South Valley
WATER RECLAMATION FACILITY

SOUTH VALLEY WATER RECLAMATION FACILITY
WEST JORDAN, UTAH

PROJECT 5

PROJECT NO. 10548A10

ADDENDUM NO. 5
TO THE
CONTRACT DOCUMENTS

MAY 16, 2019

Digitally signed by Brad D. Jeppson
Contact Info: Carollo Engineers, Inc.
Date: 2019.05.16 17:00:28 -06'00'

REGISTERED PROFESSIONAL ENGINEER
No. 4775621-2202
BRAD D. JEPPSON
STATE OF UTAH

carollo®

7090 SOUTH UNION PARK AVENUE, SUITE 600 • MIDVALE, UTAH 84047 • P. 801.233.2500 • F. 801.233.2501

Bidders on the above named project are hereby notified that the Bidding Documents are modified as indicated below. Bidders are required to acknowledge receipt of this Addendum in the space provided on the Document 00300 - Bid Form.

This Addendum shall become part of the Contract and provisions of the Contract apply.

SPECIFICATIONS

The following sections are modified as indicated below.

1. SECTION 00436 - EQUIPMENT MANUFACTURERS
   a. Table 1: Delete the following row:

11312P	Axial Wall Pumps	

2. SECTION 09968 - CONCRETE REPAIR AND COATING
   a. Paragraph 1.04 A: Replace paragraph with the following: “This specification is provided in the event repair of existing concrete structures is identified as necessary by Engineer. Unless specifically called out on the drawings or specifications as required, this work, if deemed necessary during construction, will be added as a change order.”
   b. Paragraph 1.04 A.1: Delete this sentence in its entirety.
   c. Paragraph 1.05 A: Replace paragraph with the following: “General sequence of work shall be as follows:”
   d. Paragraph 1.05 B: Delete ”in Wet Well A, Wet Well B, Wet Well Inlet Box, and Junction Box No. 4.”
3. SECTION 11312C - HORIZONTAL RECESS IMPELLER CENTRIFUGAL PUMPS
   a. Paragraph 1.04 C.3: change “direct drive” to “belt drive.”
   b. Paragraph 2.11 Belt Drives - Add the following after item B:
      1) “C. The belt drive system shall be designed to allow a speed change by means of an adjustment to the motor sheave when the drive is not in operation.”
   c. Paragraph 3.03 Pump Schedule:
      1) Change Coupling Type from “Direct Drive” to “V-Belt Drive.”
      2) Change Drive Arrangement from “Direct Drive” to “Belt Drive.”
      3) Change Minimum Driver Horsepower to 15.
4. SECTION 15115 - GATE VALVES
   a. Paragraph 2.01 A.1: Add to list of manufacturers “4) Orbinox Series 10.”
   b. Paragraph 2.01 A.2.b: Change as follows: “Suitable for submerged conditions with service under pressures equal to and less than ~~150~~ 30 pounds per square inch gauge.”
5. SECTION 15116 - PLUG VALVES
   a. Paragraph 2.02 C: Remove “Exposed Valve -.”
   b. Remove paragraph 2.02 E in its entirety.

6. SECTION 15247 - POLYVINVYL CHLORIDE (PVC) PIPE (GRAVITY)
   a. Add this Section in its entirety.
7. SECTION 16990 - CONDUIT SCHEDULE
   a. Make changes to conduit numbers P-21-110, P-21-111, P-21-120, P-21-121, P-21-130, P-21-131, P-21-140, P-21-141, P-21-150, P-21-151, P-21-160, and P-21-161 as shown in the attached edits.
8. SECTION 17401 - PRESSURE/VACUUM MEASUREMENT: DIAPHRAGM AND ANNULAR SEALS
   a. 2.01.A.: Add the following item 3:
      "3. For grit applications only: One of the following or equal:
         Ashcroft:
            1) In-line quick connect: Type 320."
9. SECTION 17735 - CONTROL SYSTEMS: FIELDBUS EQUIPMENT AND DEVICES
   a. 2.06.A.1: Add the following item c:
      "c. Conduit adapter:
         (1) Manufacturers: The following or equal:
            (a) Turck Inc., Interlink BCA-48 Series.
         (2) Operating voltage: 40 V.
         (3) Operating current: 4 A.
         (4) Material:
            (a) Housing: Nylon 66 - 33 percent glass filled.
            (b) Receptacle housing: Stainless steel.
            (c) Contact: Gold-plated brass.
         (5) Ambient temperature: -40 to 158 degrees Fahrenheit."

DRAWINGS

The following drawings are modified as indicated below.

1. DRAWING G-10
   a. Piping Schedule:
      1) Change referenced Pipe Specification Section for the following pipes:
         Vent (V) piping from "15244" to "15245."
         Vent To Roof (VTR) piping from "15244" to "15245."
         All piping referencing PVC SDR 35 from "15244" to "15247."
            (1) Applies to buried drains (D) 4" and larger, buried process drains (PD) 4" and larger, and buried sanitary sewer (SS) 4" and larger.
         Process Drain (PD) SCH 80 PVC piping from "15244" to "15245."
      2) Change Joints/Fitting abbreviations for the following pipes:
         Process Drain (PD) SCH 80 PVC from "B&SP" to "SW/FL/B&SP."

2. DRAWING GA-01
    a. Abbreviation List - Add abbreviation “NSC” with description “NON-SKID FLOOR COATING PER SPECIFICATION 09960.”
    b. Room Finish Schedule:
        1) Change the ceiling finish from “COATED” to “EXPO” for the following rooms in the Grit Building:

            Room No. 102 - Electrical Room.

            Room No. 103 - Grit Pump Room.

            Room No. 201 - HVAC Room.

            Room No. 202 - Grit Washing Room.
        2) Change the floor finish from “SEALER” to “SEALER WITH NSC” for the following rooms in the Grit Building:

            Room No. 103 - Grit Pump Room.

            Room No. 201 - HVAC Room.

            Room No. 202 - Grit Washing Room.
3. DRAWING GE-OL-21-2
    a. Change the HP of PMP-21.250 and PMP-21.260 to 15 HP and make changes to conductors, starters, and MCP rating as shown in attached Drawing GE-OL-21-2 to accommodate HP change.
4. DRAWING GE-OL-21-3
    a. Change the HP of PMP-21.210, PMP-21.220, PMP 21.230, and PMP-21.240 to 15 HP and make changes to conductors, starters, and MCP rating as shown in attached Drawing GE-OL-21-3 to accommodate HP change.
5. DRAWING GI-11 (INSTRUMENTATION TYPICAL DETAILS)
    a. Replace current Drawing GI-11 with updated attached Drawing GI-11.
6. DRAWING PI21-04
    a. Revise typical detail callout from NP503 to NP901 for the following instruments:
        1) PI-21.218.
        2) PI-22.228.
7. DRAWING PI21-05
    a. Revise typical detail callout from NP503 to NP901 for the following instruments:
        1) PI-21.238.
        2) PI-22.248.
8. DRAWING PI21-06
    a. Revise typical detail callout from NP503 to NP901 for the following instruments:
        1) PI-21.258.
        2) PI-22.268.

9. DRAWING PI21-10
    a. Show block and bleed ball valve and revise typical detail callout from NP503 to NP502 for the following instruments.
        1) PIT-21.511.
        2) PIT-21.512.
        3) PIT-21.513.
        4) PIT-21.514.
        5) PIT-21.515.
10. DRAWING PI21-11
    a. Show block and bleed ball valve and revise typical detail callout from NP503 to NP502 for the following instruments.
        1) PIT-21.521.
        2) PIT-25.522.

ATTACHMENTS

- Construction Permit from Utah Division of Water Quality (DWQ) for SWPPP and final inspection requirements.
- Specification Section 15247 - Polyvinyl Chloride PVC) Pipe (Gravity)
- Selected pages from Conduit Schedule Area 21 (Specification 16990 - Conduit Schedule)
- Drawing GE-OL-21-2
- Drawing GE-OL-21-3
- Drawing GI-11

State of Utah
GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Alan Matheson
Executive Director

DIVISION OF WATER QUALITY
Erica Brown Gaddis, PhD
Director

May 13, 2019

Lee Rawlings
General Manager
South Valley Water Reclamation Facility
7495 South 1300 West
West Jordan, Utah 84084

Subject: **Construction Permit**
South Valley Water Reclamation Facility Project 5: Aeration Conversion and Grit Facilities Upgrade

Dear Mr. Rawlings:

We have completed our review of the plans and specifications for the subject project submitted by Carollo Engineering on March 6, 2019 for the subject South Valley Water Reclamation Facility (SVWRF) treatment train upgrade project. The Preliminary Engineering Reports by Carollo for the Phosphorus Removal Project dated February 2018 and the Grit Removal Project dated July 2018 were submitted as additional supporting information.

The South Valley Water Reclamation Facility Project 5 Specifications and Drawings sealed by Brad D. Jeppson, P.E., March 4, 2019, basically comply with R317, Administrative Rules for Water Quality, Utah Administrative Code. A **Construction Permit,** as constituted by this letter, is hereby issued for the project subject to the following conditions:

1. Revisions or modifications to the approved plans and specifications must be submitted to the Division of Water Quality (the Division) for review and approval, before construction or implementation thereof.

2. The approved facilities must not be placed in service until the Division has made a final inspection, and has authorized, in writing, to do so.

3. Construction of the project shall conform to the requirements of U.A.C. R317-3 Design Requirements for Wastewater Collection, Treatment, and Disposal Systems. In particular, construction shall conform to all applicable requirements of R317-3-5 Screening and Grit Removal and R317-3-7 Biological Treatment.

4. An operations and maintenance (O&M) manual (amendment) for the aeration basins and grit facility shall be prepared and implemented to insure the system functions properly at all times. The written O&M manual shall describe the aeration basins, grit removal facility systems and subsystems, their normal operations, routine and preventative maintenance requirements and procedures, a troubleshooting guide, training, safety, and recordkeeping requirements. The manual should include all printed equipment manufacturers' installation and operating instructions, warranty information, and appropriate system checklists and maintenance logs needed for proper monitoring and management of the systems. Electronic documentation should be properly referenced in the manual. A list of telephone contacts for emergency and service should also be included. The manual shall be available at the time of final inspection.

5. A Storm Water Permit may be required for this project. Any construction activities that disturb one acre or more are required to obtain coverage under the Utah Pollutant Discharge Elimination System (UPDES) Storm Water General Permit for Construction Activities. The permit requires the development of a storm water pollution prevention plan (SWPPP) to be implemented and updated from the commencement of any soil disturbing activities at the site until final stabilization of the project. For more information contact **Lisa Stevens** of the Division at 801-536-4386, or to obtain permit coverage online, please go to https://deq.utah.gov/legacy/permits/water-quality/utah-pollutant-discharge-elimination-system/storm-water-general-construction.htm.

Issuance of this permit does not relieve you in any way, from your obligations to comply with other applicable local requirements or Division of Drinking Water requirements. You may contact Royal DeLegge Salt Lake County Health Department, at (385) 468-3874 for compliance with any other local requirements.

This construction permit will expire one year after the date of this permit, unless substantial progress is made in constructing the approved facilities or the plans and specifications have been resubmitted and the construction permit is reissued. A new construction permit must be obtained from the Division for any future modification or expansion of these facilities.

SVWRF is converting Basins 2-4 from a Modified Ludzack-Ettinger (MLE) process to an Anaerobic/Anoxic/Oxic (A2O) process. Basin 1 is currently unused and Basin 5 is currently operated using the A2O process so neither of these basins will be modified. The current basins are carousel-style oxidation ditches divided into 13 zones.

Lee Rawlings
South Valley Water Reclamation Facility

The MLE process currently operates with 4 anoxic zones and 9 oxidation zones. The project will convert anoxic zones 1-3 to anaerobic zones with the new anaerobic zone 3 operating as a swing zone, anoxic zone 4 will become anoxic zone 1. The diffusers will be removed from oxic zones 1 and 2 in order to become new anoxic zones 2 and 3. Further, to increase air delivery in the oxic zones and decrease O&M costs ceramic diffusers will be replaced with Sanitaire membrane disk diffusers.

In addition to the Basin redesign project SVWRF is constructing a new grit removal facility. The grit facilities improvements will consist of a new building with new influent pumps, multi-tray vortex grit separators, grit pumps, inverted cone-shaped vortex chamber with screw conveyor grit washers, and a grit storage bin.

A description of the project design criteria is included in Attachment No. 1.

We are retaining one set of the submitted plans for our file, with an imprint of our construction permit stamp and returning one set to you. The stamped set must be kept available for examination and inspections to be conducted by the Division and the Health Department, or for resolution of any conflicts or discrepancies that may arise during construction or installation.

Please advise us of the beginning of construction. This will enable us to schedule periodic inspections. We request that a copy of record drawings be provided after the final inspection has been conducted by the Division, and completed works have been placed in service. This will enable us to keep our information accurate.

If we can be of further assistance, please contact **Ken Hoffman** of my staff at 801-536-4313 or kenhoffman@utah.gov.

Sincerely,

Kim Shelley

Acting Director

EBG/KS/JKM/kmh/ch

Enclosures: South Valley Reclamation Facility Project 5 Volume 4 & 5 March 2019
Contract Documents

cc: Royal DeLegge, Salt Lake County Health Department,
Brad Jeppson, Carollo,
James Dixon, Carollo,
Taigon Worthen, SVWRF
Ken Hoffman, Division of Water Quality
Dan Griffin, Division of Water Quality,

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File: Municipal File, South Valley Water Reclamation Facility

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Attachment 1
Construction Permit Letter

DESIGN CRITERIA – BIOREACTOR NO. 2-4

DESCRIPTION	UNITS	VALUE
GENERAL		
DESIGN FLOWS		
ANNUAL AVERAGE	MGD	48
MAX MONTH FLOW	MGD	50
PEAK HOUR FLOW	MGD	77
INFLUENT CHARACTERISTICS (MAX MONTH)		
BOD	PPD	97,000
TSS	PPD	111,000
NH3	PPD	12,000
TP	PPD	2,300
EFFLUENT CHARACTERISTICS (30-DAY AVG)		
NH3	MG/L	0.13
NO3	MG/L	6.8
TP	MG/L	0.4/0.6
TIN	MG/L	6.9/6.5
BIOREACTORS		
NUMBER OF ZONES / BASIN		
ANAEROBIC	NO.	2
SWING	NO.	1
ANOXIC	NO.	3
AEROBIC	NO.	7
PROCESS CHARACTERICS		
MLSS	MG/L	3,500
VOLATILE SOLIDS CONTENT OF MLSS	%	79
SLUDGE PRODUCTION (MAX MONTH)	LB/DAY	15,800
AEROBIC SLUDGE AGE (SRT)	HRS	9.5
ANAEROBIC ZONE MIXERS		
TYPE	-	FIXED, VERTICAL SHAFT
TOTAL PER BIOREACTOR (NEW/EXISTING)	NO.	0/2
TOTAL (BIOREACTORS 2-4)	NO.	6
MOTOR SIZE	HP	5
MOTOR SPEED, NOMINAL	RPM	1,750
DRIVE TYPE	-	CONSTANT SPEED
IMPELLER SPEED	RPM	28.7

DESIGN CRITERIA – BIOREACTOR NO. 2-4 (CONTINUED)

DESCRIPTION	UNITS	VALUE
TYPE	-	FLOATING
TOTAL PER BIOREACTOR (NEW/EXISTING)	NO.	0/3
TOTAL (BIOREACTORS 2-4)	NO.	9
MOTOR SIZE	HP	5
MOTOR SPEED, NOMINAL	RPM	1,200
DRIVE TYPE	-	CONSTANT SPEED
ANOXIC ZONE MIXERS		
TYPE	-	FLOATING
TOTAL PER BIOREACTOR (NEW/EXISTING)	NO.	2/1
TOTAL (BIOREACTORS 2-4)	NO.	9
MOTOR SIZE	HP	5
MOTOR SPEED, NOMINAL	RPM	1,200
DRIVE TYPE	-	CONSTANT SPEED
TYPE	-	FIXED, VERTICAL SHAFT
TOTAL PER BIOREACTOR (NEW/EXISTING)	NO.	2/0
TOTAL (BIOREACTORS 2-4)	NO.	6
MOTOR SIZE	HP	5
MOTOR SPEED, NOMINAL	RPM	1,750
DRIVE TYPE	-	CONSTANT SPEED
IMPELLER SPEED	RPM	28.7
OXIC ZONE AERATION/MIXING		
TYPE	-	FINE BUBBLE, FIXED GRID
MLSS RECIRCULATION PUMPS		
NUMBER OF PUMPS PER BIOREACTOR	NO.	2
TOTAL (BIOREACTORS 2-4)	NO.	6
TYPE	-	HORIZONTAL, PROPELLER PUMP
MAX CAPACITY-EACH	MGD	15
MAX PUMP SPEED	RPM	600
TOTAL DYNAMIC HEAD	FT	3.5
MOTOR SIZE	HP	25
MOTOR SPEED, NOMINAL	RPM	1,800
DRIVE TYPE	-	GEAR DRIVE, VFD

Lee Rawlings
South Valley Water Reclamation Facility

DESIGN CRITERIA – GRIT REMOVAL FACILITY

DESCRIPTION	UNITS	VALUE
GENERAL		
DESIGN FLOWS		
DESIGN FLOW	MGD	40
MAX HYDRAULIC THROUGHPUT FLOW	MGD	66
EXISTING INFLUENT PUMP STATION		
EXISTING INFLUENT PUMPS		
TYPE		DRY PIT SUBMERSIBLE
NUMBER		6
CAPACITY - EA	MGD	18.3
TDH	FT	62
DRIVE SIZE, EACH	HP	250
CONTROL		VFD
GRIT		
GRIT BASINS		
TYPE		MULTI-TRAY VORTEX
NUMBER		2+1 BID ALT
TRAY DIAMETER	FT	12
NO. OF TRAYS PER BASIN		12
TREATMENT CAPACITY, EA	MGD	22.5
HYDRAULIC CAPACITY, EA	MGD	36
GRIT PUMPS		
TYPE		RECESSED IMPELLER
NUMBER		4 + 2 BID ALT
CONFIGURATION		1+1
CAPACITY, EA	GPM	300
HEAD	FT	26.5
DRIVE SIZE, EA	HP	7.5
CONTROL		FIXED
GRIT WASHERS		
TYPE		INVERTED CONE-SHAPED VORTEX CHAMBER WITH SCREW CONVEYOR
NUMBER		2+1 BID ALT
SOLIDS LOADING CAPACITY, EA	TON/HR	1.5
HYDRAULIC CAPACITY, EA	GPM	300
HORSEPOWER	HP	3
GRIT STORAGE BIN		
DIMENSIONS		8' x 11' x 6' H
TYPE		15 CY ROLL-OFF BIN
NUMBER		2

ADD THIS SECTION IN ITS ENTIRETY

SECTION 15247

POLYVINYL CHLORIDE (PVC) PIPE (GRAVITY)

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Gravity sewer pipe and fittings in accordance with ASTM D3034 and ASTM F679 standards.

1.02 REFERENCES

A. ASTM International (ASTM):
   1. C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
   2. D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
   3. D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
   4. D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
   5. D3212 - Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
   6. F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
   7. F679 - Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.

1.03 ABBREVIATIONS

A. PVC: Polyvinyl chloride.

B. SDR: Standard dimension ratio; the outside diameter divided by the pipe wall thickness.

1.04 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Product data: As specified in Section 15052 - Common Work Results for General Piping.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect from sunlight, scoring, and distortion.

B. Do not allow surface temperatures to exceed 120 degrees Fahrenheit.

C. Store and handle as recommended by manufacturer in published instructions.

PART 2 PRODUCTS

2.01 PIPE

A. Extruding and molding material: Virgin material containing no scrap, regrind, or rework material except where permitted in the referenced standards.

B. PVC compound: Cell classification 12454-C in accordance with ASTM D1784.

C. Stabilizers, antioxidants, lubricants, colorants, and other additives and fillers not to exceed 10 parts by weight per 100 of PVC resin in the compound.

D. Pipe less than or equal to 15-inch diameter:
   1. In accordance with ASTM D3034.
   2. Wall thickness SDR 35 or as Piping Schedule
   3. Joints: Push-on in accordance with ASTM D3212.
      a. Integral bell.
      b. Factory installed gaskets meeting the requirements in accordance with ASTM F477.

E. Pipe greater than or equal to 18-inch diameter:
   1. In accordance with ASTM F679.
   2. Minimum pipe stiffness: PS 46 in accordance with Table 1 in ASTM F679.
   3. Joints: Push-on in accordance with ASTM D3212.
      a. Integral bell.
      b. Factory installed gaskets meeting the requirements in accordance with ASTM F477.
   4. Bell:
      a. Fabricated from pipe sections.
      b. Bell wall thickness equivalent to pipe wall thickness.
   5. Gasket ring: Locked into the bell.
   6. Spigot end of the pipe: Marked by the manufacturer to identify the final in-place position of the spigot in the bell.

2.02 FITTINGS

A. Same material as the pipe.

B. Minimum wall thickness: Same as the minimum wall thickness of the equivalent size pipe as specified in Table 1 of ASTM F679.

C. Supplied by the pipe manufacturer.

D. Factory molded with joints and gaskets equal to those of the pipe.

E. Gasket:
   1. In accordance with ASTM F477.
   2. Manhole adapter gasket: Stainless steel clamp with gasket or similar device to seal the penetration.

F. Flexible gaskets for precast bases with a flexible pipe connection: In accordance with ASTM C923:
   1. Manufacturer: One of the following or approved equal:
      a. Press-Seal Gasket Corp.: PSX.
      b. A-Lok Premium.

G. Waterstop grouting rings:
   1. Manufacturer: One of the following or approved equal:
      a. NPC.
      b. Press-Seal Gasket Corp.

2.03 SOURCE QUALITY CONTROL

A. Mark pipe and fittings in accordance with ASTM D3034 and ASTM F679 as appropriate.

B. Mark the production control code on pipe and fittings.

PART 3 EXECUTION

3.01 INSTALLATION

A. General:
   1. Install piping in accordance with ASTM D2321 and manufacturer's published installation instructions.
   2. Provide plugs or caps for stubs and branch pipes left unconnected to laterals.
   3. Lubricate and assemble joints in accordance with the pipe manufacturer's published instructions.
   4. Trenching and backfill as specified in Section 02318 - Trenching.
   5. For open cut installations, install underground warning tape as specified in Section 15076 - Pipe Identification.

B. Connections to manholes:
   1. Make connections to manholes with a manhole gasket that prevents infiltration and exfiltration through the penetrations using 1 of the following methods:
      a. Precast bases with a flexible pipe connection:
         1) Pipe connectors shall be cast into the base.
            a) Pipe openings shall contain flexible gaskets.
         2) Follow manufacturer’s recommendation for lubrication to prevent damage to the gasket during pipe insertion.
         3) When PSX gaskets are used, the take-up screws for the gasket clamps shall be positioned a minimum of 90 degrees apart.
         4) Install and grout in place per manufacturer’s instructions.
      b. Cast in place or precast bases using grouting rings:
         1) Provide opening for connection large enough to allow subsequent grouting around the grouting ring.
         2) Grout around the pipe penetration manhole gasket and seal the opening.

3.02 FIELD QUALITY CONTROL

A. Test pipe as specified in Section 15956 - Piping Systems Testing.

B. Mandrel tests:
   1. Perform initial mandrel test:
      a. After cleaning and completion of other tests.
      b. After placement and compaction of backfill.
      c. Before construction of pavement or surfacing.
      d. Not sooner than 30 days after pipe installation.
      e. Not later than 60 days after installation.
   2. Perform final verification mandrel test:
      a. Not sooner than 30 days before the end of the warranty period.
      b. Not later than 10 days before the end of the warranty period.
      c. Consider the final verification mandrel test a warranty service, and include the costs related to final verification mandrel test in the Contract Price.
   3. Utilize a 9-rod mandrel with minimum length equal to NPS and diameter as follows:

Nominal Pipe Size (NPS)	**Mandrel Dia (in) (SDR 35/PS46)**	**Mandrel Dia (in) (SDR 26/PS 115)**
6	5.45	5.33
8	7.28	7.11
10	9.08	8.87
12	10.79	10.55
15	13.20	12.90
18	16.13	15.76
21	19.00	18.57
24	21.36	20.87
27	24.06	23.51
30	27.68	27.04

   4. Test procedure: Pull the mandrel through the line under test by 1 person, by hand, with reasonable effort, without the aid of mechanical equipment.
   5. Failing test: Where the mandrel test is not successful, remove and replace the section of piping with the obstruction; test the piping again, including visible leaks test, pressure test with maximum leakage allowance, mandrel tests, and other specified tests:
      a. Correction of excessive deflection or obstructions by methods other than removal of the affected piping and replacement of the removed piping with new piping will not be accepted.

END OF SECTION

CONDUIT SCHEDULE AREA 21

PROJECT 5

GRIT REMOVAL BUILDING

ENGINEER	**CAH**
REVISION	**0**
DATE	3/1/19

CONDUIT			CONDUCTORS			GROUND				
NUMBER	**DWG**	**SIZE**	**#**	**SIZE**	**TYPE**	**#**	**SIZE**	**TYPE**	**DESCRIPTION**	**CONNECTING SEGMENTS**
P-21-010	E21-3	1.5"	3	#1	XHHW-2	1	#6	XHHW-2	FR: GRB-XFMR-1 TO: GRB-MCC-1 3 #1 >> GRB-XFMR-1 POWER	
P-21-050	GE-SE-37	2"	3	#4/0	XHHW-2	1	#3	XHHW-2	FR: 4C-PB-7 TO: EMH-1 3 #4/0 >> GRB-MCC-1 POWER	M1051
P-21-051	GE-SE-37	2"	3	#4/0	XHHW-2	1	#3	XHHW-2	FR: 4C-PB-7 TO: EMH-1 3 #4/0 >> GRB-MCC-1 POWER	M1056
P-21-060	E21-3	0.75"	3	#12	XHHW-2	1	#12	XHHW-2	FR: DISCONNECT TO: CONDUIT TEE 3 #12 >> 103-4 DOOR OPERATOR POWER	P-21-062
P-21-061	E21-3	0.75"	3	#12	XHHW-2	1	#12	XHHW-2	FR: DISCONNECT TO: CONDUIT TEE 3 #12 >> 103-3 DOOR OPERATOR POWER	P-21-062
P-21-062	E21-3	0.75"	6	#12	XHHW-2	1	#12	XHHW-2	FR: CONDUIT TEE TO: CONDUIT TEE 3 #12 >> 103-4 DOOR OPERATOR POWER 3 #12 >> 103-3 DOOR OPERATOR POWER	P-21-064 P-21-060 P-21-061
P-21-063	E21-3	0.75"	3	#12	XHHW-2	1	#12	XHHW-2	FR: DISCONNECT TO: CONDUIT TEE 3 #12 >> 103-2 DOOR OPERATOR POWER	P-21-064
P-21-064	E21-3	1"	9	#12	XHHW-2	1	#12	XHHW-2	FR: CONDUIT TEE TO: GRB-MCC-1 3 #12 >> 103-4 DOOR OPERATOR POWER 3 #12 >> 103-3 DOOR OPERATOR POWER 3 #12 >> 103-2 DOOR OPERATOR POWER	P-21-062 P-21-062 P-21-063
P-21-101	E21-1 GE-SE-37	2"	3	#4/0	XHHW-2	1	#3	XHHW-2	FR: GRB-MCC-1 TO: EMH-1 3 #4/0 >> GRB-MCC-1 POWER	
P-21-102	E21-1 GE-SE-37	2"	3	#4/0	XHHW-2	1	#3	XHHW-2	FR: GRB-MCC-1 TO: EMH-1 3 #4/0 >> GRB-MCC-1 POWER	
P-21-103	E21-1 GE-SE-37	2"	3	#4/0	XHHW-2	1	#3	XHHW-2	FR: GRB-MCC-1 TO: EMH-1 3 #4/0 >> GRB-MCC-1 BACKUP POWER	P-11-109
P-21-104	E21-1 GE-SE-37	2"	3	#4/0	XHHW-2	1	#3	XHHW-2	FR: GRB-MCC-1 TO: EMH-1 3 #4/0 >> GRB-MCC-1 BACKUP POWER	P-11-110
P-21-110	E21-2	1"	3	~~#12~~ #10	XHHW-2	1	~~#12~~ #10	XHHW-2	FR: PMP-21.210 TO: DISCONNECT 3 ~~#12~~ #10 >> PMP-21.210 POWER	
P-21-111	E21-1 E21-2	~~0.75~~ 1"	3	~~#12~~ #10	XHHW-2	1	~~#12~~ #10	XHHW-2	FR: DISCONNECT TO: GRB-MCC-1 3 ~~#12~~ #10 >> PMP-21.210 POWER	
P-21-112	E21-4	0.75"	3	#10	XHHW-2	1	#10	XHHW-2	FR: EDR-21.111 TO: DISCONNECT 3 #10 >> EDR-21.111 POWER	P-21-113
P-21-113	E21-4	0.75"	3	#10	XHHW-2	1	#10	XHHW-2	FR: DISCONNECT TO: JUNCTION BOX 3 #10 >> EDR-21.111 POWER	P-21-114 P-21-112
P-21-114	E21-3 E21-4	1"	9	#10	XHHW-2	1	#10	XHHW-2	FR: JUNCTION BOX TO: GRB-MCC-1 3 #10 >> EDR-21.111 POWER 3 #10 >> EDR-21.121 POWER 3 #10 >> EDR-21.131 POWER	P-21-113 P-21-123 P-21-133
P-21-120	E21-2	1"	3	~~#12~~ #10	XHHW-2	1	~~#12~~ #10	XHHW-2	FR: PMP-21.220 TO: DISCONNECT 3 ~~#12~~ #10 >> PMP-21.220 POWER	
P-21-121	E21-1 E21-2	~~0.75~~ 1"	3	~~#12~~ #10	XHHW-2	1	~~#12~~ #10	XHHW-2	FR: DISCONNECT TO: GRB-MCC-1 3 ~~#12~~ #10 >> PMP-21.220 POWER	

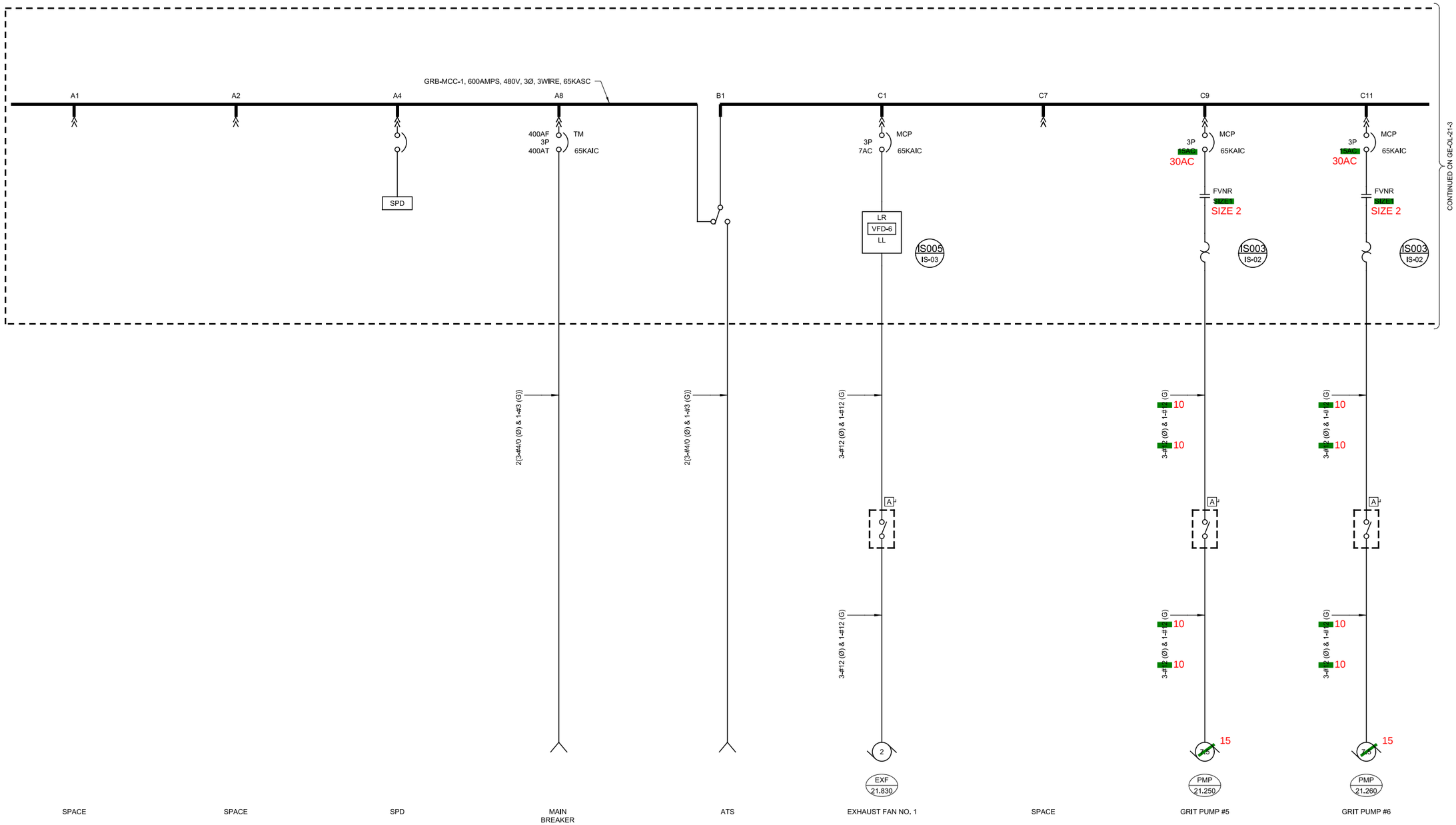
CONDUIT SCHEDULE AREA 21

PROJECT 5

GRIT REMOVAL BUILDING

ENGINEER	CAH
REVISION	0
DATE	3/1/19

CONDUIT			CONDUCTORS			GROUND				
NUMBER	DWG	SIZE	#	SIZE	TYPE	#	SIZE	TYPE	DESCRIPTION	CONNECTING SEGMENTS
P-21-122	E21-4	0.75"	3	#10	XHHW-2	1	#10	XHHW-2	FR: EDR-21.121 TO: DISCONNECT 3 #10 >> EDR-21.121 POWER	P-21-123
P-21-123	E21-4	0.75"	3	#10	XHHW-2	1	#10	XHHW-2	FR: DISCONNECT TO: JUNCTION BOX 3 #10 >> EDR-21.121 POWER	P-21-114 P-21-122
P-21-130	E21-2	1"	3	#12 #10	XHHW-2	1	#12 #10	XHHW-2	FR: PMP-21.230 TO: DISCONNECT 3 #10 >> PMP-21.230 POWER	
P-21-131	E21-1 E21-2	0.75" 1"	3	#12 #10	XHHW-2	1	#12 #10	XHHW-2	FR: CONDUIT TEE GRB-MCC-1 TO: DISCONNECT 3 #10 >> PMP-21.230 POWER	
P-21-132	E21-4	0.75"	3	#10	XHHW-2	1	#10	XHHW-2	FR: EDR-21.131 TO: DISCONNECT 3 #10 >> EDR-21.131 POWER	P-21-133
P-21-133	E21-4	0.75"	3	#10	XHHW-2	1	#10	XHHW-2	FR: DISCONNECT TO: JUNCTION BOX 3 #10 >> EDR-21.131 POWER	P-21-114 P-21-132
P-21-140	E21-2	1"	3	#12 #10	XHHW-2	1	#12 #10	XHHW-2	FR: PMP-21.240 TO: DISCONNECT 3 #10 >> PMP-21.240 POWER	
P-21-141	E21-1 E21-2	0.75" 1"	3	#12 #10	XHHW-2	1	#12 #10	XHHW-2	FR: CONDUIT TEE GRB-MCC-1 TO: DISCONNECT 3 #10 >> PMP-21.240 POWER	
P-21-150	E21-2	1"	3	#12 #10	XHHW-2	1	#12 #10	XHHW-2	FR: PMP-21.250 TO: DISCONNECT 3 #10 >> PMP-21.250 POWER	
P-21-151	E21-1 E21-2	0.75" 1"	3	#12 #10	XHHW-2	1	#12 #10	XHHW-2	FR: CONDUIT TEE GRB-MCC-1 TO: DISCONNECT 3 #10 >> PMP-21.250 POWER	
P-21-160	E21-2	1"	3	#12 #10	XHHW-2	1	#12 #10	XHHW-2	FR: PMP-21.210 21.260 TO: DISCONNECT 3 #10 >> PMP-21.210 POWER 21.260 POWER	
P-21-161	E21-1 E21-2	0.75" 1"	3	#12 #10	XHHW-2	1	#12 #10	XHHW-2	FR: CONDUIT TEE GRB-MCC-1 TO: DISCONNECT 3 #10 >> PMP-21.260 POWER	
P-21-215	E21-2	0.75"	3	#10	XHHW-2	1	#10	XHHW-2	FR: EDR-21.115 TO: DISCONNECT 3 #10 >> EDR-21.115 POWER	
P-21-216	E21-2	0.75"	3	#10	XHHW-2	1	#10	XHHW-2	FR: EDR-21.116 TO: DISCONNECT 3 #10 >> EDR-21.116 POWER	
P-21-217	E21-2	0.75"	3	#10	XHHW-2	1	#10	XHHW-2	FR: DISCONNECT TO: CONDUIT TEE 3 #10 >> EDR-21.116 POWER	P-21-220
P-21-218	E21-2	0.75"	3	#10	XHHW-2	1	#10	XHHW-2	FR: DISCONNECT TO: CONDUIT TEE 3 #10 >> EDR-21.115 POWER	P-21-220
P-21-220	E21-2	0.75"	6	#10	XHHW-2	1	#10	XHHW-2	FR: CONDUIT TEE TO: CONDUIT TEE 3 #10 >> EDR-21.116 POWER 3 #10 >> EDR-21.115 POWER	P-21-223 P-21-217 P-21-218
P-21-221	E21-2	0.75"	3	#10	XHHW-2	1	#10	XHHW-2	FR: EDR-21.221 TO: DISCONNECT 3 #10 >> EDR-21.221 POWER	
P-21-222	E21-2 E21-3	0.75"	3	#10	XHHW-2	1	#10	XHHW-2	FR: DISCONNECT TO: CONDUIT TEE 3 #10 >> EDR-21.221 POWER	P-21-223
P-21-223	E21-2	1"	9	#10	XHHW-2	1	#10	XHHW-2	FR: CONDUIT TEE TO: CONDUIT TEE 3 #10 >> EDR-21.116 POWER 3 #10 >> EDR-21.115 POWER 3 #10 >> EDR-21.221 POWER	P-21-224 P-21-220 P-21-220 P-21-222



REV	DATE	BY	DESCRIPTION

DESIGNED CAC
DRAWN AAW
CHECKED BJR
DATE MARCH 2019

REGISTERED PROFESSIONAL ENGINEER
No. 366286
CHRISTOPHER A CARVALHO
STATE OF UTAH

carollo®

South Valley
WATER RECLAMATION FACILITY
7495 South 1300 West
West Jordan, Utah 84084

SOUTH VALLEY WATER RECLAMATION FACILITY
PROJECT 5
ELECTRICAL
GRB-MCC-1
ONE-LINE DIAGRAM - I

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

JOB NO. 10548A.10
DRAWING NO. GE-OL-21-2
SHEET NO. 44 OF 159

LAST SAVED BY: jlefevre

PROJECT NO. 10548A10 FILE NAME: 10548A10_GEOL2102.dgn

CONTINUED FROM GE-OL-21-2

CONTINUED ON GE-OL-21-4

D1	D7	D9	D11	E1	E3	E5	E7	F1
3P 7AC MCP 65KAIC		3P 15AC 30AC MCP 65KAIC	3P 15AC 30AC MCP 65KAIC		3P 15AC 30AC MCP 65KAIC	3P 15AC 30AC MCP 65KAIC	3P 30AC MCP 65KAIC	3P 7AC MCP 65KAIC
LR VFD-6 LL		FVNR SIZE 1 SIZE 2	FVNR SIZE 1 SIZE 2		FVNR SIZE 1 SIZE 2	FVNR SIZE 1 SIZE 2	LR VFD-6 LL	LR VFD-6 LL
IS005 IS-03		IS003 IS-02	IS003 IS-02		IS003 IS-02	IS003 IS-02	IS004 IS-02	IS005 IS-03
3-#12 (Ø) & 1-#12 (G)		3-#12 (Ø) & 1-#12 (G) 10	3-#12 (Ø) & 1-#12 (G) 10		3-#12 (Ø) & 1-#12 (G) 10	3-#12 (Ø) & 1-#12 (G) 10	3-#10 (Ø) & 1-#10 (G)	3-#12 (Ø) & 1-#12 (G)
A		A	A		A	A		A
3-#12 (Ø) & 1-#12 (G)		3-#12 (Ø) & 1-#12 (G) 10	3-#12 (Ø) & 1-#12 (G) 10		3-#12 (Ø) & 1-#12 (G) 10	3-#12 (Ø) & 1-#12 (G) 10		3-#12 (Ø) & 1-#12 (G)
2		7.5 15	7.5 15		7.5 15	7.5 15	10	1
EXF 21.840		PMP 21.230	PMP 21.240		PMP 21.210	PMP 21.220	FAB 21.500	EXF 21.850
EXHAUST FAN NO. 2	SPACE	GRIT PUMP #3	GRIT PUMP #4	SPACE	GRIT PUMP #1	GRIT PUMP #2	ODOR CONTROL FAN	EXHAUST FAN NO. 3

LAST SAVED BY: jlefevre

REV	DATE	BY	DESCRIPTION

DESIGNED CAC
DRAWN AAW
CHECKED BJR
DATE MARCH 2019

REGISTERED PROFESSIONAL ENGINEER
No. 366286
CHRISTOPHER A CARVALHO
STATE OF UTAH

carollo®

South Valley
WATER RECLAMATION FACILITY
7495 South 1300 West
West Jordan, Utah 84084

SOUTH VALLEY WATER RECLAMATION FACILITY

PROJECT 5

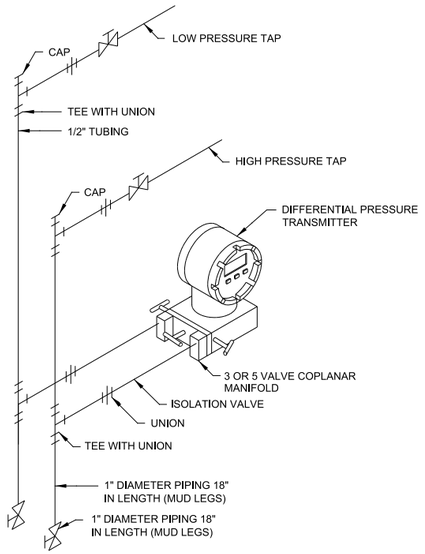
ELECTRICAL

GRB-MCC-1
ONE-LINE DIAGRAM - II

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

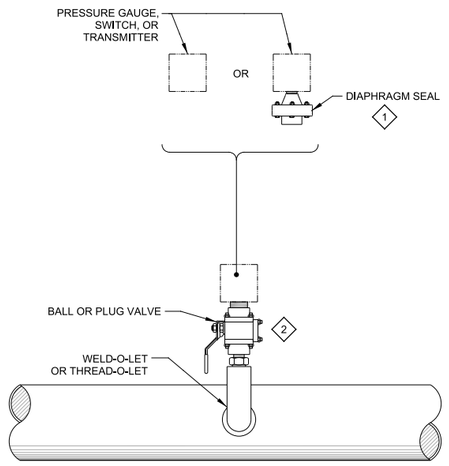
JOB NO. 10548A.10
DRAWING NO. GE-OL-21-3
SHEET NO. 45 OF 159

PROJECT NO. 10548A10 FILE NAME: 10548A10_GEOL2103.dgn



SLOPE ALL HORIZONTAL RUNS AT LEAST 1" PER 1'- 0"

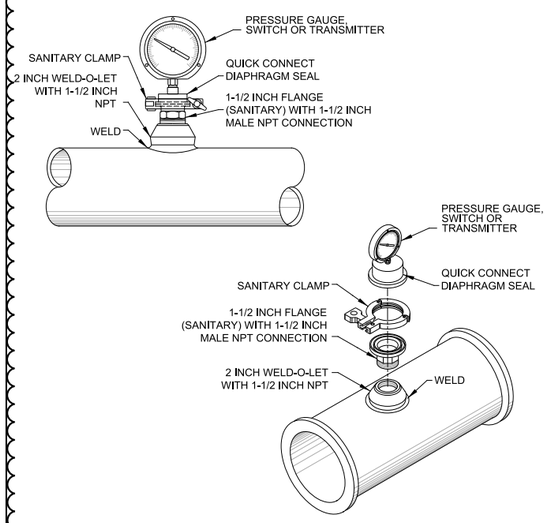
NP120 TYP S — DIFFERENTIAL PRESSURE INSTRUMENT INSTALLATION



NOTES:

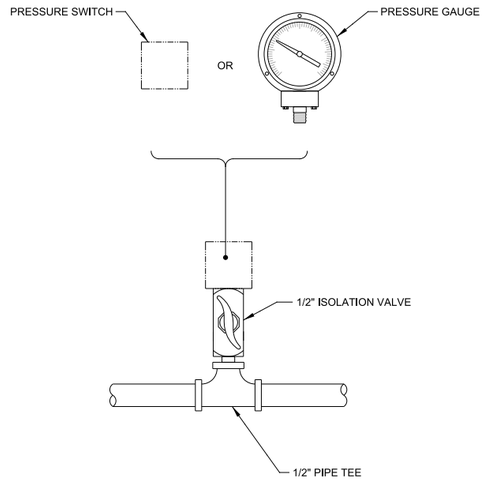
1. USE THE INSTRUMENT DATA SHEETS IN DIVISION 17 OR DIVISIONS 40 SPECS TO IDENTIFY INDIVIDUAL REQUIREMENTS FOR DIAPHRAGM SEALS.
2. ALL VALVE AND PIPE MATERIAL SHALL BE COMPATIBLE WITH PROCESS FLUID.

NP503 TYP S — ISOLATING PRESSURE INSTRUMENT MOUNTING DETAIL

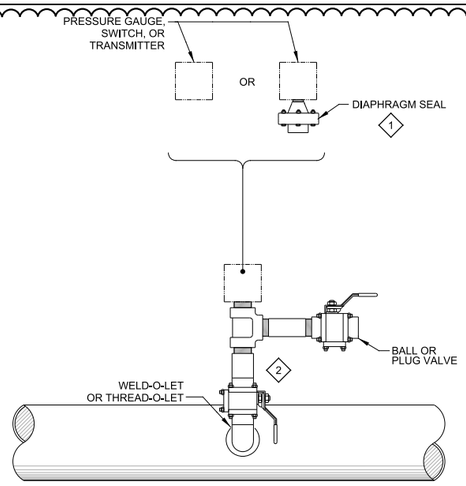


EXPLODED VIEW

NP601 TYP J — GRIT SERVICE PRESSURE INSTRUMENT INSTALLATION — 05-13-19



NP901 TYP J — SEAL WATER SERVICE PRESSURE INSTRUMENT INSTALLATION — 01-17-19



NOTES:

1. USE THE INSTRUMENT DATA SHEETS IN DIVISION 17 OR DIVISIONS 40 SPECS TO IDENTIFY INDIVIDUAL REQUIREMENTS FOR DIAPHRAGM SEALS.
2. ALL VALVE AND PIPE MATERIAL SHALL BE COMPATIBLE WITH PROCESS FLUID.

NP502 TYP S — PRESSURE INSTRUMENT MOUNTING DETAIL

REV	DATE	BY	DESCRIPTION
1	05-13-19	JMR	ADDENDUM 5

DESIGNED MGH
DRAWN AAW
CHECKED DJC
DATE MARCH 2019

** ORIGINAL SEALED BY MATTHEW G. HATCH 03/04/2019 UT 5612657 **

carollo®

South Valley WATER RECLAMATION FACILITY
7495 South 1300 West
West Jordan, Utah 84084

SOUTH VALLEY WATER RECLAMATION FACILITY
PROJECT 5
TYPICAL DETAILS
INSTRUMENTATION TYPICAL DETAILS 5

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

JOB NO. 10548A.10
DRAWING NO. GI-11
SHEET NO. 82 OF 159

PROJECT NO. 10548A10 FILE NAME: 10548A1000TI005.dgn

Plot Date: 14-MAY-2019 7:49:43 AM
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Model: Layout1
LAST SAVED BY: AHendricks