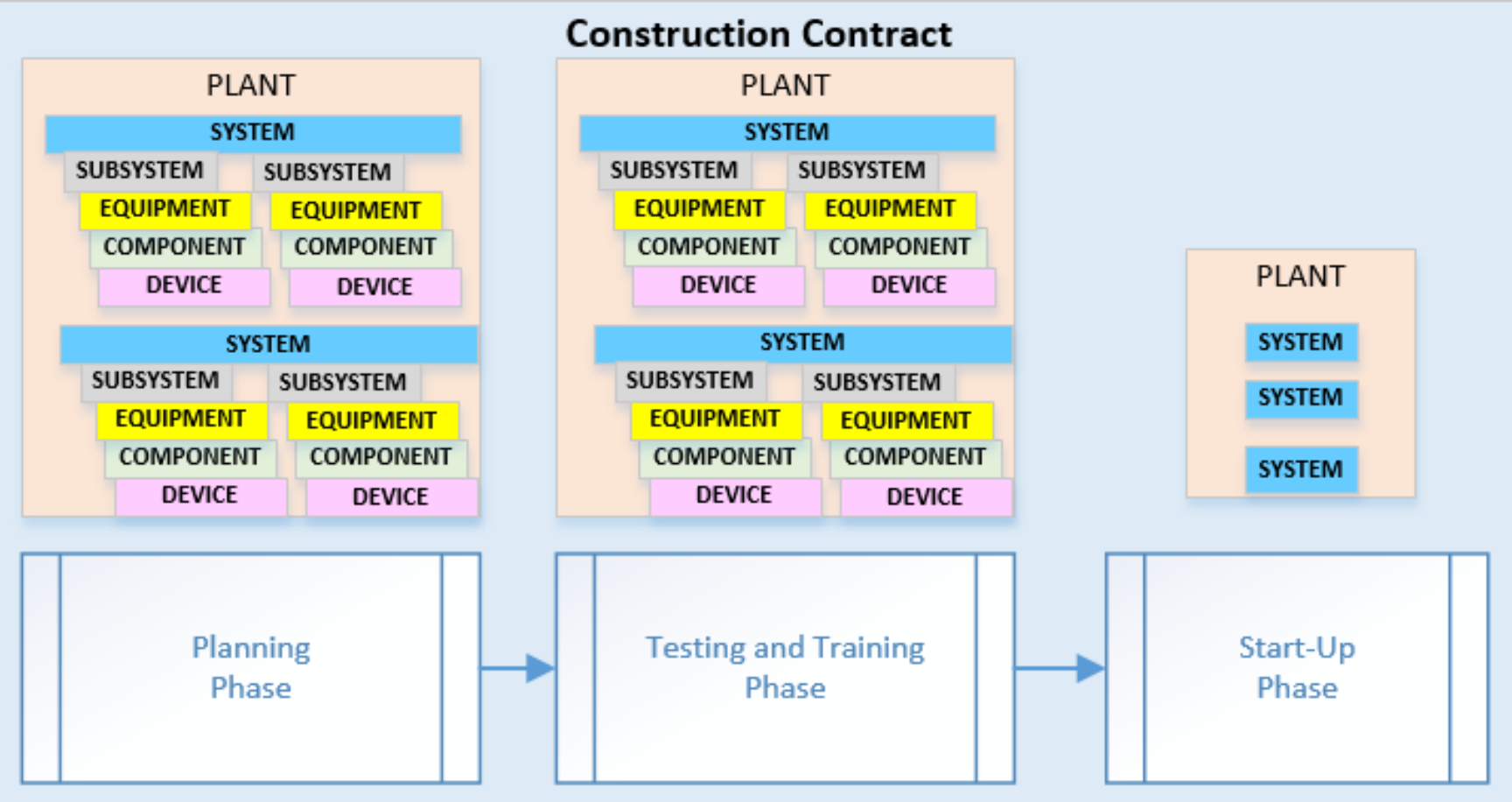
5. Duration: 1 day.
6. Engineer approval of Start-Up Period is required to achieve substantial completion.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

ATTACHMENT A - COMMISSIONING FLOWCHARTS


Construction Contract
PLANT
SYSTEM
SUBSYSTEM
SUBSYSTEM
EQUIPMENT
EQUIPMENT
COMPONENT
COMPONENT
DEVICE
DEVICE
SYSTEM
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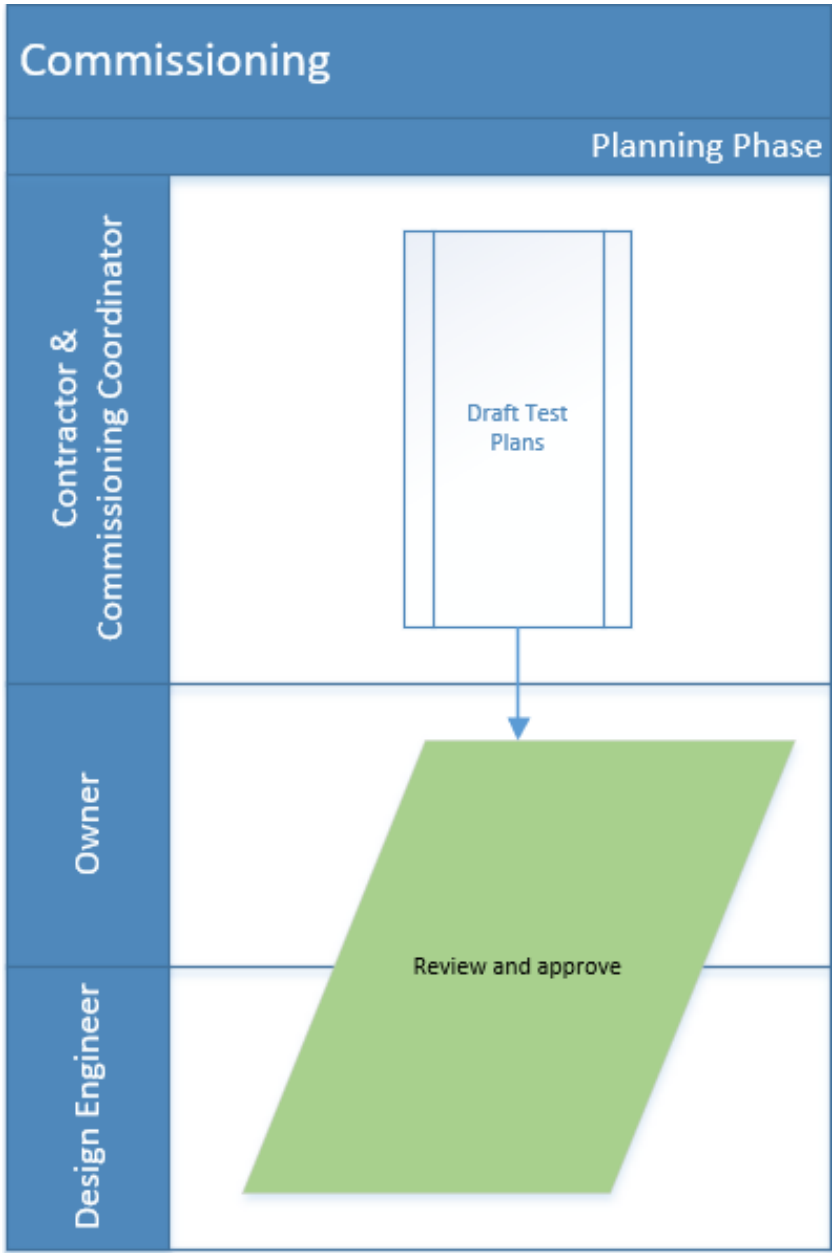
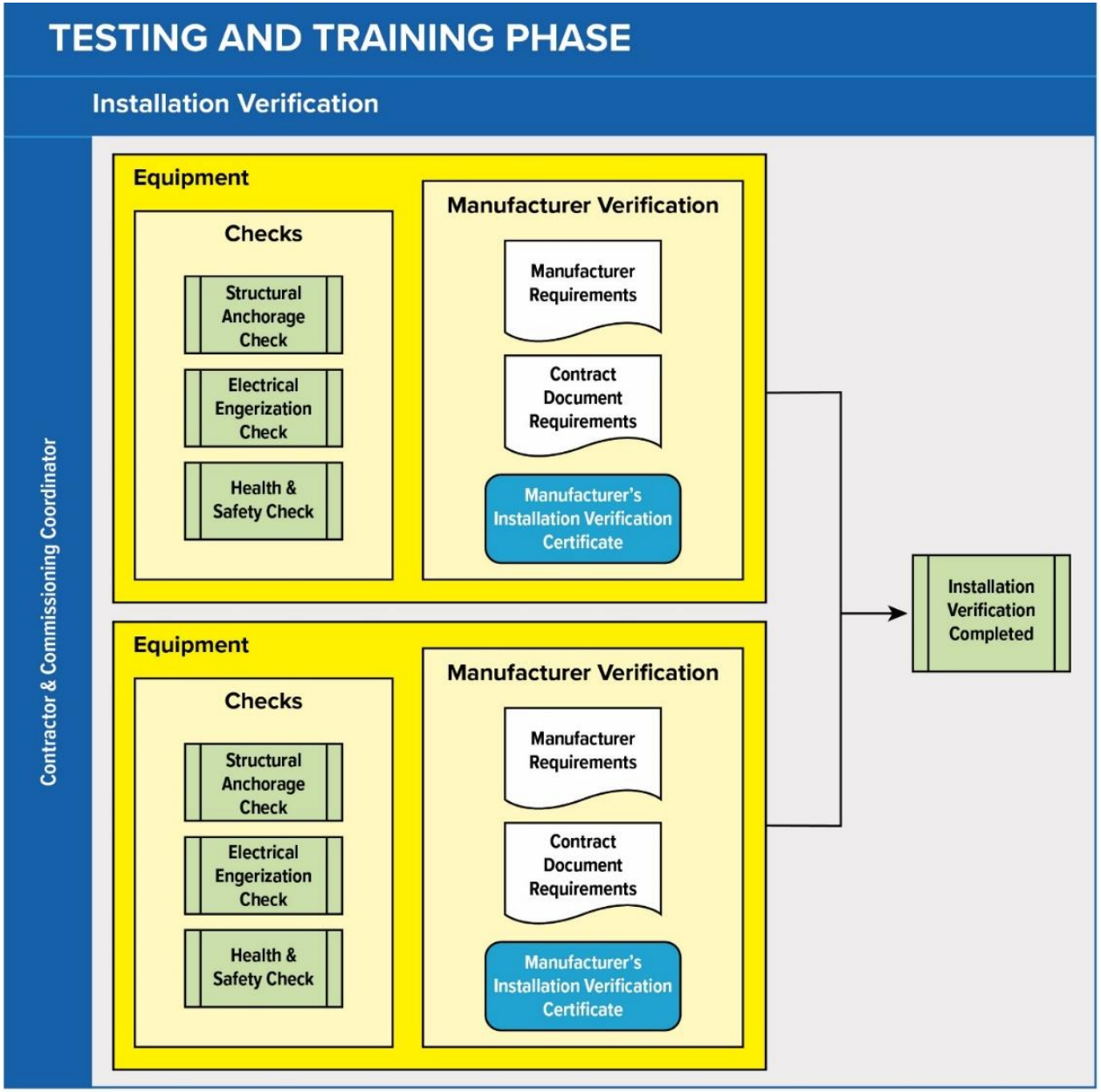
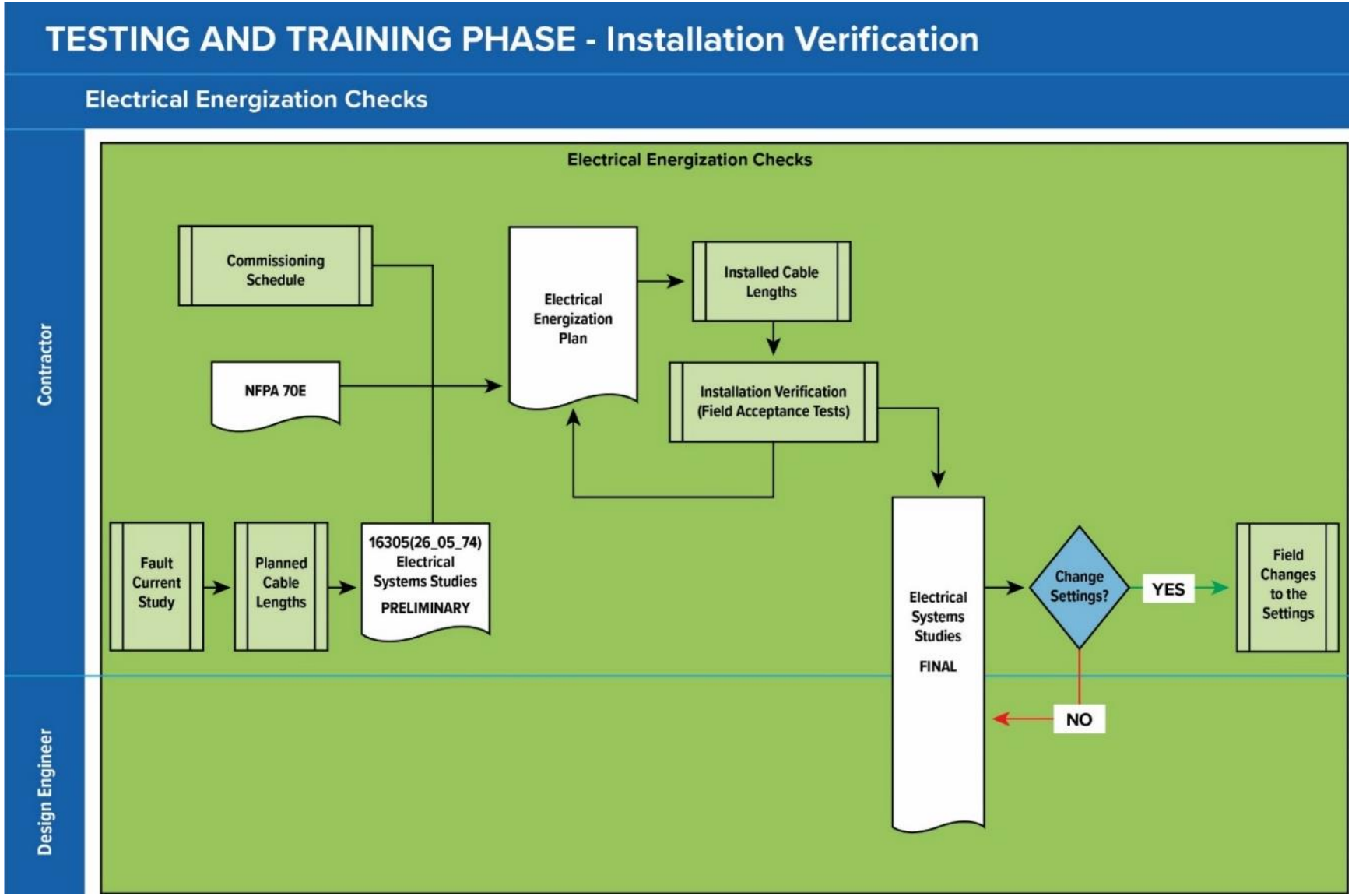
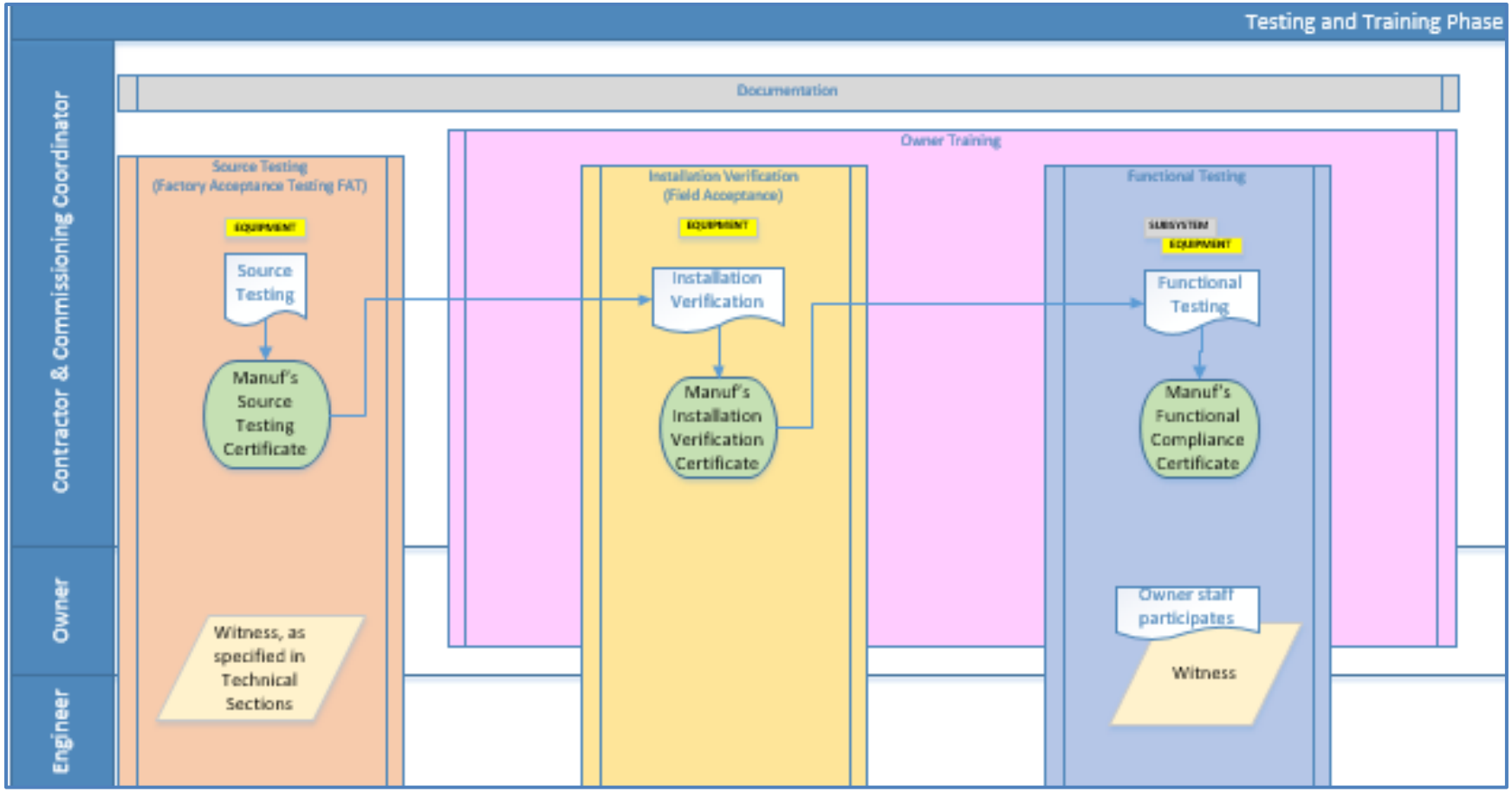
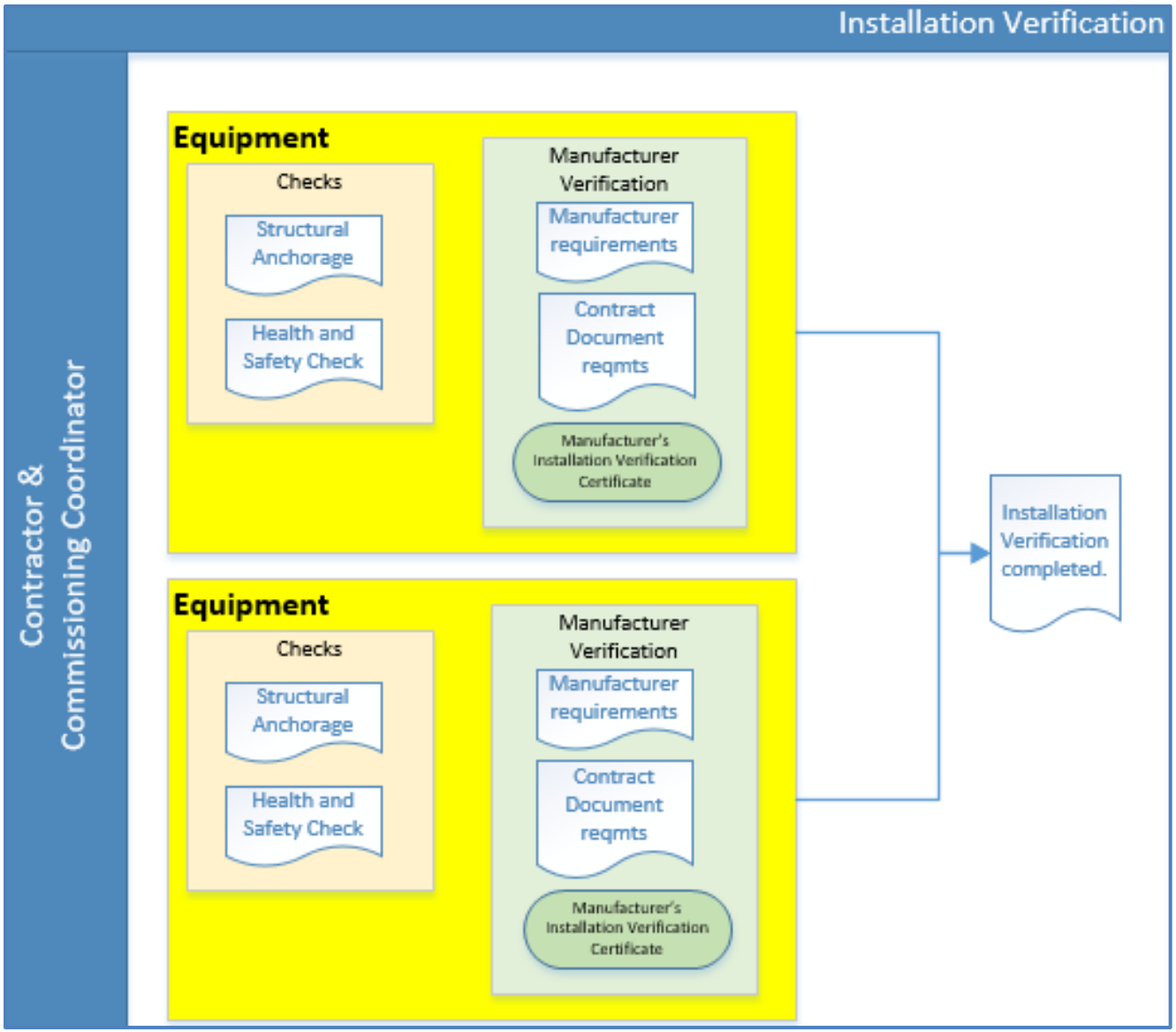
COMPONENT
COMPONENT
DEVICE
DEVICE
PLANT
SYSTEM
SYSTEM
SYSTEM
Planning Phase
Testing and Training Phase
Start-Up Phase

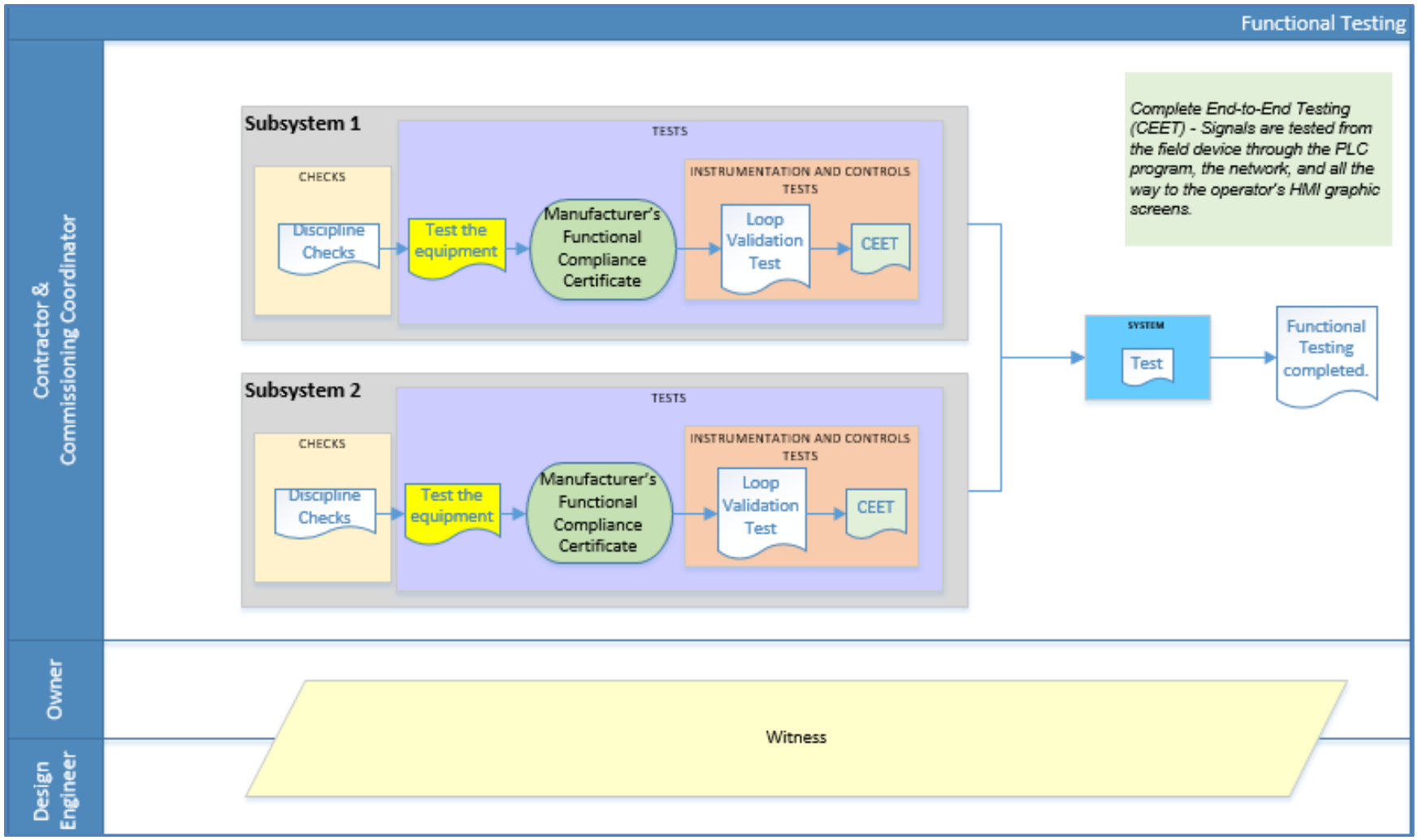

Commissioning
Planning Phase
Contractor & Commissioning Coordinator
Draft Test Plans
Owner
Review and approve
Design Engineer

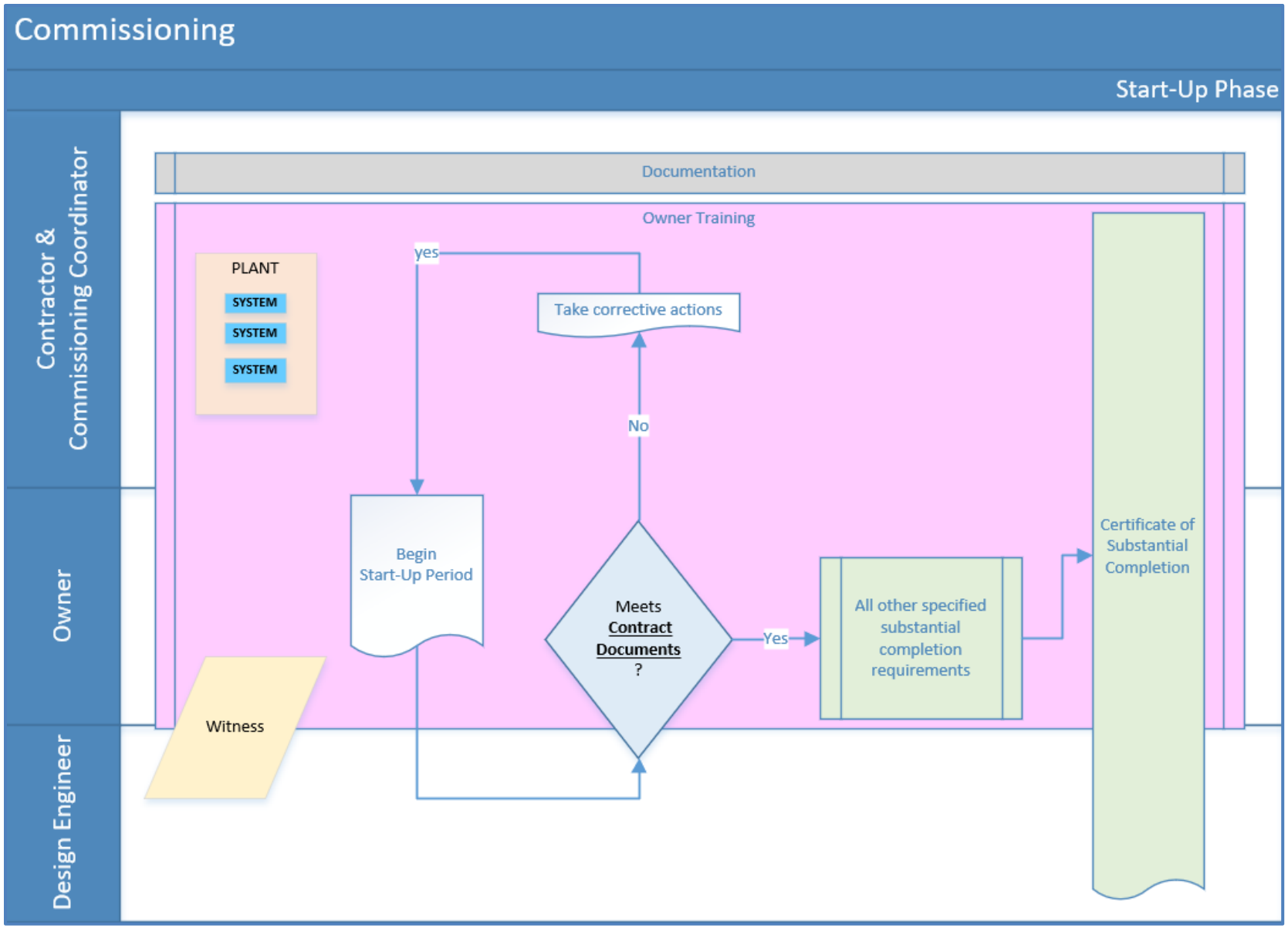

TESTING AND TRAINING PHASE
Installation Verification
Contractor & Commissioning Coordinator
Equipment
Checks
Structural Anchorage Check
Electrical Engerization Check
Health & Safety Check
Manufacturer Verification
Manufacturer Requirements
Contract Document Requirements
Manufacturer's Installation Verification Certificate
Equipment
Checks
Structural Anchorage Check
Electrical Engerization Check
Health & Safety Check
Manufacturer Verification
Manufacturer Requirements
Contract Document Requirements
Manufacturer's Installation Verification Certificate
Installation Verification Completed


TESTING AND TRAINING PHASE - Installation Verification
Electrical Energization Checks
Contractor
Design Engineer
Electrical Energization Checks
Commissioning Schedule
NFPA 70E
Electrical Energization Plan
Installed Cable Lengths
Installation Verification (Field Acceptance Tests)
Fault Current Study
Planned Cable Lengths
16305(26_05_74) Electrical Systems Studies PRELIMINARY
Electrical Systems Studies FINAL
Change Settings?
YES
NO
Field Changes to the Settings


Testing and Training Phase
Contractor & Commissioning Coordinator
Owner
Engineer
Documentation
Owner Training
Source Testing
(Factory Acceptance Testing FAT)
EQUIPMENT
Source Testing
Manuf's Source Testing Certificate
Witness, as specified in Technical Sections
Installation Verification
(Field Acceptance)
EQUIPMENT
Installation Verification
Manuf's Installation Verification Certificate
Functional Testing
SUBSYSTEM
EQUIPMENT
Functional Testing
Manuf's Functional Compliance Certificate
Owner staff participates
Witness


Installation Verification
Contractor & Commissioning Coordinator
Equipment
Checks
Structural Anchorage
Health and Safety Check
Manufacturer Verification
Manufacturer requirements
Contract Document reqmts
Manufacturer's Installation Verification Certificate
Equipment
Checks
Structural Anchorage
Health and Safety Check
Manufacturer Verification
Manufacturer requirements
Contract Document reqmts
Manufacturer's Installation Verification Certificate
Installation Verification completed.


Functional Testing
Contractor & Commissioning Coordinator
Owner
Design Engineer
Subsystem 1
TESTS
CHECKS
Discipline Checks
Test the equipment
Manufacturer's Functional Compliance Certificate
INSTRUMENTATION AND CONTROLS TESTS
Loop Validation Test
CEET
Subsystem 2
TESTS
CHECKS
Discipline Checks
Test the equipment
Manufacturer's Functional Compliance Certificate
INSTRUMENTATION AND CONTROLS TESTS
Loop Validation Test
CEET
Complete End-to-End Testing (CEET) - Signals are tested from the field device through the PLC program, the network, and all the way to the operator's HMI graphic screens.
SYSTEM
Test
Functional Testing completed.
Witness


Commissioning
Start-Up Phase
Contractor & Commissioning Coordinator
Owner
Design Engineer
Documentation
Owner Training
PLANT
SYSTEM
SYSTEM
SYSTEM
yes
Take corrective actions
No
Begin Start-Up Period
Meets Contract Documents ?
Yes
All other specified substantial completion requirements
Certificate of Substantial Completion
Witness

ATTACHMENT B - MANUFACTURER'S CERTIFICATE OF INSTALLATION VERIFICATION

MANUFACTURER'S CERTIFICATE OF INSTALLATION VERIFICATION

OWNER _____ EQPT/SYSTEM _____

PROJECT NAME _____ EQPT TAG NO. _____

PROJECT NO. _____ EQPT SERIAL NO. _____

SPECIFICATION NO. _____

SPECIFICATION TITLE _____

I hereby certify the installation of the above-referenced equipment/system as defined in the Contract Documents.

NOTES:

1. Attach written certification report prepared by and signed by the electrical and/or instrumentation subcontractor.

Comments: _____

_____

I, the undersigned manufacturer's representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate this equipment/system, and (iii) authorized to make recommendations required to ensure that the equipment/system furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____

Manufacturer: _____

Manufacturer's Authorized Representative Name *(print)*: _____

By Manufacturer's Authorized Representative: _____

(Authorized Signature)

ATTACHMENT C - MANUFACTURER'S CERTIFICATE OF FUNCTIONAL COMPLIANCE

MANUFACTURER'S CERTIFICATE OF FUNCTIONAL COMPLIANCE

OWNER _____ EQPT/SYSTEM _____

PROJECT NAME _____ EQPT TAG NO. _____

PROJECT NO. _____ EQPT SERIAL NO. _____

SPECIFICATION NO. _____

SPECIFICATION TITLE _____

I hereby certify the Functional Testing of the above-referenced equipment/system as defined in the Contract Documents.

NOTES:

1. Attach test results with collected data and test report.
2. Attach written certification report prepared by and signed by the electrical and/or instrumentation subcontractor.

Comments: _____

_____

I, the undersigned manufacturer's representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate this equipment/system, and (iii) authorized to make recommendations required to ensure that the equipment/system furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____

Manufacturer: _____

Manufacturer's Authorized Representative Name *(print)*: _____

By Manufacturer's Authorized Representative: _____

(Authorized Signature)

WITNESSES:

By Owner's Authorized Representative: _____

(Authorized Signature)

By Engineer's Authorized Representative: _____

(Authorized Signature)

ATTACHMENT D - TRAINING EVALUATION FORM

TRAINING EVALUATION FORM

EQUIPMENT/SYSTEM ITEM: _____

VENDOR/MANUFACTURER: _____

DATE: _____ NAME OF REPRESENTATIVE: _____

1.	Was representative prepared?	Acceptable	Unacceptable	or	N/A
2.	Was an overview description presented?	Acceptable	Unacceptable	or	N/A
3.	Were specific details presented for system components?	Acceptable	Unacceptable	or	N/A
4.	Were alarm and shutdown conditions clearly presented?	Acceptable	Unacceptable	or	N/A
5.	Were step-by-step procedures for starting, stopping, and troubleshooting presented?	Acceptable	Unacceptable	or	N/A
6.	Were routine/preventative maintenance items clearly identified?	Acceptable	Unacceptable	or	N/A
7.	Was the lubrication schedule (if any) discussed?	Acceptable	Unacceptable	or	N/A
8.	Was the representative able to answer all questions?	Acceptable	Unacceptable	or	N/A
9.	Did the representative agree to research and answer unanswered questions?	Acceptable	Unacceptable	or	N/A

10. Comments: _____

_____

_____

_____

11. Overall Rating Satisfactory Unsatisfactory

Note:

Sessions judged “Unsatisfactory” by a majority of attendees shall be revised and conducted again until a satisfactory rating is achieved.

ATTACHMENT E - COMMISSIONING ROLES AND RESPONSIBILITIES MATRIX

COMMISSIONING ROLES AND RESPONSIBILITIES MATRIX

NO.	TASK	OWNER	CONTRACTOR	ENGINEER
Testing and Training Phase				
Installation Verification				
	Structural Anchorage Check	Witness	Lead	Review
	Health and Safety Check	Witness	Lead	Review
	Manufacturer Requirements Verification	No Action	Lead	Review
	Contract Documents Verification	No Action	Lead	Review
	Manufacturer's Certificate of Installation Verification	No Action	Lead	Review
Functional Testing				
	Checks	Witness	Lead	Witness, Review
	Tests	Witness	Lead	Witness, Review
	Manufacturer's Certificate of Functional Compliance	No Action	Lead	Witness, Review
System Testing				
	System Testing	Witness	Lead	Witness, Review
Start-Up Phase				
	Start-Up	Lead	Support	Witness, Review

Legend:

Lead: Primarily responsible for organization, coordination, and execution of task work product or result.
Support: Assist the lead with organization, coordination, and execution of task work product or result.
Witness: Observe and document completion of task work product or result.
No Action: Limited or no involvement.
Review: Approve for compliance with Contract Documents or reject.

ATTACHMENT F - FUNCTIONAL TESTING REQUIREMENTS

FUNCTIONAL TESTING REQUIREMENTS

System	Subsystem	Consecutive Day Test Duration (Days)	Significant Interruption Duration (Hours)	Test Liquid	System Operated By
Standby Generator System		1	4	N/A	Contractor
	Switchgear				
	Engine Generators				
Odor Scrubber (upon relocation)		1	4	N/A	Contractor
Submersible Pumps (after right-angle decoupling)		1	4	N/A	Contractor
Triple Switch		1	4	N/A	Contractor
Automatic Transfer Switch		1	4	N/A	Contractor[AD1]

A. Schedule delays:
   1. Changes in the dates for Source Testing less than 25 days of the date provided in the latest approved Commissioning Schedule are considered delays.
   2. Contractor is responsible for associated costs resulting from delays:
      a. In person and/or virtual witnessing.
      b. Travel costs and witness labor costs.
         1) Witness labor costs at $250 per hour.

B. Repeat test costs:
   1. Contractor is responsible for associated costs for repeat testing:
      a. In person and/or virtual witnessing.
      b. Travel costs and witness labor costs.
         1) Witness labor costs at $250 per hour.

[AD1] Addendum No. 1

SECTION 15814

FIBERGLASS REINFORCED PLASTIC DUCTWORK

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Fiberglass reinforced plastic (FRP) ductwork system.
      a. Ducts and fittings.
      b. Expansion joints.
      c. Supports.

1.02 REFERENCES

A. American Society of Mechanical Engineers (ASME):
   1. RTP-1 - Reinforced Thermoset Plastic Corrosion-Resistant Equipment.

B. American Water Works Association (AWWA):
   1. M45 - Fiberglass Pipe Design.

C. ASTM International (ASTM):
   1. C582 - Standard Specification for Contact-Molded Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion-Resistant Equipment.
   2. D792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
   3. D2105 - Standard Test Method for Longitudinal Tensile Properties of Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Tube.
   4. D2344 - Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates.
   5. D2412 - Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
   6. D2992 - Standard Practice for Obtaining Hydrostatic or Pressure Design Basis for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Fittings.
   7. D2996 - Standard Specification for Filament-Wound “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
   8. D3982 - Standard Specification for Contact Molded “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Ducts.
   9. E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. National Fire Protection Association (NFPA):
   1. 91 - Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids.

E. National Institute of Standards and Technology (NIST):
   1. PS 15 - Custom Contact-Molded Reinforced-Polyester Chemical Resistant Process Equipment.

F. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).

1.03 DELEGATED DESIGN

A. Calculations.

1.04 SUBMITTALS

A. As specified in Section 01300 – Contractor Submittals.

B. Shop Drawings:
   1. Scaled ductwork layout.
      a. Size, joint types, horizontal dimensions, and elevations.
      b. Support locations.
      c. External stiffeners and expansion joints locations.
   2. Fabrication details.
   3. Support, expansion joints, and external stiffeners.
      a. Materials and configuration.

C. Calculations:
   1. Wall thickness calculations based upon design criteria.
   ~~2.~~ Stresses and reaction loads at supports.
   ~~D.~~2. ~~Direct burial procedure and details.~~ AD1

~~E.~~D. Delegated Design Submittals:
   1. Design calculations for FRP ductwork design and construction.

~~F.~~E. Manufacturer's installation instructions.
   1. Detailed instructions for field butt joints, including lay-up sequence, width of each reinforcement layer, and total number of layers.

~~G.~~F. Quality Control Submittals:
   1. Quality control programs.
   2. Verification that the manufacturer has been engaged in fabrication of similar fiberglass reinforced plastic equipment for a minimum of 5 years.
   3. Test reports and certification of compliance with physical property requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 01601 - Product Requirements, and the manufacturer's instructions.

B. No ductwork or components shall be shipped prior to complete resin cure.

1.06 QUALITY ASSURANCE

A. Manufacturer qualifications: Fiberglass reinforced plastic manufacturer with experienced personnel, physical facilities, and management capacity sufficient to produce custom-made glass fiber and resin products of quality and size specified for a minimum of 5 years with satisfactory performance record.

B. Quality assurance plan: Fabricator shall be responsible for implementation of a comprehensive quality assurance plan. Quality assurance plan describes procedures with the following minimum requirements:
   1. Fabricator shall designate personnel to inspect equipment while in process and after completion to ensure compliance to every aspect of the Section and fabrication drawings.
      a. Inspection shall include, as a minimum, checks for visual defects, laminate thickness and sequence, glass content, Barcol hardness, dimensional tolerances, adherence to construction details, surface preparation, and environmental conditions.
      b. Fabricator's inspector shall complete a report of the findings, including method of measurement for each separate assembly.
   2. Prior to use of resins in fabrication, fabricator shall extract samples of resins and retain them for use by the Engineer. Sample size shall be 100 cubic centimeters minimum:
      a. Take 1 sample for each manufacturer's batch number if resin is received in the form it will be used.
      b. If the fabricator alters the resin after receipt, such as through the addition of styrene, promoters, or other additives, take samples from each drum or portion thereof mixed with additives.
      c. Fabricator shall provide documentation for each sample, including resin type, manufacturer, batch and lot number, drum number, complete listing of additives with amounts added, and description and manufacturer of each additive.
   3. Fabricator shall inspect glass reinforcement prior to use in fabrication.
      a. Do not use glass that does not meet the manufacturer's acceptance standards.
      b. Do not use glass material that is wet or has been wet.

c. For each type of glass and lot number used, fabricator shall record the manufacturer, product description, binder type, product code, production date, and lot number.
d. For mat, woven roving, unidirectional roving, and cloth, also include in records actual measured weight per square yard of material.

4. Fabricator shall retain nozzle cutouts and other excess laminate, clearly marking each piece to identify its original location. These laminate samples become the property of the Owner.
5. For areas where valid laminate samples are not available, take sample plugs at the Engineer's request.
   a. Repair subsequent holes in a manner acceptable to the Engineer.
6. Fabricator shall verify glass content on available samples in accordance with ASTM D2584. Complete this test and submit the results complete for each major component where samples are available.
7. Prior to final shipment of the equipment, fabricator shall submit to the Engineer a complete quality control report, consisting of copies of records maintained for compliance with this Section.

1.07 WARRANTY

A. As specified in Section 01783 - Warranties and Bonds.

PART 2 PRODUCTS

2.01 GENERAL

A. As specified in Section 01601 - Product Requirements.

2.02 MANUFACTURERS

A. One of the following or equal:
   1. Daniel Mechanical.
   2. Engineered Composite Systems.
   3. NOV Fiber Glass Systems.
   4. Perry Fiberglass Products, Inc.

2.03 DESIGN AND PERFORMANCE CRITERIA

A. Ducting for odor control systems:
   1. Minimum internal pressure: 20.0 inches water gauge.
   2. Minimum internal vacuum: 20.0 inches water gauge.

B. Support spacing: As needed to comply with wall thicknesses calculations but not greater than the following:
   1. Contact-molded ductwork: Not greater than 5 foot centers.

2. Filament-wound ducts: In accordance with SMACNA standards below:

Duct Inside Diameter (Inches)	Maximum Span (Feet)
3 to 19	10
20 to 29	15
30 to 35	20

~~C. Buried duct: Design ductwork for H-20 loading in accordance with AWWA M45.~~
~~1. Duct pressure and vacuum conditions listed in this Section.~~
~~2. Shall not deflect more than 5 percent in the installed condition and under loads.~~[AD1]

~~D.~~C. Minimum flooding: Design ductwork for water accumulation as follows:
1. Round: 2 inches deep across bottom of duct.

~~E.~~D. Physical and mechanical properties: Duct shall meet the following standards:

Pipe Property	Standard	Design Properties	
		Hoop (psi)	Axial (psi)
Ultimate Flexural Stress Flexural Modulus	ASTM D2412	50,000 3.05×10^6	18,000 1.0×10^6
Ultimate Tensile Stress Tensile Modulus	ASTM D2105	52,000 1.5×10^6	7,485 1.56×10^6
Ultimate Shear Strength		Approximate Typical Values (psi)	
Interlaminar Cross	ASTM D2344	2,130 to 2,730 15,000	
Density	ASTM D792	0.065 to 0.072 lb./In^3	

~~F.~~E. Design tensile stress:
1. Calculations for design of wall thickness assume a laminate ultimate tensile stress of 9,000 pounds per square inch maximum.
2. Decrease ultimate tensile stress as appropriate to the laminate design.
   a. Round ducting: Maximum allowable design tensile stress shall be the ultimate tensile stress divided by 5.
   b. Rectangular ducting: Maximum allowable design tensile stress shall be the ultimate tensile stress divided by 10.

2.04 DUCTWORK MATERIALS

A. Minimum corrosion liner:
1. Interior surfacing “C” or Nexus veil as specified for the service environment.
2. Exterior surfacing: “C” or “A” veil.

3. Remainder 1-1/2 ounce per square foot mat to total minimum thickness of 0.096 inches on surface exposed to the service environment.
4. Duct shall be resistant to the following in accordance with ASTM C582:

Sulfuric Acid	75 percent	At 100 degrees Fahrenheit
Nitric Acid	20 percent	At 100 degrees Fahrenheit
Sodium Hydroxide	50 percent	At 100 degrees Fahrenheit
Hydrofluoric Acid	20 percent	At 100 degrees Fahrenheit

B. Ultraviolet stabilizer:
   1. Exposed external surfaces of FRP ductwork installed outdoors shall be provided with protection against ultraviolet degradation and weather erosion.
   2. Duct shall carry the flame spread rating of 25 or less in accordance with ASTM E84.
   3. External duct protection shall be provided by an ultraviolet stabilizer added to the final coat or resin that also incorporates paraffin wax curing elements and color pigment.
   4. An alternative system to polyurethane paint with color pigments may be used if approved by the Owner' designated representative.

C. Resin:
   1. External surface and structural layers of FRP ductwork shall carry a flame spread rating of 25 or less in accordance with ASTM E84.
   2. Premium vinyl ester as follows unless otherwise recommended by the resin manufacturer for the service environment:
      a. For structural layers: With sufficient antimony trioxide or pentoxide for Class I fire rating.
      b. Manufacturers: One of the following or equal:
         1) Ashland, Hetron 992FR.
         2) Reichhold Dion, VER 9300FR.

D. Color: Add pigment to the exterior surface resin coat such that the color of the duct will be similar to paint used for equipment, except that ducting for air conditioning systems which are concealed above suspended ceilings need not be pigmented.
   1. Color selected by the Owner.

E. Provide fasteners, field joints, expansion joints, and supports required for complete installation of a duct system.

F. Flanges:
   1. FRP flanges shall be made of the same materials as the FRP ductwork.

2. Flange bolt hole pattern as well as flange dimensions, shall be in accordance with ASTM D3982, except for thickness. Thickness of flange shall be a minimum of 3/4 inch.
3. Manufactured using the hand lay-up technique and shall be integral to the duct in accordance with ASME RTP-1. Filament-wound and/or random chopped methods of constructing flanges will not be acceptable.

2.05 DUCTWORK FABRICATION

A. Hand lay-up or filament wound construction.
   1. Provide wall thickness necessary to comply with design criteria but not less than the following minimum thicknesses.
   2. Structural wall thicknesses shall not include the thickness of the interior corrosion barrier, inner surface, and interior layer:

Duct Size	Round Ducting (Wall Thickness, Inches)	Rectangular Ducting (Wall Thickness, Inches)	Buried Ducting (Wall Thickness, Inches)
18 inch and smaller	0.1875	0.25	0.34
20 to 36 inch	0.25	0.375	0.42
42 to 54 inch	0.375	0.500	0.60
60 to 72 inch	0.438	0.625	0.625

B. Fittings:
   1. Type: Hand lay-up contact molded.
   2. Resin: Identical to and with same strength as resin used for FRP ductwork.
   3. Wall thickness: At least equal to the thickness of the thickest adjacent ducting.
   4. Internal diameter: Equal to the adjacent duct.
   5. Tolerance:
      a. Angles for fittings shall be within:
         1) 1 degree for up to 30-inch diameter duct.
         2) 1/2 degree for over 30-inch diameter and above duct.
   6. Round standard elbows:
      a. Centerline radius shall be equal to 1-1/2 times the diameter unless otherwise indicated on the Drawings.
      b. Up to 24-inch diameter: Smooth radius elbows.
      c. 26-inch diameter and greater: May be mitered sections as follows:
         1) 0- to 44-degree elbows: 1 mitered joint and 2 sections.
         2) 45- to 80-degree elbows: Minimum of 2 mitered joints and 3 sections.
         3) Elbows greater than 80 degrees: Minimum of 4 mitered joints and 5 sections.

d. Provide turning vanes in round mitered elbows.
1) FRP construction, solid or double wall construction with an airfoil-shaped profile.

7. Rectangular elbows:
a. Fittings shall be factory manufactured to meet the specified design criteria and in accordance with approved Submittals. Factory install reinforcing ribs as required to meet the specified deflection requirements and to provide a system free from pulsing, warpage, sagging, and undue vibration.
b. Provide turning vanes in rectangular elbows.
1) FRP construction, solid or double wall construction with an airfoil-shaped profile.

C. Joints:
1. Flanged:
a. In accordance with ASTM D3982.
b. Bolt hole patterns in accordance with ASTM D3982.
c. Flanged joints shall be provided at the following locations:
1) At each damper and each item of equipment to facilitate disassembly.
2) At each change in material.
3) Where indicated on the Drawings.
d. Gaskets for flanged joints: 1/8-inch neoprene over full flange face.
e. Bolt nuts and washers: Type 316 stainless steel.
2. Butt and strap welded:
a. Field joints shall be provided at the following locations:
1) 12 inches from any increasing or decreasing cross section of pipe.
2) Pipe to be joined has the same diameter.
b. Thickness of joint overlays:
1) At least equal to the thickness of the thickest adjacent duct.
c. Field weld kits:
1) Necessary fiberglass and reinforcing material shall be supplied pre-cut and individually packaged for each joint.
2) Bulk glass rolls will not be acceptable.

2.06 EXPANSION JOINTS

A. Provided as indicated on the Drawings. When not shown, they shall be provided at all duct to rotating equipment and in above grade duct at maximum spacing of 40-foot centers.

B. Construction:
1. Body: EPDM vulcanized rubber.
2. Reinforcing: Multiple layers (2 minimum) of impregnated polyester or Kevlar tire cord fabric, 1/4 inch thick.

3. Flange rings: 3/8-inch thick by 2-inch wide Type 316 stainless steel or minimum 3/4-inch thick FRP pre-drilled retaining rings/back-up bars to clamp the expansion joints into the ducting system.
4. Hardware/Fasteners: Type 316 stainless steel.
5. Minimum pressure rating: 1 pound per square inch.
6. Minimum vacuum rating: 1 pound per square inch.
7. Minimum operating temperature: 175 degrees Fahrenheit.
8. Connections: Flanged in accordance with ASTM D3982.
9. Seamless construction built as on continuous piece. Wrapped, seamed, or spliced type expansion joints are not acceptable.
10. Provide Type 316 stainless steel control rods.

C. Minimum movement:
1. Axial compression: 2.25 inches.
2. Axial extension: 1.25 inches.
3. Lateral offset: 1 inch.

D. Manufacturers: One of the following or equal:
1. Daniel Co., DanFLEX Model 101.
2. Mercer Rubber Co., Model ME for Rectangular, Model MI-9 for Round.

2.07 DUCT SUPPORTS

A. Provide duct supports as indicated on the Drawings.

B. Protect the duct from clamping force of strap hangers with a 1/8-inch thick layer of neoprene pad.

C. When anchors are required, they shall be externally bonded to the duct. Drive screws or other penetrations of the duct linter are not permitted.

D. When not indicated on the Drawings, provide supports and seismic bracing in accordance with the SMACNA design manual.

PART 3 EXECUTION

3.01 GENERAL

A. As specified in Section 01601 - Product Requirements.

3.02 INSTALLATION

A. Ductwork shall be fabricated and erected where indicated on the Drawings or as specified in this Section.
1. Rigidly supported and secured in an approved manner.

B. Bracing and vibration isolators shall be installed, where necessary, to eliminate vibration, rattle and noise.
   1. Hangers shall be installed plumb and securely suspended from supplementary steel or inserts in concrete slabs.
   2. Lower ends of hanger rods shall be sufficiently threaded to allow for adequate vertical adjustment.
   3. Building siding and metal decking shall not be used to hang ductwork.

C. Contractor shall not install any equipment or materials until the Owner's designated representative has approved all Submittals. If any equipment or materials are installed prior to approval of the Submittals, it shall be at the Contractor's risk.

D. Wherever ducts are divided, the cross-sectional area shall be maintained. All such changes must be approved and installed as directed by the Owner's designated representative or as approved on Shop Drawings or erection drawings.

E. Do not remove or alter factory installed duct reinforcing ribs, except as required to accommodate duct alterations due to unexpected field conditions.
   1. Notify the Owner's designated representative prior to starting any field modifications involving ductwork structural reinforcing members.
   2. Submit additional design calculations to demonstrate structural design integrity of ductwork and fittings requiring reinforcing modifications in the field.

~~F. Direct buried duct:~~
   ~~1. Grade trench so it will be 1.5 times wider than the diameter of the duct.~~
   ~~2. Fill bottom of trench with a minimum of 6 inches of back fill (sand or pea gravel).~~
   ~~3. Slope trench with a 1/8 inch per foot pitch back to the start of the system.~~
   ~~4. Backfill in 6 inches lift increments compacting 80 to 90 percent.~~
   ~~5. A minimum of 4 inches of backfill overtop the duct system is required.~~
   ~~6. Follow the manufacturer's burial procedures.~~ AD1

~~G.~~F. Cover ductwork openings with tape, plastic, or sheet metal to reduce the amount of dust or debris which may collect in the system at each of the following times:
   1. At the time of rough installation.
   2. During storage on the construction site.
   3. Until final start-up of the heating and cooling equipment.

~~H.~~G. Before installation remove dust and debris from ducts.

~~I.~~H. Install products in accordance with Shop Drawings and the manufacturer's instructions. Drawings indicate general routing only and shall be modified as necessary.

END OF SECTION

[AD1] Addendum No. 1

Electrical Replacement Phase 2 - Suisun Pump Station
Mandatory Pre-Bid Meeting
Sign-In Sheet

Date: April 30, 2026 Time: 10:00 A.M.

Name	Company	Phone	Email Address	
Richard White	R&D Electric	916 550 0075	estimating@rdelectric.net	RW
Steve Abusia	Auburn Const	916-997-3353	sabusia@auburnconstructors.com	
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Sheet ___ of ___